IFIP SECRETARIAT

HOFSTRASSE 3
A-2361 LAXENBURG
AUSTRIA, EUROPE

General Secretary: Eduard DUNDLER
Administrative Assistants: Brigitte BRAUNEIS
Marion SMITH

Telephone: +43 2236 73 616
Telefax: +43 2236 73 616 9
e-mail: ifip@ifip.org
Internet-URL: http://www.ifip.org
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IFIP's PAST PRESIDENTS

Isaac L. Auerbach U.S.A. 1960 - 1965
Ambros B. Speiser Switzerland 1965 - 1968
Anatol A. Dorodnicyn Russia 1968 - 1971
Heinz Zemanek Austria 1971 - 1974
Pierre A. Bobillier Switzerland 1977 - 1983
Kaoru Ando Japan 1983 - 1986
Ashley W. Goldsworthy Australia 1986 - 1989
Asbjorn Rolstadas Norway 1992 - 1995
Kurt Bauknecht Switzerland 1995 - 1998
Peter Bollerslev Denmark 1998 - 2001
Robert Aiken U.S.A. 2001
Walter Grafendorfer Austria 2001 - 2002
Klaus Brunnstein Germany 2002 - 2007
Basie von Solms South Africa 2007 - 2010
INTRODUCTION
This publication is an edited subset of a comprehensive database which is regularly updated and is accessible through international networks. In particular the “electronic Bulletin” contains detailed statements of aims and scope for every Working Group.

A wide range of information is available electronically from the IFIP secretariat including the IFIP News, minutes of our General Assembly and Board meetings, IFIP documents and other valuable information on IFIP and its activities.

There are also links to pages of information about our Members and Technical Committees.

Access may be obtained as follows:

URL: http://www.ifip.org

IFIP’s MISSION STATEMENT
IFIP’s mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of Information Technology for the benefit of all people.

Principal Elements

1. To stimulate, encourage and participate in research, development and application of Information Technology (IT) and to foster international co-operation in these activities.

2. To provide a meeting place where national IT Societies can discuss and plan courses of action on issues in our field which are of international significance and thereby to forge increasingly strong links between them and with IFIP.

3. To promote international co-operation directly and through national IT Societies in a free environment between individuals, national and international governmental bodies and kindred scientific and professional organizations.

4. To pay special attention to the needs of developing countries and to assist them in appropriate ways to secure the optimum benefit from the application of IT.

5. To promote professionalism, incorporating high standards of ethics and conduct, among all IT practitioners.

6. To provide a forum for assessing the social consequences of IT applications; to campaign for the safe and beneficial development and use of IT and the protection of people from abuse through its improper application.

7. To foster and facilitate co-operation between academics, the IT industry and governmental bodies and to seek to represent the interest of users.

8. To provide a vehicle for work on the international aspects of IT development and application including the necessary preparatory work for the generation of international standards.

9. To contribute to the formulation of the education and training needed by IT practitioners, users and the public at large.
IFIP IN PERSPECTIVE

Origins
IFIP traces its roots to the very first major international conference on computers and computing which was held in Paris in 1959 under the auspices of UNESCO. Representatives of the main computer societies active in computing got together at that meeting to explore ways of building on the achievements of the conference. As a result thirteen national computer societies agreed to found in 1960 an international federation and named it IFIP - the International Federation for Information Processing.

IFIP’s principal aims were and are to foster international cooperation, to stimulate research, development and applications and to encourage education and the dissemination and exchange of information on all aspects of computing and communication.

IFIP’s creation was well timed. In the 1960s there began a veritable explosion in the growth of the computer industry and in the application of its products. Within the life-span of IFIP information technology (as it is widely known today) has become a potent instrument affecting people in everything from their education and work to their leisure and in their homes. It is a powerful tool in science and engineering, in commerce and industry, in education and administration and in entertainment.

Membership
Today IFIP has 48 organizations as Full Members, 3 Corresponding Members and 4 Affiliate Members, representing countries from all regions of the world.

Organisation
A General Assembly of all its Members and TC Chairs takes place annually and has overall responsibility for all of IFIP’s strategy, finance and activities. It elects a President, four Vice-Presidents, a Treasurer, a Secretary and eight Councillors who together form the IFIP Board.

Congresses and Major Conferences
IFIP’s flagship event is its World Computer Congress, currently held biannually. The 20th IFIP World Congress was held in Milan, Italy from 7 to 10 September (www.ifip.org/wcc2008). The 21st IFIP World Computer Congress was held in Brisbane, Australia from 20 to 23 September (www.ifip.org/wcc2010). The 22nd IFIP World Congress will be held in Amsterdam, The Netherlands from 24 to 26 September (http://www.wcc-2012.org/).

The nature of these Congresses has changed substantially over the years. They are no longer of the all-singing and -dancing variety addressing every conceivable facet of our field. Instead they consist of a number of independent conferences, each dealing with a major specialised subject. These run in parallel so that some more general keynote addresses can be attended by all participants who can also share in social and other activities.

In addition there are major international conferences organised by our Technical Committees. These include events dealing with Production Engineering, Security, Computers in Education and Human Computer Interaction.

Technical Activities
At the heart of IFIP lie its Technical Committees that, between them, count on the active participation of some two thousand people world-wide. There are thirteen such Committees. Each Technical committee is, in effect, a management team responsible for a given field of activity and for the work of from five to thirteen Working Groups, a total of 101. These Groups work in a variety of ways to share experience and to develop their specialised knowledge. These include open conferences, smaller working conferences, seminars and tutorials, circulated papers and, increasingly, as befits our subject, electronic conferencing and e-mail.
Publications
Many IFIP events are linked to publications and there are annually some 30 to 40 IFIP books. Our principal publisher is

Springer-Verlag GmbH, Heidelberg,
Zweigniederlassung der Springer-Verlag GmbH, Berlin
Tiergartenstrasse 17
D-69121 Heidelberg
Telefon: +49 (0) 6221 487 0
e-mail: ifip@springer.com

IFIP News
A vital element of IFIP’s communication with its Members and with all who participate in our work is the IFIP Newsletter. This is published quarterly in electronic form and is published on IFIP’s website www.ifip.org.

Relationships
IFIP enjoys friendly cooperation with a number of international organisations. First among these is UNESCO with which IFIP maintains a formal consultative relationship. UNESCO has commissioned from IFIP several projects and supports the participation of some people from developing countries in IFIP events. IFIP is a Scientific Associate of ICSU (International Council of Scientific Unions).

There are four international federations with which IFIP collaborates. These are IFAC (International Federation of Automatic Control), near neighbours of ours in Laxenburg, IMACS (International Association for Mathematics and Computers in Simulation), IFORS (International Federation of Operational Research Societies) and IMEKO (International Measurement Confederation).

IFIP Secretariat
The administrative hub of IFIP is our secretariat at Laxenburg, near Vienna. Eduard Dundler, the General Secretary of IFIP, with the assistance of Brigitte Brauneis and Marion Smith is responsible for the wide range of administrative tasks vital to the operation of such a far-flung international body. Good communication and information are essential and our secretariat provides a comprehensive service using up-to-date technology.
IFIP COUNCIL

EXECUTIVE BOARD

Leon Strous President Netherlands 2010 - 2013
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Joe Turner Vice President USA 2008 - 2014
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Forrest Lin China 2011 - 2013
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Kai Rannenberg TC11 2009 - 2012
A Min Tjoa Austria 2010 - 2013
Jan Wibe Norway 2009 - 2012
## IFIP GENERAL ASSEMBLY

### Honorary Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Address</th>
<th>Telephone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Kurt BAUKNECHT</td>
<td>Universitaet Zurich</td>
<td>Winterthurerstrasse 190 CH-8057 ZURICH, Switzerland</td>
<td>+41 1 63 54310</td>
<td>+41 1 63 56809</td>
<td><a href="mailto:baukn@ifi.unizh.ch">baukn@ifi.unizh.ch</a></td>
</tr>
<tr>
<td>Prof. Pierre A. BOBILLIER</td>
<td>128 Rte de Soral</td>
<td>CH-1233 LULLY, Switzerland</td>
<td>+41 22 757 2021</td>
<td>+41 22 757 6726</td>
<td><a href="mailto:pa.bobillier@gmail.com">pa.bobillier@gmail.com</a></td>
</tr>
<tr>
<td>Prof. Klaus BRUNNSTEIN</td>
<td>University of Hamburg</td>
<td>Faculty f. Informatics Vogt-Kolln-Str. 30 DE-22527 HAMBURG</td>
<td>+49 40 42883 2406</td>
<td>+49 40 42883 2226</td>
<td><a href="mailto:brunnstein@informatik.uni-hamburg.de">brunnstein@informatik.uni-hamburg.de</a></td>
</tr>
<tr>
<td>Prof. Ashley W. GOLDSWORTHY</td>
<td>10/76 Thorn St.</td>
<td>Kangaroo Point BRISBANE, QLD 4169 Australia</td>
<td>+61 7 3391 0864</td>
<td>+61 7 3391 0868</td>
<td><a href="mailto:ashleyg@ozemail.com.au">ashleyg@ozemail.com.au</a></td>
</tr>
<tr>
<td>Mr. Aage MELBY</td>
<td>Morlenesvej 11 DK-2840 HOLTE</td>
<td>Denmark</td>
<td>+45 4542 2912</td>
<td></td>
<td><a href="mailto:melbye@tdcadsl.dk">melbye@tdcadsl.dk</a></td>
</tr>
<tr>
<td>Prof. Heinz ZEMANEK</td>
<td>Technische Universitaet Wien - ICT</td>
<td>Gusshausstrasse 25 - 29/384 A-1040 VIENNA, Austria</td>
<td>+43 1 58801 38426</td>
<td>+43 1 58801 38499</td>
<td><a href="mailto:zemanek@ict.tuwien.ac.at">zemanek@ict.tuwien.ac.at</a></td>
</tr>
<tr>
<td>Prof. Ashley W. GOLDSWORTHY</td>
<td>10/76 Thorn St.</td>
<td>Kangaroo Point BRISBANE, QLD 4169 Australia</td>
<td>+61 7 3391 0864</td>
<td>+61 7 3391 0868</td>
<td><a href="mailto:ashleyg@ozemail.com.au">ashleyg@ozemail.com.au</a></td>
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<td>University of Hamburg</td>
<td>Faculty f. Informatics Vogt-Kolln-Str. 30 DE-22527 HAMBURG</td>
<td>+49 40 42883 2406</td>
<td>+49 40 42883 2226</td>
<td><a href="mailto:brunnstein@informatik.uni-hamburg.de">brunnstein@informatik.uni-hamburg.de</a></td>
</tr>
<tr>
<td>Mr. Graham MORRIS</td>
<td>43 Pewley Hill GUILDFORD, Surrey GU1 3SW United Kingdom</td>
<td>+44 1 483 566 933</td>
<td>+44 1 483 836 517</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Aage MELBY</td>
<td>Morlenesvej 11 DK-2840 HOLTE</td>
<td>Denmark</td>
<td>+45 4542 2912</td>
<td></td>
<td><a href="mailto:melbye@tdcadsl.dk">melbye@tdcadsl.dk</a></td>
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<td>Technische Universitaet Wien - ICT</td>
<td>Gusshausstrasse 25 - 29/384 A-1040 VIENNA, Austria</td>
<td>+43 1 58801 38426</td>
<td>+43 1 58801 38499</td>
<td><a href="mailto:zemanek@ict.tuwien.ac.at">zemanek@ict.tuwien.ac.at</a></td>
</tr>
<tr>
<td>Dr. Richard I. TANAKA</td>
<td>10321 Shadyridge Drive SANTA ANA, CA 92705 U.S.A.</td>
<td>+1 714 838 7450</td>
<td></td>
<td></td>
<td><a href="mailto:ritanaka@cox.net">ritanaka@cox.net</a></td>
</tr>
</tbody>
</table>
### Full Members

<table>
<thead>
<tr>
<th>Society</th>
<th>Representative</th>
</tr>
</thead>
</table>
| **AUSTRALIA**  
Australian Computer Society (ACS)  
P.O. Box Q 534 QVB  
SYDNEY, N.S.W. 1230  
Australia  
Tel. +61 2 9299 3666  
Fax +61 2 9299 3997  
e-mail: sam.burrell@acs.org.au  
URL: http://www.acs.org.au  
Mr. Anthony WONG  
President  
Australian Computer Society Inc. (ACS)  
P.O. Box Q 534  
QVB SYDNEY, NSW 1230  
Australia  
Tel. +61 2 9299 3666  
Fax +61 2 9299 3997  
e-mail: president@acs.org.au |  
**AUSTRIA**  
Austrian Computer Society (OCG)  
Wollzeile 1-3  
AT-1010 VIENNA, Austria  
Tel. +43 1 512 0235  
Fax +43 1 512 02359  
e-mail: ocg@ocg.at  
URL: http://www.ocg.at  
Prof. A Min TJOA  
Vienna University of Technology  
Institute of Software Technology  
Favoritenstr. 9 -11/188  
AT-1040 VIENNA, Austria  
Tel. +43 1 58801 18801  
Fax +43 1 58801 18899  
e-mail: amin@ifs.tuwien.ac.at |  
**BELGIUM**  
FBVI-FAIB  
Muinkkaai 61  
BE-9000 GENT  
Tel. +32 2 629 16 20  
e-mail: olivier.braet@vub.ac.be  
URL: http://www.bfia.be  
Prof. Dirk DESCHOOLMEESTER  
Muinkkaai 61  
BE-9000 GENT  
Belgium  
Tel. +32 9 223 79 58  
e-mail: dirk.deschoolmeester@ugent.be |  
**BOSNIA AND HERZEGOVINA**  
Association of Informatics in Bosnia and Herzegovina  
Branslava Đurđeva 10  
SARAJEVO, Bosnia and Herzegovina  
Tel. +387 33 233 831  
Fax +387 33 223 709  
e-mail: ecdn@bih.net.ba  
URL: www.ecdl.ba  
Mr. Mensura BEGANOVIC  
Association of Informatics in Bosnia and Herzegovina  
Branslava Đurđeva 10  
SARAJEVO  
Bosnia and Herzegovina  
Tel. +387 32 44 00 80  
e-mail: mensura@bhm.ba |  
**BRAZIL**  
Brazilian Computer Society - SBC  
Instituto de Informatica - UFRGS  
Caixa postal 15064  
91501-970 PORTO ALEGRE, Brazil  
Tel. +55 51 3308 6835  
Fax +55 51 3308 7142  
e-mail: sbc@sbc.org.br  
URL: http://www.sbc.org.br  
Prof. Marcelo WALTER  
Universidade Federal do Rio Grande do Sul  
Instituto de Informatica  
Post Office Box 15064  
91501-970 PORTO ALEGRE, Brazil  
Tel. +55 51 3308 6808  
Fax +55 51 3308 7308  
e-mail: marcelo.walter@inf.ufrgs.br |  
**BULGARIA**  
Bulgarian Academy of Sciences  
1, “15th November” Street  
BG-1040 SOFIA, Bulgaria  
Tel. +359 2 989 8446  
Fax +359 2 981 6629  
e-mail: boyanov@bgcict.acad.bg  
URL: http://www.cu.bas.bg  
Prof. Kiril BOYANOV  
Bulgarian Academy of Sciences  
Institute for Parallel Processing  
Acad. G. Bonchev Str., Bl.25 A  
BG-1113 SOFIA, Bulgaria  
Tel. +359 2 979 6617  
Fax +359 2 870 7273  
e-mail: boyanov@acad.bg |
<table>
<thead>
<tr>
<th><strong>CANADA</strong></th>
<th><strong>CHINA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Information Processing Society (CIPS) 5090 Explorer Drive, Suite 801 MISSISSAUGA, ON. L4W 4T9, Canada Tel. +1 905 602 1370 Fax +1 905 602 7884 e-mail: <a href="mailto:info@cips.ca">info@cips.ca</a> URL: <a href="http://www.cips.ca">http://www.cips.ca</a></td>
<td>Chinese Institute of Electronics Prof. M. Zhou, Deputy Secretary General Puhuiniang Building No. 13, Room 308 Haidian District P.O. Box 165 BEIJING 100036, China Tel. +86 10 6816 0825 Fax +86 10 6823 9572 e-mail: <a href="mailto:zhoumq@public3.bta.net.cn">zhoumq@public3.bta.net.cn</a> URL: <a href="http://www.cie-china.org">http://www.cie-china.org</a></td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Mr. George BOYNTON</strong></th>
<th><strong>Mr. Runhua LIN</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat ‘67 901-2600 Pierre Dupuy Ave. MONTREAL, QUEBEC, H3C 3R6 Canada Tel. +1 514 894 0882 Fax +1 514 861 5800 e-mail: <a href="mailto:george@cips.ca">george@cips.ca</a></td>
<td>Deputy Secretary General Chinese Institute of Electronics - CIE Puhuiniang Building No. 13 Haidian District, P.O. Box 165 BEIJING 100036 China Tel. +86 10 6827 6577 Fax +86 10 6823 9572 e-mail: <a href="mailto:lin_runhua@ciecloud.org.cn">lin_runhua@ciecloud.org.cn</a></td>
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<tr>
<th><strong>CLEI</strong></th>
<th><strong>CLEI Member countries:</strong> Argentina (FM), Bolivia, Brazil (FM), Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela, Panama, Mexico.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRO LATINOAMERICANO DE ESTUDIOS INFORMATICA Dr. Rodrigo Santos Dep.Ing. Electrca y Computadoras Universidad Nacional del Sur Avda. Alem 1253 8000, BAHIA BLANCA, Argentina Tel. +54 291 459 5181 Fax: +54 291 459 5154 e-mail: <a href="mailto:ierms@criba.edu.ar">ierms@criba.edu.ar</a> URL: <a href="http://www.clei.cl">http://www.clei.cl</a></td>
<td>República Civilizacióndel Chile Departamento de Ciencias de la Computación (DCC) Av. Blanco Encalada 2120 SANTIAGO 651124, Chile Tel. +56 2 689 2736 Fax +56 2 689 5531 e-mail: <a href="mailto:rbaeza@dcc.uchile.cl">rbaeza@dcc.uchile.cl</a></td>
</tr>
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<thead>
<tr>
<th><strong>Mr. Ricardo BAEZA-YATES</strong></th>
<th><strong>Mr. Marijan FRKOVIC</strong></th>
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<tbody>
<tr>
<td>Universidad de Chile Centro Latinoamericano de Estudios Informática Prof. Ricardo Baeza-Yates Departamento de Ciencias de la Computación (DCC) Av. Blanco Encalada 2120 SANTIAGO 651124, Chile Tel. +56 2 689 2736 Fax +56 2 689 5531 e-mail: <a href="mailto:rbaeza@dcc.uchile.cl">rbaeza@dcc.uchile.cl</a></td>
<td>Croatian Information Technology Society - CITS Croatian IT Association (CITA) Illica 1919/II HR-10000 ZAGREB, Croatia Tel. +385 1 2222 722 Fax +385 1 2222 723 e-mail: <a href="mailto:hiz@hiz.hr">hiz@hiz.hr</a> URL: <a href="http://www.hiz.hr">http://www.hiz.hr</a> Vice President Sokolgradska 73 HR-10000 ZAGREB, Croatia Tel. +385 1 301 7070 Fax +385 1 222 2723 e-mail: <a href="mailto:mfrkovic@hiz.hr">mfrkovic@hiz.hr</a></td>
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<th><strong>CROATIA</strong></th>
<th><strong>CYPRUS</strong></th>
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<td>Croatian Information Technology Society - CITS Croatian IT Association (CITA) Illica 1919/II HR-10000 ZAGREB, Croatia Tel. +385 1 2222 722 Fax +385 1 2222 723 e-mail: <a href="mailto:hiz@hiz.hr">hiz@hiz.hr</a> URL: <a href="http://www.hiz.hr">http://www.hiz.hr</a></td>
<td>Cyprus Computer Society Government of Cyprus PO Box 27038 Nicosia, Cyprus Tel. +357 22 460680 Fax +357 22 767349 e-mail: <a href="mailto:info@ccs.org.cy">info@ccs.org.cy</a> URL: <a href="http://www.ccs.org.cy">http://www.ccs.org.cy</a> Director, Department IT Services NICOSIA, Cyprus Tel. +357 22 806300, +357 22 754474 Fax +357 22 462876, +357 22 767349 e-mail: <a href="mailto:cagrotis@cytanet.com.cy">cagrotis@cytanet.com.cy</a></td>
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<tr>
<th><strong>Mr. Costas AGROTIS</strong></th>
<th><strong>Mr. Marijan FRKOVIC</strong></th>
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<tbody>
<tr>
<td>Government of Cyprus Ministry of Finance Charles University in Prague</td>
<td>Croatian IT Association (CITA) Croatian Information Technology Society - CITS Illica 1919/II HR-10000 ZAGREB, Croatia Tel. +385 1 2222 722 Fax +385 1 2222 723 e-mail: <a href="mailto:hiz@hiz.hr">hiz@hiz.hr</a> URL: <a href="http://www.hiz.hr">http://www.hiz.hr</a> Vice President Sokolgradska 73 HR-10000 ZAGREB, Croatia Tel. +385 1 301 7070 Fax +385 1 222 2723 e-mail: <a href="mailto:mfrkovic@hiz.hr">mfrkovic@hiz.hr</a></td>
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<td>Czech Society for Cybernetics and Informatics Charles University in Prague Pod vodarenskou vezi 2 Faculty of Mathematics and Physics CZ-182 07 PRAHA 8 - Liben Dept. of Software Engineering Czech Republic Tel. +420 2 66 053 901 Malostranske nám. 25 Czech Republic Tel. +420 2 85 885 789 CZ-118 00 PRAHA 1, Czech Republic e-mail: <a href="mailto:cski@utia.cas.cz">cski@utia.cas.cz</a> Fax +420 2 221914 264 e-mail: <a href="mailto:cski@utia.cas.cz">cski@utia.cas.cz</a> URL: <a href="http://www.cs.ki.cz">http://www.cs.ki.cz</a></td>
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<tr>
<td>POLAND</td>
<td>Prof. Jerzy NAWROCKI</td>
<td>Poznan Univ. of Technology, Inst. of Computing Science, ul.Piotrowo 2, PL-60-965 POZNAN, Poland</td>
<td>+48 61 665 3422</td>
<td>+48 61 877 1525</td>
<td><a href="mailto:jerzy.nawrocki@put.poznan.pl">jerzy.nawrocki@put.poznan.pl</a></td>
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</tr>
<tr>
<td>PORTUGAL</td>
<td>Prof. Augusto Julio Domingues</td>
<td>INESC Lisboa, Rua Alves Redol, 9 – Apartado 13069, PT-1000-029 LISBOA, Portugal</td>
<td>+351 213 100 233</td>
<td>+351 213 145 843</td>
<td><a href="mailto:augusto.casaca@inesc.pt">augusto.casaca@inesc.pt</a></td>
<td></td>
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<tr>
<td>RUSSIA</td>
<td>Prof. Yury G. EVTUSHENKO</td>
<td>The Russian Academy of Sciences, Director of Dorodnicyn Computing Centre, Vavilov st. 40, RU-119333 MOSCOW GSP-1, Russia</td>
<td>+7 8 499 135 00 20</td>
<td>+7 8 499 135 61 59</td>
<td><a href="mailto:evt@ccas.ru">evt@ccas.ru</a></td>
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<tr>
<td>SINGAPORE</td>
<td>Mr. Alphonsus PANG</td>
<td>MINDEF Corporate Development and Services Division, Ministry of Defence, AFPN 0065, 5 Depot Road Camp #18-06, Singapore</td>
<td>+65 6373 1960</td>
<td>+65 6275 4115</td>
<td><a href="mailto:palphons@dsta.gov.sg">palphons@dsta.gov.sg</a></td>
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<tr>
<td>SLOVAKIA</td>
<td>Dr. Igor PRIVARA</td>
<td>Institute of Informatics &amp; Statistics, Dubravska 3, SK-845 24 BRATISLAVA, Slovakia</td>
<td>+421 2 547 91463</td>
<td>+421 2 593 79292</td>
<td><a href="mailto:igor.privara@gmail.com">igor.privara@gmail.com</a></td>
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<tr>
<td>SLOVENIA</td>
<td>Mr. Niko SCHLAMBERGER</td>
<td>Slovenian Society INFORMATIKA, Vozarski pot 12, SI-1000 LJUBLJANA, Slovenia</td>
<td>+386 1 2415 294</td>
<td>+386 1 2415 344</td>
<td><a href="mailto:niko.schlamberger@gmail.com">niko.schlamberger@gmail.com</a></td>
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<td>SOUTH AFRICA</td>
<td>The Computer Society of South Africa</td>
<td>P.O. Box 1714</td>
<td>+27 11 315 1319</td>
<td>+27 11 315 2276</td>
<td><a href="mailto:info@cssa.org.za">info@cssa.org.za</a></td>
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<tr>
<td>SPAIN</td>
<td>ATI Asociación de Técnicos de Informática</td>
<td>Via Laietana, 46</td>
<td>+34 93 412 52 35</td>
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<td><a href="mailto:secregen@ati.es">secregen@ati.es</a></td>
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<td>SRI LANKA</td>
<td>The Computer Society of Sri Lanka CSSL</td>
<td>Professional Centre</td>
<td>+94 11 4713336</td>
<td>+94 11 250 8009</td>
<td><a href="mailto:csslsec@cssl.lk">csslsec@cssl.lk</a></td>
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<td>Thailand Internet Association</td>
<td>Srisakdi Charmonman IT Center (8th Floor) Assumption University Bangna Campus</td>
<td>Srisakdi CHARMONMAN</td>
<td>+662 723 2891</td>
<td>+662 723 2892</td>
<td><a href="mailto:charm@ksc.net.th">charm@ksc.net.th</a></td>
</tr>
<tr>
<td>TUNISIA</td>
<td>Ecole Superieure des Communications De Tunis (Sup'Com)</td>
<td>Cite technologique des Communications El Ghazala, 2083 Ariana Tunisie</td>
<td>Prof. Dr. Mourad ZGHAL</td>
<td>+216 71 857 000</td>
<td>+216 71 856 829</td>
<td><a href="mailto:adel.ghazel@supcom.rnu.tn">adel.ghazel@supcom.rnu.tn</a></td>
</tr>
<tr>
<td>UKRAINE</td>
<td>Ukrainian Federation of Informatics (UFI)</td>
<td>031514 Smilyanska UA-03151 KYIV Ukraine</td>
<td>Prof. Dr. Igor GREBENNIK</td>
<td>+380 44 246 2784</td>
<td>+380 44 246 2784</td>
<td><a href="mailto:inf@ufi.org.ua">inf@ufi.org.ua</a></td>
</tr>
<tr>
<td>UNITED ARABIAN EMIRATES</td>
<td>Hamdan Bin Mohammed University</td>
<td>P.O.Box : 71400 Dubai, UAE</td>
<td>Dr. Mansoor Al AWAR</td>
<td>+971 4 424 1105</td>
<td>+971 4 439 3905</td>
<td><a href="mailto:n.shihabi@hbmeu.ac.ae">n.shihabi@hbmeu.ac.ae</a></td>
</tr>
<tr>
<td>UNITED KINGDOM</td>
<td>The British Computer Society (BCS)</td>
<td>c/o Ms. Anita Ayre 1st Floor, Block D North Star House, North Star Avenue</td>
<td>Dr. Roger G. JOHNSON</td>
<td>+44 1793 417 514</td>
<td>+44 1793 417 444</td>
<td><a href="mailto:anita.ayre@hq.bcs.org.uk">anita.ayre@hq.bcs.org.uk</a></td>
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| USA | Prof. Albert J. Turner  
Association for Computing Machinery (ACM)  
c/o Ms. Patricia Ryan, Chief Operating Officer  
2 Penn Plaza, Suite 701  
NEW YORK, NY 10121-0701, U.S.A.  
Tel. +1 212 869 7440  
Fax +1 212 944 1318  
e-mail: ryanp@hq.acm.org  
URL: http://www.acm.org |
| ZIMBABWE | Mr. Lawrence Gudza  
Computer Society of Zimbabwe  
P.O. Box CY 164  
Causeway  
HARARE, Zimbabwe  
Tel. +263 4 250 489  
Fax +263 4 708 861  
e-mail: info@csz.org.zw  
URL: http://www.csz.org.zw |

**Ex-Officio Members**

| Prof. Max A. Bramer, GB  
IFIP Councillor  
University of Portsmouth  
School of Computing  
Buckingham Building  
Lion Terrace  
PORTSMOUTH, PO1 3HE  
Hants, United Kingdom  
Tel. +44 2392 846380  
Fax +44 2392 846364  
e-mail: max.bramer@port.ac.uk | Mr. Lalit Sawhney, IN  
IFIP Vice President  
1032, Sobha Jasmine  
Sarjapur Outer Ring Road  
Bellandur  
BENGALURU 560 103  
India  
Tel. +91 80 4211 8165  
mobile: +91 92432 17406  
e-mail: lalit.sawhney@ifip.org |
| Prof. Gerald L. Engel, US  
IFIP Vice President  
University of Connecticut, Stamford  
Dept. of Computer Science & Engineering  
1, University Place  
STAMFORD, CT 06901-2315, U.S.A.  
Tel. +1 203 251 8431  
Fax +1 203 251 8592  
e-mail: g.engel@computer.org | Mr. Christopher Avram  
IFIP Treasurer  
Monash University  
Faculty of Information Technology  
900 Dandenong Road  
CAULFIELD EAST VIC 3145  
Australia  
Tel. +61 3 9903 2196  
Fax +61 3 9903 1077  
e-mail: chris.avram@infotech.monash.edu.au |

All Technical Committee Chairs
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| **CEPIS**                     | Mr. Declan **BRADY**
Council of European Professional Informatics Societies
Avenue Roger Vandendriessche 18/9
BE-1150 BRUXELLES
Belgium
Tel. +32 2 772 1836
Fax +32 2 646 3032
e-mail: info@cepis.org
URL: http://www.cepis.org     |
| **IMIA**                      | Prof. Hiroshi **TAKEDA**
International Medical Informatics Association
81 Boulevard de la Cluse
CH-1205 GENEVA
Switzerland
Tel. +41 22 372 7249
e-mail: imia@imia-services.org
URL: http://www.imia.org       |
| **SEARCC**                    | Mr. Yasa R. **KARUNARATNE**
South East Asia Regional Computer Confederation
SEARCC Secretariat c/o Computer Society of Sri Lanka
Professional Centre
275/75 Stanley Wijesundera Mawatha
COLOMBO 7, Sri Lanka
Tel. +94 11 259 2762
Fax +94 11 250 8009
e-mail: sg@searcc.org
URL: http://www.searcc.org/     |
| **VLDB**                      | Prof. Renee **MILLER**
The Very Large Data Bases Endowment
c/o Prof. Renee Miller
Dept. of Computer Science
University of Toronto
6 King's College Rd., rm. 283
TORONTO, ON M5S 1A4, Canada
e-mail: miller@cs.toronto.edu
URL: http://www.vldb.org       |
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TC 1 - Foundations of Computer Science

est. 1989 as SG14 / approved in 9/96 as TC 1
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Chair
Prof. Michael G. HINCHHEY, IE
Co-Director
Lero – the Irish Software
Engineering Research Centre
University of Limerick
LIMERICK
Ireland
Tel. +353 61 233607
Fax +353 61 213036
e-mail: mike.hinchey@lero.ie

AR Joos Heintz**
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Chair
Prof. Christopher SIKORSKI
University of Utah
School of Computing
50 S Centr.Campus Dr.Rm 3190
SALT LAKE CITY
UT 84112-9205, USA
Tel. +1 801 581 8579
Fax +1 801 581 5843
e-mail: sikorski@cs.utah.edu

AT Harald Niederreiter
CN Gen Sun Fang
DE K.H. Borgwardt
DE S. Graf
DE S. Heinrich
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IT R. Tempo
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Secretary
Prof. Arthur G. WERSCHULZ
Columbia University
Dept. of Computer Science
NEW YORK, NY 10027
USA
Tel. +1 212 636 6325
Fax +1 212 581 1284 at Fordham Univ.
e-mail: agw@cs.columbia.edu
WG 1.2 - Descriptional Complexity

est. 1992
URL: http://www.informatik.uni-giessen.de/ifipwg1.2/

Chair
Prof. Giovanni PIGHIZZINI
Università degli Studi di Milano
Dipartimento di Informatica e
Comunicazione
Via Comelico, 39
IT-20135 MILANO
Italy
Tel. + 39 02 519 661 3560
Fax + 39 02 519 661 3515
e-mail: pighizzini@dico.unimi.it

Vice-Chair
Prof. Helmut JÜRGENSEN
University of Western Ontario
Dep. of Computer Science
Middlesex College
LONDON, ON, N6A 5B7
Canada
Tel. +1 519 661 3560
Fax +1 519 661 3515
e-mail: hjj@csd.uwo.ca

Secretary
Dr. Andreas MALCHER
Universität Giessen
Institut für Informatik
Arndtstr. 2
DE-35392 GIESSEN
Germany
Tel. + 49 641 99 32143
Fax +49 641 99 32149
e-mail: andreas.malcher@informatik.uni-giessen.de
WG 1.3 - Foundations of Systems Specification

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Chair
Dr. Till MOSSAKOWSKI
DFKI GmbH Bremen
Enrique-Schmidt-Str. 5
DE-28359 BREMEN
Germany
Tel. +49 421 218 64226
Fax +49 421 218 9864226
e-mail: till.mossakowski@dfki.de

Secretary
Prof. Christine CHOPPY
Univ. Paris Nord 13
Lab.d'Informatique de Paris-Nord
(L.I.P.N.), Institut Galilée
Av. J.-B. Clement
FR-93430 VILLENEUVE
France
Tel. +33 1 4940 3590
Fax +33 1 4826 0712
e-mail: christine.choppy@lipn.univ-paris13.fr

WG 1.4 - Computational Learning Theory

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Chair
Prof. Arun SHARMA
Queensland University of Technology
2 George Street
GPO Box 2434
BRISBANE, QLD 4001
Australia
e-mail: arun.sharma@qut.edu.au

Vice-Chair
Mr. Paul VITANYI
CWI & Univ. of Amsterdam
Kruislaan 413
NL-1098 SJ AMSTERDAM
The Netherlands
Tel. +31 20 592 4124
Fax +31 20 592 4199
e-mail: paul.vitanyi@cwi.nl

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**Chair**
Prof. Jarkko KARI  
University of Turku  
Mathematics Department  
FI-20014 TURKU  
Finland  
Tel. +358 2 333 5616  
Fax +358 2 333 6595  
e-mail: jkari@utu.fi

**Vice-Chair**
Prof. Kenichi MORITA  
Hiroshima University  
Department of Information Engineering  
Graduate School of Eng.  
JP-739-8527 HIGASHI-HIROSHIMA, Japan  
Tel. +81 82 424 7700  
Fax +81 82 422 7195  
e-mail: morita@iee.hiroshima-u.ac.jp

**Secretary**
Prof. Nicolas OLLINGER  
Aix-Marseille Université, CNRS LIF, CMI  
39 rue Joliot-Curie  
FR-13453 MARSEILLE Cedex 13  
France  
Tel. +33 4 91 11 36 21  
Fax +33 4 91 11 36 02  
e-mail: nicolas.ollinger@lif.univ-mrs.fr

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**Chair**
Prof. Jürgen GIESL  
RWTH Aachen  
Fachgruppe Informatik  
Ahornstr. 55  
DE- 52074 AACHEN  
Germany  
Tel. +49 241 80 21230  
Fax +49 241 80 22217  
e-mail: giesl@informatik.rwth-aachen.de

**Secretary**
Prof. Dr. Peter SCHNEIDER-KAMP  
University of Southern Denmark  
Department of Mathematics & Computer Science  
Campusvej 55  
DK-5230 ODENSE M  
Denmark  
Tel. +45 6550 2327  
Fax +45 6550 2325  
e-mail: petersk@imada.sdu.dk

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**URL:** [http://verify.rwth-aachen.de/IFIP-WG1.6/](http://verify.rwth-aachen.de/IFIP-WG1.6/)
WG 1.7 Theoretical Foundations of Security Analysis and Design

est. 1999
URL: http://www.dsi.unive.it/~focardi/IFIPWG1_7/

Chair
Prof. Pierpaolo DEGANO
Università di Pisa
Dipartimento di Informatica
Largo Bruno Pontecorvo, 3
IT-56127 PISA
Italia
Tel.: +39 050 2212 757
Fax: +39 050 2212 726
e-mail: degano@di.unipi.it

AU Colin Boyd
BE Jean-Jacques Quisquater
DE Dieter Gollmann
DE Jan Jürjens
FR Dominique Bolignano
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NL Sandro Etalle

WG 1.8 – Concurrency Theory

est. 2005

Chair
Prof. Dr. Jos BAETEN
CWI
Centrum Wiskunde & Informatica
P.O. Box 94079
NL-1090 GB AMSTERDAM
The Netherlands
e-mail: jos.baeten@cwi.nl

Vice-Chair
Prof. Wan FOKKINK
Vrije Universiteit Amsterdam
Dept. of Computer Science
De Boelelaan 1081a
NL-1081 HV AMSTERDAM
The Netherlands
Tel. +31 20 598 7735
Fax +31 20 598 7653
e-mail: want@cs.vu.nl

Secretary
Prof. Anna INGÓLFSDÓTTIR
Reykjavik University
School of Computer Science
Ofanleiti 2
IS-103 REYKJAVIK
Iceland
e-mail: annaing@hi.is
| AR  | Pedro D'Argenio   | GB  | Luca Cardelli   | IT  | Anna Labelle |
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| FR  | Catuscia Palamidessi |  |  |  |  |

WG 1.9/2.15 - Verified Software

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**Chair**
Prof. Jim WOODCOCK  
University of York  
Department of Computer Science  
Heslington  
YORK Y010 5DD  
United Kingdom  
Tel. +44 1904 434335  
Fax +44 1904 432767  
e-mail: jim@cs.york.ac.uk

**Secretary**
Dr. Natarajan SHANKAR  
SRI International  
333 Ravenswood Ave.  
MENLO PARK, CA 94025-3493  
USA  
Tel. +1 415 859 5272  
e-mail: shankar@csl.sri.com

| CH  | Peter Mueller  | FR  | Jean-Christophe Fillatre  | US  | Gary Leavens |
| DE  | Tiziana Margaria | GB  | Andrew IrelandError! Bookmark not defined. | US  | Pete Manolios |
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Chair
Prof. Michael GOEDICKE, DE
paluno The Ruhr Institute for Software Technology
University of Duisburg-Essen
Gerlingstrasse 16
DE-45127 ESSEN
Germany
Tel. +49 201 183 3481
Fax +49 201 183 4698
e-mail: michael.goedicke@paluno.uni-due.de

Vice-Chair
Prof. Jerzy NAWROCKI, PL
Poznan Univ. of Technology
Inst. of Computing Science
ul. Piotrowo 2
PL-60-965 POZNAN
Poland
Tel. +48 61 665 3422
Fax +48 61 877 1525
e-mail: jerzy.nawrocki@put.poznan.pl

Secretary
Prof. Julia LAWALL
INRIA Paris-Rocquencourt
LIP6
Boîte courrier 169
4 place Jussieu
FR-75252 PARIS Cedex 05
France
Tel. +33 1 44 27 88 52
e-mail: julia.lawall@ifip6fr

ex-officio members: WG Chairs

WG 2.1 - Algorithmic Languages and Calculi

est. 1962, revised 1963, 1990, 1992
URL: http://www.ifipwg21.org

Chair
Dr. Jeremy GIBBONS
Oxford University
Computing Lab.
Wolfson Building
Parks Road
OXFORD OX1 3QD
United Kingdom
Tel. +44 1865 283508
Fax +44 1865 273839
e-mail: jeremy.gibbons@comlab.ox.ac.uk

Secretary
Prof. Johan JEURING
Utrecht University
Department of Information and Computing Sciences
Centrum Gebouw Noord (CGN),
B121, P.O. Box 80.089
NL-3508 TB UTRECHT
The Netherlands
Tel. +31 30 2534115
Fax +31 30 2513791
e-mail: johanj@cs.uu.nl

AU  Carroll C. Morgan  GB  Roland Backhouse
CA  Hendrik J. Boom  GB  Ralf Hinze
CA  Jules Desharnais  GB  Graham Hutton
CA  Eric C. R. Hehner  GB  Conor McBride
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URL: http://www.ifip.org/wg-2.2

Chair
Dr. Igor WALUKIEWICZ
LaBRI
Université Bordeaux-1
351, Cours de la Libération
FR-33405 TALENCE Cedex
France
Tel. +33 5 40 00 66 00
Fax +33 5 40 00 66 69

Vice-Chair
Prof. Javier ESPARZA
Technische Universität München
Boltzmannstr. 3
DE-85748 MÜNCHEN
Germany
Tel. +49 89 289 17204
Fax +49 89 289 17207

Secretary
Dr. Philippe DARONDEAU
IRISA
Campus de Beaulieu
FR-35042 RENNES Cedex
France
Tel. +33 2 9984 7280
Fax +33 2 9984 7171

Chair
Prof. Javier ESPARZA
Technische Universität München
Boltzmannstr. 3
DE-85748 MÜNCHEN
Germany
Tel. +49 89 289 17204
Fax +49 89 289 17207

Vice-Chair
Dr. Philippe DARONDEAU
IRISA
Campus de Beaulieu
FR-35042 RENNES Cedex
France
Tel. +33 2 9984 7280
Fax +33 2 9984 7171

Secretary
Dr. Igor WALUKIEWICZ
LaBRI
Université Bordeaux-1
351, Cours de la Libération
FR-33405 TALENCE Cedex
France
Tel. +33 5 40 00 66 00
Fax +33 5 40 00 66 69

AR Marcelo Frias
CZ Antonin Kucera
DE Joost-Pieter Katoen
DE Barbara Koenig
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US Radu Grosu

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URL: http://www.ifip.org/wg-2.3

Chair
Dr. Pamela ZAVE
AT&T Research
180 Park Ave. Rm B211
FLORHAM PARK, NJ 07932
USA
e-mail: pamela@research.att.com

Vice-Chair
Prof. Michael BUTLER
University of Southampton
School of Electronics & Computer Science
Highfield
SOUTHAMPTON SO17 1 BJ
United Kingdom
Tel. +44 23 8059 2435
Fax +44 23 8059 3045
e-mail: mjb@ecs.soton.ac.uk

Secretary
Dr. K. Rustan M. LEINO
One Microsoft Way
REDMOND, WA 98052
USA
e-mail: leino@microsoft.com

Chair
Dr. Pamela ZAVE
AT&T Research
180 Park Ave. Rm B211
FLORHAM PARK, NJ 07932
USA
e-mail: pamela@research.att.com

Vice-Chair
Prof. Michael BUTLER
University of Southampton
School of Electronics & Computer Science
Highfield
SOUTHAMPTON SO17 1 BJ
United Kingdom
Tel. +44 23 8059 2435
Fax +44 23 8059 3045
e-mail: mjb@ecs.soton.ac.uk

Secretary
Dr. K. Rustan M. LEINO
One Microsoft Way
REDMOND, WA 98052
USA
e-mail: leino@microsoft.com

AU Ian Hayes
AU Annabelle McIver
AU Carroll C. Morgan
CH Bertrand Meyer
CH Peter Mueller
DE Manfred Broy
FR Patrick Cousot
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GB Peter Henderson
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US Robert M. Balzer
US Clark Barrett
US Ernie Cohen
US William R. Cook
US John R. Harrison
US James Ray Horning
US Daniel Jackson
US Rajeev Joshi
US Shiriram Krishnamurthy
US Butler W. Lampson
US Jayadev Misra
US Greg Nelson
US John C. Reynolds
US Natarajan Shankar
WG 2.4 - Software Implementation Technology

URL: http://www.ifip.org/wg-2.4

Chair
Dr. Frank TIP
IBM Research
Thomas J. Watson Research Center
19 Skyline Drive
HAWTHORNE, NY 10532
USA
Tel. +1 914 784 6294
e-mail: ftip@us.ibm.com

Vice Chair
Dr. Jan VITEK
Purdue University
Department of Computer Science
305 N. University Street
WEST LAFAYETTE, IN 47907
USA
Tel. +1 765 494 6531
Fax +1 765 494 0739
e-mail: jv@cs.purdue.edu

Secretary
Prof. Jens KNOOP
Technische Universität Wien
Institut für Computersprachen
Fakultät für Informatik
Argentinierstrasse 8/4 E185.1
AT-1040 WIEN, Austria
Tel. +43 1 58801 1850
Fax +43 1 58801 1859
e-mail: knoop@complang.tuwien.ac.at

WG 2.5 - Numerical Software

est. 1974, revised 1991   Aims and Scopes
URL: http://www.ifip.org/wg-2.5

Chair
Dr. Ronald F. BOISVERT
Nat. Inst. of Standards and Technology
Mathematical & Computational Sciences Division
GAITHERSBURG
MD 20899-8910, USA
Tel. +1 301 975 3812
Fax +1 301 990 4127
e-mail: boisvert@nist.gov

Vice-Chair
Prof. Michael THUNÉ
Dept. of Inf. Technology
Uppsala University
Box 337
SE-751 05 UPPSALA
Sweden
Tel. +46 18 471 2981
Fax +46 18 523 049
e-mail: michael.thune@it.uu.se

Secretary
Prof. Wayne ENRIGHT
Dept. of Computer Science
University of Toronto
TORONTO ON, M5S 3G4
Canada
Tel. +1 416 978 5474
Fax +1 416 978 1931
e-mail: enright@cs.utoronto.ca

Atlantic: AT  Markus Schordan
               DE  Rudolf Landwehr
               US  Judith Bishop

American: AU  John Gough
               DE  Claus Lewerentz
               US  Cliff Click
               AU  Bernhard Scholz
               DE  Arno Poetzsch-Heffter
               US  Michael Franz
               CA  John Aycock
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               US  Todd Mistleton
               CA  Ondrej Lhotak
               DE  Christian Probst
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               GB  Peter Weich
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               DE  Uwe Assmann
               HU  Tibor Gmxithy
               US  Joseph M. Newcomer
               DE  Gerhard Goos
               PL  Jerzy R. Nawrocki
               US  William M. Waite
               DE  Stefan Jähnichen
               SE  Peter Fritzon
               US  Kurt C. Wallnau
               DE  Uwe Kastens
               SE  Welf Löwe
               ZA  Bruce Watson

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WG 2.6 - Database

URL: http://www.ifip.org/wg-2.6

Chair
Prof. Ernesto DAMIANI
University of Milan
Dipartimento di Tecnologie
dell'Informazione
Via Bramante 65
IT-26013 CREMA
Italy
Tel. +39 0373 898064
Fax +39 0373 898010
e-mail: damiani@dti.unimi.it

Vice-Chair
Prof. Mohand-Said HACID
Université Claude Bernard
LIRIS - UFR d'Informatique
Batiment Nautibus
43, boulevard du 11 nov. 1918
FR-69622 VILLEURBANNE
France
Tel. +33 4 72 43 27 74
Fax +33 4 72 43 15 36
e-mail: mshacid@liris.univ-lyon1.fr

Secretary
Dr. Paolo CERAVOLO
University of Milan
Dipartimento di Tecnologie
dell'Informazione
Via Bramante 65
IT-26013 CREMA
Italy
Tel. +39 0373 898040
Fax +39 0373 898010
e-mail: ceravolo@dti.unimi.it

AU  Tharam Dillon
BE  Rita de Caluwe
BE  Guy de Tré
BE  Olga de Troyer
BE  Robert Meersman
BE  Peter Spyns
CH  Karl Aberer
CH  Stefano Spaccapietra
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KR  Kyu-Young Whang
NL  Maurice van Keulen
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US  Philippe Gudre-Mauroux

WG 2.7/13.4 - User Interface Engineering

Aims and Scopes
URL: http://www.ifip.org/wg-2.7

Chair
Dr. Fabio PATERNO
CNR-ISTI
Via G. Moruzzi 1
IT-56124 PISA
Italy
Tel. +39 050 315 3066
Fax +39 050 313 8091
e-mail: fabio.paterno@isti.cnr.it

Vice-Chair
Prof. Anne BLANDFORD
University College London
Interaction Centre
MPEB 8th Floor
Gower Street
LONDON WC1E 6BT
United Kingdom
Tel. +44 20 7679 0688
Fax +44 20 7387 1397
e-mail: a.blandford@ucl.ac.uk

Secretary
Ms. Gaëlle CALVARY
Laboratoire d'Informatique
de Grenoble
Campus de Grenoble Bâtiment B
385 Rue de la Bibliothèque BP 53
FR-38041 GRENOBLE Cedex 9
France
Tel. +33 4 76 51 48 54
Fax +33 4 76 63 56 86
e-mail: gaëlle.calvary@imag.fr

BR  Simone Barbosa
CA  Nicholas Graham
CA  Greg Phillips
CA  Kevin Schneider
DE  Anke Dittmar
DE  Peter Forbrig
DE  Gerrit Meixner
DE  Helmut G. Stiegler
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IE  Gavin Doherty
NL  Gerrit van der Veer
PT  Jose Campos
US  Len Bass
US  Bonnie E. John
US  Rick Kazman
WG 2.8 - Functional Programming

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URL: www.wg28.org

Chair
Prof. Benjamin PIERCE
University of Pennsylvania
Dept. of Comp. & Inf. Science
3330 Walnut Street
PHILADELPHIA, PA 19104-6389
USA
Tel. +1 215 898 2012
Fax +1 215 898 0587
e-mail: bcpierce@cis.upenn.edu

Secretary
Dr. Ralf HINZE
Oxford University Computing Laboratory
Oxford University
Wolfson Building, Parks Road
OXFORD OX1 3QD
United Kingdom
Tel. +44 1865 610700
Fax +44 1865 283531
e-mail: ralf.hinze@comlab.ox.ac.uk

Chair
Prof. Kevin RYAN
University of Limerick
Lero- The Irish Software Engineering Center
Dept. of Computer Science and Information Systems
LIMERICK
Ireland
Tel. +353 61 202405
Fax +353 61 213036
e-mail: kevin.ryan@lero.ie

Vice-Chair
Prof. Mats HEIMDAHL
University of Minnesota
Software Engineering Center, Twin Cities
4-192 EE/CSci Bldg.
200 Union Street S.E.
MINNEAPOLIS, MN 55455
USA
Tel. +1 612 625 2068
Fax +1 612 625 0572
e-mail: heimdahl@cs.umn.edu

Secretary
Dr. Robert J. HALL
AT&T Labs Research
180 Park Ave, Bldg 103
FLORHAM PARK, NJ 07932
USA
Tel. +1 973 360 8207
Fax +1 973 360 8178
e-mail: hall@research.att.com

Chair
Prof. Kevin RYAN
University of Limerick
Lero- The Irish Software Engineering Center
Dept. of Computer Science and Information Systems
LIMERICK
Ireland
Tel. +353 61 202405
Fax +353 61 213036
e-mail: kevin.ryan@lero.ie

Vice-Chair
Prof. Mats HEIMDAHL
University of Minnesota
Software Engineering Center, Twin Cities
4-192 EE/CSci Bldg.
200 Union Street S.E.
MINNEAPOLIS, MN 55455
USA
Tel. +1 612 625 2068
Fax +1 612 625 0572
e-mail: heimdahl@cs.umn.edu

Secretary
Dr. Robert J. HALL
AT&T Labs Research
180 Park Ave, Bldg 103
FLORHAM PARK, NJ 07932
USA
Tel. +1 973 360 8207
Fax +1 973 360 8178
e-mail: hall@research.att.com
WG 2.10 - Software Architecture

est. 2000
URL: http://www.ifip.org/wg-2.10

Chair
Prof. Tomi MÄNNISTÖ
Aalto University
Department of Computer Science and Engineering
P.O. Box 19210
FI-00076 AALTO
Finland
Tel. +358 9 4702 3373
Fax +358 9 4702 4958
e-mail: tomi.mannisto@tkk.fi

Vice-Chair
Prof. Philippe KRUCHTEN
University of British Columbia
Dept. of Elec. & Comp. Eng.
2356 Main Mall, room 441
VANCOUVER, BC V6T 1Z4
Canada
Tel. +1 604 827 5654
e-mail: pbk@ece.ubc.ca

Secretary
Mr. John KLEIN
Carnegie Mellon University
Software Engineering Institute
4500 Fifth Avenue
PITTSBURGH, PA 15213-2612
USA
Tel. +1 412 268 4553
Fax +1 412 268 6257
e-mail: john.klein@computer.org

AU Len Bass
CA Morven W. Gentleman
GB Peter Robert Eeles
GB Eoin Woods
IN Tadinada Venkata Prabahakar
NL Patricia Lago
NL Eljo Poort
NL Hans van Vliet
SE Jan Bosch
US Paul C. Clements

WG 2.11 - Program Generation

est. 2003 Aims and Scopes
URL: http://wiki.hh.se/wg211

Chair
Prof. Christian LENGAUER
University Passau
Room 129
DE-94030 PASSAU
Germany
Tel. +49 851 509 3070
Fax +49 851 509 3092
e-mail: christian.lengauer@uni-passau.de

Vice-Chair
Dr. Ulrik Pagh SCHULTZ
University of Southern Denmark
The Maersk Mc-Kinney Moller Institute
Campusvej 55
DK-5230 ODENSE
Denmark
Tel. +45 65 50 35 70
Fax +45 66 15 76 97
e-mail: ups@mmmi.sdu.dk

AU Anthony Sloane
CA Jacques Carette
CA Krzysztof Czarnecki
DE Sven Apel
DE Christian Kästner
DE Ralf Lämmel
DK Olivier Dannv

FR Laurent Reveilliere
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US Yannis Smaragdakis
US Walid Taha
US Stephanie Weirich
US Eric van Wyk
Dr. Walt SCACCHI
University of California, Irvine
Institute for Software Research
Information and Computer Science Department
IRVINE, CA 92697-3455
USA
Tel. +1 949 824 4130
Fax +1 949 824 1715
e-mail: wscacchi@ics.uci.edu

Prof. Pär J. ÅGERFALK
Uppsala University
Dept. of Informatics and Media
P.O. Box 513
SE-75120 UPPSALA
Sweden
Tel. +46 18 4711064
Fax +46 18 4717867
e-mail: par.agerfalk@im.uu.se

AU Elisabeth Chang
AU Gregory Simmons
AT Stefan Koch
ES Jesús González-Barahona
FR Jean-Luc Hardy
FR Jean-Michel Dale
e FR Jean Pierre Laisne
GB Martin Michlmayr
IE Joseph Feller
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US Paul A. David
US Karim Lakhani
US Sandy Slaughter
US Katherine Stewart
US Tony Wasserman
ZA Derrick G. Kourie

WG 2.14 - Service-Oriented Systems
est. 2011

Interim Chair
Prof. Luciano BARESI
Politecnico di Milano
Dipartimento di Elettronica e Informazione
via Golgi, 42
IT-20133 MILANO
Italy
Tel. +39 02 2399 3638
Fax +39 02 2399 3574
e-mail: luciano.baresi@polimi.it

Member list under construction

WG 2.15/1.9 - Verified Software
est. 2010
TC 3 - Education

URL: http://www.ifip-tc3.net/

Chair
Prof. Bernard CORNU, FR
Director, CNED-EIFAD
2 avenue René Cassin
BP 30241
FR-86963 FUTUROSCOPE CHASSENEUIL Cedex
France
Tel. +33 549 499 799
email: bernard.cornu@cned.fr

Vice-Chairs
Mr. Sindre RØSVIK, NO
Volda University College
Postbox 500
NO-6101 VOLDA
Norway
Tel. +47 7007 5453
e-mail: roesviks@hivolda.no

Prof. Dr. Valentina DAGIENE, LT
Vilnius University Institute of Mathematics and Informatics
(VU MII)
Informatics Methodology Dept.
Akademijos str. 4
LT-08663 VILNIUS
Lithuania
Tel. +370 698 05448
Fax +370 527 29209
e-mail: dagiene@ktl.mii.lt

Secretary
Prof. Ana Amélia A.CARVALHO, PT
University of Minho
Institute of Education
Campus de Gaia
PT-4710-057 BRAGA
Portugal
Tel. +351 253 604 620
Fax +351 253 678 987
e-mail: aac@ie.uminho.pt

AE Alain Senteni
AT Gerald Futschek
AT Anton Knierzinger*
AU Nick Reynolds
AU Arthur Tatnall*
BG Roumen Nikolov
BR Rosa Vicari
CL Jaime Sanchez
CLEI Ernesto Cuadros-Vargas
CH Raymond Morel*
CN Xiaoming Li
DE Sigrid Elisabeth Schubert
ES Carlos Delgado Kloos

FI Jari Koivisto
FI Mikko Ruohonen*
FR Monique Grandbastien
GB Mike Kendall
GR Vassilios Makrakis
HU Marta Turcsoni-Szabo*
IE Denise Leahy
IN M.P. Gupta
IS Anna Kristjansdottir (Obs)
IT Vittorio Midero
JP Hajime Ohwa
KR Hajine Kim

NL Hans Frederik
NO Jan Wibe
PL Maciej M. Syslo
RS Miladin Stefanovic
SE Lena Olsson
SG Lung Hsiang Wong
SI Vladislav Rajkovic
SK Ivan Kalas
TH Srisakdi Charmonman
UNESCO Cedric Wachholz
US Willis King (IEEE)
ZA Peter Waker

ex-officio members: WG Chairs
*) Special Consultant

WG 3.1 Informatics and ICT in Secondary Education
URL: http://ifip-education.ning.com/group/wg31informaticsandictinsecondaryeducation

Chair
Drs. Pieter HOGENBIRK
Helen Parkhurst Dalton Secondary School
Bongerdstraat 1
NL-1326 AA ALMERE
The Netherlands
Tel. +31 36 535 70 00
Fax +31 36 535 70 05
e-mail: p.hogenbirk@helenpark.nl

Vice-Chair
Prof. Sigrid E. SCHUBERT
Universität Siegen
Didaktik der Informatik und E-Learning
Hölderlinstrasse 3
DE-57068 SIEGEN
Germany
Tel. +49 271 740 3457
Fax +49 271 740 3231
e-mail: sigrid.schubert@uni-siegen.de
WG 3.2 Informatics and ICT in Higher Education

URL: http://www.cs.brynmawr.edu/wg3.2/index.html

Chair
Prof. Dr. Torsten BRINDA
Universität Erlangen-Nürnberg
Didaktik der Informatik
Computer Science Dept. 2
Martensstr. 3, R 05. 130
DE-91058 ERLANGEN, Germany
Tel. +49 9131 85-27922
Fax +49 9131 85 28809
e-mail: torsten.brinda@informatik.uni-erlangen.de

Secretary
Dr. Andrew FLUCK
University of Tasmania
Faculty of Education
Locked Bag 1307
LAUNCESTON, TA 7250
Australia
Tel. +61 3 6324 3284
Fax +61 3 6324 3048
e-mail: andrew.fluck@utas.edu.au

WG 3.3 Research on Education Applications of Information Technologies

re-est. 1988, revised 2004
URL: http://www.ifipwg3-3.org/

Chair
Dr. Mary WEBB
King's College London
Franklin-Wilkins Building
Waterloo Road
LONDON SE1 9NH
United Kingdom
Tel. +44 20 7848 3116
Fax +44 20 7848 3182
e-mail: mary.webb@kcl.ac.uk

Vice-Chair
Dr. Nicholas REYNOLDS
The University of Melbourne
ICT in Education and Research
VICTORIA 3010
Australia
Tel. +61 3 8344 8526
Fax +61 3 8344 8739
e-mail: nreyn@unimelb.edu.au

Secretary
Dr. Andrew FLUCK
University of Tasmania
Faculty of Education
Locked Bag 1307
LAUNCESTON, TA 7250
Australia
Tel. +61 3 6324 3284
Fax +61 3 6324 3048
e-mail: andrew.fluck@utas.edu.au
WG 3.4 Professional and Vocational Education for the Information and Communication Technology ICT Sector

URL: http://www.businessandlaw.vu.edu.au/ifip34/

Chair
Dr. Arthur TATNALL
Victoria University
Victoria Graduate School of Business
P.O. Box 14428
MELBOURNE 8001
Australia
Tel. +61 3 9919 1034
Fax +61 3 9919 1064
email: arthur.tatnall@vu.edu.au

Vice-Chair
Dr. Bill DAVEY
RMIT University
School of Business IT and Logistics
GPO Box 2476
MELBOURNE, VIC 3001
Australia
Tel. +61 3 9925 5975
Fax +61 3 9925 5805
email: bill.davey@rmit.edu.au

Secretary
Barbara TATNALL
Heidelberg Press
PO Box 234
HEIDELBERG 3084
Australia
e-mail: barbara@heidelbergpress.com.au

AU Eva Dakich
AU Bill Davey
AU Judy Hammond
AU Peter Juliff
CH Helmut Schauer
DE Heike Köppe
DE Gregor Kuhlmann
DK Jane Andersen
FI Lauri Fontell

FI Timo Lainema
FI Mikko J. Ruohonen
GB Helen Edwards
GB Lynne Humphries
GB Barrie Thompson
IT Domenico Ponta
IL Ben Zion Barta
IL Daniel Millin
IN Arup Roy

日本: Shigeru Sam Otsuki
日本: Tsurayuki Kado
日本: Norio Tokumaru
メキシコ: Mohan Raj Gurubatham
オランダ: Anneke Jacquebard
オランダ: J.W. Houben
シンガポール: Angela Goh
米国: Joyce Currie Little

*) Corresponding member
**) Intending member
WG 3.5 Informatics and Digital Technologies in Elementary Education

est. 1983, 2008
URL: http://ifip35.inf.elte.hu/

Chair
Dr. Nicholas REYNOLDS
The University of Melbourne
ICT in Education and Research
VICTORIA 3010
Australia
Tel. +61 3 8344 8526
Fax +61 3 8344 8739
e-mail: nreyn@unimelb.edu.au

Vice-Chair
Dr. David BENZIE
College of St.Mark & St.John
Derriford Road
PLYMOUTH PL6 8BH
United Kingdom
Tel. +44 1752 636804
Fax +44 1752 636823
e-mail: david_benzie@compuserve.com

Members
AT Anton Krierzinger
AU Dianne Chambers
AU Eva Dakich
AU Anthony Jones
AU Christine Redman
AU Katina Zammit
BG Roumen Nikolov
BG Evgenia Sendova
CL Ernesto Laval
CZ Miroslava Cernochova
CZ Stanislav Sinor

AT Wolfgang Weber
DE Michael Wegend
DK Erling Schmidt
FR Eric Bruillard
GB Maureen Haldane
GB Cathy Lewin
GB Avril Loveless
GB Steven Naylor
GB Diane Mavers

AU Helen Drenoyianni
HU Marta Turcsanyi-Szabo
IE Tomas O’Brien
IL Yaacov J. Katz
NO Sindre Raszvik
SK Ivan Kalas
US Nancy Yost

WG 3.6 Distance Education

est. 1987

Chair
Prof. Steve WHEELER
University of Plymouth
Faculty of Education
Rolle Building
Drake Circus
PLYMOUTH Devon, PL4 8AA
United Kingdom
Tel. +44 1752 585481
Fax +44 1752 233787
e-mail: swheeler@plymouth.ac.uk

Vice-Chairs
Dr. Peter SERDYUKOV
National University
School of Education
11355 North Torrey Pines Road
LA JOLLA, CA 92037-1011
USA
Tel. +1 858 642 8332
e-mail: pserdyuk@nu.edu

Dr. Anna S. GRABOWSKA
PRO-MED sp. z o.o.
ul. Śląska 35/49
PL-80-379 GDANSK
Poland
e-mail: anka.grabowska@gmail.com

AT Hermann Maurer
AT Erich Neuwirth
AT Eveline Riedling
AU Malcolm Beazley
AU Carolyn Dowling
AU Anne Forster
AU Ruth Geer
AU Vicki Lowery

DK Kirsten M. Antilla
DK Erik Dam
DK Lone Direckinck-Holmfeld
DK Eigenschielsen
DK Erling Schmidt
ES Sebastian Dormido
ES Martin Lhamas
ES Jordi Castells Prims

IT Vittorio Midoro
IS Lara Stefansdottir
MY Zoraini Wati Abas
NL Betty Collis
NL Freek Gastkemper
NL Fred de Vries
NL Peter de Vries
NL Wim Veen
WG 3.7 Information Technology in Educational Management

est. 1996
URL: http://item.wceruw.org/

Chair
Dr. Andreas BREITER
University of Bremen
Information Management and Educational Technologies
Faculty for Mathematics and Computer Science
Am Fallturm 1
DE-28359 BREMEN, Germany
Tel. +49 421 218 7525
Fax +49 421 218 4894
e-mail: abreiter@informatik.uni-bremen.de

Vice-Chair
Dr. Don PASSEY
University of Lancaster
Department of Educational Research
County South, D25
LANCASTER, LA1 4YD
United Kingdom
Tel. +44 1524 592314
e-mail: d.passey@lancaster.ac.uk

AU Michelle Selinger
AU Peter Smith
AU Elizabeth Stacey
AU Martyn Wild
BG Roumen Nikolov
BG Iliana Nikolova
BG Ivan Stanchev
BR Joberto Martins
BR Antonio Simao Neto
CA France Henri
CA Gilbert Paquette
CH Bernadette Charlier
CH Raymond Morel
CH Ritta Rinta-Filippula
CZ Zdena Lustigova
CZ Stanislav Zelenda
DE Joachim Wedekind

ES Felisa Verdejo
FI Eero Pekkarinen
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FI Matti Sinko
FR Michel Arnaud
FR Alain Derycke
FR Pierre Vincent
GB Chris Abbott
GB Doug Brown
GB Lampros Stergioulas
GB Helen Minner
GB Brian Samways
GR Vassilis Koulountzos
HU Attila Szabó
HU Marta Turcsanyi-Szabo
IN Rakesh Mohan Bhatt
IT Rosanna Lisco

NO Bodil Ask
NO Morten Flate Paulsen
NO Hilding Sponberg
NZ Niki Davis
NZ Phillipa Gerbic
PL Anna Grabowska
PL Barbara Kedzierska
PT Ana Carvalho
SE Steewe Gardare
SE Birgitta Lindahl
SE Lars-Erik Nilsson
SE Lena Olsson
US Robert M. Aiken
US Sylvia Charp
US Catherine Fulford
US Virginia Warner

WG 3.8 Lifelong Learning

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URL: http://www.embc.uk.com/ifiptc3lll/Default.aspx

Chair
Mr. Mike KENDALL
EMBC
4 Prospect Court
Blisworth
NORHAMPTONSHIRE NN7 3DG
United Kingdom
Tel. +44 1604 879869
Fax +44 1604 858016
e-mail: mkendall@embc.org.uk

AU Greg Baker
AU Bill Davey
AU Elspeth McKay
AU Chris O'Mahony
AU Geoff Sandy
AU Maree Skillen
AU Arthur Tatnall
BW Coach Kereteleswe

CN Alex Fung
ES Jacques Bulchand
ES Jorge Rodriguez-Diaz
ES Javier Osorio
FI Tuulki Paturi
GB Len Newton
GB Brian Samways

IN Rakesh Moha Bhatt
JP Toshio Okamoto
NL Adrie Visscher
UG Ronald Bisaso
US Connie Fulmer
US Christopher A. Thorn

AU Coach Kereteleswe
SIG 3.9 Special Interest Group on Digital Literacy

est. 2007
URL: http://www.educanext.org; http://www.ifip-tc3.net

Chair
Dr. Lampros STERGIOULAS
Brunel University
Dept. of Information Systems and Computing
UXBRIDGE Middlesex UB8 3PH
United Kingdom
Tel. +44 1895 266044
Fax +44 1895 251686
e-mail: lampros.stergioulas@brunel.ac.uk

Vice-Chair
Prof. Dr. Valentina DAGIENE
Vilnius University Institute of Mathematics and Informatics
(VU MII)
Informatics Methodology Dept.
Akademijos str. 4
LT-08663 VILNIUS
Tel. +370 698 05448
Fax +370 527 29209
e-mail: dagiene@ktl.mii.lt

AU Ruth Geer
AT Gerald Futschek
AT Joanna Wild
BR Patricia Behar
CH Raymond Morel
FI Jari Keivisto
FR Bernard Cornu
GB Mike Kendall

GB Bob Muro
GB Ian Selwood
GR Helen Drenoyianni
HU Marta Turcsanyi-Szabo
IT Monica Banzato
IE Denise Leahy
LT Tatjana Jevsikova

NL Anneke Hacquebard
NO Sinéad Ratvik
NO Jan Wibe
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### Chair
Prof. Dr. Erich J. NEUHOLD, AT  
University of Vienna  
Fakultät für Informatik  
Liebiggasse 4  
AT-1010 VIENNA  
Austria  
Tel. +43 1 403 2528  
Fax +43 1 403 2528  
e-mail: erich.neuhold@univie.ac.at

### Vice-Chair
Dr. György L. KOVACS, HU  
Hungarian Acad. of Sciences  
Comp. and Autom. Research Institute  
Kende u. 13-17  
HU-1111 BUDAPEST  
Hungary  
Tel. +36 1 209 6143  
Fax +36 1 466 7503  
e-mail: gyorgy.kovacs@sztaki.hu

### Secretary
Dr. Philippe DALLEMAGNE, CH  
Centre Suisse d’électronique et de microtechnique  
CSEM SA  
Case Postate  
CH-2002 NEUCHATEL  
Switzerland  
Tel. +41 32 720 5521  
Fax +41 32 720 5720  
e-mail: philippe.dallemagne@csem.ch

### Publications & Events Officer
Prof. Gaetano CASCINI, IT  
Politecnico di Milano  
Dept. of Mechanics  
Via Giuseppe La Masa, 34  
IT-20156 MILANO  
Italy  
Tel. +39 02 2399 8463  
Fax +39 02 2399 8282  
e-mail: gaetano.cascini@polimi.it

### Financial Officer
Prof. Dr. Michael B. McGrath, US/ACM  
Colorado School of Mines  
Engineering Department  
2000 Little Raven St. 403  
DENVER, CO 80202  
USA  
Tel. +1 303 383 5016  
Fax +1 303 273 3602  
e-mail: mmcgrath@mines.edu

### Communications Officer
Mr. Ronald WAXMANN, US-IEEE  
EDA Standards Consulting  
Retired Principal Scientist at Uva  
24975 Hilltop Drive  
BEACHWOOD, OH 44122-1351  
USA  
Tel. +1 216 297 9378  
Fax +1 216 297 9378  
e-mail: r.waxmann@computer.org

---

| AR | Gabriela P. Henning |
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est. 2006, revised 2009
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Co-Chairs
Prof. Alain BERNARD
Ecole Centrale de Nantes
1, rue de la Noé
BP 92101
FR-44321 NANTES Cedex 3
France
Tel. +33 2 40 37 69 66
Fax +33 2 40 37 69 30
e-mail: alain.bernard@ircyn.ec-nantes.fr

Prof. Chris McMAHON
University of Bath
Department of Mechanical Engineering
Claverton Down
BATH BA2 7AY
United Kingdom
Tel. +44 1225 384026
Fax +44 1225 386928
e-mail: ensacam@bath.ac.uk

For Europe and Africa:
Prof. Abdelaziz BOURAS
Université Lumière
Lyon 2 - IUT Lumiere
160, Bd de l’Université
FR-69676 BRON, Cedex
France
Tel. +33 4 7877 3146
Fax +33 4 7800 6328
e-mail: abdelaziz.bouras@univ-lyon2.fr

Vice-Chairs

Secretary
Dr. Henk Jan PELS
Technische Univ. Eindhoven
Dept.of Technology Management
Section Information & Technology
P.O. Box 513 Paviljoen
NL-5600 MB EINDHOVEN
The Netherlands
Tel. +31 40 2473948
Fax +31 40 243 2612
e-mail: h.j.pels@tm.tue.nl

for America:
Prof. Debasish DUTTA
University of Illinois
226 Mechanical Engineering Building
1206 West Green Street
URBANA, IL 61801
USA
Tel. +1 217 333 6715
e-mail: ddutta@illinois.edu

for Asia and Pacific:
Dr. Balan GURUMOORTHY
Indian Institute of Science
Department of Mechanical Engineering
BANGALORE 560 012
India
Tel. +91 80 2293 2304
Fax +91 80 2360 1975
e-mail: bgm@mecheng.iisc.ernet.in

The membership list is still evolving
SIG 5.1 on Advanced Information Processing for Agriculture

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Chair
Prof. Dr. Daoliang Li
China Agricultural University
Director of CICTA
17 Tsinghua East Road
BEIJING 100083
P.R. CHINA
Tel. +86 10 62736764
Fax +86 10 62737679
e-mail: li_daoliang@yahoo.com

AU Roger Stone
CA Simon X. Yang
CN Yibin Ying
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DE Volker Grosser
DE Thomas Rauschenbach
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URL: http://www.computeraidedinnovation.net/

Chair
Prof. Gaetano CASCINI
Politecnico di Milano
Dept. of Mechanics
Via Giuseppe La Masa, 34
IT-20156 MILANO
Italy
Tel. +39 02 2399 8463
Fax +39 02 2399 8282
e-mail: gaetano.cascini@polimi.it

Vice-Chair (Asia)
Prof. Dr. Tan RUNHUA
Hebei University of Technology
Institute of Design for Innovation
TIANJIN 300130
China
Tel. +86 22 2656 4037
e-mail: rhtan@hebut.edu.cn

Vice-Chair (USA)
Dr. Su Kyeong CHO
DaimlerChrysler Corp.
CAx Research & Technology
800 Chrysler Drive
AUBURN HILLS
MI 48326-2757
USA
Tel. +1 248 576 9721
Fax +1 248 576 2880
e-mail: sc211@daimlerchrysler.com

Publication Officer
Ass. Prof. Denis CAVALUCCI
INSA Graduate School of Science and Technology
Design Engineering Laboratory
24, Boulevard de la Victoire
FR-67084 STRASBOURG
France
Tel. +33 3 88 14 4755
Fax +33 3 88 14 4799
e-mail: denis.cavallucci@insa-strasbourg.fr

AU Mary Lou Maher
BR Marco Aurelio de Carvalho
CA Nikolai Khomenko
CN Liu Hong
DE Albert Albers
DE Carsten Gundlach
DE Andreas Jost
DE Hansjürgen Linde

ES Joaquim Lloveras Maciá
ES Rosario Vidal
FR Roland De Guio
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est. 2001  
URL: [http://www.uninova.pt/~cove](http://www.uninova.pt/~cove)

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<td>Dr. Ricardo J. RABELO</td>
</tr>
<tr>
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<td>Federal Univ. of Santa Catarina</td>
</tr>
<tr>
<td>PT-2829-516 MONTE</td>
<td>DAS – Dept. of Automation and</td>
</tr>
<tr>
<td>CAPARICA</td>
<td>Systems, GSIGMA</td>
</tr>
<tr>
<td>Portugal</td>
<td>PO Box 476</td>
</tr>
<tr>
<td>Tel. +351 212948517</td>
<td>FLORIANOPOLIS</td>
</tr>
<tr>
<td>Fax +351 212941253</td>
<td>SC 088040-900</td>
</tr>
<tr>
<td>e-mail: <a href="mailto:cam@uninova.pt">cam@uninova.pt</a></td>
<td>Brazil</td>
</tr>
<tr>
<td></td>
<td>Tel. +55 48 331 9387 x 204</td>
</tr>
<tr>
<td></td>
<td>Fax +55 48 234 1519</td>
</tr>
<tr>
<td></td>
<td>e-mail: <a href="mailto:rabelo@das.ufsc.br">rabelo@das.ufsc.br</a></td>
</tr>
</tbody>
</table>

For Australia and Asia:  
Dr. Peter BERTOK  
RMIT University  
School of Computer Science & Information Technology  
GPO Box 2476  
MELBOURNE 3001  
Australia  
Tel. +61 3 9925 1851  
Fax +61 3 9662 1617  
e-mail: peter.bertok@rmit.edu.au

For Europe:  
Dr. Ing. Xavier BOUCHER  
ENSMSE-Ecole Nationale Superieure des Mines de St. Etienne  
158 Cours Fauriel  
FR-42023 ST. ETIENNE Cedex  
France  
Tel. +33 04 77 42 01 33  
Fax +33 04 77 42 66 66  
e-mail: boucher@emse.fr

| BR Rolando Vallejos       | GR Garyfallos Fragidis          | MO Tomasz Janowski              |
| CA Weiming Shen           | GR Adamantios Koupis            | MX Arturo Molina                |
| CH Myrna Flores            | HU Julius Herman                | NL Hamideh Afsarmanesh          |
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| FR Pierre Maret           | LU Francois Vernadat            | US Shimon Y. Nof                |
Chair
Prof. Marco TAISCH
Politecnico di Milano
Dip. di Ingegneria Gestionale
Piazza Leonardo da Vinci, 32
IT-20133 MILANO
Italy
Tel. +39 02 2399 4815
Fax +39 02 2399 2700
e-mail: marco.taisch@polimi.it

Vice-Chairs
for Europe:
Dr. Volker STICH
FIR Forschungsinstitut für Rationalisierung an der RWTH Aachen
Pontdriesch 14/16
DE-52062 AACHEN, Germany
Tel. +49 241 477 05 104
Fax +49 241 477 05 198
e-mail: st@fir.rwth-aachen.de

for America:
Prof. Thomas R. GULLEDGE, Jr
George Mason University
Enterprise Eng., MS 2E4
FAIRFAX, VA 22030-4444, USA
Tel. +1 703 993 3184
e-mail: gulledge@gmu.edu

for Asia-Pacific:
Prof. Shigeki UMEDA
Musashi University
1-26 Toyotama-kami Nerima,
TOKYO 176-8534, Japan
Tel. +81 35 984 3837
Fax +81 33 991 1198
e-mail: shigeki@cc.musashi.ac.jp

Secretary
Prof. Dimitris KIRITSIS
Ecole Polytechnique Fédérale de Lausanne
Fédérale de Lausanne
ME A1 396 (Bâtiment ME)
Station 9,
CH-1015 LAUSANNE
Switzerland
Tel. +41 21 693 51 63
Fax +41 21 693 35 53
e-mail: dimitris.kiritsis@epfl.ch

*) Honorary member
WG5.8 Enterprise Interoperability
est.2006, revised

Chair
Prof. Dr. Guy DOUMEINGTS
Université Bordeaux1
LAPS / IMS
351 Cours de la Libération
FR-33405 TALENCE Cedex
France
Tel. +33 607 05 73 52
Fax +33 540 00 31 32
e-mail: guy.doumeingts@interop-vlab.eu

Vice-Chairs
Prof. Xiaofei XU
Harbin Institute of Technology
School of Computer Science & Technology
92 West Dazhi Street
CN-HARBIN 150001
P. R. of China
Tel. +86 451 86418566
Fax +86 451 86418566
e-mail: xiaofei@hit.edu.cn

Prof. Kai MERTINS
Fraunhofer IPK
Pascalstrasse 8-9
DE-10587 BERLIN
Germany
Tel. +49 30 39 006233
Fax +49 30 39 32503
e-mail: kai.mertins@ipk.fraunhofer.de

Prof. Lea KUTVONEN
University of Helsinki
Department of Computer Science
FI-00014 HELSINKI
Finland
Tel. +358 9 191 51362
Fax +358 9 191 51120
e-mail: lea.kutvonen@cs.helsinki.fi

Secretary
Prof. Pontus JOHNSON
Royal Institute of Technology (KTH)
School of Electrical Engineering
Osquldas väg 12, 7tr
SE-100 44 STOCKHOLM
Sweden
Tel. +46 8 790 6825
Fax +46 8 790 6839
e-mail: pontusj@ics.kth.se

Treasurer
Prof. Stephan KASSEL
University of Applied Sciences
Faculty of Economics and Business Administration
Scheffelstraße 39
DE-08066 ZWICKAU
Germany
Tel. +49 375 536 3492
Fax +49 375 536 3104
e-mail: stephan.kassel@fh-zwickau.de

AT  Georg Weichhart**
BE  Robert Meersman
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BR  João Paulo Almeida
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SE  Paul Davidsson
US  Isabel Cruz
US  Ted Goranson

*) Web Site Responsibilities (Content)
**) Web Site Responsibilities (Structure)
****) Event Coordinator
WG 5.10 Computer Graphics and Virtual Worlds

est. 1987, revised 1994, 2012
URL: http://cospace.sce.ntu.edu.sg/ifip/

Chair
Dr. Alexei SOURIN
Nanyang Technological University
School of Computer Engineering
Nanyang Avenue
SG-SINGAPORE 939798
Singapore
Tel. +65 6790 4292
Fax +65 6792 6559
e-mail: assourin@ntu.edu.sg

Vice-Chair
Prof. Dr. Rae A. EARNSHAW
Univ.of Bradford
Dept. of Electronic Imaging and Media Communications
Richmond Rd
BRADFORD BD7 1DP
West Yorkshire
United Kingdom
Tel. +44 1 274 234 001
Fax +44 1 274 233 727
e-mail: r.a.earnshaw@bradford.ac.uk

Chair
Mr. Gerald SCHIMAK
AIT Austrian Institute of Technology GmbH
Information of Management & eHealth, Safety & Sec.Dept.
AT- 2444 SEIBERSDORF Austria
Tel: +43 (0) 50550-3125
Fax +43 (0) 50550-2813
e-mail: gerald.schimak@ait.ac.at

Vice-Chair
Dr. Steven P. FRYSINGER
James Madison University
College of Integrated Science and Technology
701 Carrier Drive – MSC 4102
HARRISONBURG, VA 22807 USA
Tel. +1 540 568 2710
Fax +1 540 568 2768
e-mail: frysinsp@jmu.edu

Secretary
Prof. Dr. Jiří HŘEBIČEK
Masaryk University
Inst. of Biostatistics and Analyses
Kamenice 126/3
CZ-625 00 BRNO Czech Republic
Tel. +420 549 493 186
e-mail: hrebicek@iba.muni.cz

AT Werner Pillmann
AU Robert Argent
AU Anthony Jakeman
AU John Norton
BR Virginia Brihante
CA William Booty
CA Daryl H. Hepting
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CA Alexander Storey
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IT Giorgio Guariso
IT Rodolfo Soncini-Sessa
MO Chris George
US Daniel Ames
US Nigel Quinn
ZA Gavin Fleming
WG 5.12 Architectures for Enterprise Integration
est. 1995

Chair
Prof. Dr. Peter BERNUS
Griffith University
School of Computing & Inf.
NATHAN, QLD 4111
Australia
Tel. +61 7 875 5039
Fax +61 7 875 5051
e-mail: p.bernus@griffith.edu.au

Vice-Chair
Prof. Richard H. WESTON
Loughborough Univ. of Techn.
LOUGHBOROUGH LE1 3TU
United Kingdom
Tel. +44 1509 222 907
Fax +44 1509 267 725
e-mail: r.h.weston@lut.ac.uk

WG 5.13 Bioinformatics and its Applications
est. 2010

Chair
Dr. K.R. PARDASANI
Maulana Azad National Institute of Technology (MANIT)
Department of Mathematics
462051 BHOPAL
India
Tel. +91 755-2671486
e-mail: kamalrajp@rediffmail.com

Vice-Chair
to be determined

Secretary
Dr. K.R. PARDASANI
Maulana Azad National Institute of Technology (MANIT)
Department of Mathematics
462051 BHOPAL
India
Tel. +91 755-2671486
e-mail: kamalrajp@rediffmail.com

AT Peter Kopacek
AT Norbert Roszenich
AU Laszlo Nemes
AU Libjsa Vlici
CA Fadi G. Fadel
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CA Ajit Pardasani
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JP Atsushi Inamoto
JP Yusaku Shibata
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MX Arturo Molina Gutierrez

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PT João José Pinto Ferreira
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MY Zeti Azura Hussein
NP D.B. Gurung

NZ Nikola Kasabov
RU Maria G. Samsonova
SG B. Mohanty
TR Hasan Ogul
US Elizabeth Ray DeLong
US Warren J. Ewens
US Matthew He
US Mamoru Kato
US Marcos S. Pinto
TC 6 - Communication Systems

Chair
Prof. Dr. Guy LEDUC, BE
Université de Liège
Faculté des Sc. Appliquées
Département d’Electricité, Électronique et Informatique
Institut Montefiore
Grande Traverse, 10 Bât. B 28
BE-4000 LIEGE
Belgium
Tel. +32 4 366 2698
Fax +32 4 366 2989
e-mail: guy.leduc@ulg.ac.be

Vice-Chair
Prof. Ramon PUIGJANER, ES
University of Balearic Islands
Departament de Ciencies
Carretera de Valldemossa km 7.5
ES-07122 PALMA DE MALLORCA, Spain
Tel. +34 9 7117 3288
Fax +34 9 7117 3003
e-mail: putxi@uib.cat

Special Consultant
Dr. Harry RUDIN, CH
IBM Zurich Research Laboratory
Säumerstrasse 4
CH-8803 RÜSCHLIKON
Tel. +41 44 720 3707
e-mail: hr@zurich.ibm.com

AT Guenter Haring
BE Andre Danthine*
BG Kiri Boyanov
BR Jose Neuman de Souza
CA Raouf Boutaba**
CLEI Benjamin Barán
EZ Robert Bestak
DE Otto Spaniol
DK Villy Baek Iversen
ES Ana Pont-Sanjuan
FI Matti Latva-aho
FR Louis Pouzin*
GB Peter Radford
GR Ioannis Stavrakakis
HU Sarolta Dibuz
IN S.V. Raghavan
JP Tadao Saito
KR Hyukjoon Lee
NL Aiko Pras
NO Finn Arve Aagesen
PL Adam Grzech
PT Augusto Casaca*
SE Gunnar Karlsson
SK Pavol Horvath
TH Vilas Wuwongse
TN Farouk Kamoun
US A. Lyman Chapin (ACM)
US Arun Iyengar (IEEE)
ZA G. Hancke
ZA Jean Whiley

ex-officio members: WG Chairs
*) honorary member
**) additional member recommended by TC6

WG 6.1 Architectures and Protocols for Distributed Systems

Chair
Prof. Dr. Elie NAJM
ENST
Networks and Computer Science Department
46, rue Barrault
FR-75013 PARIS Cedex 13
France
Tel. +33 1 4581 7709
Fax +33 1 4581 3119
e-mail: elie.najm@enst.fr

Vice-Chair
Prof. Dr. John DERRICK
University of Sheffield
Dept. of Computer Science
Regent Court
211 Portobello Street
SHEFFIELD S1 4DP
United Kingdom
Tel. +44 114 22 21800
Fax +44 114 22 21810
e-mail: j.derrick@dcs.shef.ac.uk

AU Kerry Raymond
BE Guy Leduc
CA Gregor v. Bochmann
CA Luigi Logrippo
ES David de Frutos Escrig
FI Lea Kuivonen
FI Martti Tenari
FR Ana Rosa Cavalli
IT Alessandro Fantechi
IT Roberto Gorrieri
IT Diego Latella
JP Teruo Higashino

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WG 6.2 Network and Internetwork Architectures
est. 1994, revised 2000, 2009
URL: http://www.ifip.tu-graz.ac.at/TC6/WG/index.htm

Chair
Prof. Dr.-Ing. Georg CARLE
Network Architect. and Services
Institute for Informatics
TU München
Boltzmannstr. 3
DE-85748 GARCHING/München
Germany
Tel. +49 89 289 18030
Fax +49 89 289 18033
e-mail: carle@in.tum.de

WG 6.3 Performance of Communication Systems
est. 1994, revised 2001, 2010
URL: http://cnd.iit.cnr.it/ifipwg63/

Chair
Prof. Marco CONTI
National Research Council
Institute for Informatics and Telematics
Via G. Moruzzi, 1
IT-56124 PISA, Italy
Tel. +39 050 315 3062
Fax +39 050 315 2593
e-mail: marco.conti@iit.cnr.it
WG 6.4 Internet Applications Engineering

URL: http://www.ifip.tu-graz.ac.at/TC6/WG/index.htm

Chair
Dr. Arun IYENGAR
IBM T.J. Watson Research Ctr.
19 Skyline Drive
HAWTHORNE, NY 10532
USA
Tel. +1 914 784 6468
Fax +1 914 784 7455
e-mail: aruni@us.ibm.com

WG 6.6 Management of Networks and Distributed Systems

URL: http://www.simpleweb.org/ifip/

Chair
Dr. Aiko PRAS
University of Twente
Electrical Engineering, Mathematics and Computer Science
P.O. Box 217
NL-7500 AE ENSCHEDE
The Netherlands
Tel. +31 53 489 3778
Fax +31 53 489 4524
e-mail: pras@cs.utwente.nl

Vice Chair
Dr. Olivier FESTOR
LORIA-INRIA Lorraine
Technopole de Nancy-Brabois-
Campus scientifique
615, rue de Jardin Botanique –
B.P. 101
FR-54600 VILLERS LES NANCY Cedex, France
Tel. +33 3 83 59 30 66
Fax +33 3 83 41 30 79
e-mail: olivier.festor@loria.fr
Washington, D.C., June 8-13, 2009

WG 6.7 Smart Networks

WG 6.8 Mobile and Wireless Communications
URL: http://www.ifip.tu-graz.ac.at/TC6/WG/index.htm

Chair
Dr. Pedro CUENCA
Univ. de Castilla la Mancha
Departament Informática ICLM
Escuela Politécnica Superior de Albacete
ES-02071 ALBACETE
Spain
Tel. +34 967 5999308
Fax +34 967 599224
e-mail: pedro.cuenca@uclm.es

Vice-Chair
Prof. Jozef WOZNIAK
Gdansk University of Technology
Faculty of Electronics
ul. G. Narutowicza 11/12
PL-80952 GDANSK
Poland
Tel. +48 58 472223
Fax +48 58 416132
e-mail: jowoz@pd.gda.pl

AU G. Chen
GB George Pavlou
US Shri K. Goyal
AU Pradeep Kumar Ray
GB Morris Sloman
US Takeo Hamada
BR Jose Neuman de Souza
GR George Kormentzas
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US Douglas N. Zuckerman
GB Dave Milham
US German Goldszmidt
ZA Jan Roos
GB Gerard Parr

WB 6.3 Wireless Key Management

Chair
Prof. Mariusz Krawczynski
Polish Academy of Sciences
Institute of Telecommunications
22-210 Warszawa, Poland
Tel. +48 22 823-75-11
Fax +48 22 823-75-11
e-mail: m.krawczynski@itu.pwr.wroc.pl

Vice-Chair
Prof. Jozef WOZNIAK
Gdansk University of Technology
Faculty of Electronics
ul. G. Narutowicza 11/12
PL-80952 GDANSK
Poland
Tel. +48 58 472223
Fax +48 58 416132
e-mail: jowoz@pd.gda.pl

BR Claudia Barenco
DK Villy Baek Iversen
IT Marco Conti
BR Otto Duarte
ES José Villaion
IT Franco Davoli
CA Ali Miri
FI Olli Martikainen
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PT Augusto Casaca
DE Otto Spaniol
IN Debashis Saha
US Arup Acharya
DE Adam Wolisz
WG 6.9 Communication Systems for Developing Countries

Chair
Dr. Siraj SHAIKH
Coventry University
Department of Computing and Digital Environment
Priory Street
COVENTRY CV1 5FB
United Kingdom
Tel. +44 2476 888 225
Fax +44 7939 233 995
e-mail: s.shaikh@coventry.ac.uk

Vice-Chair
Dr. Rodrigo SANTOS
Universidad Nacional del Sur – CONICET
Avda Alem 1253
AR-8000 BAHIA BLANCA
Argentina
Tel. +54 291 4595181
Fax +54 291 4595154
e-mail: ierms@criba.edu.ar

Chair
Dr. Josep SOLÉ-PARETA
Univ. Politècnica de Catalunya
Computer Architecture Dept.
C/. Jordi Girona, 1-3
Mòdul D6 (Campus Nord)
ES-08034 BARCELONA
Spain
Tel. +34 93 401 6982
Fax +34 93 401 7055
e-mail: pareta@ac.upc.edu

WG 6.10 Photonic Networking

est. 1998
URL: http://www.ifip.tu-graz.ac.at/TC6/WG/index.htm

Chair
Dr. Josep SOLÉ-PARETA
Univ. Politècnica de Catalunya
Computer Architecture Dept.
C/. Jordi Girona, 1-3
Mòdul D6 (Campus Nord)
ES-08034 BARCELONA
Spain
Tel. +34 93 401 6982
Fax +34 93 401 7055
e-mail: pareta@ac.upc.edu

Chair
Dr. Siraj SHAIKH
Coventry University
Department of Computing and Digital Environment
Priory Street
COVENTRY CV1 5FB
United Kingdom
Tel. +44 2476 888 225
Fax +44 7939 233 995
e-mail: s.shaikh@coventry.ac.uk

Vice-Chair
Dr. Rodrigo SANTOS
Universidad Nacional del Sur – CONICET
Avda Alem 1253
AR-8000 BAHIA BLANCA
Argentina
Tel. +54 291 4595181
Fax +54 291 4595154
e-mail: ierms@criba.edu.ar

AD Miquel Nicolau I Vila
AE Greg Kelaart-Courtney
BR Jose Neumann de Souza
CA Raouf Boutaba

CLEI Benjamin Barán
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ES Ana Pont-Sanjuan
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WG 6.11 Communication aspects of the e-World

est. 2000, revised 2001, 2010
URL: http://ifip.informatik.uni-hamburg.de/ifip/tc/6/wg/11

Co-Chairs
Prof. Wojciech CELLARY
The Poznan Univ. of Economics
Department of Information Technology
Mansfelda 4
PL-60-854 POZNAN, Poland
Tel. +48 61 848 0549
Fax +48 61 848 3840
e-mail: cellary@kti.ae.poznan.pl

Prof. Dr. Winfried LAMERSDORF
University of Hamburg
Department of Informatics
Faculty for Math., Informatics, and Nat. Sciences
Distributed and Information Systems (VSIS)
Vogt-Kölln-Str. 30
DE-22527 HAMBURG, Germany
Tel. +49 40 42883 2421
Fax +49 40 42883 2328
e-mail: lamersd@informatik.uni-hamburg.de

Prof. Reima SUOMI
Turku School of Economics and Business Administration
Information Systems Science
Rehtorinpellonkatu 3
FI-20500 TURKU, Finland
Tel. +358 2 4814 409
e-mail: reima.suomi@tse.fi

AT Roland Traunmüller
AU Zoran Milosevic
BE Dirk Deschoolmeester
BR America N. Amorim
BR Manuel J. Mendes
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Chair
Dr. Jacques HENRY, FR
IMB, Université Bordeaux 1
INRIA Bordeaux Sud Ouest
351, cours de la libération
FR-33405 TALENCE Cedex
France
Tel. +33 5 4000 3448
Fax +33 5 4000 6950
e-mail: jacques.henry@inria.fr

Vice-Chairs
Prof. Irena NASIECKA, US/ACM
University of Virginia
Dept. of Mathematics
Kerchof Hall
CHARLOTTESVILLE, VA
22901 USA
Tel. +1 434 924 8896
Fax +1 434 982 3084
e-mail: il2v@virginia.edu

Prof. Fred TROELTZSCH
Technische Universitaet Berlin
Inst. f. Mathematik
Strasse d. 17. Juni 135
DE-10623 BERLIN, Germany
Tel. +49 30 314 79 688
Fax +49 30 314 78 658
e-mail: troeltzsch@math.tu-berlin.de

AR Hugi D. Scolnik
AT Alfred Kalllauer
BE Philippe Toint
BG Peter Kenderov
BR Edmundo de Souza e Silva
CH Peter Kail*
CLEI Héctor Caneva
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Chair
Prof. Arunabha BAGCHI
University of Twente
Dept. Applied Mathematics
P.O. Box 217
NL-7500 AE ENSCHEDE
The Netherlands
Tel. +31 53 4893406
Fax +31 53 4340733
e-mail: a.bagchi@math.utwente.nl

BE Tom Dhaene
IT Gottfried Koch
IT A. De Santis
LT N. Telksnys
US A.V. Balakrishnan
US N. De Claris
US R. Leiland
US Ravi R. Mazumdar
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ZA Cobus Nel
WG 7.2 - Computational Techniques in Distributed Systems

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Chair
Prof. Jean Paul ZOLESIO
CNRS research director
INRIA, projet OPALE
2004 route des lucioles
FR-06902 SOPHIA ANTIPOLIS
Cedex, France
Tel. +33 492 38 7163
Fax +33 492 38 7980
e-mail: jean-paul.zolesio@sophia.inria.fr

Vice-Chair
Prof. Dr. Dietmar HÖMBERG
WIAS
Mohenstraße 39
DE-10117 BERLIN
Germany
Tel. +49 30 20372 491
Fax +49 30 20372 412
e-mail: hoemberg@wias-berlin.de

Secretary
Dr. Lorena BOCIU
North Carolina State University
Box 8205
USA
Tel. +1 919 515 7321
e-mail: lvbociu@ncsu.edu

AE Amiad Tuffaha
AT Michael Hintermueller
AT Walter Ring
CA M.C. Delfour
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CA Robert Owens
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DE Michael Hinze
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US Seevinh Sivasundaram
US Daniel Toundykov

WG 7.3 - Computer System Modeling

est. 1973

Chair
Prof. Edmundo de SOUZA e SILVA
Fed. Univ.of Rio de Janeiro
Graduate School & Research in Eng. System Eng. & Computer Science
Caixa postal 68511
RIO DE JANEIRO
RJ 21941-972, Brazil
Tel. +55 21 2562 8668
Fax +55 21 2562 8676
e-mail: edmundo@land.ufrj.br

Vice-Chair
Dr. Philippe NAIN
INRIA Sophia Antipolis
2004 route des Lucioles
BP 93
FR-06902 SOPHIA ANTIPOLIS
France
Tel. +33 4 9238 7896
Fax +33 4 9238 7858
e-mail: nain@sophia.inria.fr

Secretary
Prof. Sem BORST
Eindhoven University of Technology
Department of Mathematics & Computer Science
P.O. Box 513
NL-5600 MB EINDHOVEN
The Netherlands
Tel. +31 40 247 5105
Fax +31 40 246 5995
e-mail: sem@win.tue.nl

AT Günter Haring
BE Pierre-Jacques Courtis
BE Guy Latouche
CA Derek L. Eager
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est. 1986

URL: http://www.math.tu-bs.de/ifip/welcome.html

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Chair
Prof. Dr. Michael FABER
ETH Zürich
Institut f. Baustatik und Konstruktion; HIL E 14.1
Wolfgang-Pauli-Str. 15
CH-8093 ZÜRICH
Switzerland
Tel. +41 44 633 31 17
Fax +41 44 633 10 64
e-mail: faber@ibk.baug.ethz.ch

Vice-Chair
Prof. Daniel STRAUB
TU München
FB Risikoanalyse
DE-80290 MÜNCHEN
Germany
Tel. +49 89 289 23051
e-mail: straub@era.bv.tum.de

AU R.E. Melchers
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Chair
Prof. Janusz GRANAT
Warsaw University of Techn.
Institute of Control and Computation Engineering
ul. Nowowiejska 15/19
PL-00 665 WARSAW
Poland
Tel. +48 22 234 76 40
Fax +48 22 825 37 19
e-mail: j.granat@itl.waw.pl

Vice-Chair
Dr. Daniel R. DOLK
Naval Postgraduate School
Information Systems Academic Group
MONTEREY, CA 93943
USA
Tel. +1 831 656 2260
Fax +1 831 656 3679
e-mail: drdolk@nps.navy.mil

AU Edward Szczepicki
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WG 7.7 - Stochastic Optimization

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Chair
Prof. Kurt MARTI
Federal Armed Forces Univ. Munich
Aero-Space Eng. & Techn.
Werner Heisenberg-Weg 39
DE-85577 NEUBIBERG
Germany
Tel. +49 89 6004 2541 2560
Fax +49 89 6004 4092 3560
e-mail: kurt.marti@unibw-muenchen.de

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Chair
Prof. Jan PRIES-HEJE, DK
Roskilde University
Dept. of Communication,
Business & IT
User Driven IT Innovation
Research Group
Building 42.2
Universitetsvej 1
DK-4000 ROSKILDE, Denmark
Tel. +45 4674 3051
e-mail: janph@ruc.dk

Vice-Chairs
Prof. George M. KASPER, US/ACM
Virginia Commonwealth
University
School of Business
Dept. of Inf. Systems
301 W. Main Street
RICHMOND, VA 23284-4000
USA
e-mail: gmkasper@vcu.edu

Secretary
Prof. Isabel RAMOS, PT
Universidade do Minho
Escola de Engenharia
Departamento de Sistemas de Informação
Campus de Azurém
PT-4800 058 GUIMARAES
Portugal
Tel. +351 253 510317
e-mail: iramos@dsi.uminho.pt

Prof. A Min TJOA, AT
Vienna Univ. of Technology
Inst. of Software Technology
Favoritenstr. 9-11/188
AT-1040 WIEN
Austria
Tel. +43 1 58801 18801
Fax +43 1 58801 18899
e-mail: amin@ifis.tuwien.ac.at

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Chair
Prof. John KROGSTIE
IDI, NTNU
Sem Sælandsvei 7-9
NO-7030 TRONDHEIM
Norway
Tel. +47 73 59 36 77
Fax +47 73 59 44 66
e-mail: krogstie@idi.ntnu.no

Vice-Chair
Dr. Jolita RALYTE
Université de Genève
Centre Universitaire
d’Informatique – CUI
Battelle - bâtiment A
7, route de Drize
CH-1227 CAROUGE
Switzerland
Tel. +41 22 379 02 45
Fax +41 22 379 02 33
e-mail: jolita.ralyte@unige.ch

Secretary
Dr. Anne PERSOON
University of Skövde
School of Humanities and Informatics
P.O. Box 408
SE-541 28 SKÖVDE
Sweden
Tel. +46 500 448342
e-mail: anne.persson@his.se

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WG 8.2 - The Interaction of Information Systems and the Organization

Aims and Scopes

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Chair
Prof. Brian FITZGERALD
University of Limerick
Frederick Krehbiel Chair in Innovation in Business & Techn.
Lero – the Irish Software Engineering Research Centre
IE-LIMERICK
Ireland
Tel. +353 61 202720
Fax +353 61 213036
e-mail: bf@ul.ie

Vice-Chair
Prof. Kevin CROWSTON
Syracuse University
School of Information Studies
348 Hinds Hall
SYRACUSE, NY 13244-4100
USA
Tel. + 1 315 464 0272
Fax + 1 315 550 2155
e-mail: crowston@ifipwg82.org

Secretary
Prof. Ulrike SCHULTZE
Southern Methodist University
ITOM, Cox School of Business
PO Box 75033
DALLAS, TX 75275-0333
USA
Tel. + 1 214 768 4265
Fax + 1 214 768 4099
e-mail: uschultz@smu.edu

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Chair
Dr. Frédéric ADAM
University College Cork
Dept. of Accounting, Finance and Information Systems
O’Rahilly Building
CORK, Ireland
Tel. +353 21 90 33 43
Fax +353 21 27 15 66
e-mail: fadam@afis.ucc.ie

Vice-Chairs
Prof. Sven CARLSSON
Jönköping University
Jönköping International Business School
P.O. Box 1026
SE-551 11 JOENKOEPING
Sweden
Tel. +46 36 157504
Fax +46 36 121832
e-mail: sven.carlsson@jibs.hj.se

Secretary
Prof. Gloria PHILLIPS-WREN
Loyola College in Maryland
Management
4501 N. Charles Street
BALTIMORE, MD 21210 USA
Tel. +1 410 617 5470
Fax +1 410 617 2006
e-mail: gwren@loyola.edu

Prof. Frada BURSTEIN
Monash University
Faculty of Information Technology
School of IMS
P.O. Box 197
CAULFIELD EAST 3145
Australia
Tel. +61 3 9993 2011
Fax +61 3 9993 1077
e-mail: frada.burstein@infotech.monash.edu.au

AT Fatima Dargam
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Chair
Dr. Edgar WEIPPL
SBA Research gGmbH
 Favoritenstrasse 16, 2. Stock
 AT-1040 WIEN
 Austria
Tel. +43 1 505 36 88
Fax +43 1 505 88 88
m-Mail:
eeweip@securityresearch.at

Vice-Chairs
Dr. Wichian CHUTIMASKUL
King Mongkut’s University of Technology Thonburi
School of Information Technology
Bangmod
Thungkru
TH-BANGKOK 10140
Thailand
Tel. +66 2470 9849
Fax +66 2872 7145
e-Mail: wichian@sit.kmutt.ac.th

Professor Silvia AVASILCAI
The Technical University “Gheorghe Asachi” of Iasi
Department of Management and Production Systems Engineering
Bd. D. Mangeron 53
Corp TEX1, 305
RO-700050 IASI
Romania
Tel. +4 0 23 278683 1204
Fax +4 0 23 230491
m-ails: savasilca@mis.p.tuiasi.ro
avalcai@yahoo.com

Secretary
Dr. D. Mangeron

CA Edmond Miresco
GB Pushpa Rani Subramaniam
SE Björn Thodenius
CA Hanan Yaniv
GB Despina Tsalavoutis
SG Yin Ping Yang
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<td>Fax +1 206 616 3152</td>
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</tr>
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<td>e-mail: <a href="mailto:jscholl@u.washington.edu">jscholl@u.washington.edu</a></td>
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WG 8.6 - Transfer and Diffusion of Information Technology

Chair
Dr. Linda LEVINE
Carnegie Mellon University
Software Engineering Institute
5000 Forbes Avenue
PITTSBURGH, PA15213-3890
USA
tel. +1 412 268 3893
Fax +1 412 268 5758
e-mail: llherself@gmail.com

Vice-Chairs
Dr. Deborah BUNKER
University of New South Wales
Inf. Syst., Technology & Management School
Faculty of Commerce and Economics
Sydney 2052
Australia
tel. +61 2 9385 4255
Fax +61 2 9662 4061
e-mail: d.bunker@unsw.edu.au

Secretary
Prof. David WASTELL
Nottingham University Business School
Information Systems
Wollaton Road
NOTTINGHAM NG8 1BB
United Kingdom
tel. +44 115 8467783
e-mail: David.Wastell@nottingham.ac.uk

Prof. Tor J. LARSEN
Norwegian School of Management
Nydalsveien 37
NO-0442 OSLO
Norway
tel. +47 4641 0733
Fax +47 4641 0405
e-mail: tor.j.larsen@bi.no

AU L. Dawson
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Chair
Prof. A Min TJOA
Vienna University of Technology
Institute of Software Technology
Favoritenstr. 9 -11/188
AT-1040 VIENNA
Austria
Tel. +43 1 5880 18800
Fax +43 1 504 05 32
e-mail: tjoa@ifs.tuwien.ac.at

First Vice-Chair (Founding Chair)
Prof. Li Da XU
Old Dominion University
Department of Information Technology and Decision Science
Constant Hall 2076
NORFOLK, VA 23529
USA
Tel. +1 757 683 6138
e-mail: lxu@odu.edu

Second Vice-Chair
Prof. Maria RAFFAI
Széchenyi István University
Faculty for Information Science and Electrical Engineering
Egyetem tér 1
HU-9026 GYŐR
Hungary
Tel. +36 96 613 525
Fax +36 96 613 525
e-mail: maria.raffai@gmail.com

First Secretary
Prof. Ling LI
Old Dominion University
Department of Information Technology and Decision Sciences
NORFOLK, VA 23529
USA
Tel. +1 757 683 6455
Fax +1 757 683 5639
e-mail: lli@odu.edu

Second Secretary
Prof. Sohail CHAUDHRY
Villanova University
Faculty for Operations
VILLANOVA, PA 19085
USA
Tel. +1 610 519 4369
e-mail: sohail.chaudhry@villanova.edu

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Chair
Dr. Richard BASKERVILLE
Georgia State University
CIS Dept.
P.O. Box 4015
ATLANTA, GA 30302
USA
Tel. +1 404 413 7362
Fax +1 404 413 7394
e-mail: baskerville@acm.org

Vice-Chair
Dr. Merrill WARKENTIN
Mississippi State University
Management & Information Systems Department
P.O. Box 9581
MISSISSIPPI STATE, MS 39762-9581 USA
Tel. +1 662 325 1955
Fax +1 662 325 8651
e-mail: m.warkentin@msstate.edu

Editor
Dr. Anthony VANCE
Brigham Young University
Marriott School of Management
Inf. Systems Department
Office 779 TNRB
PROVO, UT 84602
USA
Tel. +1 801 361 2531
e-mail: anthony.vance@byu.edu

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ZA
CSIR, DPSS
P.O. Box 395
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South Africa
e-mail: jphahlamohlaka@csir.co.za
Secretary
Mr. Oliver BURMEISTER, AU
Charles Sturt University
Course Coordinator BIT &
BBus/BIT, Bldg.01
WAGGA WAGGA, NSW 2678
Australia
Tel. +61 2 6933 2591
Fax +61 2 6933 2080
e-mail: oburmeister@csu.edu.au

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Prof. Steven B. SAWYER
School of Information Studies
Syracuse University
344 Hinds Hall
SYRACUSE, NY 13244-4100
USA
Tel. +1 315 443 6147
Fax +1 315 443 6886
e-mail: ssawyer@syr.edu
Vice-Chair
Prof. Rudi SCHMIEDE
Technical University Darmstadt
Fachbereich 2
"Technisierung u.Gesellschaft"
Karolinenplatz 5
DE-64289 DARMSTADT
Germany
Tel. +49 6151 16 4933
e-mail: schmiede@ifis.tu-darmstadt.de
Secretary
Prof. Jonathan P. ALLEN
University of San Francisco
Information Systems
2130 Fulton Street, Malloy Hall
SAN FRANCISCO
CA 94117-1045, USA
Tel. +1 415 422 6570
Fax +1 415 422 2502
e-mail: jpallen@usfca.edu

AT Paul Kolm
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AU Julie Cameron
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Chair
Ms. Diane WHITEHOUSE
The Castlegate Consultancy
27 Castlegate
MALTON Y017 7DP
North Yorkshire
United Kingdom
e-mail: info@thecastlegateconsultancy.com

Vice-Chairs
Mr. Marc VAN LIESHOUT
TNO Information and Communication Technology
P.O. Box 5050
NL-2600 GB DELFT
The Netherlands
Tel. +31 15 2857125
Fax +31 15 2857382
e-mail: marc.vanlieshout@tno.nl

Prof. Norberto PATRIGNANI
Universita Cattolica di Milano
Largo Gemelli 1
IT-20123 MILANO
Italy
e-mail: norberto.patrignani@unicatt.it

Vice Chairs
Prof. Philippe GOUJON
Computer Science Institute
University of Namur (FUNDP)
rue Grandgagnage, 21
BE-5000 NAMUR
Belgium
Tel. +32 81 72 41 08
Fax +32 81 72 49 67
e-mail: philippe.goujon@fundp.ac.be

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Chair
Dr. Penny DUQUENOY
Middlesex University
School of Engineering and Information Sciences
The Burroughs
LONDON NW4 4BT
United Kingdom
Tel. +44 20 8411 4333
Fax +44 20 8411 6943
e-mail: p.duquenoy@mdx.ac.uk

Vice-Chair
Dr. Kai K. KIMPPA
University of Turku
Dept. of Inf. Technology
FI-20014 Univ. of TURKU
Finland
Tel. +358 2 333 8665
Fax +358 2 333 8600
e-mail: kai.kimppa@utu.fi

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Prof. Alladi VENKATESH
University of California
CRITO (Center for Research on Information Technology)
3200 Berkeley Place
IRVINE, CA 92697
USA
Tel. +1 949 824 1134
Fax +1 949 824 8091
e-mail: avenkate@uci.edu

Vice-Chair
Mrs. Kathy BUCKNER
Napier University
School of Computing
Merchiston Campus
EDINBURGH, Scotland
United Kingdom
Tel. +44 131 455 2775
e-mail: k.buckner@napier.ac.uk

Secretary
Dr. Claire DORMANN
Carleton University
HOT Lab
1125 Colonel By Drive
OTTAWA, ON, K1S 5B6
Canada
Tel. +1 613 520 2600 6627
e-mail: cdormann@connect.carleton.ca

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Chair
Dr. Chris WESTRUP
University of Manchester
Manchester Business School
6.06 Harold Hankins
Oxford Road
MANCHESTER M15 6PB
United Kingdom
Tel. +44 161 275 4007
Fax +44 161 275 4023
e-mail: chris.westrup@manchester.ac.uk

Vice-Chairs
for African Region:
Dr. Jonathan MILLER
Miller Esselaar & Associates
P O Box 26138
ZA-HOUT BAY 7872
South Africa
Tel. +27 21 790 1327
Fax +27 21 790 1327
e-mail: jonmiller@icon.co.za

for Asian Region:
Dr. Roger W. HARRIS
5/B Angel Court
Ville de Cascade
No. 2 Lai Wo Lane
The IFIP Working Group 9.4 on the Social Implications of Computers in Developing Countries invites seek to involve members from the global south who may not always be able to attend IFIP events in person. They encourage those interested in their work to sign up through their web site www.ifipwg94.org.

For Latin America:
Prof. Renata La ROVERE
Universidade Federal do Rio de Janeiro
Instituto de Economia
Avenue Pasteur 250
BR-22290-240 RIO DE JANEIRO, Brazil
Fax +55 21 541 8148
e-mail: renata@ie.ufrj.br

This list of members comprises those who have signed up at www.ifipwg94.org. Some members, those who have chosen not to provide full personal information, are not included here. The working group has established a 17 member board working to develop events and activities around the globe.

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Chair  
Dr. Arthur TATNALL  
Victoria University  
Graduate School of Business  
P.O. Box 14428  
MELBOURNE 8001  
Australia  
Tel. +61 3 9919 1034  
Fax +61 3 9919 1064  
e-mail: arthur.tatnall@vu.edu.au

Vice-Chair  
Dr. David ANDERSON  
University of Portsmouth  
School of Creative Techn.  
Room 1003  
PORTSMOUTH, Hants  
PO5 4BT  
United Kingdom  
Tel. +44 23 9284 5525  
e-mail: david.anderson@port.ac.uk

Secretary  
Mrs. Barbara TATNALL  
58 Meyrick Crescent  
Melbourne 3205  
Australia  
Tel. +61 3 9459 2562  
Fax +61 3 9459 8827  
e-mail: barbara@heidelbergpress.com.au

AT René Riedl  
AT Heinz Zemanek  
AU Chris Avram  
AU Maxwell Burnet  
AU William Caelli  
AU Bill Davey  
AU John Deane  
AU David Demant  
AU Graham Farr  
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US Jeffrey Yost

VG 9.8 – Gender Diversity and ICT  
est. 2001, revised 2009  
URL: http://www.informatik.uni-bremen.de/~oechteri/IFIP

Chair  
Dr. Cecile K. M. CRUTZEN  
Lindeweg 49  
NL-6367 CH VOERENDAAL  
The Netherlands  
e-mail: ccr@hwh00000.de

AT René Riedl  
AT Heinz Zemanek  
AU Chris Avram  
AU Maxwell Burnet  
AU William Caelli  
AU Bill Davey  
AU John Deane  
AU David Demant  
AU Graham Farr  
AU Peter Juliff  
AU Audra Lukaitis  
AU Judy Sheard  
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DK Lars Heide

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AT S. Turrance Nandasara  
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AU Herman Spanjersberg  
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AU Drude Berntsen  
AU Norman Sanders  
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CA William Aspray  
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CA Martha Crosby  
CA Michael N. Geselowitz  
CA Mary Hopper  
CA John Impagliazzo  
CA John A. N. Lee  
CA Robert M. Price  
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US Michael N. Geselowitz  
US Mary Hopper  
US John Impagliazzo  
US John A. N. Lee  
US Robert M. Price  
US Julian Reitman  
US Jeffrey Yost

73
**Chair**
Dr. Magda HERCHEUI
University of Westminster
Marylebone Building
Room M201
35 Marylebone Road
LONDON NW1 5LS
United Kingdom
Tel. +44 20 7911 5000x3033
Fax +44 79 0665 3238
e-mail: m.hercheui@westminster.ac.uk

**Secretary**
Prof. Peter FLEISSNER
Vienna University of Technology
Institute fuer Gestaltungs- und Wirkungsforschung
Favoritenstrasse 9-11
AT-1040 WIEN
Austria
Tel. +43 1 58801 18735
Fax +43 1 58801 18793
e-mail: peter.fleissner@igw.tuwien.ac.at

**WG 9.9 - ICT and Sustainable Development**
est. 2005  Aims and Scopes
URL: http://www.ict-sd.org/

**Chair**
Dr. Magda HERCHEUI
University of Westminster
Marylebone Building
Room M201
35 Marylebone Road
LONDON NW1 5LS
United Kingdom
Tel. +44 20 7911 5000x3033
Fax +44 79 0665 3238
e-mail: m.hercheui@westminster.ac.uk

**Secretary**
Prof. Peter FLEISSNER
Vienna University of Technology
Institute fuer Gestaltungs- und Wirkungsforschung
Favoritenstrasse 9-11
AT-1040 WIEN
Austria
Tel. +43 1 58801 18735
Fax +43 1 58801 18793
e-mail: peter.fleissner@igw.tuwien.ac.at
TC 10 - Computer Systems Technology

est. 1976, revised 1987

URL: http://www.upb.de/cs/ag-rammig/TC10-Webpages/membertc10.htm

Chair
Dr. Bernhard ESCHERMANN, CH
ABB Schweiz AG
Semiconductors
Fabrikratasse 3
CH-5600 LENZBURG
Switzerland
Tel. +41 58 586 1365
Fax +41 58 586 1301
e-mail: bernhard.eschermann@ch.abb.com

Vice-Chair
Prof. Ricardo REIS, BR
Universidade Federal do Rio Grande do Sul
Av. Bento Goncalves, 9500
BR-91501-970 PORTO
ALEGRE, Brazil
Tel. +55 51 3316 9500
Fax +55 51 3316 7308
e-mail: reis@inf.ufrgs.br

Secretary
Prof. Paolo PRINETTO, IT
Politecnico di Torino
Dipart. di Automatica e Inf.
Corso Duca degli Abruzzi 24
IT-10129 TORINO
Italy
Tel. +39 011 5647007
Fax +39 011 5647099
e-mail: paolo.prinetto@polito.it

Aims and Scopes

URL: http://websrv2.c-lab.de/ifip-wg-102

Chair
Prof. Marilyn WOLF
School of ECE
Georgia Inst. of Technology
777 Atlantic Drive NW
ATLANTA, GA 30332
USA
Tel. +1 404 894 5933
Fax +1 404 385 1746
e-mail: marilyn.wolf@ece.gatech.edu

Vice-Chair
Dr. Bernd KLEINJOHANN
C-LAB
University of Paderborn
Fürstenallee 11
DE-33102 PADERBORN
Germany
Tel. +49 52 51 60 6101
Fax +49 52 51 60 6066
e-mail: bernd@c-lab.de

Publications Chair
Dr. Lisa KLEINJOHANN
C-LAB
University of Paderborn
Fürstenallee 11
DE-33102 PADERBORN
Germany
Tel. +49 52 51 60 6102
Fax +49 52 51 60 6066
e-mail: lisa.kleinjohann@c-lab.de

ex-officio members: WG Chairs

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WG 10.3 Concurrent Systems

Acting Chair
Prof. Erik MAEHLE
University of Lübeck
Institute of Computer Engineering
Ratzeburger Allee 160, House 33, Room 104
DE-23538 LÜBECK
Tel. +49 451 500-3690
Fax +49 451 500-3687
e-mail: maehle@iti.uni-luebeck.de

Vice-Chair
Prof. Guang GAO
University of Delaware
Department of Electrical and Computer Engineering
140 Evans Hall
NEWARK, DE 19716
USA
Tel. +1 302 831 8218
Fax +1 302 831 4316
e-mail: ggao@ee.udel.edu

Secretary
Prof. Makoto AMAMIYA
Kyushu University
Faculty of Information Science and Electrical Engineering
6-1 Ksuga-koen Ksuga
FUKUOKA 816-8580
Japan
e-mail: amamiya@is.kyushu-u.ac.jp

WG 10.4 Dependable Computing and Fault Tolerance

Chair
Dr. Richard D. SCHLICHTING
AT&T Labs Research
Shannon Laboratory, E221
180 Park Avenue
FLORHAM PARK, NJ 07932
USA
Tel. +1 973 360 8234
Fax +1 973 360 8077
e-mail: rick@research.att.com

Vice-Chair
Dr. Karama KANOUN
LAAS – CNRS
7, avenue du Colonel Roche
FR-31077 TOULOUSE Cedex 4
France
Tel. +33 5 61 33 62 35
Fax +33 5 61 33 64 11
e-mail: karama.kanoun@laas.fr

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SIG - 10.4.1 - Special Interest Group on Dependability Benchmarking
est. 1999
URL: http://www.ece.cmu.edu/~koopman/ifip_wg_10_4_sigdeb/

Chair
Dr. Karama KANOUN
LAAS-CNRS
7, Av. du Colonel Roche
FR-31077 TOULOUSE Cedex
France
Tel. +33 561 33 64 05
Fax +33 561 33 64 11
e-mail: karama.kanoun@laas.fr

Vice-Chair
Dr. Lisa SPAINHOWER
IBM Inc.
POUGHKEEPSIE, NY 12601
USA
e-mail: lisa@us.ibm.com

SIG - 10.4.2 - Special Interest Group on Concepts and Ontologies
est.2009

Chair
Prof. Algirdas AVIZIENIS
Vytautas Magnus University
Informatics Faculty
Donelaicio str. 58
LT-44248 KAUNAS
Lithuania
Tel. +370 37 327812
Fax +370 37 203858
e-mail: aviz@adm.vdu.lt

Vice-Chair
Luca Simoncini
Ravishankar K. Iyer

*) member emeritus
SIG - 10.4.3 - Special Interest Group on Education in Resilient Computing

est. 2009

Chair
Prof. Luca SIMONCINI
University of Pisa
Dept. of Information Engineering
via G. Caruso, 16
IT-56122 PISA
Italy
Tel. +39 050 2217 667
Fax +39 050 2217 522
e-mail: luca.simoncini@isti.cnr.it

FR Mohamed Kaaniche  DE Neeraj Suri  IT Roberto Baldoni
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WG 10.5 Design and Engineering of Electronic Systems

URL: http://tima.imag.fr/ifip/wg10-5/index.html

Chair
Prof. Dominique BORRIONE  Vice-Chairs
TIMA Laboratory  Prof. Ricardo REIS
46, avenue Félix Viallet  Universidade Federal do Rio
FR-38031 GRENOBLE Cedex 9  Grande do Sul
France  Av. Bento Goncalves, 9500
Tel. +33 4 7657 4982  BR-91501-970 PORTO
Fax +33 4 7657 4981  ALEGRE, Brazil
e-mail: dominique.borrione@imag.fr  e-mail: reis@inf.ufrgs.br

Prof. Luis M. SILVEIRA  University of Lisboa
INESC/IST
Rua Alves Redol, 9, 136
PT-1000-029 LISBOA
Portugal
Tel. +351 21 310337  Fax +351 21 3145843
e-mail: lms@inesc-id.pt

BE Luc Claesen  ES Carlos Delgado Kloos*
BR Pavlo R. Wagner  ES Eugenio Villar
CA David Agnew*  FR Francois Anceau*
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<td>John Willis*</td>
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<tr>
<td>ES</td>
<td>Jose L. Ayala</td>
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</tr>
</tbody>
</table>

*) honorary member
TC 11 - Security and Privacy Protection in Information Processing Systems
est. 1984, revised 2006, 2009
URL: www.ifiptc11.org

Chair
Prof. Dr. Kai RANNENBERG, DE
Goethe University Frankfurt
Mobile Business and Multilateral Security
Grueneburgplatz 1
DE-60629 FRANKFURT/Main Germany
Tel. +49 69 798 34701
Fax +49 69 798 35004
URL: www.m-chair.net
e-mail: kai.rannenberg@m-chair.net

Vice-Chair
Prof. Rossouw von SOLMS, ZA
Nelson Mandela Metropolitan University
Institute for ICT Advancement
School of ICT
P.O. Box 77000
PORT ELIZABETH 6031 South Africa
Tel. +27 41 504 3604
Fax +27 41 504 3313
e-mail: rossouw.vonsolms@nmmu.ac.za

Secretary
Prof. Lech J. JANCZEWSKI, NZ
The University of Auckland
Dept. of ISOM
Private Bag 92019
Owen G Glenn Building
12 Grafton Road, Room 480
AUCKLAND New Zealand
Tel. +64 9 923 7538
Fax +64 9 373 7430
e-mail: lech@auckland.ac.nz

Prof. Yuko MURAYAMA, JP
Iwate Prefectural University
Faculty of Software and Information Science
152-52 Sugo, Takizawe, Takizawa-mura
IWATE 020-0193 Japan
Tel. +81 19 694 2548
Fax +81 19 694 2549
e-mail: murayama@iwate-pu.ac.jp

Prof. Gurpreet DHILLON
VCU School of Business
1015 Floyd Avenue
RICHMOND, VA 23284 USA
Tel. +1 804 828 3183
e-mail: gdhillon@vcu.edu

Vice-Chair
Dr. Karin HEDSTRÖM
Örebro University
Swedish Business School
SE-70182 ÖREBRO Sweden
Tel. +46 19 33 25 46
Fax +46 19 30 12 41
e-mail: karin.hedstrom@oru.se

Secretary
Dr. Paul S. DOWLAND
University of Plymouth
Drake Circus
PLYMOUTH PL4 8AA United Kingdom
Tel. +44 1752 232513
Fax +44 1752 233520
e-mail: pdowland@csacan.org

W.G 11.1 Information Security Management
est. 1985, revised 1992
URL: http://www.cscan.org/ifip

Chair
Prof. Gurpreet DHILLON
Dept. of Information Systems
VCU School of Business
1015 Floyd Avenue
RICHMOND, VA 23284 USA
Tel. +1 804 828 3183
e-mail: gdhillon@vcu.edu

Vice-Chair
Dr. Karin HEDSTRÖM
Örebro University
Swedish Business School
SE-70182 ÖREBRO Sweden
Tel. +46 19 33 25 46
Fax +46 19 30 12 41
e-mail: karin.hedstrom@oru.se

Secretary
Dr. Paul S. DOWLAND
University of Plymouth
Drake Circus
PLYMOUTH PL4 8AA United Kingdom
Tel. +44 1752 232513
Fax +44 1752 233520
e-mail: pdowland@csacan.org

ex-officio members: WG Chairs
### WG 11.2 Pervasive Systems Security

*est. 1985, revised 1992, 1995, 2009*


#### Chair
Dr. Jaap-Henk HOEPMAN  
Radboud University Nijmegen  
Security of Systems Group  
PO Box 9010  
NL-6500 GL NIJMEGEN  
The Netherlands  
Tel. +31 24 3652599  
e-mail: jhh@cs.ru.nl

#### Vice-Chair
Prof. Damien SAUVERON  
Université de Limoges/CNRS  
XLIM Institut de Recherche  
Site Jidé, 83 rue d'Isle  
FR-87000 LIMOGES  
The Netherlands  
Tel. +33 5 55 43 69 83  
Fax +33 5 55 43 69 77  
e-mail: damien.sauveron@xlim.fr

#### Secretary
Dr. Flavio D. GARCIA  
Radboud University Nijmegen  
Digital Security Group  
Institute for Computing and Information Sciences (ICIS)  
Heyendaalseweg 135  
NL-6525 AJ NIJMEGEN  
The Netherlands  
Tel. +31 24 3652599  
Fax +31 24 3652298  
e-mail: flaviog@cs.ru.nl

### WG 11.3 Data and Application Security

*est. 1987, revised 2001, 2011*

**URL:** [http://seclab.dti.unimi.it/~ifip113/](http://seclab.dti.unimi.it/~ifip113/)

#### Chair
Prof. Vijay ATLURI  
Rutgers University  
MS/CIS Department  
180 University Ave.  
NEWARK, NJ 07102  
USA  
Tel. +1 973 353 1642  
Fax +1 973 353 5033  
e-mail: atluri@andromeda.rutgers.edu

#### Vice-Chair
Prof. Sabrina DE CAPITANI DI VIMERCATI  
Università degli Studi di Milano  
DTI - Dipartimento di Tecnologie dell’Informazione  
Via Bramante 65  
IT-26013 CREMA, Italy  
Tel. +39 037 3898 057  
Fax +39 037 3898 010  
e-mail: decapita@dti.unimi.it

#### Secretary
Mr. Claudio A. ARDAGNA  
University of Milan  
Department of Information Technologies  
Via Bramante 65  
IT-26013 CREMA, Italy  
Tel. +39 037 3898 048  
Fax +39 037 3898 010  
e-mail: ardagna@dti.unimi.it
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<td>Ahlem B-Ben Tekaya</td>
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<td>US</td>
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</tr>
<tr>
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<td>Jaideep Vaidya</td>
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<td>US</td>
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</tr>
<tr>
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<td>US</td>
<td>Mustafa Canim</td>
<td>US</td>
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</tr>
<tr>
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<td>Chris Clifton</td>
<td>US</td>
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<td>US</td>
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<td>US</td>
<td>Li Xion</td>
</tr>
<tr>
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<td>Simon Foley</td>
<td>US</td>
<td>Steven A. Demurjian</td>
<td>US</td>
<td>Danfeng Yao</td>
</tr>
<tr>
<td>IL</td>
<td>Yuval Elovici</td>
<td>US</td>
<td>Vijayant Dhankhar</td>
<td>US</td>
<td>Xinwen Zhang</td>
</tr>
<tr>
<td>IL</td>
<td>Ehud Gudes</td>
<td>US</td>
<td>Gallia Parkas</td>
<td>US</td>
<td>Zutao Zhu</td>
</tr>
<tr>
<td>IN</td>
<td>K. Subramanian</td>
<td>US</td>
<td>Eduardo B. Fernandez</td>
<td>US</td>
<td></td>
</tr>
</tbody>
</table>

** WG 11.4 Network & Distributed Systems Security **

est: 1985, revised 1992
URL: http://www.ifip.tu-graz.ac.at/TC11/WG/index.htm

**Chair**
- Dr. Jan CAMENISCH
- IBM Research
- Zurich Research Laboratory
- Säumerstrasse 4
- CH-8803 RUESCHLIKON
- Switzerland
- Tel. +41 44 724 8279
- Fax +41 44 724 8953
- e-mail: jca@zurich.ibm.com

**Vice-Chair**
- Prof. Dogan KESDOGAN
- University Siegen
- Postfach
- DE-57068 SIEGEN
- Germany
- Tel. +49 271 740 3040
- Fax +49 271 740 2372
- e-mail: kesdogan@fb5.uni-siegen.de

**Secretary**
- Dr. Siraj Ahmed SHAIKH
- Department of Computing and the Digital Environment
- Faculty of Eng. and Computing
- Coventry University
- Priory Street
- COVENTRY CV1 5FB
- United Kingdom
- Tel. +44 2476 888 225
- Fax +44 7939 233 995
- e-mail: s.shaikh@coventry.ac.uk

**AT** Richard Gronvins
**GB** Steven Furnell
**AU** L. O’Connor
**BE** Bart de Decker
**CH** Rolf Oppliger
**CY** Michalis Georgiou
**DE** A. Pitzmann
**DE** Kai Rannenberg
**EG** Mahmoud T. El-Hadidi
**FR** Refik Molva

**GB** Victoria Daskalou
**GR** Anna Kefala
**GR** Kostas Moulinos
**GR** Nikitas Nikolakos
**GR** Eleni Polidorou
**NZ** Andrew Mason
**SE** Othman Dridi
**US** Milton Anderson

**AT** Randall Atkinson
**US** Matt Bishop
**US** Lester Fraim
**US** Rolf Moulon
**US** Frank O'Reilly
**US** Gene Schultz
**US** Eugene Spafford
**ZA** Basie von Solms
**WG 11.6 Identity Management**  
est. 2006  

**Chair**  
Prof. Simone FISCHER-HUEBNER  
Karlstad University  
Dept. of Computer Science  
Universitetsgatan 2  
SE-651 88 KARLSTAD  
Sweden  
Tel. +46 54 700 1723  
Fax +46 54 700 1828  
e-mail: simone.fischer-huebner@kau.se

**Vice-Chair**  
Mrs. Elisabeth DE LEEUW-LECEUR  
Ordina Infrastructure Solutions  
Ringwade 1  
3439 LM Nieuwegein  
The Netherlands  
Tel. +31 30 6638300  
e-mail: elisabeth.de.leeuw@ordina.nl

**Secretary**  
Dr. Lothar FRITSCH  
Norsk Regnesentral  
Norwegian Computing Center  
P.O. Box 114 Blindern  
NO-0314 OSLO  
Norway  
Tel. +47 22 85 26 03  
Fax +47 22 69 76 60  
e-mail: lothar.fritsch@nr.no

**AT**  
Herbert Leitold  
Reinhard Posch

**BE**  
Jos Dumortier  
Ann Cavoukian

**CH**  
Andrzej Drygajlo  
Marit Hansen  
Martin Meints

**DE**  
Kai Rannenberg  
Fernando Cruz  
Petro Luis Murioz  
Aljosa Passic

**FR**  
Gerard Chollet  
Nathan Clarke  
Eddy Higgs  
Chrispin Yuen  
Stephanos Gritzalis  
Egbert Dijkgraaf  
Zeno Geradts  
Bart Jacobs  
Ronald Leenes  
Ruud van Munster  
Max Snijder

**GB**  
Herbert Leitold  
Jos Dumortier  
Andrzej Drygajlo  
Marit Hansen  
Kai Rannenberg  
Fernando Cruz  
Petro Luis Murioz  
Aljosa Passic

**GB**  
Gerard Chollet  
Eddy Higgs  
Stephanos Gritzalis  
Egbert Dijkgraaf  
Zeno Geradts  
Bart Jacobs  
Ronald Leenes  
Max Snijder

**GR**  
Nathan Clarke  
Eddy Higgs  
Stephanos Gritzalis  
Egbert Dijkgraaf  
Zeno Geradts  
Bart Jacobs  
Ronald Leenes  
Max Snijder

**NL**  
Herbert Leitold  
Jos Dumortier  
Andrzej Drygajlo  
Marit Hansen  
Kai Rannenberg  
Fernando Cruz  
Petro Luis Murioz  
Aljosa Passic

**NL**  
Gerard Chollet  
Eddy Higgs  
Stephanos Gritzalis  
Egbert Dijkgraaf  
Zeno Geradts  
Bart Jacobs  
Ronald Leenes  
Max Snijder

**NZ**  
Herbert Leitold  
Jos Dumortier  
Andrzej Drygajlo  
Marit Hansen  
Kai Rannenberg  
Fernando Cruz  
Petro Luis Murioz  
Aljosa Passic

**US**  
Gerard Chollet  
Eddy Higgs  
Stephanos Gritzalis  
Egbert Dijkgraaf  
Zeno Geradts  
Bart Jacobs  
Ronald Leenes  
Max Snijder

**ZA**  
Herbert Leitold  
Jos Dumortier  
Andrzej Drygajlo  
Marit Hansen  
Kai Rannenberg  
Fernando Cruz  
Petro Luis Murioz  
Aljosa Passic

**WG 11.7 (joint with WG 9.6; see TC 9)**

**WG 11.8 Information Security Education**  
est. 1991  
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**Chair**  
Mr. Colin ARMSTRONG  
Gailaad Pty Ltd  
PO Box 481  
KALAMUNDA, WA 6926  
Australia  
Tel. +61 8 9293 1343  
Fax +61 8 9293 1343  
e-mail: colinarmstrong@gailaad.com

**Vice-Chairs**  
Prof. Natalia MIOSLAVSKAYA  
The National Research Nuclear University MElPh  
Information Security Faculty  
44 Deptment MEPHl  
31 Kashirskoye shosse  
RU-115409 MOSCOW  
Russia  
Tel. +7 4 95 3239084  
Fax +7 4 95 3239086  
e-mail: milmur@mephi.edu

**Secretary**  
Lt. Col. Ronald DODGE  
US Military Academy  
Dept. Electrical Eng. & Computer Science  
601 Thayer Rd.  
WEST POINT, NY 10996-1695  
USA  
Tel. +1 845 938 5569  
Fax +1 845 938 3807  
e-mail: ronald.dodge@usma.edu

**US**  
Daniel Ragsdale

Ms. Lynn FUTCHER  
Nelson Mandela Metropolitan University  
School of Inf. Technology  
PO Box 77000  
PORT ELIZABETH 6031  
South Africa  
Tel. +27 41 504 9128  
Fax +27 41 504 3313  
e-mail: lynn.futcher@nmmu.ac.za
WG 11.9 Digital Forensics

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Chair
Mr. Mark POLLITT
University of Central Florida
Dept. of Engineering Technology
National Center for Forensic Science
PO Box 162367
ORLANDO, FL 32816-2367
USA
Tel. +1 407 823 0842
Fax +1 407 823 3162
e-mail: mpollitt@mail.ucf.edu

Vice-Chair
Dr. Gilbert PETERSON
Air Force Institute of Technology
Dept. of Electrical and Computer Engineering
2950 Hobson Way
WPAFB, OH 45433-7765
USA
Tel. +1 937 255 3636 4281
e-mail: gilbert.peterson@afit.edu

Secretary
Dr. Sujeet SHENOI
University of Tulsa
Computer Science Dept.
Keplinger Hall
600 S. College Ave.
TULSA, OK 74104-3189
USA
Tel. +1 918 631 3269
Fax +1 918 631 3077
e-mail: sujeet@utulsa.edu

AU Jill Slay
FR Thomas Duval
FR Bernard Jouga
GB Jonathan Clark
IN Indrajit Ray
JP Ryochi Sasaki
NO Svein Willassen
US Charles Adams
US Nicole Beebe
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ZA Rut Laubscher
ZA Martin Olivier
ZA Colette Trompeter
ZA Hein Venter
ZA Cobus Venter

WG 11.10 Critical Infrastructure Protection

est. 2006
URL: www.ifip1110.org

Chair
Dr. Sujeet SHENOI
University of Tulsa
Computer Science Dept.
Keplinger Hall
600 S. College Ave.
TULSA, OK 74104-3189
USA
Tel. +1 918 631 3269
Fax +1 918 631 3077
e-mail: sujeet@utulsa.edu

Vice-Chair
Dr. Tyler MOORE
Harvard University
Maxwell Dworkin #110
33 Oxford Street
CAMBRIDGE, MA 02138
USA
Tel. +1 617 496 0945
Fax +1 617 496 6404
e-mail: tmoore@seas.harvard.edu

AU Andrew Clark
AU Jill Slay
AU Craig Valli
CA Eric Byres
CA John Kluver
CA Tyson Macaulay
CH Tillman Schulze
CN Rocky Chang
DE Felix Flintge
DE Sebastian Hess
ES Cristina Alcaraz Tello
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US Jim Watters
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US Dorsey Wilkin
US Rae Zimmerman
ZA Les Labuschagne
ZA Martin Oliver

WG 11.11 Trust Management
est. 2006

Chair
Dr. Theo DIMITRAKOS
British Telecom
Security Research Centre
Adastral Park, Martleham Heath,
IPSWICH, Suffolk, IP5 3RE
United Kingdom
Tel. +44 1473 646706
e-mail: theo.dimitrakos@bt.com

Vice-Chair
Prof. Audun JOSANG
University of Oslo
Universitetsstudiene på Kjeller
Postboks 70
University Graduate Center
NO-2007 KJELLER
Norway
Tel. +47 64844726
Fax +47 63818146
e-mail: josang@unik.no

Secretary
Dr. Stephen MARSH
Network Systems & Technologies
Communications Research Centre Canada
3701 Carling Ave.
PO Box 11490, Station H
OTTAWA, ON K2H 8S2
Canada
Tel. +1 613 990 6560
Fax +1 613 998 9648
e-mail: steve.marsh@crc.gc.ca

Prof. Yuko MURAYAMA
Iwate Prefectural University
Faculty of Software and Information Science
152-52 Sugo, Takizawa,
Takizawa-mura
IWATE 020-0193
Japan
Tel. +81 19 694 2548
Fax +81 19 694 2549
e-mail: murayama@iwate-pu.ac.jp

DK Christian Jensen
ES Javier Lopez-Munoz
FR Valerie Issary
GB Stefan Poulad
GR Christos Nikolaou
IE Paddy Nixon
IT Fabio Martinelli
IT Fabio Massacci
NL Sandro Etalle
NO Peter Hermann
NO Ketil Stolen
US Ninghui Li
US John Mitchell
US Simon Shiu
US William Winsborough
US Marianne Winslett

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WG 11.12 Human Aspects of Information Security and Assurance
est. 2010

Chair
Prof. Steven M. FURNELL
University of Plymouth
Drake Circus
PLYMOUTH PL4 8AA
United Kingdom
Tel. +44 1752 586222
Fax +44 1752 586229
e-mail: sfurnell@plymouth.ac.uk

Vice-Chair
Dr. Nathan CLARKE
University of Plymouth
Network Research Group
Room A304, Portland Square
PLYMOUTH PL4 8AA
United Kingdom
Tel. +44 1752 586218
Fax +44 1752 586229
e-mail: n.clarke@plymouth.ac.uk

Secretary
Dr. Kerry-Lynn THOMSON
Nelson Mandela Metropolitan University
School of ICT
PO Box 77000
PORT ELIZABETH 6031
South Africa
Tel. +27 41 504 3408
Fax +27 41 504 3602
e-mail: kerry-lynn.thomson@nmmu.ac.za

Mr. Malcolm PATTINSON
The University of Adelaide
Business School
10 Pulteney Street
ADELAIDE SA 5005
Australia
Tel. +61 8 83134649
e-mail: malcolm.pattinson@adelaide.edu.au

AU Helen Armstrong
CA Konstantin Beznosov
GR Stefanos Gritzalis
GR Vasilis Katos
GR Sokratis Katsikas
ES Javier Lopez
GB David Lacey
GB Angela Sasse
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US Murray Jennex
US Corey Schou
US Merrill Warkentin
US Mary Ellen Zurko
ZA Elme Smith
ZA Johan van Niekerk
ZA Roussouw von Solms

WG 11.13 (joint with WG8.11; see TC8)
TC 12 - Artificial Intelligence

est. 1989, revised 1991
URL: http://www.ifiptc12.org/

Chair
Prof. Tharam DILLON, AU
Curtin University of Technology
Digital Ecosystems and Business Intelligence Institute
P.O. Box U1987
PERTH WA, 6845
Australia
e-mail: tharam.dillon@cbs.curtin.edu.au

Vice-Chair
Prof. Max A. BRAMER, GB
University of Portsmouth
School of Computing
Buckingham Building
Lion Terrace
PORTSMOUTH PO1 3HE
Hants, United Kingdom
e-mail: max.bramer@port.ac.uk

Secretary
Dr. Amandeep SIDHU, AU
Curtin University of Technology
Digital Ecosystems and Business Intelligence Institute
P.O. Box U1987
PERTH WA, 6845
Australia
e-mail: asidhu@curtin.edu.au

ex-officio members: WG Chairs
**) corresponding member

AR Analia Amandi
AT Werner Horn
AU John Debenham
BE Pierre-Yves Schobbens
BG Vassil Sigurev
COEI Enrique González Guerrero**
CN Zhongzhi Shi
CZ Olga Stepankova
DE Ulrich Furbach
DK Brian Mayoh
ES Ramon López de Mántaras

FI Timo Honkela
FR Eunika Mercier-Laurent
GR Ilias Maglogiannis
GR Constantine D. Spyropoulos
HR Nikola Bogunovic
HU Ivan Futo
IN P V S Rao
IT Luigia Carlucci-Aiello
JP Toyoaki Nishida
LT Gintautas Dzemyda
NL Joost Kok

NO Agnar Aamodt
NZ Nikola Kasabov**
PT Helder Manuel Ferreira Coelho
RS Vladan Devedzic
RS Renad Stefanovic
SE Erik Sandewall
SI Matjaz Gams
SK Pavol Navrat
US Daniel O'Leary (IEEE)
US Andrea Omicini (ACM)

WG 12.1 Knowledge Representation and Reasoning

est. 2004  Aims and Scopes

Chair
Prof. Timo HONKELA
Helsinki University of Technology
Laboratory of Computer and Information Science
P.O.Box 5400
FI-02015 HUT
Finland
e-mail: timo.honkela@hut.fi

Member list under construction

WG 12.2 Machine Learning and Data Mining

est. 1993
URL: http://www.intsci.ac.cn/en/ifip/index.html

Chair
Prof. Zhongzhi SHI
Institute of Computing Technology, Chinese Academy of Sciences
Kexueyuan Nanlu

Vice-Chair
Prof. Agnar AAMODT
Norwegian Univ. of Science and Technology (NTNU)
Dept. of Computer and Information Science

Secretary
Dr. Nicolas BREDECHE
Université Paris-Sud
Laboratoire de Recherche en Informatique
Bâtiment 490
WG 12.3 Intelligent Agents
est. 2003

Chair
Prof. Helder COELHO
Universidade de Lisboa
Departamento de Informatica
Faculdade de Ciencias
Bloco c6, Piso 3 (06)
Campo Grande
PT-1749-016 LISBOA
Portugal
Tel. +351 21 750 0122
Fax +351 21 750 0084
e-mail: hcoelho@di.fc.ul.pt

Vice-Chair
Prof. John DEBENHAM
Univ. of Technology, Sydney
Faculty of Inf. Technology
PO Box 123
BROADWAY, NSW 2007
Australia
Tel. +61 2 9514 1837
Fax +61 2 9514 1807
e-mail: debenham@it.uts.edu.au

BE Pierre Yves Schobbens
CN Zhongzhi Shi
PT Eugenio Oliveira

WG 12.4/2.12 (Semantics Web - joint with TC2)

WG 12.5 Artificial Intelligence Applications
est. 1993, rev. 2003
URL: http://www-staff.it.uts.edu.au/~debenham/wg12.5/

Chair
Prof. Max A. BRAMER
University of Portsmouth
School of Computing
Buckingham Building
Lion Terrace
PORTSMOUTH PO1 3HE
Hants, United Kingdom
Tel. +44 2392 846380
Fax +44 2392 846364
e-mail: max.bramer@port.ac.uk

Secretary
Prof. Ilias MAGLOGIANNIS
University of Central Greece
Department of Biomedical Informatics
Papasiopoulou 2-4
PC 35100 LAMIA
Greece
Tel. +30 22730 82239
Fax +30 22730 82009
e-mail: imaglo@ucg.gr
WG 12.6 Knowledge Management
URL: http://www.ifip.org/index.php?option=com_content&task=view&id=185&itemid=511

**Chair**
Dr. Eunika MERCIER-LAURENT
Knowledge & Innovation Management and IAE Lyon University
620 Chemin des Grives
FR-34160 SAINT DREZERY France
Tel. +33 467 866 581
Fax +33 955 154 824
e-mail: eunika@innovation3D.fr

**Vice-Chair**
To be determined

**Secretary**
To be determined

---

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est. 2010

**Chair**
Prof. Dr. Robert MEERSMAN
Vrije Universiteit Brussel
STARLab
Pleinlaan 2
BE-1050 BRUSSELS Belgium
Tel. +32 2 629 3308
Fax +32 2 629 3525
e-mail: meersman@vub.ac.be

**Vice-Chair**
Dr. Pieter De LEENHEER
VU University Amsterdam
Inf. and Service Sciences
de Boelelaan 1081a
NL-1081 HV AMSTERDAM The Netherlands
Tel. +31 20 59 83755
e-mail: pgm.de.leenheer@few.vu.nl

**Secretary**
To be determined

---

AU John Debenham
CN Daoliang Li
CN Eric Tsui
CS Zeljko Obrenovic
CZ Olga Stepankova
FI Timo Honkela
FI Vagan Terziyan
FR Yves Demazeau
FR Anne Dourgnon-Hanoune
FR Eunika Mercier-Laurent
FR Lazaros Iliadis
FR Kostas Karpouzis
FR Lazaros Polymenakos
FR Luigi Carlucci Aiello
FR Nicola Guarino
FR Lora Aroyo
NO Agnar Aamodt
NO Weiqin Chen
NL Ray Kemp
NZ Kinshuk
NZ Tanja Mitrovic
US Daniel O’Leary

AT Peter Dalmaris
CH Knut Hinkelmann
CN Eric Tsui
FR Anne Dourgnon-Hanoune
FR Nada Matta
FR Frederique Segond
IL Ron Dvir
IT Carla Simona
MX Celso Juan Flores
PL Mieczyslaw Owoc
SE Helena Lindskog
TR Gulgun Kayakutlu
US Daniel O’Leary

AT Anna Fensel
AT Katharina Siorpaes
AU Chen Wu
AU Davor Meersman
BE Christophe Debruyne
BE Stijn Christiaens
ES Marco Schorlemmer
CN Feng Ling
CN Denny Vrandecic
GR George Vouros
IE John Breslin
IE Alex Passant
IE Axel Polleres
IT Francesco Danza
AT Sinan Tumer
AT Hans Weigand
AT Aldo de Moor
DE Maria Ganzha
PL Jorge Cardoso
UK Harith Alani
UK Amit Sheth
WG 12.8 - Intelligent Bioinformatics and Biomedical Systems
est. 2010

Chair
Dr. Laurent MOUCHARD
King’s College London
Department of Informatics
The Strand, Room S4.02D
LONDON WC2R 2LS
United Kingdom
Tel. +44 20 7848 1127
e-mail: laurent.mouchard@kcl.ac.uk

Vice-Chairs
Prof. Costas ILIOPoulos
King’s College London
Department of Informatics
The Strand, Room S5.42
LONDON WC2R 2LS
United Kingdom
Tel. +44 20 7848 2809
e-mail: c.iliopoulos@kcl.ac.uk

Secretary
Ms. Meifania CHEN
Curtin University of Technology
Digital Ecosystems and Business Intelligence Institute
Enterprise Unit 4, De Laeter Way Technology Park
BENTLEY, WA 6102
Australia
Tel. +61 892 669270
e-mail: m.chen@curtin.edu.au

Dr. Maja HADZIC
Curtin University of Technology
Digital Ecosystems and Business Intelligence Institute
Enterprise Unit 4, De Laeter Way, Technology Park
BENTLEY, WA 6102
Australia
Tel. +61 892 669270
e-mail: m.hadzic@curtin.edu.au

Member list under construction

WG 12.9 - Computational Intelligence
est. 2011

Chair
Prof. Tharam DILLON
Curtin University of Technology
DEBII - Digital Ecosystems and Business Intelligence Institute
Enterprise Unit 4, De Laeter Way Technology Park
BENTLEY, WA 6102
Australia
Tel. +61 8 9266 9280
Fax +61 8 9266 7548
e-mail: tharam.dillon@curtin.edu.au

Vice-Chairs
Dr. Vasile PALADE
Dept. of Computer Science
University of Oxford
Wolfson Building
Parks Road
OXFORD OX1 3QD
United Kingdom
Tel. +44 1865 283606
Fax +44 1865 273839
e-mail: vasile.palade@cs.ox.ac.uk

Secretary
Dr. Kit Yan CHAN
Curtin University of Technology
DEBII - Digital Ecosystems and Business Intelligence Institute
Enterprise Unit 4, De Laeter Way Technology Park
BENTLEY, WA 6102
Australia
Tel. +61 8 9266 9270
Fax +61 8 9266 7548
e-mail: kit.chan@curtin.edu.au

Dr. Masoud NIKRAVESH
CITRIS – Center for Information Technology Research in the Interest of Society
University of California Berkeley
356D Sutardja Dai Hall
BERKELEY, CA 94720-1764
USA
Tel. +1 510 643 4522
Fax +1 510 642 1800
e-mail: nikravesh@citris-uc.org
<table>
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<td>Andrew Kusiak</td>
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<td>Lawrence J. Mazlack</td>
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</table>
TC 13 - Human-Computer Interaction

est. 1989
URL: http://csmobile.upe.ac.za/ifip

Chair
Prof. Jan GULLIKSEN, SE
KTH Royal Institute of Technology
Department of Human Computer Interaction
School of Computer Science and Communication
Lindstedtsvägen 5, floor 6
SE-100 44 STOCKHOLM, Sweden
Tel. +46 730 373930
E-mail: gulliksen@kth.se

Vice-Chairs
Prof. Janet L. WESSON, ZA
Nelson Mandela Metropolitan University
Dept. of Computer Science & Information Systems
PO Box 77000
ZA-6031 PORT ELIZABETH, South Africa
Tel. +27 41 504 2323
Fax +27 41 504 2831
E-mail: janet.wesson@nmmu.ac.za

Prof. Philippe PALANQUE, FR
Université Paul Sabatier
LIIHS-IRIT
118, route de Narbonne
FR-31062 TOULOUSE Cedex 4
France
Tel. +33 561 55 69 65
Fax +33 561 55 62 58
E-mail: palanque@irit.fr

Secretary
Prof. Simone D. Junqueira
BARBOSA, BR
PUC Rio
Departamento de Informática
Rua Marquês de São Vicente
225/410 RDC
BR-22451-900 RIO DE JANEIRO
Brazil
Tel. + 55 21 3527 1500 ext. 4353
Fax + 55 21 3527 1530
E-mail: simone@inf.puc-rio.br

Prof. Andreas Holzinger
AU Judy Hammond
BE Monique Noirhomme-Fraiture
BG Kamelia Stefanova
CA Gitte Lindgaard*
CA Heather O’Brien
CH Ute Klotz
CN Zhengjie Zong
CN Panayiotis Zaphiris
CZ Vaclav Matousek
DE Achim Ebert
DE Tom Gross
DK Annelise Mark Pejtersen*
DK Julio Abascal
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IS Marta Larusdottir
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NG Chris Nwannenna
NL Gerrit van der Veer
NO Dag Svanaes
NZ Mark Apperley
PL Juliusz L. Kulikowski
PT Joaquim A. Jorge
SE Lars Oestreicher*
SG Henry Been-Lirn Duh
US Nahum D. Gershon (IEEE)
US John Karat (ACM)
ZA Paula Kotzé*

Ex-officio members: WG Chairs
*) expert member
WG 13.1 (Education in HCI and HCI Curricula)
est. 1990, revised 1991
URL: http://www.hcieducation.org

Chair
Dr. Lars OESTREICHER
Uppsala University
Dept. of Information Technology
PO Box 337
SE-751 05 UPPSALA
Sweden
Tel. +46 70 1679133
Fax +46 18 4717811
e-mail: larsoe@it.uu.se

Vice-Chairs
Prof. Jean VANDERDONCKT
Université catholique de Louvain (UCL)
Louvain School of Management
Place des Doyens, 1
BE-1348 LOUVAIN-LA NEUVE
Belgium
Tel. +32 10 47 85 25
Fax +32 10 47 83 24
e-mail: jean.vanderdonckt@uclovain.be

Secretary
Prof. Konrad BAUMANN
FH Joanneum
Alte Poststrasse 149
AT-8020 GRAZ
Austria
Tel. +43 316 5453 8615
Fax +43 316 5453 8601
e-mail: konrad.baumann@fh-joanneum.at

Dr. Carlo GIOVANNELLA
University of Rome Tor Vergata
Interfaces and Multimodal Interactive Systems
via Saturnia 55
IT-00183 ROME
Italy
Tel. +39 06 725 94524
Fax +39 06 202 3507
e-mail: info@mifav.uniroma2.it

Vice-Chairs
Prof. Konrad BAUMANN
FH Joanneum
Alte Poststrasse 149
AT-8020 GRAZ
Austria
Tel. +43 316 5453 8615
Fax +43 316 5453 8601
e-mail: konrad.baumann@fh-joanneum.at

Dr. Carlo GIOVANNELLA
University of Rome Tor Vergata
Interfaces and Multimodal Interactive Systems
via Saturnia 55
IT-00183 ROME
Italy
Tel. +39 06 725 94524
Fax +39 06 202 3507
e-mail: info@mifav.uniroma2.it

AT Peter Purgathofer
AU Judy Hammond
AU Mark Toleman
BE Monique Noirhomme-Fraiture*
CH Helmut Schauer
ES Julio Abascal
GB Alison Varey
GB William Wong
IE Liam Bannon
IT Sebastiano Bagnara
NL Mathias Rauterberg
NL Gerrit van der Veer
SE Jan Guilkens
US Jean Gasen
US Tom Hewett
US Joseph A. Konstan
US Marian G. Williams
ZA Darelle van Greunen
ZA Paula Kotzé
ZA Janet Wesson

*) Observer

SIG 13.1 Interaction Design and International Development
est. 2008

Chair
Dr. Andy DEARDEN
Sheffield Hallam University
Communication and Computing Research Centre
Furnival Building, Room 9409
153 Arundel Street
SHEFFIELD S1 2NU
United Kingdom
Tel. +44 114 225 6878
Fax +44 114 225 3161
e-mail: a.m.dearden@shu.ac.uk

Secretary
Mr. Anirudha JOSHI
IIT Bombay
Powai
MUMBAI 400076
India
Tel. +91 98203 45569
e-mail: anirudha@iitb.ac.in
WG 13.2 Methodology for User-centered System Design

est. 1992
URL: http://www.swt.informatik.uni-rostock.de/IFIP_13_2/

Chair
Prof. Dr. Peter FORBRIG
Universität Rostock
Fachbereich Informatik
Albert-Einstein-Straße 21
DE-18051 ROSTOCK
Germany
Tel. +49 381 498 7620
Fax +49 381 498 7482
e-mail: peter.forbrig@informatik.uni-rostock.de

Vice-Chairs
Dr. Regina BERNHAUPT
Universität Salzburg
ICT&S-Center
Sigmund-Haffner-Gasse 18
AT-5020 SALZBURG
Austria
Tel. +43 662 8044 4814
Fax +43 662 6389 4800
e-mail: regina.bernhaupt@sbg.ac.at

Dr. Marco WINCKLER
University Paul Sabatier
(Toulouse 3)
Institute of Research in Informatics of Toulouse (IRIT)
118 route de Narbonne
FR-31062 TOULOUSE Cedex 9
France
Tel. +33 561 55 63 59
Fax +33 561 55 62 58
e-mail: winckler@irit.fr

Secretary
Prof. Janet L. WESSON
Nelson Mandela Metropolitan University
Department of Computer Science & Information Systems
PO Box 77000
ZA-6031 PORT ELIZABETH
South Africa
Tel. +27 41 504 2323
Fax +27 41 504 2831
e-mail: janet.wesson@nmmu.ac.za

AU Judy Hammond
BR Simone Barbosa
CA Ahmed Seffah
DE Jan Borchers
DE Eduard Metzker
DK Morten Borup Harning
DK Annelise Mark-Pejtersen
ES Xavier Ferre

ES Francisco Moreno
FR Bertrand David
FR Philippe Palanque
SE Inger Boivie
SE Ake Walldius
GB David Benyon
GB Andrew Dearden
GB Susan Harker

GB Alistair Sutcliffe
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NL Matthias Rautenberg
NL Martijn van Welie
NO Jan Havrd Skjetne
SE Jan Gulliksen
US John M. Carroll
US John Karat

SIG 13.2 Interaction Design and Children

est. 2009
URL: http://www.idc-sig.org/

Chair
Dr. Janet READ
University of Central Lancashire
School of Computing, Engineering & Physical Sciences, ChiCI Group
PRESTON PR1 2HE
Lancashire
United Kingdom
Tel. +44 1772 893285
Fax +44 1772 892996
e-mail: jcread@uclan.ac.uk

Vice-Chair
Dr. Panos MARKOPOULOS
Technische Univ. Eindhoven
Industrial Design
HG 2.54, P.O. Box 513
Den Dolech 2
NL-5600 MB EINDHOVEN
The Netherlands
Tel. +31 40 247 5247
Fax +31 40 247 3285
e-mail: p.markopoulos@tue.nl
WG 13.3 (Human-Computer Interaction and Disability)
URL: http://hciaccess.inf.tu-dresden.de

Chair
Prof. Dr. Gerhard WEBER
Technical University Dresden
Institute for Applied Computer Science
Nöthnitzer Str.46
DE-01062 DRESDEN
Germany
Tel. +49 351 463 38467
Fax +49 351 463 38491
e-mail: gerhard.weber@tu-dresden.de

Vice-Chair
Prof. Helen PETRIE
University of York
Department of Computer Science
Deramore Lane, Heslington
YORK YO10 5GH
United Kingdom
Tel. +44 1904 325 603
e-mail: petrie@cs.york.ac.uk

Secretary
Dr. David SLOAN
University of Dundee
Digital Media Access Group
School of Computing
DUNDEE DD1 4HN
Scotland, United Kingdom
Tel. +44 1382 385 598
e-mail: dsloan@computing.dundee.ac.uk

AT  Klaus Miesenberger
AU  Robert Pedlow
BE  Anne de Baenst
BE  Jan Engelen
BE  Monique Noirhomme-Fraiture
DE  Klaus Fellbaum
DE  Carlos A. Velasco
DE  Gerhard Weber
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NL  M.A. Neerincx
NL  Floris van Nes
PT  Luis Azevedo
SE  Jan Gulliksen
SE  Clas Thoren
US  Gregg C. Vanderheiden

WG 13.4 (joint with WG 2.7)

WG 13.5 Human Error, Safety and System Development
est. 1998
URL: http://www.dcs.gla.ac.uk/johnson/IFIP_WG13.5

Chair
Prof. Chris W. JOHNSON
University of Glasgow
Dept. of Computer Science
GLASGOW G12 8QJ
Scotland, United Kingdom
Tel. +44 141 330 6053
Fax +44 141 330 4913
e-mail: johnson@dcs.gla.ac.uk

Vice-Chairs
Dr. Michael FEARY
NASA, Ames Research Center
MOFFETT FIELD
CA 94035-1000
USA
Tel. +1 650 604 0203
e-mail: michael.s.fear@nasa.gov

Dr. Asaf DEGANI
General Motors R&D
7 HaMada St.
IL-HERZLIYA, 46733
Israel
Tel. +972 9 972 0613
e-mail: asaf.degani@gmail.com

Secretary
Prof. Philippe PALANQUE
Université Paul Sabatier
Toulouse III
ICS-IRIT
118, route de Narbonne
FR-31062 TOULOUSE
Cedex 4, France
Tel. +33 561 55 69 65
Fax +33 561 55 62 58
e-mail: palanque@irit.fr

AU  Shelly Jeffcott
BE  Anne-Sophie Nyssen
CA  Jan Davies
CN  Zhjengjie Liu
DE  Peter Ladkin
ES  Eduardo Garcia
FR  Jari Nisula
IT  Luca Chittaro
JP  Kenji Itoh
NO  Helle Olotedal
SE  Pernilla Ulfvengren
SE  Marta Walker
US  Sue Bogner
US  Ronald Boring
US  Guy Boy
US  Randall Mumaw
US  Amy Pritchet

95
Chair
Dr. Torkil CLEMMENSEN
Copenhagen Business School
Department of IT Management
Howitzvej 60, 5
DK-2000 FREDERIKSBORG C
Denmark
Tel. +45 3815 2389
Fax +45 3815 2401
e-mail: tc.itm@cbs.dk

Vice-Chairs
Prof. Annelise Mark
PEJTERSEN
Cognitive Systems Engineering
Smerum Bygade 52
DK-2765 SMØRUM
Denmark
Tel. +45 44 65 20 67
e-mail: ampcse@mail.dk

Dr. Dinesh KATRE
Human-Centred Design & Computing Group
Centre for Development of Advanced Computing(C-DAC)
7th Flr., NSG, IT Park, S.No
127/2/2B/2A,
Sarja Hotel Lane, Aundh
IN-PUNE-411007, India
Tel. +91 20 25503386
Fax +91 20 25503131
e-mail:
dineshkatre@yahoo.co.in

Dr. Rikke Negendahl
ORNGREEN
Aarhus University
Danish School of Education
Tuborgvej 164
DK-2400 KÖZENHAVN NV
Denmark
Tel. +45 8888 9505
e-mail: rior@dpu.dk

Secretary
Dr. Pedro CAMPOS
University of Madeira
Campus Universitario da Penteada
PT-9000-390 FUNCHAL
Portugal
Tel. +351 291 705287
Fax +351 291 705199
e-mail: pcampos@uma.pt

AU Helen Hasan*
AU Toni Robertson*
CA Gitte Lindgard*
CH Victor Zwimpfer
CN Huang Lingzi Liu
CN Qingxin Shi
CN Xiangle Sun
DE Matthias Rehm*
DE Kerstin Roese
DE Ulrich Thieli
DK Lene Nielsen
DK Ravi Vatrapu
ES Sergio España*
ES Oscar Pastor*
GB Jose L. Abdelnour-Nocera
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GB Shalay Minocha
GB Andy Smith
GB William Wong
IE Liam Bannon*
IN Girish Dalvi
IN Yogesh Deshpande*
IN Anant Bhaskar Garg
IN Jhumkee Iyengar
IN Anirudha Joshi*
IN Arvind Lodaya*
IN Sanjay Tripathi*
IN Pradeep Yammiyavar
IS Ebba Póra Hvannberg
JP Masaaki Kurosu
PT Pedro Campos
PT Arninda Lopes
PT Nuno J. Nunes*
PT Nuno J. Nunes*
SE Niklas Johansson*
US Tom Plocher*

*) Observers
WG 13.7 Human - Computer Interaction & Visualization HCIV

est. 2008
URL: http://www.hciv.de

Chair
Prof. Achim EBERT
University of Kaiserslautern
Gottlieb-Daimler-Str.
DE-67663 KAISERSLAUTERN
Germany
Tel. +49 631 205 3502
Fax +49 631 205 3270
e-mail: ebert@cs.uni-kl.de

Vice-Chair
Dr. Nahum GERSHON
The MITRE Corporation
7515 Colshire Drive
MC LEAN, VA 22102-7508
USA
e-mail: gershon@mitre.org

Secretary
Prof. Peter DANNENMANN
RheinMain University of Applied Sciences
Am Brueckweg 26
DE-65428 RÜSSELHEIM
Germany
Tel. + 49 6142 898 4494
Fax +49 6142 898 4421
e-mail: peter.dannenmann@hs-rm.de

AT Andreas Holzinger
AT Margit Pohl
CA Randy Goebel
CA Azam Khan
CA Jim Parker
CH Horst Bunke
DE Henning Barthel
DE Patrick Baudisch
DE Sebastian Baumgärtner
DE Dirk Bayer
DE Michael Bender
DE Karsten Berns
DE Andreas Dengel
DE Andreas Divivier
DE Hans Hagen
DE Peter Liggesmeyer
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DE Paul Mueller
DE Theo Schmitt
DE Gerhard Steinebach
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DK Annelise Mark Pejtersen
FR Younis Hijazi
GB Alan Bundy
GB Alan Dix
GB Robert Spence
IN Sanjay Tripathi
IT Tiziana Catari
IT Giuseppe Santucci
IT Olivier Stock
NL Gerrit van der Veer
NZ Mark Apperley
SE Andreas Kerren
US Kenneth Boff
US Jeffrey Bradshaw
US John Carroll
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US Bernd Hamann
US Chuck Hansen
US Christopher Johnson
US Ken Joy
US Joerg Meyer
US Robert Moorhead
US John Stasko
US Ed Swan
US Desney Tan
TC 14 - Entertainment Computing

est. 2002 as SG16 / approved in 8/06 as TC14
URL: http://www.org.id.tue.nl/IFIP-TC14/index.html

Chair
Prof. Ryoei NAKATSU, SG
National University of Singapore
Director, Interactive & Digital Media Institute
Blk E3A #02-04, 7 Engineering Drive 1
SINGAPORE 117574
Singapore
Tel. +65 6516 7616
Fax +65 6773 5018
e-mail: elenr@nus.edu.sg

Vice-Chair
Prof. Matthias RAUTERBERG,NL
Technical Univ. of Eindhoven
Center for User-System Interaction
P.O. Box 513
NL-5600 MB EINDHOVEN
The Netherlands
Tel. +31 40 247 5215
Fax +31 40 243 1930
e-mail: g.w.m.rauterberg@tue.nl

Secretary
Dr. Timothy MARSH, SG
National University of Singapore
CNM Programme
Blk AS6, #03-41
11 Computing Drive
SINGAPORE 117416
Singapore
Tel. +65 6516 8155
Fax +65 6779 4911
e-mail: tmarsh@nus.edu.sg

AT Peter Purgathofer
BG Radoslav Yoshinov
CA Sidney Fels
CN Zhigeng Pan
CZ David Obrzalek
DE Rainer Matjka
DE Leonie Schaeffer**
ES Pedro A. González Galero
FI Tony Manninen**
FI Ville-Veiko Mattila
FR Stephane Natkin
GB Marc Cavazza
HU Barnabas Takacs
IE Richard Reilly
IT Paolo Giancarini
JP Junichi Hoshino
JP Takehiko Kamae*
KR Hyun Seung Yang
NL Benjamin Salem
NO Geir Egil Myhre
PT Nuno Correia
SG Adrian David Cheok
TH Natanicha Chorpothong
US Miguel Encarnacao**
US Nahum D. Gershon (IEEE)
US Donald Marinelli (ACM)
US Claudio Pinhanez
US Milner Makuni

*) Honorary member
**) Observing member

WG 14.1 - Digital Storytelling
est. 2004, revised 2006

Chair
Prof. Marc CAVAZZA
University of Teesside
School of Computing and Mathematics
MIDDLESBROUGH TS1 3BA
United Kingdom
Tel. +44 1642 342661
Fax +44 1642 220527
e-mail: m.o.cavazza@tees.ac.uk

CH Nicolas Szilas
DE Ulrike Spielering
ES Federico Peinado
FR Stephane Donikian
FR Stephane Natkin
PT Nuno Correia
PT Ana Paiva
US Michael Young
WG 14.2 - Entertainment Robot
est. 2004, revised 2006

Chair
Dr. David OBDRZALEK
Charles University
Department of Software Engineering
Faculty of Mathematics and Physics
S 209, 2nd floor, Mala Strana
Malostranske nam. 25
CZ-PRAHA 1
Czech Republic
Tel. +420 22191 4270
e-mail: david.obdrzalek@mff.cuni.cz

JP Hitoshi Matsubara

WG 14.3 - Theoretical Basis of Entertainment
est. 2004, revised 2006
URL: http://www.org.id.tue.nl/IFIP-WG14.3/

Chair
Prof. Matthias RAUTERBERG
Technical Univ. of Eindhoven
Faculty Industrial Design
Center for User-System Interaction
P.O. Box 513
NL-5600 MB EINDHOVEN
The Netherlands
Tel. +31 40 247 5215
Fax +31 40 243 1930
e-mail: g.w.m.rauterberg@tue.nl

CA Jason Della Rocca*
BR Suely Fragoso
IT Matteo Bittanti
JP Haruhiro Katayose
JP Noriko Nagata
NL Jeffrey Goldstein*
PH Fatima Lasay
US Johanna Blakley
US Brad Bushman
US Jeanne B. Funk
US Susan Gold
US Bary W. Pollack
US Bill Swartout
US Peter Vorderer

*) Observing member
WG 14.4 - Games and Entertainment Computing
est. 2005, revised 2006
URL: http://www.cs.unimaas.nl/IFIP-WG14.4

Chair
Prof. Stephane NATKIN
CNAM/CEDRIC
292 rue St Martin
FR-75141 PARIS Cedex 03
France
Tel. +33 1 40 27 20 64
Fax +33 1 40 27 22 96
e-mail: stephane.natkin@cnam.fr

Vice Chair
Prof. Hiroyuki IIDA
Japan Advanced Institute of Science and Technology
Dept.of Information Processing
1-1, Asahidai, Nomi
ISHIKAWA, 923-1292
Japan
e-mail: iida@jaist.ac.jp

Secretary
Dr. Jos UIERTWIJK
Universiteit Maastricht
Faculty of Humanities and Sciences, Maastricht ICT
P.O. Box 616
NL-6200 MD MAASTRICHT
The Netherlands
Tel. +31 43 3883490
Fax +31 43 3252392
e-mail: uiterwijk@micc.unimaas.nl

CA Jonathan Schaeffer
DE André Melzer
ES Pedro Gonzalez-Calero
GB Graham Kendall
IT Paolo Giancarini

CA Jong Weon Lee
KR Hyun S. Yang
KR Woontak Woo
NL Wijnand Ijsselsteijn
NL Anton Nijholt

NL Pieter Spronck
NL Jaap Van den Herik
NL Mark Winands
US Brad Bushman
US Timothy Roden

WG 14.5 - Social and Ethical Issues in Entertainment Computing
est. 2005, revised 2006

Chair
Dr. Lynne BAILLIE
Glasgow Caledonian University
MultiModal Interaction Group
School of Engineering & Computing
Cowcaddens Road
GLASGOW G4 0BA
United Kingdom
Tel. +44 141 331 8438
Fax +44 141 331 3005
e-mail: l.baillie@gcal.ac.uk

Vice Chair
Dr. Roderick McCALL
University of Luxembourg
Centre for Security, Reliability & Trust
6, rue Richard Coudenhove-Kalergi
LU-1359 LUXEMBOURG-KIRCHBERG, Luxembourg
Tel. +352 466 644 5511
Fax +352 466 644 5669
e-mail: roderick.mccall@uni.lu

CA Claire Dormann
ES Porfirio Barroso Asenjo
CG Christopher Zielinski
GB David Benyon

CA Linda Little
GB Andy Sloane
HR Suzana Stojakovic-Celustka
SG Ryohei Nakatsu

US Brad Bushman
US Jeanne Funk
US Joi Roberts
US Heatherv Vaughan
WG 14.6 – Interactive TeleVision (ITV)  
est. 2007  
URL: http://uitv.info/ifip

**Chair**  
Dr. Lyn PEMBERTON  
University of Brighton  
School of Computing, Mathem. and Information Sciences  
Lewes Rd  
BRIGHTON BN2 4GJ  
East Sussex  
United Kingdom  
Tel. +44 1273 642476  
e-mail: lyn.pemberton@bton.ac.uk

**Vice-Chair**  
Dr. Konstantinos CHORIANOPOULOS  
Ionian University  
Department of Informatics  
7 Platia Tsririgoti  
GR-49100 CORFU  
Greece  
Tel. +30 26 610 87701  
e-mail: choko@ionio.gr

**Secretary**  
Dr. Pablo CESAR  
CWI  
The National Research Institute for Mathematics and Computer Science; SEN 5  
Kruislaan 413  
NL-1090 GB AMSTERDAM  
The Netherlands  
Tel. +31 20 592 4332  
Fax +31 20 592 4199  
e-mail: p.s.cesar@cwi.nl

**Members**  
AT Marianna Obrist  
BE David Geerts  
BR Luiz F. Gomes Soares  
CN Zhang Liping  
DK Jens F. Jensen  
FI Artur Lugmayr  
GB Owen Daly-Jones  
GB Judith Maashoff  
GB Mark Springett  
GR George Lekakos  
PT Celia Quico  
TW Shang Hsu  
US Mike Darnell

WG 14.7 – Art and Entertainment  
est. 2007  
URL: http://www.tosa.media.kyoto-u.ac.jp/ifip/

**Chair**  
Prof. Naoko TOSA  
Kyoto University  
Academic Center for Comp.and Media Studies  
Yoshida-Nihon-Matsu  
Sakyo-ku, Kamingyo-ku  
KYOTO 606-8501  
Japan  
Tel. +81 75 753 9081  
Fax +81 75 753 9081  
e-mail: tosa@media.kyoto-u.ac.jp

**Vice-Chair**  
Prof. Adrian David CHEOK  
National University of Singapore  
Dept. of Electrical & Computer Engineering  
Block E4, Level 5, Room 48  
4 Engineering Drive 3  
SINGAPORE 117576  
Singapore  
e-mail: eleadc@nus.edu.sg

**Secretary**  
Dr. Tomoki YOSHIHISA  
Kyoto University  
Academic Center for Comp.and Media Studies  
Yoshida-Nihon-Matsu  
Sakyo-ku, Kamingyo-ku  
KYOTO 606-8501  
Japan

**Members**  
AT Gerfried Stocker  
FR Christian Warocquier  
GB Roy Ascott  
JP Michihiko Mihoh  
JP Gert van Tonder  
KR Soh Yeong Roh  
US Hisham M. Bizri  
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US Jeffrey Huang  
US Erkki Hutamo  
US Newton Lee  
US Brian Loyall  
US Claudio Pinhanez
Technical Committee and Working Group - Aims and Scopes

There are Aims shared by all or most Committees which are not subject specific. They are as follows:

1. To establish and maintain liaison with national and international organisations with allied interests and to foster cooperative action, collaborative research and information exchange.
2. To identify subjects and priorities for research, to stimulate theoretical work on fundamental issues and to foster fundamental research which will underpin future development.
3. To provide a forum for professionals with a view to promoting the study, collection, exchange and dissemination of ideas, information and research findings and thereby to promote the state of the art.
4. To seek and use the most effective ways of disseminating information about our work including the organisation of conferences, workshops and symposia and the timely production of relevant publications.
5. To have special regard for the needs of developing countries and to seek practicable ways of working with them.
6. To encourage communication and to promote interaction between users, practitioners and researchers.
7. To foster interdisciplinary work and, in particular, to collaborate with other Technical Committees and Working Groups.

TC 1 - Foundations of Computer Science - Aims and Scopes

est. 1989 as SG14 / approved in 9/96 as TC 1

AIMS

• to support the development of theoretical computer science as a fundamental science that has similar scientific goals in understanding the information processing world as physics has in understanding the energy processing world and similar goals in developing methodology for science and technology as mathematics does;
• to support the development and exploration of fundamental concepts, models, theories, systems, and other basic tools and the understanding of laws, limits, and possibilities of information processing as well as to de-velop bridges with other sciences and their applications.

SCOPE

To encourage, organise, support, and unify the development of the following areas:

• frontiers, laws, and limits of information processing;
• fundamental formal systems;
• efficiency and complexity of information processing;
• formal systems to specify, design, verify, analyse, and manipulate
• complex information processing systems;
• theoretical foundations of various other parts of computer science and its main application areas;
• scientific paradigms of informatics and their relations to other disciplines;
• information processing fundamental concepts, models and theories to support the development of other sciences. With the goal to develop foundations and to make use of them.
WG1.1 - Continuous Algorithms and Complexity  
est. 1992

AIMS

To provide a forum for international collaboration and for the dissemination of research and applications of continuous algorithms and complexity.

SCOPE

Many problems in natural science, engineering, social science and business have continuous models. Hence the scope of WG 1.1 is algorithms and especially computational complexity of algorithms for solving continuous models. By computational complexity is meant the intrinsic difficulty of solving such problems. Examples of the problems that are being studied include: ordinary and partial differential equations, continuous optimization, multivariate integration and approximation, matrix multiplication, and systems of polynomial equations.

Of special interest is the solution of continuous problems on parallel and distributed computer systems.

WG1.2 - Descriptive Complexity  
est. 1992

AIMS

- to promote research in all aspects of descriptive complexity through conferences, publications, and more informal means of scientific interaction;
- to promote interaction and the exchange of information across traditional disciplinary boundaries;
- to provide a point of contact for all researchers in all disciplines interested in descriptive complexity and its applications.

SCOPE

All aspects of descriptive complexity, both theory and application. These aspects include:

- generalized descriptive complexity measures and their properties, including resource-bounded complexity, structural complexity, hierarchical complexity, trade-offs in succinctness, and the complexity of sets, languages, grammars, automata, etc.;
- algorithmic and other descriptive theories of randomness;
- the use of descriptive randomness and associated descriptive complexity measures in computational complexity, economy of description, cryptography, information theory, probability, and statistics;
- descriptive complexity measures for inductive inference and prediction, and the use of these measures in machine learning, computational learning theory, computer vision, pattern recognition, statistical inference, and neural networks.

WG1.3 - Foundations of Systems Specifications  
est. 1992

AIMS

- To support and promote the systematic development of the mathematical theory and the foundations of systems specifications;
• To investigate the theory of formal models for systems specifications, development, transformation and verification;

**SCOPE**

The theoretical aspects of the specification and development of computing systems that are based on algebraic and logic concepts and can be studied systematically within a theory of systems specifications.

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**WG 1.4 - Computational Learning Theory**
est.1995

**AIMS**

To promote the field of computational learning theory and to establish close cooperation between existing groups working in geographically separated areas. To support steps helping to bridge theory and applications.

**SCOPE**

• Computational and complexity-theoretic aspects of learning
• Investigation of formal models of learning
• The teacher/learner and other learning paradigms
• Neural networks and learning
• Kolomogorov complexity approach to learning
• Application of the computational and complexity approach to learning to the design of learning systems

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**WG 1.5 - Cellular Automata and Discrete Complex Systems**
est. 1994, dissolved 2004, re-established 2008

**AIMS**

To support the development of cellular automata theory and their applications (especially in parallel computing, in the study of complex systems, in physics, biology, artificial life, ...). To pursue the design and utilization of cellular automata machines.

**SCOPE**

Cellular automata as models of parallelism, complex systems, dynamic systems, interactive behavior, physical systems and models of biological systems. Cellular automata machines.

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**WG 1.6 - Term Rewriting**
est. 1998, revised 1999

**AIMS**

• To promote research efforts in rewriting and its applications.
• To establish close cooperation between existing groups and to facilitate the emergence of new ones.
• To increase awareness of rewriting techniques in the computer science community at large.
• To foster development of applications of theoretical advances.

SCOPE

• Rewriting for computing and reasoning
• Theoretical studies of the rewriting relation of different orders.
• Complexity issues of rewriting.
• Compilation techniques and applications.
• Theory and applications of rewriting logic and calculus
• Application of rewriting to constraint solving, theorem proving and algebraic specifications
• The design, promotion and teaching of rewrite based techniques and applications.

WG 1.7 - Theoretical Foundations of Security Analysis and Design
est. 1999

AIMS

• To investigate the theoretical foundations of security as an independent discipline with firm grounds in logic, semantics and complexity.
• To discover and promote new areas of application of theoretical techniques in computer security.
• To provide a platform for presenting and discussing emerging ideas and trends.
• To strengthen research efforts in current and emerging applications of formal methods and related approaches to the design and analysis of secure systems and applications.
• To make formal methods amenable to the security practitioners, hence increasing awareness of formal verification techniques for security in the computer science community at large.
• To support and promote the systematic use of formal techniques in the development of security related applications.
• To encourage researchers, especially younger ones, to enter this field.
• To promote or support the organization of meetings in this and related areas.
• To provide a clearinghouse for dissemination of information and publications, also with industry.

SCOPE

The main research topics relevant for the Working Group include:

• formal definition and verification of the various aspects of security: confidentiality, integrity, authentication and availability;
• new theoretically-based techniques for the formal analysis and design of cryptographic protocols and their manifold applications (e.g., electronic commerce);
• information flow modelling and its application to the theory of confidentiality policies, composition of systems, and covert channel analysis;
• formal techniques for the analysis and verification of mobile code;
• formal analysis and design for prevention of denial of service.

WG 1.8 - Concurrency Theory
est. 2005

AIMS

• To develop theoretical foundations of concurrency, exploring frontiers of existing theoretical models like process algebra and various process calculi, so as to obtain a deeper theoretical understanding of concurrent and parallel systems.
• To promote and coordinate the exchange of information on concurrency theory, exchanging ideas, discussing open problems, and identifying future directions of research in the area.

SCOPE

The activities of this WG will encompass all aspects of concurrency theory and its applications. The themes of the WG include:

- process algebras and calculi,
- expressiveness of formalisms for concurrency,
- modal and temporal logics for concurrency and their extensions,
- resource sensitive approaches to concurrency and their developments,
- tools for verification and validation of concurrent systems,
- reactive models for real-time and hybrid systems,
- calculi and typing systems for mobile processes and global computing,
- stochastic and probabilistic models of concurrent processes,
- behavioral relations for processes,
- decidability and complexity issues in concurrency theory,
- semantic frameworks for concurrency such as structural operational semantics,
- integration of concepts from concurrency theory into specification, modeling and programming languages, and (global) concurrent systems, and
- exploration of the frontiers of concurrency theory in connections to various branches of computer science, including theories of operating systems, internet languages, Petri nets and their applications, communication protocols, security issues on the internet, global ubiquitous computing, distributed algorithms, embedded systems, software architectures and engineering, automata theory; information theory, various formal methods, control theory and robotics, bio-computing, quantum computing, and other emerging areas.

WG1.9/2.15 Verified Software
est. 2010

AIMS

• To contribute to a comprehensive theory of programming that covers the features needed to build practical and reliable programs.
• To contribute to a coherent toolset that automates the theory and scales up to the analysis of industrial-strength software.
• To collect realistic, verified programs as part of the Verified Software Initiative (VSI) Repository. It will do this using the following means:
  * By encouraging members to solve agreed theoretical problems, adapt tools to advance the state of the art, and to populate the VSI’s Repository by conducting experiments using the VSI’s open problem collection.
  * By having a sharply focused common sense of purpose.
  * By being committed to making progress on the VSI roadmap.
  * By producing deliverables determined by the membership.
  * By further developing the research agenda, collecting open problems, recording progress with appropriate milestones, etc.

SCOPE

Theories, tools and experiments for verified software.
TC 2 - SOFTWARE: Theory and Practice - Aims and Scopes

est. 1962, revised 1982, 1990

AIMS

To obtain a deeper understanding of programming concepts in order to improve the quality of software by studying all aspects of the software development process, both theoretical and practical.

SCOPE

The scope of the committee encompasses all aspects of the software development process including the specification, design, implementation and validation of software systems. Areas of present activity are:

- formal models of software concepts
- programming languages and techniques
- models for information storage and processing
- program support environments
- user interfaces to software systems
- software quality

WG2.1 - Algorithmic Languages and Calculi

est. 1962, revised 1963, 1990, 1992

AIMS

To explore and evaluate new ideas in the field of programming, possibly leading to the design of new languages.

SCOPE

- the study of calculation of programs from specifications;
- the design of notations for such calculations;
- the formulation of algorithm theories, using such notations;
- the investigation of software support for program derivation;
- continuing responsibility for ALGOL 60 and ALGOL 68.

WG2.2 - Formal Description of Programming-Concepts

est. 1965, revised 1991

AIMS

The aim of the Working Group is to explicate programming concepts through the development, examination and comparison of various formal models of these concepts.

SCOPE

The Working Group will investigate formalisms and models which represent different approaches to formal specification of programming concepts. The models of concern must, at least in part:

- apply to the actual computing milieu;
• have sufficient generality to describe total systems or useful subsystems;
• treat either:
  - problem specification or
  - solution specification;
• provide practical guides towards derivation of:
  - capabilities,
  - correctness,
  - equivalence,
  - implementability,
  - performance;
• assist in standards development and specification;
• have a pedagogical utility.

WG2.3 - Programming Methodology
est. 1969, revised 1991

AIMS

To increase programmers' ability to compose programs.

SCOPE

• identification of sources of difficulties encountered in present day programming;
• the interdependence between the formulation of problems and the formulation of programs, and the mapping of relations existing in the world of problems into relations among programs and their components;
• intellectual disciplines and problem-solving techniques which can aid programmers in the composition of programs;
• the problem of achieving program reliability;
• the consequences of requirements for program adaptability;
• the problem of probability of program correctness and its influence on the structure of programs and on the process of their composition;
• guidelines for partitioning large programming tasks and defining the interfaces between the parts;
• software for mechanized assistance to program composition.

WG2.4 - Software Implementation Languages

AIMS

To promote the exchange of information between researchers and users of languages for the description of software systems at all stages of development and support. The particular focus of the group is upon the pragmatic engineering aspects of the problem: measurements, evaluation, critical comparisons, and development of economically viable techniques.

SCOPE

• experience in the actual use of systems implementation languages;
• the relation of language design to the problems of system maintenance and enhancement;
• impacts of programming methodology on system implementation languages;
• compilation techniques for system implementation languages;
- software and hardware environments to facilitate the design, construction and maintenance of large software systems;
- software portability and reusability, and their relationship to machine dependence.

WG2.5 - Numerical Software

AIMS

To improve the quality of scientific computation by promoting the development and availability of sound numerical software.

SCOPE

1. **Environment.** The definition from a numerical standpoint of a set of hardware and software features for a computing system.
2. **Tools.** The development and improvement of programming languages and other tools for numerical computation.
3. **Algorithms.** The establishment of guidelines for the assessment of numerical algorithms and their implementations.
4. **Software.** The establishment of guidelines for the preparation, interoperability, verification, validation, documentation, distribution and maintenance of numerical software.
5. **Data.** The establishment of guidelines for the validation, documentation, preservation, and distribution of numerical data.
6. **Communication.** The exchange of information concerning numerical software and the determination of the needs of computer users.

WG2.6 - Database

AIMS

For the benefit of society, to promote visibility and to increase the impact of research and development in the database area, especially in the fields defined in the scope of the working group.

- To promote quality and relevance of academic and industrial research and development in the database area.
- To promote ethical behavior and appropriate recommendations or guidelines for research related activities, e.g. submission and selection of publications, organization of conferences, allocation of grants and awards, and evaluation of professional merits and curricula.
- To promote cooperation between researchers and with other established bodies and organizations pursuing the above aims.
- To contribute to assessing the scientific merits and practical relevance of proposed approaches for data and knowledge management.

SCOPE

The notion of database has evolved to include systems that accept, describe, store and enable manipulation and presentation of data, information and knowledge in a wide spectrum of forms, ranging from tuples to rules, text, images, sounds and others, with their corresponding operators, usage and management.

The group’s interests cover formalisms, models, architectures, techniques and methodologies for the purpose of designing and realizing such database systems.
These currently include in particular:

- new models, languages and theories for database design and representation
- new architectures and techniques, e.g. data warehouses, data mining, multimedia and spatio-temporal databases
- impact of new communication technologies, such as Internet, broadband networks or wireless communications
- understanding, reuse and interoperation of existing data stores
- visual user interfaces and information visualization
- new methodologies for building database applications

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**WG2.7 - User Interface Engineering**

**AIMS**

To investigate the nature, concepts and construction of user interfaces for software systems.

**SCOPE**

- increase understanding of the development of user interfaces based on knowledge of system and user behaviour.
- provide a framework for reasoning about interactive systems;
- provide an engineering model for the development of user interfaces.

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**WG2.8 - Functional Programming**
est. 1987, revised 1991

**AIMS**

To study the design, implementation, and use of functional (applicative) languages.

**SCOPE**

- semantic theories for functional languages;
- specification and correctness for functional programs;
- data and demand driven execution models;
- programming with higher-order functions;
- functional approaches to input-output and persistent memory;
- programming systems based on functional languages;
- novel architectures for functional programming systems;
- implementation based on combinator graph reduction;
- multiple processor implementations;
- programming styles and techniques appropriate for functional languages;
- applications and experience.

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**WG2.9 - Software Requirements Engineering)**
est. 1993
AIMS

The aim of the Working Group is to develop a better understanding of:

- the elicitation, specification, analysis and management of the requirements for large and complex software intensive systems;
- the interpretation and documentation of those requirements in such a way as to permit the developer to construct a system which will satisfy them.

SCOPE

The Scope of the WG includes all aspects of requirements engineering. Some examples of areas of special interest are:

- formal representation schemes and requirements modelling;
- descriptions of the requirements engineering process;
- tools and environments to support requirements engineering;
- requirements engineering methods;
- requirements analysis and validation;
- requirements elicitation, acquisition and formalisation;
- methods and tools for verification of implementations compliance with requirements;
- reuse and adaptation of requirements;
- domain modelling and analysis;
- requirements engineering for distributed, safety-critical, composite, real-time and embedded systems.

WG2.10 - Software Architecture

est. 2000

AIMS

The purpose of WG 2.10 is to further the practice of software architecture by integrating software architecture research and practice.

Software architecture is concerned with

- the structure and organization by which components and subsystems interact to form systems, and
- the properties of a system that can best be designed and analyzed at the system level, for example end-to-end performance and system-family compatibility.

Software architecture is important because

- it captures and preserves designers’ intentions about system structure, thereby providing a defense against design decay as a system ages, and
- it is the key to achieving intellectual control over the enormous complexity of a sophisticated system.

Some of the concerns of a software architect are

- early analysis of critical whole-system properties and
- preservation of the integrity of design over time in the face of system modifications and the creation of families of related systems.

SCOPE
The aspects of software architecture within the working group’s scope are:

- identifying common problems encountered by practitioners,
- investigating notations, languages, techniques, tools, and methodologies for improving the practice of software architecture; current areas for improvement are describing software architectures, supporting reuse at the architectural level, interoperability and integration, evaluating and analyzing software architectures (e.g. for fulfillment of requirements or properties, comparing design alternatives, etc.), supporting the correspondence between the architecture and the implementation, reverse-engineering the architecture of an implemented system,
- training, education, and certification of software architects.

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**WG2.11 – Program Generation**  
est. 2003

**AIMS**

Generative approaches have the potential to revolutionize software development as automation and components revolutionized manufacturing. At the same time, the abundancy of current research in this area indicates that there is a host of technical problems both at the foundational and engineering levels. As such, the aim of this Working Group of researchers and practitioners is to promote progress in this area.

**SCOPE**

The scope of this WG includes the design, analysis, generation, and quality control of generative programs and the programs that they generate. Specific research themes include (but are not limited to the following areas):

- Foundations: language design, semantics, type systems, formal methods, multi-stage and multi-level languages, validation and verification,
- Design: models of generative programming, domain engineering, domain analysis and design, system family and product line engineering,
- model-driven development, separation of concerns, aspect-oriented modeling, feature-oriented modeling,
- Engineering: practices in the context of program generation, such as requirements elicitation and management, software process engineering
- and management, software maintenance, software estimation and measurement
- Techniques: meta-programming, staging, templates, in-lining, macro expansion, reflection, partial evaluation, intentional programming,
- staged configuration, stepwise refinement, software reuse, adaptive compilation, runtime code generation, compilation, integration of
- domain specific languages, testing,
- Tools: open compilers, extensible programming environments, active libraries, frame processors, program transformation systems,
- program specializers, aspect weavers, and tools for domain modeling.
- Application: IT infrastructure, finance, telecom, automotive, aerospace, space applications, scientific computing, health, life sciences, manufacturing, government, systems software and middle-ware, embedded and real-time systems, generation of non-code artifacts.
WG2.12/12.4 - Web Semantics
est. 2004, revised 2005

AIMS
The aim of the WG2.12 is to obtain a deeper understanding of the semantic web, and help in the development of its theoretical foundations and technological underpinning, as well as its impact on computing in general.

SCOPE
The scope of the working-group includes:

- Study of the formal and practical knowledge representation issues of the semantic web
- Provide input into developing standards for adding semantics to the web and their enabling technologies
- Design, evaluation and use of ontologies
- Study of the semantics of agent and web interaction
- Issues related to the development, design and deployment of web services particularly the impact of semantic aspects
- Metrics for evaluation of the quality of web semantics
- Studies of human centered aspects specifically for the semantic web
- Study of the impact of semantic web computing on organizations and society
- Interoperability of data and Web Services including aspects of Trust and Security
- Content-based information and knowledge retrieval
- Metadata and knowledge markup
- Information extraction, automatic and semi-automatic generation of meta data

WG2.13 – Open Source Software
est. 2006

AIMS
To enable a diverse community of researchers and practitioners to rigorously investigate the technology, work practices, development processes, community dynamics within free, libre and open source software (OSS) systems, complementing appropriately other IFIP Working Groups where OSS is increasingly relevant.

SCOPE
Software engineering perspective

- OSS architecture, configuration and release management, environments
- Testing and assuring OSS quality and security
- Mining and analyzing OSS project repositories
- Lessons from OSS for conventional development
- OSS and standards

Studies of OSS deployment

- Case studies of OSS deployment, migration models, success and failure
- Role of OSS in the public sector (government, education, health etc) and ‘secondary’ (automotive, telco, medical devices etc) software sector
- OSS-compatible IT governance architectures
- Open sourcing – offshore sourcing of development

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• OSS applications catalog (functionality, platforms, support providers, training needs)

Social science perspective

• Diversity and international participation in OSS projects
• Learning, knowledge sharing, collaboration, control or conflict in OSS projects
• Dynamics of OSS project communities – building and sustaining

External perspectives & influences

• Diffusion and adoption of OSS innovations
• Economic analysis of OSS – business and migration models
• OSS and alternative intellectual property regimes
• Stimulation of OSS development in vertical domains

WG2.14 – Service-Oriented Systems

est. 2011

AIMS and SCOPE

The aim of the new working group is to organize and promote the exchange of information on fundamental as well as practical aspects of service-oriented systems. In doing so, the working group will consider service-oriented systems from a technological perspective, but it will also address their business aspects and economic impact.

The aim is to structure a research community that comprises both academia and industry (maybe through living labs) and become an active, permanent, and international forum on services-oriented systems. Besides the technological underpinnings, the working group will address the different facets of the discipline. It will also try to organize current initiatives and research, and propose suitable and sustainable future research directions.

WG2.15 – Verified Software

est. 2011

TC 3 - Education - Aims and Scopes


AIMS

- To provide an international forum for educators to discuss research and practice in:
  - teaching informatics
  - educational uses of communication and information technologies (ICT)
- To establish models for informatics curricula, training programs, and teaching methodologies.
- To consider the relationship of informatics in other curriculum areas.
To promote the ongoing education of ICT professionals and those in the workforce whose employment involves the use of information and communication technologies.

To examine the impact of information and communication technologies on the whole educational environment:
- teaching and learning
- administration and management of the educational enterprise
- local, national and regional policy-making and collaboration.

WG3.1 - Informatics and ICT in Secondary Education

The Working Group is concerned with the role of both informatics and information literacy on the one hand and the use of Information and Communication Technologies (ICT) in education on the other hand in secondary education (age range from 11 to 18 years).

The mission of the Working Group is to provide a forward look on the development and impact of informatics and of using ICT’s in secondary education from an international viewpoint. It tries to identify problems, document experiences and find solutions. It does not strive to offer a unique solution to problems, as it is aware that specific circumstances of people and countries must in general be taken into account.

AIMS

- The Working Group aims to develop effective communication among its members who come from many countries. This communication network which is based on group communication through internet and e-mail, meeting in person at working conferences and workshops, allows members to actively access state-of-the-art results of research and practice and to develop a collective expertise.
- On the basis of this collective expertise, prospective ideas about development and impact of informatics and the use of ICT in secondary education are formed.
- The collective expertise is shared with others in open conferences, seminars and workshops, consultancy, and through internet, a web space and publications.

SCOPE

The work in Working Group 3.1 covers all aspects of the role of informatics and ICT usage in secondary education. Among these aspects are:

- informatics curricula: content and pedagogy
- information literacy: content and pedagogy
- informatics in other subject areas
- use of ICT within the subject of informatics
- use of ICT within other subject areas
- impacts of informatics and ICT on contents and methods of teaching and learning
- impacts of ICT on organization and management of teaching impacts of ICT on the learning of the new generation
- impacts of ICT on teacher training and professional development of teachers
- use and impacts of ICT on learning outside of the institution whether formal or informal in nature

WG3.2 - Informatics and ICT in Higher Education

The Working Group is concerned with the roles of both informatics and resulting Information and Communication Technologies (ICT) in higher education.
The mission of the Working Group is to provide a forward look on the development and impact of informatics and resulting technologies in higher education from an international viewpoint. It tries to further the professional work of each of its members and to identify problems, experiences and solutions. It does not strive to offer a unique solution to problems, as it is aware that specific circumstances of people and countries must in general be taken into account.

AIMS

- The Working Group aims to develop effective communication among its members who come from many countries. This communication network, which is based on meetings in person at working conferences and workshops, allows members to actively access state of the art results of research and practice, and to develop a collective expertise.
- On the basis of this collective expertise, prospective ideas about development and impact of informatics and related technologies in higher education are formed.
- The collective expertise is shared with others in open conferences, seminars, and consultancy and through publications.
- The Working Group strives to achieve a proper understanding of the impact of the information technologies on society in order to be able to define the consequent new professional responsibilities of all students.
- The curricular work of the working group aims:
  - to revise curricula for informatics dealing with changes both from technological development and from theoretical advances;
  - to provide guidance on the informatics component needed in the curricula of all disciplines;
  - to provide model curricula, adaptable to various cultural needs and educational systems, especially those of developing countries.

SCOPE

The work in Working Group 3.2 covers all aspects of the role of informatics and resulting technologies in higher education (universities, polytechnics, colleges of higher education, institutes of technology, etc.) covering education of specialists (like informaticians, computer scientists, software engineers, etc.), as well as the education of students from other disciplines.

Among the aspects covered are:

- informatics curricula
- informatics in other subject areas
- use of ICT within the subject of informatics and other subject areas
- impacts of informatics and ICT on contents and methods of teaching and learning
- impacts of ICT on organization and management of teaching and learning.

WG3.3 - Research on Education Applications of Information Technologies
re-est. 1988, revised 2004

AIMS

To provide a forum to identify issues and priorities for research and to map research policies arising from the differing cultures in IFIP Member countries.

SCOPE

- Identification of research needs and topics in the field of education
- Improvement of research approaches and methods
- Production of synthesis of research on major topics in the field
Dissemination of research, in partnership with educational research communities.

WG3.4 Professional and Vocational Education for the Information and Communication Technologies (ICT) Sector

AIMS

- To promote the acquisition and updating of appropriate ICT knowledge and expertise by all whose working environment requires contact with computer-based systems.
- To consider the nature, content and method of delivery of professional and vocational education, within the ICT sector, which will enable learners achieve their employment expectations.
- To promote the effective use of ICT as a medium for the delivery of professional and vocational education.
- To examine the activities of ICT professional bodies concerning the professional development and certification of their members.

SCOPE

- The integration of ICT knowledge and practice with other vocational and professional education.
- The on-going professional development of ICT practitioners.
- The provision of initial and on-going IT training and education for non-ICT professionals to enable them to use and contribute to the development of ICT systems.
- The use of computer-based training methods in the delivery of professional and vocational education within the ICT sector.

WG3.4 is focused on the area of professional and vocational education rather than on specific computing curricula in primary, secondary or tertiary educational institutions. The membership of WG3.4 comprises academics and ICT practitioners whose interests are reflected in the conference activities organized by the Working Group over recent years. These include the use of computer-mediated education, the on-going professional education of both ICT and non-ICT professionals, the activities of national ICT professional bodies, the delivery of effective ICT vocational education to post-secondary learners and the integration of ICT into other tertiary curricula.

WG3.5 – Informatics and Digital Technologies in Elementary Education

The working group is concerned with the role of digital technologies and Informatics in elementary education (age range from pre-school to 14 years). Its mission is to provide educationalists with an international forum where ideas, practical educational experiences, research and project-oriented work can be presented and discussed in a professional way in order to promote the development of elementary education teaching and children's learning.

AIMS

- develop pedagogical perspectives and respond to challenges raised by digital technologies in education and for creative activities and learning as cognitive tools;
- study and evaluate the issues arising when ICT is used in pre-school and elementary education; pre-service teacher education; and professional development for teachers and teacher educators;
- assist teachers (as practitioners), administrators and other educators to assess the impact of ICT on children, teachers, and the school community;
- develop understanding of learning environments appropriate to ICT use and where ICT is used;
promote critical use of educational technologies in pre-school and elementary school settings including schools in the developing nations;
- promote the development of ICT materials and equipment, of recognized quality including the developing nations;
- promote the use of ICT to support the school integration of disabled and hospitalized pupils;
- focus on consequences and implications for teacher education and pedagogical needs of the future in ICT;
- ensure that ethical perspectives raised by the applications of ICT on education and children's lives are handled in a critical and appropriate way;
- enable ICT to make a beneficial contribution to children's learning and living;
- bring the problems of ICT education in pre-school and elementary education to the attention of school administrators and appropriate authorities to whom they report; and
- recognize the importance of Informatics in education and implementation of Informatics in curriculum of elementary education.

SCOPE

The scope of this working group is ICT in Elementary Education including:

- pre-school (nursery or early childhood) education;
- elementary (primary) schools;
- disabled and hospitalized pupils;
- teachers (initial training and professional development)
- the curriculum
- use in all disciplines and across all curriculum areas
- national policies
- equity and gender
- social, cultural and psychological aspects
- competency and assessment

WG3.6 - Distance Education
est. 1987, revised 2000, 2006

AIMS

The aims of the working group are:

1) to investigate the use of Information and Communication Technologies (ICT) for learning in open, flexible and distance education.

2) To facilitate discussion and dissemination of research and development in the field of learning through processes enabled by information and communication technologies (termed telelearning, E-learning, tele-education and online learning).

SCOPE

The focus of the work will be on:

- Pedagogical issues
- Administrative issues
- Technological capabilities

With respect to the communication, interaction and information occurring in technologically mediated educational contexts such as virtual universities, globally networked school projects and internet distributed resources.

The working group’s activities will mainly be conducted through working conferences, workshops, electronically
mediated discussion and TC3 Teleteaching conferences.

WG3.7 - Information Technology in Educational Management
est. 1996, revised 2008

AIMS

- To promote effective and efficient use of Information and Communication Technologies within the management of educational institutions;
- To promote the use of ICT to support school improvement and accountability;
- To promote the use and advancement of decision support systems within educational management, including those from operations research, decision science, expert systems, human-computer interaction and others;
- To follow-up technological developments (hardware, software, communication systems), and their interoperability, their possible impact on ITEM application and to recommend and forecast the development of ITEM systems;
- To investigate the potentials of mobile technologies to support managerial and administrative work in educational institutions;
- To investigate human, social, ethical, aspects of ITEM systems and to provide recommendations for their adequate integration in educational settings;
- To develop and improve qualitative and quantitative empirical methods to understand the role of ICT in educational organizations;
- To investigate aspects of security and privacy of ITEM systems and to provide recommendations for their adequate integration in educational settings;
- To care for international exchanges of information on the state of the art of research, development and implementation of ITEM systems;
- To promote international cooperation among ITEM research teams;
- To propose themes for international, collaborative research and development in ITEM and to seek funding for such research and development from national and international bodies;
- To provide advice and support to countries/educational systems in the developmental stage of their ITEM systems.

SCOPE

The whole range of educational institutions from kindergarten to primary and secondary education, to universities, adult education and in-service training;
Local education authorities/school districts and educational policies;
Local, regional, national, international research and development institutions;
Academic, non-profit organizations, government, commercial.

WG3.8 - Lifelong Learning
est. 2008

This Group is concerned with the role of both Informatics and the resulting Information and Communication Technologies (ICT) that enable each citizen and worker to adapt to the knowledge-based society and actively participate in all spheres of social and economic life, taking more control of his or her future. It looks particularly at the interaction between the different ways of acquiring and updating all kinds of abilities, interests, knowledge and qualifications. From this perspective of the individual learner it addresses all forms of learning and the interaction between them, including:

- formal learning, such as a degree course followed at university;
- non-formal learning, such as vocational skills acquired at the workplace;
- societal learning that enables individuals to live and work together, and
- informal learning that crosses generations.
Lifelong Learning is also a tool for reducing the “Digital Divide”, whether it be between individuals in a single country or between individuals in different countries.

The mission of the Group is to provide a forward look on the development and impact of Informatics and the resulting technologies on Lifelong Learning from an international viewpoint. It tries to identify problems, document experiences and find solutions. It does not strive to offer a unique solution to problems as is aware of the specific circumstances of countries and of individual people.

AIMS

- The Group aims to develop effective communication among its members. This communication network, which is based on group communication through telecommunications and meeting in person at working conferences and workshops, allows members to actively access state-of-the-art results of research and practice and to develop a collective expertise.
- On the basis of this collective expertise, prospective ideas about development and impact of informatics and related technologies in lifelong learning are formed.
- The collective expertise is shared with others in open conferences, seminars and workshops, consultancy, and through telecommunications and publications.

SCOPE

The work in Group 3.8 covers all aspects of the interactive role of informatics and resulting technologies in lifelong learning. Among these aspects are:

- Lifelong Learning as an economic issue;
- Lifelong Learning as a social issue;
- Lifelong Learning as a civic issue;
- Lifelong Learning as a cultural issue;
- Lifelong Learning as a personal issue;
- Lifelong Learning as an Information and Communication Technology issue;

Lifelong Learning is an economic issue:
Economies are changing; in knowledge-intensive economies the demand for competent knowledge workers and skills workers is increasing. Supply is not in balance with the demand. The main economic importance of knowledge workers is through knowledge creation; the main economic importance of skills workers is in knowledge application. To keep up with economic demands both groups have to enhance their competence in ‘learning teams’. Learning has to be integrated into the work and this learning on the job constitutes Lifelong Learning from an employment related perspective.

Lifelong Learning as a social issue:
Social changes occur because of part-time work during initial education, of disappearing transition between initial education and working life, and of change as a second nature in work. Also new technological possibilities such as mobile phones play a role. We want (to do) it now, we want to do more at one time, we want it flexible and we want it personal and meaningful. This also applies to our social learning where ‘learning communities’ appear, be it local communities or communities of hobby or interest.

Lifelong Learning is a civic issue:
New opportunities for active participation in society are needed, empowering citizens to increase their influence over social, cultural and economic factors, locally and further afield, as ICT permits remote participation. Lifelong Learning in citizenship communities is a means to this active participation: ”Just as Learning is being taken to the learner enhanced by the use of ICT, so is citizenship with developments in electronic governance.”

Lifelong Learning is a cultural issue:
We have moved to a ‘zap’ culture with television, local satellite, web video and mobile TV, all being amplified by ICT. Small chunks of information, or entertainment, build up the mosaic of our cultural experiences, a culture of ‘blips’. Ubiquitous mobile communication (”where are you?”), video and gaming, surfing the globe, all allow us to create our own cultural communities. Attention must be given to the digital divide being created by the ‘haves’ and ‘have-nots’.

Lifelong Learning is a personal issue:
Changes in economic and social life require on-going personal development. In *personal life* a person may be a ‘lonely’ learner. But economic, social and cultural life require ‘team learning’ or ‘community learning’. ‘Lone wolf’ learners may be able to ‘help themselves’, but have to be drawn into teams or communities. These ‘lone wolf’ learners fall into several age groups. Attention must be given to reaching all ages.

**Lifelong Learning is an Information and Communication Technology issue:**
Lifelong Learning provides new opportunities for active participation in society, empowering citizens to increase their influence over social, cultural and economic factors, locally and further a field, as ICT permits remote participation. Economic, social and cultural developments all point in a direction where personalized, flexible learning will be part of our economic, democratic, cultural and social life. Just as in the work place where its use is integrated, ICT will play an important enabling role in merging personal, private, leisure and work time. Lifelong Learning takes place in the real world; that is, in a real-life setting where new knowledge has to be created and applied, because it is needed (to steer our actions). Therefore Lifelong Learning may appear in different contexts such as in a professional context, in a local/dispersed community context and in an Individual context. All of these fall within the scope of the group.

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**SIG3.9 – Digital Literacy**
est. 2007

The mission of Special Interest Group 3.9 is to provide an international forum for understanding and endorsing research, promoting policy development and improving practice on the challenging area of *Digital Literacy* and *e-Inclusion*. The work of SIG 3.9 encompasses the entire lifecycle of learning and aims to identify problems and factors, analyze experiences and provide solutions that would address successfully the differentiated needs, interests and aspirations of different groups of people with regard to digital literacy.

**AIMS**

- To create and expand a hub of experts in Digital Literacy with the aim to raise awareness and work in an organized and systematic way towards the pursuit of *Digital Literacy* and the bridging of *Digital Divide* in education, the workplace and society at large.
- To develop and offer a sustainable, single-point-of-access, high-quality information service on Digital Literacy.
- To offer consultancy, reporting and expertise brokering services on Digital Literacy and e-Inclusion in education and training.

**SCOPE**

To study and promote the pursuit of *digital literacy* and *e-Inclusion* in the full range of educational settings:

- Formal Education (primary, secondary, and higher education)
- Continuing Professional Development/Training and Vocational Education
- Adult Education
- Informal Education & social learning: learning at home/social environments

**Focus areas:** Democratic education, Critical pedagogy, Curricula and Educational frameworks, National policies, Teacher education and training, Professional education, Learning communities and Social/resource networks.

The work of Special Interest Group 3.9 aims to have a *global reach*, with a broad geographical granularity: local, regional, national, international/continental, worldwide.
TC5 - Information Technology Applications - Aims and Scopes

est. 1970, rev. 2004

AIMS

To promote research and the development of fundamental concepts, models, and theories to support applications of Information Technology.

- Research: To identify and study advanced issues related to the application of techniques and information technologies that automate, integrate, and optimize the processes of innovation, design, production and management, including environmental issues.

- Communication: To provide an international forum for government, academia, research and industry for the dissemination, publication and peer review of information, research, education and practices.

- Collaboration: To foster interdisciplinary work and to collaborate with other Technical Committees, Working Groups and global professional organizations with allied interests.

SCOPES

This Technical Committee provides a focus for multi-disciplinary research into the application of information technologies and practices to facilitate information management - that is, to make it easier for people to have up-to-date knowledge, to be flexible, and to adapt. Some non-exclusive examples are:

- Product Lifecycle Management
- Digital Engineering / Digital Modeling and Simulation / Digital Manufacturing
- Computer Aided Product Realization
- Integrated Manufacturing / Production Management including Data Management for Production, Process Planning and Tools
- Virtual Product Creation, Visualization and Digital Verification of Product and Process
- Environmental Information and Decision Support Systems for Environmental Monitoring, Management, Research and Policy, including Risk and Crisis Management
- Virtual collaboration supporting the interaction between product, production, supply chain management, recycling and end of life disposal

Enterprise integration to facilitate product realization.

WG5.1 – Global Product Development for the whole life-cycle

est. 2006, revised 2009

AIMS

The aim of the WG is to understand the impact of the whole product life-cycle on product development. One of the major issues is to analyze and take into account the interaction of products with the environment which has a strategic importance for the sustainability of future economic development. The reason is that a product’s life-cycle costs (the total costs and impacts of ownership), which play a key role in the move toward product-service systems (PSS), become more and more important in the new economic environment. The objectives are to propose new approaches for product development taking account of the importance of life-cycle issues, and to develop IT systems supporting product information in a sustainable way through the product life-cycle. These approaches would include the consideration of “Green Technology,” so important for our world’s future.
SCOPE

The scope of the WG concerns all aspects of Product Development for the whole life-cycle, including rapid product development and concept validation, CAD tools for early design, collaborative product development, capture and reuse of design information, feedback from the supply chain, usage and product recycle management, etc. More specifically, the following topics are included in the scope of the WG:

- Global Product Development (global products, global teams, global processes).
- Product Life-cycle Management (PLM) (product life-cycle phases, PLM systems architecture, distributed PLM systems).
- Product Life-cycle Engineering concepts and methods (design for the life cycle, life-cycle analysis, through-life aspects – feedback from users and service, knowledge lifecycle management and long-term knowledge sustainment, product-service systems).
- New organizational issues within Product Life-cycle Engineering (collaboration strategies, business strategies and benefits, infrastructure and environment, support tools, collaboration environments and platforms, virtual and simulation environments, infrastructure and implementation processes, interoperability and security issues).
- Generic issues (value, risk and cost management, emerging standards and best practices, metrics and benchmarking, performance evaluation, educational and training approaches).

SIG5.1 on Advanced Information Processing for Agriculture
est. 2010

AIMS

The IFIP Special Interesting Group (SIG) on Computer and Computing Technologies in Agriculture (CCTA) encourages the development towards a science and technology of CCTA, through pursuit of the following aims:

- to promote the use of knowledge and methods from the computer and computing sciences in the agriculture;
- to illustrate the experiences and publications of the government and institutes, and also the profitable technologies and policies on agriculture;
- to provide business opportunities on communicating with participants, including researchers, IT professionals, consultants and government officials;
- to provide opportunities of exchanging knowledge, strategies and experiences between par participants;
- Promote and encourage interactions among agriculture Scientists, Meteorologists, Biologists (Pathologists/Entomologists) with IT Professional and other stakeholders to develop and implement methods, techniques, tools, and issues related to information & knowledge management systems in agriculture technology.
- Create expert pool of scientists, R&D personnel on global level in various agro-advisory domains using IT tools.
- Develop and enhance excellence through new educational training programs and technology dissemination among faculty members, professionals and students.
- Establish and strengthen the link between academia, R&D companies, institutions government organization and professional bodies etc for best utilization of resources.
- Develop support in teaching and learning process Act as platform for transfer of knowledge and information in agriculture and related sciences and technology to professionals, faculty, students and organization.
- Serve as platform for dissemination of scientific and technological knowledge in the field of agro-advisories especially based on IT applications.
- Organize various need based faculty training programs in various areas of IT applications in agriculture.

The topic will include:

1. Computer and Agriculture
• Scientific and technological support for the infrastructure construction in agriculture and rural informatization;
• Universal information service technology and service systems development in rural areas;
• The simulation models and decision-support systems for animals and plants management;
• Virtual agriculture technology;
• The inspection and traceability technology for agricultural product quality;
• E-commerce technology for agricultural products;
• The application of information and communication technology in agriculture;
• Intelligent system in Agriculture.

2. Precision Agriculture and advanced computing

• The application and development of GPS, GIS and RS in agriculture and the technological innovation for farm-used products;
• Novel Sensors and data processing technology for the effective information acquisition of agricultural biology, resources and environment;
• The management decision-support and the prescription generation technology of variable operation for farm crops and livestock production system;
• Intelligent precise-control technology for farm machinery equipment and agricultural facilities;
• System integration technology of precision agriculture in Asia;
• Practice and prospect of precision agriculture development in Asia;
• To create and promote expert groups for development of agro-meteorological databases, crop modeling software and applications for development of crop performance based decision support system;
• Encourage younger generation of students/researchers to join this emerging area.

For the recognition of successful initiatives by government NGOs institutions and individuals for promotion of growth and prosperity of agriculture it is proposed to institute international awards for research and development activities in the areas of agriculture as below;

* By establishing and maintaining liaison with national and international organisations with allied interests and to foster cooperative action, collaborative research and information exchange.

* To identify subjects and priorities for research, to stimulate theoretical work on fundamental issues and to foster fundamental research which will underpin future development.

* To provide a forum for professionals with a view to promoting the study, collection, exchange and dissemination of ideas, information and research findings and thereby to promote the state of the art.

* To seek and use the most effective ways of disseminating information about the work of the group including the organisation of conferences, workshops and symposia and the timely production of relevant publications.

* To have special regard for the needs of developing countries and to seek practicable ways of working with them.

* To encourage communication and to promote interaction between users, practitioners and researchers.

* To foster interdisciplinary work and, in particular, to collaborate with other Technical Committees and Working Groups.

SCOPE

WG/SIG will serve as platform to create expertise and pool of scientists in various areas of agricultural and related sciences from institution all over the world. This information will be provided online for use by various user communities.
To develop and enhance excellence through new educational training programs in various areas of crop/soil modeling & other IT applications which can be delivered in the institution across the world through standalone and virtual programs.

It will serve as a platform to provide information and other resources of professionals, faculty and students for promotion of bioinformatics activities.

To provide a forum for developing teaching and learning process in different disciplines with central focus to improve understanding and R&D on various aspect of agricultural and related sciences.

To provide a forum for dissemination of Scientific and technological knowledge in the field of agricultural and related sciences by organizing seminars/conferences and developing databases, web sites etc.

Organize various need based faculty training programs in various areas of agricultural and related sciences.

Provide a platform for interaction among scientists form various disciplines like IT, computer science, mathematics life sciences, agricultural sciences and meteorological sciences for the development of agricultural and related sciences.

Promote and encourage the collaborations among scientists to create inter disciplinary groups for research and development of biological databases, bioinformatics software and application in areas of weather, pest/disease and agriculture.

Encourage sharing of knowledge and resources like agrometeorological infrastructure, data communicating infrastructure, grid computing infrastructure data software and other electronic resources.

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**WG5.4 - Computer-Aided Innovation**
est. 2005, revised 2008

**AIMS**

1. To contribute to identify the underlying scientific foundation of Computer Aided Innovation and also to evaluate their effectiveness and efficiency.
2. To identify the state of the art and trends of Computer Aided Innovation Software and its tools and methods by discussing organizational, technological and cognitive aspects of the application of CAI methods and tools.
3. To promote the development of Computer Aided Innovation Software focusing on end-to-end product creation process with methods and tools to ensure the feasibility and success of innovations.
4. To address the main motivations of the industrial sector, regarding the engineering innovation activity with computer tools and methods.
5. To address the main motivations of the academic community regarding theoretical foundations of computer aided innovation.

**SCOPE**

- The Working Group will promote regular working conferences, seminars and workshops on Computer Aided Innovation calling for contributions for clarifying the role of computer aided innovation tools.
- The Working Group will focus in connecting together managers, engineers, scientists and academics interested in pushing forward the development of this new kind of tools and methods.
- The Working Group will promote that the best papers presented at its conferences, seminars and workshops will be further developed and enhanced for being published in selected journals with high impact.
WG5.5 – COVE: Cooperation Infrastructure for Virtual Enterprises and electronic Business
est. 2001

AIMS
To promote and encourage the research and technological development on many aspects of business practices, advanced tools and mechanisms, and forthcoming standards, in the areas of virtual organizations, virtual enterprises, and advanced electronic business models.
To contribute to the harmonization and knowledge dissemination of world-wide research results on virtual organizations and collaborative networks, and to foster needed collaborative developments.

SCOPE
- Reference architectures for virtual organizations including life cycle models
- Collaboration models in networked organizations
- Interoperability infrastructures in collaborative web-based environments
- Safe communications and authentication frameworks
- Distributed/federated information and knowledge management
- Assessment of the role of ontology and standards
- Planning and supervision of distributed business processes
- New value systems and assessment methods
- Collaboration coordination and management
- Supporting functions for the full life cycle of virtual organizations
- Novel paradigms and methods to support distributed collaborative processes.

WG5.7 Advances in Production Management Systems

AIMS
The aim of WG 5.7 is to promote and encourage the advancement of knowledge and practice in the field of Integrated Production Management and to maximize global dissemination of this knowledge.
This broad aim is achieved by:
- Continuous development and refinement of a research agenda.
- Developing a research culture that nurtures research that addresses industrial need whilst maintaining academic excellence.
- Disseminating R&D results and best practices globally to both academics and practitioners through the groups annual conference and the activities of its special interest groups.

SCOPE
- design and implementation of new production planning and control systems taking into account new technology and management philosophy;
- CAPM in a CIM environment including interfaces to CAD and CAM;
- project management and cost engineering;
- knowledge-engineering in CAPM;
- CAPM for Flexible Manufacturing Systems (FMS) and Flexible Assembly Systems (FAS);
- methods and concepts in CAPM;
- economic and social implications of CAPM.
- Supply Chain Management
- Operations and manufacturing strategy
AIMS

The purpose of this Working Group is to progress and to disseminate research and development results in the area of Enterprise Interoperability.

The goal of this group is to bring together experts of multiple disciplines that contribute to this field. The result of this research is to enable enterprises (networked enterprise, extended enterprise, administration, virtual organizations) or organizational units, applications to interoperate seamlessly with each other either inside and enterprise or among independent enterprises.

Specifically, the goals of the WG are:

G1: to identify the scientific foundation of enterprise interoperability and promote its acceptance by the scientific community and all stakeholders;
G2: to identify and to classify the key problems of interoperability to contribute to the elaboration of roadmaps through identifying new research challenges and to facilitate the creation of research projects;
G3: to identify practical tools, methods, architectures and solutions and promote their usage;
G4: to promote the activities and to disseminate the vision of the WG through organizing conferences, workshops and other related activities;
G5: to promote education and to promote the development of the discipline interoperability;
G6: to contribute to the standardization.

SCOPE

Activities

Activity 1: to define and characterize “Enterprise Interoperability”
1.1 describe/define enterprise interoperability
1.2 define glossary of terms used in enterprise interoperability
1.3 Review periodically

Activity 2: to identify and characterize key interoperability problems and research issues, deriving them from case studies and practical solution tools and architectures
2.1 to analyze existing project results to identify key interoperability problems, Kai Mertins
2.2 to collect industrial experience scenarios (use cases) using the defined template
2.3 to collect and classify practical tools, methods, architectures and solutions to be used in the framework

Activity 3: to contribute to the scientific foundation of Enterprise Interoperability
3.1 Use a defined framework for classification of the issues
3.2 to create, maintain and use a conceptual structure of enterprise interoperability issues
3.3 to classify previous research results using the framework to identify open research problems
3.4 to use the template to structure the key interoperability problems
3.5 to identify new theoretical contribution to enterprise interoperability area by other research disciplines
3.6 to develop metrics and maturity model for enterprise interoperability

**Activity 4: Provide a roadmap for Enterprise Interoperability**

4.1 to identify and analyze the existing roadmaps and other strategic programs on the field of enterprise interoperability
4.2 to provide recommendations on the definition of a new roadmap based on the results of the analysis and the outcome of activities related to goal 1. The roadmap should identify barriers, opportunities and challenges related to the field of enterprise interoperability and a time plan to address topics related to these challenges
4.3 to facilitate the creation of research projects

**Activity 5: to identify subjects for standardization and the standardization bodies that (could) cover these subjects**

5.1 to propose certain subjects for the standardization to standardization bodies and offer support

**Activity 6: Education**

6.1 to identify and collect existing courses at Bachelor and Master level, Academic and professional
6.2 to define reference curricula for enterprise interoperability education
6.3 organize and sponsor summer schools for master and doctoral students and for professionals

**Activity 7: Dissemination of the results of the WG**

7.1 to publish and disseminate all the results of our activities in order to promote the work performed,
7.2 to organize and sponsor conferences, workshops and seminars in the field of enterprise interoperability
7.3 Dissemination of definition and terms

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**WG5.10 - Computer Graphics and Virtual Worlds**
est. 1987, revised 1994, 2012

**AIMS**

To promote and encourage the advancement of the field of computer graphics, visualization, and virtual reality in science and technology.
To organize and coordinate the International Conference on Cyberworlds as the workgroup's annual conference.

**SCOPE**

Computer graphics and web visualization; Geometric and Solid modeling; Computer Animation; Real-time rendering;
Virtual humans and avatars; Shared virtual worlds; Virtual collaborative spaces; Telepresence; Haptic rendering and haptic interaction;
Simulation and training in virtual environments; Augmented and mixed reality; Computer games; Multi-user internet games; Art and heritage in cyberspace;
Cyber-museums; Cyberworlds and their impact on the real worlds; Information visualization; Visual analytics; Interactive techniques; Applications.
WG5.11 - Computers and Environment  
est. 1991, revised 1992  

AIMS  
To investigate existing methods and applications of computer based technologies to environmental engineering, environmental protection, and environmental research.

SCOPE  
- Monitoring and remote sensing of environmental variables.  
- GIS and mapping systems.  
- Natural resources conservation (land, water, noise ...).  
- Hazardous waste management.  
- Environmental impact assessment.  
- Environmental information and decision support systems.  
- Environmental AI applications.  
- Cultural and artistic patrimony protection.

WG5.12 - Architectures for Enterprise Integration  
est.1995, revised 2008  

AIMS  
- To foster research into enterprise architecture, and in particular enterprise architecture frameworks, enterprise engineering methodologies, enterprise modeling and generic enterprise models / ontologies;  
- To identify theoretically sound and practically viable techniques for the process of change toward the integrated enterprise.  
- The multi-disciplinary perspective of this working group requires the synthesis of relevant results from other disciplines, such as Manufacturing Engineering and Management, Industrial Engineering, Management Science, Information Systems and Systems Engineering as well as can build on results from the Software Engineering discipline.  
- Active involvement and liaison with relevant standardisation bodies, such as  
  - ISO TC184 Industrial Automation Systems and Integration SC5 WG1 on Modeling and Architecture  
  - ISO/IEC JTC1/SC7 Software and Systems Engineering WG42 on Architecture

SCOPE  
The scope of this working group is intended to foster information exchange and evaluation of Enterprise Architecture Frameworks and associated

Enterprise modeling tools and languages (language specifications, ontological theories, computer-aided enterprise engineering tools);  

Enterprise engineering methodologies and meta-methodologies;  

Generic building blocks and reference models applicable to EA, such as intra- and inter- enterprise integration, agent-based integration, information integration infrastructure, organisational models, self-similar structures, and reusable industry-specific models.  

In particular the WG is mainly involved in the following types of activities:

- Scholarly evaluation of enterprise architecture frameworks that capture the life-cycle of the enterprise and its constituent entities. This aspect of the WG activity is addressed through the active liaison and co-
sponsorship activities with other relevant Working Group and Technical Committees of IFIP, and other organisations conducting research and development in this area, such as IFAC, and the continued organisation of the ICEIMT conference series.

- Evaluation of the physical and functional architectures of information systems, industrial production – or service systems, as well as EA program architectures (such as Information-, Process-, Applications- and Technical Architecture, as well as models of the Organisation) for complete enterprise live-cycle development and management. This aspect of the WG activity is mainly addressed through liaison and participation in relevant standard bodies.

WG5.13 – Bioinformatics and its Applications
est. 2010

AIMS

1. Develop theoretical and technological foundations for meeting the challenges of bioinformatics and its applications.

2. To understand and identify the challenges of Bioinformatics, and its Applications for development of skills, software tools, databases and solving real life problems related to health, food, energy, environment and agriculture etc.

3. To integrate Global biological data, information and knowledge resources for meeting the challenges of bioinformatics.

4. Create & promote Inter disciplinary teams/groups for developing new educational training programs, technology dissemination, research and development with focus on bioinformatics & its applications.

SCOPE

- WG will serve as platform to create expertise and pool of scientists in various areas of bioinformatics from institutions all over the world to understand the new challenges and opportunities.
- Encourage sharing of knowledge and resources like biotech infrastructure, grid computing infrastructure, databases, softwares and other electronic resources.
- To develop and enhance excellence through new educational training programs in various areas of bioinformatics.
- It will serve as forum with central focus to improve understanding and R & D on various aspects of bioinformatics.
- To provide a forum for dissemination of Scientific and technological knowledge in the field of bioinformatics by organizing seminars, conferences, need based faculty training programs
- To provide support for research & development and establish linkages with biotech, pharmaceutical and IT industry.
- Provide a platform for interaction among scientists from various disciplines like IT, computer science, mathematics, life sciences, agricultural sciences and medical sciences for research and development of biological databases, bioinformatics softwares, integration of resources and applications in areas of health, energy, food, environment and agriculture.
TC 6 - Communication Systems - Aims and Scopes

est. 1971, revised 1987 and 1991

AIMS

- to promote the international exchange of information related to communication systems;
- to bridge gaps existing between users, telecommunication operators, service providers and computer and equipment manufacturers;
- to establish working contacts with international bodies concerned with data communication, such as ITU, ETSI, ISO, IEEE, IETF, ITC and ATM Forum.

SCOPE

The Scope of its work includes all aspects of communication systems, such as research on and design, manufacture and operation of products, systems, concepts and architectures related to information exchange. Some examples of areas of special interest are:

- Work fostering the development of standards;
- Formal protocol specification and verification techniques;
- National and international communication networks;
- Local and wide area communication networks;
- Integrated services digital networks;
- Network management;
- Distributed computing and information interchange between databases within a network of computers;
- Communication systems in the office and manufacturing area;
- Communications tools and communication services;
- Promotion of existing and innovative communication concepts both in developing countries and in developed countries;
- Teleservice architectures;
- Multimedia communications;
- New applications of communication systems, e.g. electronic commerce.

WG6.1 - Architecture and Protocols for Distributed Systems


AIMS

- To identify and study questions associated with the development of distributed systems and the communications and middleware protocols that support distributed applications.
- To support convergence of information processing systems, communication and networking technologies into a distributed infrastructure that is open for application to all members of the global society.
- To investigate rigorous methods applicable to the specification, verification, implementation and testing of distributed systems and applications.
- To support and promote the systematic use of these methods, and make them amenable to the practitioners, hence increasing awareness of formal methods in the distributed networking and computer networking areas at large.
- To bring together researchers, developers, and practitioners working in these areas to discuss recent innovative results and future directions by promoting and supporting the organization of meetings, workshops and conferences.
- To disseminate information and publications, foster an active participation of industry and encourage the transfer of knowledge between academia and industry.
- To encourage young researchers to enter this field.
SCOPE

This WG provides a framework for the launching and the continued organization of activities in areas that include:

- **Formal Description Techniques**: including rigorous models, methods and tools applicable to the design, specification, validation, verification, implementation, easy prototyping, efficiency evaluation, and testing of communicating systems and object-based distributed systems.
- **Open Distributed Systems**: including the design, implementation, deployment and evaluation of distributed systems platforms and architectures for networked environments and distributed applications.
- **Quality of Service**: including architectures, services, multimedia, operating systems and middleware in a networked or distributed environment.

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**WG6.2 – Network and Internetwork Architectures**
est. 1994, revised 2001, 2009

**AIMS**

To identify and study advanced issues related to networking and internetworking design, with main emphasis on the provision of services at the network layer, on the integration of present and future technologies for physical and data link layers, and on techniques for providing network-wide internetwork services.

**SCOPE**

This WG provides a framework for the launching and the continued organization of activities in the area of Network and Internetwork architectures, namely:

- **Network architectures**: including architectures for the Future Internet, architectures of local area networks, wide area networks, access networks, mobile IP networks, internetworking.
- **Network protocols**: including transport and network layer protocols, and protocols for Internet evolution.
- **Network control and quality-of-service**: including traffic engineering and control, signaling, network quality of service.
- **Network components design**: including switch and router design, techniques for the transport of packetized voice and video.
- **Parallel processing of network protocols**: including multi-core architectures for network elements.
- **Overlay services and systems**: including peer-to-peer communication services and virtualisation.
- **Network resilience**: robust and survivable networks.
- **Network measurements**: traffic monitoring and analysis.
- **Energy-efficient network protocols and architectures**.
- **Network protocols and transport protocols for delay-tolerant networks and space internetworks**.

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**WG6.3 - Performance of Communication Systems**
est. 1994, revised 2001, 2010

**AIMS**

WG 6.3 is aimed at promoting the use of the performance evaluation techniques for studying and optimizing existing and future communication systems.

**SCOPE**
The WG organizes and promotes activities related to modeling, analysis, simulation and measurement of computer communication systems, with a special attention to studying and optimizing the performance of:

- Wired/wireless computer communication networks;
- Existing and future network technologies;
- LAN/MAN/WAN;
- Network Services and Applications;
- Internet architecture, protocols and services;
- Internet of things;
- Green networking;
- Content- and service-centric architectures;
- Peer-to-peer, overlay, and content distribution networks;
- Mobile and ubiquitous networks;
- Self-organizing networks;
- Mobile and on-line social networks.

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**WG6.4 – Internet Applications Engineering**

**AIMS**

To investigate and report on Internet applications which typically reside above the IP level, encompassing World Wide Web applications.

**SCOPE**

This Working Group provides a framework for the launching and the organization of activities in the area of Internet applications engineering, including:

- Applications: agent technologies, distributed games, hypertext and hypermedia, multimedia on the Web.
- Infrastructure: audio/video/voice coding for Internet services, Internet security, multicast, searching and querying, virtual private networks, Web navigation strategies.
- Performance: caching, quality of service, scalability aspects, traffic characterization.

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**WG6.6 - Management of Networks and Distributed Systems**

**AIMS**

To facilitate cooperation between different organizations and individuals internationally in the areas of distributed operations and management, integrated network management, systems management, and service engineering. To be an effective conduit in the technology transfer between the academic and research communities, industry and the standard bodies.

**SCOPE**

Our planet is increasingly being networked using a variety of media, a variety of protocols and a variety of services. On the other hand, computers are becoming increasingly pervasive in a variety of forms and architectures ranging from large scale high performance systems to micro computers in any type of appliances, cars, etc. The scope of WG 6.6 is Operations and Management paradigms and technologies for these novel and complex systems and networks continuously evolving over different levels of abstraction such as element, network, service, and business level. The Operations and Management encompass different function areas such
as configuration, fault, accounting, performance and security. This includes new technologies such as autonomic computing, distributed and policy based management as well as already established management protocols and information models. The scope of the working group encompass the operation and management of existing networked systems including enterprise networks and multi-provider networks as well as emerging ad-hoc and sensor networks, Grids, peer to peer networks and interplanetary networks.

WG6.7 - Smart Networks  

AIMS

To identify and study current issues related to the state-of-the-art and the development of intelligent capabilities in networks. These issues include the distribution, the management, the control of every kind of algorithms inside the network. These intelligent capabilities lead to the concept of autonomic networking. Consequently to identify future trends of the network performance from industrial as well as the academic point of view.

SCOPE

Smart Networks is concentrated on research on tools and services able to be placed on top of network algorithms in order to adapt them. The concept of smart networks was developed as a step to give the network a way to adapt itself to changes within the environment and following network conditions. New emerging research and technologies include autonomic networking, Intelligent Agents, knowledge plane, situated view, Configurable Architectures for Software and Hardware, Dependable Reconfigurable Networks, Mobility Management, QoS Management, Security Management, Flow Control, Mobility and Network Integration Issues.

WG6.8 - Mobile and Wireless Communications  

AIMS

To organise and promote the exchange of information on wireless communication systems and networks, fixed and mobile, terrestrial and space, local and global. To help in the research, development, design, standardisation and applications for mobile and wireless modules, equipment and systems. To examine technical operational capabilities of the future mobile and wireless networks for voice, data, text and image communications. The results of the work will be made available to individuals as well as organisations concerned, such as manufacturers, operators, common carriers, standardisation bodies, users.

SCOPE

The scope of the Working Group includes:

- Wireless LANs.
- Wireless Sensor Networks.
- Wireless Actor Networks.
- Mobile computing.
- Cellular networks.
- Ad-hoc networks.
- Mobile and wireless personal communications.
- Short range communications and applications.
- Digital microwave systems and networks.
- Digital radio and TV broadcasting.
- Satellite networks.
All topics should be examined from the viewpoint of architecture and protocols, modulation, coding and decoding, methods of communication functions (multiple access, error control, flow control, routing, etc.), security, implementation, user aspects, legal, economic, social and human related issues.

**WG6.9 - Communication Systems for Developing Countries**
est. 2002

**AIMS**
To identify and study technical problems related to the access to, understanding of and application of network and telecommunications technology in developing countries or regions.
To encourage cross-fertilisation of concepts and techniques among developing countries, and between developing countries and developed countries.
To promote activities oriented to the diffusion of the methods and techniques for accessing computer networks in developing countries or regions.

**SCOPE**
The areas of study include models and methods for transfer of concepts and methods in communication systems and establishment of new applications in developing regions for existing technologies.
The requirements of the users of those regions include cost-effective technologies for global access, rural access to services and social development in those regions through appropriate applications of communication systems.
The problems of human resources, sharing of experience and cost of technology are particularly acute, and are to be examined in detail.
Although not limited to, the following items are of particular significance in the scope of the Working Group:
- Satellite systems
- Applications for cellular technology
- Alternative network technologies
- Technologies for distance learning, e-business, tele-meeting and any other reducing the distance effect between partners
- Global access and interconnectivity technologies
- Internet services.

**WG6.10 - Photonic Networking**

**MOTIVATION**
Photonic Communication networks hold the promise of solving several problems in the current generation of networks, among them restricted transmission capacity and limited performance capability.

**AIMS**
To strengthen research on photonic networks, to explore the potentials of photonic networks and to accelerate their early development. Additionally, the Working Group provides a platform for presenting and discussing research activities, major achievements and trends involving the all-optical communication networks.

**SCOPE**
The Working Group scope includes:
Architectures, system design, control mechanisms and applications that exploit the abundant transmission capacity and flexibility of photonics.

Development of analytical and simulation tools as well as methods for analysing, operating, dimensioning, and planning photonic networks.

WG6.11 – Communication aspects of the e-World
est. 2000, revised 2001, 2010

AIMS

To organise and promote the exchange of information on communication protocols and information exchange mechanisms for Electronic Commerce. To foster research, development, standardisation, and applications for communication platforms and services for pre-sales support, sales and service management, settlement, and virtual enterprises in and open trading environment.

SCOPE

The scope of the work encompasses all aspects of communication and information exchange in Electronic Commerce, including:

- Navigation, brokerage, advertising, and catalogue exchange in pre-sales activities.
- Negotiation and contract making protocols in interactions between consumers, businesses, and public administration.
- Secure exchange of documents, content and value in open trading protocols.
- Communication platforms for the e-Economy, including e-commerce, e-business and e-government.
- Application of mobile agent technology.
- Advanced devices and protocols for the support of mobility and the ubiquitous access to electronic markets

TC 7 - System Modeling and Optimization - Aims and Scopes

est. 1972

AIMS

- to provide an international clearing house for computational (as well as related theoretical) aspects of optimization problems in diverse areas and to share computing experience gained on specific applications;
- to promote the development of necessary high-level theory to meet the needs of complex optimization problems and establish appropriate cooperation with the International Mathematics Union and similar organisations;
- to foster interdisciplinary activity on optimization problems spanning the various areas such as Economics (including Business Administration and Management), Biomedicine, Meteorology, etc., in cooperation with associated international bodies.

SCOPE

Computational aspects of optimization problems arising in such areas as Aerospace, Biomedicine, Economics, Meteorology, and Public Services (Health, Environment, Police, Fire, Transportation, etc.).

Some specific examples are:
on-line and off-line computational techniques in modelling and control of dynamic systems;
trajectory analysis and computation;
optimization of decentralized systems (macro-economic systems) and systems with multicriteria;
optimization of resource allocation in urban systems;
optimization of pollution-control systems;
optimization of man-machine systems;
optimization of power systems operation.

WG7.1 - Modeling and Simulation
est. 1972

AIMS

To foster cooperation and information interchange among those engaged in the simulation of large and complex systems including specialists in:

- Modelling and Identification Methodology;
- Simulation Methodology;
- Computer Simulation Languages;
- Interactive On-Line Computation;
- Hybrid Computation.

SCOPE

The work will include three major classes of problems:

- Environmental Systems
- Biological Systems
- Societal Systems

using various approaches such as:

- new simulation languages for digital simulation;
- new computer graphics techniques;
- application of pattern recognition and feature extraction methods;
- new mathematical techniques (e.g. finite elements);
- new data base organisations and simulations of data bases.

WG7.2 - Computational Techniques in Distributed Systems
est. 1973

AIMS

To foster the international exchange of ideas and experience in the area of Computational Techniques with particular emphasis on distributed systems arising in diverse disciplines such as Mechanics, Economics, Biomedical Engineering, Geophysics, etc.

SCOPE

Computational Techniques for Identification and Optimal Control of Systems Modelled by Partial Differential Equations;
Computational Techniques for Structural Problems, Elasticity, Plasticity, etc., including various approaches such as: Finite Element Approximation Techniques, Decomposition Techniques, Interactive and Graphic Computer Techniques.

WG7.3 - Computer Systems Modeling
est. 1973

AIMS
The work of the Group is directed toward improving the art of analyzing and optimizing performance and costs of data processing systems through the use of analytical models.

SCOPE
- optimized allocation of resources (such as memory, telecommunication lines, computer power, and points of concentration and switching), in distributed information processing systems;
- analyses of throughput and response time;
- analyses of reliability in the presence of failures of hardware, software or telecommunications;
- analyses of CPU main memory and I/O channel scheduling and allocating procedures;
- analyses of storage systems including memory hierarchies and geographically distributed data bases;
- comparison with simulations and with performance indices measured experimentally.

WG7.4 - Discrete Optimization
est. 1986

AIMS and SCOPE
- to promote theoretical contributions on the fundamental issues of discrete mathematics, such as graph theory, finite algebras, polyhedral combinatorics, discrete probability, etc.;
- to promote methodological contribution on specific fields of discrete optimization like topological network design, network optimization problems, scheduling and routing, game theory, combinational problems on graphs, etc.;
- to encourage the exchange of information and the cooperation between algorithms designers and computer scientists on the issues of problem solving and artificial intelligence;
- to promote the definition of standards for combinatorial optimization algorithms software production;
- to promote the definition of standards for combinatorial optimization software performance evaluation.

WG7.5 - Reliability and Optimization of Structural Systems
est. 1986

AIMS and SCOPE
- Promote modern structural system reliability and optimization theory;
- Advance international cooperation in the field of structural system reliability and optimization theory;
- Stimulate research, development and application of structural system reliability and optimization theory;
- Disseminate and exchange the information on reliability and optimization of structural systems;
- Encourage education in structural system reliability and optimization theory.
WG7.6 - Optimization-Based Computer Aided Modeling and Design
est. 1989, revised 1999

AIMS

The Working Group 7.6 considers high-performance computer-aided systems to support modelling, decision analysis, optimization and multi-criteria decision making.

The Working Group is focused on

- Policy and Management (Application Focus)
- Optimization, Multi-Criteria Decision Analysis and Simulation (Methodological Focus)
- Design, Planning and Scheduling (Problem Type Focus)
- Modelling and Implementation of Intelligent Systems (Information Technology Focus)

SCOPES

Any methodological approach or combination of solution techniques, which solves real world problems successfully. Thus, the following problem types are examples of application areas in policy and management the WG will deal with:

- Network Design (Communication, Transportation, Traffic)
- Planning and Scheduling in Transportation Logistics
- Production Planning and Scheduling
- Environmental Planning Problems

WG7.7 - Stochastic Optimization
est. 1989

AIMS

To foster international cooperation among experts in stochastic optimization, and to spread information about the achievements of the field into areas of possible applications.

SCOPE

Subject of this WG are all problems involving in an essential way stochastic components (variables or processes) and the task of optimizing functions. In particular this includes:

- Theoretical investigation of stochastic optimization models;
- Design, development and analysis of solution methods;
- Modelling practical problems by stochastic optimization problems, e.g. in agriculture, industrial production, finance, power systems, water reservoir management, and implementing stochastic optimization models into decision support systems.

TC 8 - Information Systems - Aims and Scopes
est. 1966, revised 1990

AIMS
To promote and encourage interactions among professionals from practice and research and advancement of investigation of concepts, methods, techniques, tools, and issues related to information systems in organisations.

**SCOPE**

The planning, analysis, design, construction, modification, implementation, utilization, evaluation, and management of information systems that use information technology to support and coordinate organisational activities including:

- effective utilization of information technologies in organisational context;
- interdependencies of information technologies and organisational structure, relationships and interaction;
- evaluation and management of information systems;
- analysis, design, construction, modification and implementation of computer-based information systems for organisations;
- management of knowledge, information, and data in organisations;
- information systems applications in organisations such as transaction processing, routine data processing, decision support, office support, computer-integrated manufacturing, expert support, executive support and support for strategic advantage plus the coordination and interaction of such applications;
- relevant research and practice from associated fields such as computer science, operations management, economics, organisation theory, cognitive science, knowledge engineering, and systems theory.

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**WG 8.1 - Design and Evaluation of Information Systems**
est. 1976, revised 1990 and 1992

**AIMS**

The planning, analysis, design and evaluation of information systems for organisations.

**SCOPE**

- Identify concepts and develop theories relevant to the planning, analysis, design and evaluation of information systems;
- Develop languages, techniques, tools and methods for applying these concepts and theories to the:
  - planning
  - requirements analysis and determination, and specification
  - design
  - evolution of information systems, and their verification, validation and overall evaluation;
- Develop methodologies for the analysis, evaluation and selection of information systems development methods;
- Take cognizance of relevant work from associated fields - such as computer science, software engineering, knowledge engineering, cognitive science, management science, organisation theory and systems theory - and apply the findings to the development of information systems.

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**WG 8.2 - The Interaction of Information Systems and the Organization**
est. 1977, rev. 2005

**AIMS**
To develop integrative frameworks that facilitate recognition and transfer or relevant knowledge about the role and uses of IT. Such frameworks can be based on a wide range of disciplines. these frameworks should be open to all research traditions and lines of research which further the study of the uses of IT in organizational contexts., and can also include the critical questioning of their relevance for the scope and aims of WG 8.2.

To build theories and generate evidence about the role and impact of IT in specific organizational contexts.

To improve the ways and means by which organizations design, implement and maintain IT.

To nurture a critical discourse about the role which IT plays in the lives of people as individuals and as members of complex social institutions such as government, community, business, professional societies and other forms of social associations.

To engage in ethical discourse about the practices and dilemmas which arise in the development, use and consequences of IT, or in research about such technology.

**SCOPE**

Working Group 8.2 is concerned with the generation and dissemination of descriptive and normative knowledge about the development and use of information technologies in organizational contexts, both broadly defined. By information technology (IT), we mean technologies that can be used to store, transfer, process or represent information. By organizational context, we mean the institutional arrangements in which information is used or created. Descriptively, the WG seeks to generate and disseminate knowledge about and improve understand of the role and impact of information technology across a range of social levels (society, organization, individual) and across a diversity of spheres (marketplace, workplace, home, community). Normatively, it seeks to improve the design and application of information technologies that are both useful and effective for individuals, groups, organizations and society at large.

**WG 8.3 - Decision Support Systems**
est. 1981

**AIMS**

The development of approaches for applying information systems technology to increase the effectiveness of decision-makers in situations where the computer system can support and enhance human judgements in the performance of tasks that have elements which cannot be specified in advance.

**SCOPE**

To improve ways of synthesizing and applying relevant work from resource disciplines to practical implementations of systems that enhance decision support capability;

The resource disciplines include

- information technology
- artificial intelligence
- cognitive psychology
- decision theory
- organisational theory
- operations research and modeling.

**WG 8.4 - E-Business Information Systems: Multi-disciplinary research and practice**

**AIMS**
To promote collaboration across disciplines in E-Business research and practice.

SCOPE

This working group provides a reference point and a focus for multi-disciplinary research and practice in E-Business. The intention is to extend the community's focus on E-Business to recognize, acknowledge and facilitate research and practice as it crosses the boundaries of IS, organizational, consumer, community, industry and national domains.

Where researchers and practitioners focus on specific issues and technologies, eg smart-card developments, mobile technologies or organizational adoption of IT practices then that research is more properly located within existing working groups. Where that work is cross or multi-disciplinary it can be located here.

WG 8.5 Information Systems in Public Administration
est. 1988

AIMS

To improve the quality of information systems in public administration at international, national, regional and local levels. The Working Group's special emphasis is on the relationship between central and local use of information systems and the provision of citizen services, together with the accomplishment of social goals.

SCOPE

- analyse information processing policies in public administration;
- discuss specific applications of information systems in public administration;
- analyse the impacts of information systems on public administration;
- apply the results of other IFIP Working Groups, and specifically of TC 8 Working Groups, to public administration.

WG 8.6 - Transfer and Diffusion of Information Technology
est. 1994

AIMS

To foster understanding and improve research in practice, methods, and techniques in the transfer and diffusion of information technology within systems that are developed and in the development process.

SCOPE

- Diffusion, transfer, and implementation of both mature and immature information technologies and systems in organizations and among organizations, sectors, and countries.
- Transfer of technology to be incorporated in systems for customers and clients.
- Transfer of both system and development technologies to technologists, developers, managers, and sponsors of systems.
- Development of frameworks, models, and terminology for information technology transfer and diffusion.
- Identification of risk factors and barriers to success in technology transfer and strategies for addressing them.
- Conditions or scenarios under which specific transfer and diffusion techniques are applicable.
- Methods to evaluate the efficiency, effectiveness, and value of technology transfer programs and approaches, including time and effort estimators and metrics.
- Organization design and process issues related to technology transfer and diffusion.
Case studies of technology transfer and diffusion to provide instances to guide research, development, and practice.

Standards and intellectual property issues that inhibit or facilitate information technology transfer.

WG 8.8 - Smart Cards
est. 1998, rev. 2001

AIMS

Smart cards are to be understood as personal, portable, flexible, secure tokens that form an integral part of a larger information infrastructure. Therefore the aims of WG 8.8 are:

- to encourage interaction between the numerous actors in the smart card area.
- to create a common and coherent approach of a specific methodology.
- to address the background technologies of component architectures; for example dedicated chips, security devices, memory management.
- to specify and design smart card operating systems.
- to identify and develop relationship between different themes of information systems and smart cards, for example promote the theme of smart cards as a widely distributed data base.
- to identify interfaces between smart cards as an active components of distributed systems and networks.
- to promote a global security analysis of information systems using smart cards.
- to investigate the field of applications of smart cards and propose a scheme for a design methodology.
- to create new models for information systems which use smart cards.
- to participate to advanced standardization discussions and propositions.

SCOPE

The study of smart cards as an innovative component of widely distributed systems. The scope includes all the aspects of smart cards design and applications:

- Technology with hardware, software and security specific requirements.
- Application design with a special emphasis on development methodology of distributed systems.
- Service providing including analysis of transactions, protocols and more generally speaking, the process of a top down design of smart cards projects.
- The interaction of smart card related technology with society, economics, public services and organizations.

WG 8.9- Enterprise Information Systems
est. 2006

AIMS

- Provide a forum for international collaboration and dissemination of research and best practices in the enterprise information systems area
- Establish close cooperation between academics and practitioners in the area of enterprise information systems
- Increase the impact of research, and use development in the area of Enterprise Resource Planning Systems
- To study the design, implementation and use of Enterprise Resource Planning Systems
SCOPE

- Concepts, theories, techniques, and implementation relevant to enterprise information systems
- Identification of best practices encountered in the use of present day Enterprise Resource Planning Systems
- Management of Enterprise Information Systems
- Utilization of Enterprise Resource Planning in small and Medium enterprises
- Enterprise Resource Planning Systems in the public sector
- Applications of enterprise information systems in a supply chain environment
- Enterprise-control system integration

WG 8.11/11.13 – Information Systems Security Research
est. 2010

AIMS

The aim of the working group is the creation, dissemination, and preservation of well-formed research about information systems security. While relevant for advanced practical development, our primary audience consists of researchers in this area. We value research products with highly reliable and validated theory, empirical data, or quantitative/qualitative social scientific methodology. The group’s activities will be workshop-based, and intended to nurture individual journal articles for submission to a wide variety of journals. Our workshops will produce notebooks that consist of formative working papers. We mainly target final publication venues in the management research journal communication system.

SCOPE

Anchoring to information systems means our research will attend and extend the social, organizational, and managerial literature in this area. While we assume an effective foundation in information security technology, we regard information systems risks broadly, for example crime, employee misconduct, warfare, terrorism, error, accident, natural events, etc. We also address information systems security broadly, for example, privacy, awareness, policies, strategy, audit, planning and control.

TC 9 - ICT and Society - Aims and Scopes
est. 1976, revised 2008, 2009

AIMS

The TC9 aims:

- To develop understanding of how ICT innovation is associated with change in society;
- To influence the shaping of socially responsible and ethical policies and professional practices.

SCOPE

The TC9 fosters multidisciplinary discourse into:

- The role of ICT in the change of particular domains of human activity, including work; the home and private life; governance.
- Ethical, political, economic and cultural dimensions of ICT innovation.
- Issues stemming from ICT innovation, such as gender, the phenomenon of virtuality, sustainable development.
WG 9.1 - Computers and Work  
est. 1977

AIMS

- to study and report on how computers have affected employment levels, job content and structure, working conditions, career patterns, and participation problems;
- to give an account of problems relating to computers and work, and of proposed measures for dealing with these problems;
- to encourage and support the design and development of systems which promote not only efficiency but provide job satisfaction, for example through interesting work and reduction of stress.

SCOPE

The effects of computerization on the lives of three distinct groups of person:

- computer professionals,
- users of computers,
- non-users affected by computers.

WG 9.2 - Social Accountability  
est. 1977, revised 2009

AIMS

- To provide an international forum for assessing the social consequences of ubiquitous Information and Communication Technologies (ICT) and its applications
- To promote the safe and socially beneficial development and use of ICT
- To encourage a human-centred and inclusive approach in the design and implementation of ICT, together with responsible long-range planning
- To foster academic discussion on the use of ICT in its capacity to enhance the quality of life

SCOPE

Those aspects of ICT development and implementation that impact on society in general and which affect the public interest in particular, such as:

- Privacy and confidentiality
- Inclusion, access for all, and choice
- Equality in system relationships
- User and IT professional education and awareness
- Social consequences of future technologies
- Ethical, legal and regulatory issues

WG 9.3 - Home-Oriented Informatics and Telematics  
est. 1988, revised 1989

AIMS
- Foster benevolent design, development, implementation, applications and use of Home-Oriented Informatics and Telematics (HOIT).
- Encourage surveys and studies on HOIT.
- Develop methodologies for studying social implications of HOIT.
- Establish a global platform for interaction, exchange, joint initiatives and co-operation between such groups as:
  - the end of users of HOIT: members of households
  - industrial developers and designers of HOIT technology and related services
  - implementation designers
  - policy, decision making, social and consultative bodies
  - architects and urban planners
  - scientists.

SCOPE

The social implications of informatics, communications and telematics in the home, the family and its environment (HOIT);

including:

- actual and potential human usefulness of HOIT;
- social impact of these technologies and their applications;
- developments of the underlying infrastructure;
- rationale in innovation and design processes;
- dynamics of technology development.

WG 9.3 explicitly cares about the position of and the potentials for vulnerable groups like children, less-educated, disabled, elderly and non-employed people, paid and non-paid workers at home, cultural minorities, unaware users and others.

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WG 9.4 - Social Implications of Computers in Developing Countries
est. 1989, revised 2007

AIMS

- to collect, exchange and disseminate experiences of information and communications technology (ICT) implementation in developing countries;
- to develop a consciousness amongst professionals, policy makers and public on social implications of ICT in developing nations;
- to develop criteria, theory, methods, and guidelines for design and implementation of culturally adapted information systems;
- to create a greater interest in professionals from industrialized countries to focus on issues of special relevance to developing countries through joint activities with other Technical Committees.

SCOPE

- national ICT policy issues;
- culturally adapted computer technology and information systems;
- role of transnational corporations, regional and international cooperation and self-sufficiency in informatics;
- social awareness of ICT and ICT literacy.
AIMS

The IFIP Working Group 9.5 (Virtuality & Society) sees information and communication technologies as being intertwined with society. In this sense, virtuality is taken as constituting both the social and the technical modes of existence. The aim therefore of this WG is to explore the globality of virtuality, the complex, emergent and changing nature of this field and to act as a location for transdisciplinary work on virtuality. Through workshops and conferences the WG will promote a dialogue and mutual exchange from a diverse set of disciplines such as computing, information systems, media studies, social theory and philosophy but also anthropology, organizational studies, gender studies, politics and ethics.

SCOPE

The scope of the working group is all aspects of virtuality as evident in a multiplicity of empirical sites and social phenomena. Given its scope, we welcome contributors from, but not limited to, the following areas:

- Ethics of virtuality
- Virtual media and art
- Computing games
- Telem medicine
- Internet studies
- Organizational Aspects of Virtuality
- Virtual politics and political web-sites
- Virtual reality

AIMS

To foster co-operation between the “Computers and Society” and “Information Security” communities on issues of “IT misuse and the law”.

To develop an understanding in IFIP committees and national bodies of:

- threats associated with IT systems and the related legal concerns.
- risks to people and organisations arising from these threats.
- responsibilities of people and organisations arising from legal and other provisions for information security.
- risks arising from incoherency between legal, technical and managerial provisions.
- the impact of IT systems on the current law, e.g. (criminal and civil law) and potential problems.

To propose and/or evaluate legal and other prescriptions to combat these threats and their associated risks.

To engender information exchange on threats, their origins, and possible consequences.

To propose and/or evaluate legal and other appropriate courses of action.

SCOPE

- Analysis of existing and emerging threats to IT systems security, and the associated risks to people, organisations and society.
- Analysis of security principles.
- Aspects of the law where the use or introduction of IT on a global scale has rendered the current law (and/or its interpretations) obsolete or obsolescent or made it unenforceable.
Analysis of potential means of countering and mitigating threats, e.g. legal frameworks, ethical standards, managerial procedures, and other social factors applicable to behaviour and responsibilities in the context of IT systems.

Possible solutions.

New legal, social and organisational consequences of the development and use of IT systems.

WG 9.7 - History of Computing
est. 1992

AIMS

To provide a central vehicle for information interchange regarding the methods and techniques of historiography, especially as related to the opportunities for the studies of contemporary history.
To provide expertise for the design, implementation and operation of archives and displays related to the history of information processing.
To encourage the development of national archives.
To develop a program of "Pioneers' Days" which recognize the contribution of pioneers and anniversaries of major events.
To identify pioneers worthy of an appreciation and distinction and make "IFIP Pioneer Awards".
To develop publication plans for histories of Information Processing.
To promote the inclusion of historical modules in appropriate curricula.

SCOPE

The history of computing and informatics with a view to providing the impetus to preserve the records and artifacts of information processing inventions, practices and activities throughout the world under the auspices of IFIP and its constituent organizations. One special focus is the socio-historical context and consequences of Information Technologies.

WG 9.8 Gender Diversity and ICT
est. 2001, 2009

AIMS

This WG is dedicated to research and action how different areas of society being transformed by computer technology with particular emphasis on changes in women’s work and life and how these have come about. It is based on the integration of gender studies and computer science. Membership is open to both women and men.

In this context the WG aims

to serve as an international, interdisciplinary communication forum and to hold discussions in workshops and conferences,
to exchange women’s experiences as scholars and professionals in information technology,
to integrate feminist perspectives into computer science,
to develop an understanding in the IFIP communities and national bodies of the gendered aspects in design, realisation, and implementation of information systems,
to propose and/or evaluate appropriate courses of action.

SCOPE

The topics cover the transitions from women’s traditional work to work based on modern technology, from communication within personal communities to virtual communities, from traditional gendered life to new
gendered perspectives. Computerisation is understood in the narrow sense of computing systems as well as in the broader sense which includes the organisational, ethical, and social context of design and usage.

Discourses are linked to

- the analysis of the effects of computer technology on women’s status as citizens,
- the analysis of opportunities and risks of computerised technologies for women’s work in the paid labour force and in domestic spheres,
- the analysis of gender perspectives in the formative and constructive processes of computers and information systems,
- the analysis of gender in computing education and educational strategies for girls and women.

WG 9.9 ICT and Sustainable Development  
est. 2005

AIMS

- To contribute to the development of an information society that meets the human needs of the present without compromising the ability of future generations to meet their own needs.
- To be actively involved in the development of ICT applications which involve the goal of sustainable development.
- To investigate the interaction among social, environmental and economic issues in the development of ICTs and their applications.
- To promote worldwide research and practice for further advancement of ICT towards a safe and sustainable self developing World.
- To strengthen interdisciplinary research efforts in technology assessment for ICTs with a focus on ICT-induced opportunities and risks for the individual, for social systems and for the global ecosystem.
- To provide a platform for presenting and discussing emerging ideas and trends in the intersection of the topics ‘information society’ and ‘sustainable development’.
- To promote or support the organization of meetings as well as easy access to high-quality data, information and knowledge in this area and related areas.

SCOPE

- To create a network of experts working on ICT applications or implications related to sustainable development.
- To support the coordination of policies related to information society issues with policies related to sustainable development.
- To support applications of ICT for global environmental and development issues.
- To facilitate research assessing the environmental and health impacts
  a) of ICT hardware life cycles; production, use, recycling and final disposal
  b) of ICT applications with respect to the resource efficiency of processes they influence
  c) of ICT-induced long-term changes of consumption patterns or lifestyles.
- To promote the communication between computer professionals and other experts on relationships between ICT and sustainable development.
- To promote prospective studies to disseminate early warnings on consequences of applications of ICT that could compromise the goal of sustainable development, and encourage the development of strategies to ensure that ICT applications will contribute to sustainable development.
TC 10 - Computer Systems Technology - Aims and Scopes

est. 1976, revised 1987

AIMS

The Aims of the Committee are the promotion of the State-of-the-Art and the coordination of information exchange on concepts, methodologies, and tools in the stages in the life cycle of computer systems.

SCOPE

- system and component concepts, architecture and organisation;
- specification, design and verification methodologies of computer systems;
- logical design and fabrication of components and systems;
- evaluation of the parameters of computer systems and components;
- reliability;
- assessment of emerging technologies;
- application specific computer systems and components including peripherals.

WG10.2 – Embedded Systems

est. 2006

AIMS

The WG10.2 shall be constituted as a group under the sponsoring organization with the following basic aims:

- to be the internationally open reference group for all aspects of embedded system design promoted and sponsored by the sponsoring organization of the WG10.2;
- to further the dissemination and exchange of information and experience on research and applications in the area of embedded systems;
- to address ES designers and researchers from both, industry and academia;
- to encourage education in all areas of embedded systems;
- to further the interdisciplinary character of embedded systems, that encompasses hardware (system on a chip), real-time software, real-time operating systems, control theory, intelligent features, dependability issues.

SCOPE

Embedded systems are gaining increasing importance in all aspects of engineering. It is expected that in the near future roughly no technical artifact will exist without embedded information technology. There is a tendency to software oriented embedded and/or dependable systems, based on standardized micro-controller cores. This implies that the design of embedded real-time software and real-time operating systems will play a dominant role in this field. As more and more networks of micro-controllers are applied, real-time communication systems and in general the design of distributed embedded systems will gain importance. As high-performance embedded computing components have become available the challenges of designing embedded systems have become more acute.

The scope of WG10.2 comprises in detail to:

- organize events in the area of ES (e.g. DIPES (Distributed and Parallel Embedded Systems));
- seek co-operation with user and interest groups as well as with ES-oriented groups within IFIP and other societies;
- discuss, disseminate and exchange information on ES-related standardization activities;
- study and encourage curricula on ES design;
- initiate and organize new ES-related activities.
WG10.3 - Concurrent Systems  
est. 1978, revised 1979, 1988, 2006

AIMS

The study of computer systems, having several computing elements, with the goal of improving the quality of attributes such as cost, performance, programmability, extendability and functionality.

The study includes the interrelation software/firmware/hardware in specification, design and implementation.

SCOPE

- Exploration of problem areas and solutions pertaining to the interrelation between the hardware functions and the software functions in systems such as supervisors, data management, language translators, I/O systems, and user interfaces.
- Evaluation of the implementation of trends in computer systems technology on the interrelation of software, firmware and hardware.
- Evaluation of the implication of this interrelation in the trends in computer systems technology.

WG10.4 - Dependable Computing and Fault Tolerance  
est. 1980, revised 1988

AIMS

Increasingly, individuals and organizations are developing or procuring sophisticated computing systems on whose services they need to place great reliance. In differing circumstances, the focus will be on differing properties of such services - e.g. continuity, performance, real-time response, ability to avoid catastrophic failures, prevention of deliberate privacy intrusions. The notion of dependability, defined as that property of a computing system which allows reliance to be justifiably placed on the service it delivers, enables these various concerns to be subsumed within a single conceptional framework. Dependability thus includes as special cares such attributes as reliability, availability, safety, security. The Working Group is aimed at identifying and integrating approaches, methods and techniques for specifying, designing, building, assessing, validating, operating and maintaining computer systems which should exhibit some or all of these attributes.

SCOPE

Specifically, the Working Group is concerned with progress in:

- understanding of faults (accidental faults, be they physical, design induced, originating from human interaction; intentional faults) and their effect;
- specification and design methods for dependability;
- methods for error detection and processing, and for fault treatment;
- validation (testing, verification, evaluation) and design for testability and verifiability;
- assessing dependability through modelling and measurement.

WG10.4 SIG on Education in Resilient Computing  
est. 2009

AIMS

The primary aims of the SIG are:
To acquire knowledge on how Resilient Computing is taught today in different worldwide higher educations institutions;
To compare the experiences so to provide an incremental process towards the structuring of an educational track in Resilient computing;
To promote the outcomes of the SIG to update or change or start proper tracks in Resilient Computing in higher educations institutions;
To interact with international bodies working on educational issues i.e. ACM, IFIP, etc., to present the outcomes of the SIG;
To collect and make accessible, through the web, support material useful to cover the several disciplines relevant to Resilient Computing
To build and maintain a comprehensive database of material, available to the community of students, scientists, industrial designers and regulatory bodies

SCOPE

The adjective resilient has been in use for decades in the field of dependable computing systems essentially as a synonym of fault-tolerant, thus generally ignoring the unexpected aspect of the phenomena the systems may have to face. These phenomena become of primary relevance when moving to systems like the future large, networked, evolving systems constituting complex information infrastructures – perhaps involving everything from super-computers and huge server “farms” to myriads of small mobile computers and tiny embedded devices, with humans being central part of the operation of such systems. Such systems are in fact the emergence of the ubiquitous systems that will support Ambient Intelligence.

From an educational point of view, very few Universities, if any, are offering a comprehensive and methodical curriculum that is able to provide students with a multi-disciplinary preparation that makes them able to cope with the challenges posed by the design of ubiquitous systems. Multi-disciplinarily spans over dependability, security, usability, human factors, legal issues and ethics. Thus, from the educational point of view there is the need to scale-up the spectrum of topics offered, to identify the best curricular structure to make successful both teaching and learning processes.

It is thus relevant to have an open worldwide forum in which the different educational approaches to teaching Resilient Computing are presented, compared and discussed to reach an agreed approach to this issue.

In addition it will be very valuable to collect together in a open and public database all available support material (as lecture’s slides, textbooks, relevant literature, links to useful sites, etc.) that covers the different facets of multi-disciplinarily.

A first attempt to offer to our community a proposal for an MSc curriculum in Resilient Computing and gather extended support material has been done very recently in a European Network of Excellence ReSIST; the material is accessible at http://resist.isti.cnr.it/home.php.

WG10.4 SIG on Concepts and Ontologies

est. 2009

AIMS

1. To take part in the development of the updated Computing Classification System (CCS) that is undertaken by the ACM to assure that our domain of interest is properly represented, since that was not the case in the two previous versions (1988 and 1998) of the CCS.
2. To develop a thesaurus and an ontology that integrates the concepts of dependability, security, resilience, robustness, trustworthiness, survivability, high confidence, information assurance, self-healing (and possibly other related terms) and identifies their similarities and differences.
3. To employ document clustering algorithms and other classification techniques in order to create a methodology for automatic identification of related documents from all the domains listed in Aim 2 above. To use the methodology in developing automatic tools that assist researchers and referees in creating and evaluating new research results.
4. To use advanced natural language processing (NLP) tools and to collaborate with artificial intelligence experts of the computational linguistics and knowledge representation domains in the pursuit of the above Aims 2 and 3.
5. To use our experience in order to promote the formation of an IFIP activity aimed to create a thesaurus, an ontology and a classification system for the entire field of informatics (computer science and engineering), possibly in collaboration with the ACM.

SCOPE

Dependability has naturally concerned most disciplines of computer science and engineering (informatics) since the early days. As a consequence, significantly different terminologies were developed by different communities to describe the same aspects of dependability. The terminologies became entrenched through usage at annual conferences, in books, journals, research reports, standards, industrial handbooks and manuals, patents, etc.

As an illustration, we have the concepts of dependability, security, trustworthiness, survivability, high confidence, resilience, information assurance, robustness, self-healing, etc., whose definitions appear to be identical or to overlap extensively. In many cases the definitions themselves have multiple versions that depend on a given author’s preference.

An example of a long-term effort to create a framework of dependability and security concepts is the effort within IEEE CS TC/DCFT and IFIP WG 10.4 that since a special session at FTCS-12 in 1982 has resulted in a series of papers, a six-language book, and in 2004 a “Taxonomy” paper in vol.1, no.1 of the IEEE Transactions on Dependable and Secure Computing. No other community has produced such a taxonomy.

The description of a domain by several synonyms or near-synonyms that lack well-defined distinctions is a source of continuing confusion that leads to re-inventions and plagiarism, impairs the transfer of research results to practical use in industry and impairs the recognition of related documents.

The orderly progress of dependability research and its practical applications requires that past work as well as new results should be classified on the basis of a single ontology and thus made accessible to the entire profession. However, it is unreasonable to expect that a committee formed by the different communities could by volunteer effort create a taxonomy document from which a single consensus ontology could be generated.

It must be concluded that today the purely “intellectual” (i.e., human) process of ontology building for dependability concepts is reaching its limits. The complementary solution is to augment the human effort by the use of automatic natural language processing tools that have been developed by computer linguists. The next step must be computer-aided building of a consensus ontology.

During the past decade much progress has been made in the development of computer tools for human language processing. Such tools have been developed for the extraction of term candidates from a corpus (set of texts). A thesaurus (list of important terms with related terms for each entry) is constructed from the term candidates. The ontology for a given domain is a data model that represents those terms and their relationships. Automatic indexation of the texts is carried out using the thesaurus, followed by clustering analysis using statistical and linguistic techniques. A measure of similarity between texts is computed that serves as a basis for automatic classification. The applicability of the above listed techniques to texts in the dependability domain has been part of research supported by the European Network of Excellence ReSIST (Resilience for Survivability in Information Society Technologies) in 2006-2009.

The corpus is composed of the texts of nearly 2000 papers presented at all 29 FTCS and 7 DSN conferences (1971-2006). The encouraging results of the processing of texts from the FTCS/DSN community leads to the conjecture that similar processing of texts from other conferences, journals, books, industrial documents, etc., will produce other ontologies that can be merged into a consensus ontology that covers the entire domain of dependability and its near-synonyms.

A dependability ontology is an integral part of an (still non-existent) ontology for all of computer science and engineering. The only existing and widely used taxonomy that could be used to build it is the ACM Computing Classification System (CCS). The CCS was created in 1988 and was last revised in 1998. It has fallen far behind the evolution of CS&E and information technology. The concepts of dependability are treated very inadequately, and many significant dependability terms are altogether missing in the 1998 ACM CCS taxonomy.

The coming update of the CCS is a challenge to the dependability community: we must take part in the process of creating an up-to-date and evolvable version of the CCS that adequately incorporates dependability concepts. The new CCS would allow the computer-aided construction of a thesaurus and an ontology for the entire CS&E profession. However, a consensus dependability ontology with explicit synonymy relations must be available to the CCS builders.

Finally, it is very appropriate for IFIP to take part in the building of a CCS. The experience of the SIG can serve as a starting point for such an effort within IFIP.

WG10.5 - Design and Engineering of Electronic Systems


AIMS

Electronic system design demands a tight integration on a very large profile of knowledge and skills ranging from hardware and software system architecture to semiconductor physics.

Functionality of complex embedded or stand-alone systems, to be applied in areas such as general-purpose computing, telecommunications, automotive, entertainment, and multimedia, may be realized by various combinations of analog and digital hardware and software parts.

Systems can be implemented by single or multiple integrated circuits and software modules that can be either of...
special purpose, programmable or reconfigurable.
The working group aims at providing a forum amongst creative experts to explore problem areas and solutions for the design of such complex electronic systems and also disseminating the solutions to a broader industrial and educational sphere.

**SCOPE**

The Working Group is interested in a broad range of topics related to the design and engineering of heterogeneous systems, containing hardware, software, and even mechanical parts.

- System Design Methods
- Embedded Systems
- Modeling and Specification
- Design Validation
- Formal Methods in Design
- Synthesis
- Design Environments
- Reconfigurable Computing
- VLSI Systems and Applications
- Physical Design
- Test and Testability
- Power-aware Design
- Analog and Mixed-Signal Systems
- Fundamental CAD Algorithms

TC 11 - Security and Privacy Protection in Information Processing Systems - Aims and Scopes

est. 1984, revised 2006, 2009

**AIMS**

To increase the trustworthiness and general confidence in information processing and to act as a forum for security and privacy protection experts and others professionally active in the field.

**SCOPE**

Work towards:

- the establishment of a common frame of reference for security and privacy protection in organizations, professions and the public domain;
- the exchange of practical experience;
- the dissemination of information on and the evaluation of current and future protective techniques;
- the promotion of security and privacy protection as essential elements of information processing systems.
- The clarification of the relation between security and privacy protection.

WG11.1 - Information Security Management

est. 1985, revised 1992

**AIMS**
As management, at any level, may be increasingly held answerable for the reliable and secure operation of the information systems and services in their respective organizations in the same manner as they are for financial aspects of the enterprise, the Working Group will promote all aspects related to the Management of Information Security.

These aspects cover a wide range, from purely managerial aspects concerning Information Security, (like upper management awareness and responsibility for establishing and maintaining the necessary policy documents), to more technical aspects (like risk analysis, disaster recovery and other technical tools) to support the Information Security management process.

SCOPE

- to study and promote methods to make senior business management aware of the value of information as a corporate asset, and to get their commitment to implementing and maintaining the necessary objectives and policies to protect these assets
- to study and promote methods and ways to measure and assess the security level in a company and to convey these measures and assessments to management in an understandable way;
- to research and develop new ways to identify the Information Security threats and vulnerabilities which every organization must face;
- to research and identify the effect of new and changed facilities and functions in new hardware and software on the management of Information Security;
- to study and develop means and ways to help information security managers to assess their effectiveness and degree of control;
- to address the problem of standards for Information Security.

STATEMENT OF CASE

There is a growing trend for senior business management to be held answerable for the reliable and secure operation of their information systems, as they are for control of their financial aspects. Information Security is, and should always be upper management responsibility. Information security professionals, and WG 11.1 in particular, should therefore be responsible for the development of all types of tools, mechanisms and methods to support top management in this new responsibility.

WG11.2 – Pervasive Systems Security

AIMS

To investigate methods and issues in the area of information security related to pervasive systems; and to advance knowledge and awareness of the subject through publications, conferences and other means. The aim is to address pervasive systems security from both a functional, technical, and societal perspective.

SCOPE

The scope of the working group shall be to:

- Promote the design of the new information security techniques and methods in pervasive systems.
- Investigate and report on the information security aspects of information technology products and information services for pervasive systems.
- Design guidelines and promote methodologies for the implementation of information security in pervasive systems.
- Investigate intelligent token and smart card applications in information security with the aim of making the user less dependent on single fixed environment.
To foster public debate on the security and privacy issues that emerge when pervasive systems are deployed on a large scale.

**STATEMENT OF CASE**

Pervasive systems shall be defined to be large scale systems that are comprised of nodes ranging from RFID tags, through embedded systems, to personal mobile devices, interconnected by a mixture of short range wireless and wide are wired networks. The typical characteristics of a pervasive system are: resource constrained nodes, often physically unreachable or without user interface, whose interconnections often span a large number of administrative domains with conflicting interests. Security of such systems is therefore an emergent property.

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**WG11.3 - Data and Application Security and Privacy**
est. 1987, revised 2001, 2011

**AIMS**

To promote wider understanding of the risks to society of operating data management systems that lack adequate measures for security or privacy.

To encourage the application of existing technology for enhancing the security of database systems.

**SCOPE**

To advance technologies that support:

- the statement of security requirements for database systems;
- the design, implementation, and operation of database systems that include security functions;
- the assurance that implemented data management systems meet their security requirements.

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**WG11.4 - Network & Distributed Systems Security**

**AIMS**

- to promote research on technical measures for securing computer networks, including both hardware- and software-based techniques;
- to promote dissemination of research results on network security in real-life networks in industry, academia and administrative institutions;
- to promote education in the application of security techniques, and to promote general awareness about security problems in the broad field of information technology.

**SCOPE**

Research on network security is understood to encompass at least the following topics:

- cryptographic techniques and their applications (confidentiality, digital signatures, integrity checking, ...);
- cryptographic protocols, including protocols for authentication, key distribution, electronic voting, electronic commerce, digital cash, ...
- practical implementations of cryptographic protocols in network security systems (Kerberos, SSL, KryptoKnight, ...);
- secure mobile code (language based security, Java Security, proof-carrying code, code signing, meta-level protocols for security, aspect languages for security, ...);
security from a software engineering point of view; adding security to applications in an orthogonal way
using meta-level protocols, aspect languages, secure software engineering ...;
- firewalls;
- software for intrusion detection and audit tools.

STATEMENT OF CASE

Management in any organization is responsible for the reliable and secure operation of the information systems
that support the organization. As inter and intra-organization networking between information systems become
the rule as well as the daily operational environment, the scope of concern takes on new aspects and new
technical details come into play.
Management must not only address the security issues of wholly internal systems together with any networks to
which they might be connected, but also must assure that the protective mechanisms installed in them are not
accidentally or intentionally thwarted or subverted by other systems with which data exchange connections are
established.

The range of subjects includes local area networks, regional and wide area networks, homogeneous and
heterogeneous networks, and the networks which can arise for varying periods of time as a result of operational
requirements for temporary or semi-permanent interconnections which can exist for varying periods of time.

Such networks will include dial-up or other connections which permit an organization's employees to work from
their homes, and those external connections enabling organizations to transact mutually linked business
activities e.g. such as will take place under EDI agreement.

WG11.5 - Systems Integrity and Control

WG11.6 – Identity Management
est. 2006

AIMS

The aim is to promote through education, research and outreach, the awareness and understanding of:
1. Identity management in general, and, in this context:
   - identity management applications and methodologies;
   - optical and electronic document security;
   - potential and actual role and function of biometrics in particular;
2. Methods and techniques that can help to evaluate (specific) biometric technologies;
   - operational aspects of biometrics;
   - legal aspects of the application of biometrics;
   - impact of biometrics on society;
   - methods and techniques that can help to improve the quality of biometric technology (performance,
     privacy, compliance); and
3. National identity management in particular:
   - national identity management as (a kind of) federated identity management;
   - national identity management as a part of multilateral identity management;
   - (possible) role and effectiveness of identity management in fighting (inter)national fraud, crime and
terrorism;
   - methods and techniques that can help to improve the quality of national identity management.

SCOPE

1. To establish and expand a common identity management lexicon so that the international community speaks
the same language.
2. To propose, define and evaluate identity management applications and methodologies that will meet the standards of decision-makers in the public and private sector.
3. To propose, define and evaluate optical and electronical document security technologies that will meet the standards of decision-makers in the public and private sector.
4. To propose, define and evaluate biometric technologies and methodologies to be incorporated in (national) identity management that will meet the standards of decision-makers in the public and private sector.
5. To promote through education, research and outreach, a wider understanding of the legal, social and operational issues related to (national) identity management in general and the technologies mentioned above in particular.
6. In order to promote discussion related to research in the field, WG 11.6 will foster cooperation between:

- International communities
- Stakeholders, scientists and industry.
- Technicians, sociologists, biologists, philosophers, psychologists and political scientists.

WG11.8 - Information Security Education
est. 1991

AIMS
To promote information security education and training at the university level and in government and industry.

SCOPE
- To establish an international resource center for the exchange of information about education and training in information security.
- To develop model courses in information security at the university level.
- To encourage colleges and universities to include a suitable model course in information security at the graduate and/or undergraduate level in the disciplines of computer science, information systems and public service.
- To develop information security modules that can be integrated into a business educational training program and/or introductory computer courses at the college or university level.
- To promote an appropriate module about information security to colleges and universities, industry and government.
- To collect, exchange and disseminate information, relating to information security courses conducted by private organizations for industry.
- To collect and periodically disseminate an annotated bibliography of information security books, feature articles, reports, and other educational media.

WG11.9 - Digital Forensics
est. 2004

AIMS
The aim of the IFIP WG11.9 group is to promote through education, research and outreach, the awareness and understanding of (i) the scientific methods and techniques that help to tell about a computer related security incident (including those that involve converging digital technology), what occurred, when it occurred, how it occurred, what resources were affected and who initiated the incident, in a manner that will support a legal action, and (ii) the operational and legal aspects of new and emerging digital technology so as to help develop such methods and techniques.

SCOPE
To establish and expand a common digital forensics lexicon so that international community speaks the same language.
To propose, define and evaluate core technologies that assist in the discovery, explanation and presentation of conclusive and persuasive digital evidence that will meet the heightened scrutiny of the courts and other decision-makers in military and civilian environments.
To promote through education, research and outreach, a wider understanding of the legal, social and operational issues related to digital forensics.
To foster cooperation between international communities so as to promote scholarly discussion related to digital forensic research and its application.

WG11.10 – Critical Infrastructure Protection
est. 2006

AIMS

The principal aim of IFIP WG 11.10 is to weave science, technology and policy in developing and implementing sophisticated, yet practical, solutions that will help secure information, computer and network assets in the various critical infrastructure sectors. Information infrastructure protection efforts at all levels – local, regional, national and international – will be advanced by leveraging the WG 11.10 membership’s strengths in sustained research and development, educational and outreach initiatives.

SCOPE

- To identify information security challenges and implementation issues that are common (as well as unique) to infrastructure sectors.
- To elucidate the interdependencies existing between infrastructure sectors and their information security implications.
- To identify core security principles and techniques that can be applied to address problems in information infrastructure protection.
- To develop sophisticated information infrastructure protection solutions that blend scientific methods, engineering techniques and public policy.

WG11.11 – Trust Management
est. 2006

AIMS

Working Group 11.11 aims to provide a forum for cross-disciplinary investigation of the application of trust as a means of establishing security and confidence in the global computing infrastructure, recognizing trust as a crucial enabler for meaningful and mutual beneficial interactions. The working group will bring together researchers with an interest in complementary aspects of trust, from both technology oriented disciplines and the field of law, social sciences and philosophy. In this way the working group will provide the common background necessary for advancing towards an in-depth understanding of the fundamental issues and challenges in the area of trust management in open systems.

The main membership will most likely be specialized researchers, both from universities and company laboratories. Government organizations and IFIP member societies and their members will be the main users of the results of the group.

Working Group 11.11 has a link to the area of other groups, both inside and outside IFIP and the group will seek actively for close cooperation with these groups.
**SCOPE** of the working group (non-exhaustive and non-exclusive):

- semantics and models for security and trust;
- trust management architectures, mechanisms and policies;
- trust in e-commerce, e-service, e-government;
- trust and privacy; (link with wg 9.6 / 11.7)
- identity and trust management; (link with wg 11.6)
- trust securing digital as well as physical assets;
- social and legal aspects of trust (link with wg 9.6 / 11.7)

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**WG11.12 – Human Aspects of Information Security and Assurance**  
est. 2010

**AIMS**

The Human Aspects of Information Security and Assurance Working Group seeks to promote all aspects of research that can better support and inform our use of security within information systems.

**SCOPE**

The scope of the WG11.12 includes any aspects that pertain to the attitudes, perceptions and behavior of people, and how human characteristics or technologies may be positively modified to improve the ease of use and level of protection provided. Indicative themes within this remit will include:

- Information security culture
- Awareness and education methods
- Enhancing risk perception
- Public understanding of security
- Usable security
- Psychological models of security software usage
- User acceptance of security policies and technologies
- User-friendly authentication methods
- Automating security functionality
- Non-intrusive security
- Assisting security administration
- Impacts of standards, policies, compliance requirements
- Organizational governance for information assurance
- Simplifying risk and threat assessment
- Understanding motivations for misuse
- Social engineering and other human-related risks
- Privacy attitudes and practices
- Computer ethics and security

It is anticipated that the activity of this Working Group will have many cross-disciplinary aspects with other groups, both inside and outside of IFIP and the group will actively seek close cooperation.
AIMS

To foster the development and understanding of Artificial Intelligence and its applications worldwide.
To promote interdisciplinary exchanges between Artificial Intelligence and other fields of information processing.
To contribute to the overall aims and objectives and further development of IFIP as the international body for Information Processing.

SCOPE

Artificial Intelligence covers a wide range of techniques, which can be applied to a very wide range of application areas. Its subfields include (but are not restricted to) the following:

- Automated Reasoning
- Belief Revision
- Case-Based Reasoning
- Computer Vision
- Constraint Satisfaction
- Data Mining
- Evolutionary Algorithms
- Intelligent Agents
- Intelligent Planning and Scheduling
- Intelligent Robotics
- Knowledge Acquisition
- Knowledge Discovery and Data Mining
- Knowledge Engineering
- Knowledge-Based Systems
- Knowledge Management
- Knowledge Representation and Reasoning
- Machine Learning
- Machine Translation
- Model-based Reasoning
- Natural Language Processing
- Neural Nets
- Pattern Recognition
- Qualitative Reasoning
- Search
- Semantic Web
- Temporal Reasoning

WG12.1 - Knowledge Representation and Reasoning

est. 2004

AIM

To study and develop theory and techniques for knowledge representation and reasoning.

SCOPE

The scope of the Working Group's activities includes (but is not restricted to) the following:
Abductive Reasoning
Inductive Reasoning
Non-monotonic Reasoning
Reasoning about Actions and Change
Spatial Reasoning
Temporal Reasoning
Automated Reasoning
Computational Logic
Logic Programming
Situation Calculus
Production Systems
Semantic Networks
Frames
Object-orientated Representation
Bayesian Networks

WG12.2 - Machine Learning and Data Mining
est. 2003, revised 2005

AIM
To explore computer methodology and algorithms that improve automatically through experience. Applications range from data mining programs that discover general rules in large data sets, to information filtering systems that automatically learn users' interests.

SCOPE

- Concept Learning and Inductive Learning
- Association Rules
- Case-based Learning
- Artificial Neural Networks
- Bayesian Learning
- Uncertainty Learning
- Reinforcement Learning
- Evolutionary Learning
- Perceptual Learning
- Computational Learning Theory
- Population-based Learning
- Data Mining
- Application Case Study

WG12.3 - Intelligent Agents
est. 2003

AIM
To study and develop theory and techniques for intelligent agents.

SCOPE

- Theory and agent modeling
Agent architectures
Agent-based software engineering
Coordinating, cooperation and negotiation
Evolution, adaptation and learning
Multiple agents
Mobile agents
Agent-based grid computing
Agent-based applications

WG12.4 - (joint with WG2.12, see TC2)

WG12.5 - Artificial Intelligence Applications
est. 1993, rev. 2003

AIM

To explore the use of Artificial Intelligence techniques for applications development.

SCOPE

All areas of application in which Artificial Intelligence techniques can give benefits to users.

Techniques for application development including:

- Conceptual frameworks for application specification and design
- User interface design
- Integration of AI software and systems with conventional databases, programming languages, and operating systems
- Related research issues such as knowledge acquisition, learning, validation and implementation techniques.

WG12.6 - Knowledge Management
est. 1993, revised 2003, 2008

AIMS

- To develop advanced methods for organizing, accessing and exploiting multidisciplinary knowledge within organizations and enterprises.
- To bring together various areas of KM research and technology to meet this challenge, e.g. knowledge transfer and modeling, optimisation, natural language understanding, speech and image processing and understanding, reasoning methods, learning methods, communication methods, social aspects, complex problem solving, decision support, human-machine interaction, serious games.
- To develop technology for intelligent support of Knowledge Cultivators, e.g. intelligent knowledge navigation systems, multi modal interface, automatic translation, competency management, e- and m-activities such as learning, collaborative research and design, business, process control.
- To share worldwide experience in the above domains.

SCOPE

Methodology, technologies, processes, and systems for supporting all aspects of knowledge management as communication, collaboration, learning, innovation, decision making, investigation, embedding and archiving.
Knowledge thinking.

Knowledge Holonomy – the interplay between individual, organizational, enterprise and society levels. Cross organisational.

Technology trends include:

- Intelligent multimodal knowledge acquisition and retrieval
- Knowledge discovery
- Technology for sustainable development
- Convergence of intelligences
- Technology for Knowledge Innovation
- Human machine interaction and collaboration
- Virtual reality and Games for KM

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WG12.7 – Social Networking Semantics and Collective Intelligence
est. 2010

AIMS

- To become a multidisciplinary group that searches for and studies the theoretical foundations, new paradigms, methodologies and technologies needed for the specific support by intelligent computer systems of the knowledge aspects of social processes, community-based elicitation and specification of semantics, and the use of such knowledge e.g. as linked data in applications;
- To investigate and promote the applications of such systems in science, industry, and society at large, including opportunities for standardisation;
- To meet and communicate regularly, to endorse and create scientific forums of exchange in order to achieve these aims;
- To interact productively with selected other working groups and research projects within and outside of IFIP, in particular but not limited to TC2 (Software Theory and Practice), TC5 (Information Technology Applications), TC8 (Information Systems) and other Working Groups of TC12 (Artificial Intelligence).

SCOPE

An initial but not comprehensive list of topics of study includes

- theory, formal models, e.g. ontologies, and emerging new paradigms of organized and informal communities, of social and collaborative processes, and of semantics of data and knowledge;
- elicitation of ontologies and semantic content creation in general by social processes, expertise sharing and agreement; methodologies for same;
- auto-emergence of social semantics; harvesting and mining collective intelligence from community interactions; pragmatic web;
- engineering and prototyping of supporting knowledge-based systems for collective intelligence;
- collective intelligence in linked data; evolution and quality assurance of such linked data;
- the interaction of formal semantics with informal social semantics; social web interoperability issues;
- modeling of situational awareness; hybrid socio-technical systems;
- identity and authentication of entities and services on the (social) semantic web; related issues of trust, privacy and security;
- implementation and exploitation of social semantics as web services; self-organizing services tailored to communities; methodologies for adoption of such services;
- scalability issues for web-sized collective intelligence;
- interoperability of heterogeneous and autonomous knowledge sources from multiple disciplines through their respective communities.
WG12.9 – Computational Intelligence
est. 2011

AIMS

- To obtain a deeper understanding of Computational Intelligence and its Applications and help in the development of its theoretical foundations and technological underpinnings.

1) Novel concepts of computational Intelligence approaches and their adaptation for handling real world applications.
2) Investigation of techniques of modification of computational Intelligence approaches so as to produce more effective computational Intelligence approaches.
3) Enhancement of the computational Intelligence approaches by co-operating with classical or statistical methods.
4) Using computational Intelligence approaches for handling constrained, multi-objective and large scale optimization problems for real world applications.
5) Application of computational Intelligence approaches in real industrial applications.
6) Parallel computational Intelligence approaches for practical applications in real world.
7) Using computational Intelligence approaches for solving dynamic optimization or time-varying problems in real world.
8) The following computational intelligence approaches include, but are not limited to:
   - Neural Networks
   - Fuzzy Systems
   - Evolutionary Computation
   - Particle swarm optimization
   - Multi-agent systems
   - Intelligent control systems
   - Support vector machine
   - Bayesian networks
   - Global and constrained optimization

TC 13 - Human-Computer Interaction - Aims and Scopes
est. 1989

AIMS

To encourage development towards a science and a technology of human-computer interaction, the Technical Committee will pursue the following Aims:

- to encourage empirical research (using valid and reliable methodology, with studies of the methods themselves where necessary);
- to promote the use of knowledge and methods from the human sciences in both design and evaluation of computer systems;
- to promote better understanding of the relation between formal design methods and system usability and acceptability;
- to develop guidelines, models and methods by which designers may be able to provide better human-oriented computer systems;
- to co-operate with other groups, inside and outside IFIP, so as to promote user-orientation and “humanization” in system design.
SCOPE

The main orientation is toward the users, especially the non-computer-professional users, and how to improve the human-computer relationship for them.

Areas of study include:

- the problems people have with computers;
- the impact of computers upon people in both individual and organizational contexts;
- the determinants of utility, usability and acceptability;
- the appropriate allocation of tasks between computers and people;
- modelling the user as an aid to better system design;
- harmonising the computer to the characteristics and needs of the user.

While the Scope is thus set wide, with a tendency towards general principles rather than particular systems, it is recognised that progress will only be achieved through both general studies to advance theoretical understanding and specific studies on practical issues (e.g. interface design standards, software system consistency; documentation, appropriateness of alternative communication media, human factors guidelines for dialogue design, the problems of integrating multi-media systems to match user needs and organizational practices etc.).

WG13.1 - Education in HCI and HCI Curricula

est. 1990, revised 1991

AIMS

- to improve HCI education at all levels of higher education;
- to coordinate and unite efforts to enhance the development of HCI curricula;
- to recommend fundamental structures for curricula and course materials and for their adaptation to the various national educational systems;
- to advance international recognition of qualifications in this field, and
to promote the teaching of HCI

SCOPE

The scope of the Working Group will build upon existing work in IFIP member countries to include:

- the evaluation of the needs of industry to enhance the qualifications of HCI, based upon societal objectives to improve the work environment;
- the collation of existing curricula, course literature and other relevant materials developed by member societies or institutions who are contributing to their work;
- the design of recommendations and guidelines for HCI curricula at different levels of higher education, and the adaptation of the guidelines to the cultural situation within which the respective education systems are based.

SIG13.1 - Interaction Design and International Development

est. 2008

AIMS

- To promote application of interaction design research, practice and education to address the needs, desires and aspirations of people in the developing world;
To support and develop the research, practice and education capabilities of HCI institutions and organisations based in the developing world;

To develop links between the HCI community in general, and IFIP TC13 in particular, with other relevant communities involved in Development, especially IFIP WG 9.4 Computers in Developing Countries.

**WG13.2 - Methodology for User Centred System Design**
est. 1992

**AIMS**

The principal objective of the Working Group will be:

- To foster research, dissemination of information and good practice in the methodical application of HCI to software engineering.

This objective decomposes into two sub-goals:

- To encourage research into and development of HCI principles, methods and techniques applied to system design and integrated with principles, methods and tools in software engineering, and
- To encourage research into human action within the system development process and to promote knowledge transfer from such studies into the construction of integrated HCI-SE design methods.

**SCOPE**

- Evaluation and synthesis of HCI specification and design methods;
- Implications of cognitive psychology for the design of human-computer interfaces;
- Evaluation and study of different approaches to design delivery: cognitive models, design rationales, task artifact cycles, engineering principles, development methods;
- Methods and techniques of human factors in software engineering as practised in industrial environments;
- Human behaviour in software development, i.e. cognitive studies of software engineering;
- Cooperative work techniques applied to software development.

**WG13.3 - Human-Computer Interaction and Disability**

**AIMS**

The principal objectives of the Working Group will be:

- To make HCI designers aware of the needs of people with disabilities;
- To recommend guidelines for the design of HCI to facilitate the use of computers by people with disabilities;
- To monitor the latest developments in the design of HCI and their impact on accessibility and usability;
- To encourage the development of information systems and complementary tools which permit the adaptation of the human interface for each specific user.

**SCOPE**

There are over 500 million people with disabilities in the world. Social exclusion and many other problems often result from their situation. It is recognised that developments in IT/HCI can often help with problems, for example to maximise choice and integration. However, there is also a danger that such developments can lead to the further exclusion of this user group if they are not designed from the beginning with universal access as an aim.
Working Group 13.3 intends to make designers of information systems and complementary tools aware of the needs of this group in order to encourage the development of more appropriate tools for access and usability. As a result, systems will become universally accessible, and the market for them will increase.

Specifically the scope of WG13.3 will include the following activities:

- coordination and exchange of information with other relevant bodies;
- collaboration with institutions interested in this field of HCI and disability;
- focussed HCI orientation to enable people with disabilities to use information systems and complementary tools for positive advantage.

WG13.4 (joint with WG2.7; see TC2)

WG13.5 - Human Error, Safety and System Development
est. 1998

AIMS

This working group aims to support practitioners, regulators and researchers to develop leading edge techniques in hazard analysis and the safety engineering of computer-based systems. Particular emphasis will be on the role of human error both in the development and in the operation of complex processes and on techniques that can be easily integrated into existing system engineering practices. Specifically, the aims are:

- to provide a framework for studying human factors that relate to systems failure;
- to provide a forum for practitioners, regulators and researchers interested in the ‘human contribution’ to major accidents and incidents;
- to identify leading edge techniques for the development of safety-critical interactive systems and integrate them with existing systems engineering techniques;
- to support and guide international accreditation activities in the area of safety-critical systems.

SCOPE

To build on existing work in IFIP member countries in the following areas:

- techniques for analysing human, managerial and organisational factors that relate to the occurrence of accidents;
- the integration of human factors concerns into risk analysis and assessment;
- the integration of human factors concerns into systems engineering techniques for safety-critical systems development;
- the ergonomics of human-computer interaction with safety-critical applications;
- the role of human error both in the development and in the operation of complex processes.

WG13.6 - Human-Work Interaction Design
est. 2005

AIMS

The aims of the HWID working group are:

- To encourage empirical studies and conceptualisations of the interaction among humans, their variegated social contexts and the technology they use both within and across these contexts.
Promote the use of knowledge, concepts, methods and techniques that enables user studies to procure a better apprehension of the complex interplay between individual, social and organisational contexts and thereby a better understanding of how and why people work in the ways they do.

Promote a better understanding of the relationship between work-domain based empirical studies and iterative design of prototypes and new technologies.

Establish a network of researchers, practitioners and domain/subject matter experts working within this field.

Thus on an overall level the working group aims at establishing relationships between extensive empirical work-domain studies and HCI design.

**SCOPE**

A Human-Work Interaction Design group (HWID) will provide the basis for an improved cross-disciplinary co-operation and mutual inspiration among researchers, but it will also lead to a number of new research initiatives and developments, as well as to an increased awareness of HWID in existing HCI educations. Complexity will be a key notion in the working group, it is not a priori defined or limited to any particular domains. A main target of the work group is the analysis of and the design for the variety of complex work and life contexts found in different business. Technology is changing human life and work contexts in numerous, multi-faceted ways:

- Interfaces between collaborating individuals; advanced communication networks
- Small and large-scale distributed systems
- Multimedia and embedded technologies
- Mobile technologies and advanced "intelligent" robots
- With this evolution, toward new ways of working, has followed an intensive demand for techniques and technologies that address contemporary issues connected to:
- Communication, collaboration, and problem solving
- Large information spaces, variability, discretion, learning, and information seeking

This evolution toward new ways of working and living must be embraced as a challenge to current knowledge and practice and one, moreover, which presents exciting new opportunities in:

- Epistemology, with knowledge acquisition, knowledge creation, management and knowledge sharing
- The symbiosis of users and contexts of use, between work and life-quality and with both professional and individual development.

It is a challenge to design applications that support users of technology in complex and emergent organisational and work contexts, and thus opportunities exist to focus on methods, theories, tools, techniques and prototype design on an experimental basis.

Under these circumstances, the primary question is less whether we choose to study the use of a particular computer application or prefer, instead, to conduct bottom up empirical experiments of work contexts. The new problem is how we can understand, conceptualise and design for the complex and emergent contexts in which human life and work are now embroiled. This problem calls for cross disciplinary, empirical and theoretical approaches that focus on Human-Work Interaction Design, meaning that the technology itself and particularly the design and use of technologies mediates the interaction between humans and specific work contexts.

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**AIMS**

To establish a study and research program that will combine both scientific work and practical applications in the fields of Human – Computer Interaction and Visualization.
To promote the development of “effective” visualizations that benefit from the capabilities and functionalities of the human visual system, e.g. visual perception and other cognitive abilities.
To promote the development of practical applications, e.g. in engineering, which benefit from the newly developed concepts and which provide the necessary fields for evaluation.
To integrate several additional aspects of further research areas, such as Scientific Visualization, Data mining, Information Design, Computer Graphics, Cognition Sciences, Perception Theory, or Psychology, into this approach.

Thus the WG will provide a creative work environment for performing innovative research at the interface between Human – Computer Interaction and Visualization.

TC 14 - Entertainment Computing - Aims and Scopes


AIMS

To encourage computer applications for entertainment and to enhance computer utilization in the home, the technical committee will pursue the following aims:

- to enhance algorithmic research on board and card games
- to promote a new type of entertainment using information technologies
- to encourage hardware technology research and development to facilitate implementing entertainment systems, and
- to encourage non-traditional human interface technologies for entertainment.

SCOPES

(1) Algorithm and strategy for board and card games
-- algorithms of board and card games
-- strategy control for board and card games
-- level setup for game and card games

(2) Novel entertainment using ICT
-- network-based entertainment
-- mobile entertainment
-- location-based entertainment
-- mixed reality entertainment

(3) Audio
-- music informatics for entertainment
-- 3D audio for entertainment
-- sound effects for entertainment

(4) Entertainment human interface technologies
-- haptic and non-traditional human interface technologies
-- mixed reality human interface technologies for entertainment

(5) Entertainment robots
-- ICT-based toys
-- pet robots
-- emotion model and rendering technologies for robots

(6) Entertainment systems
-- design of entertainment systems
(7) Theoretical aspects of entertainment
-- sociology, psychology and physiology for entertainment
-- legal aspects of entertainment

(8) Video game and animation technologies
-- video game hardware and software technologies
-- video game design toolkits
-- motion capture and motion design
-- interactive story telling
-- digital actors and emotion model

(9) Interactive TV and movies
-- multiple view synthesis
-- free viewpoint TV
-- authoring technologies

(10) Edutainment
-- entertainment technologies for children’s education
-- open environment entertainment robots for education

WG 14.1 – Digital Storytelling

SCOPES
Storytelling is one of the core technology of entertainment. Especially with the advancement of information and communication technologies (ICT), new type of entertainment called video games have been developed where interactive story development is the key that makes those games really entertaining. At the same time, however, it has not been studied well what is the difference between the interactive storytelling and the conventional storytelling. Also as the development of interactive storytelling need a lot of time and human power, it is crucial to develop technologies for automatic or semiautomatic story development. The objective of this working group is to study and discuss these issues.

WG 14.2 – Entertainment Robot
est. 2004, rev. 2006

SCOPES
Robot is becoming one of the most appealing entertainment. New entertainment robot and/or pet robot is becoming popular. Also, from theoretical point of view, compared with computer graphics based characters/animations, robot is an interesting research object as it has physical entity. Taking these into considerations, it was decided at the SG16 annual meeting that a new working group on entertainment robot is to be established.

WG 14.3 – Theoretical Basis of Entertainment
est. 2003, rev. 2006

AIMS
• For the benefit of society, to promote visibility and to increase the impact of research and development in the entertainment computing area, especially in the fields defined in the scope of this working group.
• To promote quality and relevance of academic and industrial research and development in the entertainment computing area.
• To promote ethical behavior and appropriate recommendations or guidelines for research related activities, for example, submission and selection of publications, organization of conferences, allocation of grants and awards, and evaluation of professional merits and curricula.
• To promote cooperation between researchers and with other established bodies and organizations pursuing the above aims.
• To contribute to assessing the scientific merits and practical relevance of proposed approaches for entertainment technology and applications.

SCOPES
Although there are huge entertainment industries already such as video games, toys, movies, etc., little academic interest has been paid on such questions as what is the core of entertainment, what is the technologies of entertainment can be applied to other areas such as education, learning and so on. The main objective of this WG is to study these issues.

WG 14.4 - Games and Entertainment Computing
est. 2005, rev. 2006

AIMS
To research and develop computing techniques for the improvement of computer games and other forms of computer entertainment.

SCOPES
The scope of this workgroup includes, but is not limited to the following applications, technologies and activities.

Applications:

• Analytical games (e.g., Chess, Go, Poker)
• Commercial games (e.g., Action games, Role-playing games, Strategy games)
• Mobile games (e.g., Mobile phones, PDA’s)
• Interactive multimedia (e.g., Virtual reality, Simulations)

Technologies:

• Search Techniques
• Machine Learning
• Reasoning
• Agent Technology
• Human-Computer Interaction

WG 14.5 - Social and Ethical Issues in Entertainment Computing
est. 2005, rev. 2006

AIMS
1. Foster the ethical design, development, implementation, applications and use of entertainment computing.
2. Encourage surveys and studies on social, ethical and cultural aspects of entertainment computing.
3. Develop methodologies for studying social, ethical and cultural implications of entertainment computing.
4. Establish a global platform for interaction, exchange, joint initiatives and co-operation between such groups as:
   - the end users of entertainment computing
   - industrial developers and designers of entertainment computing
   - policy, decision making, social and consultative bodies
   - academics and scientists.

**SCOPES**

The social and ethical implications of entertainment computing including:

- actual and potential human usefulness or harm of entertainment computing
- social impact of these technologies
- developments of the underlying infrastructure
- rationale in innovation and design processes
- dynamics of technology development
- ethical development
- cultural diversity and other cultural issues
- education of the public about the social and ethical implications of entertainment computing, and of computer professionals about the effects of their work.

WG 14.5 explicitly cares about the position of, and the potentials for, vulnerable groups such as children, the less-educated, disabled, elderly and non-employed people, cultural minorities, unaware users and others.

**WG 14.6 – Interactive TeleVision (ITV)**
est. 2007

**AIMS**

- To promote visibility and to increase the impact of research and development in the ITV field
- To bring together interdisciplinary approaches to ITV research and development issues (e.g. content production, computer science, media studies)
- To encourage cooperation between researchers and other established bodies and organizations, through the development of joint project proposals
- To facilitate the development of suitable academic and practical teaching programs

**SCOPES**

- Alternative content distribution (mobile TV, peer-to-peer TV, IPTV)
- Interactive storytelling, user contributed content
- Interactive and personalized advertising systems
- Applications for t-commerce, t-learning, t-health, entertainment
- Ethical, regulatory and policy issues
- Interoperability of middleware, standards, multimedia metadata
- Authoring, production and virtual reality systems
- Content management, digital rights management
- Multimedia, graphics, broadcast and video technology
- Content enriched communication services, video conferencing
WG 14.7 – Art and Entertainment
est. 2007

SCOPE

The influence of technology and scientific innovation is profoundly changing how we express ourselves. Arts and Entertainment is a new field that represents the exciting convergence of technology with the established design discipline. The Media Arts and Cinema offers a comprehensive approach to design that encourages innovation by media artists, scientists and engineers. The working group will pursue the following activities:

AIMS

- To explore the way art and cinema aesthetics can play a role in different areas of computer science.
- One of its goals is to modify computer science by the application of the wide range of definitions and categories normally associated by making art and cinema.
- To go beyond the usual definition of art and cinema aesthetics in computing, which most often refers to the formal, abstract qualities of such structures – a beautiful proof, or an elegant diagram.
- To research the broader spectrum of aesthetics – from abstract qualities of symmetry and form to ideas of creative expression and pleasure – in the context of computer science.
- To prove the assumption behind art and cinema aesthetic computing that the field of computing will be enriched if it embraces all of aesthetics.
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