ERCIM

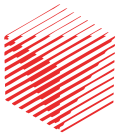
European Research Consortium
for Informatics and Mathematics

Cooperating for Excellence in Research

Activity Report 2020

Contents

ERCIM at a Glance



ERCIM – the European Research Consortium for Informatics and Mathematics – aims to foster collaborative work within the European research community and to increase cooperation with European industry. In 2020, the members of ERCIM included 17 leading research establishments from 15 European countries. Encompassing about 10 000 researchers and engineers, ERCIM is able to undertake consultancy, development and educational projects on any subject related to its field of activity. ERCIM was founded in 1989.

What is ERCIM?

ERCIM aims to foster collaboration within the European ICST research community and to increase cooperation with industry. Its members are centres of excellence across Europe. ERCIM is internationally recognized as a major representative organization in its field. ERCIM provides access to all major ICST research groups in Europe and has established an extensive program of working groups, publications, fellowships and prizes. It also hosts the European branch of the World Wide Web Consortium (W3C).

ERCIM, a consortium of leading research institutions, focuses on information and communication science and technology (ICST) and related areas of mathematics. ERCIM has a successful track record of promoting ICST research and cooperation in Europe and beyond. Membership is open to top level research institutions (including universities) in ICST.

Objectives

ERCIM's aim is to play a leading role in Information and Communication Technology in Europe by:

- building a Europe-wide, open network of centres of excellence in ICST and Applied Mathematics.
- excelling in research and acting as a bridge for applications
- being internationally recognised both as a major representative organisation in its field and as a portal giving access to all relevant ICST research groups in Europe
- liaising with other international organisations in its field
- promoting cooperation in research, technology transfer, innovation and training.

International Cooperation

ERCIM considers it a high priority to develop cooperation with scientists all over the world. ERCIM hosts the European branch of the World Wide Web Consortium (W3C), the unique international standardization body which sets the Web standards and protocols (HTML, HTTP, XML, etc.). Through W3C, ERCIM participates also in the definition of Web data standards such as RDF, SPARQL and OWL which are of high importance to the research community. ERCIM participates in EU activities and projects. ERCIM has also established cooperation with Informatics Europe, ETSI, the European Telecommunications Standards Institute and with ACM Europe.

Consultancy

ERCIM experts have been involved in many advisory bodies convened by the European Commission. Additionally, ERCIM senior researchers are participating in several EC-funded roadmapping projects as partners, invited participants or members of advisory boards.

Research Projects

In addition to many projects involving ERCIM member institutes, ERCIM is itself participating in several European Commission related activities and projects as coordinator or partner. In these projects, several member institutes carry out the research while the ERCIM Office takes care of administrative and financial tasks.

Working Groups

Working Groups are specialist networks set up by researchers, within which the ERCIM partners arrange regular workshops with invited external participation to study a specific topic and prepare international research projects.

Members

Member institutes are leading research establishments with excellent links to both the national and international, academic and commercial research communities. All current ERCIM members are national centres of excellence, independent of specific commercial ties. They have a strong involvement in the research programs of the European Union and their country, and joint projects with both small and medium-sized enterprises and large industrial companies.

Benefit of Membership

ERCIM is a European-wide network internationally recognized as a representative organisation in its field. Members can benefit from:

- International recognition as a leading centre for ICT R&D. ERCIM, a European-wide network of centres of excellence in ICT, is internationally recognised as a major representative organisation in its field;
- More influence on European and national government R&D strategy in ICT. ERCIM members team up to speak with a common voice and produce strategic reports to shape the European research agenda;
- Privileged access to standardisation bodies, such as the W3C which is hosted by ERCIM as to other bodies with which ERCIM has also established strategic cooperation. These include ETSI, the European Mathematical Society and Informatics Europe;
- Invitations to join projects of strategic importance;
- Establishing personal contacts among executives of leading European research institutes during the bi-annual ERCIM meetings;
- Invitations to join committees and boards developing ICT strategy nationally and internationally;
- Excellent networking possibilities with more than 10.000 high-quality research colleagues across Europe. ERCIM's mobility activities, such as the fellowship programme, leverages scientific cooperation and excellence;
- Professional development of staff including international recognition;
- Publicity through the ERCIM website and ERCIM News, the widely read quarterly magazine.

Innovation

In addition to research in computer science and mathematics, innovation and transfer of research results is one of the ERCIM institutes' current main assignments. ERCIM members play a pioneering role in creating small and medium-sized high-tech companies, an effective way of achieving such a transfer. In addition, ERCIM members have a long track record of cooperation with European industry in R&D projects, generally within the framework of European programmes. As a network, ERCIM can help industrial partners to locate the best scientific teams in Europe for a given domain.

Cor Baayen Award

Each year, ERCIM presents a promising young researcher in computer science and applied mathematics with the prestigious Cor Baayen Award.

Publications

ERCIM publishes the quarterly magazine "ERCIM News", white papers, and policy documents.

Structure and Organisation

ERCIM is holding general meetings in spring and fall each year. The 2020 meetings were held online due to the Covid-19 pandemic. The spring meetings were held on 25-26 May, the fall meetings including the ERCIM AISBL general assembly were held on 2-4 November.

The ERCIM community is supported by a Consortium of two bodies:

- ERCIM AISBL an international non for profit association under Belgian law, carrying on the activities of ERCIM concerning collaborative research, networking, and support.
- ERCIM EEIG, the European Economic Interest Grouping, responsible for managing the ERCIM Office and hosting the European branch of W3C.

ERCIM Association

The ERCIM association is managed by the Board of the Association:

- Björn Levin, RISE, Sweden
- Chrisos Koulamas, ISI, Greece: Treasurer
- Gabriel David, INESCTEC/University of Porto, Portugal: Secretary

and in addition:

- Han La Poutre, CWI, Strategy Task Group chair and Vice-President
- Dimitris Plexousakis, ICS-FORTH, Science Task Group chair
- Monica Divitini, NTNU, Human Capital Task Group chair
- Andreas Rauber, SBA Research and TU Vienna, Outreach Task Group chair.

ERCIM EEIG

The ERCIM EEIG is governed by the EEIG Board of Directors. In 2020 the board was composed of:

- Bruno Sportisse, Inria (president ERCIM EEIG)
- Dieter Fellner, Fraunhofer-Gesellschaft
- Fabio Martinelli, CNR
- Dimitris Plexousakis, ICS-FORTH

and supported by an Executive Committee composed of:

- Alexander Nouak, Fraunhofer Gesellschaft (chair)
- Thierry Priol, Inria
- Yannis Tsikikas, FORTH
- Carlo Meghini, CNR.

ERCIM Workshop on Quality in AI

ERCIM invited experts in the field of artificial intelligence to a workshop held on 26 May 2020, with the aim of collecting ideas and suggestions about approaches to ensure high quality artificial intelligence (AI) in practical applications.

The main items and ideas discussed in the workshop have been grouped into five clusters:

- Governance – what factors and regulations should society consider to ensure the best use of AI, who should be responsible for what, and how should rules and regulations be developed?
- Trust – how is trust best built both among the public, and among professionals in other fields that use AI?
- Skills – how do we ensure that we have sufficiently skilled and responsible AI engineers?
- Process – how do we avoid repeating errors, how do we build and communicate best practices, and what public resources are needed?
- Testing – what can be tested, and what about the variables that are outside the realm of testing?
- Quality of data and methods – transparency vs integrity and trade secrets, deterioration over time, and the pros and cons of explainable AI.

Governance

Governance for AI touches fundamental values such as equality and fairness. Several participants called for the development of a vision of how society should work, including for AI and its use. However, a problem that was raised is that the interpretation of these values changes over time. What was morally the norm one or two generations ago is in many cases no longer valid. Humanity improves, but this makes it hard to create fixed rules that are built into systems that may exist over long periods. The interpretations are also complex, require delicate balancing of risks, and vary with different applications, domains, and communities where the same AI components are used.

Trust

Unlike other systems, the complexity of AI systems often makes them hard to grasp. AI systems are also usually trained in a way that is unusual in engineering, in that they minimise average error but provide no hard limits. (A bar of steel sold as 1m plus or minus 1mm will never be longer or shorter than that, whereas AI systems on average do not deviate more than a certain error, but may be wildly off in individual situations.) This is a huge obstacle in building trust. One way of handling this is to educate people. Another way of improving the situation is to educate AI ambassadors – people who can explain what a certain piece of equipment does and what to expect from it. They could also assist in procurement and in user studies. An issue that came up several times is expectation management. AI has often been grossly oversold; even the name AI is poorly chosen. In its defence it is hard to describe all the things that can be achieved using AI without it sounding like a universal solution for everything. A solution that was discussed heavily during the workshop is explainable AI, i.e. systems that can motivate their decisions when required. Such a property would be highly effective in building trust and setting the right expectations.

Skills

One conclusion that was almost unanimously agreed on during the workshop is the need for a common curriculum for AI education. This could include a minimum set of topics to be covered and practical exercises in AI applications going wrong. It could also be combined with a European certification as an AI engineer. Outside this, the workshop favoured more focus on the processes (see below) rather than focus on the individuals creating AI applications. It was also pointed out that ACM is currently working on standards for AI degrees.

Processes

There was a strong agreement in the workshop that the processes around the applications of AI are highly important. Good AI algorithms and well curated data are extremely important for a good AI application, and a good process surrounding these is critical. A principal purpose of a good process is to continuously improve quality. All agreed that there is vast experience that should be collected, curated and unified, compiled and condensed, and used for teaching and continuous improvement. However, there was some debate about how this should be done, since many perceive that there is a general reluctance in reporting, due to stigma and financial risk. There is also a large amount of work involved in curating and condensing the information. One proposal is to use the data factories (i.e. experimental facilities that facilitate the access to data for the development of methods and applications) to gather and disseminate best practice. A complementary proposal is an official European Commission publication, acting as an official channel to communicate best practices from multiple sources. Looking further into the future, one could also try to establish a research field in the use of AI, distinct from the development of AI, in order to stress the importance of this. Another suggestion was the creation of standard benchmarks. The difficulty here is maintaining an up-to-date set, and how strongly dependent on the application domains that the benchmarks will be. A solution would be to rely on institutes and universities to maintain this under the patronage of the European Commission. A point of strong agreement is that AI is software and that it is almost always a part of a large software system. In many respects we need to

view the application of AI as a process and not as a product. We therefore need a software engineering approach to the use of AI, contrary to the mostly mathematical and algorithmic approaches used so far.

Testing

Testing and validation are integral parts of AI, and there is a large body of publications on this with respect to core AI. However, testing the entire systems that AI is part of is a different matter. This is especially difficult since the effects in the surrounding systems stemming from errors in the AI part are difficult to anticipate. It is also impossible to exhaustively test the core AI module once it has even a moderate number of inputs.

While the "unknown unkowns" will always exist, their effects can be reduced with good processes. Some interesting questions evolved from the concept of the contract between the AI specialist and the problem owner. What are component's properties that the AI specialist delivers? How should they be described? What does it mean legally? How would one test for legal conformity against what is actually statistical properties in high dimensions? These are questions that need to be answered.

Quality of data and methods

The quality of data is an obvious weakness of AI. It is especially true if the system continuously learns from new data, as there is generally poor control over bias in this stream, and according to experience, the quality of data tends to deteriorate over time. Many of the participants advocated requiring AI providers and users to openly publish all their data. This was criticised based on issues of individual privacy and, business considerations. The proposed solution is to create AI auditors that will perform audits in a similar way to financial audits but on processes and data practices related to AI. It may be possible to create standards for training data with corresponding certification ("Only organic data used"). Given the rapid development in the area, it was suggested that this should be done by industry consortia or institutes, as formal standardisation processes would be too slow. If data is shared in several steps, a pedigree of the data needs to be established. A complementary approach that was suggested, is to provide good public datasets on which systems can be trained. A question is then how to maintain quality and relevance over time. This would require a curator, which could be – as mentioned above – under the auspices of the European Commission and might be part of the mission of data factories. There also need to be best practices on how to use data for training, testing and validation, the importance of cross-validation and permutation, etc.

The ideas presented do not necessarily reflect the opinions of any individual participant in the workshop.

Workshop Participants

The participants of the workshop were:

- ***Björn Levin, RISE***
- ***Gabriel David, INESC TEC***
- ***Daniel Gillblad, RISE***
- ***Arnaud Gotlieb, Simula Research Laboratory***
- ***Olivier Grisel, Inria***
- ***Alípio Jorge, INESC TEC***
- ***Bert Kappen, Radboud University***
- ***Fabio Martinelli, CNR***
- ***Michael Mock, Fraunhofer IAIS***
- ***Anirban Mukhopadhyay, TU Darmstadt***
- ***Ana Paiva, INESC-ID***
- ***Han La Poutré, CWI***
- ***Andreas Rauber, TU Wien***

Science Coordination

A major activity within the scope of the Association's mission is related to the promotion of excellence in research and the maintenance of a strong portfolio of scientific activity, materialized in the form of ERCIM-led and coordinated joint research projects and ERCIM-hosted Working Groups. The Science Task Group aims to enable, encourage, sustain and coordinate scientific activities in the form of collaborative research projects and working groups in areas of ICST and Mathematics within which significant research activity is taking place at Institutions within and beyond ERCIM.

The Science Task Group is therefore divided into subtasks:

- Working Groups for building and maintaining a strong network of ERCIM researchers in the different scientific fields of competence of ERCIM.
- Expert Groups which are established on the initiative of ERCIM board to investigate current topics for a limited period with the aim to produce strategic papers or to coordinate relevant activities of common interest.
- Projects for stimulating the submission of ERCIM-led strategically relevant projects and for helping to define the topics for the yearly ERCIM Conference.

The members of the Science Task Group in 2020 included:

Chair:

- Dimitris Plexousakis, FORTH

Members:

- Stéphane Bordas, Univ. of Luxembourg (FNO)
- Gabriel David, INESC
- Björn Levin, RISE SICS
- Kyrre Lekve, SIMULA
- Thierry Priol, Inria
- Carlo Meghini, CNR
- Edgar Weippl, SBA.
- Tumo Tuikka , VTT.

The Science Task Group can be contacted at tg-science@ercim.eu

Dimitris Plexousakis, ICS-FORTH
chair of the ERCIM Science Task Group

Working Groups

The activities of a Working Group can be divided into several areas: workshops to build the community and maintain its vibrancy, projects designed to advance research and innovation in the particular area of the group, and human mobility to assure the appropriate trained human capital. ERCIM provides some financial support to the Working Groups.

A major activity of an ERCIM Working Group is to search actively for project funding that crosses national borders. ERCIM Working Groups contribute many of the articles in ERCIM News.

The purpose of an ERCIM Working Group is to build and maintain a network of researchers in a particular scientific field. The Working Groups are open to any researcher in the specific scientific field.

Working Groups with activities in 2020

- Computational and Methodological Statistics
- Dependable Software-Intensive Embedded Systems
- Formal Methods for Industrial Critical Systems
- Multimedia Understanding through Semantics Computation and Learning - MUSCLE
- Trust and Security Management.

Computational and Methodological Statistics

The Working Group Computational and Methodological Statistics (CMStatistics) focuses on all computational and methodological aspects of statistics. Of particular interest is research in important statistical applications areas where both computational and/or methodological aspects have a major impact. The aim is threefold: first, to consolidate the research in computational and methodological statistics that is scattered throughout Europe; second to provide researches with a network from which they can obtain an unrivalled sources of information about the most recent developments in computational and methodological statistics as well as its applications; third to edit quality publications of high impact and significance in the broad interface of computing, methodological statistics and its applications.

The journal Computational Statistics and Data Analysis (CSDA) is currently an official publication of CMStatistics. CMStatistics edits special issues and publishes papers in regular issues in CSDA. Moreover, CMStatistics has recently started to edit the journal Econometrics and Statistics, published by Elsevier.

Coordinator:
Erricos Kontoghiorghes, School of Computer Science and Information Systems, Birkbeck, University of London

Organised event:
- CMStatistics 2020 (ERCIM 2020) virtual conference. - the 13th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2020) took place virtually on 19-21 December 2020. Tutorials were also given virtually on Friday 18th of December 2020.

http://www.cmstatistics.org/

Dependable Software-Intensive Embedded Systems

Coordinator:
Erwin Schoitsch, Austrian Institute of Technology/SBA

Co-organised event:
- The Working Group (Erwin Schoitsch, AIT, and Amund Skavhaug, NTNU, organised the 15th International International Workshop on "Dependable Smart Embedded and Cyber-Physical Systems and Systems-of-Systems" at SAFECOMP 2020, a full day workshop co-located with SAFECOMP 2020 held online on 15 September 2020. Papers and presentations are published in Springer LNCS 1235, https://link.springer.com/book/10.1007/978-3-030-55583-2

Formal Methods for Industrial Critical Systems

Formal methods have been advocated as a means of increasing the reliability of systems, especially those which are safety or business critical, but the industrial uptake of such methods has been slow. This is due to the perceived difficulty of mathematical nature of these methods, the lack of tool support, and the lack of precedents where formal methods have been proven to be effective. It is even more difficult to develop automatic specification and verification tools due to limitations like state explosion, undecidability, etc. The FMICS Working Group brings together researchers of the ERCIM consortium and beyond in order to promote the use of formal methods within industry.

Coordinator:
Jaco van de Pol, Aarhus University, Denmark

Joint publications:
- Hubert Garavel, Maurice H. ter Beek, Jaco van de Pol, The 2020 Expert Survey on Formal Methods. Appeared in FMICS 2020, LNCS 12327, August 2020. This extensive survey of the application of formal methods has been written to celebrate the 25th birthday of FMICS. It contains position statements from 130 high profile researchers. .
- Maurice H. ter Beek, Dejan Nickovic: Formal Methods for Industrial Critical Systems - 25th International Conference. FMICS 2020, Vienna, Austria, September 2-3, 2020, Proceedings. Lecture Notes in Computer Science 12327, Springer 2020, ISBN 978-3-030-58297-5.
- Tiziana Margaria, Bernhard Steffen: Leveraging Applications of Formal Methods, Verification and Validation: Verification Principles - 9th International Symposium on Leveraging Applications of Formal Methods, ISoLA 2020, Rhodes, Greece, October 20-30, 2020, Proceedings, Part I, II and III. Lecture Notes in Computer Science 12476, Springer 2020, ISBN 978-3-030-61361-7
- Alessio Ferrari, Franco Mazzanti, Davide Basile, Maurice H. ter Beek, Alessandro Fantechi: Comparing formal tools for system design: a judgment study. ICSE 2020: 62-74
- Davide Basile, Maurice H. ter Beek, Felicita Di Giandomenico, Alessandro Fantechi, Stefania Gnesi, Giorgio Oronzo Spagnolo: 30 Years of Simulation-Based Quantitative Analysis Tools: A Comparison Experiment Between Möbius and Uppaal SMC. ISoLA (1) 2020: 368-384

- Davide Basile, Maurice H. ter Beek, Alessandro Fantechi, Alessio Ferrari, Stefania Gnesi, Laura Masullo, Franco Mazzanti, Andrea Piattino, Daniele Trentini: Designing a Demonstrator of Formal Methods for Railways Infrastructure Managers. ISoLA (3) 2020: 467-485
- Frédéric Lang, Radu Mateescu, Franco Mazzanti: Sharp Congruences Adequate with Temporal Logics Combining Weak and Strong Modalities. TACAS (2) 2020: 57-76
- Ansgar Fehnker, Hubert Garavel: Proceedings of the 4th Workshop on Models for Formal Analysis of Real Systems, MARS@ETAPS 2020, Dublin, Ireland, April 26, 2020. EPTCS 316, 2020
- Sander de Putter, Frédéric Lang, Anton Wijs: Compositional model checking with divergence preserving branching bisimilarity is lively. Sci. Comput. Program. 196: 102493 (2020)
- Alessandro Fantechi, Stefania Gnesi, Anne E. Haxthausen: Formal Methods for Distributed Computing in Future Railway Systems. ISoLA (3) 2020: 389-392
- Ezio Bartocci, Dirk Beyer, Paul Black, Grigory Fedyukovich, Hubert Garavel, Arnd Hartmanns, Marieke Huisman, Fabrice Kordon, Julian Nagele, Mihaela Sighireanu, Bernhard Steffen, Martin Suda, Geoff Sutcliffe, Tjark Weber, and Akihisa Yamada. TOOLympics 2019: An Overview of Competitions in Formal Methods. TACAS 2019: 3-24.
- Frédéric Lang, Radu Mateescu, Franco Mazzanti: Compositional Verification of Concurrent Systems by Combining Bisimulations. FM 2019: 196-213
- Maurice H. ter Beek, Arne Borälv, Alessandro Fantechi, Alessio Ferrari, Stefania Gnesi, Christer Löfving, Franco Mazzanti: Adopting Formal Methods in an Industrial Setting: The Railways Case. FM 2019: 762-772.

Co-organised event:

- The FMICS 2020 conference was held as an online conference, organized by Vienna Austrian Institute of Technology, co-located with QONFEST. PC chairs: Maurice ter Beek (ISTI-CNR) and Dejan Nickovic (AIT Austria). This event coincided with the 25th birthday of FMICS, where we also presented the 2020 Expert Survey on Formal Methods. We received the staggering amount of 149 registered participants! https://fmics20.ait.ac.at/
- Ansgar Fehnker (U Twente, Netherlands) and Hubert Garavel (Inria Grenoble, France) organized the 4th MARS Workshop on Models for Formal Analysis of Real Systems, Dublin, Ireland, April 26, 2020.
- Tiziana Margaria (U Limerick, Ireland) and Bernhard Steffen (U Dortmund, Germany) organized the 9th International Symposium ISOLA 2020 on “Leveraging Applications of Formal Methods, Verification and Validation: Verification Principles”, Rhodes, Greece, October 20-30, 2020.

http://fmics.inria.fr/

MUSCLE - Multimedia Understanding through Semantics Computation and Learning

MUSCLE (formerly Image and Vision Understanding) is the ERCIM Working Group on multimedia understanding through semantics, computation and learning. It gathers teams from both ERCIM and non-ERCIM institutions whose expertise ranges from machine learning and artificial intelligence to image, video and audio processing, and multimedia database management. .

Coordinator:

Davide Moroni, ISTI-CNR

Joint Publication:

The Working Group is editing a joint special issue on “Intelligent Sensors for Monitoring Physical Activities” involving two members (CNR-ISTI & Digital Signal and Image Processing Research Group, Department of Computing and Control Engineering)

Organised event:

International Workshop on Computational Intelligence for Multimedia Understanding (IWCIM) helod on 30 November 3 December 2020 in Da Nang, Vietnam and online.

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https://wiki.ercim.eu/wg/MUSCLE/

Security and Trust Management

The topics of interest for the Workging Group include , rigorous semantics and computational models for security and trust; security and trust management architectures, mechanisms and policies; networked systems security; privacy and anonymity; identity management; ICT for securing digital as well as physical assets; cryptography.

Coordinator:

Pierangela Samarati, University of Milan

Co-organised events

- 2020 ERCIM STM Best PhD Thesis Award. Awardee: Jorge Luis Toro Pozo, University of Luxembourg for his theses “Computational and Symbolic Analysis of Distance-Bounding Protocols”
- 16th International Workshop on Security and Trust Management STM2020, held online on 17 - 18 September, 2020

https://www.iit.cnr.it/STM-WG/

Projects

In 2020, ERCIM participated in twelve research projects funded by the European Commission either as coordinator or as a partner, as well as in one national French research project.

A European project can be a richly rewarding tool for pushing your research or innovation activities to the state-of-the-art and beyond. Through ERCIM, our member institutes have participated in more than 100 projects funded by the European Commission in the ICT domain, by carrying out joint research activities while the ERCIM Office successfully manages the complexity of the project administration, finances and outreach.

Horizon Europe: How can you get involved?

The ERCIM Office has recognized expertise in a full range of services, including:

- Identification of funding opportunities
- Recruitment of project partners (within ERCIM and through a strategic partnership with Ideal-IST)
- Proposal writing and project negotiation
- Contractual and consortium management
- Communications and systems support
- Organization of attractive events, from team meetings to large-scale workshops and conferences
- Support for the dissemination of results.

How does it work in practice?

Contact the ERCIM Office to present your project idea and a panel of experts within the ERCIM Science Task Group will review your idea and provide recommendations. Based on this feedback, the ERCIM Office will decide whether to commit to help producing your proposal. Note that having at least one ERCIM member involved is mandatory for the ERCIM Office to engage in a project.

If the ERCIM Office expresses its interest to participate, it will assist the project consortium as described above, either as project coordinator or project partner.

For more information, please contact:
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peter.kunz@ercim.eu

Project acronym	Project Type	ERCIM's role	ERCIM members involved
Boost 4.0	EU H2020 Innovation Action	partner	Fraunhofer-Gesellschaft ERCIM EEIG/W3C
CREATE-IoT	EU H2020 Coordination and support action	partner	ERCIM EEIG/W3C
Data Market Services	EU H2020 Coordination and support action	partner	ERCIM EEIG/W3C
Easy Reading	EU H2020 Research and Innovation Action	partner	ERCIM EEIG/W3C
GateKeeper	EU H2020 Innovation Action	partner	ERCIM EEIG/W3C
HRADIO	EU H2020 Innovation Action	partner	ERCIM EEIG/W3C
MOSAICrOWN	EU H2020 Research and Innovation Action	partner	ERCIM EEIG/W3C
SDN-microSENSE	EU H2020 Innovation Action	partner	NTNU, ERCIM EEIG/W3C
TERMINET	EU H2020 Research and Innovation Action	partner	ERCIM EEIG/W3C
TRAPEZE	EU H2020 Innovation Action	partner	ERCIM EEIG/W3C
WAI-Guide	EU H2020 Research and Innovation Action	coordinator	ERCIM EEIG/W3C
WAI-Tools	EU H2020 Innovation Action	coordinator	ERCIM EEIG/W3C

Funded projects with participation of ERCIM EEIG in 2020.

BOOST 4.0

Boost 4.0 is the biggest European initiative in Big Data for Industry 4.0. With a 20M€ budget and leveraging 100M€ of private investment. Boost 4.0 will lead the construction of the European Industrial Data Space to improve the competitiveness of Industry 4.0 and will guide the European manufacturing industry in the introduction of Big Data in the factory, providing the industrial sector with the necessary tools to obtain the maximum benefit of Big Data.

Within the project, ERCIM/W3C is responsible for tasks related to data governance and data protection, standardisation and certification. ERCIM/W3C is also involved in work on semantic models, vocabularies and registries.

Overall Project Objectives:

Global Standards:
Contribution to the international standardization of European Industrial Data Space data models and open interfaces aligned with the European Reference Architectural Model Industry 4.0 (RAMI 4.0)

Secure Digital Infrastructures:
Adaptation and extension of cloud and edge digital infrastructures to ensure high performance operation of the European Industrial Data Space; i,e, support of high-speed processing and analysis of huge and very heterogeneous industrial data sources.

Trusted Big Data Middleware:
Integration of the four main open source European initiatives (Industrial Data Space, FIWARE, Hyperledger, Big Data Europe) to support the development of open connectors and big data middleware with native blockchain support in the European Industrial Data Space.

Digital Manufacturing Platforms:
Open interfaces for the development of big data pipelines for advanced analysis services and data visualization supported by the main digital engineering, simulation, operations and industrial quality control platforms.

Certification:
European certification program of equipment, infrastructures, platforms and big data services for their operation in the European Industrial Data Space.

ERCIM's participation in the Boost 4.0 project is helping to support work by ERCIM on the digital transformation of industry. This has included support for the W3C Graph Data workshop, and ongoing work on ideas for a higher level framework for graph data and rules, and exploring the potential for combining symbolic and statistical techniques as a basis for handling incompleteness, uncertainty, inconsistency and the likelihood of errors. This work results in simplifying semantic technologies for the average developer and the application of Cognitive AI to Industry 4.0.

BOOST 4.0 - Big Data Value Spaces for COmpetitiveness of European COnnected Smart FacTories 4.0

EU funding: € 14 983 516

ERCIM's role:
ERCIM EEIG project partner

ERCIM/W3C contact:
Philipp Hoschka, Dave Raggett, W3C

ERCIM members involved:
Fraunhofer-Gesellschaft, ERCIM/W3C

Coordinator: Innovalia

Duration:
January 2018 to December 2020

https://boost40.eu/

CREATE-IoT

CREATE-IoT's aim is to stimulate collaboration between IoT initiatives, foster the take up of IoT in Europe and support the development and growth of IoT ecosystems based on open technologies and platforms. This requires synchronisation and alignment on strategic and operational terms through frequent, multi-directional exchanges between the various activities under the IoT Focus Areas (FAs). It also requires cross fertilisation of the various IoT Large Scale Pilots (LSPs) for technological and validation issues of common interest across the various application domains and use cases. CREATE-IoT will align the activities with the Alliance for Internet of Things Innovation (AIOTI) and will coordinate and support the upcoming LSPs in sustaining the ecosystems developed during those projects through mapping the pilot architecture approaches, address interoperability and standards approaches at technical and semantic levels for object connectivity, protocols, data formats, privacy, security, trusted IoT, open APIs and share the road-mapping with international initiatives.

The project will foster the exchange on requirements for legal accompanying measures, development of common methodologies and KPI for design, testing and validation and for success and impact measurement, federation of pilot activities and transfer to other pilot areas, facilitating the access for IoT entrepreneurs/API developers/makers, SMEs, including combination of ICT & Art.

The project was extended until June 2020 and has organised a series of workshops to bring together people working on IoT in different domains and help coordinate plans for future work. An IoF Ontologies Workshop in Oslo presented an opportunity to network with people working on industrial ontologies and to evangelize the Web of Things and the Sentient Web. Further evangelizing took place at the IoT Tech Expo in London, the open day for the 2nd W3C Web of Things Workshop, and during sessions at the IoT Week in Aarhus. The Web of Things was advanced to W3C Candidate Recommendation status in June 2019.

Create-IoT - Cross Fertilisation through alignment, synchronisation and exchanges for IoT

EU funding: € 2.999,999

ERCIM's role:
ERCIM EEIG project partner

ERCIM/W3C contact:
Philipp Hoschka, Dave Raggett, W3C

ERCIM members involved:
ERCIM/W3C

Coordinator: SINTEF

Duration:
January 2017 – June 2020

https://european-iot-pilots.eu/create-iot

DMS Accelerator

DMS Accelerator aims at overcoming the barriers of data-centrics SMEs and start-ups in Europe in data skills, entrepreneurial opportunities, legal issues and standardisation. Over three years, the project offers a comprehensive range of support and services to a total 150 European startups and SMEs: interactive webinars, mentoring, free entry to accelerators and incubators in four European countries, direct connections to top-tier investors, personalised training sessions (GDPR, IP, etc.), as well as getting a sponsored booth at the The Next Web conference.

DMS Accelerator offers to startups:

- *Webinars* - More than 50 online courses with one hour duration about GDPR, intellectual property, how to pitch in front of investors, how to find customers and much more.
- *Mentoring* - Support and advice from different experts on demand in a variety of areas to meet your most specific needs.
- *Content* - Guides developed by our partners based on their expertise and adapted to the selected startups needs easily at hand to support the acceleration process.
- *Promotion* - Attendance of relevant events in Europe, being part of the exhibition area or the protagonist of a pitch session. Additionally, a personal video to promote the startup.
- *Mobility Programme* - Access to other entrepreneurial ecosystems through a stage in one of our accelerators located in The Netherlands, Germany, Romania and Portugal.
- Bootcamp - participation at a final exclusive event with workshops and one-to-one sessions given by DMS experts in the field. An opportunity to growth, linkbuilding and increase experience.

DMS Accelerator - Supporting the European data market providing free support services to data-centric SMEs and start-ups

EU funding: € 2 993 961

ERCIM's role:
ERCIM EEIG project partner

ERCIM/W3C contact:
Rigo Wenning

ERCIM members involved:
ERCIM/W3C

Coordinator:
Zabala, Spain

Duration:
January 2019 – December 2021

https://www.datamarketservices.eu

Easy Reading

The "Easy Reading" framework will improve the cognitive accessibility of original digital documents by providing real time personalisation through annotation (using e.g. symbol, pictures, videos), adaptation (using e.g. layout, structure) and translation (using e.g Easy-to-Read, Plain Language, symbol writing systems). The framework provides these (semi-)automated services using HCI techniques (e.g. pop-ups/ Text-To-Speech (TTS)/captions through mouse-over or eye-tracking) allowing the user to remain and work within the original digital document. This fosters independent access and keeps the user in the inclusive discourse about the original content. Services adapt to each user through a personal profile (sensor based tracking and reasoning of e.g. the level of performance, understanding, preferences, mood, attention, context and the individual learning curve).

ERCIM/W3C staff provides technical guidance and clarification on the W3C standards and resources relevant to the project. This includes accessibility standards, with particular emphsasis on current developments of accessibility for people with cognitive accessibility.

Easy Reading - A Framework for Personalised Cognitive Accessibility when using Original Digital Content

EU funding: € 1 992 063

ERCIM's role:
ERCIM EEIG project partner

ERCIM/W3C contact:
Shadi Abou-Zahra, W3C

ERCIM members involved:
ERCIM/W3C

Coordinator:
University Linz

Duration:
January 2018 – June 2020

https://www.easyreading.eu

GATEKEEPER

The rising population of elderly in the EU member states is giving rise to new challenges in relation to independent living. The EU-funded GATEKEEPER project (Innovation Action) aims to ensure healthier independent lives for the ageing populations. It will connect healthcare providers, businesses, entrepreneurs, elderly citizens and the communities they live in. The goal is to create an open, trust-based arena for matching ideas, technologies, user needs and processes. The project will also incorporate data protection while underpinning value creation using advanced marketing patterns. The solutions deployed will involve 40 000 elderly citizens, as well as authorities, institutions, companies, associations and academics, and eight regional communities from seven EU member states.

By 2022, GATEKEEPER will be embodied in an open source, European, standard-based, interoperable and secure framework available to all developers, for creating combined digital solutions for personalised early detection and interventions that (i) harness the next generation of healthcare and wellness innovations; (ii) cover the whole care continuum for elderly citizens, including primary, secondary and tertiary prevention, chronic diseases and co-morbidities; (iii) straightforwardly fit “by design” with European regulations, on data protection, consumer protection and patient protection (iv) are subjected to trustable certification processes; (iv) support value generation through the deployment of advanced business models based on the VBHC paradigm.

Gatekeeper applies the Web of Things to healthcare. This will help to support further work by ERCIM on the Web of Things. ERCIM/W3C contributes to the project with work on the Web of Things, data, semantics, security, privacy, accessibility and standardisations and also contribute to dissemination and communication activities.

GATEKEEPER - Smart Living Homes - Whole Interventions Demonstrators for People at Health and Social Risks

EU funding: € 19 598 327

ERCIM’s role:
ERCIM EEIG project partner

ERCIM/W3C contact:
Dave Ragett (W3C)

ERCIM members involved:
ERCIM/W3C

Coordinator:
MEDTRONIC IBERICA SA

Duration:
October 2019 – March 2023

https://www.datamarketservices.eu

HRADIO

HRADIO (Hybrid Radio everywhere for everyone) focuses on radio service innovations enabled by convergence. While radio, with its rich editorial content, remains a highly popular medium, listening figures are slowly declining, particularly among youngsters. With the rapid rise of smartphones, radio faces competition from many new services including music streaming platforms. Regular radio today often does not include attractive features as known from vertical platforms. And if present, they are mostly not well integrated with the actual radio programme. This is where HRADIO will deliver.

Driven by the industry need to create attractive new radio experiences, the goal of the project was to leverage the full potential of hybrid technology for radio – enabling the integration of cost-effective broadcast distribution with new online features. Broadcasters will be enabled to personalise radio services (while respecting privacy), to provide intuitive functionalities like time-shifting and, eventually, to foster and to exploit user engagement. HRADIO will pave the way to bring these features not only to broadcasters' native mobile applications, but also to portals, to connected radios and into the car. The core approach was to integrate validated solutions and to harmonise APIs which together will provide broadcasters with an abstracted service layer accessible across any device and distribution platform – ensuring sustainability and return of investment. Therefore, consumers are able to access their personal radio services on different devices and platforms enabled by a seamless broadcast-internet integration for radio content distribution. All features have been be tested in three phases of large-scale pilots involving broadcasters, app developers for mobile and automotive devices.

ERCIM/W3C led the standadisation activites of the project, working with partners to align modelling and technical tasks with ongoing standardisation activities, and to identify and specify possible extenstions to standards beneficial for the project. As such, ERCIM/W3C contributed to the definition of scenarios and requirements, the system architecture and specifications.

HRADIO published its developments as ready-to-use Android and HTML client implementations including an extensive set of well documented APIs fostering new service developments for the radio sector.

HRADIO - Hybrid Radio everywhere for everyone

EC Funding: € 2.953,371

ERCIM's role:
Project partner

Scientific coordination:
Christine van Houtven, IMEC

ERCIM/W3C contacts:
François Daoust, Dominique Hazael-Massieux, Philipp Hoschka, W3C

Duration:
September 2017 - April 2020

https://www.hradio.eu/projects/

MOSAICrOWN

MOSAICrOWN - Multi-Owner data Sharing for Analytics and Integration respecting Confidentiality and OWNer control - is a Horizon 2020 project that aims at enabling data sharing and collaborative analytics in multi-owner scenarios in a privacy-preserving way, ensuring proper protection of private, sensitive, and confidential information. MOSAICrOWN will provide effective and deployable solutions allowing data owners to maintain control on the data sharing process, enabling selective and sanitized disclosure providing for efficient and scalable privacy-aware collaborative computations.

The application of data analysis techniques over large data collections provides great benefits, to the personal, business, research, and social domains. The availability of large data collections recording actions and choices of individuals and organizations can lead to great improvement in the understanding of how the world operates. The continuous evolution of ICT is enabling the realization of such vision at a fast pace, supporting the realization of architectures enabling collaborative data sharing and analytics. Clear obstacles towards the realization of such potential and vision are security and privacy concerns. Indeed, the loss of control over data and potential compromise of their confidentiality can have a strong detrimental impact on the realization of an open framework for enabling the sharing of data from multiple independent data owners.

The goal of providing effective data protection in multi-owner scenarios entails several challenges. MOSAICrOWN tackles such challenges with a gradual approach, addressing first policy specification and data governance, and then developing enabling technologies providing data wrapping and data sanitization techniques for enforcing data protection.

The result of MOSAICrOWN will be a set of modular tools providing for an enriched data market scenario and protection to data across the whole life-cycle.

MOSAICrOWN - Multi-Owner data Sharing for Analytics and Integration respecting Confidentiality and OWNer control

EC Funding: € 3 203 750

ERCIM's role: Project partner

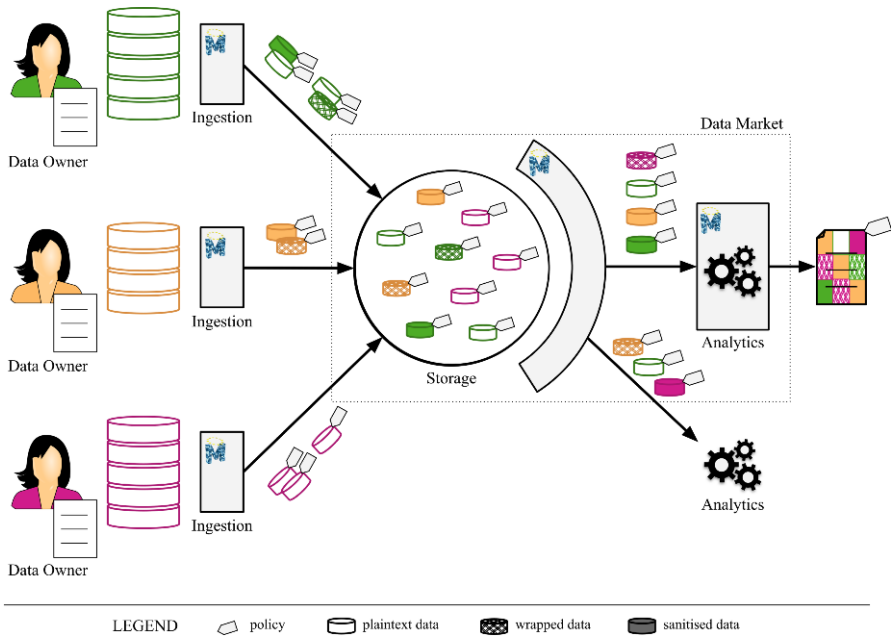
ERCIM members involved: EEIG ERCIM

ERCIM/W3C contact: Rigo Wenning

Scientific coordination:
Pierangela Samarati, University of Milan

Duration:
January 2019 - December 2021

https://mosaicrown.eu/



The MOSAICrOWN protected data and data market scenario

SDN-microSENSE

The smart energy ecosystem constitutes the next technological leap of the conventional electrical grid, providing multiple benefits such as increased reliability, better service quality and efficient utilization of the existing infrastructures. However, despite the fact that it brings beneficial environmental, economic and social changes, it also generates significant security and privacy challenges, as it includes a combination of heterogeneous, co-existing smart and legacy technologies. Based on this reality, the SDN-microSENSE project intends to provide a set of secure, privacy-enabled and resilient to cyberattacks tools, thus ensuring the normal operation of EPES as well as the integrity and the confidentiality of communications. In particular, adopting an SDN-based technology,

SDN-microSENSE will develop a three-layer security architecture, by deploying and implementing risk assessment processes, self-healing capabilities, large-scale distributed detection and prevention mechanisms, as well as an overlay privacy protection framework. Firstly, the risk assessment framework will identify the risk level of each component of EPES, identifying the possible threats and vulnerabilities. Accordingly, in the context of self-healing, islanding schemes and energy management processes will be deployed, isolating the critical parts of the network in the case of emergency. Furthermore, collaborative intrusion detection tools will be capable of detecting and preventing possible threats and anomalies timely. Finally, the overlay privacy protection framework will focus on the privacy issues, including homomorphic encryption and anonymity processes.

ERCIM/W3C is involved in the project's pilot and demonstration scenarios, energy ecosystem standardization, and dissemination. Interoperability testing from ERCIM/W3C will strengthen the proposed SCADA & ICS standardisation activities and also consider aspects of accessibility, privacy, security, and internationalization. ERCIM participates in the Security Advisory Board.

SDN-microSENSE - microgrid reSilient Electrical eNergy SystEm

EC Funding: € 7 992 463

ERCIM's role:
Project partner

ERCIM/W3C contact:
Philipp Hoschka

Coordinatior:
AYESA ADVANCED TECHNOLOGIES SA

ERCIM members involved: E
NTNU, EEIG ERCIM/W3C

Duration:
May 2019 - April 2022

https://www.hradio.eu/projects/

TERMINET

The vision of TERMINET is to provide a novel next generation reference architecture based on cutting-edge technologies such as SDN, multiple-access edge computing, and virtualisation for next generation IoT, while introducing new, intelligent IoT devices for low-latency, market-oriented use cases. TERMINET's primary intention is to bring (more efficient and accurate) decisions to the point of interest to better serve the final user targeting at applying distributed AI at the edge by using accelerated hardware and sophisticated software to support local AI model training using federated learning. Our solution aspires to reduce the complexity of the connecting vast number of heterogeneous devices through a flexible SDNenabled middleware layer. It also aims to design, develop, and integrate novel, intelligent IoT devices such as smart glasses, haptic devices, energy harvesting modules, smart animal monitoring collars, AR/VR environments, and autonomous drones, to support new market-oriented use cases. Great expectation of the proposal is to foster AR/VR contextual computing by demonstrating applicable results in realistic use cases by using cutting-edge IoT-enabled AR/VR applications. By designing and implementing an IoT-driven decentralised and distributed blockchain framework within manufacturing, TERMINET aims to support maintenance and supply chain optimisation. TERMINET's solution intends to apply a vertical security by design methodology by meeting the privacy-preserving and trust requirements of the NG-IoT architecture. To foster standardisation activities for the IoT ecosystem, TERMINET will provide novel disruptive business models. For the evaluation of its wide applicability, TERMINET will validate and demonstrate six proof-of-concept, realistic use cases in compelling IoT domains such as the energy, smart buildings, smart farming, healthcare, and manufacturing.

TERMINET - Next Generation Smart Interconnected IoT

EC funding: €3 991,389

ERCIM's role:
ERCIM EEIG project partner

ERCIM members involved:
ERCIM/W3C

Scientific coordination:
University of Western Macedonia

ERCIM/W3C contact:
Philipp Hoschka

Duration:
November 2020 - October 2023

https://terminet-h2020.eu/

TRAPEZE

TRAPEZE – Transparency, Privacy and Security for European Citizens – is a European Innovation Action with the ambitious goal of driving a cultural shift in the protection of the European data economy. It aims to achieve this by reconstructing the concepts of control, transparency and compliance through technical and methodological, citizen-first, innovations. The project will lead the way in putting often-misplaced cutting-edge technologies to practical use for the citizens.

TRAPEZE is aiming to become a lighthouse for European and global initiatives that aspire to deliver citizen-first, cyber-resilient, innovation.

To make this goal a reality, TRAPEZE aims to put citizens' security and privacy into their own hands by providing them, first of all, with innovative dashboards that will enable fine-grained and dynamic control of their data protection preferences across all relevant controllers. These will be accompanied by transparency and feedback mechanisms that will allow data subjects to comprehend the complex flows of their data and actively participate in the prevention, detection, and reporting of legal noncompliance or incidents, and in exercising their legal rights. Furthermore, to ensure citizens of all groups, skills, and physical abilities can manage and monitor their data flows, TRAPEZE will place a special emphasis on usability, but also privacy preferences and sociological aspects across different member states, seeking to establish a feedback loop with its end-users internationally.

TRAPEZE is significantly different from existing approaches in that it does not attempt to protect the citizen by abruptly reshaping the European digital economy. Instead, it seeks to empower the data subject, while enabling a realistic, steady, transition to a more trustworthy data ecosystem that extends beyond online services and deep into the controllers' data silos. TRAPEZE aims to enable privacy-aware and privacy-preserving data value chains by leveraging the concepts of linked data graphs and distributed ledgers (blockchain). Linked data will be used to control the handling of the payload data (actual personal data relating to the citizen) stored and processed by controllers', or processors' systems, even downstream (re-sharing from controller to controller/processor) in the data value chain. Blockchain technology will ensure compliance and decentralisation of records of processing activities, as well as immutability and non-repudiation of said records (with GDPR compliance in mind).

TRAPEZE's proposed architecture and tools will be developed and evaluated under real-world conditions in three pilot scenarios in government, telecommunication and IT services, and banking. All three pilots involve the processing and aggregation of large amounts of personal data from various data sources, with policies specified at different levels of granularity.

TRAPEZE is not starting from scratch, but builds on a decade of EU-funded research in security and privacy, as well as on proprietary solutions and know-how, towards marketable innovations.

TRAPEZE - TRAnsparency, Privacy and security for European citiZEns

EC Funding: € 4 995 812

ERCIM's role:
Project partner, administrative coordination

ERCIM/W3C contact:
Jessica Assoumou

Coordinatior:
TENFORCE BVBA

ERCIM members involved:
ERCIM EEIG/W3C

Duration:
September 2020 - August 2023

https://www.trapeze-project.eu

WAI-GUIDE

WAI-Guide, Authoritative Implementation Guidance and International Cooperation to Support Training, Awareness Raising, and Capacity Building, is an H2020 coordination and support action that drives sustainable impact for more scalable and affordable digital accessibility solutions. WAI-Guide aims to:

- Provide authoritative implementation guidance and training, thereby growing capacities of available accessibility experts;
- Accelerate tooling support for accessible content authoring, thereby making it more cost efficient to create accessible content;
- Identify and address gaps in accessibility standardisation, thereby increasing the coverage of digital accessibility requirements.

WAI-Guide achieves these objectives by conducting its work as an integral part of the vendor-neutral environment of the World Wide Web Consortium (W3C). WAI-Guide draws together key expertise from industry, end-user representation, public bodies, research, and other fields, to develop core accessibility solutions that are internationally consensed and recognised as authoritative references.

WAI-Guide develops open, royalty-free resources for a variety of audiences, each having a role in digital accessibility. This includes accessibility trainers and educators, consultants and service providers; vendors, developers, and integrators of authoring tools and content management systems; and designers, developers, procurers, project managers, and others involved throughout accessibility implementation processes. WAI-Guide is uniquely positioned and qualified to develop best practices for digital accessibility that are rigorously vetted through the open collaborative W3C Process, and that are harmonised with the authoritative interpretation of the internationally recognised W3C standards for accessibility. WAI-Guide comes at an opportune time to support implementation of the European Directive on Web Accessibility. It strengthens the European Digital Single Market and supports its alignment with global standards on digital accessibility.

WAI-GUIDE - Authoritative Implementation Guidance and International Cooperation to Support Training, Awareness Raising, and Capacity Building

EC funding: € 1 499 743

ERCIM's role:
Project coordinator

ERCIM members involved:
ERCIM/W3C

Scientific coordination:
Shadi Abou-Zahra, W3C

Administrative coordination:
Jessica Michel Assoumou, ERCIM Office

Duration:
January 2019 – December 2021

https://www.w3.org/WAI/about/projects/wai-guide/

WAI-TOOLS

WAI-Tools, Advanced Decision Support Tools for Scalable Web Accessibility Assessments, drives innovation with sustainable impact on the entire field of web accessibility evaluation and repair through:

- Building on the on-going international standardisation efforts on web accessibility conformance testing;
- Ensuring consistent accuracy across automated, semi-automated, and manual web accessibility testing;
- Pursuing leading edge technologies for website testing, including dynamic and mobile web applications;
- Leveraging the existing market of commercial, free, and open source web accessibility evaluation tools;
- Demonstrating large-scale web accessibility monitoring built on open standards and open source tools.

WAI-Tools achieves this by carrying out key efforts in the vendor-neutral environment of the World Wide Web Consortium (W3C). WAI-Tools draws together key expertise from industry,public bodies, and research to develop common understanding of web accessibility requirements in exchange with the existing community and networks of the W3C Web Accessibility Initiative (WAI).

WAI-Tools is uniquely positioned and qualified to develop authoritative resources that are coordinated and aligned with the on-going European and international efforts on web accessibility standardisation, including W3C Web Content Accessibility Guidelines (WCAG) 2.1, the expected revision of EN 301 549, and upcoming EC definition of mobile requirements and monitoring methodology in light of the EU Directive on web accessibility.

WAI-Tools maximises the impacts while minimising the use of project resources by building on existing open source tools from leading market vendors, rather than investing in teething troubles of less mature tools. WAI-Tools deploys testing tools in existing web accessibility monitoring observatories and integrates these differing national approaches using open data, to demonstrate easier and more cost effective assessment of web accessibility requirements at scale.

WAI-TOOLS - Advanced Decision Support Tools for Scalable Web Accessibility Assessments

EC funding: € 1 999,812

ERCIM's role:
Project coordinator

ERCIM members involved:
ERCIM/W3C

Scientific coordination:
Shadi Abou-Zahra, W3C

Administrative coordination:
Jessica Michel Assoumou, ERCIM Office

Duration:
November 2017 – October 2020

http://www.w3.org/WAI/Tools/

Human Capital

Human Capital (HC) is a central concern within all organizations. In ERCIM its main focus is the European cooperation of different entities with their own HC policies. To this end we are currently building on two key activities. The first is the ERCIM post-doctoral fellowship programme that has been in existence since 1994. This programme facilitates the participation of young scientists in research teams within ERCIM member institutes by organizing postdoctoral fellowships. In addition to mobility in high quality teams, it helps participants further their understanding of the European research environment and carrier capabilities. The second key activity is the Cor Baayen Young Researcher Award that acknowledges the achievements of young research scientists from European teams in informatics or mathematics.

There is scope for further development of both of these tools, but we would also like to create new schemes for mobility between ERCIM members. In particular, in addition to post-docs, we would like to foster mobility of all scientists, including PhD students, engineers and management and administration professionals.

ERCIM's Human Capital Task Group is in charge of supervising these actions and proposing new directions. Since 2020 the group is chaired by Monica Divitini, NTNU.

Participants of the Task Group:

- Monica Divitini, NTNU, (chair)
- Adriana Lazzaroni, CNR
- Emma Lière, ERCIM Office
- Laszlo Monostori, SZTAKI
- Jerzy Tiuryn, University of Warsaw
- Bettina Touré, Fraunhofer
- Edgar Weippl, SBA Research
- Leon van der Torre , FNR.

Monica Divitini, chair of the ERCIM Human Capital Task Group.

"Alain Bensoussan" Fellowship Programme

The PhD Fellowship Programme has been established as one of the premier activities of ERCIM. Since its inception in 1991, over 650 fellows have passed through the programme. In 2020, 21 young scientists have started an ERCIM PhD Fellowship and 77 fellows have been hosted during the year. This represents 562 person-months.

The ERCIM Fellowship Programme is open to young researchers from all over the world. It focuses on a broad range of fields in Computer Science and Applied Mathematics. The fellowship scheme also helps young scientists to improve their knowledge of European research structures and networks and to gain more insight into the working conditions of leading European research institutions. In 2020, many of the hosted fellows were native of countries outside the European Union. This reflects ERCIM's contribution to make Europe not only the world's biggest 'brain factory' but also a large 'brain magnet' in the field of informatics and applied mathematics. The fellowships are of 12 months duration (with a possible extension), spent in one of the ERCIM member institute. Fellows can apply for second year in a different institute.

Conditions

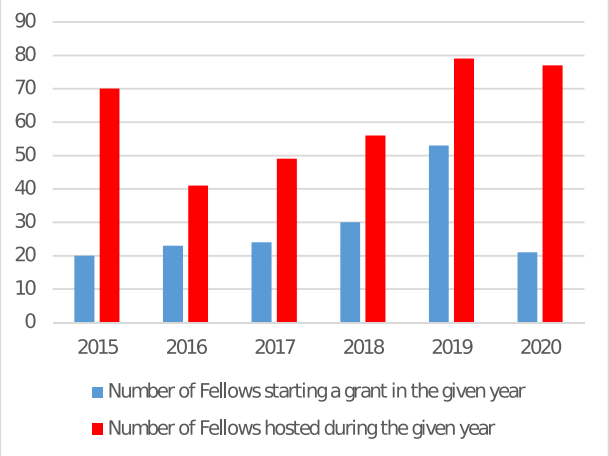
Candidates must:

- have obtained a PhD degree during the last eight years (prior to the application deadline) or be in the last year of the thesis work with an outstanding academic record
- be fluent in English
- have completed their PhD before starting the grant.

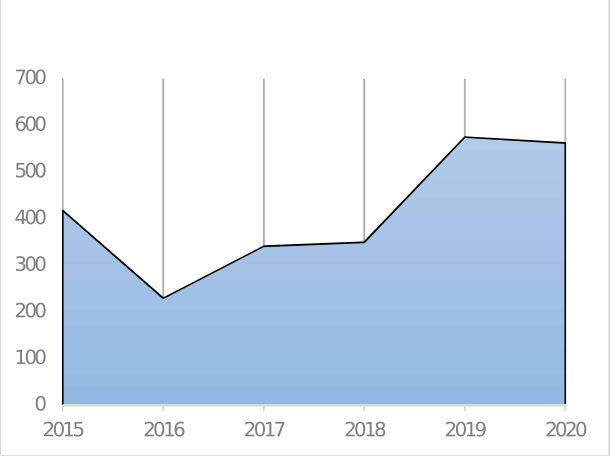
Deadlines for applications are currently 30 April and 30 September each year.

Since 2005 the Fellowship Programme has been named in honour of Alain Bensoussan, former president of Inria, one of the three ERCIM founding institutes.

http://fellowship.ercim.eu



Number of fellows hosted from 2015 to 2020.



Person-months equivalents for the fellows hosted from 2015 to 2020.

ERCIM Fellows hosted in 2020

- Nancy Agarwal at NTNU
- Javed Ahmed at NTNU
- Erdem Alkim at Fraunhofer-Gesellschaft
- Basheer Alwaely at NTNU
- Hamidreza Arjmandi at NTNU
- Hamid Asgari at VTT
- Melissa Beason at Fraunhofer-Gesellschaft
- Pritam Bose at NTNU
- Simon Bouget at RISE
- Evren Catak at NTNU
- Shounak Chakraborty at NTNU
- Ramesh Chandra at NTNU
- Indranil Chowdhury at NTNU
- Yaser Dalveren at NTNU
- Deepanwita Datta at NTNU
- Kanjar De at NTNU
- Francesco Depretis at VTT
- Sanchari Deb at VTT
- Youcef Djenouri at NTNU
- Ogerta Elezaj at NTNU
- Noha El-Ganainy at NTNU
- Rasul Enayatifar at NTNU
- Michail Fasoulakis at CWI
- Léo Françoso Dal Piccol Sotto at Fraunhofer-Gesellschaft
- Nicolas Gilliers at NTNU
- Vinay Chakravarthi at NTNU
- Alina Goldman Striner at CWI
- Hong Guo at NTNU
- Shubham Gupta at NTNU
- Seyed Reza Hosseini Raviz at NTNU
- Ravinderpraveenkumar Jain at NTNU
- Minho Jung at NTNU
- Markus Arthur Köbis at NTNU
- Nikita Kopylov at NTNU
- Milosz Krupski at NTNU
- Hung Le at NTNU
- Meng Li at CNR
- Timur Luguev at Fraunhofer-Gesellschaft
- Amir Maghoul at NTNU
- Maryam Mahmoudi at NTNU
- Sehail Mazid at NTNU
- Fozia Mehboob at RISE
- Gonca Gokce Menekse Dalveren at NTNU
- Fereshteh Mirjalili at NTNU
- Purnedu Mishra at University of Warsaw
- Massa Ndong at Fraunhofer-Gesellschaft
- Trungky Nguyen at VTT
- Evangelos Niforatos at NTNU
- David Orellana Martin at NTNU
- Michael Osadebey at NTNU
- Pavlos Paraskevopoulos at CNR
- Gleb Polevoy at University of Warsaw
- Enislay Ramentol at Fraunhofer-Gesellschaft
- Abdul Rauf at RISE
- Sumanta Ray at CWI
- Asreen Rostami at RISE
- Bekir Sahin at NTNU
- Beatriz Salvador Mancho at CWI
- Tiago Santos Veiga at NTNU
- Eduardo Scarparo at NTNU
- Ali Sedaghatbaf at RISE
- Amin Shahraki at Fraunhofer-Gesellschaft
- Mohammad Idrees Sheikh at NTNU
- Ankur Shukla at NTNU
- Mahnaz Sinaie at VTT
- Nikita Singh at RISE
- Piyush Swami at NTNU
- Jun Tang at NTNU
- Jim Tao at NTNU
- Sunilkumar Telagam Setti at NTNU
- Juancarlos Torrado Vidal at NTNU
- Alejandro Antonio Torres-Garcia at NTNU
- Cristina Trocin at NTNU
- Kishor Kumar Upla at NTNU
- Yu Wang at NTNU
- Mudasir Ahmad Wani at NTNU
- Meng Zhao at NTNU

Stefano Cresci, CNR, winner of the 2020 Cor Baayen Young Researcher Award.

Stefano Cresci Wins the 2020 ERCIM Cor Baayen Young Researcher Award

Stefano Cresci has been selected from among 13 excellent short-listed nominees as the winner of the 2020 ERCIM Cor Baayen Award. Stefano, from CNR, Italy, has received the award in recognition of the outstanding scientific quality of his research and the impact on science and society that he has already achieved as a young researcher.

Stefano Cresci is currently employed at the Institute of Informatics and Telematics at the National Italian Research Council (IIT-CNR). He obtained his PhD with honours in 2018 from University of Pisa, Italy, publishing a thesis titled "Harnessing the Social Sensing revolution: Challenges and Opportunities". His timely and societally relevant research focuses on the study of online social networks, with the twofold goal of evaluating their potential to improve society, and their pitfalls. As part of his research, he studied how to collect, filter, and analyse real-time online data streams to improve situational awareness in the aftermath of natural and human-made disasters, for example earthquakes, riots or terrorist attacks. Stefano has also been investigating the challenges related to the use of online social network data, pioneering studies on online deception and on the manipulation of online information. Since 2013, he has been studying problems such as the automatic detection of automated and malicious online accounts – for example, the detection of social bots and trolls, and the spread of false and misleading information, like fake news detection.

His research is highly interdisciplinary, lying at the conjunction of systems and information security, AI and data science, web and social media. In his research he adopts and develops web crawling and scraping techniques, big data analytics, as well as novel data science and AI techniques, making several widely-acclaimed contributions to these areas of research.

He has published over 50 papers, including publications in highly prestigious journals and conferences in the fields of web analytics and security. These contributions have amassed more than 1,500 citations on Google Scholar, with a high h-index (which measures the impact of a particular scientist).

Stefano is an active and recognised member of the research community. During and after his PhD, he was invited to visit renowned international institutions such as the Hamad Bin Khalifa University in Doha (Qatar) and the Nokia Bell Labs in Paris (France), where he spent several months researching solutions to threats to information credibility. Stefano regularly organises and chairs workshops and special issues at important conferences and journals. He has also held a number of presentations and keynotes at international venues. He holds editorial roles for several journals, and reviews for major conferences and journals in his scientific fields, including Nature Communications. Over the years, he has been involved in many national and European research projects.

In acknowledgment of his notable scientific contributions and the impact of his research, Stefano has already received several prizes. His PhD thesis was awarded the 2018 PhD thesis Award by the Italian Section of the IEEE Computer Society. In 2018 he received a SAGE Ocean Concept Grant in recognition of his

The Cor Baayen Young Researcher Award

The Cor Baayen Young Researcher Award, given to a promising young researcher in computer science and applied mathematics, was created in 1995 to honour the first ERCIM President and is open to young researchers having completed their PhD thesis in one of the "ERCIM countries". The Cor Baayen Award is a young researcher prize: The selection panel therefore considers the quality of the PhD thesis and all the achievements done up to the nomination date. The award carries a prize of € 5,000. The winner is invited to the ERCIM autumn meetings.

https://www.ercim.eu/human-capital/cor-baayen-award

contributions to social and political scientists as well as to data journalists. In 2019 Stefano received the IEEE Next-Generation Data Scientist Award in Washington, DC – awarded for exceptional early-career achievements in data science. Recently, he was selected by senior ACM members as one of the most promising young researchers in computer science and was invited to participate in the 8th Heidelberg Laureate Forum, meeting the recipients of the most prestigious awards in computer science and mathematics.

In addition to the scientific value of Stefano´s research, it is important to underline its societal impact. The Italian State Police, Europol, and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) are using some of his algorithms and tools. The Italian National Institute of Geophysics and Volcanology uses the social media emergency management tools developed by Stefano.

His research has also attracted the attention of non-profit organisations and NGOs, such as the United Nations via their Global Pulse initiative, and First Draft – a renowned non-profit organisation devoted to the fight of mis/disinformation.

2020 Award

Winner:
Stefano Cresci (IIT-CNR), nominated by Maurizio Tesconi (IIT-CNR)

Honorary mention
- *Jasmijn Baaijens (Harvard Medical School-DBMI), nominated by Leen Stougie (CWI)*
- *Kelwin Fernandes (NILG.AI), nominated by Jaime Cardoso (INESC)*
- *Xixi Lu (Utrecht University), nominated by Lynda Hardman (CWI)*
- *Paulo Martins (Samsung R&D Institute UK), nominated by Leonel Sousa (INESC)*
- *Hana Vrzakova (Kuopio University Hospital and University of Eastern Finland), nominated by Tuomo Tuikka (VTT)*

Finalists
- *Michalis Agathocleous (AC Goldman Solutions & Services), nominated by Chris Christodoulou (University of Cyprus)*
- *Marcella Bonazzoli (Inria) , nominated by Laura Grigori (Inria)*
- *Michael Fasoulakis (FORTH-ICS), nominated by Dimitris Plexousakis (FORTH)*
- *Adam Karczmarz (University of Warsaw), nominated by Piotr Sankowski (University of Warsaw)*
- *Michalis Mountantonakis (FORTH-ICS), nominated by Yannis Tzitzikas (FORTH)*
- *Hussein Rappel (Alan Turing Institute/Cambridge University), nominated by Stéphane BORDAS (University of Luxembourg and Cardiff University)*
- *Michał Włodarczyk (Eindhoven University of Technology), nominated by Marek Cygan (University of Warsaw)*

Evaluation Committee
The Evaluation Committee was composed of Monica Divitini (NTNU - chair of the ERCIM Human Capital Task Group); Thierry Priol (Inria); Fabrizio Sebastiani (CNR ISTI); Jerzy Tiuryn (UWAW); Edgar Weippl (University of Vienna). The evaluation was conducted with the support from the ERCIM members' representatives. The decision was unanimous.

Outreach

The ERCIM Outreach Task Group is responsible for the communication between ERCIM and its wide range of stakeholders. They include national and international funding bodies, the research community in informatics and applied mathematics, with a focus on both senior scientists and young researchers, as well as industrial R&D. ERCIM considers its outreach activities as an important tool for community building. These include publications such as the ERCIM News magazine, the ERCIM web site and the support and organisation of scientific events.

The well-established ERCIM News magazine, under the responsibility of the editorial board, has already successfully contributed to ERCIM's reputation in the scientific community. It is also a good example of the close cooperation between all ERCIM institutes. In addition to ERCIM News, a number of strategic reports have also been published.

Andreas Rauber, SBA Research, chair of the ERCIM Outreach Task Group

ERCIM News

Since ERCIM's creation in 1989, the quarterly ERCIM News has been reporting on leading edge European research and developments in Information and Communication Science and Technology (ICST) and Applied Mathematics.

When Inria, CWI and former GMD founded ERCIM in 1989, the establishment of an 'in-house magazine' with the aim of reporting on joint activities was one of the first 'joint actions'. ERCIM rapidly evolved from an in-house magazine to a fpublication covering reports and news about scientific projects from all over Europe and even beyond.

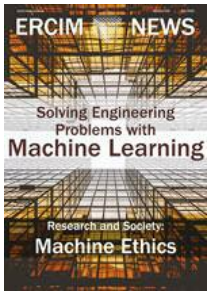
Today, ERCIM News is published in print and online. In 2020 the printed edition had a circulation of 2000 copies and more than 8600 readers are subscribed to the online edition.

From the early issues on, each issue has focused on a special theme identified by the editorial board. The ERCIM News series has thus become a unique collection providing an overview on a wide range of research topics in ICST and Applied Mathematics. All articles in ERCIM News are written by the scientists themselves and professionally edited. The structure of the articles and the limited length also make them comprehensible for non-experts. Thanks to these unique characteristics, ERCIM News has become well-known in the world of scientific publications, and regular positive feedback from our readers has encouraged us to continue in this way. Indeed, our readership comprises not only scientists, but also students, decision makers, professionals within the industry, representatives from the European Commission, and politicians.

In 2020 ERCIM News published the issues nos 116 - 120. Since its creation, more than 2,000 articles have been published. The popularity of ERCIM News can be credited primarily to our authors to whom the ERCIM editorial board wants to express their warmest thanks on this occasion.

In 2020 ERCIM News issues covered the following special themes:
- ERCIM News 120: Educational Technology
- ERCIM News 121: The Climate Action
- ERCIM News 122: Solving Engineering Problems with Machine Learning
- ERCIM News 123: Smart Things Everywhere

http://ercim-news.ercim.eu



The four issues published in 2020.

ERCIM Office

ERCIM has an office in Southern France, hosted by Inria and located in the Inria Sophia Antipolis - Méditerranée Research Centre premises, nestled amongst researchers (and surrounded by cicadas). The ERCIM Office manages the day-to-day business of ERCIM as well as the European branch of the World Wide Web Consortium (W3C).

With its team of experts, the ERCIM Office provides assistance to ERCIM members in managing European projects by performing the financial and administrative tasks, either as coordinator or partner. Member institutes can thus fully concentrate on scientific work, unburdened by time-consuming administrative tasks. The office has been involved with more than 100 successful projects. The projects in which the ERCIM Office was involved in 2018 are presented in the section “Projects” in this report. In 2020, they all include projects with participation of the W3C. They provide an example of how ERCIM can facilitate cooperation between research institutes and the W3C with its interest in Web standardization.

The ERCIM Office is under the responsibility of the ERCIM EEIG Board of Directors and also handles ERCIM AISBL financial matters. The Office supports the whole ERCIM community in administrative matters such as the management of the ERCIM Fellowship Programme, as well as in communications, for example by hosting and maintaining web sites and by producing and publishing ERCIM News.

Hosting and managing the European branch of W3C is another major task of the ERCIM Office.

The ERCIM office is located in the Inria Sophia Antipolis - Méditerranée Research Centre premises.

ERCIM Office Staff
(as of December 2020)

- Philipp Hoschka, manager
- Caroline Baron, finance and administration manager
- Laurent Carcone, systems engineer
- Peter Kunz, communications, ERCIM News central editor, project coordinator
- Vivien Lacourba, IT manager
- Alexandra Lacourba, event manager and W3C European members administration
- Emma Lière, project assistant and Fellowship Programme coordinator
- Jessica Michel Assoumou, project coordinator
- Pascale Peyrol, project assistant
- Catherine Riou, administrative assistant

Finances

Throughout 2020 ERCIM traded as a consortium consisting of ERCIM EEIG and ERCIM AISBL. ERCIM operated with a gross turnover of 4.9 M€.

ERCIM AISBL		
Receipts	136,759 €	
ERCIM Office		
Receipts	986,759 €	(including 474,407 € from EU contracts)
Total received by the EU	1.278,478 €	
Total Office turnover	*1.790,830 €*	
W3C Europe		
Receipts	3.064,180 €	(including 702,725 € from EU contracts)
Total received by the EU	582,381 €	
Total W3C Turnover	*2.943,836 €*	
Total turnover	4.871,425 €	

ERCIM and W3C

ERCIM hosts the European headquarters of the World Wide Web Consortium (W3C). ERCIM and W3C aim to strengthen research relationships throughout Europe to better support the development of Web technology and to jointly share the results of their collaboration.

Many of the ERCIM institutes are involved in the work of W3C and and some of the European W3C Chapters, formallay called “Offices” are based at ERCIM institutes, namely at CWI (Benelux); ICS- FORTH (Greece); Inria (France) and SZTAKI (Hungary). W3C Chapters in Europe work with their regional Web communities to promote W3C technology in local languages, broaden W3C's geographical base, and encourage international participation in W3C activities. Specifically, the W3C Chapters help organize meetings and workshops.

As a consortium of members from many European countries, ERCIM creates a balance between European diversity and necessary homogeneity by building bridges between different cultures and facilitating the movement of technical ideas within academia and across borders. W3C is very heavily swayed by its members, several of them having interests in the Web (such as IoT, AI, Social Web, Web Privacy and Security, Big Data, etc.) whereas ERCIM jointly has widespread interest in many research fields where Web standards are rarely used. ERCIM then helps to gather those Web communities and make them work together.

Moreover, ERCIM members have strong ties with industrial partners and start-up companies. This is an excellent opportunity for W3C to enlarge its cooperation with European industry, which can broaden its participation in the making of standards.

Finally, hosting the W3C allows ERCIM members to benefit from the know-how and expertise of the W3C team, and to increase its visibility based on W3C's worldwide reputation. The joint efforts of ERCIM and the W3C have started to increase Web research cooperation in Europe.

The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. W3C’s mission is to lead the Web to its full potential.

W3C does not have a single physical headquarters. There are four institutions that “host” W3C. ERCIM is the host of the Europan branch of W3C and part of the W3C staff is employed by ERCIM.

ERCIM Membership

ERCIM is one of the most recognized ICT Societies in Europe. By joining ERCIM, your research institution or university can directly participate in ERCIM's activities and contribute to the ERCIM members' common objectives to play a leading role in Information and Communication Technology in Europe:

- Building a Europe-wide, open network of centres of excellence in ICT and Applied Mathematics;
- Excelling in research and acting as a bridge for ICT applications;
- Being internationally recognised both as a major representative organisation in its field and as a portal giving access to all relevant ICT research groups in Europe;
- Liaising with other international organisations in its field;
- Promoting cooperation in research, technology transfer, innovation and training.

Benefit of ERCIM membership

Institutions, as members of ERCIM AISBL, benefit from:

- International recognition as a leading centre for ICT R&D. ERCIM, a European-wide network of centres of excellence in ICT, is internationally recognised as a major representative organisation in its field;
- More influence on European and national government R&D strategy in ICT. ERCIM members team up to speak with a common voice and produce strategic reports to shape the European research agenda;
- Privileged access to standardisation bodies, such as the W3C which is hosted by ERCIM as to other bodies with which ERCIM has also established strategic cooperation. These include ETSI, the European Mathematical Society and Informatics Europe;
- Invitations to join projects of strategic importance;
- Establishing personal contacts among executives of leading European research institutes during the bi-annual ERCIM meetings;
- Invitations to join committees and boards developing ICT strategy nationally and internationally;
- Excellent networking possibilities with more than 10.000 high-quality research colleagues across Europe. ERCIM's mobility activities, such as the fellowship programme, leverages scientific cooperation and excellence;
- Professional development of staff including international recognition;
- Publicity through the ERCIM website and ERCIM News, the widely read quarterly magazine.

For further information about how to join ERCIM AISBL, please contact the ERCIM Office (contact@ercim.eu)

How to become an ERCIM Member

- Prospective members must be outstanding research institutions (including universities) within their country;
- Applicants shall address a request accompanied by short description to the ERCIM Office. The description must contain:
- Name and address of the institute;
- Short description of the institute's activities;
- Staff (full time equivalent) relevant to ERCIM's fields of activity;
- Number of European projects currently involved in;
- Name of the representative and the alternate.
- Membership applications will be reviewed by an internal board and may include an on-site visit;
- The decision on admission of new members is made by the General Assembly of the Association, in accordance with the procedure defined in the Bylaws (http://kwz.me/U7), and notified in writing by the Secretary to the applicant;
- Admission becomes effective upon payment of the appropriate membership fee in each year of membership;
- Membership is renewable as long as the criteria for excellence in research and an active participation in the ERCIM community, cooperating for excellence, are met.

Institutions member of ERCIM in 2020:

Consiglio Nazionale delle Ricerche
Area della Ricerca CNR di Pisa
Via G. Moruzzi 1, 56124 Pisa, Italy
www.iit.cnr.it

Norwegian University of Science and Technology
Faculty of Information Technology, Mathematics and Electrical Engineering, N 7491 Trondheim, Norway
http://www.ntnu.no/

Centrum Wiskunde & Informatica
Science Park 123,
NL-1098 XG Amsterdam, The Netherlands
www.cwi.nl

RISE SICS
Box 1263,
SE-164 29 Kista, Sweden
http://www.sics.se/

Fonds National de la Recherche
6, rue Antoine de Saint-Exupéry, B.P. 1777
L-1017 Luxembourg-Kirchberg
www.fnr.lu

SBA Research gGmbH
Floragasse 7, 1040 Wien, Austria
www.sba-research.org/

Foundation for Research and Technology – Hellas
Institute of Computer Science
P.O. Box 1385, GR-71110 Heraklion, Crete, Greece
www.ics.forth.gr

SIMULA
PO Box 134
1325 Lysaker, Norway
www.simula.no

Magyar Tudományos Akadémia
Számítástechnikai és Automatizálási Kutató Intézet
P.O. Box 63, H-1518 Budapest, Hungary
www.sztaki.hu/

Fraunhofer ICT Group
Anna-Louisa-Karsch-Str. 2
10178 Berlin, Germany
www.iuk.fraunhofer.de

TNO
PO Box 96829
2509 JE DEN HAAG
www.tno.nl

INESC
c/o INESC Porto, Campus da FEUP,
Rua Dr. Roberto Frias, nº 378,
4200-465 Porto, Portugal
www.inesc.pt

University of Cyprus
P.O. Box 20537
1678 Nicosia, Cyprus
www.cs.ucy.ac.cy/

Institut National de Recherche en Informatique et en Automatique
B.P. 105, F-78153 Le Chesnay, France
www.inria.fr

Universty of Warsaw
Faculty of Mathematics, Informatics and Mechanics
Banacha 2, 02-097 Warsaw, Poland
www.mimuw.edu.pl/

I.S.I. – Industrial Systems Institute
Patras Science Park building
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www.isi.gr

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