Proceedings

20th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing

11–14 May 2020
Melbourne, Australia

Editors

Laurent Lefevre
Carlos A. Varela
George Pallis
Adel N. Toosi
Omer Rana
Rajkumar Buyya

CPS Conference Publishing Services

Los Alamitos, California

Washington • Tokyo

IEEE computer society

BMS Part Number CFP20276-ART
ISBN 978-1-7281-6095-5

Additional copies may be ordered from:

IEEE Computer Society
Customer Service Center
10662 Los Vaqueros Circle
P.O. Box 3014
Los Alamitos, CA 90720-1314
Tel: + 1 800 272 6657
Fax: + 1 714 821 4641
http://computer.org/cspress
csbooks@computer.org

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Tel: + 1 732 981 0060
Fax: + 1 732 981 9667
http://shop.ieee.org/store/
customer-service@ieee.org

IEEE Computer Society
Asia/Pacific Office
Watanabe Bldg., 1-4-2
Minami-Aoyama
Minato-ku, Tokyo 107-0062
JAPAN
Tel: + 81 3 3408 3118
Fax: + 81 3 3408 3553
tokyo.ofc@computer.org

Individual paper REPRINTS may be ordered at: <reprints@computer.org>

Editorial production by Lisa O'Conner

IEEE Computer Society
***Conference Publishing Services* (CPS)**
http://www.computer.org/cps

2020 20th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID)

CCGrid 2020

Table of Contents

Session 2: Architecture, Networking, Data Centers

Session 3: Storage and I/O Systems

Session 4: Programming Models and Runtime Systems

Session 5: Resource Management and Scheduling

Session 6: Performance Modelling and Evaluation

Session 7: Cyber-Security and Privacy

Session 8: Sustainable and Green Computing

Session 9: Applications: Data Science, Artificial Intelligence, Cyber-Physical Systems, etc.

Session 10: Resource Management and Scheduling & Sustainable and Green Computing

Session 11: Applications: Data Science, Artificial Intelligence, Cyber-Physical Systems, etc. and Resource Management and Scheduling

Session 12: Architecture, Networking, Data Centers & Resource Management and Scheduling & Performance Modelling and Evaluation

Poster Papers

CCGRID 2020 Workshops

The First International Workshop on Secure Mobile Cloud Computing (IWoSeMC-20)

The 3rd High Performance Machine Learning Workshop (HPML 2020)

The 1st Workshop on Secure IoT, Edge and Cloud systems (SIoTEC) 2020

The 5th International Workshop on Emerging Computing Paradigms and Context in Business Process Management (CCBPM 2020)

The 2nd IEEE/ACM International Workshop on Network-Aware Big Data Computing (NEAC'20)

Doctoral Symposium

Message from the General Chair

I am delighted to chair and host the 20th IEEE/ACM International Symposium on Cluster, Cloud, and Internet Computing (CCGrid 2020) sponsored by the IEEE Computer Society, IEEE Technical Committee on Scalable Computing (TCSC), and the Association for Computing Machinery (ACM) in Melbourne, Australia.

Tremendous advances in network-driven computing, communication, storage, and systems/middleware technologies are leading to new paradigms and platforms, ranging from computing clusters to widely distributed Clouds and emerging Internet computing paradigms such as Fog/Edge Computing for the Internet of Things (IoT)/Big Data applications. CCGrid is a series of very successful conference with the overarching goal of bringing together international researchers, developers, and users and to provide an international forum to present leading research activities and results on a broad range of topics related to these platforms and paradigms and their applications. The conference features keynotes, technical presentations, posters, workshops, tutorials, as well as the SCALE challenge featuring live demonstrations and the ICFEC 2020 conference.

CCGrid is an important conference for the international community as it provides a forum for all cluster, cloud, and Internet computing researchers, developers, and users, and those who are just curious to see the project results and become aware of the progress made in these areas. The inaugural CCGrid conference was held in Brisbane, Australia in 2001. Since then, the conference has successfully been hosted around the world and has emerged as a truly global event. From 2002 to 2019, CCGrid annual events were held in Germany, Japan, the USA, UK, Singapore, Brazil, France, China, Australia, USA, Canada, Colombia, Spain, USA, and Cyprus. Returning to its originating country, we are honoured to host the 20th anniversary of the CCGrid conference in Melbourne, Australia.

CCGrid has been featuring original and outstanding research work in Cluster, Cloud, and Internet Computing. In fact, many emerging research trends and associated publications are featured “first” in CCGrid and their follow-up papers have appeared in other conferences later. This demonstrates the emergence of CCGrid as a “first” class venue for presenting original and ground-breaking works. For instance, CCGrid has been featuring various Internet computing paradigms actively during the last few years. At the same time, submissions for the Grid computing area have drastically declined. Hence, from 2020, we explicitly recognized this growing trend in CCGrid by including “Internet computing” in the conference title to embrace all emerging/new Internet-driven computing paradigms.

This 20th anniversary, CCGrid 2020 conference offers an outstanding technical program featuring keynote talks, tutorials, workshops, mini-symposiums, posters sessions, industry track, research exhibits and demos, and IEEE SCALE competition. CCGrid has been extremely fortunate to serve as a venue for presentation of prestigious “IEEE Medal/Award for Excellence in Scalable Computing” award offered annually by the IEEE Technical Committee on Scalable Computing. We are fortunate to host three keynote speakers drawn from Australia, USA, and Europe. Our Australian-originated keynote speaker, Professor John Grundy, is a Laureate Fellowship recipient from Australian Research Council.

The continued success and leadership of CCGrid requires dedicated and high-quality efforts from several international leaders and volunteers. As the Chair of CCGrid conference series and General Chair of this year’s event, I would like to express my sincere gratitude to the members of the Steering Committee and the Program Committee co-chaired by Professor Carlos A Varela and Laurent Lefevre. The Program Committee Co-Chairs and his Vice chairs

have coordinated peer-reviews of all submitted “full” papers and selected top-quality research papers for presentation at the conference. The CCGrid 2020 conference received 234 submissions (full papers) from 810 co-authors from 45 countries around the world: United States, China, Australia, France, India, Brazil, Spain, Canada, Germany, Japan, South Korea, Italy, United Kingdom, New Zealand, Israel, Poland, Sweden, Greece, Hungary, Norway, Portugal, Singapore, Hong Kong, Iran, Netherlands, Pakistan, Slovenia, Belgium, Finland, Indonesia, Austria, Saudi Arabia, Senegal, Taiwan, Denmark, Estonia, Switzerland, Thailand, Algeria, Ireland, North Korea, Mexico, Slovakia, Tunisia, and Vietnam. After peer-review of all submitted “full” papers, the Program Committee accepted 66 papers, resulting in an acceptance rate of 28%.

I thank George Pallis for coordinating the organisation of satellite workshops/mini-symposiums on hot topics such as Secure Mobile Cloud Computing, Network-Aware Big Data Computing (NEAC), and High-Performance Machine Learning. We appreciate the efforts of the chairs of various workshops and their PC members for attracting and selecting top-quality papers for presentation at the conference. I appreciate dedicated efforts of Doctoral Symposium Chairs (Anne-Cecile Orgerie and Ivan Rodero), Industry Chair (Rajeev Muralidhar), and Research/Product Demonstrations Chairs (Rodrigo Calheiros and Deepak Puthal).

I thank Hari Subramoni and Joanna Kolodziej for organising and managing the poster session, Mohammad Goudarzi for the excellent management of the conference website, and publicity coordinators, Jithin Jose, Stefan Schulte, Bahman Javadi, Mohsen Amini, Ching-Hsien Hsu, Carlos Westphall, and Minxian Xu, for helping us reach a broader community. I thank SCALE Challenge chairs, Yogesh Simmhan and Daniel S. Katz, and all other chairs for their efforts in enhancing the conference program with interesting demos. I thank Adel Toosi and Lisa O'Conner for their support in ensuring the publication of the conference proceedings in record time. I thank Laurence Yangfor managing TCSC sponsorship and the best paper awards.

I would like to offer my special appreciation to leading volunteers of the local organizing committee, led by Shashikant Ilager and Mohammad Goudarzi, for their dedicated services. I would like to thank Marie Trinh for managing registrations and Tricia Yamaguchi for her friendly services in finalising various contracts and budgets as an IEEE representative. Thanks are also due to our sponsors, namely, IEEE, ACM, and TCSC and organization supporters Melbourne’s CLOUDS Lab.

One of the key benefits of a conference is the networking opportunities provided especially for early-career community members: PhD students get to give a talk and be nominated to post-doctoral and faculty positions, junior tenure-track faculty get to meet senior faculty who can later write recommendation letters for tenure/promotion, PIs discuss future grants and collaboration, etc. Furthermore, sessions enable paper authors of similar directions to exchange ideas in ways that virtual meetings truly lack. Coffee breaks, meals, social events, elevator speeches, birds-of-a-feather sessions are where most interaction happens.

The safety and well-being of all conference participants is our priority. After evaluating the current COVID-19 situation, the conference leadership decided to postpone the physical meeting of CCGrid 2020 to 2021 (May). That is, all accepted papers and programs of CCGrid 2020 will presented jointly with CCGrid 2021 program. However, this decision does not impact the publication of CCGrid 2020 accepted papers as we are publishing the Proceedings as per the original date. Thus, ensuring that innovative research contributions of CCGrid 2020 authors are disseminated in timely manner in 2020 itself!

We (PC Chairs, Tricia Yamaguchi of IEEE Computer Society Event Sourcing & Contracting Specialist, and I on exploring various options) decided that given the uncertainties associated with the Covid-19 pandemic, it would be in the best interest of authors to postpone the conference but still hold it physically. In this way, social interaction is not undermined, particularly given the worldwide audience we have and the difficulty of even finding a time zone that would work for everyone or even the majority. While we initially postponed it to November 2020, it became clearer that it is not obvious whether we can still do it in that timeframe. So, we decided that we would merge presentations with 2021 which will be again hosted in Melbourne. Of course, we are taking risks: (1) will we be able to have the 2021 conference physically?, (2) is the work presented one year later going to be stale?, and (3) will there be people unwilling/unable to travel in 2021?

It was not an easy decision, but putting all the pros and cons, we decided it would be best to co-locate CCGrid 2020 and CCGrid 2021, and have one big celebration of the first two decades of the conference in Australia, its birthplace. The proceedings is published in May 2020 as per the original plan, and therefore, the accepted articles can still be timely read and referenced.

Ultimately, the success of the conference will be judged by how well the delegates have participated, learnt, interacted, and established contacts with other researchers in different fields. The Committees and the sponsors have provided the funding, the venue, and the environment to allow these objectives to be achieved. It is now up to all of us to ensure that the conference is an outstanding success. Finally, I wish everyone a successful, stimulating, and rewarding meeting and look forward to seeing you all CCGrid 2020 registered participants in Melbourne in May 2021 along with new delegates of CCGrid 2021. Please plan to join, enjoy your visit to multicultural Melbourne and beautiful Australia!

Thank you for your cooperation, understanding, and support.

Dr. Rajkumar Buyya,
Redmond Barry Distinguished Professor
Director, Cloud Computing and Distributed Systems (CLOUDS) Lab
School of Computing and Information Systems
The University of Melbourne, Australia
http://www.cloudbus.org/

CEO, Manjrasoft Pty Ltd, Melbourne, Australia
http://www.manjrasoft.com

Message from the Program Chairs

The 20th IEEE/ACM International Symposium on Cluster, Cloud, and Internet Computing (CCGrid 2020) program contains 66 high-quality technical papers selected from 234 submissions from 48 different countries (28.2% acceptance rate). The great majority of papers received three or more reviews, and we ensured that all borderline papers received at least three reviews and were discussed electronically by the Program Committee before deciding on acceptance or rejection.

Peer review reports of program committee members and their quality rating on papers have guided in the selection of best quality papers. We had no target on acceptance rate for any of topics; and all accepted papers were based on their peer review quality report. We end up observing the following statistics of each topic:

Topic	Submitted	Accepted	PC Members
Sustainable and Green Computing	19	8	35
Storage and I/O Systems	21	9	58
Cyber-Security and Privacy	25	8	40
Programming Models and Runtime Systems	25	10	76
Architecture, Networking, Data Centers	41	8	60
Performance Modelling and Evaluation	45	14	67
Internet Computing Frontiers: Edge, Fog, Serverless, Lambda, Streaming, etc.	60	14	75
Applications: Data Science, Artificial Intelligence, Cyber-Physical Systems, etc.	66	13	67
Resource Management and Scheduling	87	22	101

This high-quality program has been possible due to the hard work of 249 Program Committee members and Program Vice-Chairs of the various topics noted below:

- Internet Computing Frontiers: Edge, Fog, Serverless, Lambda, Streaming: **Stacy Patterson** (RPI, USA) and **Satish Srirama** (University of Tartu, Estonia)
- Architecture, Networking, Data Centers: **Shadi Ibrahim** (INRIA, France) and **Nageswara Rao** (Oak Ridge National Lab, USA)
- Storage, and I/O Systems: **Suren Byna** (Lawrence Berkeley National Lab, USA) and **Gregory Chockler** (U London, UK)
- Programming Models and Runtime Systems: **Gul Agha** (UIUC, USA) and **Hélène Coullon** (IMT&Inria, France)
- Scheduling and Resource Management: **Ivona Brandić** (Vienna U of Technology, Austria), **Shikharesh Majumdar** (Carleton University, Canada) and **Rizos Sakellariou** (U Manchester, UK)
- Performance Modeling and Evaluation: **Pavan Balaji** (Argonne Nat Lab, USA) and **Marco Netto** (IBM Research, Brazil)
- Cyber-Security and Privacy: **Richard Sinnott** (U. Melbourne, Australia)
- Sustainable and Green Computing: **Wu Feng** (Virginia Tech, USA) and **Young Choon Lee** (Macquarie U., Australia)
- Applications: Data Science, Artificial Intelligence, Cyber-Physical Systems: **Travis Desell** (Rochester Inst of Tech, USA), **Rajiv Ranjan** (University of Newcastle, UK) and **Lizhe Wang** (Chinese Academy of Sciences, China)

We also are indebted to the additional reviewers who volunteered their time and effort to make this the best possible CCGrid technical program. We also want to especially thank Rajkumar Buyya, the CCGrid 2020 General Chair for his never-ending guidance. Last but not least, we want to thank the technical paper authors for submitting their research results and presenting them to the CCGrid community. Without their work, this conference would not have been possible.

We have selected three papers receiving the highest quality ratings for their contributions and recommendations of program committee and vice chairs for the **best papers awards** as follows:

- First prize: "NFV Placement in Resource-Scarce Edge Nodes", Yaron Fairstein, Dor Harris, Joseph Naor and Danny Raz (Technion - Israel Institute of Technology, Israel)
- Second prize: "A Data-Driven Frequency Scaling Approach for Deadline-Aware Energy Efficient Scheduling on Graphics Processing Units (GPUs)", Shashikant Ilager, Rajeev Muralidhar, Kotagiri Rammohanrao and Rajkumar Buyya (The University of Melbourne, Australia)
- Third prize: "A Pattern-Based API for Mapping Applications to a Hierarchy of Multi-core Devices", Jia Guo, Radu Teodorescu (The Ohio State University, USA), and Gagan Agrawal (The Augusta University, USA)

Due to the pandemic situation imposed by the Coronavirus, we had to postpone the CCGrid 2020 conference. But this will not stop the CCGrid dynamism and we will lively celebrate later the 20th CCGrid conference. And now, it is your time to enjoy the CCGrid 2020 accepted publications!

Laurent Lefevre
Inria, ENS Lyon, France

Carlos A. Varela
Rensselaer Polytechnic Institute, USA

CCGrid 2020 Committees

Organizing Committee

General Chair
Rajkumar Buyya, *University of Melbourne and Manjrasoft Pty Ltd, Australia*

General Vice Chairs
Dhabaleswar Panda, *Ohio State University, USA*
Jin Hai, *Huazhong University of Science and Technology, China*
Massimo Villari, *The University of Messina, Italy*

Program Committee Co-Chairs
Carlos A. Varela, *RPI, USA*
Laurent Lefevre*, INRIA, France*

Workshops Co-Chairs
George Pallis, *The University of Cyprus, Cyprus*
Borja Sotomayor, *The University of Chicago, USA*

Doctoral Symposium Chairs
Anne-Cecile Orgerie, *Inria, France*
Ivan Rodero, *The State University of New Jersey, USA*

Posters Co-Chairs
Hari Subramoni, *Ohio State University, USA*
Joanna Kolodziej, *National Research Institute (NASK), Poland*

Student Travel Awards Chair
Lena Mashayekhy, *University of Delaware, USA*

SCALE Challenge Chairs
Yogesh Simmhan, *Indian Institute of Science, India*
Daniel S. Katz, *University of Illinois at Urbana-Champaign, USA*

Industry Chair
Rajeev Muralidhar, Amazon and the University of Melbourne, Australia

Research/Product Demonstrations Chairs
Rodrigo Calheiros, *Western Sydney University, Australia*
Deepak Puthal, *Newcastle University, UK*

Proceedings Co-Chairs
Omer Rana, *Cardiff University, UK*
Adel N. Toosi, *Monash University, Australia*

Publicity Co-Chairs

Jithin Jose, *Microsoft, USA*
Stefan Schulte, *Vienna University of Technology, Austria*
Bahman Javadi, *Western Sydney University, Australia*
Mohsen Amini, *The University of Louisiana at Lafayette, USA*
Ching-Hsien Hsu, *National Chung Cheng University, Taiwan*
Carlos Westphall, *Federal University of Santa Catarina, Brazil*
Minxian Xu, *Chinese Academy of Sciences, China*

Finance Chair

Shashikant Ilager, *The University of Melbourne, Australia*

Cyber Chair

Mohammad Goudarzi, *The University of Melbourne, Australia*

Program Committee Vice Chairs

Internet Computing Frontiers: Edge, Fog, Serverless, Lambda, Streaming, etc.

Stacy Patterson, *RPI, USA*
Satish Srirama, *University of Tartu, Estonia*

Architecture, Networking, Data Centers

Shadi Ibrahim, *INRIA, France*
Nageswara Rao, *Oak Ridge National Lab, USA*

Storage, and I/O Systems

Suren Byna, *Lawrence Berkeley National Lab, USA*
Gregory Chockler, *U London, UK*

Programming Models and Runtime Systems

Gul Agha, *UIUC, USA*
Hélène Coullon, *IMT & Inria, France*

Scheduling and Resource Management

Ivona Brandić, *Vienna U of Technology, Austria*
Shikharesh Majumdar, *Carleton University, Canada*
Rizos Sakellariou, *U Manchester, UK*

Performance Modeling and Evaluation

Pavan Balaji, *Argonne Nat Lab, USA*
Marco Netto, *IBM Research, Brazil*

Cyber-Security and Privacy

Richard Sinnott, *U. Melbourne, Australia*

Sustainable and Green Computing

Wu Feng, *Virginia Tech, USA*
Young Choon Lee, *Macquarie U., Australia*

Applications: Data Science, Artificial Intelligence, Cyber-Physical Systems, etc.

Travis Desell, *Rochester Inst of Tech, USA*
Rajiv Ranjan, *University of Newcastle, UK*
Lizhe Wang, *Chinese Academy of Sciences, China*

Program Committee Members

Ferrol Aderholdt, *Middle Tennessee State University, USA*
Ali Anwar, *IBM, USA*
Engin Arslan, *University of Nevada, Reno, USA*
Marcos Assuncao, *Inria, LIP, ENS Lyon, France*
Pavan Balaji, *Argonne National Laboratory, USA*
Ioana Banicescu, *Mississippi State University, USA*
Denis Barthou, *University of Bordeaux, France*
Umesh Bellur, *IIT Bombay, India*
Vicenç Beltran, *Barcelona Supercomputing Center, Spain*
Abhinav Bhatele, *University of Maryland, USA*
Julien Bigot, *CEA, Maison de la Simulation, France*
Luiz F. Bittencourt, *University of Campinas, Brazil*
Antonio Brogi, *University of Pisa, Italy*
Suren Byna, *Lawrence Berkeley National Laboratory, USA*
Rodrigo N. Calheiros, *Western Sydney University, Australia*
Philip Carns, *Argonne National Laboratory, USA*
Giuliano Casale, *Imperial College London, United Kingdom*
Mohamad Chaarawi, *Intel, USA*
Kalyana Chadalavada, *Google, USA*
Aparna Chandramowlishwaran, *University of California, Irvine, USA*
Sunita Chandrasekaran, *University of Delaware, USA*
Yong Chen, *Texas Tech University, USA*
Yue Cheng, *George Mason University, USA*
Lucy Cherkasova, *ARM Research, USA*
Gregory Chockler, *Royal Holloway, University of London, United Kingdom*
Sudheer Chunduri, *Argonne National Laboratory, USA*
Florina M. Ciorba, *University of Basel, Switzerland*
Giuseppe Congiu, *Argonne National Laboratory, United Kingdom*
Helene Coullon, *INRIA, France*
Dong Dai, *UNC Charlotte, USA*
Debashis De, *West Bengal University of Technology, India*
Bronis de Supinski, *Lawrence Livermore National Laboratory, USA*
Ewa Deelman, *USC Information Sciences Institute, USA*
Alex Delis, *University of Athens, Greece*
Travis Desell, *Rochester Institute of Technology, USA*
Bin Dong, *Lawrence Berkeley National Lab, USA*
Matthieu Dorier, *Argonne National Laboratory, USA*
Matthieu Dreher, *Argonne National Laboratory, USA*
Dick Epema, *Delft University of Technology, Netherlands*
Thomas Fahringer, *University of Innsbruck, Austria, Austria*
Pedro Garcia Lopez, *Universitat Rovira i Virgili, Spain*
Balazs Gerofi, *The University of Tokyo, Japan*
Marco Guazzone, *University of Piemonte Orientale, Italy*
Tian Guo, *Worcester Polytechnic Institute, USA*
Yanfei Guo, *Argonne National Laboratory, USA*
David Guyon, *Inria, IMT-Atlantique, France*

Bingsheng He, *National University of Singapore, Singapore*
Dan Holmes, *The University of Edinburgh, United Kingdom*
Atsushi Hori, *RIKEN AICS, Japan*
Sascha Hunold, *Vienna University of Technology, Austria*
Shadi Ibrahim, *Inria, Rennes Bretagne Atlantique Research Center, France*
Neena Imam, *Oak Ridge National Lab, USA*
Joseph Izraelevitz, *University of Rochester, USA*
Surabhi Jain, *Intel, USA*
Jithin Jose, *Microsoft, USA*
Rubasri Kalidas, *Intel, USA*
Helen Karatza, *Aristotle University of Thessaloniki, Greece*
Karen Karavanic, *Portland State University, USA*
Dimitrios Katramatos, *Brookhaven National Laboratory, USA*
Attila Kertesz, *University of Szeged, Hungary*
Rajkumar Kettimuthu, *Argonne National Lab and The University of Chicago, USA*
In Kee Kim, *University of Georgia, USA*
Mariam Kiran, *Lawrence Berkeley National Lab, USA*
Hillel Kolodner, *IBM Haifa Research Lab, Israel*
Ioannis Konstantinou, *National Technical University of Athens, Greece*
Anthony Kougkas, *Illinois Institute of Technology, USA*
Quincey Koziol, *Lawrence Berkeley National Laboratory, USA*
Diwakar Krishnamurthy, *University of Calgary, Canada*
Julian Martin Kunkel, *University of Reading, United Kingdom*
Palden Lama, *University of Texas at San Antonio, USA*
Thomas Lambert, *Université de Bordeaux, France*
Young Choon Lee, *Macquarie University, Australia*
Yao Liu, *SUNY Binghamton, USA*
Xiaoyi Lu, *The Ohio State University, USA*
Shikharesh Majumdar, *Carleton University, Canada*
Preeti Malakar, *Indian Institute of Technology Kanpur, India*
Anirban Mandal, *Renaissance Computing Institute, USA*
Zoltan Mann, *University Duisburg-Essen, Germany*
Naoya Maruyama, *Lawrence Livermore National Laboratory, USA*
Suzanne McIntosh, *New York University - Courant Institute of Mathematical Sciences, Center for Data Science, USA*
Alba Cristina M. A. Melo, *University of Brasilia (UnB), Brazil*
Gabriele Mencagli, *University of Pisa, Italy*
Diana Moise, *Cray Inc., Switzerland*
Sébastien Monnet, *University Savoie Mont Blanc, France*
Suku Nair, *Southern Methodist University, USA*
Marco Netto, *IBM, Brazil*
Tuan Nguyen Gia, *University of Turku, Finland*
Dimitrios Nikolopoulos, *Virginia Tech, USA*
Dan O'Keeffe, *Royal Holloway University of London, United Kingdom*
Claus Pahl, *Free University of Bolzano / Bozen, Italy*
George Pallis, *University of Cyprus, Cyprus*
Stacy Patterson, *Rensselaer Polytechnic Institute, USA*

Christian Perez, *INRIA, France*
Maria S. Perez, *Universidad Politécnica de Madrid, Spain*
Antonio J. Peña, *Barcelona Supercomputing Center (BSC), Spain*
Guillaume Pierre, *IRISA / Université de Rennes 1, France*
Jean-Marc Pierson, *University of Toulouse, IRIT, France*
Ilia Pietri, *University of Athens, Greece*
Swaroop Pophale, *Oak Ridge National Laboratory, USA*
Radu Prodan, *University of Klagenfurt, Austria*
Chenxi Qiu, *Rowan University, USA*
Anna Queralt, *Barcelona Supercomputing Center, Spain*
Ivan Rodero, *Rutgers University, USA*
Rizos Sakellariou, *The University of Manchester, United Kingdom*
Nancy Samaan, *University of Ottawa, Canada*
Uwe Schwiegelshohn, *TU Dortmund University, Germany*
Satyabrata Sen, *Oak Ridge National Laboratory, USA*
Bradley Settlemyer, *Los Alamos National Laboratory, USA*
Sameer Shende, *University of Oregon, USA*
Xuanhua Shi, *Huazhong University of Science and Technology, China*
Bruno Silva, *IBM, Brazil*
Yogesh Simmhan, *Indian Institute of Science, India*
Oliver Sinnen, *University of Auckland, New Zealand*
Raül Sirvent, *Barcelona Supercomputing Center, Spain*
Lauren Smith, *US Department of Defense, USA*
Jerome Soumagne, *The HDF Group, USA*
Satish Narayana Srirama, *University of Tartu, Estonia*
Patricia Stolf, *IRIT, France*
Francois Taiani, *Univ Rennes, CNRS, Inria, IRISA, France*
Domenico Talia, *University of Calabria, Italy*
Nathan Tallent, *Pacific Northwest National Laboratory, USA*
Damian Andrew Tamburri, *Technical University of Eindhoven, Netherlands*
Houjun Tang, *Lawrence Berkeley National Laboratory, USA*
Osamu Tatebe, *University of Tsukuba, Japan*
Francois Tessier, *ETH, Switzerland*
Douglas Thain, *University of Notre Dame, USA*
Massimo Torquati, *University of Pisa, Italy*
Denis Trystram, *Grenoble Alpes university, France*
Dimitrios Tsoumakos, *National Technical University of Athens, Greece*
Carlos A. Varela, *Rensselaer Polytechnic Institute, USA*
Blesson Varghese*, Queen's University Belfast, United Kingdom*
Vladimir Vlassov, *Royal Institute of Technology (KTH), Sweden*
Lizhe Wang, *Chinese Academy of Sciences, China*
Yanjie Wei, *Shenzhen Institutes of Advanced Technology, CAS, China*
Michele Weiland, *The University of Edinburgh, United Kingdom*
Mike Wittie, *Montana State University, USA*
Chase Wu, *New Jersey Institute of Technology, USA*
Song Wu, *Huazhong University of Science and Technology, China*
Ramin Yahyapour, *GWDG - University of Göttingen, Germany*

Orcun Yildiz, *Argonne National Laboratory, USA*
Weikuan Yu, *Florida State University, USA*
Mohamed Zahran, *New York University, USA*
Jidong Zhai, *Tsinghua University, China*
Mai Zheng, *New Mexico State University, USA*
Amelie Chi Zhou, *Shenzhen University, China*
Michelle Zhu, *Montclair State University, USA*
Xiao Liu, *Deakin University, Australia*
H B Acharya, *Rochester Inst of Tech, USA*
Vignesh Adhinarayanan, *AMD Research, USA*
Ashiq Anjum, *University of Derby, United Kingdom*
Christos Antonopoulos, *University of Thessaly, Greece*
Olivier Aumage, *INRIA, France*
Woongki Baek, *UNIST, South Korea*
Olivier Barais, *Irisa, France*
Mutaz Barika, *University of Tasmania, Australia*
Nikolaos Bellas, *University of Thessaly, Greece*
Abhinav Bhatele, *University of Maryland, USA*
Walter Binder, *Università Della Svizzera Italiana, Switzerland*
Loren Bruns, *The University of Melbourne, Australia*
Kris Bubendorfer, *Victoria University of Wellington, New Zealand*
Harold Castro, *Universidad de Los Andes, Colombia*
Eugenio Cesario, *ICAR-CNR, Italy*
Jinjun Chen, *University of Technology, Sydney, Australia*
Shiping Chen, *CSIRO, Australia*
Chris Culnane, *The University of Melbourne, Australia*
Marco Danelutto, *University of Pisa, Italy*
Silvia Delgado Olabarriaga, *ICAR-CNR, Netherlands*
Yuri Demchenko, *University of Amsterdam, Netherlands*
Yuan Dong, *The University of Sydney, Australia*
Matthew Dosanjh, *Sandia National Laboratories, USA*
Jonathan Eastep, *Intel, USA*
Wu-Chun Feng, *Virginia Tech, USA*
Rong Ge, *Clemson University, USA*
Dimitrios Georgakopoulos, *Swinburne University of Technology, Australia*
Sandra Gesing, *University of Notre Dame, USA*
Soumya Ghosh, *Indian Institute of Technology Kharagpur, India*
Tristan Glatard, *Concordia University, Canada*
John Grundy, *Monash University, Australia*
Gareth Howells, *University of Kent, United Kingdom*
Chung-Hsing Hsu, *Oak Ridge National Laboratory, USA*
Robert Hsu, *Chung Hua University, Taiwan*
William Hu, *University of Melbourne, Australia*
Fang Huang, *University of Science and Technology of China, China*
Alexandru Iosup, *Vrije Universiteit Amsterdam and TU Delft, Netherlands*
Glenn Jayaputera, *Melbourne eResearch Group, Australia*
Wei Jie, *University of Manchester, UK, United Kingdom*

Dali Kaafar, *CSIRO, Australia*
Paul Kaufmann, *Mainz University, Germany*
Samee Khan, *North Dakota State University, USA*
Kavi Kumar Khedo, *University of Mauritius, Mauritius*
Jinyoung Kim, *The University of Melbourne, Australia*
Joanna Kolodziej, *National Research Institute NASK, Poland*
Yu Kong, *Rochester Institute of Technology, USA*
Sriram Krishnamoorthy, *Pacific Northwest National Lab, USA*
Daniel Krutz, *Rochester Institute of Technology, USA*
Minseok Kwon, *Rochester Institute of Technology, USA*
Dongyoon Lee, *Stony Brook University, USA*
Shujun Li, *University of Kent, UK*
Weiguo Liu, *Shandong University, China*
Xumin Liu, *Rochester Institute of Technology, USA*
Alexander Loui, *Rochester Institute of Technology, USA*
Yang Lu, *The University of Kent, United Kingdom*
Preeti Malakar, *Indian Institute of Technology Kanpur, USA*
Maciej Malawski, *AGH University of Science and Technology, Poland*
Lena Mashayekhy, *University of Delaware, USA*
Michael Mior, *Rochester Institute of Technology, USA*
Hiroshi Nakashima, *Kyoto University, Japan*
Surya Nepal, *CSIRO, Australia*
Ifeoma Nwogu, *Rochester Institute of Technology, USA*
Anne-Cécile Orgerie, *Inria, France*
Yao Pan, *The University of Melbourne, Australia*
Yin Pan, *Rochester Institute of Technology, USA*
Udaya Parampalli, *The University of Melbourne, Australia*
Viktor K. Prasanna, *University of Southern California, USA*
Satish Puri, *Marquette University, USA*
Hossein Pursultani, *The University of Melbourne, Australia*
M. Mustafa Rafique, *Rochester Institute of Technology, USA*
Omer Rana, *Cardiff University, United Kingdom*
Hassan Reza, *University of North Dakota, USA*
Barry Rountree, *Lawrence Livermore National Laboratory, USA*
Ing-Ray Chen, *Virginia Tech University, USA*
Romain Rouvoy, *University of Lille, France*
Richard Sinnott, *The University of Melbourne, Australia*
Anthony Stell, *The University of Melbourne, Australia*
Jeremy Straub, *North Dakota State University, USA*
Zahir Tari, *RMIT University, Australia*
Chen Wang, *CSIRO, Australia*
Linwei Wang, *Rochester Institute of Technology, USA*
Shuo Wang, *Monash University/ Data 61, CSIRO, Australia*
Paul Watson, *University of Newcastle, United Kingdom*
Tongquan Wei, *East China Normal University, China*
Fatos Xhafa, *Universitat Politècnica de Catalunya, Spain*
Wang Xiaokang, *HUST, China*

Wei Xue, *Tsinghua University, China*
Deze Zeng, *The University of Aizu, Japan*
FZiming Zhao, *Rochester Institute of Technology, USA*
Gul Agha, *University of Illinois Urbana-Champaign, USA*
Ivona Brandić, *Vienna University of Technology, Austria*
Laurent Lefevre, *École normale supérieure de Lyon, France*
Rajiv Ranjan, *Newcastle University, UK*
Nageswara Rao, *Oak Ridge National Laboratory, USA*
Adel N. Toosi, *Monash University, Australia*
Joanna Kolodziej, *Cracow University of Technology, Poland*
Alexandru Uta, *Vrije Universiteit Amsterdam, Netherlands*
Philipp Gschwandtner, *University of Innsbruck, Austria*
Guido Salvaneschi, *TU Darmstadt, Germany*

CCGrid 2020 Workshops and Organising Chairs

1. The First International Workshop on Secure Mobile Cloud Computing (IWoSeMC-20)

• Joanna Kolodziej, *NASK/ Cracow University of Technology, Warsaw, Poland*
• Martin Gilje Jaatun, *SINTEF Digital / University of Stavanger, Trondheim, Norway*

2. The 3rd High Performance Machine Learning Workshop (HPML 2020)

• Eduardo Rocha Rodrigues, *IBM Research*
• Jairo Panetta, *Instituto Tecnologico de Aeronautica, ITA, Brazil*
• Bruno Raffin, *INRIA, France*
• Abhishek Gupta, *Schlumberger, USA*
• Leonardo Bautista Gomez, *Barcelona Supercomputing Center, Spain*
• Marco Netto, *IBM Research, Brazil*

3. The 1st Workshop on Secure IoT, Edge and Cloud systems (SIoTEC) 2020

• Massimo Villari, *University of Messina, Italy*
• Javid Taheri, *Karlstad University, Sweden*
• Maria Fazio, *University of Messina, Italy*
• Giuseppe Di Modica, *University of Bologna, Bologna*
• Antonino Galletta, *University of Messina, Italy*

4. The 5th International Workshop on Emerging Computing Paradigms and Context in Business Process Management (CCBPM 2020)

• Yun Yang, *Swinburne University of Technology*
• Xuejun Li, *Anhui University*
• Dong Yuan, *University of Sydney*

5. The 2nd IEEE/ACM International Workshop on Network-Aware Big Data Computing (NEAC'20)

• Long Cheng, *Dublin City University, Ireland*
• John Murphy, *University College Dublin, Ireland*
• Zhiming Zhao, *University of Amsterdam, Netherlands*