



# Welcome to ISPDC 2022

## 21st IEEE International Symposium on Parallel and Distributed Computing

Basel, Switzerland

July 11-13, 2022

[ispdc2022.dmi.unibas.ch](http://ispdc2022.dmi.unibas.ch)



University  
of Basel



# Welcome Remarks from the ISPDC 2022 General Chair

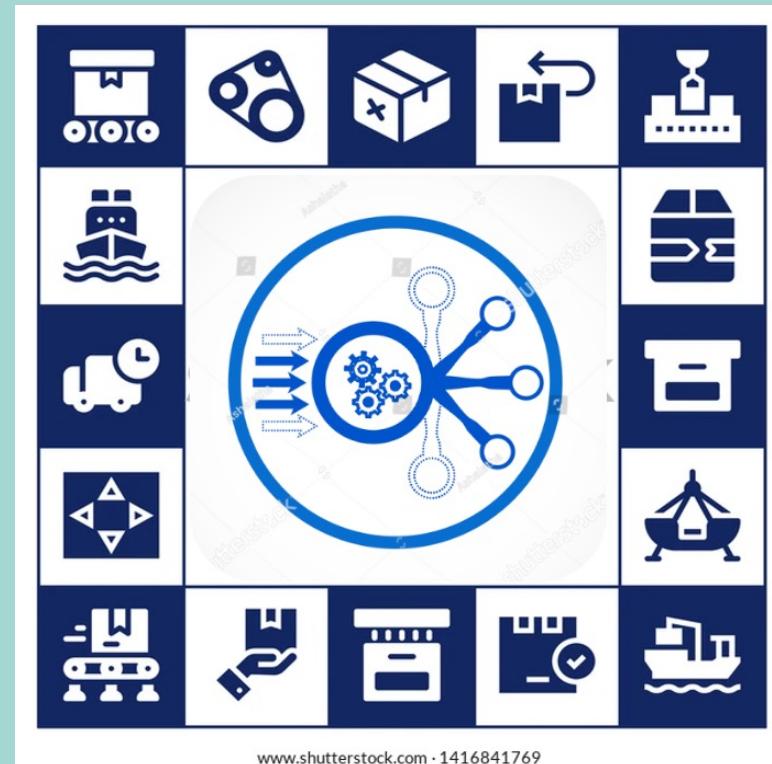
Florina M. Ciorba (University of Basel, Switzerland)

# ISPDC: 21 editions



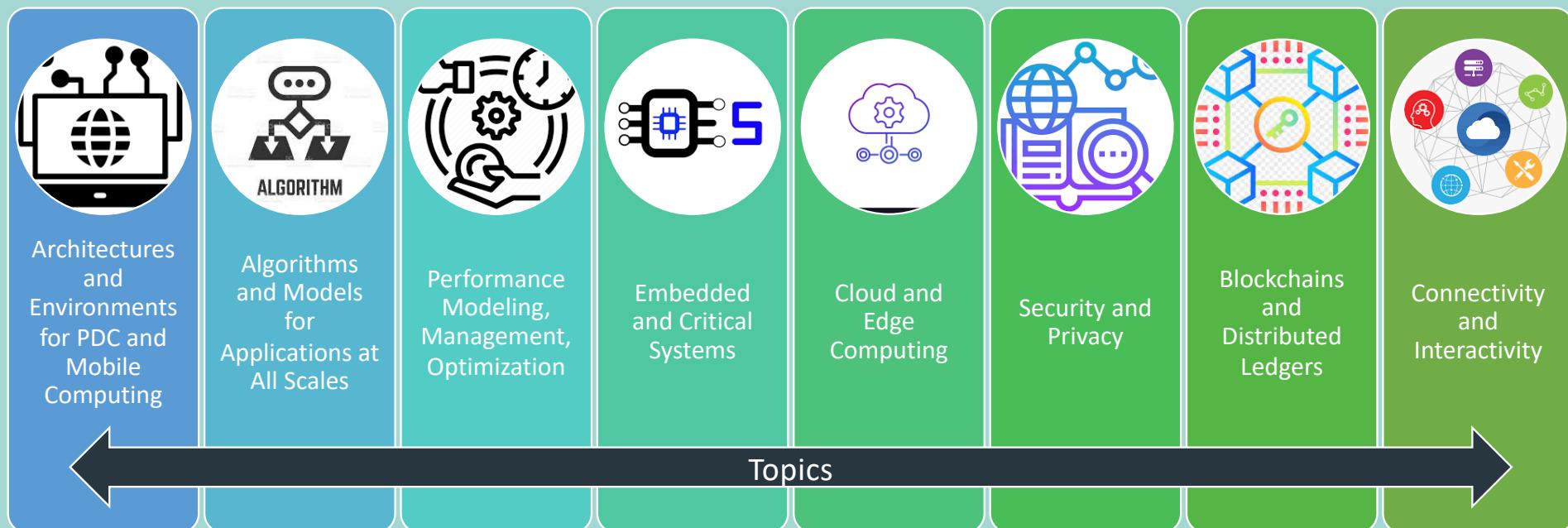
# ISPDC Profile

Parallelism and distribution in computing and systems for the advancement & benefit of science, engineering, and society.



www.shutterstock.com · 1416841769

# ISPDC 2022



# ISPDC 2022: [ispdc2022.dmi.unibas.ch](http://ispdc2022.dmi.unibas.ch)

**20 Original Research Paper Presentations (18 full, 2 short)**  
*On password protected website*

**6 Oral Research Communications**  
*On password protected website*

**1 Opening Word**  
**5 Keynote Presentations**

**4 Coffee breaks**  
**3 Lunch breaks**  
**1 Conference Dinner**

**1 Day-long Social Event (optional)**

1st ISPDC edition  
sponsored by



# Opening Word and Keynote Presentations



**Torsten Schwede**  
University of Basel, Switzerland  
*Opening Word*  
9:00 Monday



**Rosa M. Badia**  
BSC, Spain  
*Easy Development and Execution of Workflows with eFlows4HPC*  
9:15 Monday



**Joachim Stadel**  
University of Zurich, Switzerland  
*Simulating Our Universe: Leveraging Present and Future Supercomputing Systems*  
13:30 Monday



**Rachid Guerraoui**  
EPFL, Switzerland  
*The Road to a Universal Internet Machine*  
9:00 Tuesday



**Utz-Uwe Haus**  
HPE HPC/AI EMEA Research Lab  
*The Green vs. Exascale HPC: Carbon-neutral site operations, energy efficiency, and overall sustainability*  
13:30 Tuesday



**Joseph Sifakis**  
Verimag Laboratory Grenoble, France  
*Why is it so Hard to Make Self-driving Cars?*  
9:00 Wednesday



# Program

Up on the terrace

Monday, July 11, 2022 (Day 1)

08:00 Registration

**08:45 ISPDC 2022 Welcome Remarks** – Florina Ciorba, University of Basel, Switzerland

09:00 **Opening word** – Prof. Dr. Torsten Schwede  
Vice-President of Research, University of Basel, Switzerland

09:15 **[Keynote talk] Easy Development and Execution of Workflows with eFlows4HPC**  
Rosa M. Badia, Barcelona Supercomputing Center, Spain

10:15 [Break] Coffee (provided)

**Session 1: Large-scale distributed systems – Chair Ahmed Eleliemy**

10:40 [Full paper] Deep Heuristic for Broadcasting in Arbitrary Networks  
Hovhannes Harutyunyan, Narek Hovhannisyan, and Rakshit Magithiya

11:10 [Full paper] FlexiShard: a Flexible Sharding Scheme for Blockchain based on a Hybrid Fault Model,  
Tirathraj Ramburn, and Dhrubajyoti Goswami

11:40 [Oral communication] Maestro: A Middleware for Data Orchestration in Scientific Workflows  
Ali Mohammed, Christopher Haine, and Utz-Uwe Haus

12:00 [Oral communication] Real-time scheduling mechanisms for cost-efficient power consumption  
strategies, Bogdan-Costel Mocanu and Florin Pop

12:20 [Break] Lunch (provided)

**13:30 [Keynote talk] Simulating Our Universe: Leveraging Present and Future Supercomputing Systems**  
Joachim Stadel, University of Zurich, Switzerland

**Session 2: Acceleration – Chair Hovhannes Harutyunyan**

14:30 [Full paper] Online Event Selection for Mu3e using GPUs  
Valentin Henkys, Bertil Schmidt, and Niklaus Berger

15:00 [Full paper] Cuckoo Node Hashing on GPUs  
Muhammad Javed, Hao Zhou, David Troendle, and Byunghyun Jang

15:30 [Full paper] Coarse-Grained Floorplanning for Accelerating Quantized Neural Networks on Multi-Die  
FPGAs, Danielle Tchuinkou Kwadjo, Erman Nghonda, and Christophe Bobda

# Program

Dock near and under  
the central bridge

Tuesday, July 12, 2022 (Day 2)

09:00 [Keynote talk] **The Road to a Universal Internet Machine**  
Rachid Guerraoui, École Polytechnique Fédérale de Lausanne, Switzerland

10:00 [Break] Coffee (provided)

**Session 3: Parallel, distributed computing, machine learning, and security – Chair Sheikh Ghafoor**

10:20 [Full paper] A type system to avoid runtime errors for Multi-ML  
Frédéric Gava, Victor Allombert, and Julien Tesson

10:50 [Full paper] Estimating the Impact of Communication Schemes for Distributed Graph Processing  
Tian Ye, Sanmukh R. Kuppannagari, Cesar A. F. De Rose, Sasindu Wijeratne, Rajgopal Kannan, and  
Viktor Prasanna

11:20 [Full paper] A scalable algorithm for homomorphic computing on multi-core clusters  
Frédéric Gava and Léa Bayati

11:50 [Oral communication] DAPHNE: An Open and Extensible System Infrastructure for Integrated Data  
Analysis Pipelines, Patrick Damme

12:10 [Short paper] TrustS: Probability based trust management system in smart cities  
Bogdan-Costel Mocanu, Gabriel Cosmin Apostol, Dragoș Rădulescu, and Cristina Șerbănescu

12:30 [Break] Lunch (provided)

13:30 [Keynote talk] **Green vs. Exascale HPC : Carbon-neutral site operations, energy efficiency and  
overall sustainability** (sponsored by HPE), Utz-Uwe Haus, Head of the HPE HPC/AI EMEA Research  
Lab

**Session 4: High performance computing – Chair Bogdan-Costel Mocanu**

14:30 [Full paper] APPFIS: An Advanced Parallel Programming Framework for Iterative Stencil Based  
Scientific Applications in HPC Environments, Md Bulbul Sharif and Sheikh Ghafoor

15:00 [Oral communication] A nonblocking approach for the computation of the Laplacian  
Julio Sanchez-Curto and Pedro Chamorro-Posada

15:20 [Short paper] A hybrid clustering algorithm for high-performance edge computing devices  
Giuliano Laccetti, Marco Lapegna, and Diego Romano

18:00 [Conference dinner] Boat trip on the Rhine (included in the registration)

# Program

Best paper award &  
Next year's location

Wednesday, July 13, 2022 (Day 3)

09:00 [Distinguished keynote talk]: **Why is it so Hard to Make Self-driving Cars?**  
Joseph Sifakis, Verimag Laboratory, Grenoble, France, 2007 Turing Award Winner

10:00 [Break] Coffee (provided)

**Session 5: Program and performance analysis – Chair Josef Spillner**

10:30 [Full paper] Performance Comparison of Speculative Taskloop and OpenMP-for-loop Thread Level Speculation on Hardware Transactional Memory, Juan Salamanca

11:00 [Full paper] Analysis and Mitigation of Soft-Errors on High Performance Embedded GPUs  
Luca Sterpone, Sarah Azimi, Corrado De Sio, and Filippo Parisi

11:30 [Full paper] Performance Modeling of Scalable Resource Allocations with the Imperial PEPA Compiler, William Sanders, Srishti Srivastava, and Ioana Banicescu

12:15 [Break] Lunch (provided)

**Session 6: Networking, distributed computing, and scalability – Chair Frédéric Gava**

13:30 [Full paper] Investigating TCP/MPTCP Support for Drop Computing in User Space Network Stacks, Cosmin Stoica, Radu-Ioan Ciobanu, and Ciprian Dobre

14:00 [Full paper] ZPAXOS: An asynchronous BFT PAXOS with a leaderless synchronous group  
Dinesh Amarasekera and Nalin Ranasinghe

14:30 [Oral communication] FARGO: Federated leARNinG for human mobility  
Radu-Ioan Ciobanu and Ciprian Dobre

14:50 [Break] Coffee (provided)

**Session 7: Middleware – Chair Ciprian Dobre**

15:30 [Full paper] Workload Deployment and Configuration Reconciliation at Scale in Kubernetes-Based Edge-Cloud Continuums, Hass Daniel and Josef Spillner

16:00 [Full paper] Optimizing the RJMS of an Academic HPC & Research Computing Facility  
Sebastien Varrette, Emmanuel Kieffer, and Frederic Pinel

16:30 [Full paper] Communication-Efficient Cluster Scalable Genomics Data Processing Using Arrow Flight, Tanveer Ahmad, Chengxin Ma, and Zaid Al Ars

17:00 **ISPDC 2022 Best Paper Award and Closing Remarks** – Florina Ciorba, University of Basel, Switzerland  
**Invitation to ISPDC 2023 in Bucharest, Romania** – Ciprian Dobre, University Politehnica Bucharest, Romania

# Program

Thursday, July 14, 2022 (Day 4 – optional)

08:30

20:30

[Social event] [Hiking in Swiss mountains](#)  
(optional – requires separate ticket)

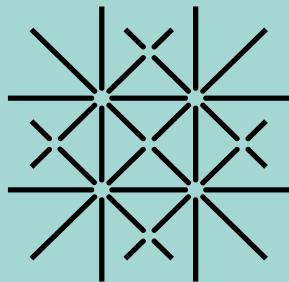
- Oeschinen Lake is a UNESCO World Heritage Site
- Perhaps the most beautiful mountain lake in the Swiss Alps



# ISPDC 2022 People

- [ispdc2022.dmi.unibas.ch/people/](http://ispdc2022.dmi.unibas.ch/people/)
- Program Committee Co-Chairs
- Proceedings Chair
- Publicity Chairs
- Local Organizing Committee
- Program Committee
- Advisory Committee
- Steering Committee





University  
of Basel



IEEE  
COMPUTER  
SOCIETY



Technical Committee on Parallel Processing



**Hewlett Packard  
Enterprise**

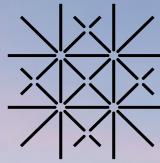
Many thanks to our sponsors

@ISPDC2022  
#ISPDC2022



University  
of Basel





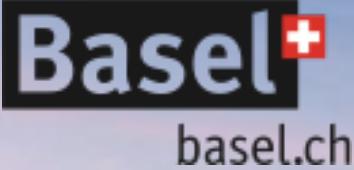
# University of Basel

- 1460: Pope Pius II founded Switzerland's **first university**
- 1527: **Paracelsus** (Medicine)
- 1532: Reformation, University in Augustinian monastery
- 1588: Botanical garden on Rhine terrace
- 1590: University Library (2'700 books from monasteries)
- 1687: Jakob **Bernoulli** (Mathematics)
- 1733: Leonhard **Euler** (Mathematics)
- 1822: Course catalog in German (vs. Latin)
- 1869: Friedrich **Nietzsche** (Classical Philology)
- 1890: Emilie **Frey** (1<sup>st</sup> female student, Medicine)
- 1938: Elsa **Mahler** (1<sup>st</sup> female Professor, Russian & Lit.)
- 1939: Headquarters Kollegienhaus (previously here)
- 1948: Karl **Jaspers** (Philosophy, Psychology, Sociology)
- 1950: Tadeusz **Reichstein** (Nobel Prize for Medicine)
- 1978: Werner **Arber** (Nobel Prize for Medicine)
- 2022: UniBas among the 100 best universities worldwide

13'039 students, 2'900 PhD students, 380 professors  
7 faculties



584 Basel. Kollegienhaus der Universität



**Grüzi!**

Basel – Where the world comes together.

Cultural capital of Switzerland, 40 museums

Well-preserved historic old town

Corner of three different countries:  
Switzerland, France, Germany

Free public transportation for all hotel guests

Free surfing via Basel's own WLAN network

Basel Rhine Swim



# Opening Word President's Office



Torsten Schwede (Vice President of Research, University of Basel, Switzerland)

9:00 July 11, 2022

# Keynote Presentation

## *Easy Development and Execution of Workflows with eFlows4HPC*



Rosa M. Badia (Barcelona Supercomputing Center, Spain)

9:15 July 11, 2022

# Keynote Presentation

*Simulating Our Universe: Leveraging  
Present and Future Supercomputing Systems*



Joachim Stadel (University of Zurich, Switzerland)

13:30 July 11, 2022

# Keynote Presentation

## *The Road to a Universal Internet Machine*



Rachid Guerraoui (EPFL Lausanne, Switzerland)

9:00 July 12, 2022

# Keynote Presentation

*The Green vs. Exascale HPC: Carbon-neutral site operations, energy efficiency, and overall sustainability*



Utz-Uwe Haus (HPE HPC/AI EMEA Research Lab)

13:30 July 12, 2022

Sponsored by



**Hewlett Packard**  
Enterprise

# Keynote Presentation

## *Why is it so Hard to Make Self-driving Cars?*



Joseph Sifakis (Verimag Laboratory Grenoble, France)

9:00 July 13, 2022

