

# International Nanodevices and Computing Conference

Minatec, Grenoble  
April 3-5, 2019

## INC2019 Program - April 3<sup>rd</sup>, 2019

- IRDS International Focus Team Workshops
- IEEE International Conference on Rebooting Computing: “Emerging technology for probabilistic inference” 14:00 - 18:00

|                      |                                                                                                     |                                    |                                                             |
|----------------------|-----------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|
| <b>14:00 - 18:00</b> | <b>ICRC/Session “Emerging technology for probabilistic inference”</b>                               |                                    |                                                             |
| 14:00 - 14:15        | Overview                                                                                            | Dr. Arvind Kumar                   | IBM-US                                                      |
| 14:15 - 14:30        | Presentation                                                                                        | Marvin Faix<br>Dr. Pierre Bessière | Univ. Grenoble Alpes<br>CNRS                                |
| 14:30 - 15:00        | An optical co-processor for large-scale machine learning based on random features                   | Pr. Laurent Daudet                 | Paris Diderot Univ. and CTO & co-founder at LightOn company |
| 15:00 - 15:30        | Generating Stochastic Bits using Tunable Quantum Systems                                            | Dr. Enrique Blair                  | Baylor University                                           |
| 15:30 - 16:00        | Memory Centric Artificial Intelligence                                                              | Dr. Damien Querlioz                | University of Paris-Sud/CNRS                                |
| <b>16:00 - 16:30</b> | <b>Coffee-Break</b>                                                                                 |                                    |                                                             |
| 16:30 - 17:00        | Asynchronous design for new device development                                                      | Dr. Laurent Fesquet                | Grenoble INP                                                |
| 17:00 - 17:30        | Playing with number representations for energy efficiency: an introduction to approximate computing | Pr. Olivier Sentieys               | INRIA, Univ. of Rennes 1                                    |
| 17:30 - 18:00        | Stochastic sampling machine for Bayesian inference                                                  | Raphael Frisch                     | University of Grenoble Alpes                                |

- Panel Session “The next 20 years” 18:00 - 19:30

|                      |                                          |                             |  |
|----------------------|------------------------------------------|-----------------------------|--|
| <b>18:00 - 19:30</b> | <b>Panel Session “The next 20 years”</b> |                             |  |
| 18 - 18:20           | <b>IoT</b>                               | Prof. Adrian Ionescu – EPFL |  |
| 18:20 - 18:40        | <b>Architecture</b>                      | Kirk Bresniker – IRDS       |  |
| <b>18:40 - 18:50</b> | <b>Short Break</b>                       |                             |  |
| 18:50 - 19:10        | <b>Devices</b>                           | Mustafa Badaroglu – IRDS    |  |
| 19: 10 - 19: 30      | <b>Communication</b>                     | Timothy Lee – IEEE          |  |
| <b>19:30 PM</b>      | <b>Welcome Reception Cocktail</b>        |                             |  |



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## INC2019 Program - April 4<sup>th</sup>, 2019

### ● IRDS International Roadmap for Devices and Systems 8:00-13:00

- Overview: Paolo Gargini
- Application Benchmarking: Tom Conte
- System and Architecture: Kirk Bresniker
- More Moore: Mustafa Badaroglu
- Beyond CMOS and Emerging Research Materials: Shamik Das
- Cryogenic Electronics & Quantum Information Processing: Scott Holmes
- Outside System Connectivity: Michael Garner
- Yield Enhancement: Slava Libman
- Factory Integration: Supika Mashiro
- Lithography: Mark Neisser
- Environment, Health, Safety and Sustainability: Leo Kenny
- Metrology: George Orji
- Packaging Integration: Dev Gupta

|                      |                                                                                                                |                        |                                         |
|----------------------|----------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|
| <b>14:00 - 15:15</b> | <b>European NEREID Roadmap Session</b>                                                                         |                        |                                         |
| 14:00 - 14:25        | Overview                                                                                                       | Dr. Francis Balestra   | GINP-CNRS/ Sinano Institute             |
| 14:25 - 14:50        | More than Moore - Smart Energy for power applications & Autonomous IOT Systems                                 | Dr. David Holden       | CEA-LETI                                |
| 14:50 - 15:15        | A novel approach born inside NEREID Project applied to System Design and Heterogeneous Integration roadmapping | Prof. Danilo De Marchi | Politecnico Di Torino                   |
| <b>15:15 - 16:30</b> | <b>Systems and Devices Roadmap of Japan (SDRJ) Session</b>                                                     |                        |                                         |
| 15:15 - 15:30        | Introduction of the System Device Roadmap Committee of Japan (SDRJ), JSAP                                      | Dr. Yoshihiro Hayashi  | Chair of SDRJ/Renesas Electronics       |
| 15:30 - 16:00        | Small to large scale quantum computational systems                                                             | Prof. Kae Nemoto       | NII/SDRJ                                |
| 16:00 - 16:30        | Terahertz Electronics towards the Post-Moore Era                                                               | Dr. Hideyuki Nosaka    | NTT Device Technology Laboratories/SDRJ |
| <b>16:30 - 17:00</b> | <b>Coffee-Break</b>                                                                                            |                        |                                         |
| <b>17:00 - 19:30</b> | <b>Status and trends in Advanced Nanodevices Session</b>                                                       |                        |                                         |
| 17:00 - 17:30        | Small Slope Switches, TFET, FeFET                                                                              | Prof. Adrian Ionescu   | EPFL                                    |
| 17:30 - 18:00        | Advanced Simulation of Nanodevices                                                                             | Prof. Luca Selmi       | IUNET- University of Unimore            |
| 18:00 - 18:30        | 2D Nanodevices: Investigating the electronic properties of oxide/MoS <sub>2</sub> interfaces                   | Prof. Paul Hurley      | Tyndall                                 |
| 18:30 - 19:00        | Ferroelectric and Ionic Analog Memory                                                                          | Prof. Alan Seabaugh    | University Notre Dame, Indiana          |
| 19:00 - 19:30        | Ultrafast Spintronics                                                                                          | Prof. Jeff Bokor       | University California Berkeley          |
| <b>19:30</b>         | <b>Gala Dinner</b>                                                                                             |                        |                                         |



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## INC2019 Program - April 5<sup>th</sup>, 2019

### IEEE International Conference on Rebooting Computing

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|-----------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|
| <b>8:00 - 19:15</b>                                       | <b>IEEE International Conference on Rebooting Computing</b>                                 |                           |                                                                                     |
| 8:00 - 8:15                                               | Opening Remarks                                                                             | Dr. Arvind Kumar          | IBM US                                                                              |
| 8:15 - 9:00                                               | <b>Keynote speaker1 - Future Technologies</b>                                               | <b>Dr Bill Chappell</b>   | Microsystems Technology Office Director / Defense Advanced Research Projects Agency |
| <b>ICRC/Session "Neuromorphic computing"</b>              |                                                                                             |                           |                                                                                     |
| 9:00 - 9:30                                               | Connecting silicon and brain neurons with memristive synapses                               | Prof. Stefano Vassanelli  | University of Padova                                                                |
| 9:30 - 10:00                                              |                                                                                             | Prof. Joshua Yang         | University of Massachusetts                                                         |
| <b>ICRC/Session "Quantum and probabilistic computing"</b> |                                                                                             |                           |                                                                                     |
| 10:00 - 10:30                                             | A CMOS qubit                                                                                | Dr. Marc Sanquer          | INAC                                                                                |
| 10:30 - 11:00                                             | Harnessing uncertainty in circuits and reasoning with probabilistic AI                      | Dr. Jean Simatic          | CEO of Hawai.tech                                                                   |
| <b>11:00 - 11:30</b>                                      | <b>Coffee-Break</b>                                                                         |                           |                                                                                     |
| <b>ICRC/Session "Optical computing"</b>                   |                                                                                             |                           |                                                                                     |
| 11:30 - 12:00                                             | Nanophotonic devices for quantum information processing                                     | Prof. Dr. Carsten Schuck  | University of Münster                                                               |
| 12:00 - 12:30                                             | Encoding a robust qubit in photonic integrated circuits                                     | Dr. Pérola Milman         | University Paris Diderot, LMPQ, CNRS                                                |
| <b>12:30 - 13:30</b>                                      | <b>Lunch</b>                                                                                |                           |                                                                                     |
| 13:30 - 14:15                                             | <b>Keynote speaker 2 - Architecture</b>                                                     | <b>Prof. Wen-mei Hwu</b>  | University of Illinois                                                              |
| <b>ICRC/Session "Energy efficient computing"</b>          |                                                                                             |                           |                                                                                     |
| 14:15 - 14:45                                             |                                                                                             | Dr. Michael Frank         | Sandia National Labs                                                                |
| 14:45 - 15:15                                             |                                                                                             | Natesh Ganesh             | UMass Amherst                                                                       |
| 15:15 - 15:45                                             | Deus ex machina: Energy and effectiveness in stimulated implementations of machine learning | Prof. Sandip Tiwari       | Cornell University                                                                  |
| <b>15:45 - 16:15</b>                                      | <b>Coffee-Break</b>                                                                         |                           |                                                                                     |
| <b>ICRC/Session "Communications" Beyond 5G</b>            |                                                                                             |                           |                                                                                     |
| 16:15 - 16:45                                             |                                                                                             | Dr. Paolo Gargini         | IEEE Future Networks                                                                |
| 16:45 - 17:15                                             |                                                                                             | Dr. Gerhard P. Fettweis   | TU, Dresden                                                                         |
| 17:15 - 17:45                                             |                                                                                             | Timothy Lee               | IEEE                                                                                |
| <b>ICRC/Session "Software"</b>                            |                                                                                             |                           |                                                                                     |
| 17:45 - 18:15                                             |                                                                                             | Dr. Sorin-Cristian Cheran | Hewlett Packard Enterprise                                                          |
| <b>ICRC/Session "Spintronics/Magnonics"</b>               |                                                                                             |                           |                                                                                     |
| 18:15 - 18:45                                             | Magnon Computing                                                                            | Dr. Marius Costache       | ICN2                                                                                |
| 18:45 - 19:15                                             | Bio-inspired computing with stochastic nanomagnets                                          | Dr. Alice Mizrahi         | CNRS Thalès                                                                         |



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## Sponsors:



INTERNATIONAL ROADMAP FOR DEVICES AND SYSTEMS

