Neuromorphic Computing
Session co-chairs: James (Brad) Aimone, Sandia National Laboratories, and Yulia Sandamirskaya, Intel

As modern computing technology contributes more and more to global energy costs, it is increasingly important to reduce power demands of computation. The human brain remains the strongest existence proof of energy-efficient computation, providing intelligence far beyond our current capabilities at orders of magnitude less power than most computing platforms. The brain has been an inspiration for computers since the time of Von Neumann and Turing, but only in recent years has neuromorphic computing become a reality. Today, neuromorphic chips using conventional silicon transistors can provide millions of artificial brain-like neurons on a chip, with materials and device research promising even more energy-efficient scaling in the future. The session *Neuromorphic Computing* will provide an overview of how research in the neuromorphic community is advancing at all technology scales, with brain-inspiration impacting novel algorithms, architectures, and electronics hardware. We will start with a talk on the *Promises and Challenges of Neuromorphic Computing*, which will provide an overview of the field and an outlook for how this emerging technology it will enable energy-efficient computing. The next talk on the *Neuroscience-inspired computing strategies* will highlight how neuroscience, a vast field itself, can be translated into computing. We then will describe how current successful AI strategies, like neural networks, can be converted into *Neuromorphic Artificial Intelligence* algorithms. We will then close the session with a talk that describes the challenges of integrating neuromorphic systems into current computing technologies, with a talk on *Neuromorphic Hardware: A System Perspective*.

Speakers:

Promises and Challenges of Neuromorphic Computing
German speaker: Emre Neftci, Jülich Research Center
https://www.elektrotechnik.rwth-aachen.de/go/id/cjfg/gguid/0xAD43767C262D1B4EACC02EF979CAE443/lidx/1/ikz/6/reverse/1

Neuroscience-inspired Computing Strategies
US speaker: Angel Yaguas-Gil, Argonne National Laboratory
https://www.anl.gov/profile/angel-yanguasgil

Neuromorphic Artificial Intelligence
US speaker: Jean Anne Incorvia, University of Texas at Austin
https://www.ece.utexas.edu/people/faculty/jean-anne-incorvia

Neuromorphic Hardware: A System Perspective
German speaker: Johannes Partzsch, TU Dresden (tbc)
Bio link: https://tu-dresden.de/ing/elektrotechnik/iee/hpsn/die-professur/beschaeftigte#ck_partzsch
https://www.researchgate.net/profile/Johannes-Partzsch