EECS 739: Opportunities in Parallel Scientific Computing

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May 2019
Relevant Conferences

• The International Conference for High Performance Computing, Networking, Storage, and Analysis (i.e., Supercomputing or SC19)
  • **Paper Tracks:** Algorithms; Applications; Architecture and Networks; Clouds and Distributed Computing; Data Analytics, Visualization, and Storage; Machine Learning and HPC; Performance Measurement, Modeling, and Tools; Programming Systems; State of the Practice; System Software
  • **Types of Sessions:** Papers, Panels, Keynote and Invited Talks, Posters, Doctoral Showcase, ACM Student Research Competition, Birds-of-a-Feather, Tutorials, Workshops, Exhibits, and more!
• 10K+ attendees!
• November 2019
• Annual meeting
Relevant Conferences

• **International Conference on Parallel Processing (i.e., ICPP 2019)**
  • **Paper Tracks:** Algorithms, Applications, Architecture, Performance, Software
  • **Types of Sessions:** Papers, Posters, Workshops, Keynote Talks, Tutorials
  • August 2019
  • Annual meeting
Relevant Conferences

• **IEEE International Parallel and Distributed Processing Symposium (i.e., IPDPS 2019)**
  • **Paper Tracks:** Algorithms, Experiments, Program Models, System Software, Architecture, Multidisciplinary
  • **Types of Sessions:** Papers, Workshops, Ph.D. Forum, Tutorials, Panels
  • May 2019
  • Annual meeting
Relevant Conferences

• **International European Conference on Parallel and Distributed Computing (EURO-PAR 19)**
  
  • **Paper Topics:** Support Tools and Environments; Performance and Power Modeling, Prediction, and Evaluation; Scheduling and Load Balancing; High Performance Architectures and Compilers; Data Management, Analytics, and Deep Learning; Cluster and Cloud Computing; Distributed Systems and Algorithms; Parallel and Distributed Programming, Interfaces, and Languages; Multicore and Manycore Parallelism; Theory and Algorithms for Parallel Computation and Networking; Parallel Numerical Methods and Applications; Accelerator Computing; Algorithms and Systems for Bioinformatics; Algorithms and Systems for Digital Humanities

  • **Types of Sessions:** Papers, Workshops, Posters, Tutorials,

  • August 2019

  • Annual meeting
Relevant Conferences

• SIAM Conference on Parallel Processing for Scientific Computing (i.e., SIAM PP20)
  • **Paper Topics:** the design of numerical and discrete algorithms in the context of modern parallel computer architectures, covering both theory and practice. **Specific topics:** parallel algorithms, scalable scientific computing, simulation, visualization, and machine learning. *(New for 2020!)*
  • **Types of Sessions:** Papers, Plenary Talks, Award Talks, Minisymposia, Contributed Talks, Posters
  • **February 2020**
  • **Held every two years**
Relevant Conferences

• **IEEE Cluster Conference (IEEE Cluster 2019)**
  • **Paper Tracks:** Applications, Algorithms, and Libraries; Architecture, Networks/Communication, and Management; Programming and Systems Software; Data, Storage, and Visualization
  • **Types of Sessions:** Papers, Workshops, Posters, Tutorials, Panels
  • **September 2019**
  • **Annual meeting**
Relevant Conferences

• **International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)**
  • **Paper Tracks:** Computer Architecture; Programming models and runtimes for parallel systems; System software for distributed computing; Applications and performance evaluation
  • **Types of Sessions:** Papers, Workshops, Tutorials, Posters, Keynote Talks
  • October 2019
  • Annual meeting
Relevant Journals

• **Journal of Parallel and Distributed Computing**
  • **Topics**: Theory of parallel/distributed computing; parallel algorithms and their implementation; innovative computer architectures; shared-memory multiprocessors; peer-to-peer systems; distributed sensor networks; pervasive computing; optical computing; software tools and environments; languages, compilers, and operating systems; fault-tolerant computing; applications and performance analysis; bioinformatics; cyber trust and security; parallel programming; grid computing
Relevant Journals

• **Parallel Computing**
  
  • **Topics:** System software for parallel computer systems including programming languages, operating systems, and resource management; enabling software including debuggers, performance tools, and system and numeric libraries; general hardware (architecture) concepts, new technologies enabling the realization of such new concepts, and details of commercially available systems; software engineering and productivity as it relates to parallel computing; application or tool case studies demonstrating novel ways to achieve parallelism; performance measurement results on state-of-the-art systems; approaches to effectively utilize large-scale parallel computing including new algorithms or algorithm analysis with demonstrated relevance to real applications using existing or next generation parallel architectures; parallel I/O systems both hardware and software; networking technology for support of high-speed computing demonstrating the impact of high-speed computation on parallel applications.

• They do not publish papers about single GPU or single node (i.e., one address space) systems.
Relevant Journals

• **International Journal of Parallel Programming**
  • **Topics**: linguistic foundations, conceptual frameworks, high-level languages, evaluation methods, implementation techniques, programming support systems, pragmatic considerations, architectural characteristics, software engineering aspects, advances in parallel algorithms, performance studies, and application studies
Relevant Journals

• **Cluster Computing**
  
  • **Description:** Cluster Computing addresses the latest results in these fields that support **High Performance Distributed Computing (HPDC)**. In HPDC environments, parallel and/or distributed computing techniques are applied to the solution of computationally intensive applications across networks of computers. The journal represents an important source of information for the growing number of researchers, developers and users of HPDC environments. The journal provides a forum for presenting the latest research and technology in the fields of **parallel processing, distributed computing systems and computer networks**.
Relevant Journals

• **International Journal of High Performance Computing Applications**
  
  • **Description:** IJHPCA provides original peer reviewed research papers and review articles on the **use of supercomputers to solve complex modeling problems in a spectrum of disciplines**.
  
  • **Topics include:** artificial intelligence, climate modeling, cryptographic analysis, geophysics, molecular biology, molecular dynamics, nuclear physics, physical oceanography...
Research Topics

• Exascale computing (a billion billion calculations per second!)
• MPI+X
• GPGPU computing
• HPC and machine learning
• Novel hardware
• Power-awareness, energy efficiency
• Fault tolerance
• Novel applications
Employers

• **Department of Energy Laboratories** – Argonne National Laboratory (Illinois), Lawrence Berkeley National Laboratory (California), Lawrence Livermore National Laboratory (California), Los Alamos National Laboratory, Oak Ridge National Laboratory (Tennessee), Sandia National Laboratory (California and New Mexico)


• **Academia** – University of Illinois at Urbana-Champaign (Blue Waters System), University of Texas at Austin (Stampede). Lots of universities have parallel computing as a research focus.
Other

• Argonne Training Program on Extreme-Scale Computing, July 28-August 9, 2019

• XSEDE Supercomputing Resources and Allocations