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James Gregory Pauloski, Rohan Basu Roy, and Hua Huang Named Recipients of 2023 ACM-IEEE CS George Michael Memorial HPC Fellowships

New York, NY, **October 26, 2023** – ACM, the Association for Computing Machinery, and the IEEE Computer Society announced today that James Gregory Pauloski of the University of Chicago and Rohan Basu Roy of Northeastern University are the recipients of the 2023 ACM-IEEE CS George Michael Memorial HPC Fellowships. Hua Huang of the Georgia Institute of Technology received an Honorable Mention. Pauloski is recognized for developing systems for optimal HPC resource usage from scalable optimization methods for deep learning training to data fabrics for sophisticated applications spanning heterogeneous resources. Roy is recognized for enhancing the productivity of computational scientists and environmental sustainability of HPC with novel methods and tools exploiting cloud computing and on-premise HPC resources. Huang is recognized for contributions to high performance parallel matrix algorithms and implementations and their application to quantum chemistry calculations.

J. Gregory Pauloski
Pauloski's aim is to build tools that are approachable and easily used by HPC novices and experts alike. His research approaches HPC from two aspects: efficient large scale machine learning (ML) training, and data fabrics that support distributed and federated scientific applications. The rapid increase in demand for AI tools (e.g., ChatGPT, LaMDA, etc.) has promoted scalable deep learning to a core challenge for HPC. Pauloski has made advancements in system software and algorithms to efficiently use novel hardware systems for AI applications. He has also worked on the development of federated applications which span heterogeneous systems composed of specialized accelerators, edge devices, cloud compute, and HPC. Pauloski's work on data fabrics enables autonomous actors to communicate efficiently and reliably, independent of location.

In addition to his technical contributions, Pauloski's colleagues have cited his work as a role model and mentor for younger students.

Rohan Basu Roy

Roy designs new tools and methods for enhancing HPC programmer productivity and making large-scale computing systems more cost-effective and environmentally sustainable.

The key challenges computational scientists face include the time required to performance-tune their code and the time required to efficiently provision and utilize computing resources. To address these challenges, Roy has designed HPC performance auto-tuner tools to significantly improve the program productivity. Roy's research contributions include the first demonstration of significant productivity and performance advantages of the serverless computing model for complex scientific workflows, including quick elasticity in the cloud (eliminating the long queue wait time), ease of use, and opportunistic co-location for better resource utilization.

Opportunistic co-location of workloads in the cloud reduces the carbon footprint of on-premise HPC cluster/supercomputer -- Roy continues to aim toward improving the environmental sustainability of HPC systems as their carbon footprint is increasing rapidly.

Hua Huang

Huang has focused on developing new algorithms and implementations for high-performance matrix computations. His research problems have mostly come from the area of quantum chemistry and electronic structure calculations. Huang's innovations have been integrated into widely used codes such as Psi4, NWChem, and SPARC, as well as a proxy application, GTFock, from Georgia Tech.

His many contributions include developing a high-performance, multi-purpose, rank-structured matrix library for multiple scientific computing tasks, designing innovative parallel algorithms for large-scale matrix operations, etc. He also introduced new optimization strategies for constructing the Fock and density matrices in quantum chemistry calculations.

About the ACM IEEE CS George Michael Memorial Fellowship

The ACM-IEEE CS George Michael Memorial HPC Fellowship is endowed in memory of George Michael, one of the founders of the SC Conference series. The fellowship honors exceptional PhD students throughout the world whose research focus is on high performance computing applications, networking, storage, or large-scale data analytics using the most powerful computers that are currently available. The Fellowship includes a $5,000 honorarium and travel expenses to attend the SC conference, where the Fellowships are formally presented.

About ACM

ACM, the Association for Computing Machinery, is the world's largest educational and scientific computing society, uniting computing educators, researchers, and professionals to inspire dialogue, share resources, and address the field's challenges. ACM strengthens the computing profession's collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

About SC

SC, the International Conference for High Performance Computing, sponsored by ACM and IEEE-CS offers a complete technical education program and exhibition to showcase the many ways high performance computing, networking, storage, and analysis lead to advances in scientific discovery, research, education and commerce. This premier international conference includes a globally attended technical program, workshops, tutorials, a world class exhibit area, demonstrations, and opportunities for hands-on learning.

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