

Data Science Seminar Series

An Overview of High Performance Computing and Future Requirements



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Date: Wednesday, October 20th, 2021

Time: 4:00 PM – 5:00 PM EDT

Location: Zoom Virtual Room

Web Link: <https://njit-institute-for-data-science.eventbrite.com>

In this talk we examine how high performance computing has changed over the last 10-year and look toward the future in terms of trends. These changes have had and will continue to have a major impact on our numerical scientific software. A new generation of software libraries and algorithms are needed for the effective and reliable use of (wide area) dynamic, distributed and parallel environments. Some of the software and algorithm challenges have already been encountered, such as management of communication and memory hierarchies through a combination of compile--time and run--time techniques, but the increased scale of computation, depth of memory hierarchies, range of latencies, and increased run--time environment variability will make these problems much harder.

Jack Dongarra holds an appointment at the University of Tennessee, Oak Ridge National Laboratory, and the University of Manchester. He specializes in numerical algorithms in linear algebra, parallel computing, the use of advanced computer architectures, programming methodology, and tools for parallel computers. He was awarded the IEEE Sid Fernbach Award in 2004; in 2008, he was the recipient of the first IEEE Medal of Excellence in Scalable Computing; in 2010, he was the first recipient of the SIAM Special Interest Group on Supercomputing's award for Career Achievement; in 2011 he was the recipient of the IEEE Charles Babbage Award; in 2013 he received the ACM/IEEE Ken Kennedy Award; in 2019 he received the ACM/SIAM Computational Science and Engineering Prize, and in 2020 he received the IEEE-CS Computer Pioneer Award. He is a Fellow of the AAAS, ACM, IEEE, and SIAM and a foreign member of the Russian Academy of Science, a foreign member of the British Royal Society, and a US National Academy of Engineering member.