

Future Directions for NSF's Advanced Cyberinfrastructure

Committee

Daniel A. Reed

Chair

Daniel A. Reed is Presidential Professor (emeritus) in Computer and Computational Science at the University of Utah, where he previously served as Senior Vice President for Academic Affairs (Provost). He has served in a variety of senior academic and industry roles, including as Vice President for Research at the University of Iowa and as Microsoft's Corporate Vice President for Technology Policy and Extreme Computing. While at Microsoft, he helped shape Microsoft's long-term vision for technology innovations in cloud computing and the company's policy engagement with governments and institutions worldwide. Before joining Microsoft, he was the founding director of the Renaissance Computing Institute (RENCI) at the University of North Carolina at Chapel Hill and both Head of the Department of Computer Science and Director of the National Center for Supercomputing Applications (NCSA) at the University of Illinois. Dr. Reed just completed two years as chair of the U.S. National Science Board (NSB), which provides oversight for the U.S. National Science Foundation, and serves as a member of the Internet2 Board of Trustees. For a decade, he also served as chair of the U.S. Department of Energy's Advanced Science Computing Advisory Committee. Dr. Reed has also served as a member of the U.S. President's Council of Advisors on Science and Technology (PCAST) and the U.S. President's Information Technology Advisory Committee (PITAC). He is the past chair of the Board of Directors of the Computing Research Association (CRA), which represents PhD-granting computer science departments in North America. As chair of CRA, he was one of the co-founders of the Computing Community Consortium (CCC), responsible for envisioning new ideas on computing research. Dr. Reed is a Fellow of the ACM, the IEEE, and the AAAS. He received his B.S. from Missouri University of Science and Technology and his M.S. and Ph.D. from Purdue University, all in computer science.

Todd Gamblin

Member

Todd Gamblin is a Distinguished Member of Technical Staff in the Livermore Computing division at Lawrence Livermore National Laboratory (LLNL). He leads cloud collaborations and software strategy in LLNL's Advanced Technology Office. He is the General Chair of the Governing Board of the High Performance Software Foundation, which he co-founded. Todd created Spack, a widely used open-source software management tool for High Performance Computing (HPC). In the past, he led the Packaging Technologies Project under the U.S. Exascale Computing Project, as well as R&D projects on software integration and parallel performance analysis. Todd's research interests include dependency management, software, parallel computing, performance analysis, and cloud/HPC convergence.

Todd has been at LLNL since 2008. He received the Early Career Research Award from the U.S. Department of Energy in 2014, an R&D 100 award in 2019, the LLNL Director's Science & Technology Award in 2020, and the DOE Secretary's Honor Award for leadership in the Exascale Computing Project in 2024. He received Ph.D. and M.S. degrees in Computer Science from the University of North Carolina at Chapel Hill in 2009 and 2005, and his B.A. in Computer Science from Williams College in 2002.

William D. Gropp

Member

William Gropp is a professor of Computer Science in the Siebel School of Computing and Data Science and holds a Grainger Distinguished Chair in Engineering at the University of Illinois in Urbana-Champaign. He was Director of the National Center for Supercomputing Applications from 2016-2025. Previously, he was at Yale University from 1982-1990 and at Argonne National Laboratory from 1990-2007. His research interests are in parallel computing, software for scientific computing, and numerical methods for partial differential equations. He is a Fellow of AAAS, ACM, IEEE, and SIAM and a member of the National Academy of Engineering and has received both the IEEE CS Sidney Fernbach Award and ACM/IEEE CS Ken Kennedy Award. He was president of the IEEE Computer Society in 2022. He co-chaired the National Academy's Committee on Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science from 2013-2015. He received his Ph.D. in Computer Science from Stanford University in 1982.

Gropp is a member of the board of the Computing Research Association and Chair of the Computing Community Consortium.

Torsten Hoefler

Member

Torsten Hoefler is a Professor of Computer Science at ETH Zurich, a member of Academia Europaea, and a Fellow of the ACM, IEEE, and ELLIS. He received the 2024 ACM Prize in Computing, one of the highest honors in the field. His research interests revolve around the central topic of "Performance-centric System Design" and include artificial intelligence, scalable networks, parallel programming techniques, and performance modeling. Torsten won best paper awards at the ACM/IEEE Supercomputing Conference SC10, SC13, SC14, SC19, SC22, SC23, SC24, HPDC'15, HPDC'16, IPDPS'15, and other conferences. He published hundreds of peer-reviewed scientific conference and journal articles and authored chapters of the MPI-2.2 and MPI-3.0 standards. He received the IEEE CS Sidney Fernbach Award, the ACM Gordon Bell Prize 2019, the ACM Gordon Bell Prize for Climate Modeling 2025, the ISC Jack Dongarra award, the Latsis prize of ETH Zurich, as well as the German Max Planck-Humboldt Medal. Additional information about Torsten can be found on his homepage at htor.ethz.ch.

The conflict-of-interest policy of the National Academies of Sciences, Engineering, and Medicine (<http://www.nationalacademies.org/coi>) prohibits the appointment of an individual to a committee authoring a Consensus Study Report if the individual has a conflict of interest that is relevant to the task to be performed. An exception to this prohibition is permitted if the National Academies determines that the conflict is unavoidable and the conflict is publicly disclosed. A determination of a conflict of interest for an individual is not an assessment of that individual's actual behavior or character or ability to act objectively despite the conflicting interest.

Dr. Hoefler has a conflict in relation to his service on the Committee on Future Directions for NSF's Advanced Cyberinfrastructure because he consults for Microsoft Corporation.

The National Academies has concluded that for the committee to accomplish the tasks for which it was established, its membership should include at least one member with current experience with industry innovations in AI and high-performance computing. As described in his biographical summary, as a consultant for Microsoft in the areas of large-scale AI and networking and as chief architect for machine learning at the Swiss National Supercomputing Center, Dr. Hoefler has extensive experience with development of the next generation high-performance computer architectures and the use of machine learning for scientific discovery as well as deep knowledge about technology directions for high-performance computing in both academic and industrial settings. He is also cochair of the Ultra Ethernet Consortium's Transport Working Group, contributing to advancements in networking technologies aligned with the committee's focus.

The National Academies has determined that the experience and expertise of Dr. Hoefler is needed for the committee to accomplish the task for which it has been established. The National Academies could not find another available individual with the equivalent experience and expertise who did not have a conflict of interest. Therefore, the National Academies has concluded that the conflict is unavoidable.

The National Academies believes that Dr. Hoefler can serve effectively as a member of the committee, and the committee can produce an objective report, considering the composition of the committee, the work to be performed, and the procedures to be followed in completing the study.

Ruth Marinshaw

Member

Ruth Marinshaw joined Yale University in 2024 as Executive Director of Research Computing Technologies, after serving as CTO for Research Computing at Stanford University for twelve years. With thirty years of experience leading research technology services in higher education, Marinshaw has both broad and deep experience in supporting scientific computation and data analysis across domains and in creating technology solutions to meet evolving user needs. In addition to developing and leading cyberinfrastructure services at major research institutions, she has contributed expertise to national CI discussions and organizations including the NSF XSEDE program as a service provider, as chair of the Service Provider forum, and as a Program Advisory committee member; the Coalition for Academic Scientific Computation; and through multiple leadership roles associated with the PEARC (Practice and Experience in Research Computing) conference series. She also served as co-chair of the NSF Advisory Committee for Cyberinfrastructure and as a member of the NAIRR Pilot Subcommittee. Her undergraduate and graduate degrees were from the University of North Carolina at Chapel Hill.

Michael L. Norman

Member

Michael Norman is Distinguished Professor, Graduate Division at UC San Diego affiliated with the Department of Astronomy & Astrophysics. Previously he directed the San Diego Supercomputer Center, also at UCSD. He has held appointments at Lawrence Livermore and Los Alamos national laboratories, the Max Planck Institute for Astrophysics, and the National Center for Supercomputing Applications. His research focus is the development of community codes for astrophysical fluid and cosmological simulations on supercomputers. His current research interests include asynchronous task-based parallel adaptive mesh refinement and the formation of the first stars and galaxies in the universe. His computer visualizations have appeared in numerous educational TV shows and films, including PBS Nova and The Discovery Channel. He is the recipient of the Alexander von Humboldt Research Prize and the IEEE Sidney Fernbach Award. He is a Fellow of the American Physical Society and the American Academy of Arts & Sciences.

Amanda Randles

Member

Amanda Randles is the Alfred Winborne Mordecai and Victoria Stover Mordecai Associate Professor of Biomedical Sciences and Biomedical Engineering at Duke University. She also holds courtesy appointments in Mechanical Engineering and Material Science, Computer Science, and Mathematics and is a member of the Duke Cancer Institute. Prior to her academic career, she worked as a software engineer at IBM on the Blue Gene supercomputing team.

Her research focuses on high performance computing, machine learning, and personalized modeling to advance the diagnosis and treatment of diseases, including cardiovascular disease and cancer. She has developed pioneering methods integrating computational modeling and machine learning to simulate and predict disease progression and treatment outcomes.

Dr. Randles has received numerous prestigious honors, including the ACM Prize in Computing, the NIH Pioneer Award, the NSF CAREER Award, the ACM Grace Hopper Award, and the Presidential Early Career Award for Scientists and Engineers (PECASE). She was named to the World Economic Forum Young Scientist List, the MIT Technology Review Innovators Under 35 list, and is a Fellow of the National Academy of Inventors.

She earned her Ph.D. in Applied Physics and M.S. in Computer Science from Harvard University as a DOE Computational Science Graduate Fellow and NSF Fellow. She holds a B.A. in Computer Science and Physics from Duke University.

Valerie Taylor

Member

Valerie Taylor is the Director of the Mathematics and Computer Science Division at Argonne National Laboratory. She received her Ph.D. in Electrical Engineering and Computer Science from the University of California, Berkeley, in 1991. She then joined the faculty in the Electrical Engineering and Computer Science Department at Northwestern University, where she was a member of the faculty for 11 years. In 2003, she joined Texas A&M, where she served as Head of the Computer Science and Engineering Department and Senior Associate Dean of Academic Affairs in the College of Engineering and a Regents Professor and the Royce E. Wisenbaker Professor in the Department of Computer Science. Her research is in the area of performance analysis and modeling of parallel, scientific applications. Currently, she is focused on the areas of performance analysis, power analysis, and resiliency. Dr. Taylor is the Executive Director of the Center for Minorities and People with Disabilities in IT (CMD-IT). The organization seeks to develop the participation of minorities and people with disabilities in the IT workforce in the United States.

Katherine A. Yelick

Member

Katherine Yelick is the Vice Chancellor for Research and the Robert S. Pepper Distinguished Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley. She is an internationally recognized expert in high-performance computing. Her research interests include parallel programming languages, automatic performance tuning, parallel algorithms, and computational genomics. Yelick concurrently holds a senior faculty scientist appointment at Lawrence Berkeley National Laboratory, where she was an associate lab director of the Computing Sciences Area from 2010 through December 2019. Yelick was also Director of the National Energy Research Scientific Computing Center (NERSC) from 2008 through 2012. She is also a co-principal investigator for the NSF-funded CloudBank cloud access entity. Dr. Yelick earned her Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology.