

*PUBLIC AGENDA*

**Foundational Research Gaps and Future Directions for Digital Twins**  
**Meeting Agenda: November 21, 2022**

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**OPEN SESSION**

- 11:00 a.m.<sup>1</sup> Opening Remarks**  
*Karen Willcox, Chair*
- 11:05 a.m. Digital Twins and the essential, mathematical, statistical and computing research foundations**  
*Mark Girolami*  
*Chief Scientist, The Alan Turing Institute; Sir Kirby Laing Professor of Civil Engineering, University of Cambridge*
- 11:15 a.m. Presentation from Michael Mahoney**  
*Professor of Statistics, UC Berkeley*
- 11:25 a.m. Joint Q&A with Mark & Michael**
- 11:40 a.m. Digital Twins and NVIDIA Omniverse**  
*Jack Wells*  
*Science Program Manager for HPC/Supercomputing, NVIDIA*
- 11:50 a.m. Q&A with Jack**
- 12:00 p.m. ADJOURN**

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<sup>1</sup> All times ET

**Speaker Biographies**

**Mark Girolami**

Mark Girolami is a Computational Statistician having ten years experience as a Chartered Engineer within IBM. In March 2019 he was elected to the Sir Kirby Laing Professorship of Civil Engineering within the Department of Engineering at the University of Cambridge where he also holds the Royal Academy of Engineering Research Chair in Data Centric Engineering. Prior to joining the University of Cambridge he held the Chair of Statistics in the Department of Mathematics at Imperial College London. He was one of the original founding Executive Directors of the Alan Turing Institute the UK's national institute for Data Science and Artificial Intelligence, after which he was appointed as Strategic Programme Director at Turing, where he established and led the Lloyd's Register Foundation Programme on Data Centric Engineering. Since October 2021 he serves as the Chief Scientist of the Alan Turing Institute.

Professor Girolami is an elected fellow of the Royal Academy of Engineering, the Royal Society of Edinburgh, was an EPSRC Advanced Research Fellow (2007-2012), an EPSRC Established Career Research Fellow (2012-2018), and a recipient of a Royal Society Wolfson Research Merit Award. He delivered the IMS Medallion Lecture at the Joint Statistical Meeting 2017, and the Bernoulli Society Forum Lecture at the European Meeting of Statisticians 2017. In 2020 Professor Girolami delivered the BCS and IET Turing Talk in London, Manchester, and Belfast.

**Michael Mahoney**

Michael W. Mahoney is at the University of California at Berkeley in the Department of Statistics and at the International Computer Science Institute (ICSI). He is also an Amazon Scholar as well as head of the Machine Learning and Analytics Group at the Lawrence Berkeley National Laboratory. He works on algorithmic and statistical aspects of modern large-scale data analysis. Much of his recent research has focused on large-scale machine learning, including randomized matrix algorithms and randomized numerical linear algebra, scalable stochastic optimization, geometric network analysis tools for structure extraction in large informatics graphs, scalable implicit regularization methods, computational methods for neural network analysis, physics informed machine learning, and applications in genetics, astronomy, medical imaging, social network analysis, and internet data analysis. He received his PhD from Yale University with a dissertation in computational statistical mechanics, and he has worked and taught at Yale University in the mathematics department, at Yahoo Research, and at Stanford University in the mathematics department. Among other things, he was on the national advisory committee of the Statistical and Applied Mathematical Sciences Institute (SAMSI), he

was on the National Research Council's Committee on the Analysis of Massive Data, he co-organized the Simons Institute's fall 2013 and 2018 programs on the foundations of data science, he ran the Park City Mathematics Institute's 2016 PCMI Summer Session on The Mathematics of Data, he ran the biennial MMDS Workshops on Algorithms for Modern Massive Data Sets, and he was the Director of the NSF/TRIPODS-funded FODA (Foundations of Data Analysis) Institute at UC Berkeley. More information is available at <https://www.stat.berkeley.edu/~mmahoney/>

### **Jack Wells**

Jack Wells is Scientific Program Manager at NVIDIA, where he engages thought leaders across the scientific computing ecosystem, focusing on aligning the NVIDIA computing platform with stakeholder goals and mission. Jack joined NVIDIA in 2021 following 23 years at Oak Ridge National Laboratory where he was part of the team that delivered three world-leading supercomputers, serving as Director of Science for the Oak Ridge Leadership Computing Facility, a Department of Energy, Office of Science national user facility. He has authored or co-authored more than 100 scientific papers and edited two books. His research interests span nanoscience, materials science and engineering, nuclear and atomic physics, computational science, applied mathematics, and data analytics. Jack has a PhD in Physics from Vanderbilt University. He is serving in the chair line of the American Physical Society's Division of Computational Physics, and is President of OpenACC, a consortium dedicated to the research community's advancement by expanding accelerated and parallel computing capabilities.