ANTICIPATING RARE EVENTS OF MAJOR SIGNIFICANCE: AN UNCLASSIFIED WORKSHOP

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Christopher L. Barrett is an endowed Distinguished Professor in Biocomplexity, the founding Executive Director of the Biocomplexity Institute, and Professor of the Department of Computer Science at the University of Virginia. Over the past 35 years, Barrett has conceived, founded, and led interdisciplinary complex systems research projects and organizations, established national and international technology programs, and co-founded organizations for federal agencies including: the Department of Defense, the Department of Energy, the Department of Homeland Security and the Department of Transportation. Barrett received the 2012–2013 Jubilee Professorship in Computer Science and Engineering at Chalmers University in Sweden and is a member of the 2010 Royal Colloquium for the King of Sweden. He was a distinguished international professor at the Royal Institute of Technology in Stockholm. He has received Distinguished Research, Service, Advisory and Security Awards from the U.S. Navy, Los Alamos National Laboratory, and the Alliance for Transportation Research. He has served as advisor to U.S. government agencies, the Commonwealth of Virginia, the European Commission, and others. He is the author and coauthor of over 100 peer-reviewed papers and presentations. He holds seven patents and has ten pending. Barrett holds a PhD in Bioinformation Systems/Engineering Science and MS in Engineering Science from California Institute of Technology and a U.S. Navy Aerospace Experimental Psychology, Medical Service Corps Post PhD Certification.

T. Charles Clancy is senior vice president, general manager of MITRE Labs, and chief futurist. He is responsible for sparking innovative disruption, accelerating risk-taking and discovery, and delivering real-time technology capabilities and execution through the company's laboratories, solution platforms, and MITRE Fellows program. He leads technical innovation to anticipate and meet the future demands of government sponsors and industry and academic partners. Clancy is an internationally recognized expert on topics at the intersection of wireless, cybersecurity, and artificial intelligence.

Before joining MITRE in 2019 as vice president for intelligence programs, Clancy served as the Bradley Distinguished Professor in Cybersecurity at Virginia Tech and executive director at the Hume Center for National Security and Technology. There, he led Virginia Tech's research and experiential learning programs in defense and intelligence. He started his career at the National Security Agency, filling a variety of research, engineering, and operations roles, with a focus on wireless communications. He has co- authored more than 250 patents and academic publications, as well as six books. He co-founded several venturebacked security startup companies that apply commercial innovation to national security challenges.

Clancy is an IEEE Fellow and sits on the AFCEA International Board of Directors' Executive Committee, the AFCEA Intelligence Committee, the Intelligence and National Security Alliance Advisory Committee, the Systems Engineering Research Center Advisory Board, the Alliance for Telecommunications Industry Solutions Next G Alliance, and the Center for New American Security Task Force on Artificial Intelligence and National Security. He also serves on advisory boards at Howard University, Norfolk State University, North Carolina A&T State University, and Virginia Tech. In 2021, WashingtonExec magazine named Clancy one of the nation's Top Climate Executives to Watch.Clancy holds a bachelor's degree in computer engineering from the Rose-Hulman Institute of Technology, a master's degree in electrical engineering from the University of Illinois at Urbana-Champaign, and a doctorate in computer science from the University of Maryland, College Park.

Madeleine Clare Elish is a cultural anthropologist whose work examines the social impacts of AI and automation on society. She recently joined Google as a Senior Research Scientist working on the Ethical AI team. Previously, she co-founded and led the AI on the Ground Initiative at Data & Society Research Institute, which uses social science research to inform future design, use, and governance of automated and AI systems. She has conducted field work across varied industries and communities, ranging from the Air Force, the driverless car industry, and commercial aviation to precision agriculture and emergency healthcare. Her research has been published and cited in scholarly journals as well as publications including The New York Times, Wired, The Guardian, MIT Tech Review, Vice, and USA Today. She holds a PhD in Anthropology from Columbia University and an S.M. in Comparative Media Studies from MIT.

Jeffrey J. Love has an A.B. in physics from the University of California, Berkeley, and a Ph.D. in geophysics from Harvard University. After receiving his doctorate in 1993, Jeffrey worked at the University of Leeds, England, the Atomic Energy Commission, France, and the Scripps Institution for Oceanography, La Jolla, California. In 2001, he was hired by the U.S. Geological Survey (USGS) as a research geophysicist, and he is presently the USGS Advisor for Geomagnetic Research. Jeffrey works in collaboration with colleagues on three subjects: 1. Using geomagnetic monitoring data and magnetotelluric survey data to evaluate geoelectric hazards of concern to the electric-power grid industry. 2. Statistical analysis of the rare occurrences of intense magnetic storms. 3. Analysis of historical records of past space-weather events and their impacts. Jeffrey also works to coordinate USGS projects with other government agencies through the Space Weather Operations Research and Mitigation (SWORM) working group of the National Science and Technology Council (NSTC).

Madhav Marathe is a Distinguished Professor in Biocomplexity, the division director of the Networks, Simulation Science and Advanced Computing Division at the Biocomplexity Institute and Initiative, and a Professor in the Department of Computer Science at the University of Virginia (UVA). His research interests are in network science, computational epidemiology, AI, foundations of computing, socially coupled system science and high performance computing. Over the past 25 years, he and his colleagues have developed scalable computational methods to study the social, economic and health impacts of large-scale natural and human initiated disasters. The tools and methods have been used in over 50 case studies to inform and assess various policy questions pertaining to planning and response in the event of such disasters. Before joining UVA, he held positions at Virginia Tech, the Los Alamos National Laboratory and was the inaugural George Michael Fellow at the Lawrence Livermore National Laboratory. He is a Fellow of the American Association for the Advancement of Science (AAAS), Society for Industrial and Applied Mathematics (SIAM), Association for Computing Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE).

Alon Orlitsky, planning committee member. He is currently a professor of Electrical and Computer Engineering and of Computer Science and Engineering at UC San Diego where he holds the Qualcomm Chair in Information Theory and its Applications. His research focuses on learning from scarce data and on predicting rare and even unseen events, which received several paper awards from the IEEE Transactions on Information Theory, and the NeurIPS and ICML conferences. He graduated from Stanford University with a Ph.D. degree in Electrical Engineering.

M. Elisabeth Pate-Cornell is the Burt and Deedee McMurtry Professor and Chair of the Department of Management Science and Engineering at Stanford University. Her specialty is engineering risk analysis with application to complex systems (space, medical). Her research has focused on explicit consideration of human and organizational factors in the analysis of failure risks, and recently on the use of game theory in risk analysis. Applications in the last few years have included counter-terrorism and nuclear counter-proliferation problems. She is a member of several boards, including Aerospace, Draper, and InQtel. She was a member of the President's Foreign Intelligence Advisory Board until December 2008. She received a Ph.D. in engineering economic systems from Stanford University. Dr. Pate-Cornell was elected to the National Academy of Engineering in 1995.

Nestor Alfonzo Santamaria is an expert in adaptation and disaster risk management and currently serves as a senior advisor on risk governance for the Organisation for Economic Co-operation and Development (OECD) working for the Governance Reviews and Partnerships Division, within the Public Governance Directorate. Prior to his current position, he worked on resilience and disaster management policy in several UK ministries and for the government of London's Financial District (the City of London). Nestor has also advised on disaster management issues for the European Union, various UN agencies, the World Bank and the Inter-American Development Bank. In Latin America, Nestor has worked on political violence prevention and peacebuilding initiatives, electoral observation, human rights promotion and support to refugees/internally displaced persons.

Arvand Satyam is the Chief Commercial Officer of Pano, a purpose-driven business to address climate change-related disasters and infrastructure resilience using IoT and AI solutions & Venture Partner at Ozone Ventures. Previously, Managing Director, Global Public Sector at Cisco; led growth initiatives for \$13Bn public sector business including critical infrastructure, cyber security strategy for state and national governments and public private partnerships with multinational institutions. Formerly, led telco service provider sales, strategic partnerships and venture investments for Cisco's IOT & Smart Citybusinesses. Undergraduate degree and Master's in Computer Science and Finance, University of New South Wales; alumnus, Harvard Business School; studies, Kenan-Flagler Business School, University of North Carolina (UNC). Adams Advisor, UNC. Member: Advisory Board, World Sensing, EQITII and Urbanise; Governor of Illinois's Technology Advisory Board. Investor and advisor to several companies. Has contributed to articles for the Wall Street Journal, Bloomberg Finance, the Atlantic, the New York Times, Fortune, Harvard Business School Alumni Magazine and L'Atelier. Young Leader, World Cities Summit (2016); Young Global Leader, World Economic Forum (2018). Academy judge for \$1M Varkey Foundation Global Teacher Prize.