Scalable Distributed Deep/Machine Learning:
Challenges and Opportunities in Handling Societal Problems

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With High-Level Panel of Leaders in Science, Technology, On-the-Ground Action, and Policy

Thursday, April 7, 2022 | 11 AM to 1 PM EST (2 hours in duration)

For Remote Participation, please register HERE

ABSTRACT: The talk begins by motivating the need for Deep/Machine Learning (DL/ML) to address various societal problems including digital pathology, digital agriculture, smart foodsheds, and animal ecology. Next, it focuses on challenges and opportunities emerging over the years (past, present, and future) in designing scalable distributed DL/ML solutions. I will focus on MPI-driven solutions for the DL/ML domains to extract performance and scalability for popular Deep Learning frameworks, large out-of-core models, GPUs, and DPUs. The applicability of the solutions to train large WSI pathology images will be presented next. After that, I will provide an overview of the newly established NSF-AI Institute ICICLE (https://icicle.osu.edu/) to address challenges in designing future high-performance edge-to-HPC/cloud middleware for AI-driven data-intensive applications. The role of DL/ML solutions in the context of the ICICLE institute on three user-inspired science cases (digital agriculture, smart foodsheds, and animal ecology) will be highlighted.

PRESENTER: DK Panda is a Professor and University Distinguished Scholar of Computer Science and Engineering at the Ohio State University. He has published over 500 papers. The MVAPICH2 MPI libraries, designed and developed by his research group (http://mvapich.cse.ohio-state.edu), are currently being used by more than 3,200 organizations worldwide (in 89 countries). More than 1.56M downloads of this software have taken place from the project's site. This software is empowering many clusters in the TOP500 list. High-performance and scalable solutions for Deep Learning frameworks and Machine Learning applications are available from https://hidl.cse.ohio-state.edu. Prof. Panda is an IEEE Fellow and recipient of the 2022 IEEE Charles Babbage Award. More details about Prof. Panda are available at http://www.cse.ohio-state.edu/~panda.

Co-Chairs:

Laurette Dubé, PhD is the founding Chair and Scientific Director of the McGill Centre for the Convergence of Health Economics. She holds the James McGill Chair of Consumer and Lifestyle Psychology and Marketing. Her work has been published in top disciplinary journals in Psychology, Management and Medicine as well as in multidisciplinary journals. She holds an MBA in finance, and a PhD in behavioural decision making and consumer psychology. During her 2020-2021 sabbatical, she is a visiting scholar at the National Research Council of Canada and at the Pittsburgh Supercomputing Center, Carnegie Mellon, USA. https://thefutureeconomy.ca/interviews/ laurette-dube

Shawn Brown, PhD is Vice Chancellor for Research Computing at the University of Pittsburgh and the Director of Pittsburgh Supercomputing Center at the Carnegie Mellon University/University of Pittsburgh and. Prior to his appointment, Dr. Brown served as the Associate Director of Research Software Development at the McGill Centre of Integrative Neuroscience at the McGill Neurological Institute. Dr. Brown is an expert on high - performance computing and computational simulation. He has over 25 years of experience in developing software to support the use of high-performance computing for research in areas such as chemistry, bioinformatics, and public health. his research interests are ALSO in how agent-based modeling and other computational techniques can be used to provide decision support in public health and chronic disease.

Panelists:

David Easterling is a Supervisory Physical Scientist with the National Oceanic and Atmospheric Administration's National Centers for Environmental Information (NOAA/NCEI) in Asheville, North Carolina. He is currently Director of the Technical Support Unit (TSU) for the U.S. National Climate Assessment. In his career at NOAA, he has developed or enhanced methods to improve the quality of climate data sets, helped guide the development of high-quality climate observing networks, and analyzed climate data and model simulations for evidence of climate variability and change, particularly in extreme events. David received his Ph.D. in 1988 from the University of North Carolina at Chapel Hill and served as an Assistant Professor in the Atmospheric Sciences Program, Department of Geography, Indiana University-Bloomington from 1987 to 1990. In 1990 he moved to NOAA's National Climatic Data Center as a climate scientist, was appointed Principal Scientist in 1999, Chief of the Scientific Services Division in 2002, and Director of the Technical Support Unit in 2013. He has authored or co-authored more than 100 research articles and book chapters on climate science. He is a Fellow of the American Meteorological Society, and has been awarded four NOAA Administrator's Awards, four NOAA Bronze Medals, and one Department of Commerce Silver Medal.

Jan Bjaalie, M.D., Ph.D., is Professor at the Institute of Basic Medical Sciences, University of Oslo, where he leads a team of researchers, data curation scientists, and software developers contributing to the building of the EBRAINS RI, the European distributed research infrastructure for brain and brain-inspired research. He is Infrastructure Director of the EU Human Brain Project, leader of the EBRAINS Data services, special advisor on neuroinformatics for the EBRAINS AISBL, Head of the Norwegian Neuroinformatics Node, and former Head of the Institute of Basic Medical Sciences at the University of Oslo (2009 - 2016). With a strong background in neuroanatomy and neuroscience, he is focused on making scientific research data more accessible and interpretable and on developing advanced brain atlasing tools for brain-wide analysis of multimodal data. In his role as founding Executive Director of the International Neuroinformatics Coordinating Facility (2006 – 2008), he initiated INCF programs on brain atlasing and multi-scale modeling. Professor Bjaalie has been partner and coordinator of several EU projects and has collaborated extensively with leading laboratories in many countries. He is Chief-Editor of Frontiers in Neuroinformatics and has served as member of the Neuroinformatics Committee of the Society for Neuroscience (2004 - 2009) and co-Chair (2018 - 2020) and Chair (2021) of the International Brain Initiative.

Steven R. Webb joined the Global Institute for Food Security (GIFS) as Chief Executive Officer in 2019, following a 23-year career with Corteva Agriscience (formerly Dow AgroSciences) in Indiana, United States. His most recent role at Corteva was Research and Development Director of External Technology, where he led many research collaborations with private sector companies, research institutes and universities around the world. Steven earned a PhD in immunochemistry (1998), a Master's degree in biochemistry (1992) and a Bachelor of Science degree in microbiology (1990) from the University of Guelph, Ontario.

Jay Boisseau is a computing technologies leader and strategist, with more than 20 years of experience leading major computing-focused projects, departments, and organizations. Jay is the chief executive officer and co-founder of Vizias, a computing consultancy specializing in high performance computing (HPC), artificial intelligence (AI), smart cities, and technology outreach. One of his major current projects is helping Dell Technologies develop HPC and AI programs and future solutions. Jay is also the director and founder of the Austin Forum on Technology & Society, which he started in 2006, and the president and founder of the Austin CityUP Consortium, which he started in 2014 to help transform Austin into a smart city. Past experience includes creating the Texas Advanced Computing Center (TACC) and leading it to world prominence, and working at the San Diego Supercomputer Center (SDSC). He has a PhD in astronomy from UT Austin, with a strong emphasis on computational astrophysics. For more info, see www.vizias.com/team#jayboisseau.

Peter Schelstraete is co-founder and CEO of Ubuntoo, an Environmental Solutions Platform at the crossroads of AI and Human Expertise. Ubuntoo's mission is to help achieve the Sustainable Development Goals by scaling the most impactful and promising solutions. Previously, Peter was at The Coca-Cola Company. In his 19 years' tenure, he held a variety of high profiles roles, including Global VP Digital & Assets and CMO for Asia Pacific. Peter holds Master's degree in Commercial Engineering at the University of Leuven, Belgium and a Postgraduate Master's degree in Business Management from the University of Montpellier, France.