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The DB Community vis-à-vis Environmental, Health, and Societal Grand Challenges: Innovation Engine, Plumber, or Bystander?

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Abstract

This panel considers the role of the database research community in addressing humanity's greatest challenges. Are we an innovation engine, tool providers, or are we standing on the side while other research communities take the lead?

CCS CONCEPTS

• Information systems → Data management systems;

KEYWORDS

Data management

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Panel Overview

The world is facing many pressing challenges related to the environment, health, and society. If we are to overcome these challenges, the best minds of current generations need to work

together across disciplinary boundaries and across industry, government, and academia.

In all these domains, data is a fundamental asset that serves to advance our understanding of problems, devise solutions, and then implement and evaluate those solutions.

In this panel, we consider the role of the database *research* community in addressing humanity's greatest challenges. Are we an innovation engine? Are we just tool providers? Or are we standing on the side while other research communities take the lead? Do we provide incremental ideas or game-changing ones? Are we successful in doing our part; and if not, what could we do better? Can we engage with humanity's greatest challenges directly as opposed to producing tools that may happen to also help in these domains?

We will examine how database researchers can best engage to work in partnership with other stakeholders and serve as innovation engines. In particular, we will explore how the community can support not only researchers from other domains, but also practitioners and policy makers.

We will further explore ways for the database community to organize itself to create an environment best suited for promoting our participation and partnership with other communities on tackling important world challenges, including how to encourage and promote publication and dissemination of interdisciplinary research and artifacts in these areas.

We will discuss the questions above through the lens of specific examples in various domains from environmental challenges to healthcare ones, and to societal issues.

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The panel will feature seven experts from the database research community and one moderator, who will share their perspectives and engage in animated discussions.

Panelists

Anastasia Ailamaki is a Professor of Computer and Communication Sciences at the École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, as well as the co-founder and Chair of the Board of Directors of RAW Labs SA, a Swiss company developing systems to analyze heterogeneous big data from multiple sources efficiently. She earned a Ph.D. in Computer Science from the University of Wisconsin-Madison in 2000. She has received the 2019 ACM SIGMOD Edgar F. Codd Innovations Award and the 2020 VLDB Women in Database Research Award. She is also the recipient of an ERC Consolidator Award (2013), the Finmeccanica endowed chair from the Computer Science Department at Carnegie Mellon (2007), a European Young Investigator Award from the European Science Foundation (2007), an Alfred P. Sloan Research Fellowship (2005), an NSF CAREER award (2002), and ten best-paper awards in international scientific conferences. She has received the 2018 Nemitsas Prize in Computer Science by the President of Cyprus and the 2021 ARGO Innovation Award by the President of the Hellenic Republic. She is an ACM fellow, an IEEE fellow, a member of the Academia Europaea, and an elected member of the Swiss, the Belgian, the Greek, and the Cypriot National Research Councils.

Leilani Battle is an Assistant Professor in the Paul G. Allen School for Computer Science and Engineering and co-director of the Interactive Data Lab. Her research interests focus on developing interactive data-intensive systems that can aid analysts in performing complex data exploration and analysis. Her current research is anchored in the field of databases, but utilizes research methodology and techniques from HCI and visualization to integrate data processing (databases) with interactive interfaces (HCI, visualization). Prof. Battle was named one of the 35 Innovators Under 35 by the MIT Technology Review in 2020. She is also a recipient of an NSF Graduate Research Fellowship Recipient (2012), an Adobe research award (2019), an NSF CRII Award (2019), ORAU Ralph E. Powe Junior Faculty Enhancement Award (2019), a VMware Early Career Faculty Grant (2021), and NSF CAREER Award (2022). In 2017, she completed a postdoc in the UW Interactive Data Lab. She holds an MS (2013) and PhD (2017) in Computer Science from MIT and a BS in Computer Engineering from UW (2011).

Johannes Gehrke is a Technical Fellow at Microsoft and the Lab Director of Microsoft Research at Redmond and the CTO and head of machine learning for Microsoft's Intelligent Communication Cloud. His recent research is on understanding how machine learning impacts database systems, cloud infrastructure, and software development. He has received a National Science Foundation Career Award, an Arthur P. Sloan Fellowship, a Humboldt Research Award, the 2011 IEEE Computer Society Technical Achievement Award, the 2021 ACM SIGKDD Innovation Award, and he is an ACM Fellow and an IEEE Fellow. From 1999 to 2015, Johannes was on the faculty in the Department

of Computer Science at Cornell University where he graduated 25 PhD students, and from 2005 to 2008, he was Chief Scientist at FAST Search and Transfer.

Masaru Kitsuregawa is the Director General of National Institute of Informatics and University Professor of the University of Tokyo. He received his Ph.D. degree from the University of Tokyo in 1983 and served in various roles such as ICDE steering committee chair and President of the Information Processing Society of Japan. He has worked on both fundamental algorithms for high performance database and big data applications. He received an ACM SIGMOD E. F. Codd Innovations Award, an IEEE Innovation in Societal Infrastructure Award and a Japan Academy Award. He is a fellow of the ACM and IEEE.

David Maier is Maseeh Professor of Emerging Technologies at Portland State University. Prior to his current position, he was on the faculty at the State University of New York, Stony Brook; Oregon Graduate Institute; and Oregon Health and Science University. He has spent extended visits with Inria, the University of Wisconsin-Madison, Microsoft Research, and the National University of Singapore. He is the author of books on relational databases, logic programming, and object-oriented databases, as well as papers on database theory, object-oriented technology, stream processing, scientific databases, and urban informatics. He received an NSF Young Investigator Award in 1984, was awarded the 1997 ACM SIGMOD's Innovations Award for his contributions in objects and databases, and received a Microsoft Research Outstanding Collaborator Award in 2016. He is also an ACM Fellow and IEEE Senior Member. He served on the Board on Mathematical Sciences and Analytics of the National Academies for nine years. He holds a dual B.A. in mathematics and in computer science from the University of Oregon (Honors College, 1974) and a Ph.D. in electrical engineering and computer science from Princeton University (1978).

Christopher Re is an associate professor in the Department of Computer Science at Stanford University. He is in the Stanford AI Lab and is affiliated with the Machine Learning Group. His recent work is to understand how software and hardware systems will change as a result of machine learning along with a continuing, petulant drive to work on math problems. Research from his group has been incorporated into scientific and humanitarian efforts, such as the fight against human trafficking, along with widely used products from technology and enterprise companies including Google Ads, Gmail, YouTube, and Apple. He has cofounded four companies based on his research into machine learning systems, SambaNova and Snorkel, along with two companies that are now part of Apple, Lattice (DeepDive) in 2017 and Inductiv (HoloClean) in 2020. His research contributions have spanned database theory, database systems, and machine learning. His work has won best paper or test-of-time awards at the premier venues in each area. He still can't believe he won the MacArthur Foundation Fellowship.

Meihui Zhang is a professor at the School of Computer Science and Technology, Beijing Institute of Technology (BIT), China. Before joining BIT, she was an Assistant Professor at the

Singapore University of Technology and Design (SUTD). She obtained her PhD from the National University of Singapore (NUS). Her main research interests include Big Data Management and Analytics, Large-scale Data Integration, Modern Database Systems, Blockchain Systems and AI. She is a winner of 2020 VLDB Early Career Research Contribution Award and 2019 CCF-IEEE CS Young Scientist Award. She is also a co-author of VLDB 2019 Best Paper, IEEE ICDE 2018 best paper runner up, and 2019 ACM SIGMOD Highlight Award paper. Meihui has served as Research Track Associate Editor of VLDB 2018-2020, VLDB 2023, SIGMOD 2021, SIGMOD 2023, ICDE 2018 and ICDE 2022-2023. She is serving as Associate Editor for IEEE Transactions on Knowledge and Data Engineering (TKDE) and Survey Track Editor of Distributed and Parallel Databases. She is a trustee of VLDB endowment.

Moderator

Magdalena Balazinska is Professor and Director of the Paul G. Allen School of Computer Science & Engineering at the University of Washington. Magdalena's research interests are in the field of database management systems. Her current research focuses on data management for data science, big data systems, cloud computing, and image and video analytics. Prior to her leadership of the Allen School, Magdalena was the Director of the eScience Institute, the Associate Vice Provost for Data Science, and the Director of the Advanced Data Science PhD Option. She also served as Co-Editor-in-Chief for Volume 13 of the Proceedings of the Very Large Data Bases Endowment (PVLDB) journal and as PC co-chair for the corresponding VLDB'20 conference. Magdalena is an ACM Fellow. She holds a Ph.D. from the Massachusetts Institute of Technology (2006). Shortly after her arrival at the University of Washington, she was named a Microsoft Research New Faculty Fellow (2007). Magdalena received the inaugural VLDB Women in Database Research Award (2016) for her work on scalable distributed data systems. She also received an ACM SIGMOD Test-of-Time Award (2017) for her work on fault-tolerant distributed stream processing and a 10-year most influential paper award (2010) from her earlier work on reengineering software clones.