SYMPOSIUM BI01

Materials Data Science—Transformations in Interdisciplinary Education
December 2 - December 3, 2019

Symposium Organizers
Raymundo Arroyave, Texas A&M University
Elizabeth Dickey, North Carolina State University
Roger French, Case Western Reserve University
Hiroyuki Fukuyama, Tohoku University

Symposium Support
Bronze
Citrine Informatics

* Invited Paper

SESSION BI01.01: Data Science in Materials Education and Methods Development
Session Chairs: Raymundo Arroyave and Elizabeth Dickey
Monday Afternoon, December 2, 2019
Hynes, Level 2, Room 205

1:30 PM *BI01.01.01
Data Science—The New Critical Capability for Every Materials Scientist
Kristen Brosnan; GE Global Research, United States

2:00 PM *BI01.01.02
Transforming the Science of Materials through the Science of Information—A Pedagogical Perspective
Krishna Rajan; University at Buffalo, The State University of New York, United States

2:30 PM *BI01.01.03
Machine Learning and Data Science in the MSE Undergraduate Program
Elizabeth A. Holm; Carnegie Mellon University, United States

3:00 PM BREAK

3:30 PM *BI01.01.04
Open-Source Tools for Materials Informatics—Atomate, Matminer and Matscholar
Anubhav Jain; Lawrence Berkeley National Laboratory, United States

4:00 PM BI01.01.05
Materials Software Workshop and Outreach at DOE Materials Genome Innovation for Computational Software (MAGICS)
Center Ken-ichi Nomura, Aichiro Nakano, Priya Vashishta and Rajiv Kalia; University of Southern California, United States

4:15 PM *BI01.01.06
Incorporating the Principles of Compressed Sensing/Inpainting and Machine Learning into the Implementation of Advanced TEM Methods
Nigel Browning1,2, B. Layla Mehdi2,3, Houari Amari2, Heath Bagshaw4, Matthew Bilton1, Andrew Stevens1 and Christopher Buurma1; 1University of Liverpool, United Kingdom; 2Pacific Northwest National Laboratory, United States; 3Sivananthan Laboratories, United States

4:45 PM BI01.01.07
Semantic Exploration of Nanowires Technological Trend and Scientific Advancement
Vasiliy Kaliteevskii; Lappeenranta University of Technology, Finland

SESSION BI01.02: Poster Session: Data-Driven Pedagogy and Research
Session Chairs: Raymundo Arroyave, Elizabeth Dickey, Roger French and Hiroyuki Fukuyama
Monday Afternoon, December 2, 2019
8:00 PM - 10:00 PM
Hynes, Level 1, Hall B

BI01.02.01
Development of Data Scientists for Interdisciplinary Environments
Such as Materials Science
Kazanori D. Yamada1, Samy Baladram1, Takaru Nakayama1, Yinxing Li1, Roger H. French2 and Mitusuyuki Nakao3; 1Tohoku University, Japan; 2Case Western Reserve University, United States

BI01.02.02
Pathway toward Sustainable Development of Next Generation Photovoltaics Focused on Materials—A Detailed Study on Research Trends through Bibliometrics
Jun-Seok Yeo; Korea Institute of Science and Technology, Korea (the Republic of)

BI01.02.03
Designing Laboratory Activities for Undergraduate Synthetic Materials Chemistry Course
Brandon J. Burnett; Weber State University, United States

BI01.02.04
Developing Selective Absorbers for Solar Water Heating as a Holistic Materials Undergraduate Research Experience
Kristin Rabosky, Corey Collatz and Colin Inglefield; Weber State University, United States

BI01.02.06
From Stored Data to Data Stories—Jupyter and R Notebooks for Reproducible Materials Informatics
Paul J. Kowaleczk; Solvay, United States

SESSION BI01.03: Data Driven Innovation in Graduate and Undergraduate Education
Session Chairs: Dane Morgan and Krishna Rajan
Tuesday Morning, December 3, 2019
Hynes, Level 2, Room 205

8:30 AM *BI01.03.01
National Science Foundation Initiatives to Catalyze Advances in Graduate Education
Laura B. Regassa; National Science Foundation, United States

9:00 AM BI01.03.02
Data-Enabled Discovery and Design of Energy Materials (D3em)—Structure of an Interdisciplinary Materials Design Graduate Program
Raymundo Arroyave, Debra Fowler, Patrick Shamberger, Douglas Allaire and Joseph H. Ross; Texas A&M University, United States

9:15 AM *BI01.03.03
Opportunities for Merging Materials and Data Science in Graduate and Undergraduate Education
Yaroslava G. Yingling, Elizabeth C. Dickey and Ashleigh Wright; North Carolina State University, United States

9:45 AM BI01.03.04
Challenges and Opportunities in the Development of Data Science Skills in Undergraduate Materials Education—A Perspective from Mexico
Yarel Rojas-Aguire, Yara C. Almanza-Arjona, Jesús S. Alejandro-Cruz, Lorena Meza-Puente and Marlene Covarrubias-Sánchez; Universidad Nacional Autónoma de México, Mexico

10:00 AM BREAK
10:30 AM *BI01.03.05
Data-Driven Materials Design—Educational Needs to Harness Legacy Data for New Materials Development Jennifer L. Carter; Case Western Reserve University, United States

11:00 AM BI01.03.06
Student Inquiry of Precipitate Morphologies Using an Online GUI for PRISMS-PF Susan Gentry1, Stephen DeWitt2 and Mingwei Zhang1; 1University of California, Davis, United States; 2University of Michigan, United States

11:15 AM *BI01.03.07
Microstructural Analysis in Python for Materials Data Science Daniela Ushizima1,2, Silvia Miramontes-Lizarraga1,2, Michael Macneil1 and Dillworth Parkinson1; 1Lawrence Berkeley National Laboratory, United States; 2University of California, Berkeley, United States

11:45 AM BI01.03.08
Nucleation and Growth of AlN—A Case Study of the Challenges in Blending Materials Science and Data Science in an International Collaboration Masayoshi Adachi1, Benjamin G. Pierce2, Ahmad M. Karimi3, Laura G. Wilson4, Roger H. French5, Jennifer L. Carter2 and Hiroyuki Fukuyama1; 1Tohoku University, Japan; 2Case Western Reserve University, United States

1:30 PM *BI01.04.01
The Informatics Skunkworks—Undergraduate Research at the Interface of Data Science and Science and Engineering Dane Morgan; University of Wisconsin-Madison, United States

2:00 PM BI01.04.02
Hackathons Foster Collaboration between Materials and Data Scientists Brian Reich, Ashleigh Wright, Ralph Smith and Elizabeth C. Dickey; North Carolina State University, United States

2:15 PM *BI01.04.03
Teaching Machine Learning and Artificial Intelligence in Materials through Experiential Learning Joshua Tappan; Citrine Informatics, United States

2:45 PM BI01.04.04
SonicAtomic—New Interactive Sonification Interface for Students with Visual Impairment Assisting Multidimensional Scientific Data Analysis Thomas Watts1, Ahlam Lee2, Roberto Myers3 and Jinwoo Hwang4; 1Cornell University, United States; 2Xavier University, United States; 3The Ohio State University, United States

3:00 PM BREAK

3:00 PM *BI01.04.05
An Overview of Educational Efforts in Materials Data Science at Northwestern Christopher Wolverton; Northwestern University, United States

3:30 PM BI01.04.06
Learnings from Developing a Materials Data Science Curricula for Undergraduates and Graduate Students Roger H. French; Case Western Reserve University, United States

3:45 PM BI01.04.07
Experiences of MIT MechE Faculty Integrating Machine Learning into Teaching Tonio Buonassisi and George Barbastathis; Massachusetts Institute of Technology, United States

SESSION BI01.04: Novel Experiential Learning and Best Practices in Data-Driven Materials Education
Session Chairs: Roger French and Yaroslava Yingling
Tuesday Afternoon, December 3, 2019
Hynes, Level 2, Room 205

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