Challenges and Opportunities in Computing Research to Enable Next-Generation Engineering Applications

Citation for the original published paper (version of record):
Allen, J., Esfahani, E., Gupta, S. et al (2023). Challenges and Opportunities in Computing Research to Enable Next-Generation Engineering
Applications. Journal of Computing and Information Science in Engineering, 23(6).
http://dx.doi.org/10.1115/1.4063437

(article starts on next page)

ASME Journal of Computing and Information Science in Engineering
Online journal at:
https://asmedigitalcollection.asme.org/computingengineering

Journal of Computing and Information Science in Engineering

Guest Editorial

Special Issue: Challenges and Opportunities in Computing Research to Enable Next-Generation Engineering Applications

Recent advances in computing and information science such as artificial intelligence (AI), machine learning (ML), edge computing, cloud computing, metacomputing, and quantum computing are creating new computing paradigms. These advances are providing new opportunities for new research and application development. For instance, the adoption of Industry 4.0 enabled by AI/ML is fundamentally changing how products are designed, manufactured, maintained, and recycled. It enables consideration of all aspects of the product life cycle and realizing sustainable designs and helps us in achieving carbon neutrality. Intelligent machines such as robots and autonomous vehicles are revolutionizing human–machine interactions and increasing digitalization in the manufacturing and transportation industries. It is important for the *Journal of Computing and Information Science in Engineering* (JCISE) community to identify challenges and opportunities in these emerging areas and inspire new researchers to join the field and become a part of the community. This Special Issue consists of 19 position papers that span a wide variety of topics of interest to the JCISE community. These position papers identify challenges and opportunities, outline new areas of research, and point out new applications that will be enabled by advances in this field.

Janet K. Allen
School of Industrial and Systems Engineering,
University of Oklahoma,
Norman, OK 73019
e-mail: janet.allen@ou.edu

Ehsan Esfahani
Department of Mechanical and Aerospace Engineering,
University at Buffalo,
Buffalo, NY 14260
e-mail: ehsanesf@buffalo.edu

SK Gupta
Department of Aerospace and Mechanical Engineering,
Viterbi School of Engineering,
University of Southern California,
Los Angeles, CA 90089
e-mail: guptask@usc.edu

Balan Gurumoorthy
Department of Mechanical Engineering,
Indian Institute of Science,
Bangalore, Karnataka 560012, India
e-mail: bgm@iisc.ac.in

Bin He
School of Mechatronic Engineering and Automation,
Shanghai University,
Shanghai 200444, China
e-mail: mehebin@shu.edu.cn

Ying Liu
Department of Mechanical Engineering,
School of Engineering,
Cardiff University,
Cardiff CF24 3AA, UK
e-mail: liuy81@cardiff.ac.uk

John G. Michopoulos
Naval Research Laboratory,
Washington, DC 20375
e-mail: john.michopoulos@nrl.navy.mil

Jitesh H. Panchal
School of Mechanical Engineering,
Purdue University,
West Lafayette, IN 47907
e-mails: jpancha@purdue.edu; panchal@purdue.edu

Anurag Purwar
Department of Mechanical Engineering,
State University of New York,
Stony Brook, NY 11794-2300
e-mail: anurag.purwar@stonybrook.edu

Kristina Wärmefjord
Industrial and Materials Science Department,
Chalmers University of Technology,
Göteborg SE-41296, Sweden
e-mail: kristina.warmefjord@chalmers.se