

Foreword

Special section on Big Data for Nuclear Power Plants

Guest Editors

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This special section of *Nuclear Technology*, Big Data for Nuclear Power Plants, describes the role and value of big data analytics in nuclear power systems. It contains interdisciplinary papers that bridge the domains of nuclear reactor systems, instrumentation and control, information science, system reliability, and safety to shed light on how data analytics might reshape contemporary industry.

Big data technologies have experienced rapid development over the past few years and have seen extensive application in power production, distribution, and transmission. As the term itself indicates, “big data” refers to large volumes of data generated and made available for new knowledge discovery and theory development. An increasing number of nuclear organizations—i.e., power plant operators, vendors, and research institutions—are realizing the big data analytics potential for significant improvements to nuclear energy utilization economics, efficiency, and safety. However, there is limited understanding on how organizations might incorporate these

technological innovations in their current models of operation.

This special section presents emerging and promising topics on the application of big data for nuclear power plants. It includes papers discussing (1) a machine learning analysis method for analyzing moisture carryover in boiling water reactors, (2) using kernel density estimation to detect loss-of-coolant accidents in a pressurized water reactor, (3) a method for automatically identifying the causal relationships found in free-text event reports, (4) a deep learning method for real-time emergency planning, (5) data models of work packages, and (6) possible sources of data. These papers open the way for realizing the benefits of big data analytics in nuclear energy utilization.

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