

# Foreword

## Selected papers from the 2018 International Topical Meeting on Advances in Thermal Hydraulics (ATH 2018)

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This special issue of *Nuclear Technology* contains full-length, peer-reviewed papers presented at the 2018 International Topical Meeting on Advances in Thermal Hydraulics (ATH 2018), held in conjunction with the 2018 American Nuclear Society (ANS) Winter Meeting in Orlando, Florida, on November 11–15, 2018. This embedded topical meeting was the fourth in its series, organized by the Thermal Hydraulics Division of ANS, and covered recent advances and new developments in nuclear thermal hydraulics.

ATH 2018 included a vibrant plenary session. In a first for the ATH series, three conference keynotes that span the breadth of the art and science of reactor thermal hydraulics were also presented. These three papers are included in this special issue: “Direct Numerical Simulation and Wall-Resolved Large Eddy Simulation in Nuclear Thermal Hydraulics,” by Tiselj et al.; “Interface-Resolved Simulations of Reactor Flows,” by Fang et al.; and “Advanced Liquid-Metal Thermal-Hydraulic Research for MYRRHA,” by Van Tichelen et al. In another first for ATH, we organized a panel on one of the hottest topics in thermal hydraulics: “Thermal Hydraulics Applications of Machine Learning and Data Science.” A total of 145 summaries and full papers were submitted to the meeting, a record for this

young series. Finally, 130 presentations were scheduled in the final program, organized into 32 sessions.

After ATH 2018, the conference and technical program committees had the difficult task of down-selecting the list of papers for this special issue. The committees combined the recommendations of reviewers and session chairs. In addition to the keynotes, the top-scoring papers were chosen, including all papers recommended by session chairs that scored above a certain threshold in the review process. We note that the paper “Velocity and Scalar Fields of a Turbulent Buoyant Jet in the Self-Similar Region,” by Qin et al., received an ATH 2018 Best Paper award after an additional peer-reviewing evaluation was performed on the top-scoring papers.

The result of this process was selection of the 19 articles in this issue. It represents an exciting collection of cutting-edge articles in thermal hydraulics research. Topics in this issue include experimental, computational, and analytical evaluations of various aspects of thermal-hydraulic phenomena related to the practical application of nuclear science and technology. We note in particular two special sections: one on liquid-metal thermal hydraulics and one on high-performance computing. Papers in these areas are highlighted given the high level of interest and participation of those communities in ATH 2018. The

papers in this issue have been revised and expanded from their original form to include additional content. Readers will find these topics of great interest and will derive significant value from this compilation.

Finally, we would like to extend a heartfelt thanks to the reviewers who volunteered their time and expertise to reviewing the papers contained in this ATH 2018 special

issue of *Nuclear Technology*. We would also like to thank Dr. Andy Klein for supporting and spearheading the publication of this special issue and Mr. David Strutz, who has been instrumental in getting this issue published on a timely basis. Finally, we would like to thank the attendees and authors of ATH 2018, who have made this conference an incredible success.