

ASC 2020 Introduction

THE 2020 Applied Superconductivity Conference, ASC 2020, was held for the first time as a virtual conference from October 24 to November 7, 2020. The final ASC 2020 program included 1639 submitted abstracts. A total of 1031 presentations (438 contributed/invited talks, 580 posters/invited posters, six young professional plenary talks, and seven plenary talks) and seven short courses were given during the fifteen days of the conference. A total of 501 manuscripts were submitted for peer review in the Special Issue of the IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY; 417 have been accepted for publication. The peer review of manuscripts produced 1666 reports, which resulted, on average, in requiring at least one revision per manuscript. Approximately 44% of manuscripts required substantial revision in response to the expert reviews. The conference was attended by 1428 participants (374 of whom were students) from 35 countries. A virtual exhibition took place during the conference with the participation of 34 companies from 11 countries.

The 2020 conference was held in a virtual format in response to the COVID-19 pandemic. As with past conferences, the 2020 virtual conference highlighted various ways in which superconductivity enables breakthroughs in medicine, energy, quantum information, cosmology, physics, transportation, and many other technology areas. Room-temperature superconductivity has now been found, being described in the opening plenary by Mikhail Erements (Max Planck Institute for Chemistry), whose group first demonstrated the potential of this class of high-pressure hydride superconductors. Forefront research in medical imaging and nuclear magnetic resonance applications enabled by high-field superconducting magnets was described by Pierre Vedrine (CEA-IRFU) and Joanna Long (University of Florida). A somewhat new and rapidly evolving topic highlighted in 2020 was quantum engineering, as featured in the plenary presentation by William Oliver (Massachusetts Institute of Technology). Large science projects in fusion and particle physics were discussed by Neil Mitchell (ITER Organization) and thanks to the virtual format Fabiola Gianotti (Director General of CERN) was able to speak live from CERN. The conference closed with a public lecture by Arthur Lichtenberger (University of Virginia) about the scientific journey to producing the first images of a black hole and how those images were obtained using telescopes equipped with superconducting SIS detectors.

A new program component, ASC ELEVATE, incorporated sessions for training and professional development, diversity in science, and enrichment of and equity in the scientific environment. The flexibility of the virtual format allowed us to add a new special session on encouraging innovation in applied superconductivity after the conference had already started. In addition to the special and memorial sessions that have become regular features of the ASC, the conference introduced the field to up-and-coming researchers who expressed their visions of the future of applied superconductivity *via* the Young Scientist Plenary Session.

The ASC Best Student Paper Contest was held again. The first-place winners and two runners-up in each category received monetary prizes. Additionally, there were three corporate prizes. The first, the Alexander Shikov Memorial Prize, was for the best paper in the “LTS and HTS Conductors” subcategory. The second and the third, the Viktor Keilin Memorial Prizes, were for the best papers on the “Development of Superconducting Materials for Large Scale Applications” in the Materials category and on the “Innovations in Magnet Science and Technology” in the Large Scale category, respectively.

Awards presented by the IEEE Council on Superconductivity at the ASC 2020, described in more detail in article 0300114 in this volume, included the IEEE Max Swerdlow Award for Sustained Service to the Applied Superconductivity Community, the IEEE Award for Continuing and Significant Contributions to Applied Superconductivity (Large Scale and Small Scale Applications), the IEEE Council on Superconductivity Carl H. Rosner Entrepreneurship Award, and the IEEE Dr. James Wong Award for Continuing and Significant Contributions to Applied Superconductor Materials Technology. In addition, the IEEE CSC Van Duzer Prize for 2018 and 2019 were announced as well as the recipients of the IEEE CSC Graduate Study Fellowships in Applied Superconductivity for 2020. Furthermore, the Cryogenic Society of America presented The Roger W. Boom Award. The Institute of Physics also presented the Jan Evetts SUST Award for the best early career paper in superconductor science and technology.

We wish to thank the members of the program committee for their tremendous efforts at putting together excellent program for the originally planned 5-day in-person meeting in Tampa, an alternative 4-day conference for early 2021, and finally the two week virtual conference. We also thank the entire editorial team (Lead Editors, Technical Editors, and the Editorial Staff) for a superb effort in managing the peer-review process to very high standards, and putting together the published manuscripts from ASC 2020. We also wish to thank the reviewers, without whom we would be unable to publish the Special Issue.

Finally, we wish to thank the applied superconductivity community for coming together to overcome difficulties of the 2020 pandemic and make the virtual conference a success.

LANCE COOLEY
Conference Chair

PETER LEE
Program Chair

AL ZELLER
Special Issue Editor-in-Chief