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Preface—JES Focus Issue on Advanced Techniques in Corrosion Science in Memory of Hugh Isaacs

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We are proud to present this focus issue on Advanced Techniques in Corrosion Science in Memory of Hugh Isaacs. Hugh Isaacs, who was widely known as a key innovator in the application of new techniques to study corrosion processes, was a leader in the corrosion community for more than four decades, publishing his first JES paper in 1963 and maintaining membership in the Society from 1967 until his death on Long Island, New York on December 5, 2016. He was also recognized as an ECS Fellow. A prolific author, he published more than 130 papers, and his family and friends have made all 45 of his previous JES publications freely available as open access in the form of the Hugh Isaacs Collection. We are delighted that this focus issue adds to this total in the form of a paper co-authored by Dr. Isaacs.

This issue covers a very wide range of corrosion topics and techniques, which is quite fitting for the corrosion field, given the ubiquity of corrosion processes and the need to use any and every effective means available to investigate them. It is also in keeping with the scientific legacy of Hugh Isaacs, who was active in many areas of corrosion, particularly localized corrosion, microelectrodes, scanning electrochemical systems to map surface reactivity, and the use of synchrotron radiation in corrosion studies, some of which he established or adapted to corrosion science, and all of which continue as thriving corrosion topics today.

After setting out to produce an issue focused on advanced techniques in the field, your guest editors were immediately faced with the issue of deciding which techniques qualified as "advanced". Some help in this regard was derived from an anecdote about an approach taken by Dr. Isaacs to determine the distribution of pH values deep within the inaccessible occluded regions of an alloy undergoing crevice corrosion. While others were devising sophisticated means of probing the local chemistry in the tiny spaces within such crevices using microelectrodes, remote micro-sampling, etc., Dr. Isaacs simply, yet elegantly, made a crevice between the alloy and a transparent polymer sheet, and added a universal pH indicator to the solution in the crevice interior. The internal pH distribution and its time evolution were then straightforwardly revealed to the naked eye. This helped clarify for us that "advanced techniques" should include not only the latest, greatest, high-powered, ultra-nanoscopic methods, but also approaches involving what one might deem "ordinary" techniques used in extraordinary ways.

As this focus issue demonstrates, corrosion scientists continue to apply analytical techniques in novel and innovative ways, sometimes coupling multiple analytical methods, to yield previously unobtainable information about corroding systems. Corrosion science, by its nature, is an interdisciplinary science and occupies a "sweet spot" in which there is plenty of scope for both immediate and critical practical applications and the fundamental, underlying science that supports them. Aside from being a showcase for cutting edge developments in corrosion, we hope that this focus issue will stimulate creation and adoption of more new techniques and applications in and beyond the field of corrosion and generate additional collaborations with the electrochemical community at large.

The guest editors would like to thank and acknowledge the efforts of all authors and reviewers who contributed their time, talent, and knowledge to making this focus issue a success. We were thrilled to have received a record number of submissions for this issue. We would also like to thank the JES editorial and publications staff, who kept the process on track and on time while also patiently answering many questions from the guest editors, as well as the Technical Editor and Associate Editors in the Corrosion Topical Interest Area, who handled the large influx of manuscripts for review with grace, finesse, and much hard work.

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