



## Signals and Signal Processing: The Invisibles and the Everlastings

When you receive this issue of *IEEE Signal Processing Magazine*, a symposium, “The Future of Signal Processing,” was just held at the Massachusetts Institute of Technology (MIT). The symposium honored the career of Prof. Alan Oppenheim as one of the pioneers in signal processing research and education. Attendees from various organizations around the world discussed and shared insights of the profound roles that signal processing have played and envisioned the future trends of signal processing.

I delivered a talk with the same title as this editorial at the MIT symposium. The term *invisibles* has a dual meaning to me. A central theme of my research has been dealing with “micro signals” that are small in strength or scale by at least an order of magnitude and are nearly invisible, yet developing the theory and techniques to extract and utilize these invisible micro signals opens up new opportunities in a broad range of applications from security and forensics to data analytics to entertainment. One class of micro signals provides telltale traces of evidence in determining the origin and integrity of images, which is an active research area investigated by the Information Forensics and Security Technical Committee (IFS TC) of the IEEE Signal Processing Society (SPS) and the subject of the ongoing SP Cup 2018 competition (see page 175) and the latest outreach video “Multimedia

Forensics,” available online at the SPS Resource Center; please visit <http://rc.signalprocessingsociety.org/sps/product/conference-videos-and-slides/SPSVID00194>. Meanwhile, the profound role and contributions of signal processing are often invisible to the public, leading to the notion of “Signal Processing Inside.” In this issue, the second edition of the new “Community Voices” column presents the thoughts on such a topic by our magazine readers who are at various career stages and come from different regions and backgrounds.

Several other formal and informal gatherings have been held this year, celebrating the careers of signal processing pioneers and significant contributors: among them are Prof. Sanjit Mitra, who had a broad range of research interests over the years and nurtured signal processing activities in a number of underrepresented countries and regions; Prof. Mos Kaveh, who played a key role in developing statistical signal processing and served as the IEEE SPS president in 2010–2011; and Dr. John Cozzens, who led the signal processing program at the U.S. National Science Foundation for many years, just to name a few. Thanks to the persistent contributions of them and many others over the past decades, the field of signal processing has grown and our community has expanded both technically and geographically.

It has been a year and half since we launched the redesign of the print version of the magazine. I hope you enjoy the modern look and enhanced graphics of the magazine and its correspond-

ing electronic version. The second part of the redesign effort is for the online presence of our magazine. Although the timetable of the magazine’s web design was deferred to give priority to the major redesign of the SPS’s website, I am happy to report that the matching design for our magazine’s website is well underway. The first phase has been completed and launched this summer for the monthly “Inside Signal Processing eNewsletter” that complements the print version of the magazine. If you haven’t already, please check it out at <http://signalprocessingsociety.org/newsletter/>. My sincere thanks to Christian Debes, the area editor for eNewsletter, and Ervin Sejdic, who succeeded Christian in June 2017, and SPS Web Administrator Rupal Bhatt for their dedicated efforts.

The second phase of the website redesign is currently being implemented with the goal of creating a modern landing page that can host timely updates based on the magazine’s bimonthly content and well-organized resources for prospective authors.

This is the magazine’s final issue of 2017 and the last issue for which I serve as editor-in-chief. Looking back, this three-year journey has been a huge undertaking, and it could not have been possible without the hard work and support of many colleagues. A number of unsung heroes, whom ordinary readers may not have seen or known, contributed to the success of our magazine.

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Furthermore, signal processing has now become much larger and diverse. It has permeated a vast number of technologies and applications. Watch, for example, our video “What Is Signal Processing?” at <https://www.youtube.com/watch?v=EERkgriMWw0> for some examples of these applications. The scope of our journals range from speech to networks, from forensics to imaging, from biomedical to multimedia, and so on. We have more than 185 Chapters in approximately 120 countries. This compels me to appreciate the good comments and relevant points made by

those who advocate for keeping our current name, as well as feel their devotion to the name. Whether or not we change our name, we should continue to expand our activities to stress our wide scope, for example, by initiating a new journal, workshop, distinguished speakers, summer schools, and educational material related to data science. I consider myself fortunate that I have been working in this exciting field and am equally proud to be attached to our beloved name *signal processing*.

Let us continue this important discussion. Please add your comments

to <https://signalprocessingsociety.org/get-involved/signal-processing-larger-its-beloved-name>



## Reference

[1] R. G. Lyons and D. Lee Fugal, *Essentials of Digital Signal Processing*. Englewood Cliffs, NJ: Prentice Hall, 2014.



## FROM THE EDITOR (continued from page 4)

Managing Editor Jessica Welsh and the IEEE Magazines Department production team are a driving force in interacting with authors and creating a professional look and feel for the articles. In addition, Senior Art Director Janet Dudar and Associate Art Director Gail Schnitzer help bring eye-catching artistic elements to each issue of the magazine.

I have also had the privilege to work very closely with a team of area editors who play a key role in the magazine operations: Shuguang Robert Cui screens dozens of feature article proposals each year and tirelessly coordinates the proposal reviews; Kenneth Lam leads a team of dedicated column associate editors to enrich the magazine content to serve our broad readership; Douglas O'Shaughnessy coordinates the special issue efforts, a signature tradition of the magazine; Andres Kwasinski, Erwin Sejdic, Christian Debes, and the associate editors on their teams who contributed to the electronic efforts that complement the print version of the magazine.

Our senior Editorial Board members bring a diverse set of expertise and perspectives and provide candid feedback and guidance; special thanks to 13 members who are completing their

three-year services: Mounir Ghogho, Lina Karam, Sven Lončarić, Brian Lovell, Stephen McLaughlin, Yi Ma, Henrique (Rico) Malvar, Athina Petropulu, Peter Ramadge, Shigeki Sagayama, Erchin Serpedin, Shihab Shamma, Gregory Wornell, and Dapeng Wu. In addition, special issue and cluster organizers work intensively to bring timely content to our readers, and each special issue, cluster, or series is a major undertaking by itself. My sincere thanks to all authors for contributing to the magazine, especially for the time and hard work it takes to make content accessible, and to the many reviewers who provided timely assessments and constructive comments to ensure the high technical and presentation quality of the articles. You can find an annual index of authors and articles associated with each year-end issue of the magazine in IEEE *Xplore*. The collective effort by authors, reviewers, and editors helped our magazine reach an all-time high in impact factor (9.65) and article influence score (4.02) in the most recent *Journal Citation Report*. Last but not the least, I thank SPS staff members Rebecca Wollman, Richard Baseil, Theresa Argiropoulos, Jessica Perry, and Deborah Blazek for their assistance, and I appreciate the

thoughtful feedback and support from our readers.

The SPS Executive Committee has appointed Prof. Robert Heath as the next editor-in-chief of the magazine, effective January 2018. Robert is a world-renowned expert and proliferate researcher on signal processing for communications. Please join me in welcoming him. As I pass the baton, I take this opportunity to thank all supporters of the magazine in the past and appreciate the continued support in the years to come. Together, we can continue to build this premier publication with a strong technical impact as well as indispensable benefits to our members and readers.

To quote Prof. Oppenheim: “There will always be signals, they will always need processing, and there will always be new applications, new mathematics, and new implementation technologies.” Let *IEEE Signal Processing Magazine* be your helpful companion in this everlasting journey of signal processing!


