ACS SENSORS

Editorial

Cite This: *ACS Sens.* 2018, 3, 519−519

pubs.acs.org/acssensors

A Glimpse into the Future of Sensing

The lectures from the inaugural Advances in Measurement Science Lectureship Awards—sponsored by the ACS Analytical Division and ACS Publications—were presented at Pittcon on February 27th in Orlando, Florida. It was a special day for all three of the measurement journals of the ACS—*ACS Sensors*, *Analytical Chemistry*, and *Journal of Proteome Research*—as an idea, hatched sometime in 2015 by Jonathan Sweedler and the division, finally came into fruition. The award reflects the truly international focus of ACS Publications with one winner from the Americas, one from Europe/Middle East/Africa, and one from Asia-Pacific. Each awardee also had the pleasure of inviting a colleague to speak after them, on a complementary topic to their own talk. There was no restriction in topic. The three winners were Professor Neil Kelleher from Northwestern University in Evanston, IL, USA; Associate Professor Francesco Ricci from the University of Rome, Tor Vergata in Italy; and Professor Kourosh Kalantar-zadeh from RMIT, in Melbourne, Australia.

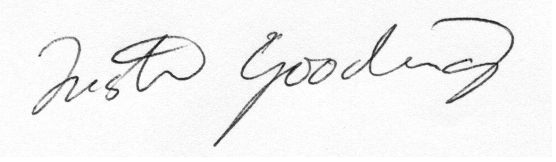
The award session was a really special 3−4 hours of science, which gave glimpses into the future of sensing. The first award speaker was Neil Kelleher—representing the Americas—who spoke about top-down proteomics.[1] We learned that the beauty of top-down proteomics is that it can lead to the identification of post translational modifications of proteins and protein−protein interactions (so-called proteoforms), both of which are vital for understanding the processes of human cell biology and disease progression. The relevance to sensing was immediately apparent. Such knowledge allows the identification of new, and potentially highly specific, biomarkers for understanding disease. Of course these very same biomarkers then become the target species or sensors. The next speaker in this session was Neil's collaborator, Lloyd Smith from the University of Wisconsin-Madison, who talked about mass spectrometry-based proteomics and proteoform identification.

The second pair of talks included the European awardee, Francesco Ricci, and his collaborator Alexis Vallée-Bélisle from the University of Montreal. Francesco talked about applications of synthetic biology in sensing, specifically DNA nanotechnology. In a very elegant introduction to his field, Francesco spoke about how the predictable structures, ease of synthesis, low cost, and biocompatibility create new opportunities in sensing, using nanomechanical devices with well-defined structures and functions.[2] He then chose to focus on two specific examples where fluorescent-based DNA nanomechanical switches were used to detect antibodies in biological fluids via either a conformational switching or a colocalization approach. Alexis followed on in this theme discussing how the DNA switches could be used to provide insights into different biological protein binding events before discussing some of the electrochemical applications in sensing including his recent paper in *ACS Sensors*.[3]

The final pair of talks included the Asia-Pacific awardee, Kourosh Kalantar-zadeh, and his collaborator, Jianzhen Ou, also from RMIT. These two talks saw a shift to electrical engineering and materials chemistry. Kourosh spoke about ingestible sensors;[4] really elegant gas sensing pills that contain all the electronics and power source inside the pill as well as employing sophisticated purpose-designed gas sensing membranes. The sensors, once swallowed, allow gas sensing inside the user's gut. One of the real highlights of this talk was the way these ingestible sensors not only provided diagnostic information regarding levels of gases in the gut, but also provided new insights into the microbiological processes that were occurring in the gut. Jiazhen followed with further discussion on two-dimensional materials and their sensing applications based on tunable plasmonics.

So, it was a brilliant session of science that really illustrated how fields as broad as mass spectrometry, synthetic biology, electrical engineering, and materials chemistry impact sensing. Congratulations are once again extended to the winners, Neil, Francesco, and Kourosh. As the Advances in Measurement Science Lectureship Awards are awarded annually, as soon as the award symposium was over our attention turned to next year's awards. The applications for these are already open. You can find details of the application process here.

We encourage you to nominate a colleague, or even apply yourself. We would welcome the opportunity to hear about the great analytical chemistry you perform.



J. Justin Gooding, Editor-in-Chief

The University of New South Wales, Sydney, Australia

AUTHOR INFORMATION

ORCID

J. Justin Gooding: 0000-0002-5398-0597

Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

REFERENCES

(1) Smith, L. M.; Kelleher, N. L. *Nat. Methods* **2013**, *10*, 186−187.

(2) Ricci, F.; Vallee-Belisle, A.; Simon, A. J.; Porchetta, A.; Plaxco, K. W. *Acc. Chem. Res.* **2016**, *49*, 1884−1892.

(3) Mahshid, S. S.; Ricci, F.; Kelley, S. O.; Vallee-Belisle, A. *ACS Sensors* **2017**, *2*, 718.

(4) Kalantar-Zadeh, K.; Ha, N.; Ou, J. Z.; Berean, K. J. *ACS Sensors* **2017**, *2*, 468−483.

Received: March 2, 2018

Published: March 23, 2018

DOI: 10.1021/acssensors.8b00177

ACS Sens. 2018, 3, 519−519