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Advanced Nanoelectronics

NANOELECTRONICS HAS BEEN one of the most dynamic topics in nanotechnology over recent decades, and the demands in the quantum era associated with nanoelectronics have never been more challenging. It is our great pleasure to introduce the guest editors of this special issue of *IEEE Nanotechnology Magazine* on nanoelectronics, Prof. Malgorzata Chrzanowska-Jeske, Prof. Stephen M. Goodnick, and Prof. Martin Wybourne, who are experienced nanoelectronics researchers.

This special issue includes articles on cytomorphic electronic systems, magnetic skyrmions, quantum computing, annealing in the noisy intermediate-scale quantum era, design automation, and first principles in the determining of nanoelectronic materials. Prof. Jiming Bao from the University of Houston and Prof. Georgios Sirakoulis from the Democritus University of Thrace served as associate editors for this special issue. We hope readers greatly enjoy these articles.

PROF. MALGORZATA CHRZANOWSKA-JESKE

Prof. Malgorzata Chrzanowska-Jeske is a professor in the Electrical and Computer Engineering Department at Portland State University, and she served as department chair during 2004–2010. She received her M.S. degree from the Technical University of Warsaw, Poland, and her Ph.D. degree in electrical engineering from Auburn University.

She conducts research in CAD for sub-micron 3D integrated circuits, carbon nanotube field-effect transistors and



Prof. Malgorzata Chrzanowska-Jeske.

nanoribbon field-effect transistors, exclusive or reversible logic synthesis, nanobio systems, and emerging technologies. She has published more than 150 papers in international journals and conference proceedings. She has given numerous plenary, keynote, and tutorial lectures at various IEEE conferences worldwide. She serves on the editorial boards of *IEEE Transactions on Nanotechnology*, *Now Publishers' Foundations and Trends in Integrated Circuits and Systems*, and the Institute of Physics' *Nano Express*. Over the years, she has served on the editorial boards of *IEEE Transactions on Circuits and Systems II* (2016–2019) and *Journal on Emerging and Selected Topics in Circuits and Systems* (2014–2015) and as a guest editor of *IEEE Transactions on Nanotechnology*, *IEEE Nanotechnology Magazine*, *Analog Integrated Circuits and Signal Processing*, and *VLSI International Journal*.

She has served as the vice president (VP) of finances for the IEEE Nanotechnology Council since 2019 and on the IEEE Tech-



Prof. Stephen M. Goodnick.

nical Activities Board Award and Recognition Committee since 2021. Previously, she served as VP for technical activities for the IEEE Nanotechnology Council during 2016–2017; as an IEEE Circuits and Systems (CAS) Society Board of Governors (BoG) member during 2007–2013; and on numerous organizational, technical, and steering committees of major international conferences. She received the IEEE Council on Electronic Design Automation 2008 Donald O. Pederson Best Paper Award and the 1990 Best IEEE Transactions Paper Award from the IEEE Alabama Section. She is a founding member of Women in CAS and former chair during 2010–2011, and she is a Life Senior Member of IEEE.

PROF. STEPHEN M. GOODNICK

Prof. Stephen M. Goodnick is currently the David and Darleen Ferry Professor of Electrical Engineering at Arizona State University (ASU). He received his Ph.D. degree in

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The other Chapter news is that the new international coordinator, Lan Fu of Australian National University, is supported by five regional coordinators: Vasuda Bhatia, Regions 1–7; Attila Bonyár, Region 8; Camilo Tellez Villamizar, Region 9; Zhiming Wang, Region 10; and Brajesh Kumar Kaushik, Region 10 (India).

There are ongoing projects that must be completed by the end of the year, including passing changes to the Constitution and Bylaws, which will introduce vice president-elect and member-at-large positions to the ExCom and AdCom, respectively, and completion of the Operations and Conferences manuals, the latter for future conference organizers to ensure greater year-to-year continuity. Identifying paths for young volunteers to become known and

involved in NTC activities remains an ongoing discussion; the obvious avenues are to publish in the journals and conferences, then become reviewers and beyond, and to volunteer for TryNano or join a TC. There are also regional paths through Chapters, YPs, or WIN. It is no secret that the NTC is usually struggling to find financial support for all of its activities as it has only publications and conferences as sources of revenue (and no membership fees). We need a third source of income, especially since all models predict a drastic decline in publication income with the move to open access, and the only obvious source is magazine advertising and increasing conference sponsorships through increased industrial contacts. You should have seen first efforts in this direction in the fourth quarter.

As past president in 2022 and 2023, I will chair the Nominations and Appointments and the Liaison and Transnational Committees. As the Liaison and Transnational chair, it will be my goal to attend as many regional Chapter, YP, and WIN meetings; NTC conferences (including cosponsored ones); and Member Society AdCom/Board of Governors meetings as possible, preferably F2F, but virtually if that's not possible. So, I hope to see you soon!

ABOUT THE AUTHOR

James E. Morris (j.e.morris@ieee.org) is the IEEE Nanotechnology Council president for 2020–2021. He is emeritus with Portland State University, Portland, Oregon, 97207, USA.

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THE EDITORS' DESK *(continued from page 2)*

electrical engineering from Colorado State University, Fort Collins, in 1983. He was an Alexander von Humboldt Fellow with the Technical University of Munich, Germany, and the University of Modena, Italy, in 1985 and 1986, respectively. He served as chair and professor of electrical engineering at ASU, Tempe, from 1996 to 2005. He served as associate VP for research at ASU during 2006–2008 and presently is the deputy director of ASU Lightworks. He was also a Hans Fischer Senior Fellow with the Institute for Advanced Studies at the Technical University of Munich.

Professionally, he served as president of the IEEE Nanotechnology Council during 2012–2013 and as president of the IEEE Eta Kappa Nu Electrical and Computer Engineering Honor Society BoG during 2011–2012. Some of his main research contributions include the analysis of surface roughness at the Si–SiO₂ interface, Monte Carlo simulation of ultrafast carrier relaxation in quantum confined systems, global modeling of high-frequency and energy-conversion devices, full-band simu-



Prof. Martin Wybourne.

lation of semiconductor devices, transport in nanostructures, and the fabrication and characterization of nanoscale semiconductor devices. He has published more than 450 journal articles, books, book chapters, and conference proceedings, and he is a Fellow of IEEE (2004) for contributions to carrier transport fundamentals and semiconductor devices.

PROF. MARTIN WYBOURNE

Prof. Martin Wybourne is the Francis and Mildred Sears Professor of Physics at Dartmouth College and received his Ph.D. and D.Sc. degrees from the University of Nottingham, United Kingdom. He joined the Dartmouth faculty in 1997 following 10 years at the University of Oregon, before which he directed the Phonon Physics Research Team at the General Electric Company's Hirst Research Centre, London. His research focuses on the electrical, thermal, and mechanical properties of nanoscale systems. He has published more than 125 papers and organized several major international conferences.

At Dartmouth College, he has served as senior vice provost for research, associate dean of the faculty for the sciences, and interim provost. From 2003 to 2015, he chaired the Institute for Information Infrastructure Protection, a national consortium of universities and nonprofit organizations. He is a Senior Member of IEEE and a fellow of the Institute of Physics.

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