IGSC 2020 Panel

Towards Self-powered Embedded Computing Systems

The Internet of Things is expected to lead to billions of new computing devices, many of which embedded in other systems and objects. Powering these devices will be a challenge. Frequently, a wired power supply will be unavailable and too cumbersome to install. As a result, many prototypes and early products are battery-powered, leading to limited system lifetimes and unwanted maintenance. In order to address these limitations, energy harvesting technologies have attracted attention in recent years. Energy harvesting is envisioned to enable IoT devices to extract energy from available sources in their environment, and thus to increase battery lifetime or to replace batteries entirely. This interdisciplinary panel brings together energy harvesting experts in order to discuss the state-of-the-art, challenges, and future research opportunities.

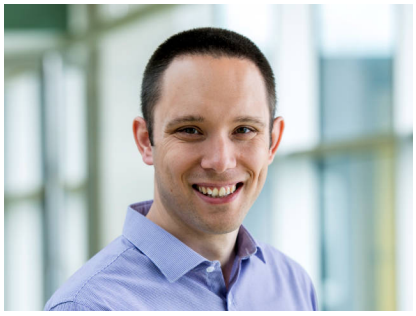
Panel Organizer:

Dr. Sebastian Bader is an Assistant Professor at the Department of Electronics Design at the Mid Sweden University. His main research interests lie in the areas of energy harvesting and low-energy embedded systems. His work includes the characterization of ambient energies, the design, modeling and optimization of energy transducers, and energy harvesting system integration with low-energy sensing solutions. Sebastian has received his PhD degree in 2013 with a focus on low-power and self-powered wireless sensor networks. He is involved in a number of international conferences and networks, an associate editor for the journal on Sustainable Computing: Informatics and Systems, and a senior member of the IEEE.

Panelists:

Prof. Shad Roundy received the MS and PhD in Mechanical Engineering from the University of California, Berkeley in 2000 and 2003 respectively. From there he moved to the Australian National University where he was a senior lecturer in the Systems Engineering Department. He spent the next several years working with startup companies LV Sensors and EcoHarvester developing MEMS pressure sensors, accelerometers, gyroscopes, and energy harvesting devices. In 2012, he re-entered academia joining the mechanical engineering faculty at the University of Utah where he currently researchers energy harvesting, wireless power transfer, and micro-sensors. Dr. Roundy has published or edited two books on energy harvesting and his journal articles on vibration energy harvesting remain some of the seminal works on the topic. He is currently an associate editor for Smart Materials and Structures and the International Journal for Precision Engineering and Manufacturing-Green Technology. He is a member of IEEE and a fellow of the American Society of Mechanical Engineers (ASME).

Prof. Dr. Ali Muhtaroglu received his B.S. from University of Rochester in 1994, M.S. from Cornell University in 1996, and Ph.D. from Oregon State University in 2007, all degrees in Electrical and Computer Engineering. He worked at Intel Corporation R&D in U.S.A for 11 years before becoming a faculty member in Electrical-Electronics Engineering (EEE) at Middle East Technical University (METU) Northern Cyprus Campus (NCC) in 2007. His experience and research interests include Integrated Circuit (IC) design, energy harvesting, and low power system architectures. He was the (Founding) Coordinator of the Sustainable Environment and Energy Systems (SEES) MS Program between 2010-2016, and was the EEE Program Coordinator between 2011-2013. He led the establishment of Center for Sustainability (CfS) at METU NCC in 2017, and is directing the Center at the moment. He has been serving as the Head of the Academic Board of Engineering and Natural Sciences since 2017. Dr. Muhtaroglu has numerous publications, and a number of patents. He has chaired, co-chaired, and served on the technical program committees for various IEEE conferences. He is a Senior IEEE Member.



Prof. Geoff Merrett is Head of the Centre for Internet of Things and Pervasive Systems at the University of Southampton, UK, and Co-Director of the Arm-ECS Research Centre. He received the PhD degree in Electronic Engineering, also from Southampton, in 2009. His research interests are in energy management of mobile/embedded systems and self-/intermittently powered devices, and he has published over 200 conference and journal articles on these topics. He co-manages the UK's Energy Harvesting Network, and founded the International Workshop on Energy Neutral Sensing Systems (ENSsys), serving as General Chair from 2013-15 and on its steering/organisation committees since 2016.