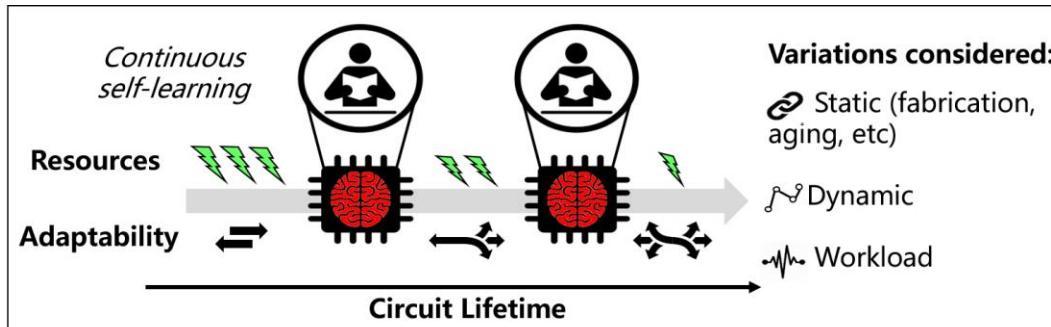


# Make our chips decide! Towards resource-efficient on-chip intelligence for self-adaptive integrated circuits



## Abstract

Recently, embedded adaptive analog and mixed-signal circuits have flourished, pushed by the incredible integration possibilities offered by the latest fabrication technologies. However, although enabling "better" circuits (more clever, ubiquitous, user-centered), these techniques usually come at the expense of a significant increase in terms of consumed resources, such as power, computation, or area. Specifically considering new applications, as the internet of things, there is a high need for more resource-efficient yet adaptive circuits, able to be integrated in small-sized systems. So, if I have tight energy and resources, what can be adapted, and how? How can I increase the adaptation efficiency of my circuits?

In this talk, we will provide possible answers to these questions, starting from the current situation and projecting ourselves on the next few years. We will detail our current research axis, based on flexible hardware design and hardware efficient machine learning. For instance, we will detail calibration strategies based on Bayesian Networks, which can offer an alternative to classical neural-network based approaches. We will also details novel concepts and possible applications, as neuromorphic computing or self-learning systems able to compensate for a large variety of variations autonomously, learning directly in the field. I don't decide anymore, my circuit does!

## Bio

Martin Andraud was born in Clermont-Ferrand, France, in 1988. He is currently an assistant professor in the Department of Electronics and Nanoengineering in Aalto University, Helsinki, Finland, since 2019. He received the Diploma degree in engineering, with a focus on microelectronics, from Telecom Physics Strasbourg, Illkirch-Graffenstaden, France, in 2012, the M.S. degree in micro- and nano-electronics from Strasbourg University, Strasbourg, France, in 2012, and the Ph.D. degree in micro- and nano electronics from TIMA Laboratory, University of Grenoble Alpes, Grenoble, France, in 2016. Between 2016 and 2019, he was a Post-Doctoral Researcher, successively with TU Eindhoven, The Netherlands and KU Leuven, Belgium. His current research interests are the design of ultra low-power integrated circuit design and the development of machine learning hardware implemetations using analog and mixed-signal circuits.