Post-doc title: Embedded test instruments for high-performance Analog-to-Digital Converters in advanced nanometric technological nodes

Post-doc supervisors: Manuel J. Barragán (manuel.barragan@univ-grenoble-alpes.fr), Salvador Mir (salvador.mir@univ-grenoble-alpes.fr)

Location: TIMA Laboratory, Reliable Mixed-Signal Systems group (CNRS – Université Grenoble Alpes), Grenoble, France

Funding: Research contract with a net salary around 2000 Euro/month.

Starting date: April 2017

Duration: 1 year

In collaboration with: STMicroelectronics (Crolles, France), IMSE/CNM (Sevilla, Spain)

Context: The integration capabilities offered by current nanoscale CMOS technologies enable the fabrication of complete and very complex mixed-signal systems on a single die. However, manufacturing processes are prone to imperfections that may degrade the intended functionality of the fabricated circuits. Extensive production tests are needed in order to separate defective or unreliable parts from functionally correct devices. Unfortunately, the co-integration of blocks of very distinct nature (analog, mixed-signal, digital, RF, ...) as well as the limited access to internal nodes in an integrated system make the test of these devices a very challenging and costly task. Nowadays, testing the analog, mixed-signal, and radio-frequency (RF) functions of ICs results in a high cost that may amount up to 50% of the overall manufacturing cost. The test cost is expected to rise in the coming years as ICs include ever more functionality and as we move to smaller technology nodes for which process variations and defect density become more prevalent. Therefore, reducing the cost of testing for analog, mixed-signal, and RF circuits is an area of focus and innovation for the semiconductor industry.

This post-doc project envisages built-in test solutions for high-performance Analog-to-Digital converters (ADCs). Built-in test consists of migrating some of the test instruments into the IC, in order to facilitate and speed-up testing. For example, built-in test could consist of generating test stimuli on-chip, performing and processing measurements on-chip, etc. Built-in test can also help to diagnose the source of failure and, thereby, enhance production yield through appropriate actions. Furthermore, embedded test instruments may enable on-line test, self-healing, self-calibration and adaptive operation in safety-critical and mission-critical applications.

Specifically, this post-doc aims at the development of efficient built-in test instruments for static test of ADCs in a nanometric technology with the final goal of integrating a self-testable ADC demonstrator.

Skills: The prospective candidate should be highly motivated, have a PhD in Electrical and Electronics Engineering, Microelectronics or equivalent subject, have a good publication track in related fields, and should be proficient in analog and mixed-signal integrated circuit design, Analog-to-Digital converters, and computer-aided design tools (e.g. Cadence). Experience on FDSOI technologies and hardware description languages are also a plus.

Contact: Manuel J. Barragán (manuel.barragan@univ-grenoble-alpes.fr) Salvador Mir (salvador.mir@univ-grenoble-alpes.fr) TIMA Laboratory, 46 Av. Félix Viallet Viallet, 38031 Grenoble FRANCE, http://tima.imag.fr