



PhD in Mixed-Signal Design for the Internet of Things

IOC-17 PhD in Mixed-Signal Design for the Internet of Things

Job type: Full-time / Fixed Term

Job description

[Microelectronic Circuits Centre Ireland \(MCCI\)](http://www.mcci.ie) is an EI / IDA technology centre hosted at Tyndall National Institute. Its mission is to carry out industry-led world-class Analog, Mixed-Signal and RF integrated circuit research and to deliver trained people and IP to industry. MCCI is already collaborating with 35 companies and many of the staff eventually transfer into the thriving microelectronics industry in Ireland. MCCI targets real-life applications with its research and currently has projects in diverse topics such as DNA detection for food safety, next generation optical communications, bio-sensing, imaging for security applications and early cancer detection.

As microelectronics chips are manufactured in ever smaller geometries the performance of Analogue and Mixed-Signal circuits degrade while at the same time digital logic becomes cheaper, smaller and lower power. Applications associated with the Internet of Things is placing multiple challenges on the Integrated Circuit Chips that are required to enable the next generation of IoT applications.

Sampling aperture errors caused by jitter on the edges of the sampling clock is a major performance limitation for Analogue to Digital converters both at high speeds and at high precision. Applications such as Automotive Radar and 5G Cellular communications are limited by jitter. The requirement for sub 1ps rms jitter or even 10fs rms jitter for the latest State of Art GHz ADCs puts large demands on the clock source and clock buffers. The Clock source is usually a Phase Locked loop (PLL) and this has high power consumption to meet the tight precision specifications. This a large opportunity for innovative solutions to make ADCs more robust to jitter errors to overcome this performance and power limitation.

Please look at www.mcci.ie for more information.

MCCI is opening up a number of PhD studentships in the area of Analogue Mixed-Signal Design for the Internet of Things. These will encompass areas such as Data Converters, Ultra Low Power Data Converters, Energy Harvesting, Power Management and RF IC design. There are particular opportunities in the areas of:

- Jitter Reduction techniques for Analogue to Digital converters.
- Electrochemical Sensor Interfaces.
- High Speed Data Converters
- High Resolution

Key Responsibilities

- Carry out innovative research in Analogue Mixed-Signal IC Design, with a focus on taking advantage of deep-submicron CMOS technologies.
- Perform modelling and analysis on the limitations of existing solutions.

- Participate on research projects under the direction of a project team leader to design and develop new architectures and circuits in areas such as Data Converters, Ultra Low Power Data Converters, Energy Harvesting, Power Management and RF IC design.
- With guidance, implement the solution on an integrated circuit. This may include system level simulation, algorithm development, schematic design, layout and validation of manufactured silicon.
- Work on collaborative research projects with MCCI industry partners.
- Engage in the dissemination of the results of the research, as directed by and with the support of senior MCCI research staff.

Essential Criteria

- The minimum academic qualification is a first or upper second class honours degree (or an equivalent international degree) in electrical engineering, electronic engineering, physics or related relevant discipline.
- The successful candidate will be highly innovative with a strong desire to create world-beating integrated circuits research for real-life applications.
- The successful candidate will be highly analytical with good interpersonal and organizational skills.

Desirable Criteria

- A Master's Degree in Electronic/Electrical Engineering
- Good mathematical ability and knowledge of statistics
- Circuit knowledge on Analogue to Digital converters and Phase Locked Loops
- Experience in the area of Analog, Mixed-Signal or RF circuit design
- Knowledge of mathematical modelling tools such as MATLAB.

Any queries relating to this position can be forwarded to Dr. Ivan O' Connell on email ivan.oconnell@mcci.ie

An annual student stipend of €18,500 applies for this successful candidate for this position. Yearly University academic fees will be paid by the Tyndall National Institute.

Application Instructions

Step 1 - Click [here](#) to download the Application form and indicate the Job Reference IOC-17

Step 2 - Return the completed Application form, together with your CV and motivation letter to careers@tyndall.ie.

Postgraduate applicants whose first language is not English must provide evidence of English language proficiency as per UCC regulations

(<https://www.ucc.ie/en/study/comparison/english/postgraduate/>). Certificates should be valid (usually less than 2 years old) and should be uploaded with their application. In special circumstances the panel may consider a prior degree in English (e.g. Master thesis written in English) as evidence of English language proficiency.

Please note that Garda vetting and/or an international police clearance check may form part of the selection process.

The University, at its discretion, may undertake to make an additional appointment(s) from this competition following the conclusion of the process.

At this time, Tyndall National Institute does not require the assistance of recruitment agencies.

Tyndall National Institute at University College, Cork is an Equal Opportunities Employer.