STudent REseArch Mobility Programme (STREAM)
Project proposal

Host University:
Universität Zurich

Field:
Information and communication technologies

Specified field, subject:
Neuromorphic Engineering

Research project title:
Neuromorphic VLSI Circuits for Smart Microanalytical Systems

Possible starting month(s):
☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Jan ☑ Feb ☑ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug

Possible duration in months:
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☑ 6

Exact starting and end dates will be discussed between the supervisor and the student

Suitable for students in:
☐ Bachelor level ☑ Master level

Prerequisites:
• Enrolled in Master’s degree in Electronics/IT Engineering (or similar) covering: analog and digital VLSI circuit design, sensors and instrumentation, and mixed signal processing.
• Competent with Cadence EDA tools for IC design, and/or experience with PCB design and FPGA programming.
• Experience with programming in C++, Java and/or Python.
• Team player and strong communicator. Capacity to work on own initiative.
• Good written and spoken English.

Restrictions:
NONE

Description:
This research work is part of a European project with academic and corporational partnership, aiming to integrate novel adaptive microanalytical solutions to address the global challenge of real-time environmental monitoring. You will have the opportunity to collaborate with a multidisciplinary team with expertise in neuroscience, computer science, environmental science, chemistry and microelectronics.

Under the Swiss-European Mobility Programme (SEMP), you will explore new ultra low-power neuromorphic VLSI circuits for the readout of smart electrochemical sensors: solid-state conductimetric, amperometric and potentiometric devices fabricated by our academic partner in Barcelona, IMB-CNMC.

• Design and validate efficient compressive, event-based sensing architectures to enable on-demand operation on mobile devices powered by
batteries or local energy harvesting. You will develop your circuit proposals following standard custom IC/FPGA design methodology.

- Characterize your prototypes at both electrical and electrochemical levels. You will benchmark the designs in the field together with the associate company.

**Department:**
Sensors Group, Institute of Neuroinformatics.

**Contact person:**
Katja Durkin, Project Manager, International Relations Office

**Contact email:**
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**Deadline for nomination to reach host university:**
31. December 2017

**Notification of admission given by the end of:**
February 2018

**Additional information:**
NA