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):

<table>
<thead>
<tr>
<th>Month</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☑️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☒️</td>
<td>☒️</td>
<td>☒️</td>
<td>☒️</td>
<td>☐️</td>
</tr>
</tbody>
</table>

Possible duration in months:

<table>
<thead>
<tr>
<th>Duration</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☑️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☐️</td>
<td>☒️</td>
</tr>
</tbody>
</table>

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

Suitable for students in: ☒️ 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-CNMCIC.

- 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:
Katja.durkin@int.uzh.ch

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

Notification of admission given by the end of:
February 2018

Additional information:
NA