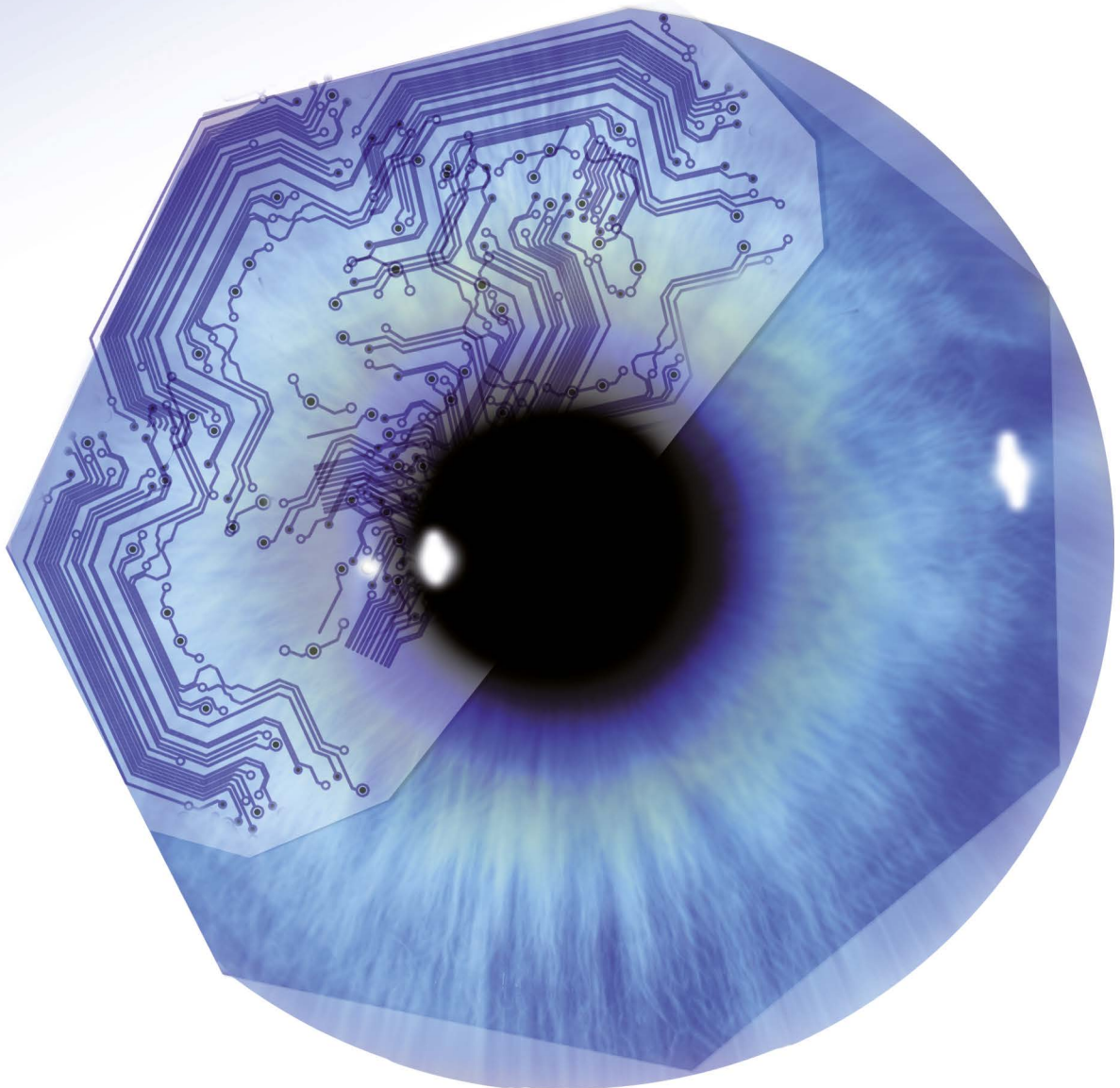# ELECTRICAL
ENGINEERING

EPFL

The doctoral program in Electrical Engineering (EDEE) at EPFL is the focal point for PhD theses in the fields of Electronics, Information Technologies and Electrical Energy. Being one of the largest doctoral programs at EPFL, EDEE offers a complete network of internationally leading research groups, advanced doctoral courses and attractive scientific and social activities.

The Panoptic camera

Omnidirectional stereoscopy and depth estimation are complex problems in image and video processing that need novel solutions to support real-time operation. The Panoptic camera is a biologically-inspired multi-camera vision sensor. It is a polydioptric system mimicking the eyes of flying insects where multiple imagers, each with a distinct focal point, are distributed over a hemisphere. This collaboration between two labs of EPFL's Institute of Electrical Engineering lead to the development of innovative omnidirectional image reconstruction algorithms (OIR) and to the realization of customized hardware imaging platforms. The combined hardware/software system enables advanced real-time applications including omnidirectional image reconstruction, 3D model construction (3D display) and depth estimation. A start-up company has been created to commercialize this innovation.
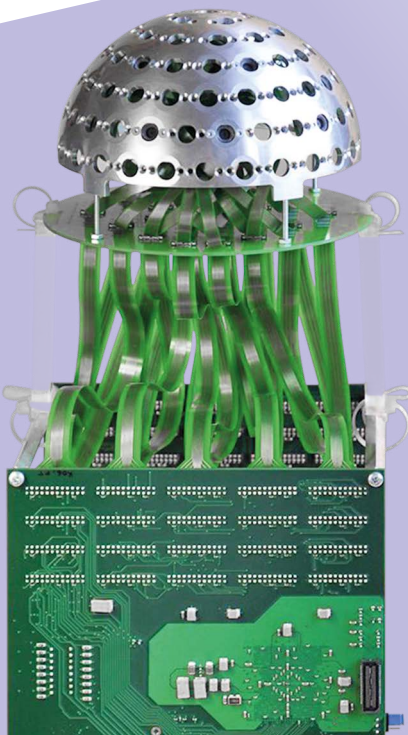
A time machine to protect future smart grids

Would it be possible to create a time capsule that allows to rewind the time in order to study the dynamic evolution of a power system subsequent to a fault? The reply to this question is definitely yes, and it is coming from the PhD thesis of Reza Razzaghi from the Distributed Electrical Systems (Prof. Mario Paolone) and Electromagnetic Compatibility (Prof. Farhad Rachidi) laboratories. The outcome of this research is to produce a new class of protection devices to be used in the context of smart grid applications. In particular, these new protections will merge two main functionalities, namely the identification and the location of a fault in a power network by time-reversing the electromagnetic transients generated by any kind of fault in power systems. The applicability of this method has been already validated on a large variety of power systems ranging from transmission to distribution networks with inhomogeneous and complex topologies.

**Reza Razzaghi,**
EPFL PhD student

Lakshmi Saheer,
EPFL PhD student working at the Idiap Research Institute in Martigny, Switzerland.

I first heard of EPFL and Idiap while doing my Master's at the Indian Institute of Technology Madras (India). Both these institutions were well known at my university as hubs for high quality research in speech and signal processing. So, when I decided to come back to research life and pursue a PhD, these were the places I wanted to be.
During my doctoral course at EPFL, I was involved in a European project with international partners, and this helped me generate high quality collaborative research and publications. The brilliant research colleagues and supervisors at Idiap helped me approach my research problems with ease. Students get the opportunity to attend all relevant international conferences and workshops in their area. This gives a great opportunity to meet and personally have discussions with the legends in our respective areas of research.
I also publish several publications in international conferences and journals. I also won some recognition like the Google Anita Borg scholarship and the Idiap Paper Award during my course. Being paid a good stipend while working towards a doctorate in our area of interest was a dream come true for me. When I had my daughter in the middle of my doctoral studies, I enjoyed a great deal of support from my supervisors and colleagues in addition to the paid maternity leave. After finishing my PhD I wanted to pursue an entrepreneurial career. Being an alumni of EPFL gave me direct access to the Swiss startup ecosystem. I discovered that grants like EPFL's Innogrant, other efforts from Venture lab, or The Ark Foundation in Valais (which Idiap is a participant of) are efforts specially catered for researchers like me to blend into the startup system. There are different funding and coaching options in Switzerland that promote startups and being an EPFL graduate gives easy access to most of these programs. For instance, I won the Ark Grant and the Venture Kick Stage 1 funding. Overall, this is the perfect place for my dream career.
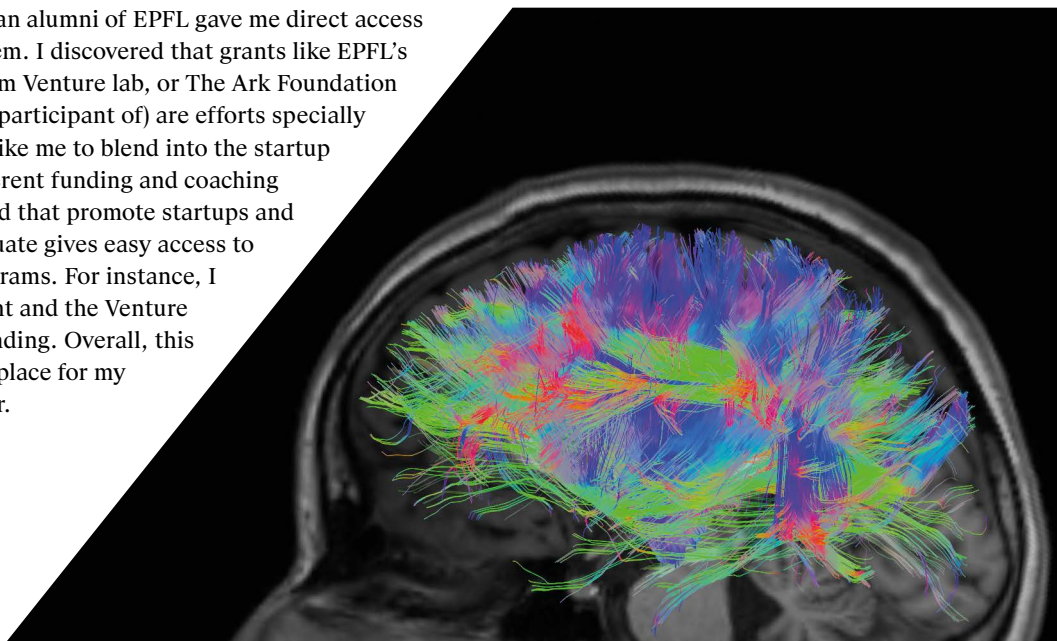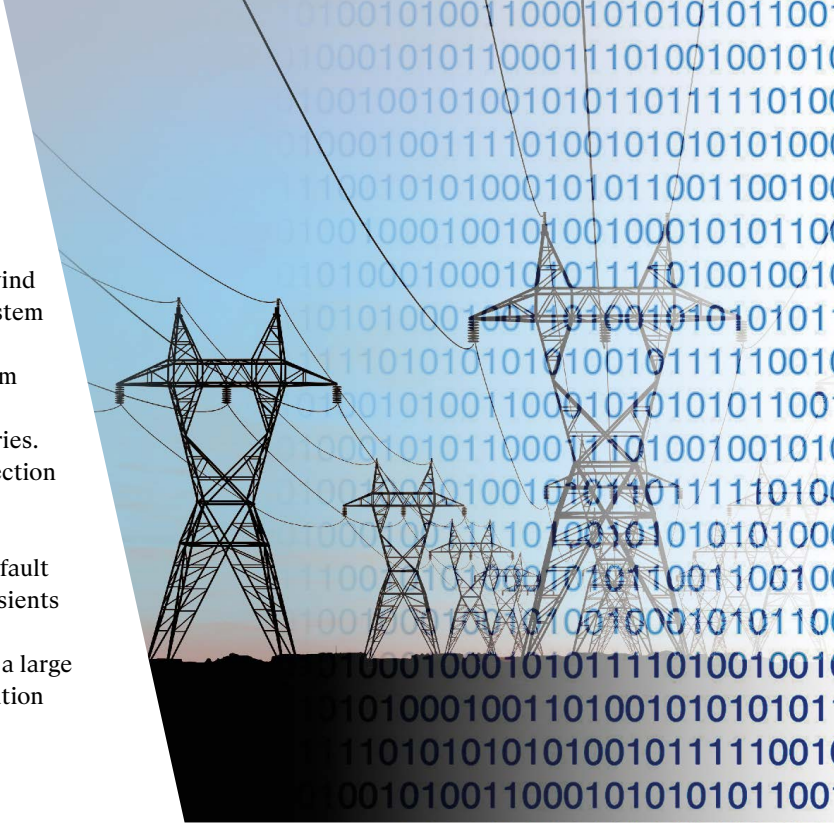
The EPFL doctoral program in Electrical Engineering (EDEE) is one of the largest doctoral programs at EPFL:
It has on average 200 PhD students affiliated to the program and the number of applicants is between 400-450 per year.

The admission is on a competitive basis (yearly admission rate: 8-10%).

Application process

You need to complete and submit the EPFL Doctoral School online application form. The application process is entirely electronic:
phd.epfl.ch/application

Beforehand, we encourage you to consult the EPFL Doctoral School and EDEE program webpages to get an idea of ongoing research in Electrical Engineering at EPFL:
go.epfl.ch/phd-edee

At the time of enrolment to the EDEE program, applicants must have successfully obtained a Master's degree.
PhD students are hired as EPFL employees at highly competitive conditions. Consequently your application will be considered in respect of the available financial support and open positions in relevant laboratories.

Deadlines

The EDEE application deadlines are:
April 15th, September 15th, December 15th

Changes to the application deadlines may apply. For the most recent information, please refer to the program's webpage.

General information

The EDEE program is in English. The typical duration of the program is four years. Students can start the program at any time of the year.

Requirements

At the end of the first year, students have to submit a research plan and pass a qualifying exam.
In order to successfully complete the EDEE doctoral program, students must acquire 12 course-credits among the doctoral courses provided at EPFL.

Research Areas
Circuits and Systems
Signal and Image Processing
Machine learning
Electronics
Computer Engineering
Optics and Photonics
Telecommunications
Electromagnetic Fields and Waves
Automatic Control

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