

## Sensors and Actuators

- ▶ Piezoelectric and ultrasonic transducers
- ▶ Micro-pumps
- ▶ Accelerometers, force and pressure sensors
- ▶ Magnetic bearings
- ▶ Inductive and Eddy current sensors
- ▶ Picoampere currents sensors

## Conditioning

- ▶ Sensors and actuators dedicated/optimized electronics, control techniques
- ▶ Analog and/or digital signal processing, noise reduction techniques, spectral characteristics
- ▶ Energy harvesting and management

**A project to submit, an analysis to conduct,  
a solution to find ?**

Your contact :

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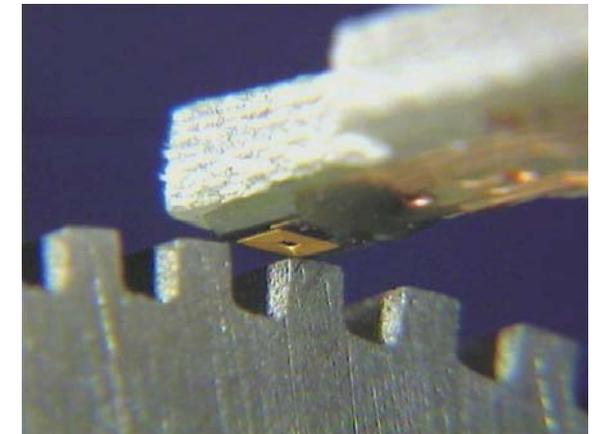
The HES-SO "Integration and Systems" network of excellence consists of over 150 engineers with recognized expertise in the fields of micro-systems, embedded systems, mechatronics and signal processing.

Five different thematic clusters have been created to gather the best competences of the network, independently from the location of engaged resources :

- ▶ Optical systems
- ▶ Sensors, actuators and conditioning
- ▶ Mechatronics and control software
- ▶ Nomadic systems
- ▶ High performance embedded systems

Looking for more information ?

[www.isys.hes-so.ch](http://www.isys.hes-so.ch)



## Sensors, Actuators and Conditioning

10 professors and their team ready  
to face new challenges with you

## Your needs Our skills

### Your needs

- ▶ Applied research and development (aR&D)
- ▶ Advice and expertise
- ▶ Pre-studies and prototyping for technological risks evaluation
- ▶ Continuing education courses

### Our skills

- ▶ Multiphysics modelisation and simulation
- ▶ Micro-fabrication and micro-structuring on silicon and polymer technologies
- ▶ Microfluidics
- ▶ Ferroelectric layers deposition
- ▶ Silicon MEMS design
- ▶ Electromagnetic sensors and systems
- ▶ Application specific integrated circuits design (ASIC)
- ▶ Low power electronics, energy management
- ▶ Bioelectric and biochemical signals measurements
- ▶ High resolution commands and measurements ( $\geq 100\text{dB}$ ), generation and measurements of very slow signals (0.1mHz...1.0 Hz)
- ▶ High speed A/D and D/A conversion ( $> 1\text{ GS/s}$ )
- ▶ Wireless communication
- ▶ Signal processing

## Recent projects

### Measurement and control of micro displacements

Capacitive measurement and electrostatic control of movements in six degrees of freedom of a test mass for the detection of gravitational waves

### Micropump

Development of a silicon micro-pump for insulin delivery

### Indirect calorimeter

Indirect evaluation of human metabolism by measuring oxygen consumption and carbon dioxide production in respiratory gases. Research and development of new streaming type physiological gas sensors for oxygen and carbon dioxide

### Micro-energy harvesting

Sensor powered by optical energy through a optical fiber

### MEMs Technology

Development of technology for microstructuring by the deposit of a solid (parylene) on a liquid : SOLID : Solid on Liquid Deposition

### Electromagnetic actuators

Thermomagnetic modeling of the electromagnet of an active magnetic weighing machine, modelisation of the hysteresis

### Inductive 2D Sensors

2D position measurement using a network of micro-coils and digital techniques of modulation / demodulation

### Instrumented in-vitro culture room

Instrumented multiprocessing platform for the in-vitro measurement of bioelectric and biochemical signals on cultures of biologic tissues

## Our engineers at your service

Thanks to a pro-active technological survey, our professors and their collaborators are positioned at the leading edge of their specialties. They will bring advanced skills to design new solutions to suit your needs.

### José Alberty

Multiphysics modelisation and simulation

### Cédric Bornand

Multimode systems (acoustic and vision)

### Mario Dellea

E Low-power analog electronics

### Raoul Herzog

Electromagnetics sensors and actuators  
Signal estimation techniques (EKF)

### Riad Kanan

RF and RFID Circuits design  
Antenna design and optimization (LF, HF, UHF)

### Herbert Keppner

MEMS technologies

### Didier Maillefer

MEMS, medical devices

### Joseph Moerschell

Very high precision measurement

### Philippe Passeraub

Microsystems, sensors and biosensors

### Enrico Staderini

Medical electronics