idiap
RESEARCH INSTITUTE

# ANNUAL REPORT 2018

The cover page shows Idiap's biometrics lab test bed.
→ *More on page 32.*

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## Idiap thanks

## the authorities and its founding members

AVEC LE SOUTIEN DE LA VILLE DE MARTIGNY

www.martigny.ch

CANTON DU VALAIS
KANTON WALLIS

www.vs.ch

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Département fédéral de l'économie, de la formation et de la recherche DEFR
**Secrétariat d'Etat à la formation, à la recherche et à l'innovation SEFRI**

www.sbfi.admin.ch

Fondation Dalle Molle
*Pour la qualité de la vie*

www.dallemolle.ch

swisscom

www.swisscom.ch

EPFL

www.epfl.ch

UNIVERSITÉ DE GENÈVE

www.unige.ch



## as well as its partners for their support

LOTERIE ROMANDE

www.loro.ch

the ark
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www.theark.ch

ideark

www.ideark.ch

FNSNF
Fonds national suisse
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Fondo nazionale svizzero
Swiss National Science Foundation

www.snf.ch

Schweizerische Eidgenossenschaft
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Confederazione Svizzera
Confederaziun svizra

Swiss Confederation
**Innosuisse – Swiss Innovation Agency**

www.innosuisse.ch

HASLERSTIFTUNG

www.haslerstiftung.ch

UniDistance.ch

www.unidistance.ch

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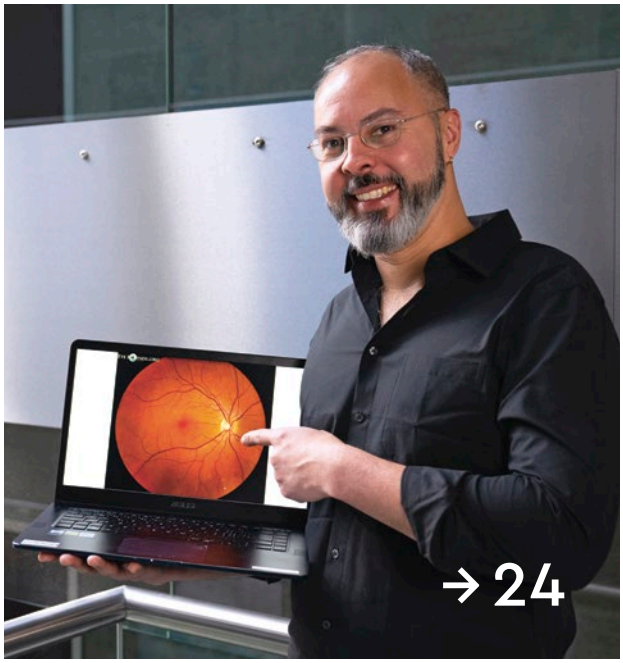
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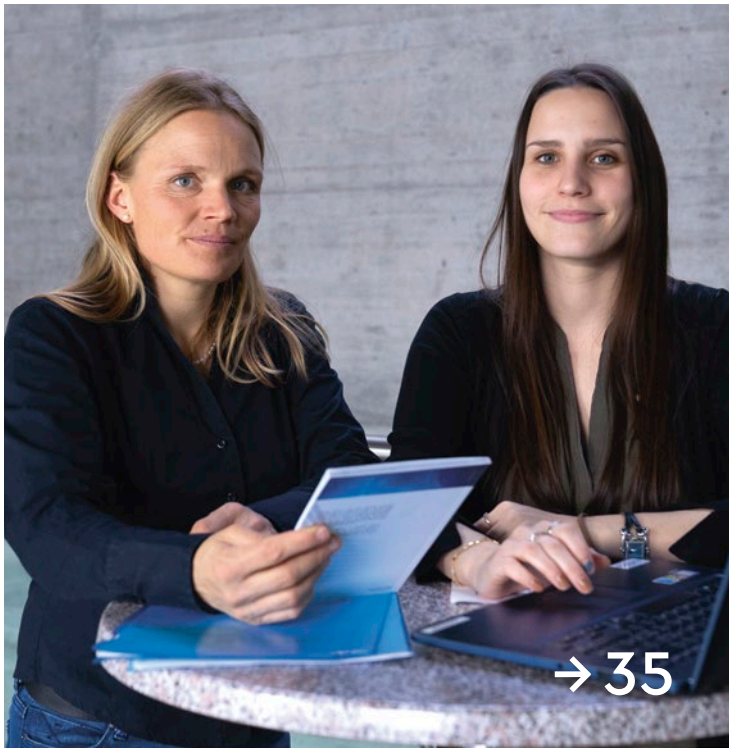
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**Olivier Dumas**
President of the Foundation Council



# "Idiap's growth indicates developments in artificial intelligence"

Two new research groups were created at Idiap in 2018: Biosignal Processing and Energy Informatics. These two themes simultaneously enrich the Institute's expertise and reflect certain concerns of society, thus illustrating perfectly our Institute's slogan—"AI for Society"—a slogan that also speaks of our pioneering role in numerous developments in the field of AI. Private partners' interest in these new themes is also encouraging with regard to their potential for development.

Growth in Idiap's activities is indicative of developments in artificial intelligence. Indeed, it is more fitting to speak of artificial intelligences than of a single artificial intelligence. This diversification of research activities implies an increase in project numbers and, consequently, in the means placed at these projects' disposal. Which explains why the Institute's financial growth is also following the same curve.

With this in mind, Idiap is already preparing to submit its forthcoming plan—for the period 2021–24—to the State Secretariat for Education, Research and Innovation (SERI). The proposal falls within the scope of this aforementioned diversification and consolidation of the Institute's expertise. And we are happy to be able to count on the support not only of the Confederation, but also of the authorities of the Canton of Valais and the city of Martigny and on all of our partners. It is thanks to their continued support that Idiap is, today, able to foresee and to meet such challenges.

The Foundation Council is pleased to share with you this appraisal of the year 2018 and thanks Idiap's supporters and partners for their commitment.

**Hervé Bourlard**
Director, Idiap; Professor, EPFL



# "We are always ready to take on new challenges"

Visiting Silicon Valley; presenting our expertise to major industrial groups; being awarded Swiss and international projects; creating new research groups... the past year typifies the wealth and variety of our Institute's activities. And thanks to these successes, our eyes are fixed firmly on the future—including on 2019, which promises to be just as prolific.

2019 will constitute an important step in our development. Together with our partners, we have submitted a proposal to create a National Centre of Competence in Research (NCCR) named "Human Trust in AI". We hope that our proposal will be selected and that we will thus be able to contribute to this particularly important though often-neglected dimension of artificial intelligence.

Facing the future with confidence, we are also giving ourselves the means to match our ambitions. With this in mind, we have established the first dual Masters in Artificial Intelligence, combining a flexible academic education with vital on-the-job experience. This approach contributes to us meeting our own staffing needs, while providing businesses with the only tool of its kind in the world, and one that allows them to draw a significant competitive advantage. And we have also begun transforming a neighboring site to house a start-up incubator. Our current hosting capacity is approaching its limits, which is a good sign.

Thanks to this ever-present need to surpass ourselves, we are constantly taking on new challenges. And it is this spirit that I and all Idiap's teams are happy to share with you via this overview of our Institute.

# overview

## 06 — 09

# Research at the service of society

**Christine Marcel**
Research and development engineer

## "As part of my job, I was able to present the engineering profession to young girls who participated in the Institute's 'Futur en tous genres' (Future for all Genders) Day."

Engaged in the development of customized tools for numerous research projects, Christine is also committed to encouraging the next generation of researchers, particularly young girls. Thanks to the engagement of its staff, Idiap is working to combat the shortage of talent in the various fields of computing.
*→ More on page 30.*

**Yann Rodriguez**
KeyLemon

## "My doctorate at Idiap enabled me to create a start-up that was later bought out by one of Apple's suppliers."

The results of Yann's dissertation were used in a business creation exercise in collaboration with the HES, leading to the creation of a start-up in the field of 3D facial recognition—a success subsequently confirmed when the start-up was bought out by one of Apple's suppliers, which retained the jobs that had been created in the region.
*→ More on page 31.*

**Justine Darioly**
Junior program manager

## "Since I joined Idiap in August 2018, I've assisted in the submission of some 30 research projects, including 15 at the international level."

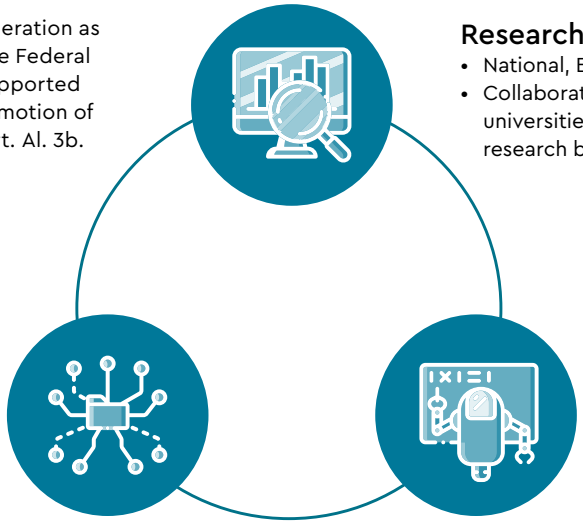
True orchestrators, the Institute's program managers coordinate and monitor research projects from an administrative standpoint. With no less than 40 or more projects ongoing at any time, their work is essential to the proper functioning of Idiap's activities.
*→ More on page 35.*

# Idiap, at a glance

**Idiap's vision is to promote quality of life through scientific progress in the field of artificial intelligence.**

## 3 missions

Idiap is recognized by the Confederation as part of the strategic domain of the Federal Institutes of Technology and is supported under the Federal Law on the Promotion of Research and Innovation (LERI), art. Al. 3b.



### Research
- National, European, and worldwide
- Collaborations with prestigious universities and public and private research bodies

### Innovation
- Technology transfer
- Start-up creation
- Dedicated incubator—TheArk
- Patents, licenses, and open source

### Training
- Numerous courses at EPFL and internally
- Master's in Artificial Intelligence incorporating guaranteed work experience
- Encouraging the next generation of young researchers



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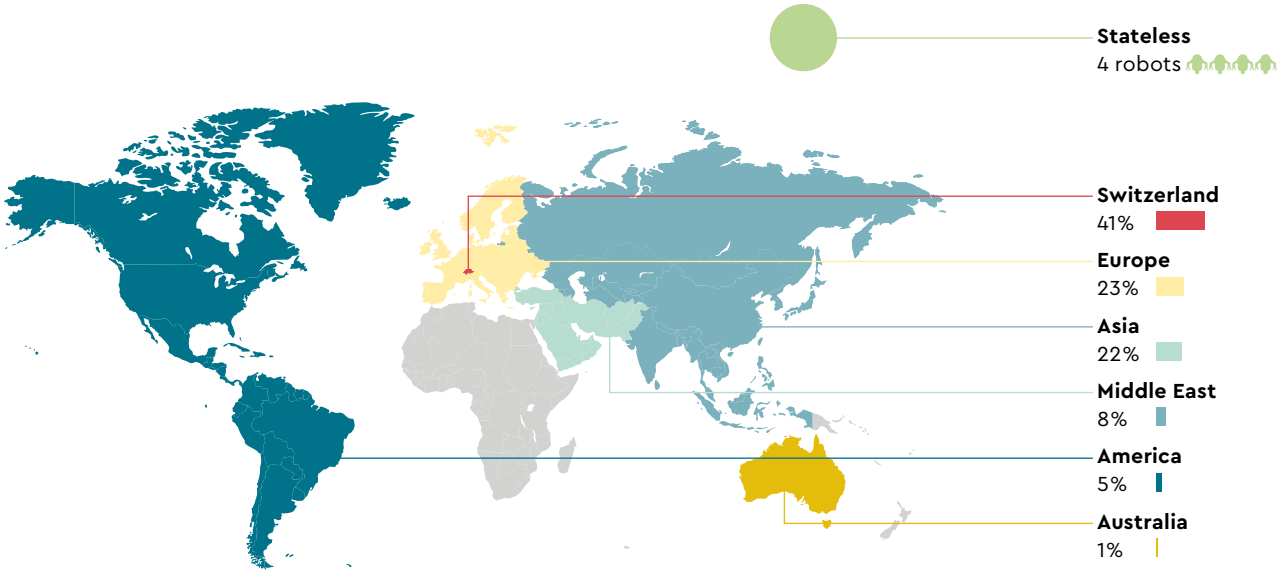
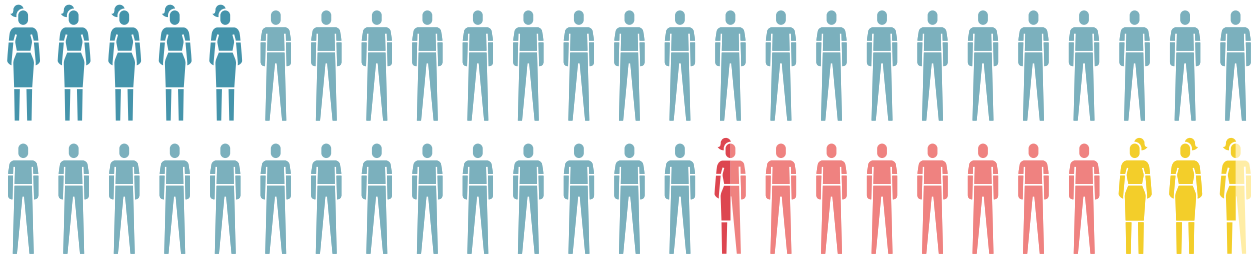
## 27 nationalities are represented at Idiap



## Human resources



**161 individuals in total**
**and more than 50 posts in the start-up ecosystem**

**Scientists**

- 4 professors
- 2 senior scientists (MER)
- 8 permanent senior researchers
- 32 postdocs
- 41 research assistants
- 38 trainees/visitors

**12.2%** women

**Engineers**

- 16 development and research engineers
- 7 system engineers

**8.7%** women

**Administrative staff**

- 13 administrative staff

**61.5%** women

**25.5%**
of our staff are women

## Publications and patents in 2018

Contributions to 115 peer-review publications.

**70**
conference articles

**5**
theses completed

**35**
scientific articles

**3**
recognized patents

**5**
book chapters

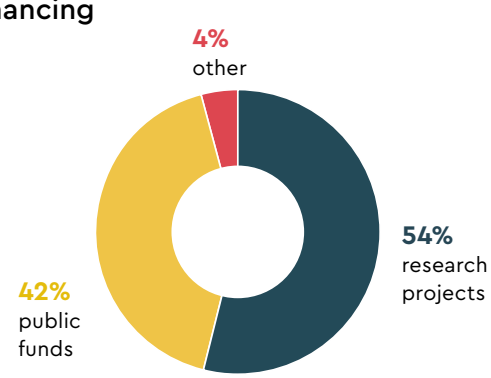
**2**
further patents filed

**2,179**
LinkedIn followers

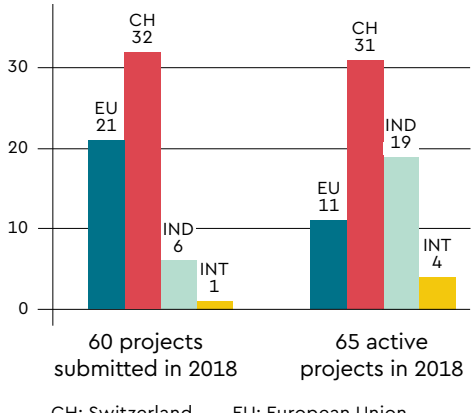
**696**
Twitter followers
↗ 41% in 2018

**1,200**
visitors

## Financing




## Submission and financing of research projects

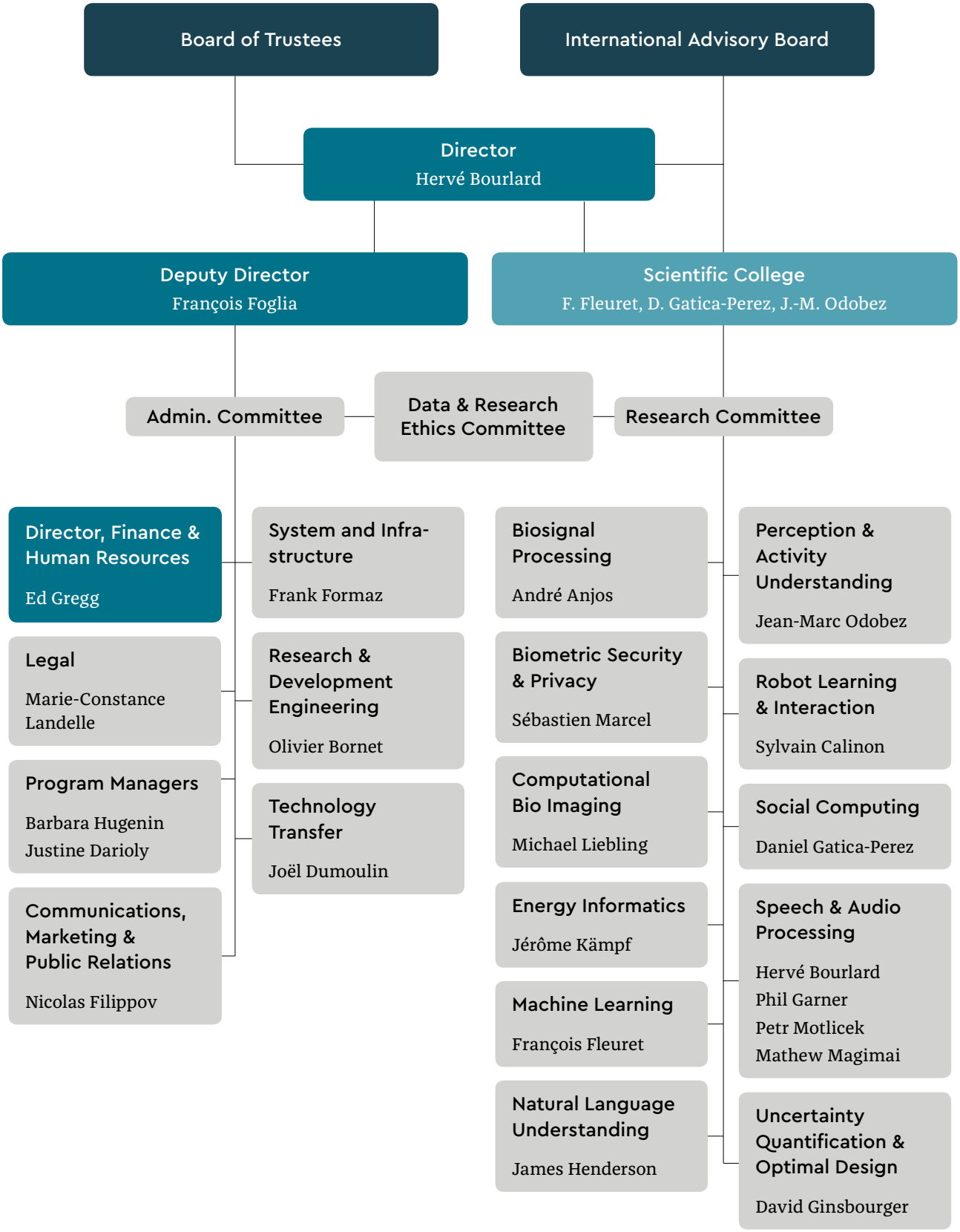



CH: Switzerland
IND: Industrial
EU: European Union
INT: international

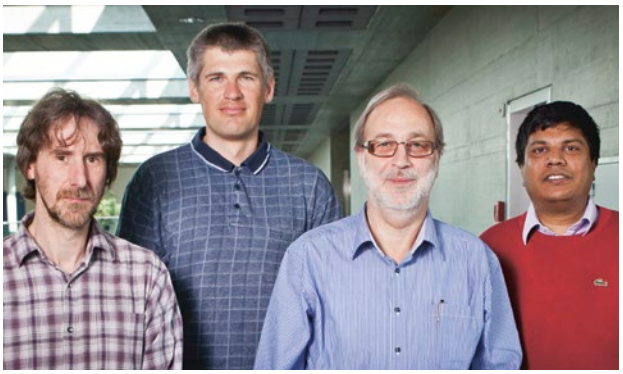
# organization

10 — 17

# Organization chart



# 11 research groups



## Speech & Audio Processing

Prof. Hervé Bourlard (third from left),
Dr. Phil Garner, Dr. Petr Motlicek, Dr. Mathew Magimai-Doss
H-index: PG: 24, PM: 19, HB: 62, MMD: 25

***Speech processing has, for many years, been one of Idiap's major research themes.***

Statistical automatic speech recognition; voice synthesis and the generic processing of audio information (source localization; microphone networks; speaker segmentation; information indexing; very-low-bit-rate speech coding; background noise analysis).

## Biometric Security and Privacy

Dr. Sébastien Marcel
H-index: 47

***The automatic recognition of individuals through the use of behavioral and biological characteristics is the foundation stone of computer biometrics.***

Development of new image processing and pattern recognition algorithms for face recognition (2D, 3D, and near infrared); speaker recognition; attack detection (antispoofing); the study of emerging biometrics modalities (electrophysiology and veins ); open science through the use of our own library.

## Biosignal Processing

Dr. André Anjos
H-index: 21

***The analysis of biomedical sensor data for medical or research purposes lies at the heart of the research carried out by the Biosignal Processing group.***

Analysis of e-health data; detection of human biological signals for medical and scientific applications; use of machine learning techniques; data acquisition and analysis; open science.

## Computational Bio Imaging

Prof. Michael Liebling
H-index: 21

***The technique of computational imaging and biomedical image analysis lie at the heart of the group's imaging research.***

Development of algorithms for deconvolution and super-resolution in optical microscopy; three-dimensional tomographic reconstruction, more generally, combination of unusual detection methods and devices with computational software to produce images ideally suited to the observation and quantification of complex, living biological systems.

## Energy Informatics

Dr. Jérôme Kämpf
H-index: 19

***Information and communication technologies help us to fight climate change and to increase both the proportion of renewable energy in the overall energy mix and the number distributed energy sources.***

Creation of smarter energy systems; optimization of energy resource planning in order to protect the environment; simulation of energy transition scenarios including intelligent control and adjustment mechanisms for buildings; production and storage of renewable energies in the context of climate change.

* **The h-Index** attempts to quantify both the productivity and the impact of scientists based on the number of citations that they have received in other publications (citation level). The higher the number, the more the researcher has been cited. H-index as of February 28, 2019 (source: Google Scholar).

## Machine Learning

Dr. François Fleuret
H-index: 31

***The development of new statistical learning techniques, principally for computer vision, is the basis of the group's work.***

Computational properties of statistical learning; automatic image analysis, particularly the automatic extraction of significance; object detection; tracking of people and biological structures.

## Natural Language Understanding

Dr. James Henderson
H-index: 23

***Deep learning models of the syntax and meaning of text are used for machine translation, natural language inference, and summarization.***

Neural machine translation; summarization; information retrieval and extraction; text classification; attention-based deep learning models of language understanding; representation learning for modeling abstraction and natural language inference.

## Perception & Activity Understanding

Dr. Jean-Marc Odobez
H-index: 42

***The analysis of human activities from multimodal data is useful for surveillance, behavior analysis, human–robot interfaces, and multimedia content analysis.***

Development of algorithms based on computer vision and learning and data fusion methods in order to detect and track objects and people, to represent and characterize their state, and to model sequential data and interpret them in the form of gestures, behaviors, and social relations.

## Robot Learning & Interaction

Dr. Sylvain Calinon
H-index: 39

***Human-centric robotic applications exploit multimodal sensory information and develop intuitive learning interfaces.***

Develop statistical approaches for encoding movements and behaviors in robots evolving in unconstrained environments; models with multiple roles (recognition, prediction, reproduction); learning strategies (imitation, emulation, incremental correction, or exploration).

## Social Computing

Prof. Daniel Gatica-Perez
H-index: 60

***The integration of theories and models from informatics and the social sciences makes it possible to detect, analyze, and interpret human and social behavior.***

Behavioral analysis of face-to-face interactions; crowd-sourcing and the large-scale treatment of urban data; smartphones and social networks.

## Uncertainty Quantification and Optimal Design

Prof. David Ginsbourger
H-index: 23

***Quantifying and reducing uncertainties in the context of high-fidelity models is central to this group's research interests.***

Gaussian process methods; the planning of numerical experiments for optimization, inversion, and other related problems. Areas of application include energy and geosciences, with collaborations ranging from safety engineering to hydrology and climate sciences.

# Foundation Council

The Foundation Council is responsible for the economic and financial management of Idiap. It defines the Institute's structure, appoints its director, and—more generally—ensures Idiap's development and defends its interests.

**Olivier Dumas, President**

Independent manager and business consultant

**Jordi Montserrat**

Regional Manager Venturelab

**Anne-Laure Couchepin Vouilloz, Vice-President**

President of the city of Martigny

**Prof. Stéphane Marchand-Maillet**

Associate professor at the Department of Computer Science of the University of Geneva

**Marc-André Berclaz**

Valais–Wallis Cluster

**Dominique Perruchoud**

President of the Board of Cimark SA

**Stefan Bumann**

Head of the Service des Hautes Ecoles (SHE)

**Prof. Pierre Vandergheynst**

Professor and Vice-President for Education at EPFL

**Patrick Furrer**

Scientific collaborator at swissuniversities

**Dr. Michael Baeriswyl**

Executive Vice-President of Data, Analytics & AI, Swisscom

# International Advisory Board

The Advisory Board is composed of members of the scientific community selected by Idiap's management for their exceptional skills and avant-garde vision. Although their role is strictly advisory, their support is frequently sought and proves to be valuable when making decisions regarding research, training, and technology transfer.

**Dr. Alex Acero**

Senior Director at Apple, Cupertino, CA, USA

**Dr. Alessandro Curioni**

IBM Fellow, Vice President Europe and Director IBM Research, Zurich, CH

**Prof. Anil K. Jain**

Distinguished Professor, Department of Computer Science & Engineering, Michigan State University, USA

**Prof. Johanna Moore**

Head of the School of Informatics, University of Edinburgh; Director of the Human Communication Research Centre, UK

**Prof. Klaus-Robert Müller**

Professor of Computer Science, TU Berlin; Director, Bernstein Focus on Neurotechnology, Berlin, DE

**Dr. Prem Natarajan**

Director of the Information Sciences Institute, affiliated with the Viterbi School of the University of Southern California, USA

**Prof. Bernt Schiele**

Director, MPI Informatics, Max Planck Institute; Professor at Saarland University, Saarbrücken, DE

**Dr. Luciana Vaccaro**

Rector of the HES-SO, University of Applied Sciences and Arts Western Switzerland, CH

# Employees

## Scientists

First name, last name, position, country of origin, year of arrival

Abrol Vinayard, postdoc, India, 2018
Achinger Ida, postdoc, Austria, 2018
Bozorgmehr Aminian, research assistant, Switzerland, 2018
Afsaneh Asaei, postdoc, Iran, 2018
Dario Azzimonti, postdoc, Italy, 2015
Sushil K Bhattacharjee, research associate, Switzerland, 2015
Hervé Bourlard, director, Belgium/Switzerland, 1997
Sylvain Calinon, researcher, Switzerland, 2014
Gulcan Can, research assistant, Turkey, 2013
Yuanzhougan Cao, postdoc, China, 2017
Tatjana Chaudarova, research assistant, Macedonia, 2014
Tiago de Freitas Pereira, research assistant, Spain, 2014
Nicolas Deprès, research assistant, France, 2018
Subhadeep Dey, research assistant, India, 2014
Pranay Dighe, research assistant, India, 2013
Pavankumar Dubagunta, research assistant, India, 2017
Hermann Enno, research assistant, Germany, 2018
François Fleuret, senior researcher, France/Switzerland, 2007
Julian Fritsch, research assistant, Germany, 2018
Philip Garner, senior researcher, UK, 2007
Daniel Gatica-Perez, senior researcher, EPFL Adjunct Professor, Mexico, 2002
Athénaïs Gautier, research assistant, France, 2018
Anjith George, postdoc, India, 2017
David Ginsbourger, senior researcher, France, 2017
Hakan Girgin, research assistant, Turkey, 2018
Michael Halstead, postdoc, Australia, 2018
Weipeng He, research assistant, China, 2016
James Henderson, senior researcher, USA/Switzerland, 2017
Guillaume Heusch, research associate, Switzerland, 2015
Rui Hu, postdoc, China, 2013
David Imseng, research associate, Switzerland, 2017
Parvaneh Janbakhshi, research assistant, India, 2018
Christian Jaques, research assistant, Switzerland, 2016
Noémie Jaquier, research assistant, Switzerland, 2016
Cijo Jose, research assistant, India, 2014
Selen Hande Kabil, research assistant, Turkey, 2017
Jérôme Kämpf, senior researcher, Switzerland, 2018
Rabeeh Karimi Mahabadi, research assistant, Iran, 2018
Angelos Katharopoulos, research assistant, Greece, 2017
Banriskhem Kayang Khonglah, postdoc, India, 2018
Ina Kodrasi, postdoc, Albania, 2017
Alain Komaty, postdoc, France, 2016
Pavel Korshubov, research associate, Estonia, 2015
Ketan Kotwal, postdoc, India, 2018
Vedrana Krivokuca, postdoc, New Zealand/Croatia, 2017
Thibaut Kulak, research assistant, France, 2017
Andras Gabor Kupcsik, postdoc, Hungary, 2017
Florian Labhart, research associate, Switzerland, 2017
Do Hoang Nam Le, research assistant, Vietnam, 2015
Taguh Lembono, research assistant, Indonesia, 2018
Yann Lepoittevin, postdoc, France, 2016
Michael Liebling, senior researcher, Switzerland, 2015
Gang Liu, postdoc, China, 2017
Srikanth Madikeri, research associate, India, 2013
Mathew Magimai Doss, senior researcher, India, 2007
Florian Mai, research assistant, Germany, 2018
Sébastien Marcel, senior researcher, France/Switzerland, 2000
François Marelli, research assistant, Belgium, 2018
Andreas Marfurt, research assistant, Switzerland, 2018
Olivia Mariani, research assistant, Switzerland, 2016
Angel Martinez-Gonzales, research assistant, Mexico, 2016
Lesly Miculicic, research assistant, Peru, 2016
Amir Mohammadi, research assistant, Iran, 2016
Petr Motlicek, senior researcher, Czech Republic, 2005
Hanna Muckenhirn, research assistant, Germany, 2015
Skanda Muralidhar, research assistant, India, 2014
James Newling, research assistant, UK/Africa, 2013
Laurent Nguyen, postdoc, Switzerland, 2011
Olegs Nikisins, postdoc, Lithuania, 2016
Jean-Marc Odobez, senior researcher, Switzerland/France, 2001
Antonio Paolillo, postdoc, Italy, 2018
Nicolaos Pappas, postdoc, Greece, 2016
Thanh Trung Phan, research assistant, Vietnam, 2014
Emmanuel Pignat, research assistant, Switzerland, 2015
Ravi Shankar Prasad, postdoc, India, 2018
Xiao Pu, research assistant, China, 2014
André Rabello Dos Anjos, researcher, Brazil/Switzerland, 2010
Dhananjay Ran, research assistant, India, 2014
Marzieh Razavi, postdoc, Iran, 2013
Navid Rekabsaz, postdoc, Iran, 2018
Suman Samui, postdoc, India, 2018
Seyyeed Saeed Sarfjoo, postdoc, Iran, 2018

Bastian Schnell, research assistant, Germany, 2017
Sebastian Jilt, research assistant, India, 2017
Syed Shahnawazuddin, postdoc, India, 2018
Adrian Shajkofci, research assistant, Switzerland, 2016
Alexis Shakas, postdoc, Greece, 2018
Rémy Siegfried, research assistant, Switzerland, 2017
Prabhu Teja Sivaprasad, research assistant, India, 2018
Suraj Srinivas, research assistant, India, 2017
Ajay Srinivasamurthy, postdoc, India, 2016
Ajay Kumar Tanwani, research assistant, Pakistan, 2015
Sibon Tong, research assistant, China, 2016
Sandrine Tornay, research assistant, Switzerland, 2016
Cédric Travelletti, research assistant, Switzerland, 2018
Michael Villamizar, postdoc, Spain, 2016
Bogdan Vlasenko, postdoc, Germany, 2017
Apporv Vyas, research assistant, India, 2018
Yu Yu, research assistant, China, 2015
Qingran Zhan, research assistant, China, 2018

**Research & development engineers**

Philip Abbet, senior development engineer, Switzerland, 2006
Olivier Bornet, head of development team, Switzerland, 2004
Olivier Canévet, research and development engineer, France, 2012
Guillaume Clivaz, development engineer, Switzerland, 2017
Jaden Diefenbaugh, development engineer, USA, 2015
William Droz, research and development engineer, Switzerland, 2018
Samuel Gaist, development engineer, Switzerland, 2013
Théophile Gentilhomme, research and development engineer, France, 2018
Mélanie Huck, development engineer, Switzerland, 2017
Salim Kayal, senior research and development engineer, Switzerland, 2011
Christine Marcel, development engineer, France/ Switzerland, 2007
Alexandre Nanchen, senior research and development engineer, Switzerland, 2008
Flavio Tarsetti, senior development engineer, Switzerland, 2008

## Administrative staff

First name, last name, position, country of origin, year of arrival

Elisa Bovio, program manager, Switzerland, 2015
Justine Darioly, junior program manager, Switzerland, 2018
Joël Dumoulin, technology transfer officer, Switzerland, 2018
Martina Fellay, junior program manager, Austria/ Switzerland, 2012
Nicolas Filippov, communications, marketing & public relations, Switzerland/Poland, 2018
François Foglia, deputy director, Switzerland, 2006
Edward-Lee Gregg, financial director, USA, 2004
Barbara Huguenin-Landl, program manager, Austria, 2018
Marie-Constance Kaifflin Landelle, legal adviser, Switzerland, 2017
Léonore Miauton, head of program management, Switzerland, 2012
Sylvie Millius, administrative assistant, Switzerland, 1996
Florent Monay, technology transfer officer, Switzerland, 2008
Nadine Rousseau, administrative assistant, Belgium/ Switzerland, 1998

**System engineers**

Bastien Crettol, system engineer, Switzerland, 2005
Norbert Crettol, system engineer, Switzerland, 2002
Cédric Dufour, system engineer, Switzerland, 2007
Frank Formaz, system manager, Switzerland, 1998
Louis-Marie Plumel, senior system administrator, France, 2011
Vincent Spano, webmaster, Switzerland, 2004
Laurent Thomas, senior system administrator, Switzerland, 2017

**Thank you to all our employees for their support and all the best to those who have left our institute to pursue their professional paths elsewhere.**

# finances

## 18 — 21

# Profit and loss statement (CHF)

| INCOME | 2018 | % | 2017 | % |
|---|---|---|---|---|
| Swiss Confederation Art. 15 | **2 334 100** | 19.50 | 2 418 500 | 21.60 |
| Canton of Valais | **2 000 000** | 16.70 | 2 000 000 | 17.90 |
| City of Martigny | **700 000** | 5.80 | 700 000 | 6.20 |
| Capital, donations | **207 000** | 1.70 | 261 994 | 2.30 |
| **Competitive funding** | **5 241 100** | **43.70** | **5 380 494** | **48.00** |
| Swiss National Science Foundation | **1 851 130** | 15.50 | 1 268 003 | 11.30 |
| EU | **2 036 927** | 17.00 | 1 760 240 | 15.70 |
| CTI/Innosuise | **956 368** | 8.00 | 1 007 604 | 9.00 |
| Others | **1 632 606** | 13.60 | 1 274 581 | 11.40 |
| **Third-party contributions (non-competitive)** | **6 477 031** | **54.10** | **5 310 457** | **47.40** |
| Interest | **7 074** | 0.10 | 2 459 | 0.00 |
| Sub-letting | **170 150** | 1.40 | 187 750 | 1.70 |
| Other incomes | **95 413** | 0.80 | 285 092 | 2.50 |
| Profit/exchange loss | **-10 006** | -0.10 | 34 637 | 0.30 |
| Adjustment of reserve | **0** | 0.00 | 0 | 0.00 |
| **Divers incomes** | **262 631** | **2.20** | **509 938** | **4.60** |
| **TOTAL INCOME** | **11 980 762** | **100.00** | **11 200 889** | **100.00** |

| EXPENSE | 2018 | % | 2017 | % |
|---|---|---|---|---|
| Personnel (including social deductions) | **9 300 657** | 77.90 | 8 660 493 | 77.60 |
| Operational costs | **2 013 052** | 16.90 | 2 215 015 | 19.80 |
| Provisions | **626 800** | 5.20 | 290 894 | 2.60 |
| **Expense** | **11 940 509** | **100.00** | **11 166 402** | **100.00** |
| **TOTAL EXPENSES** | **11 940 509** | **100.00** | **11 166 402** | **100.00** |
| **OPERATING PROFIT/LOSS** | **40 253** | — | **34 487** | — |

# Accounting analysis 2018

In 2017, for the first time in its history, Idiap ended a financial period with revenues in excess of 11 million Swiss francs. In 2018 that performance was improved upon, and the symbolic figure of 12 million francs almost reached. Revenues of CHF 11,980,762 contributed to a final profit of just over CHF 40,000. Year after year, Idiap's finances testify to the Institute's dynamism in the form of growth in both its research and technology transfer activities. Its diversified project portfolio and multiple sources of funding permit the Institute to look to the future with a certain serenity.

**Federal, cantonal, and municipal subsidies**

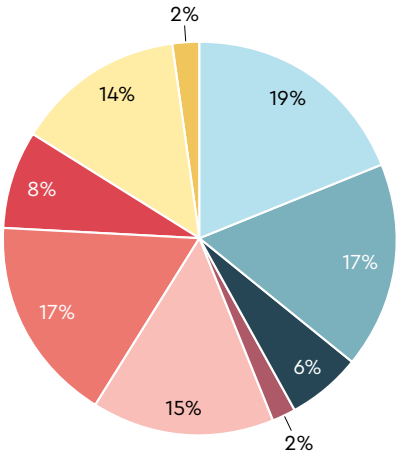
(In thousands of Swiss francs)

| YEAR | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Confederation | 2 467 | 2 424 | 2 418 | 2 334 |
| Canton | 1 720 | 1 720 | 2 000 | 2 000 |
| Municipality | 700 | 700 | 700 | 700 |



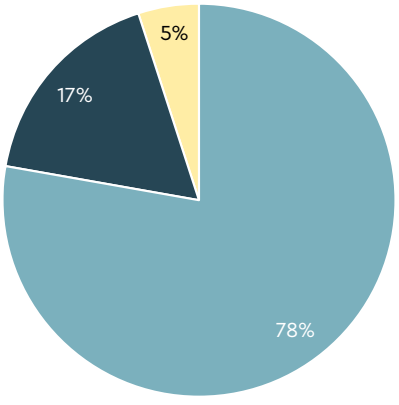
**Distribution of funding sources**

- Swiss Confederation
- Canton of Valais
- City of Martigny
- Capital, donations
- Swiss National Science Foundation
- EU
- CTI/Innosuisse
- Others (The Ark, Hasler, Industrials, Bio, Valais Ambition)
- Other incomes




**Distribution of costs**

- Personnel expenses
- Operating expenses
- Provisions



# Balance sheet (CHF)

| ASSETS | 31.12.2018 | 31.12.2017 |
|---|---|---|
| Cash | **6 177 495.28** | 5 306 132.52 |
| Accounts receivable | **277 533.00** | 61 886.00 |
| Accrued income and other | **1 109 667.08** | 769 938.24 |
| **TOTAL CURRENT ASSETS** | **7 564 695.36** | **6 137 956.76** |
| Equipment | **542 966.99** | 458 112.24 |
| Other assets | **536 590.85** | |
| Financial assets | **10 000.00** | 10 000.00 |
| **TOTAL NON-CURRENT ASSETS** | **1 089 557.84** | **468 112.24** |
| **TOTAL ASSETS** | **8 654 253.20** | **6 606 069.00** |

| LIABILITIES | 31.12.2018 | 31.12.2017 |
|---|---|---|
| Accounts payable | **280 745.51** | 472 526.46 |
| Accrued expenses | **3 908 573.83** | 2 517 150.17 |
| Provisions | **1 158 288.44** | 1 450 000.00 |
| **TOTAL FOREIGN FUNDS** | **5 347 607.78** | **4 439 676.63** |
| Share capital | **40 000.00** | 40 000.00 |
| Research funds reserve | **1 400 000.00** | 700 000.00 |
| Special reserve | **1 600 000.00** | 1 200 000.00 |
| Retained earnings | **226 392.37** | 191 934.57 |
| Net income | **40 253.05** | 34 457.80 |
| **TOTAL OWN FUNDS** | **3 306 645.42** | **2 166 392.37** |
| **TOTAL LIABILITIES** | **8 654 253.20** | **6 606 069.00** |

# research

22 — 27

# Smart energy? A challenge for Idiap and for artificial intelligence

Jérôme Kämpf, head of the Energy Informatics group

**How to save energy, fight climate change, and improve energy supply? Be smart and use artificial intelligence. To achieve this goal, the Idiap Research Institute has created a new research group in Energy Informatics in collaboration with the Centre de recherches énergétiques et municipales (CREM)—a group dedicated to research in the energy field with a particular emphasis on local communities.**

The head of this new group, Jérôme Kämpf, is a man of many talents. Thanks to his experience as a company founder, as a teacher, and as a researcher at both EPFL and HEIA (Fribourg), his view of his domain is particularly broad. He explains to us how the group was created and what the challenges are for artificial intelligence in the energy sector.

### Why did you join Idiap and agree to launch this new research group?

I was working with the CREM and they told me about the job opening. As a physicist, I saw the link between the models used for artificial intelligence and models used in physics in the energy field. Statistical tools from each of these domains can add value to one another. During my career I've worked on projects dedicated to 3D energy simulations of buildings in urban areas. In such projects, there are so many parameters to consider and so much data to process that artificial intelligence can be a real asset, allowing us to work faster and more efficiently. Another example of AI use concerns the calculation of urban comfort indexes. As those indexes are very subjective, statistical methods from artificial intelligence are very useful.

### Do you already have projects you would like to work on?

Until the end of February 2019, I will only be working at 20 percent at Idiap, but I'm already building up my group. I've received several applications for exchange PhDs and Master's students. Currently, I'm working on a way to improve the visualization of the energy data of a building so that architects can use these tools to understand the impact of their technical solutions on the building's final energy balance. I'm also working on a project in collaboration with the Federal Office for the Environment to simulate urban heat islands in the city of Fribourg, as well as on an Innosuisse project to develop a smart controlling system for district heating. My other goal is to submit a project proposal to the Swiss National Science Foundation (SNSF).

### What is the development potential for your research group?

My aim is to offer a holistic vision of energy thanks to the tools offered by artificial intelligence. Today, we have a lot of diverse data that are not used to enhance our understanding of our energy consumption and of its optimization. For example, more and more connected objects can provide information, including on temperature and humidity levels inside homes. These data cannot be obtained in another way. Another example from the public domain is linked to land registers and mapping. Data are very heterogeneous and cannot be fully exploited to simulate the environment of a building. Being able to overlap data from Google Street View, from the land register, and from a satellite view, using machine learning techniques, would be very useful to efforts to precisely identify the positions of trees in proximity to a building. In this way, it would then be possible to calculate their impact on a building's final energy balance (through casting shadow, being a wind stopper, etc.). So, yes, there is a huge potential for the group's development.

# Analyzing biosignals using artificial intelligence

**What if artificial intelligence could analyze an electrocardiogram (ECG) or a medical image scan and highlight results that physicians should be looking at as a priority? Thanks to signal and image processing and to machine learning techniques, that is the goal of the new Biosignal Processing group at the Idiap Research Institute.**

Biological data that can be extracted from the human body constitute an amazing opportunity. It is, however, often hard to make sense of these data, especially when it comes to diagnosis or to understanding a biological process in the human body. The newly created Biosignal Processing group of André Anjos will use machine learning tools—the automated statistical learning process followed by software—in order to analyze such data. The long-term aim is to develop tools that can be applied to medical data and that will help clinicians and healthcare practitioners in their daily duties, as well as improving treatments and the well-being of patients.

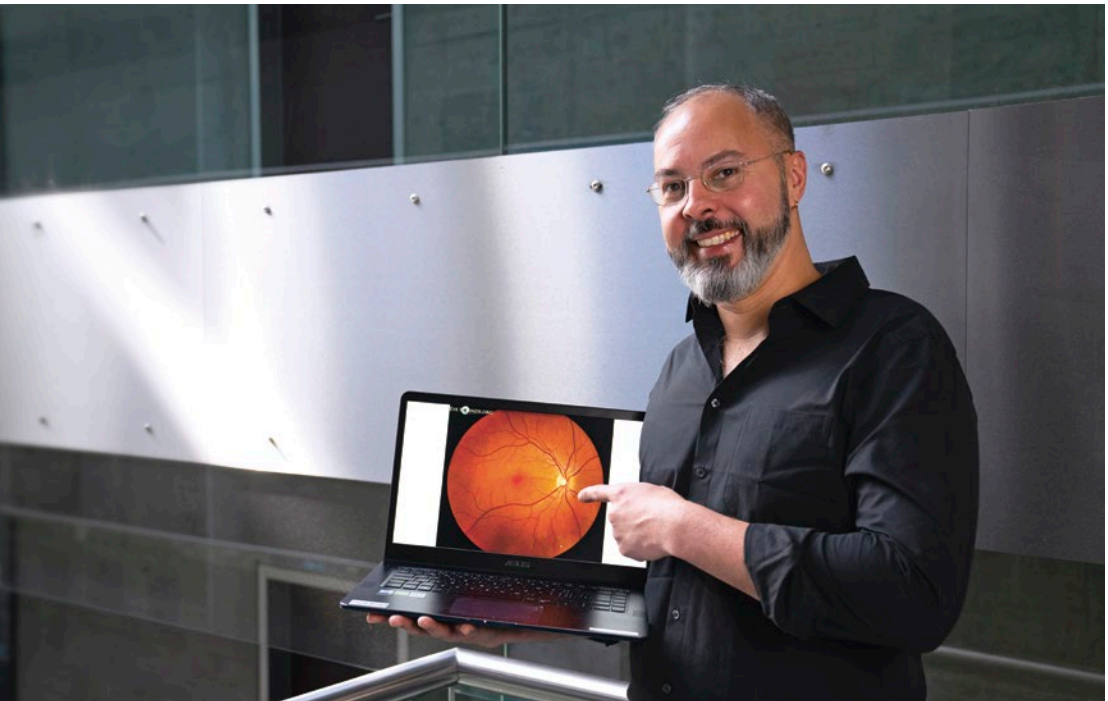
## A significant potential for practical applications

For example, the detection of anomalies in ECGs (electrocardiograms) requires the measurement of variations that are significant from a medical standpoint, given that there is a lot of ordinary variation in a natural heartbeat. In general, pattern recognition in such challenging conditions, including with regard to ECG signals, is a major challenge in many research fields. And healthcare is no exception. An X-ray, an eye fundus image, or the evolution of a blood-sugar-level curve are not that different from an ECG: each are an image from which one needs to extract meaningful information.

## A toolkit for artificial intelligence

Building on Idiap's expertise in image recognition and audio analysis, the methods developed by the Institute can be useful in analyzing many biological signals from the human body. A toolkit for reproducible research, referred to as "Bob", already contains various baseline algorithms for signal analysis and image and sound recognition. The goal is to continue to adapt this framework, extending its scope and rendering these methods useful with regard to the analysis and understanding of biological signals.





André Anjos, head of the Biosignal Processing group

# Modeling human behavior with Airbnb

**Photos create first impressions, but how are those impressions formed? Idiap researchers have been working with psychologists to understand people's perception of the accommodation offered on Airbnb. Better analysis of human behavior will make it possible to program machines that are more sensitive to human choices.**

A few clicks on TripAdvisor or Airbnb and you've chosen a romantic apartment for a weekend getaway or a chic restaurant for a business lunch. And these quick decisions based solely on images are, in commercial terms, highly significant. What are the characteristics of an image that lead us to define an interior as "fashionable", "colorful", or "practical"? To answer this question, Idiap researchers have been working with psychologists from the University of Lausanne, the goal being to better understand the perceptions and behavior of social media users and to use this knowledge to program computers that can make decisions that are closer to those of humans. "In this era of Big Data, more and more decisions are being made by machines," states Daniel Gatica-Perez, head of the Institute's Social Computing group. "Our goal is that they resemble as closely as possible the choices of humans."

## Psychologists and engineers, working together

To understand how a first impression is formed, the researchers first conducted interviews in order to capture the process of choosing an accommodation. They then selected 22,000 homes from Airbnb in Switzerland and Mexico, represented by 350,000 images in total. These images were analyzed using algorithms to verify that they depicted interiors. The researchers then randomly selected 200 accommodations and submitted a list of adjectives to online observers, who had to judge the relevance of these adjectives for each dwelling on a scale of 1 to 7. Some adjectives—"clean" or "cluttered", for example—were quite factual, while others, such as "bohemian" or "charming", were more subjective in flavor. This step allowed the researchers to observe which characteristics were perceived unanimously by participants and which criteria they disagreed on. Accommodations defined as "colorful" or "dark" proved quite consensual, unlike those described as "relaxed" or "traditional".

## Analysis of online human perceptions

The scientists then modeled these data to identify the visual characteristics that lead us to apply this or that adjective—a step essential to programing computers to recognize them—before defining how the adjectives were interrelated. Will an accommodation described as "colorful" also be described as "clean"? What is the link between "pretentious", "organized", and "big"? How do positive and negative adjectives, or factual and subjective ones, relate to one another? And why is the word "romantic" more readily associated with "sophisticated" than with "fashionable"? "One can expect 'wide' and 'spacious' to be very close to each other in people's minds, or 'cluttered' and 'empty' to be very far apart," states Daniel Gatica-Perez, "but the relationships are much more complex. Thanks to this tool, knowing a single characteristic enables us to associate other adjectives that are related in people's minds."

## Machines in the service of humans

Finally, the researchers submitted the images of accommodations to algorithms from the technique of deep learning and compared the results with those coming from human subjects. Eventually, such results could be used by, for example, architects or designers. The Institute is also closely following the development of image sharing sites, which often display very different photos of the same place leading to very different perceptions. But the ultimate goal of Idiap's scientists is to understand the characteristics of images and the links that underpin the formation of our impressions—all this in order to program computers to imitate those impressions. "We often hear that machines are already doing better than humans. Our goal here is different," Gatica-Perez concludes. "We want machines to be trained in accordance with the human subtleties of everyday life, so they can better meet the needs of real people."

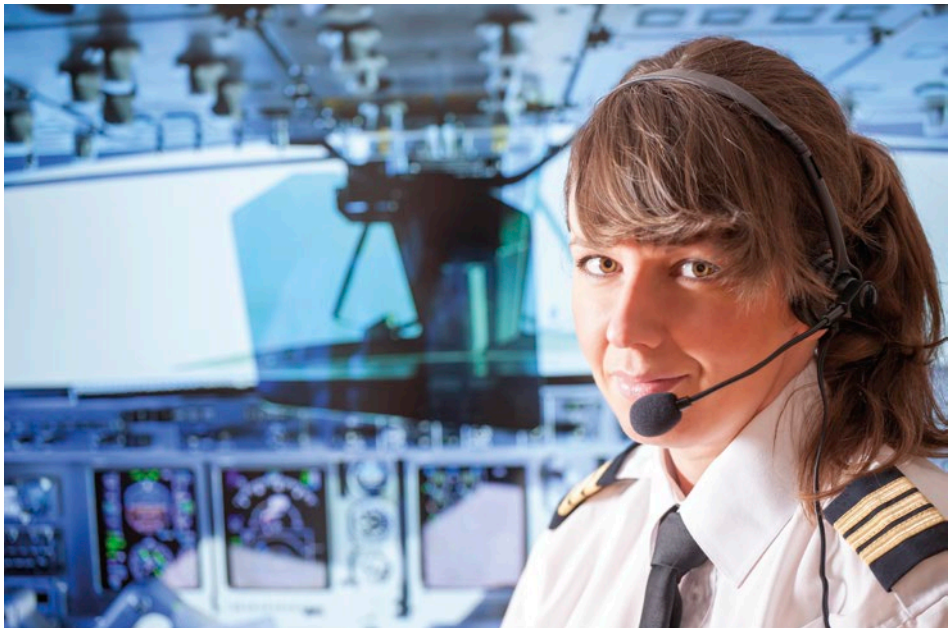
# Taking off with artificial intelligence

**One of the main obstacles hampering the introduction of higher levels of automation in the air traffic management (ATM) field is the intensive use of spoken language as the natural means of communication. Thanks to Idiap's participation to the European project Malorca, voice recognition will be improved and better-performing tools made available to aviation professionals.**

Today, air traffic control instructions are usually still given via voice communication to pilots. But to be safe and efficient, air traffic control systems need up-to-date data. It therefore requires lots of inputs from air traffic controllers for the data system to run effectively. The difference between voice information and data from sensors can creates misunderstandings between operators and pilots. This situation may lead to errors and to a lack of acceptance with regard to further automation. One promising solution to this problem is the introduction of automatic speech recognition as an integral part of the system.

Assistant-based speech recognition (ABSR) models for air traffic control must be manually adapted if they are to be implemented. The aim is to take into account the local environment, including—for example—different accents and deviations from standard phraseology. This process is long and costly. The Malorca project has proposed a global, affordable, and effective solution to automate this process of relearning, adaptation, and customization to new environments. Taking advantage of the large amount of speech data available in the air traffic management world, machine learning algorithms will automatically adapt ABSR models to respective environments.

Formally concluded in 2018, this project was a collaboration between Idiap and the German Aerospace Center (DLR), Saarland University (USAAR), Austro Control Österreichische Gesellschaft für Zivilluftfahrt mit beschränkter Haftung (ACG), and Air Navigation Services of the Czech Republic (ANS CR).



Artificial intelligence can improve communications with pilots

# Our researchers are involved in cutting-edge biometrics projects

**As part of the US government's research activities, the program ODIN brings teams of biometrics researchers into competition with one another. Rising to this challenge, Idiap's team has passed successive tests and is still in the running.**

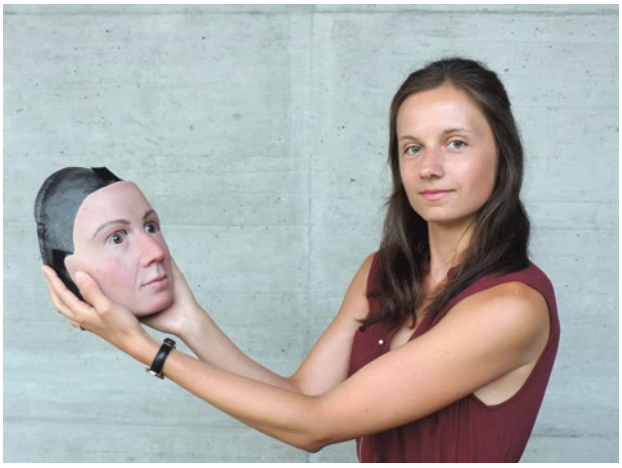
Too many biometric face-identification systems are still too easily fooled. A face on video or even its image printed on a simple sheet of paper is sometimes enough to get around the system. To counter these fake-face attacks, the Intelligence Advanced Research Project Activity (IARPA) launched ODIN, in which teams test their respective detection systems. The process brings the best specialists in the field into fierce competition with one another, but Idiap's team has played its cards well and has qualified for the second phase, which takes place in 2019.

## Attack detection in several stages

To detect attacks made by a fake face, the Institute has built a set of sensors supported by a recognition system. First, biometric data is recorded thanks to several sensors, including cameras operating in both visible light and in different wavelengths of the infrared spectrum and depth sensors. The data is then processed by different so-called classification algorithms to detect if a fake-face attack is taking place. Each algorithm processes the data from each sensor separately. Finally, the last step consists in combining the results of these different processes to establish the probability of an attack. Thanks to this approach, the Institute's team has been able to qualify for the second phase of the project.

## Deep learning to the rescue for the second phase

In the first phase the focus was on analyzing characteristics specific to each type of attack. For example, a photo doesn't blink its eyes, and this tells you if a given face is animated or not. Likewise, a video screen or a silicone mask reflects light differently than does a real face. Having explored these different ways of detecting attacks, the researchers changed course.



A researcher and her silicone mask



For the second stage of the competition, the team is using a more innovative approach, based on deep learning techniques. The goal is to enable the data of the various sensors to be processed in a combined manner. This direct integration of all the sensors is possible thanks to what is referred to as a deep neural network. To achieve this, a tool has been trained on a large database of examples of all kinds of attack. This network then directly provides the overall probability of an attack. Preliminary results are encouraging, and the researchers hope to remain in the running.

# commitment

28 — 32

# Idiap's brand new artificial intelligence applied Master's

**Digitalization is impacting every business, from tourism to energy. Artificial intelligence (AI) can constitute a strategic asset for businesses, but the lack of experts can be a limitation when it comes to using such technologies. Thanks to the first Master's in AI tailored to companies' development and in collaboration with Switzerland's Distance University and the Canton of Valais, the Idiap Research Institute is offering a brand-new solution that also creates new jobs. The target audience for this Master's is very broad and not limited to the Canton of Valais alone.**

Despite the headlines, such as that from MIT about a new AI faculty opening in September 2019, the problem of the lack of qualified professionals in the field is not going to be solved any time soon. This shortage is a global issue. In order to grow, big companies as well as SMEs need theoretical and practical skills right now. This issue is also impacting the Canton of Valais, as many AI developers trained by Idiap are getting offered jobs by big US tech companies (Google, Amazon, Facebook, Microsoft) or big Swiss companies such as Swisscom or Logitech. To solve this problem in a quick yet sustainable way, new and innovative solutions are needed.

## Creating jobs to train and retain internal experts

Inspired by the successful Swiss apprenticeship model, Idiap has initiated a unique program. The aim is to create job openings within companies, openings linked with an academic education. This unusual strategy will enable companies to use students' skills more rapidly thanks to a university education program that is directly connected to a company's activities. In the scheme, each student thus represents a new paid position. The partnership between Idiap and Switzerland's the Distance University provides a tailored solution for both businesses and students. E-learning, personal coaching by tech transfer experts, and the support of a team of developers are among the unique assets of this Master's program. Started in February 2019, this 90-ECTS-credits Master's is already offering seven newly created positions.

Details about the Master's in Artificial Intelligence:
**www.master-ai.ch**

# Idiap supports the next generation of women in computer science

**The shortage of computer developers is impacting many sectors. Increasing the number of women in the field would go some way to addressing this shortage. Idiap is committed to this approach, raising awareness among young girls and proposing a fellowship program for female researchers.**

Bearded, hiding behind thick glasses, and addicted to his computer. A cliché perhaps, but this traditional image of the computer scientist points to a worrying reality: professionals in this domain are overwhelmingly male. And the challenge goes beyond fighting clichés. “Talents are distributed equally between women and men. It is therefore extremely harmful to deprive oneself of female skills, especially in domains related to technology,” says Luciana Vaccaro, Rector of the University of Applied Sciences and Arts Western Switzerland. This shortage of talent is substantial and it is essential to increase considerably the number of people trained in this field. Young women constitute one of the essential ways of achieving this goal, and the Idiap Research Institute is working to implement solutions through various initiatives.



## Launch vocations and facilitate careers

During the “Futur en tous genres” Day (Future for all Genders) on November 8, the Institute welcomed a group of 20 girls aged from 10 to 12 years. In addition to discovering the diversity of the various jobs that make up daily life at Idiap, participants attended five different workshops: programming a robot, detecting a false identity thanks to biometrics, learning sign language by using artificial intelligence, computer editing of images, and demonstrations of Idiap’s technologies, including people tracking, object detection, and voice activation.

In order to serve as role models for these young women, several female researchers—helped by their male colleagues—presented these workshops: an important contribution, as underlined by Luciana Vaccaro, “As a physicist, mother of two girls, and now Rector of a university with more than 21,000 students, I hope that my career can inspire young women”. The aim of this day of many discoveries was to give young girls the self-confidence necessary to get involved in technical fields.

> «I hope that my career can inspire young women.»
>
> **Luciana Vaccaro**
> Member of the International Advisory Board

In addition to these upstream initiatives, Idiap also offers an incentive fellowship for women’s careers in artificial intelligence. The aim is to propose to professionals in academia or industry that they develop a project at the Institute, thus consolidating their scientific career or furthering a personal research topic. Thanks to this fellowship, participants can also access Idiap’s hardware and scientific resources and benefit from the Institute's network.

Programming workshop with Pepper the robot

# How to stimulate innovation, the Idiap way

**Idiap technology transfer is a well-established tool for bridging the gap between research and the world of business. The Institute also has other ways of creating an environment conducive to innovation. Let's discover some.**

Olivier Volto, Portfolio Manager, Airbus

The path from a scientific project to mainstream impact can be long. To facilitate this process, Idiap operates a technology transfer service (see p. 36). This service is reinforced by the presence of a complete ecosystem. Indeed, a whole set of tools complements the levers available to the Institute: dedicated days for companies, a project acceleration program, and the hosting of a start-up incubator to forge and reinforce the necessary connections.

## Company visits to Idiap

At the end of August, the Institute organized its Innovation Day. Idiap research groups presented the essence of their activities, each in just 15 minutes. Certain research projects were also showcased through demonstrations. These included the identification of participants in a conversation, robotic learning via imitation, and the hacking of a facial recognition system via the use of a silicone mask.

As the day came to a close, guest of honor Olivier Volto from Airbus presented applications of artificial intelligence in reconnaissance and surveillance systems. In total, representatives of nearly 150 businesses attended. Several media outlets were also present, providing the Institute with excellent local, regional, and national coverage.

## Start-up creation: ICC and Innopeaks

The creation of a start-up is often a necessary step in the implementation of certain technologies. And this is why the idea accelerator the International Create Challenge (ICC) is of particular importance. This three-week program takes place at Idiap and allows international teams to move from concept to first product prototype.

The 2018 edition of the ICC honored two projects. A team from advAIsor was awarded CHF 10,000 by the Institute and CHF 5,000 by Groupe Mutuel, their project focusing on an emotions assistant that facilitates the writing of e-mails. A team from BetterSkillz received a prize of CHF 5,000 from Idiap for its virtual cricket coaching project, which improves players' technique.

In its early phase, the links between a start-up and research are crucial to enabling the development of innovative technology. This is why the Institute hosted, during three months, the Innopeaks incubator—a collaboration that allowed numerous exchanges between entrepreneurs and researchers. The same perspective is illustrated by Idiap's sharing its premises with the IdeArk incubator.

**www.createchallenge.org**
**www.innopeaks.ch**
**www.ideark.ch**

# A new biometrics room: A step toward becoming an accredited center

**Idiap's high-tech biometrics room not only offers a high-performance working environment, it also contributes the infrastructure necessary for the Institute to be accredited as a certification laboratory.**

Facial recognition systems are regularly severely tested. To improve them, it is particularly necessary to be able to detect attempts made by impostors to circumvent the system. There is nothing like fooling the system oneself to allow one to correct and perfect it. Idiap's Biometrics Center has many ways of doing this, from silicone masks to high-definition video screens. Developing and testing these methods requires an appropriate space in which to capture and evaluate biometric data, and this was the motivation behind the establishment of the biometrics room.



## Certification capacity

From conception to completion, it took several months to put the biometrics room together. Of course, it is imperative that the room's lighting is controlled perfectly and that sensitive material is secure. This respect for standards has made it possible to meet the criteria of ISO 17025—the standard that specifies the requirements concerning the competencies of calibration and testing laboratories. Thus, the Institute has been able to apply for accreditation from the FIDO Alliance, an industrial consortium working to harmonize authentication systems. Operational from December 2018, the biometrics room was immediately used as part of the American ODIN research project (see p. 27).

Idiap thanks the Loterie Romande for its support in the realization of the room.

**www.biometrics-center.ch**

↑ Silicone masks seem very real and can spoof a facial recognition system

↙ Idiap's biometrics lab can test various identity theft techniques

# faces

## 33 — 39

Barbara Huguenin and Justine Darioly

# Changes in the Scientific Project Management team



**An essential though often little-known link in the chain of scientific research, the Scientific Project Management group provides valuable support to researchers. Following the departure of two of its three members, the team had not only to regenerate itself, but also to reorganize its work.**

How to prepare the answer to a call for projects from the European Union. How to establish a budget for the Swiss National Science Foundation that meets the needs of researchers. How to ensure the effective organization of a scientific symposium. The Project Management team provides answers to these questions and makes many other skills available to Idiap's scientists—work that takes place behind the scenes and on which researchers rely when seeking to raise the Institute's profile.

The departure of the head of the group, who wanted to take a Sabbatical year, and one of her colleagues, who wanted to focus on the arrival of a new child, led the group to review its strategy for providing administrative support to the Institute. Aware of the arrival of a new head of Technology Transfer (see p. 36) and a new head of Communications, Marketing & Public Relations (see p. 37), the management team wanted to give a fresh impetus to the Institute by augmenting the skills of its administrative team.

With this goal in mind, the Institute hired two administrative officers for its scientific programs: Justine Darioly as Junior Program Manager and Barbara Huguenin-Landl as Program Manager. The team is completed by Elisa Bovio. Their close collaboration allows for better monitoring of projects by ensuring better communication with researchers, the new heads of Technology Transfer and  of Communications, Marketing & Public Relations, and with the Finance department.

With a Master's degree from HEC Lausanne, Justine brings to Idiap valuable management skills and a fresh look at the processes already in place. Barbara, meanwhile, comes from the world of scientific research and has worked on the management of projects related to meteorology, thus bringing with her rich experience in the field. Their complementarity has already proved its worth during these last few months and the Institute is delighted with this new dynamic.

# Why does Idiap have a technology transfer office?

**At Idiap, technology transfer is much more than a simple office dedicated to managing contacts with industry. The Technology Transfer Office (TTO) is one of Idiap's many assets. Interview with Joël Dumoulin, a man of many roles.**

### How do your contacts with companies work; do you need to canvass them?

Thanks, in particular, to its scientific reputation, Idiap doesn't have to canvass companies. Spontaneous requests for collaboration are numerous and come in all the time. For example, this last quarter I answered no less than 20 enquiries. Of course, not all of them lead to a collaboration. It's a question of responding to requests by assessing their relevance and clarifying the requestor's needs. If the project is interesting from a research point of view and if the necessary resources are available, then it's possible to consider what the options are with regard to a collaboration. Some collaborations are conducted in the form of a research mandate, others in the framework of funded projects, such as those proposed by Innosuisse (the Swiss Innovation Agency) or by The Ark Foundation. During the setup phase of these projects, Idiap and its industrial partners often have different expectations, and my role is to forge contacts and to find a way forward on which all can agree.

### What are companies that get in touch with Idiap looking for?

Machine learning is a recurring demand. Indeed, many companies grasp the potential of the data they have at their fingertips and that they are not yet exploiting to the full. Fortunately, the fields of application are diverse and varied and often concern the majority of our research groups and not just the Machine Learning group. In addition to the constraints of this technique, which requires a rigorous methodology to collect exploitable data, it is also sometimes necessary to explain the risks linked to the fact that scientific research cannot always guarantee the expected result.

### Is ownership of the results of collaborations with companies sometimes problematic?

My role is to discuss these issues at an early stage and I'm in charge of coordinating the process that leads to the signing of a contract regarding intellectual property. To achieve this, consultation is crucial—with the researcher(s), the industrial partner, and any other scientific partners. The support of our legal department is essential. Together we ensure that the interests of Idiap are taken into account. The result of a project sometimes makes it possible to file a patent or to announce an invention, which then makes it possible to showcase our work using project incubators (the development of pre-production prototypes) for example.

### How is the role of technology transfer going to evolve within the Institute?

To support the continuous growth of Idiap, it is essential that tech transfer activities keep the pace and support the development of research. To achieve this, I have several goals, including enhancing the value of Idiap's technology portfolio and generating statistics with which to measure the evolution of technology transfer. Today, we lack the information necessary to improve our services. Idiap has a fantastic potential for innovation, and the creation of new spin-offs is one of the many challenges our Institute is facing. There are many possibilities. And potential partners shouldn't hesitate to get in touch.

# Idiap is developing its communications and marketing

**Interview with Nicolas Filippov, the Idiap Research Institute's new head of Communications, Marketing & Public Relations.**

In early July 2018, Idiap strengthened its team by hiring Nicolas Filippov as head of Communications, Marketing & Public Relations. The goal was to develop and strengthen the Institute's visibility, but also to improve internal communications in a research center that brings together more than 100 people.

### What is the current situation at Idiap in terms of communications and marketing?

The institute excels in research, at the national as well as at the international level. The creation of spin-offs, links with GAFAM (Google, Apple, Facebook, Amazon, and Microsoft), and European projects are all common. But Idiap is still too little known to a wider audience and even in certain Swiss academic circles. The significant scientific development of the Institute has not, until now, left enough time and resources to work on communications and marketing aspects.

### What are your goals for Idiap in this regard?

My aim is to give the Institute a visibility on a par with its research. At the local level, communicating more effectively with the general public will enable us to explain what's really at stake with regard to artificial intelligence. Idiap's 25 years of expertise are a great asset in a context where sensational news is often difficult to understand. In "la Romandie" and at the national level, it is also essential to make oneself known to the scientific community in order to strengthen exchange and collaboration. The Institute possesses amazing experience in scientific collaboration. It is also important to heighten our profile within our international projects. Idiap is really a visiting card for Switzerland.

### Which of your strengths will enable you to achieve this?

While I have significant experience in communications and marketing in the scientific and academic context, my real asset is that I'm not a scientist myself. With the eye of the beginner, I generally question and seek to understand. This will make it possible to share the scientific message effectively with a wider audience. In addition, I'll use my entrepreneurial experience to put in place new tools while maintaining an overall vision.

# Prizes and distinctions

## Idiap recognizes the work of its doctoral students

Each year, Idiap presents two awards internal to the Institute. The first rewards research, the second a publication. For the Idiap Research Prize, an internal commission evaluates candidates against five criteria: their publications, their team spirit, their engagement, their communication skills, and their autonomy. For the Idiap Publication Prize, an initial selection is made by the Institute's permanent researchers from among the works for which the principal author is an Idiap PhD student. The members of the Advisory Board then, separately and anonymously, select the winning publication.

In 2018, the Research Prize was awarded to Tiago de Freitas Pereira, who is focusing on the problem of facial recognition using images from different domains, such as visible light and infrared. The Publication Prize went to Yu Yu for her excellent scientific article on the identification of head postures in three-dimensional space using visual and depth sensors (including Kinect).

## Internationally recognized Idiap researchers

This year, Idiap wishes to highlight its researchers' excellent participation in international conferences. The quality of their research was rewarded by several awards and distinctions.

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25th IEEE International Conference on Image Processing (ICIP), October 9, 2018, Best Student Paper Award

**Adrian Shajkofci**
Semi-Blind Spatially-Variant Deconvolution in Optical Microscopy with Local Point Spread Function Estimation by Use of Convolutional Neural Networks

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35th International Conference on Machine Learning (ICML), 2018, Outstanding reviewer

**David Ginsbourger**

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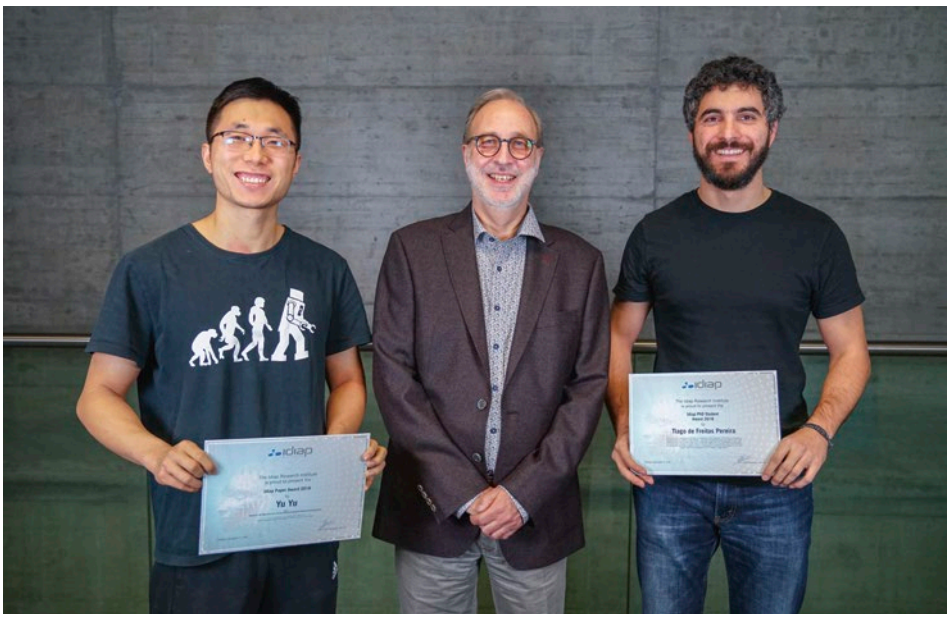
The University of Bern awarded the title of professor to the head of our Uncertainty Quantification & Optimal Design group

**David Ginsbourger**




From left to right: Yu Yu, Hervé Bourlard, Tiago de Freitas Pereira

# Theses completed

**Five students completed and presented their theses in 2018: Pierre-Edouard Honnet, Pedro Henrique Oliveira Pinheiro, Olivier Canevet, Marzieh Razavi, and Gülcan Can.**

## Novel Algorithms For Clustering

**James NEWLING**
February 2018

*Thesis director: Dr. François Fleuret*
*Members of the* thesis committee*: Prof. Robert West, Prof. Martin Jaggi, Prof. Stéphane Marchand-Maillet, Prof. Raphael Sznitman*

## Word Sense Consistency in Statistical and Neural Machine Translation

**Xiao PU**
June 2018

*Thesis directors: Prof. H. Bourlard and Prof. A. Popescu-Belis*
*Members of the* thesis committee*: Prof. Pascal Frossard, Prof. Paola Merlo,* Dr. *Martin Rajman, Prof. Martin Volk*

## Generative Models for Learning Robot Manipulation Skills from Humans

**Ajay TANWANI**
February 2018

*Thesis directors: Prof. Hervé Bourlard and Dr. Sylvain Calinon*
*Members of the* thesis committee*: Prof. Pascal Frossard, Prof. Ken Goldberg, Prof. Sethu Vijayakumar, Dr. Ronan Boulic*

## Phonetic aware techniques for Speaker Verification

**Subhadeep DEY**
July 2018

*Thesis directors: Prof. H. Bourlard and Dr. P. Motlicek*
*Members of the* thesis committee*: Dr. Alexandre Schmid, Prof. Jean-Philippe Thiran, Dr. Honza Cernocky, Prof. Jean-Francois Bonastre*

## Learning embeddings: efficient algorithms and applications

**Cijo JOSE**
February 2018

*Thesis director: Dr. François Fleuret*
*Members of the* thesis committee*: Prof. Pascal Frossard, Dr. Olivier Bousquet, Dr. Moustapha Cissé, Dr. Mathieu Salzmann*

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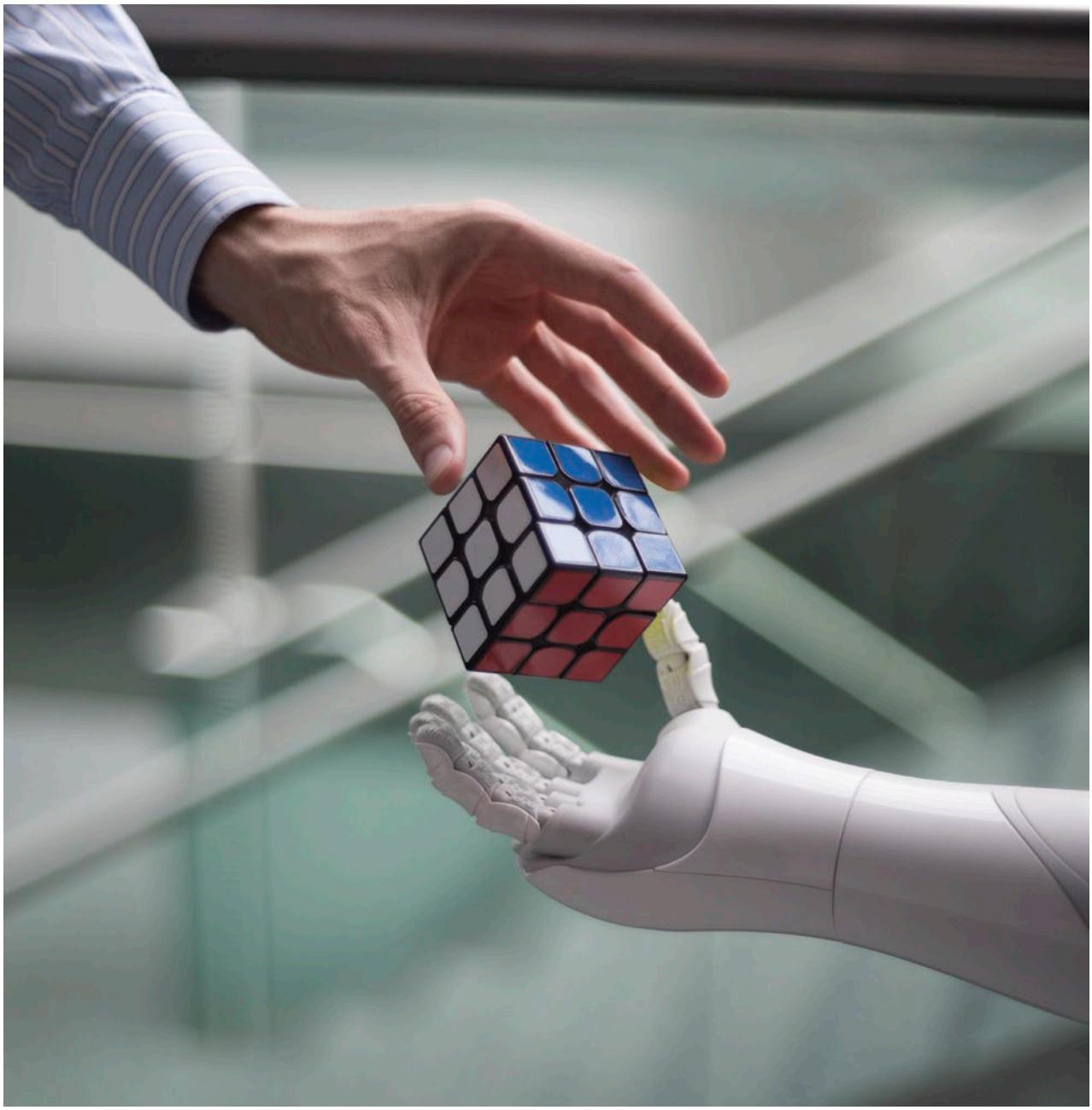
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