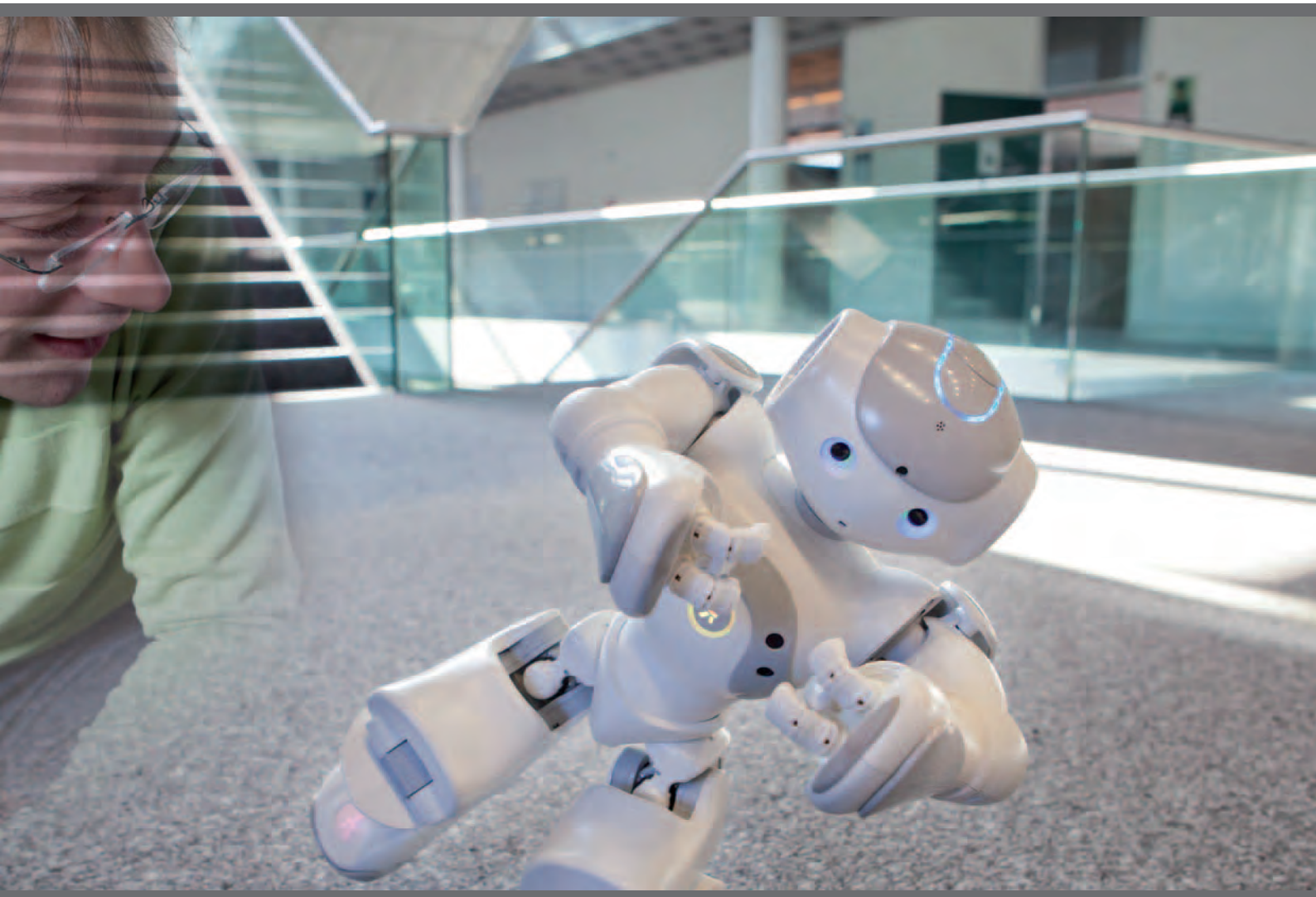
idiap
RESEARCH INSTITUTE

ANNUAL REPORT 2011



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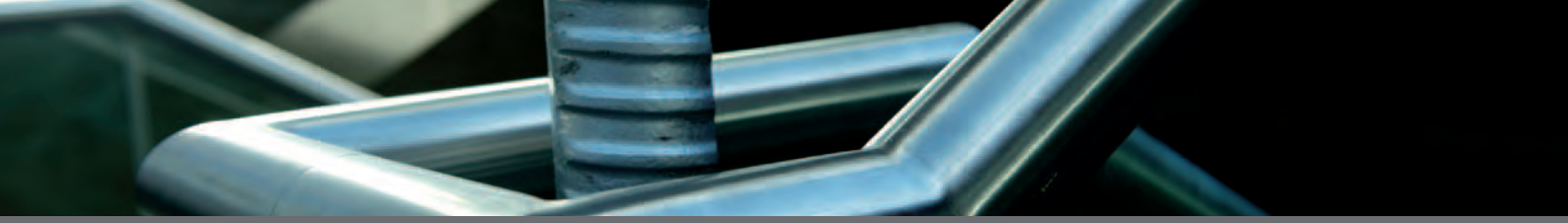

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WORD FROM THE PRESIDENT

"CONCURRENT POLITICAL WILLPOWER AND A SOCIO-ECONOMIC NEED IS THE RECIPE FOR SUCCESS"

Olivier Dumas, President of the Foundation Council of Idiap

2011 was Idiap's 20th anniversary—its childhood was often turbulent and its adolescence hard-working—two phases that have now allowed our institute to reach adulthood with maturity, highly-valued knowledge and remarkable experience. Starting with an annual budget of less than one million Swiss francs and about a dozen collaborators, today Idiap has over one hundred employees and manages a budget of almost 10 million francs.

Here, I would like to express my heartfelt recognition to all of Idiap's leaders, researchers, engineers, doctoral students and collaborators who have given their best so that our institute could develop and reinforce its notoriety during the last twenty years. My gratitude is also directed towards the members of the Foundation Council who contribute their precious expertise, often behind the scenes, so that Idiap's numerous projects may bear rich and successful fruit.

A research institute cannot be created and prosper unless there is a concurrence between political willpower and a socio-economic need. These two factors are not, however, sufficient in themselves. It is also imperative to build and motivate well-structured teams that share a common vision and ambition. This challenge was clearly and skillfully met by professor Hervé Bourlard who, from the very beginning of his term at head of the Institute, firmly took the reins and led the stagecoach to its current prosperity.

These last twenty years have offered the opportunity to strengthen our collaboration with the Ecole polytechnique fédérale de Lausanne (EPFL). We are delighted that the research university and the Valais local government have officially manifested their common intention of developing ambitious research and education projects in key economic domains for the Canton. The project will concentrate its efforts on energy, health and nutrition—20% of the Canton's GDB and employment—as well as reinforcing already existing collaborations between EPFL and Valais. It is no secret that EPFL is a mainstay in regional research centers and institutes such as CREM, IRO and, of course, Idiap.

The Valais government and EPFL have made it clear that the university's permanent establishment in Valais is part of EPFL's strategy to accelerate the future of technology transfer—efficiently creating jobs by taking advantage of the already-existing relationship between high-technology research and graduate education. It is yet another chance for Idiap to become even more dynamic by continuing its partnership with the Foundation for Innovation in Valais (The Ark), a major motor for the creation of start-ups on their Martigny site and throughout the Canton.

MESSAGE FROM THE DIRECTOR

"OUR SHIP HAS STAYED ON COURSE FOR TWENTY YEARS."

Professor Hervé Bourlard, Director of Idiap

A research institute that is as active and multidisciplinary as Idiap is not tossed about the seas by capricious winds. In order for a boat to arrive in its port, it has to hold its course. And beyond maintaining constant quality and controlled diversification in our research, it is wise to establish targeted goals in promising domains. That is why, each year, I determine a guiding theme for our work. In 2011, the theme was technology transfer to industry – a choice that has already been fruitful.

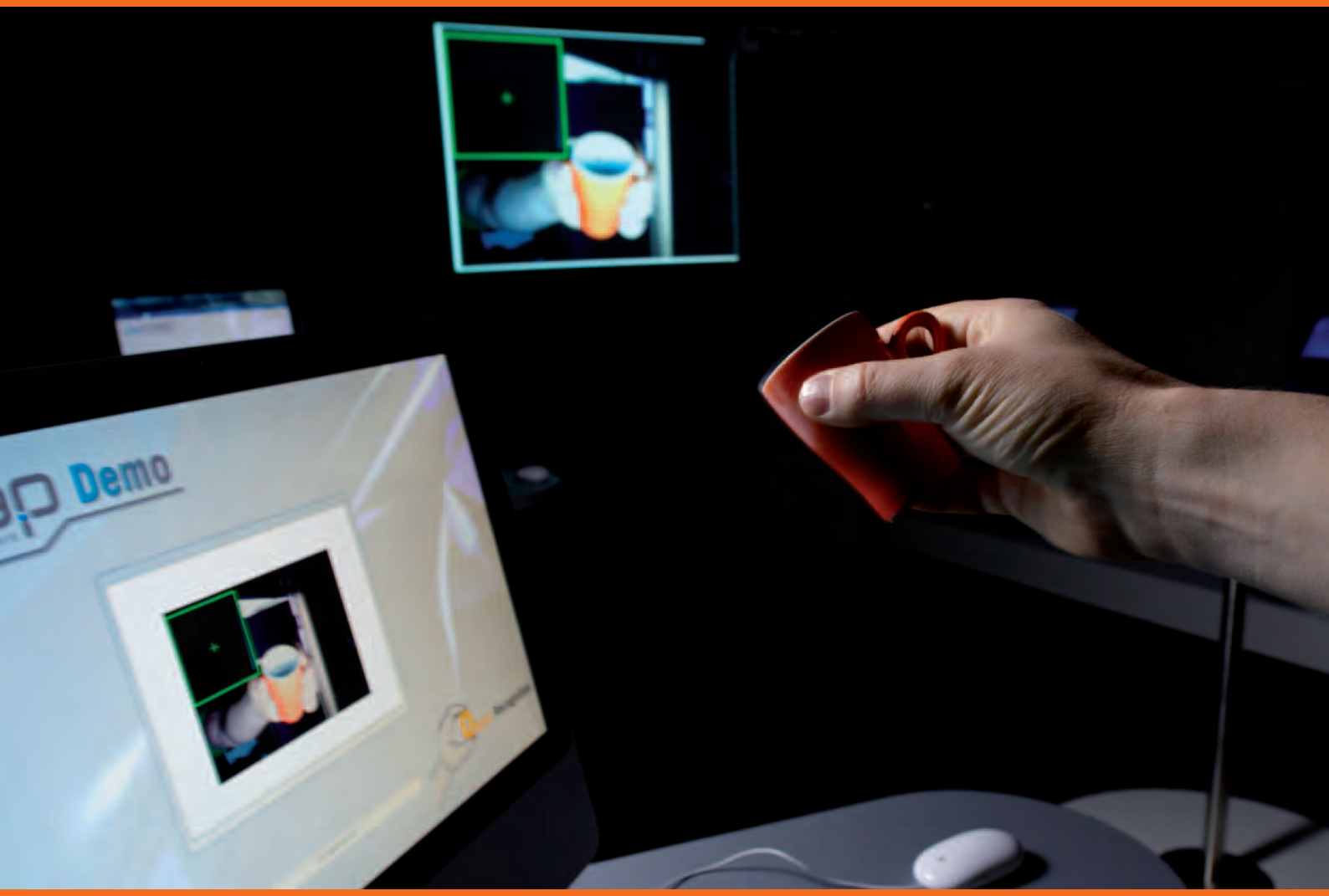
Idiap startups are going healthy and strong. What a pleasure to see these businesses find their niche in the increasingly competitive marketplace and attract prestigious clients. What satisfaction to see increasingly numerous contracts signed or extended between Idiap and internationally reputable companies! I'm delighted to see telecommunication giants continually seeking out our skills, this is telling about the value of the research done at our institute. New clients arrive, others renew their confidence in us, *e la nave va*.

2011 was marked not only by the institute's growth and consolidation, as well as a notable increase in its budget, but also by its 20th anniversary – a great occasion for remembering its exemplary trajectory and bringing this message to the public. We seized the opportunity with conviction and dynamism, and the events of the year took place in a particularly warm and friendly spirit. Some of these events were for specialists, such as the well-attended international scientific conference on Idiap's research. But special efforts were made in the direction of the general public, in a mindset of openness and transparency. The invitation to discover our institute was heard: over 300 people participated in our open house in order to learn more about our world and meet those who "create" Idiap on a daily basis. The friendly competition to locate balloons that we randomly spread throughout the Valais territory was a big success. Above all, it allowed the public to better understand our fields of activity and to measure the importance of our network.

Staying on the positive note, our collaboration with EPFL grows stronger with each year. Together with the prestigious institution in Lausanne, we value quality and have the same economic and social vision. We recognize this steady support as essential and our relationship will continue to develop in the future, for this Idiap-EPFL cooperation is the theme for Idiap 2012 – a theme to strengthen our common development plan.

I would like to take advantage of this annual assessment to reaffirm my conviction to conserve the humanistic values that are our greatest strength and the friendly atmosphere that contributes to our creativity and competitiveness. Finally, it is impossible to conclude without thanking my Idiap colleagues for their constant efforts, without exception. In particular, a special thanks is due to the three people who were promoted MER and who are by my side at the helm: François Fleuret, Daniel Gatica-Perez and Jean-Marc Odobez. I am convinced that together we will remain responsive and dynamic – a combination that has already proved to be successful in the past.

RESEARCH



IDIAP, IDENTITY CARD

A PERSONALIZED INSTITUTE WITH AN INTERNATIONAL REPUTATION

With over one hundred employees, and research domains in touch with current challenges, Idiap is committed to scientific progress in the service of humanity.

The Idiap research institute first established its mission of promoting scientific progress in the service of the well-being of humanity in its founding year of 1991. Today, twenty years later, society's best interest continues to be at the heart of Idiap's activities.

A Torrent of Technological Tools

The beginning of the 21st Century has given us a permanent torrent of new technological tools. On one hand these tools allow for considerable improvements in efficiency and comfort, on the other hand, they disrupt people's habits – leaving some on the wayside while others feel helpless in a wake of constant system modifications. It is within this context that Idiap is working to improve the man-machine relationship and to optimize human communication.

National and International Network

In Switzerland, Idiap works mostly with the two Federal Institutes of Technology as well as other Universities of Applied Sciences and Arts and Cantonal Universities. Idiap is currently working on several European projects, and its numerous partners include France, England and Germany. On the other side of the Atlantic, the International Computer Science Institute (ICSI) in Berkley, California, is a privileged partner.

At a Glance

Structure / The Idiap Research Institute is a non-profit foundation which specializes in the management of multimedia information and man-machine multimodal interactions. In 1991, the Town of Martigny, the State of Valais, the Ecole polytechnique fédérale de Lausanne (EPFL), the University of Geneva, and Swisscom founded Idiap. Although connected to EPFL through a joint development plan, Idiap remains an independent institution.

Financing / Idiap's Budget – 10 million Swiss Francs – 60% of Idiap's annual budget is financed by research projects competitively awarded, and 40% by public funds. (cf. Distribution of sources of financing, page 34)

Team / As of 2011, Idiap employs more than 100 people, 80 of which are researchers (professors, senior scientists, researchers, postdoctoral and doctoral students).

Site / All institute personnel work in the west wing at Centre du Parc in Martigny, after moving there in August 2007. Idiap now occupies 2,600 m2 on four floors.

Missions

- **Research**
  To conduct fundamental research projects at the highest level, thereby assuming its position among the best on a national, European and global scale. Idiap benefits from a wide network of international partners and works collaboratively with, among others, public and private research centers as well as large universities.
  Competitive research projects guarantee 60% of the institute's financing.

- **Education**
  To support the educational process by helping its interns discover the world of research and thereby foster their recruitment. Idiap welcomes talented young researchers working on their PhD by providing a number of courses at EPFL and within our institution.
  One collaborator out of two is a doctoral student.

- **Technology Transfer to Industry**
  To ensure technology transfer not only by promoting the widest possible dissemination of its research results into the scientific community, but also by forging close ties with the world of industry.
  Thanks to the incubator, The Ark, Idiap contributes to numerous successful start-ups.

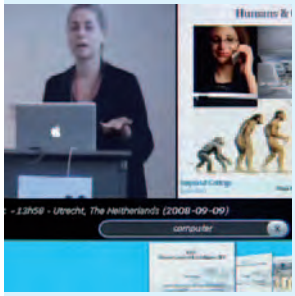
RESEARCH DOMAINS

Human-machine communication and communication among humans facilitated by machines are at the heart of Idiap's activities. Our research aims to improve existing mechanisms and to develop new procedures.

Idiap has always centered its activity around the general theme of multi-sensorial information processing, be it multimedia (textual and video data) or multimodal (data from diverse sensors). It is within this context that Idiap's domain of applications concern human-machine interfaces, computer modeling and the understanding of human interactions and, more recently, modeling human behavior, notably in social networks. This central research question is approached by Idiap's five complementary research domains.

Perceptual and Cognitive Systems
This domain comprises all systems capable of perceiving and understanding/interpreting what happens in a given environment in a wide sense (audio, video, writing, etc.). It covers a variety of fields including automatic voice recognition, computer vision, word and handwriting recognition and robotics.

Human and Social Behavior
Given the recent proliferation of portable communication and information access devices (cell phones and tablets) as well as the rapid development of numerous social networking platforms, our society is witnessing a convergence of research domains at the crossroads of data processing and human behavior. This new discipline treats problems related to data extraction and human behavior modeling on a large scale (YouTube, Facebook, Twitter, etc.). Idiap believes that the necessary and natural path to resolve important social problems (economy, health, ecology, etc.) will come from the mobilization of all currently available human and technological resources connected to different digital media.



Information and Presentation Interfaces
This theme, at the meeting point between user and machine, aims to increase the value and usefulness of information (multimedia) as well as its accessibility (research, indexation). Researchers also evaluate user interfaces and representation systems such as internet browsers and smartphone/tablet interfaces for their ease of use and utility. Solutions are found in extrapolations of systems such as Google, but they allow for a richer and less explicit access to information.

Biometric Authentication
This is a field of study that is important for both data management in general (detection and tracking of faces in photos and videos) and for security systems that are based on individually unique physiological factors to determine access to protected spaces or private information. Even if Idiap essentially focuses on voice and face verification, the same technology can be used for identity verification based on the iris, hand veins, movements, etc.

Machine Learning
This domain, while much more theoretical, is truly the keystone to all of Idiap's activities and from which it draws its main force. It concerns the research and development of mathematical algorithms, statistics and their efficient digital implementation – allowing for automatic information extraction from very large databases. It is the modern version of artificial intelligence. These algorithms are able to learn rules and extremely complex concepts based on examples (for example: audio signals for lexical transcription, content description for videos and individuals' identity from photos).

Key Figures (Year 2011)

Human Resources

1 professor

3 MER

10 permanent researchers and senior scientists

20 postdoctoral students

32 doctoral students

8 development engineers

6 system engineers

9 interns and visitors (average per year)

10 administrative staff

6 doctoral thesis

42 jobs in the startup park IdeArk

28 nationalities

Scientific activities

- National Centre of Competence in Research IM2 (Interactive Multimodal Information Management) since 2001
- Participation in 36 research programs
- Project direction for 8 consortiums
- Participation in the economic development strategy of the Canton of Valais through The Ark program and in particular the IdeArk company
- 221 scientific publications
- Participation in numerous international conferences

www.idiap.ch

THE AMBIZIONE PROJECT

THE NATIONAL SCIENCE FOUNDATION STEPS IN

Oya Aran, scientist and post-doctoral student at Idiap, received SNSF "Ambizione" funding for her ambitious project to improve the behavior of professionals when interaction is at the heart of their career.

Having arrived at Idiap in 2009 on a Marie Curie scholarship (see page 25), Oya Aran, a young Turkish scientist, has extended her stay in Martigny to 2014, thanks to "Ambizione"—a new Swiss National Science Foundation (SNSF) program.

The SNSF program "Ambizione" is a research grant intended for young scientists from abroad, or talented young foreigners already working in Switzerland, and "is geared for young researchers who would like to conduct, manage and lead an independently planned project at a Swiss university." Each year, forty to fifty research projects, chosen out of close to two hundred, are funded via "Ambizione." The program also aims for 35% of researchers to be women.

The SNSF supports the research by financing the researcher's salary for three years with the possibility of extending another two years. Meanwhile, the host institute, here Idiap, furnishes the necessary framework for research (material, equipment, mobility, etc.).

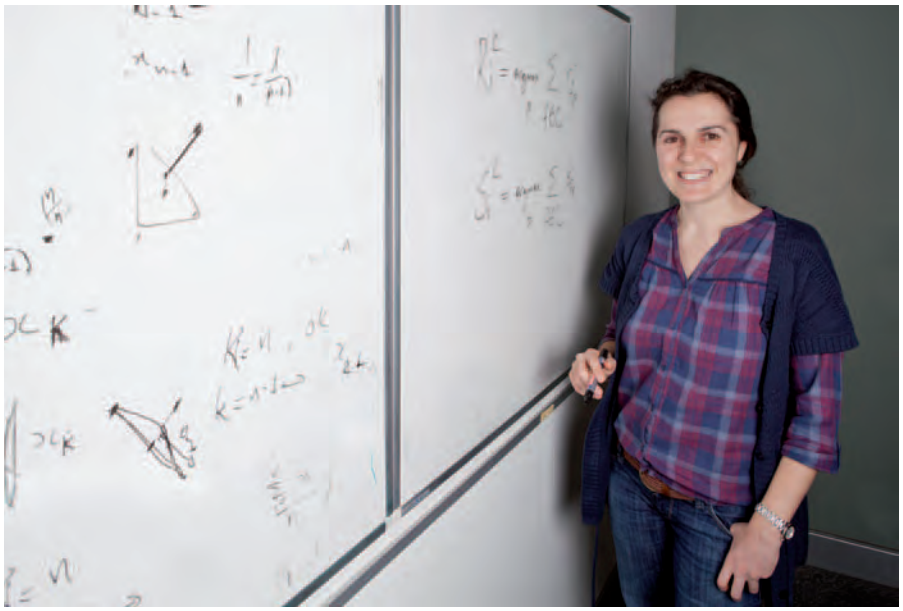
Integration of Social Context and Nonverbal Communication

Oya Aran, whose enthusiasm matches the difficulty of the task at hand, is researching the recognition and automatic analysis of human behavior. The program allows her to pursue a domain that she truly cares about and that is, due to recent progess in video technology, at the forefront of the field. "Currently available prototypes are able to analyze movements and even the tone of voice of different people in a room equipped with sensors," explains the post-doctoral student. "However, these tools do not take social context or non-verbal behavior into account."

Two elements make up the original nature of this "Ambizione" project. First, the study of the relationship between different social constructions such as personality and domination. Second, Aran will turn towards social networking to analyze the numerous videos posted by people candidly filming themselves—a precious source of data. Senior researcher Daniel Gatica-Perez, head of the Idiap group for social computing, accompanies Aran during her project's development.

Improving Teaching

When Aran is asked how this research affects daily life, she explains: "Technology is now and forever a part of our life, so why not bring out its best qualities and try to make it as socially pertinent as possible. My research aims to develop tools that not only help group decision processes, but also aid in the self-evaluation of professionals and improve teaching techniques. For example, just imagine an application that determines why some teachers have better results than others, or why one work group performs better than another."



FOR MORE INTELLIGENT SEARCH ENGINES

Idiap researcher Ronan Collobert is proposing a different way to index the 500 billion pages on the web, questioning the pertinence of current search engines. The Fondation Hasler is financing the project.

"Semantically Self-Organized Distributed Web Search" is an audacious project to create a new type of web search engine that is semantic, automatic and distributed. Under the research umbrella financed by the Swiss Foundation, Hasler, "SmartWorld - Information and Communication Technology for a Better World 2020" started in 2011 with 86 other projects proposed—this Idiap idea was one of the few chosen.

Ethical and Energy Problems

"My project started with a factual assessment," explains Ronan Collobert, "current search engines are insufficient and their way of working creates problems both ethical and energy-based. Not to mention that they don't completely fulfill their task." The young researcher believes that Google and Microsoft control humanity's access to web resources and that their monopoly allows them to collect all the private data relating to research habits. Furthermore, the energy cost for all of these servers, which continually scan and copy the web, is gigantic. Finally, he is convinced that only one-tenth of all web pages are taken into account by these search engines. A quite surprising factual assessment indeed.

Indexing with a Natural Language Tool

Ronan Collobert wishes to fix the way information is classified and sorted. "Current research engines work with basic keyword algorithms. The web is like a library where all the books are thrown on the ground in one big pile. You cannot find the book you are looking for, so you have to ask for help from a person in charge who has already gone through the mess of a pile and knows by heart where each book is located."

The novel system, as imagined by Ronan Collobert, proposes to define a way to organize the library so that it is done automatically. "The basic principle is to establish a semantic link between documents by using a natural language tool—a digital system able to read a sentence and indicate to the library that document X is linked to document Y and classify them into the same category."

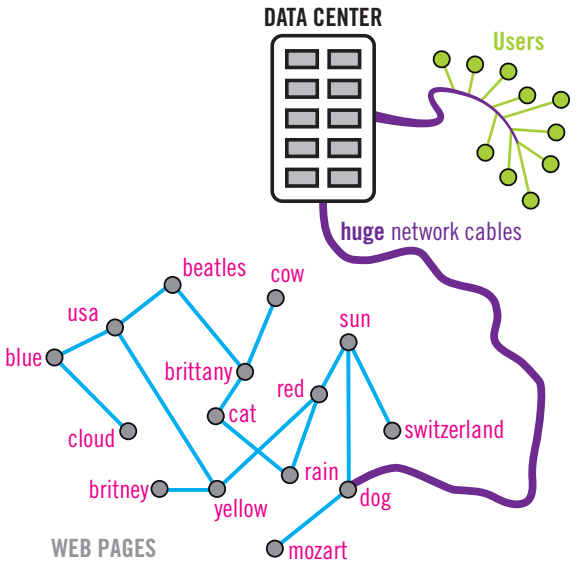
In order to ensure sorting and classification on a large scale through a well-developed library, this young researcher advocates the installation of a program on each server, starting with Open Source systems such as Apache on Linux. "The idea is to leave the web as is—scattered—and to deal with it as such instead of copying everything into one place," ventures Collobert.

Improving Search Engines Through Machine Learning

In the end, it will be "enough" to have all of the servers communicate amongst themselves and to add a bit of computer learning in order for the sorting algorithm to develop over time.

And what if internet users are already so used to one search engine that no other one will be able to compete with the American giants? "This would not be a disaster as this type of system is sure to interest the large multinational corporations who deal with big data," answers Ronan Collobert with a smile.

Current search engines (see schematic below) work by continually copying information onto servers and centralizing information, thereby keeping control of its distribution. Ronan Collobert's system distributes the tasks among the servers already in place.



TWO NEW IDIAP PROJECTS FINANCED BY THE FP7

In 2011, Idiap coordinated five projects and participated in eight others, all financed by the European 7th Framework Program (FP7). A record for the Valaisian institute which has never been so competitive on the European stage. Let us take a look at the two new projects, BEAT and inEvent.

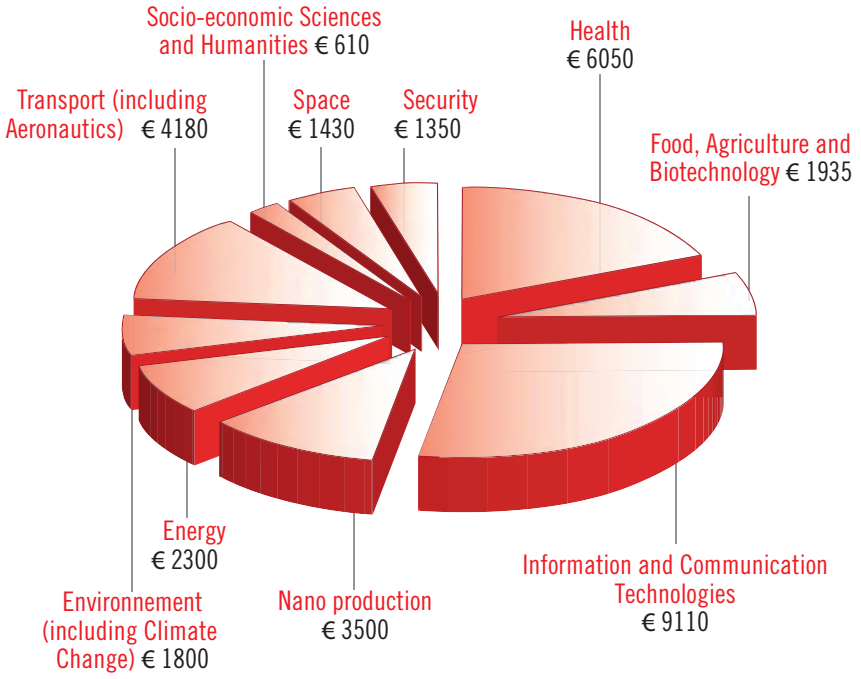
The Seventh Framework Program for Research and Technological Development (FP7) is the European Union's principal instrument for financing research across Europe. It is the largest transnational platform for research in the world with a budget of 50 billion Euros (2007-2013), of which 33 billion is allocated at collaborative research (FP7-Cooperation).

The Cooperation program has been set up in order to reinforce the job market, economic growth and competitiveness in Europe. It covers ten themes (health, energy, etc), including the field that directly concerns Idiap, Information and Communication Technology (ICT). Even though ICT is the mainstay for Idiap collaboration in FP7 projects, in 2011 Idiap landed an FP7 project in the field of security. (See BEAT project, page 11).

Investing in ICT for Sustainable Growth

For the European Union, ICT plays a crucial role in stimulating innovation, creativity, and competition in the service and industry sectors. "ICTs are opening up many new opportunities for European citizens and consumers. There is a wide range of applications including healthcare provision, transport systems, as well as innovative interactive systems for entertainment and learning. Innovation in ICT can help improve illness prevention and safety of care, facilitate active participation of patients and enable personalization of care and can also tackle problems associated with the aging population." No less than 9.1 billion Euros are invested in ICT, more than 28% of the 2007-2013 EU budget for the FP7 Cooperation program.

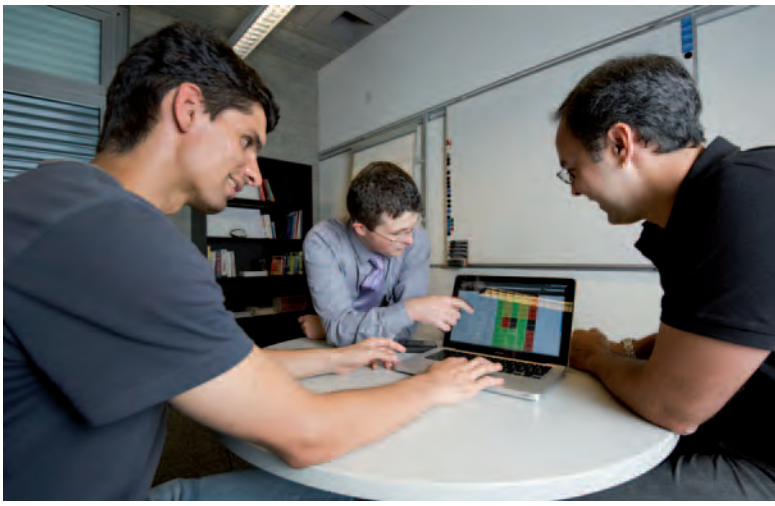
The Cooperation Programme breakdown (€ million)



Information and Communication Technologies are an important part of the collaborative research program (Cooperation), with a 28% slice of the cake.

BEAT: BIOMETRICS EVALUATION AND TESTING

Even if biometric evaluation is increasingly common, its reliability is not guaranteed. That is why Sébastien Marcel, senior scientist at Idiap, answered a call for projects from the EU in the field of security. His project was accepted.



Let us start with the facts: even though biometric technology is increasingly common (passports, security access, etc.), its reliability is not necessarily guaranteed, especially concerning its vulnerability against cyber attacks on private data. "In fact, no evaluation and verification process exists for systems that are already installed, and no common method is adopted across the board for measuring the performance of algorithms," explains Sébastien Marcel. This security hole creates significant problems for scientists. "Students, for example, could arrive at wrong conclusions, and we are without recourse to confidently assess the success or failure of an algorithm that is intended to solve a given problem."

Back in 2010, Sébastien Marcel imagined creating an online evaluation tool and had hopes of creating a collaborative research platform that could develop it. "I had a discussion with my colleague, François Fleuret, who is already working on this kind of collaborative tool for his MASH project—a sort of web 2.0 for collaboration and development—and I confirmed the technical feasibility of my idea." The researcher hastened to submit his idea when he saw the call by FP7 in the "security" category.

Developing a European Certification

The project: to create a framework for independent and standardized evaluations that are based on unanimously approved criteria. The framework would be transparent, internet-based, and available for both researchers and industry. Legal agreements would be reached and authorities would be kept up to date on the progress made in the domain. Parallel goal: to contribute to the development of a European certification system.

The experts in the EU were convinced, and the project was accepted. "We have a server at Idiap that is uniquely dedicated to the secure conservation of biometric databases and the rigorous evaluation of biometric algorithms," explains Sébastien Marcel. This way different entities can test their algorithms without seeing or modifying personal data—an important advance that has already incited new collaboration proposals; forensic science professionals in Holland wish to collaboratively work on highly secure biometric data.

Projet BEAT
Biometrics Evaluation and Testing

Idiap	Manager: Sébastien Marcel, senior researcher Employees involved: 4 (1 senior researcher, 1 post-doctoral student, 1 doctoral student and 1 development engineer)
Partners	Universidad Autónoma de Madrid, UAM (ES) University of Surrey, Centre for Vision, Speech and Signal Processing, CVSSP (GB) Ecole polytechnique fédérale de Lausanne, The Security and Cryptography Laboratory, EPFL-LASEC (CH) The Scientific & Technological Research Council of Turkey, TÜBITAK (TR) Commissariat à l'énergie atomique et aux énergies alternatives, Laboratoire d'électronique des technologies de l'information, CEA-Leti (F) Katholieke Universiteit Leuven, KULeuven (BE) As well as an advisory board composed of the most important European agencies in the field (BSI, ANSSI, NPL, CCN, BI)
Industrial Partners	Morpho SA (F) TÜViT Informationstechnik GmbH (DE)
Budget	Around 1.3 million francs (Idiap's contribution)
Calender	March 2012 - February 2016
Internet site	www.beat-eu.org

INEVENT: INDEXING DYNAMIC MULTIMEDIA DOCUMENTS IN A NETWORK

The second European project coordinated by Idiap is headed by its director, Hervé Bourlard. It aims to develop new research engines and new indexing methods for dynamically changing multimedia documents (text, audio and video).

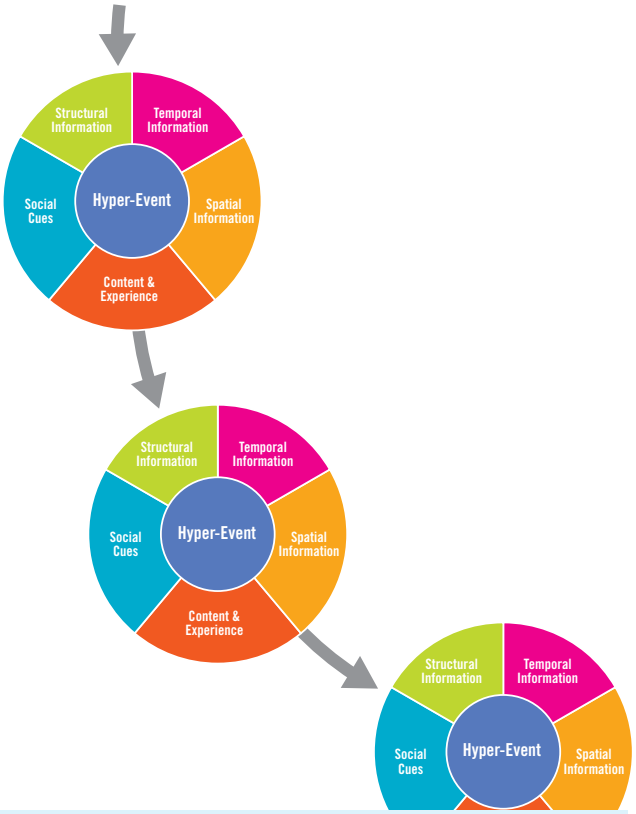
Today, systems like Google are able to recognize and index mainly text and textual metadata. “But as it stands, audio and video content are superficially indexed,” explains Hervé Bourlard, head of the second European project led at Idiap in 2011. “inEvent aims to create a system that indexes events on the interior of video and audio media – hence the name, and labels them according to automatically extracted meta-data such as time, geographic coordinates, causality, etc.” Through this new approach, the project aims to develop an understanding of data instead of simple indexation, since each person has a different way of experiencing a multimedia event.

Complex connections between these different multimedia experiences, called “hyper-events” (in reference to “hyper-links”), are to be created automatically in order to allow for research from different perspectives (for example, video on the same subject or filmed in the same place or even with the same people).

An Idiap Start-up Alongside IBM and Radvision

Hervé Bourlard says, “Above and beyond the international significance of this project, I have a supplementary satisfaction in knowing that, once more, a company that has been born from the belly of Idiap is participating in a European project! Klewel, a start-up that develops and commercializes state-of-the-art solutions for recording conferences, has become a partner in the inEvent project, alongside giants such as IBM and Radvision.” An excellent example of successful technology transfer to industry!

The system intends to “understand” audio and video content on the web and to “label” them in order to facilitate indexation.



Project inEvent **Accessing Dynamic Networked Multimedia Events**	
Idiap	Manager: Hervé Bourlard, director Employees involved: 3 (1 senior researcher, 1 post-doctoral student and 1 doctoral student)
Partners	Fraunhofer Heinrich-Hertz-Institute, HHI (DE) University of Edinburgh (GB)
Industrial partners	Radvision LTD, RVSN (IL) IBM Israël – Science and Technology Ltd (IL) Klewel SA, Martigny (CH)
Budget	**Around 500’000.- francs (Idiap’s contribution)**
Calender	November 2011 - October 2014
Internet site	www.inevent-project.eu

TWO START-UPS BENEFIT FROM IDIAP RESEARCH

Technology transfer from research to industry is one of Idiap's three missions. Each year, research undergone at the institute is evaluated from a dissemination perspective. In 2011, two innovations were adopted by Idiap start-ups, one accredited financial support by the Swiss government, the other by The Ark, innovation promoter.

The acronym, "CTI," has become commonplace in Idiap's vocabulary. When someone speaks about a "CTI project," it means that the project is funded by the Commission for Technology and Innovation—a Swiss agency that makes independent decisions for innovation promotion and is an organ of the Federal Department of Economic Affairs. Its mission: to encourage not only applied research and development (AR&D), but also entrepreneurship.

"The CTI allots more than 100 million Swiss francs in support of AR&D each year," explains Yann Rodriguez, head of technology transfer at Idiap. "Project proposals must include at least one academic partnership and one industrial. CTI finances the researcher, and the company commits to financing the same amount via human resources."

Koemei SA: Personalized Automatic Translations

Koemei is a young start-up founded in 2010 and was granted with a CTI project in 2011. The company is specialized in high-performance speech recognition that is independent from the speaker and offers, more specifically, automatic transcriptions of discussions and unstructured conversations such as meetings and conferences, as well as audio-visual documents and video. The start-up's services are in high demand (see page 23).

The company continues to innovate. Its project, "Task Adaptation and Optimization for Conversational Speech Recognition" (TAO-CSR), is an adaptation of current tools. The novel automatic transcription service is personalized according to each speaker's profile (accent, way of speaking) and field of expertise. Once the profile is established, the software can immediately draw upon common vocabulary and increase its relevance and usability. Starting in October 2011 and ending in September 2012, 152,000 Swiss francs have been allocated by CTI for Idiap researchers.

AudioSearch Sàrl:
Storing and Indexing Telephone Conversations

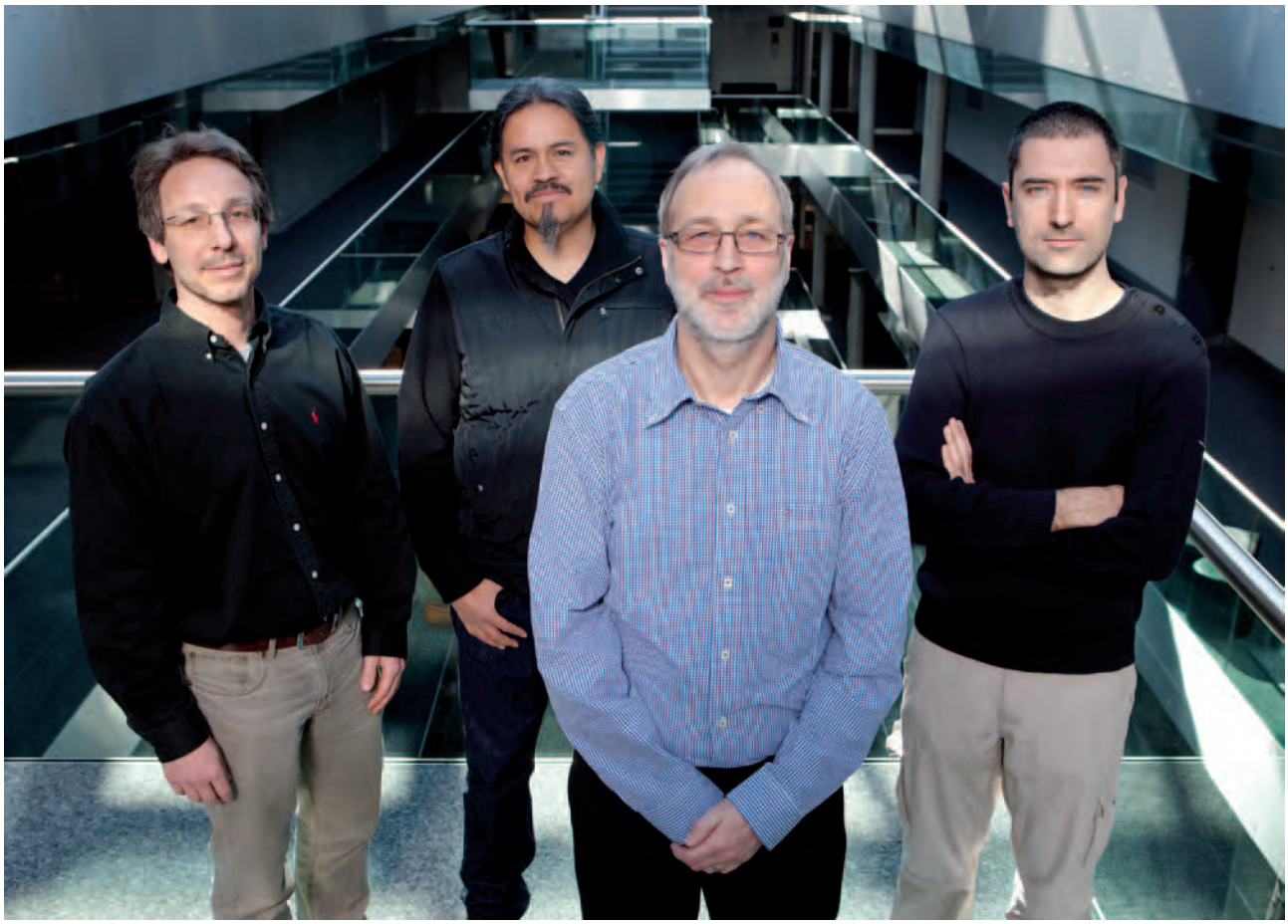
A different start-up, a different dissemination process. AudioSearch, founded in 2010, aims to commercialize automatic voice detection and keyword recognition in audio recording. Its dissemination approach has been supported by the Foundation, The Ark, a strategy developed by the Valais government to support innovation. "The initiative began with Idiap researcher Mathew Magimai-Doss, who specializes in the field of speech recognition," explains Frédéric Bagnoud, head of The Ark. "He contacted us to help disseminate his research results. We worked together to find different possible applications." During this process, a start-up was launched – AudioSearch Sàrl – with the goal of developing a tool named, "AudioTag," that allows the user to stock his own telephone conversations and be able to share them over the web with keyword indexing. "We now have a prototype on a smartphone," proclaims the company, which is exploring different business models in order to commercialize the application. The Ark finances the project at 95,000 Swiss francs, of which 62,000 francs for developments at Idiap.

NETWORK

IDIAP-EPFL: THREE RESEARCHERS GIVEN THE MER TITLE

THE SCIENTIFIC BOARD AT IDIAP EXPANDS

Named “Maîtres d’enseignement et de recherche” (MER) or, Senior Scientists, by EPFL in 2011, three top researchers are now working alongside director, Hervé Bourlard. Here is their portrait.



Doctoral students from the Ecole polytechnique fédérale de Lausanne (EPFL) have always had the opportunity to conduct their research at Idiap. However, despite the fact that Idiap senior researchers supervise students, they did not have any official recognition until 2008. “We have always had the recognition of our peers,” explains one of them, “but in my case, for example, I was considered able to direct research in France, but not in Switzerland.” Since 2008, when a common development plan was signed between the two institutions, Idiap scientists finally gained access to academic titles and their advantages: full professor, adjunct professors, MER, etc. By offering this academic recognition to its researchers, Idiap becomes even more attractive for high-level researchers around the world.

Three researchers in 2011 were promoted to the rank of Senior Scientist (MER) after a standard evaluation process by EPFL. François Fleuret, Daniel Gatica-Perez and Jean-Marc Odobez reinforce Idiap’s scientific management alongside its director, Hervé Bourlard.

François Fleuret, 40 years old (France)

www.idiap.ch/~fleuret

Research
Machine learning, recognition models, statistical models, computer vision

Resume

2000	Thesis in mathematics, University of Paris VI
2000-2001	Post-doctoral position at the University of Chicago, Department of Computer Science, and at EPFL, Laboratory of computational neuroscience (LCN)
2001-2003	Researcher at the INRIA, IMEDIA research group, France (images and multimedia)
2004-2007	Senior Researcher at EPFL, Computer Vision Laboratory (CVLab)
2006	Habilitation degree in Applied Mathematics from the University of Paris XIII
From 2007	Senior Researcher and MER (from 2011) at Idiap

Principal projects and current research
European project coordination MASH (www.mash-project.eu)

Supervision 2011
Supervision of three doctoral students and co-supervision of two doctoral students

Teaching
Class on statistical learning, in collaboration with Professor Billard, EPFL

Daniel Gatica-Perez, 42 years old (Mexico)

www.idiap.ch/~gatica

Research
Social and mobile computing, social medias

Resumé

2001	PhD, University of Washington, Yang Research Award, Fullbright Scholarship
From 2002	Senior Researcher and MER (from 2011) at Idiap

Principal projects and current research
Swiss National Science Foundation funded projects: SONVB, CODICES, HAI, IM2
Industrial projects financed by Nokia and NTT

Supervision 2011
9 doctoral students and 3 postdoctoral students

Teaching
Computer perception using multimodal sensors

Jean-Marc Odobez, 44 years old (France-Switzerland)

www.idiap.ch/~odobez

Research
Statistical models and machine learning, computer vision, human tracking and activity analysis, human-robot/computer interaction

Resume

1990	Master in signal processing (Rennes) and engineering diploma from Ecole nationale supérieure des télécommunications de Bretagne
1991-1994	Thesis in Matter Physics (University of Rennes) at INRIA
1995	Postdoctoral at University of Pennsylvania, Philadelphia (USA)
1996-2001	Lecturer in computer science at the University of Mans (F)
From 2001	Senior Researcher and MER (from 2011) at Idiap

Principal projects and current research
Direction of Swiss National Science Foundation funded projects: HAI, TRACOME, PROMOVAR. Principle representative in European projects HUMAVIPS and VANAHEIM

Supervision 2011
Supervision of 4 doctoral students, co-supervision of 2 doctoral students

Teaching
Computer perception using multimodal sensors

1991-2011, IDIAP TURNS 20

A YEAR TO INCREASE ITS VISIBILITY TO THE LARGE PUBLIC

In 2011 the institute celebrated its 20th anniversary, an opportunity to remember its exceptional moments and to open doors to the public. Following are highlights of this occasion.

September 2011

By way of announcement, an advertisement was placed in the newspaper, Le Nouvelliste

On September 7, around 120,000 daily readers of the regional newspaper, *Le Nouvelliste*, discovered in their paper a sizeable announcement: "Idiap turns 20! 1991-2011: a research institute at the turn of the century." This 24-page supplement offered an unabridged portrait of the institute through a look back at highlights, portraits and testimonials, figures, projects, etc. Through texts and images, the Valais learned of the international influence and the considerable appeal of Idiap, located a few dozen kilometers from home.

August 30 – September 20, 2011

Exhibition at the Rest Stop, Relais du Gd-St-Bernard

Each day thousands stop at this highway rest stop on the way to vacation, work, or simply to relax at mealtime. For almost a month Idiap presented its activities in a fun and interactive fashion in this friendly and colorful environment.

August 31 – September 2

Scientists' Workshop with Experts from Around the World

Around 110 scientists participated in a workshop organized on the occasion of the 20th anniversary, coming not only from the Federal Institutes of Technology in Lausanne and Zurich, from the University of Fribourg and the University of Geneva, but also from the United States. It's worth noting that the speakers came from Idiap, Google and Yahoo (from California), large American and European research institutions, and spoke on topics such as social networking, the multimedia mobile phone, and indexing content.

September 9 – 10, 2011

Open Doors

For two days the general public discovered Idiap from the inside, by learning about our important research institute – along with the applications of its work – or by becoming familiar with the start-ups born here each year in The Ark. Almost 300 people responded to the invitation, participated in interactive demonstrations, watched films or even got to know the robot, NAO! More importantly, they met researchers, developers, doctoral students, and everyone who "creates" Idiap: they are enthusiastically committed, day in and day out, to bringing scientific progress for the well being of all.

September 24, 2011

Competition: Make Your Network Play

In collaboration with the regional police, Idiap launched a contest titled, "Make Your Network Play," carrying a prize of 10,000 francs. The challenge? Locate as quickly as possible ten balloons, each measuring two meters in diameter, in the Canton of Valais. The objective: demonstrate the efficiency and role of the internet and social networks in communication today, as well as in the capacity to mobilize citizens to resolve a puzzle on a large scale in which time is critical.

Seven hours and thirty-six minutes is the time it took the Valais-Community to announce the location of these ten balloons on www.faisjouertonreseau.ch. The group, born of an initiative from the Marque Valais Association, presented the check to the Valais Disability Forum.

November 2 – 3, 2011

Gala

To close this anniversary year with hospitality, two parties were organized at Idiap: one for employees (annual dinner), and the other for partners of the Institute. No fewer than 150 people responded to the invitation to share an organized meal… in the hallways of this research institute (!), according to a concept originally proposed by FVS Event Management. A "lounge" atmosphere prevailed, decorated by artistic and musical performances.

In terms of speakers, there were: Mr. Claude Roch, State Councillor of Education, Culture, and Sport, Jean-René Germanier, President of the National Council and Member of the Foundation Council of Idiap, Marc-Henri Favre, President of the City of Martigny and member of the Foundation Council of Idiap, Professor Patrick Aebischer, President of EPFL, and Professor Hervé Bourlard, director of Idiap. Many speeches addressed the dynamism and the exceptional trajectory of the Institute, and expressed wishes for its continued prosperity and productivity.

A booklet entitled, "20th Anniversary of Idiap, A Success Story," was published for the occasion and distributed to participants.

PROJECT ENERGY IN THE CITY

CAP ON RENEWABLE ENERGY

For the first time, Idiap undertakes a research project related to energy. In collaboration with CREM and EPFL, the Institute is responding to the abandonment of the nuclear program with "Energy in the City," which explores how to integrate renewable energy into urban areas, where 80% of Swiss live.

Locate production facilities and distribute renewable energy in the heart of Swiss cities. Construct buildings that produce more energy than they consume (energy positive buildings) and could supply energy to neighboring buildings. Know consumer usage and increase awareness of the need to harmonize their practices with new methods of producing electricity.

These are some of the areas explored by "Energy in the City," an ambitious joint venture of Idiap, EPFL, and CREM (The Municipal Center for Energy Research, Martigny). These three partners intend to bring renewable energy to areas where consumption is high: urban areas where currently 80% of the Swiss population is concentrated.

A National Research Program to Meet the Challenges of New Energy

The history of "Energy in the City" begins in May 2011, when the Federal Council decided, several months after the accident in the nuclear facility at Fukushima, to abandon the project of nuclear energy. How then to compensate for the energy created by these facilities? In response to that question, the National Council launched the National Research Program (PNR) on the theme of new energy resources and production.

M. Gaëtan Cherix, director of CREM in Martigny

At Idiap, director Hervé Bourlard emphasizes the role the Institute could play in facing this new challenge. "Our work revolves around three axes: data analysis, data modeling, and data prediction. And we have several projects that explore social behavior. This approach corresponds completely with the current one developed in the domain of renewable energy! We simply add the reference to the prediction of usage."

Renewable Energy and New Technologies, Winning Duo

Hervé Bourlard then approached Hans Björn Püttgen, director of the Energy Center at EPFL, and the direction of CREM, in Martigny, regarding Idiap's intention to submit a research project. The two partners enthusiastically agreed. "We have several ongoing projects with Idiap," explains Gaëtan Cherix, director of CREM, "one of which, begun in 2009, just obtained continued funding for further work. Idiap's skills in new technologies and ours in the field of the management of energy flow, forms an effective combination. I strongly believe in 'Energy in the City.' I am convinced that cities will have a great influence on energy challenges of today and tomorrow."

Although the project, "Energy in the City," is one of twenty-eight PNR (National Research Programs) submitted last September, and only ten of them will be selected, Hervé Bourlard is confident: "No matter what happens, we will cultivate this partnership with CREM and EPFL for the development of renewable energy. The canton of Valais, with its geographic situation and natural assets, truly has a card to play in this area."

COLLABORATION AGREEMENT

IDIAP SIGNS AN AGREEMENT WITH THE PRESTIGIOUS IITG AND IIIT IN INDIA

At the end of 2011, Idiap's director, Hervé Bourlard, took a business trip to India. He came back with two collaboration agreements: one with the prestigious Indian Institute of Technology Guwahati (IITG), the other with the International Institute of Information Technology (IIIT) in Hyderabad. These are valuable tools for scientists at Idiap.

In December 2011, Hervé Bourlard leapt over half of Europe and Asia to set foot in India. The objective: to tighten the bonds between the Insitutite and several active academic and scientific institutions in similar or complementary domains. He visited the highly reputed Indian Institute of Technology Guwahati (IITG) and the International Institute of Information Technology (IIIT) in Hyderabad, two Indian institutions considered to be among the most illustrious in the world, especially active in the field of information and communication technology (ITC). IITG and IIIT are also developing centers of technology transfer in a similar manner to Idiap.

An Asset for Researchers

"For Idiap, the steady expansion of its network of academic partners is of paramount importance," explains the director. "It's obviously interesting in terms of supplementing our expertise, thereby increasing our opportunities for collaboration, but it's also beneficial for our scientists. When setting up a project, one more readily associates with someone previously met, and with whom one has affinities." For this letter of intent, the signatories committed, for example, to intensify their collaboration, to offer partners priority notification of any job postings, and to facilitate exchanges of doctoral students and researchers between the institutions.

IIT (Indian Institute of Technology), Home to Elite Indian Scientists

India is one of the most coveted sites for young students from all over the world, and the Indian Institutes of Technology (IIT) – of which IITG is a member – constitute a network of the best colleges in the country. Created by the government in 1951 to educate engineers and scientists, it's comparable to the Federal Institutes of Technology in Switzerland. Professors and students from there are regularly distinguished for their work. Each year more than 300,000 young people take the exam to enter into this network of institutions, in the hopes of joining the ranks of India's elite scientists. Ultimately only 4,000 can benefit from this excellent educational opportunity.

A Dozen Indian Doctoral Students at Idiap

Idiap has similar agreements with other countries in Europe and elsewhere in the world, but that with India happened naturally. Idiap regularly hosts interns from India, counting among its ranks an average of a dozen doctoral students, as well as a permanent researcher from that country – but that's not all. "We have worked together in the past," explains Hervé Bourlard, "but above all in recent years we have depended on the presence in our advisory board of Professor Dr. Bayya Yegnanarayana, Microsoft Chair at IIIT." (See interview on page 42)

Handhsake between Professor Hervé Bourlard, director of Idiap, and Dr. Bayya Yegnanarayana, director of the Microsoft Chair at IIT (on the left) and Professor Gautam Barua, director of IITG (on the right).

INDUSTRIAL PARNTERS

THE BIG NAMES OF INDUSTRY CALL ON IDIAP

Idiap closed four resarch contracts with world-famous companies in 2011. These prestigious collaborations permit the Institute to remain connected to market needs while increasing its own visibility.

NOKIA
Connecting People

Multitudes of Data to Use

Nokia and Idiap have a long history of enduring trust. In 2011 their contract was renewed for the third year. The objective: to better understand the behavior of smartphone users. Almost two hundred volunteers in Switzerland participated in this three-year study. The database is there. Thousands of pieces of information were collected anonymously: features used, music listened to, location, mobile manipulation, etc. For Idiap the task is now to analyze the data and the models, and then conceive applications adapted to various user lifestyles.

SAMSUNG

New Techniques for Speech Recognition

Each year Samsung appeals to researchers worldwide. As of today Idiap is the only Swiss institute included in the list of 33 projects selected by the Korean giant. The Institute has a total of 100,000 dollars to develop a new mode of speech recognition. Researchers are working on “Subspace Models” (Gaussian Models), a field still largely unexplored in speech processing. This could give a competitive advantage to Samsung. In terms of Idiap, this collaboration is an excellent occasion to network with Asian society. The first contacts have already led to a fruitful exchange of ideas.

NTT

Nonverbal Analysis in Question

This partnership began with a Visiting Research Agreement. The Laboratory of Communication Sciences NTT (Nippon Telegrah Telecom) sent one of its researchers to Martigny in 2010 to consider a joint project with Idiap on the analysis of social behavior, particularly in the context of teamwork whose quality is of great importance to industry. Nonverbal interactions are revealing about employee relations. In using methods of probability, the NISHA project aims to map these behaviors, analyze their properties, and characterize key aspects of interpersonal relationships. The researchers are working with audiovisual data from sessions in which people must work together to solve various problems.

NEC

Helping Machines Understand the Meaning of a Text

NEC (Nippon Electric Company) is an important Japanese group that runs two laboratories in the United States. This company is funding a thesis at Idiap on the theme of semantic analysis of a text. The project’s goal: to convert a phrase, paragraph, or even a document into a data structure that can be interpreted by a machine. Algorithms already exist which permit a machine to determine automatically that “Barack Obama” and “President of the United States” refer to the same entity. How to go further so that a machine could discover for itself that “the project’s goal” and “what we want to achieve” are semantically identical in this context? Of course, this extremely complex task will not be resolved immediately. It will be necessary first to improve the efficiency of simpler tasks, already established by linguists, which require some semantic understanding.

THREE COMPANIES TAKE OFF

All three start with “K” and share the same dynamism. Born at Idiap, the start-ups KeyLemon, Klewel, and Koemei take flight, attracting prestigious clients.

Klewel

www.klewel.com

Klewel: Its Product Fits in a Suitcase

Klewel has filmed, indexed, and published conferences on the web for the past four years. In 2011, the start-up launched a product that makes it possible to automate this solution to innovative webcasting. The client receives a recording station with a portal for online publication. All it takes is to press a button to engage or stop the capture. Data is transmitted on a server that references the sound, image, and projected slides. Then anyone can view and review a presentation on the website of the institution, and search for specific content using keywords. All of this is available in an easily transportable suitcase.

With this product, Klewel proposes a turnkey system available by subscription. EPFL uses it already to share course content with students. The start-up also provides custom recordings for clients such as Nestle, Unicef and the International Association for Sustainable Development (WBCSD).

In 2012 Klewel will introduce the integration of speech recognition, which enables keyword searches in an oral presentation, and high-definition broadcasting on tablets and mobile telephones.

KOEMEI

www.koemei.com

Koemei: The American Market in Its Sights

The Koemei platform proposes a unique solution to the world: it transcribes conversations, distinguishing different speakers. With the hiring of two additional staff in 2011 and a budget over one million, the start-up has invested in a new version that meets current market needs. This innovation arrives at a moment when 60% of web traffic is generated by video files. However, no referencing exists for this kind of content. Koemei’s mode of transcription allows search engines to access it. Knowing that videos will occupy 90% of the canvas in 2015, the development potential of this platform is gigantic! This is why the start-up from Martigny will propose its platform to major video producers, like Adobe.

Koemei’s solution has become allied with higher education. It has been adopted notably by the University of Geneva, IMD Business School of Lausanne, and the University of California at Berkeley. Koemei promotes itself as well on the market of closed captioning for the deaf and hearing impaired. It plans to open a branch in the United States, where transcription needs are particularly important.

KeyLemon pure access solutions

www.keylemon.com

KeyLemon: Three Million Downloads

Identified as the ones smiling at their PCs: the KeyLemon formula always delights internet surfers! This facial recognition software has surpassed three million downloads in 2011. The “LemonDay” function, which allows users to have their picture taken at each session (login), has created a genuine buzz.

KeyLemon technology has become more sophisticated. The software can no longer be fooled by a picture. Thanks to research conducted at Idiap and funded by a CTI project, recognition can only be done in the presence of the user. In 2011, the tool was adapted for smartphones.

KeyLemon is in the process of securing contracts with large clients. The start-up has already licensed its technology to a company that sells banking solutions to all of South America and MedTech Europe. They’re currently focusing on enterprises wishing to integrate facial recognition into their own products.

In 2012, the start-up wants to make available an integrated combination of voice and facial recognition. KeyLemon hopes to make more room in the market for mobile telephones and televisions.

FACES

MARIE CURIE DOCTORAL STUDENTS

IDIAP, A GREAT OPPORTUNITY

One is Italian, the other is Iranian. Both are the recipients of a Marie Curie Fellowship, which permits young female doctoral students to follow their research in a country within, or associated with, the European Union. A joint interview follows.

The essential in five questions:

1) What was your first contact with Idiap?
2) Were you already familiar with Switzerland?
3) What surprised you the most here?
4) How do women like you feel in the male-dominated field of research?
5) Are you familiar with raclette?

Serena Soldo *(pictured on the left)*, 30 years old, Italian
Research Assistant at Idiap since 2009
Participating in the European Project, SCALE
(Speech Communication with Adaptive Learning)

1) My project brought me here. I wanted to do my doctorate outside Italy, and through the Marie Curie Project, I discovered Idiap, which impressed me with the nature and high level of its research. When I first arrived here, I had a strange feeling, because everything was so much calmer, more tranquil and precise than in Naples, where I'm from. I really appreciate this environment, which is truly favorable for work. I value this chance to be at Idiap; it's a huge pleasure. Even if it isn't easy to leave family and friends, it's worth it. I'll never regret this experience! Plus, in Valais, I can enjoy nature.
2) I was on vacation in Schaffhausen several years ago and visited the Rhine waterfalls. I said to myself that it would be really nice to live in Switzerland.
3) That everything works! After all, I come from a country where one doesn't expect that everything functions…
4) It's not always obvious. There are sometimes people who think you're in the wrong place, just because you're a woman. But here, at Idiap, I've never encountered discrimination.
5) I love that—it's even better than fondue! I often have raclette on weekends in a small café in Martigny.

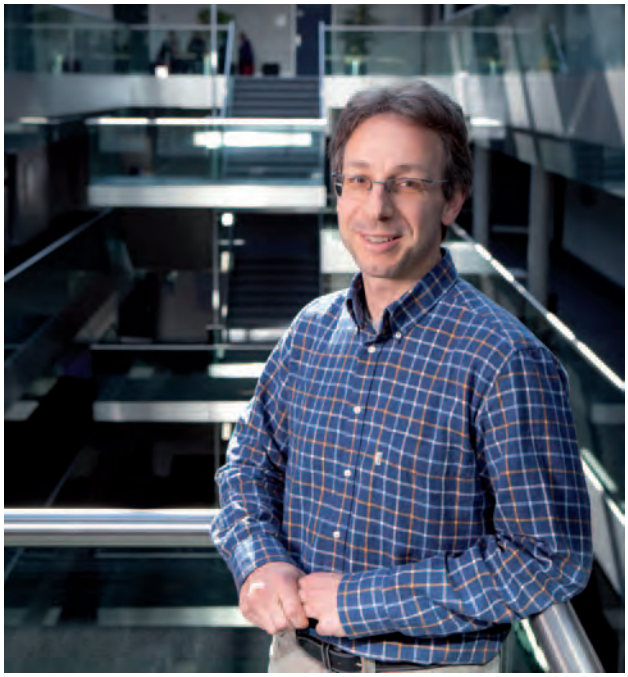
Afsaneh Asaei *(pictured on the right)*, 31 years old, Iranian
Research Assistant at Idiap since 2008
Participating in the European Project, SCALE
(Speech Communication with Adaptive Learning)

1) In the Iranian research institute where I worked for six years, I encountered some passionate and inspirational projects, and several of them were from Idiap. I was really impressed and, what's more, these projects corresponded perfectly with my interests. It was clear that I needed to go there, and I didn't hesitate a second between Idiap and any other institute. I've always been passionate about the big scientists who improve people's lives, which is equally the goal. Professor Bourlard is one of them; he has accomplished something big in his life, and helps me do the same.
2) I came to Martigny for a conference. I immediately fell in love with this city surrounded by mountains, and I left with only one thought in my head: to return.
3) Everything is so well organized and calm that I can concentrate singularly on my research, with the assurance that everything functions.
4) I believe that we all speak the same language, we have above all the same passion, but there may be more friendships between women.
5) We love it so much—my husband and myself—that we often make it at home.

JEAN-MARC ODOBEZ, NEW EPFL EXTERNAL SENIOR SCIENTIST

"I STRIVE FOR EXELLENCE."

With Idiap celebrating its 20th anniversary, Jean-Marc Obodez celebrated his tenth year of presence at this institute that he loves. An anniversary crowned by a nomination for the title of MER.



With Idiap celebrating its 20th anniversary, Jean-Marc Obodez celebrated his tenth year of presence at this institute that he loves. An anniversary crowned by a nomination for the title of MER.

On the homepage of Jean-Marc Obodez, which primarily presents the progress of his research, text is surrounded by two panoramas: boats near a rocky coastline and snowy mountains. These images alone tell much about the background of this 44-year old French-Swiss citizen. After a childhood spent in a "little enclosed village" in the French Alps (Morez), he studied then taught in Brittany, where his fiancee is from, before joining Idiap in 2001. He now lives near Montreux, but a high-altitude village would be no disappointment: "I have a mountain side to me. I'm a man of nature."

Where does his Swiss nationality come from? "My mother is German. She also passed down her Protestant origins," confides Jean-Marc Obodez, with a smile. "I think that plays a part, for example, in my relationship with money. When I travel for a project, even if there's a budget for the trip, I always try not to waste." This perfectionist who "always strives for excellence" allows himself the time to relax with his wife and their 15-year old son, but always with the ongoing and active practice of sports.

An Efficient Structure on a Human Scale

As a child Jean-Marc Obodez regularly spent holidays in Zurich. Today – and over the past decade – he experiments with being Swiss in his daily life. The French man readily admits that this has allowed him to discover other perspectives, since these two countries are radically different in certain domains. "For example, here there's a pragmatic approach that I really appreciate, but which can sometimes lead to missing the ideal, notably in terms of social projects. On the other hand, France tends to privilege big ideas and big principles… The two approaches should be combined!"

The arrival of Jean-Marc Obodez at Idiap happened a bit by chance. Around 2000, he decided to leave his position as lecturer at the University of Le Mans, because it didn't allow him sufficient time for research. "Seeing the offer at Idiap, I was attracted by the proposed research themes and its international character. I made a presentation, met with Hervé Bourlard and other researchers, and appreciated the human character of the Institute. The result? I am now one of the 'oldest' researchers at Idiap!"

Imparting Knowledge

At Idiap Jean-Marc Obodez welcomes the opportunity to reconcile research and the mentoring of PhD students. "Imparting knowledge is a way of being useful. My satisfaction comes as well from the practical realization of my work." The algorithm of video stabilization, which is the result of his thesis and his research at Idiap, is used commercially and at the basis of a computer software developed for Mac.

Another satisfaction came with his recent nomination as Senior Scientist (MER) at EPFL (see page 15). "This will not fundamentally change how I work, but it is an important academic recognition that, I hope, will help to further strengthen our ties with EPFL."

A ROBOT LEARNING TO BE HUMAN

NAO has been one of the stars of the 20th anniversary of Idiap. Local children got to know him during an open house in autumn 2011. In addition to being a world-famous "toy," it is at the heart of a European project.

"NAO Will Improve Daily Life"

He's two feet tall, understands what one says to him, knows how to walk, dance, pick things up, take and send pictures, and perform a multitude of other tasks. He is NAO, a humanoid robot, who is having his worldwide debut. Put on the market in 2008, he is one of the first androids worthy of that name after the dog, Aibo, from Sony. Behind the playful aspect of the object stands a European research project, HUMAVIPS (Humanoids equipped with auditory and visual faculties in populated areas), in which Idiap applies its expertise, notably in the area of nonverbal behavior and the analysis of interactions.

"The goal of this project is to conceive a humanoid robot capable of improving our daily life and interacting not only with a single person, but also with a group of people," explains Jean-Marc Odobez, senior scientist at Idiap. "Doing this means giving the robot perceptual capabilities: who is in the room, who is speaking, who is looking at me? The project also includes an aspect of social interaction: what is the profile of the speakers, what are their intentions, etc."

A Robot to Inform Visitors at the Gianadda Foundation

A fictional scenario developed in this project measures the complexity of a task. Imagine that NAO received a mission to inform visitors at the Gianadda Foundation. "For any human," explains Jean-Marc Obodez, "it poses no problem at all to immediately perceive who is addressing whom, and to understand whether or not a person wants information. But if one dissects all that must happen to comprehend that (simultaneous audio and visual messages, etc.), one understands that it's a complex process, and that a robot would have a lot of trouble understanding what is being asked."

How can a robot be assured that the curious visitor is following its explanations? How to maintain an internal representation of people around it when they rarely speak and aren't permanently within its field of vision? "Because a human's field of perception is more extensive than that of a robot," describes Jean-Marc Obodez. "We also have a sense of presence that it doesn't have." These are the challenges that Idiap seeks to address. "Not to mention that communication has – besides its semantic component – an important nonverbal dimension!"

NAO, Interactive Source of Knowledge

If NAO could be programmed for diverse functions (dancing, playing football, etc.), Jean-Marc Obodez envisions for it other uses connected to the job of research at the Institute. "We're trying, for example, to make an assistant for young readers, who could interrogate the robot when they encounter an unknown word in a text. "That would still be more educational than consulting an Internet screen plastered with advertisements! And there would be an interaction through dialogue."

Therapeutic Robots

Could humanoid robots have a beneficial effect on certain pathologies? This is one of the tracks currently being explored by scientists. It could be that the "attendance" of robots such as NAO aids in the development of children with autism. Experiments with patients diagnosed with Alzheimer's are also in process with other types of robots.

PETR MOTLICEK, RESEARCHER

"I KNEW IDIAP BY REPUTATION."

In seven years at Idiap, Petr Motlicek has forged strong ties with Valais. The specialist in speech and audio processing only leaves the region to visit his parents in the Czech Republic.

Petr Motlicek has worked at Idiap since 2005, but his history with the Institute and with the region goes back to 2001. He and his parents toured the Alps: Chamonix, Martigny, Zermatt. "The Iron Curtain had just fallen," explains the charming 35-year old giant from the Czech Rebublic. "It was the first time we could travel outside the Communist Block countries."

A First Visit to Idiap for a Conference

Two years later, the young man returned to Martigny to attend a conference at Idiap. "I had just climbed Mont Blanc with some friends," he recalled. "I knew the reputation of Idiap, since I was also in the field of speech and audio processing, and some colleagues from Brno were continuing their research there." The Institute, located in the town, organized the event in the Centre du Parc. "At this moment, I was certain that I'd work there one day!"

When that opportunity arose in 2005, with the competition for a research position in his chosen field, Petr did not hesitate to pursue his doctorate and to explore Europe. "All the signs were positive: the position was interesting, Idiap leads this research in Europe, and its researchers are respected. I also liked the idea that the institute benefitted from a large network of collaboration on the international stage and that it was very active in technology transfer. Additionally, I already knew that Martigny is a beautiful town."

The Advantages of Proximity

This young man who has always lived in large urban centers chose a domicile in Plan-Cerisier, a bucolic hamlet nestled in the vineyards above Martigny. "It's great – with Idiap right nearby, I don't spend hours in public transportation. In summer, I go there by bike." The proximity also facilitates flexible working hours, which Petr appreciates. "Since my time in the United States, I modified my work rhythm. Today I work mostly afternoons and evenings, when I'm more efficient."

Petr is in love with the mountains. As an amateur ski jumper, mountain climber and hiker, he takes advantage of the full range of what Valais has to offer. He started playing ice hockey again, defending since his arrival the colors of HC Nendaz. "Given that I'm the type who dreams of work when I'm asleep, it's sports that truly allow me to relax."

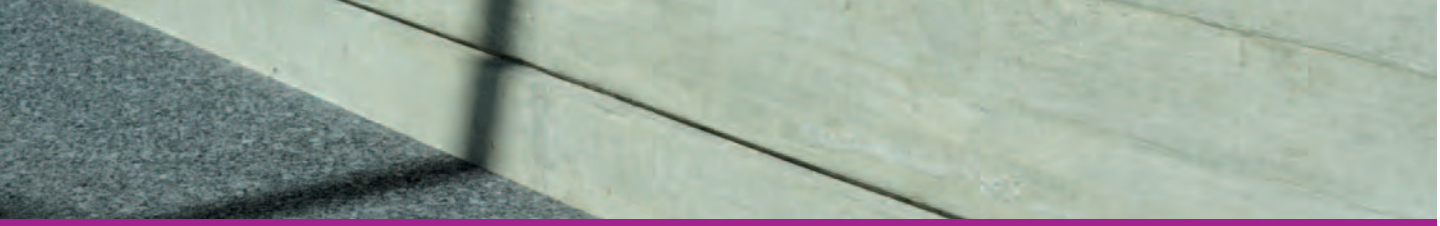
Learning French to Better Integrate

As a polyglot, Petr wanted to add a new language to his palette. He took French courses made available to Idiap staff. "If one wants to communicate with the people of a region and to integrate, it's necessary to speak their language. Today, outside the Institute, all of my friends are Swiss."

A deep attachment nevertheless keeps this young man very open to his adopted homeland. As it seems to offer him all that he needs, he rarely leaves – except to visit his parents in Brno. "From here, it takes twelve hours by car or by bus. Fortunately, I'm not in the United States!"

Highlights

2000-2001	The Schools of Technological Innovation, ESIEE (formerly Ecole supérieure d'ingénieurs en électrotechnique et électronique), Paris, France
2001-2002	Oregon Graduate Institute, Portland, USA
2003	Doctorate at the University of Brno, Czech Republic
2003-2005	Brno University of Technology, Czech Republic
2005-	Researcher at Idiap



EMPLOYEES JOINING AND LEAVING

In 2011 we saw eleven collaborators leave and sixteen join the team. Among the new arrivals are: two development engineers, one system engineer, six postdoctoral students and seven doctoral students.

JOINING US IN 2011

First Name, Last Name, Position, Country of Origin, Residence

Milos Cernak, Senior Dev. Engineer, Slovakia
Ivana Chingovska, Research Assistant, Macedonia
Marc Ferras Font, Postdoc, Spain
Kenneth Funes Mora, Research Assistant, Costa Rica
Arjan Gijsberts, Postdoc, Netherlands
Maryam Habibi, Research Assistant, Iran
Najeh Hajlaoui, Postdoc, France
Salim Kayal, Dev. Engineer, Switzerland, Ecublens
Samuel Kim, Postdoc, South Korea
Gwénolé Lecorvé, Postdoc, France
Riwal Lefort, Postdoc, France
Laurent Nguyen, Research Assistant, Switzerland, Nyon
Dimitri Palaz, Research Assistant, Switzerland, Pully
Louis-Marie Plumel, System Administrator, France
Ashtosh Sapru, Research Assistant, India
Mohammad Javad Taghizadeh, Research Assistant, Iran

MOVING ON IN 2011

First Name, Last Name, Position, Country of Origin, Year of Arrival at Idiap, New Employer

Eray Abdurrahman Baran, Research Assistant, Turkey, 2010, Faculty of engineering and Natural Sciences Mechatronics Engineering, Orhanli-Tuzla, Istanbul
Volkan Cevher, Proofessor, Turkey, 2010, EPFL, Lausanne
Cong-Thanh Do, Postdoc, Vietnam, 2010
Katayoun Farrahi, Research Assistant, Canada, 2007
Niklas Johansson, Research Assistant, Sweden, 2008
Jie Luo, Research Assistant, China, 2007, Yahoo ! Labs, California
Olivier Masson, Dev. Engineer, Switzerland, 2002, Meggit SA, Fribourg
Radu Andrei Negoescu, Research Assistant, Romania, 2007
Sree Hari Krishnan Parthasarathi, Research Assistant, India, 2007, ICSI, Berkeley, California
Hugo Augusto Penedones Fernandes, Research Assistant, Portugal, 2008
Anindya Roy, Research Assistant, India, 2007, LIMSI-CNRS, Paris
Carl Scheffler, Postdoc, Germany, 2010, Stellenbosch 7600, South Africa
Zoltan Tüske, Research Assistant, Hungary, 2010, RWTH Aachen University
Tristan Carron, System Administrator, Switzerland, 2003, Rabotage et commerce de bois du Rhône SA, Evionnaz

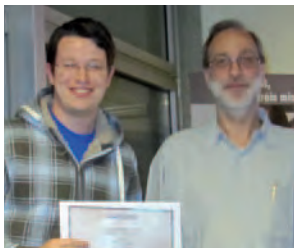
HONORS

DISTINCTIONS

Internal

Each year Idiap awards two prizes to its doctoral students. The first rewards research, the second publication. For Idiap's Research Award, the candidate is evaluated by an internal commission on the basis of five criteria: publications, teamwork, involvement in a project, ability to communicate, and autonomy. For the Publication Prize, the leadership of the institute makes an initial selection among the work for which an Idiap doctoral candidate is the primary author. The members of the Advisory Board then note, independently and anonymously, the selected publication.

In 2011 the Publication Prize was awarded to **Charles Dubout** and **Gokul Chittaranjan**, and that for Research went to **Joan Isaac Biel Tres** and **Anindya Roy**.



Charles Dubout

Gokul Chittaranjan

Publication by Charles Dubout

"Boosting with Maximum Adaptive Sampling"
Charles Dubout and Francois Fleuret
Proceedings of the Neural Information Processing Systems Conference, 2011

Publication by Gokul Chittaranjan

"Who's Who with Big-Five: Analyzing and Classifying Personality Traits with Smartphones"
Gokul Chittaranjan, Jan Blom and Daniel Gatica-Perez
International Symposium on Wearable Computing, page 8, 2011

Joan Isaac Biel Tres

Anindya Roy

External

This year Idiap wishes to acknowledge the brilliant participation of its researchers at international conferences. The quality of their research was rewarded with three awards to: **Lakshmi Saheer**, **Trinh-Minh-Tri Do** and **Daniel Gatica-Perez**.

Lakshmi Saheer

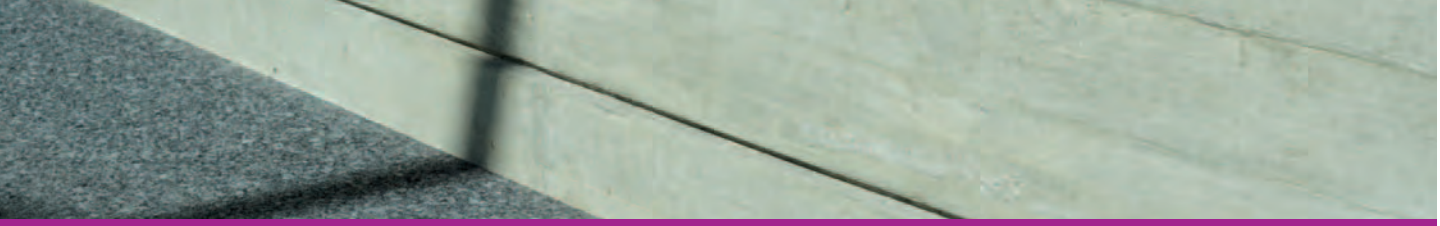
Scholarship 2010, Google Anita Borg Memorial Scholarship, June 2011

Trinh-Minh-Tri Do and Daniel Gatica-Perez

Best Paper Award, IEEE International Symposium on Wearable Computers, June 2011
"GroupUs: Smartphone Proximity Data and Human Interaction Type Mining"

Trinh-Minh-Tri Do and Daniel Gatica-Perez

Best Paper Runner Up Award, IEEE International Conference on Mobile Data Management, June 2011
"Contextual Grouping: Discovering Real-life Interaction Types from Longitudinal Bluetooth Data"



COMPLETED THESES

Six students completed a thesis in 2011: Dinesh Babu Jayagopi, Katayoun Farrahi, Radu Andrei Negoescu, Anindya Roy, Sree Hari Krishnan Parthasarathi, Jie Luo

- **Computational Modeling of Face-to-face Social Interaction using Nonverbal Behavioural Cues**
  Dinesh Babu Jayagopi, January 25, 2011
  Thesis director: Dr. Daniel Gatica-Perez
  Members of the Thesis Committee: Fabio Pianesi, Prof. Anton Nijholt, Prof. Jean-Philippe Thiran

- **A Probabilistic Approach to Socio-Geographic Reality Mining**
  Katayoun Farrahi, March 9, 2011
  Thesis director: Dr. Daniel Gatica-Perez
  Members of the Thesis Committee: Prof. Alex Pentland, Juha Laurila, Prof. Pascal Frossard

- **Modeling and Understanding Communities in online Social Media Using Probabilistic Methods**
  Radu Andrei Negoescu, May 9, 2011
  Thesis director: Dr. Daniel Gatica-Perez
  Members of the Thesis Committee: Prof. Susanne Boll, Dr. Roelof van Zwol, Prof. José del R. Millàn

- **Boosting Localized Features for Speaker and Speech Recognition**
  Anindya Roy, October 6, 2011
  Thesis directors: Prof. Hervé Bourlard, Dr. Sébastien Marcel
  Members of the Thesis Committee: Prof. Jean-Philippe Thiran, Dr. Jan Cernocky, Prof. Nicholas Evans

- **Privacy-Sensitive Audio Features for Conversational Speech Processing**
  Sree Hari Krishnan Parthasarathi, November 4, 2011
  Thesis directors: Prof. Hervé Bourlard, Dr. Daniel Gatica-Perez
  Members of the Thesis Committee: Prof. Daniel P. W. Ellis, Prof. Simon King, Prof. Andrzej Drygajlo

- **Open-ended Learning of Visual and Multi-modal Patterns**
  Jie Luo, November 4, 2011
  Thesis directors: Prof. Hervé Bourlard, Dr. Barbara Caputo
  Members of the Thesis Committee: Dr. Samy Bengio, Prof. Aude Billard, Prof. Bastian Leibe

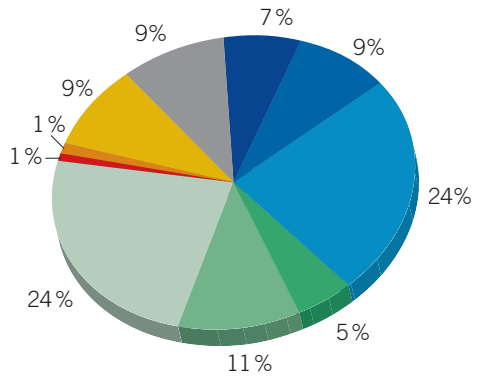
FINANCES

OPERATING ACCOUNTS

(Swiss francs)	2010	2011	%
INCOME			
City of Martigny	600,000	650,000	6.55%
Canton of Valais	900,000	900,000	9.06%
Swiss Confederation	1,795,000	2,357,000	23.74%
EPFL contribution	72,000	72,000	0.73%
NCCR IM2 projects	776,520	533,900	5.38%
Swiss National Science Foundation projects	1,271,946	1,072,445	10.80%
European Commission projects	2,342,794	2,390,855	24.08%
CTI projects	151,426	105,135	1.06%
Industrial financing	429,354	943,656	9.50%
Other income / Extraordinary income	536,579	903,443	9.10%
TOTAL INCOME	**8,875,619**	**9,928,434**	**100.00%**
EXPENSES			
Personnel expenses	6,592,844	7,520,332	75.75%
Education and travel	498,747	473,803	4.77%
Third party expenses	45,896	119,968	1.21%
Computer equipment and maintenance	208,950	237,787	2.40%
Administrative costs	187,167	159,423	1.60%
Promotion and communication / 20th anniversary	57,814	241,641	2.43%
Rent	871,114	872,967	8.79%
Depreciation	551,250	290,622	2.93%
Exceptional expenses	-	40,000	0.40%
TOTAL EXPENSES	**9,013,782**	**9,956,543**	**100.28%**
OPERATING PROFIT / LOSS	**-138,163**	**-28,109**	**-0.28%**

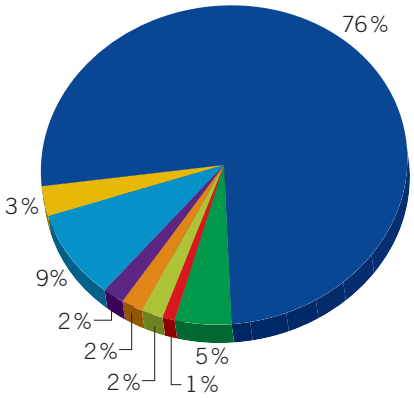
SOURCES OF FUNDS / COSTS / COMMENTS

Distribution of Sources of Financing



- City of Martigny
- Canton of Valais
- Swiss Confederation
- NCCR IM2 projects
- Swiss National Science Foundation projects
- European Commission projects
- CTI projects
- EPFL contribution
- Industrial financing
- Other income / Extraordinary income

Distribution of Costs



- Personnel expenses
- Education and travel
- Third party expenses
- Computer equipment and maintenance
- Administrative costs
- Promotion and communication / 20th anniversary
- Rent
- Depreciation

Comments on the 2011 Accounts

After two years marked by a slight decline in revenues (2009 -1.30%, 2010 -6.18%), Idiap cycled through 2011 with a strong increase of +11.86% over the previous year. Although the Insitute didn't pass the symbolic figure of 10 million Swiss francs, it is projected to do so in 2012. The most significant progress came from industrial projects. Note that the share of subsidies is within the strategic goal of 39.5%. The costs of the 20th anniversary celebration – around 200,000 – had been set aside the previous year. Unlike in 2010, the combination of a grant of 2,357,000 from SER and tighter management of funds meant that the strength of the franc didn't impact the 2011 accounts. The one-time charge of 40,000 comes from the reduced participation in the organization, IdeArk SA.

Swiss Confederation, Canton, Municipality Subsidies

(In thousands of Swiss francs)

YEAR	2008	2009	2010	2011	Total
Confederation	900	1,510	1,795	2,357	**6,562**
Canton	1,200	1,000	900	900	**4,000**
Municipality	550	600	600	650	**2,400**

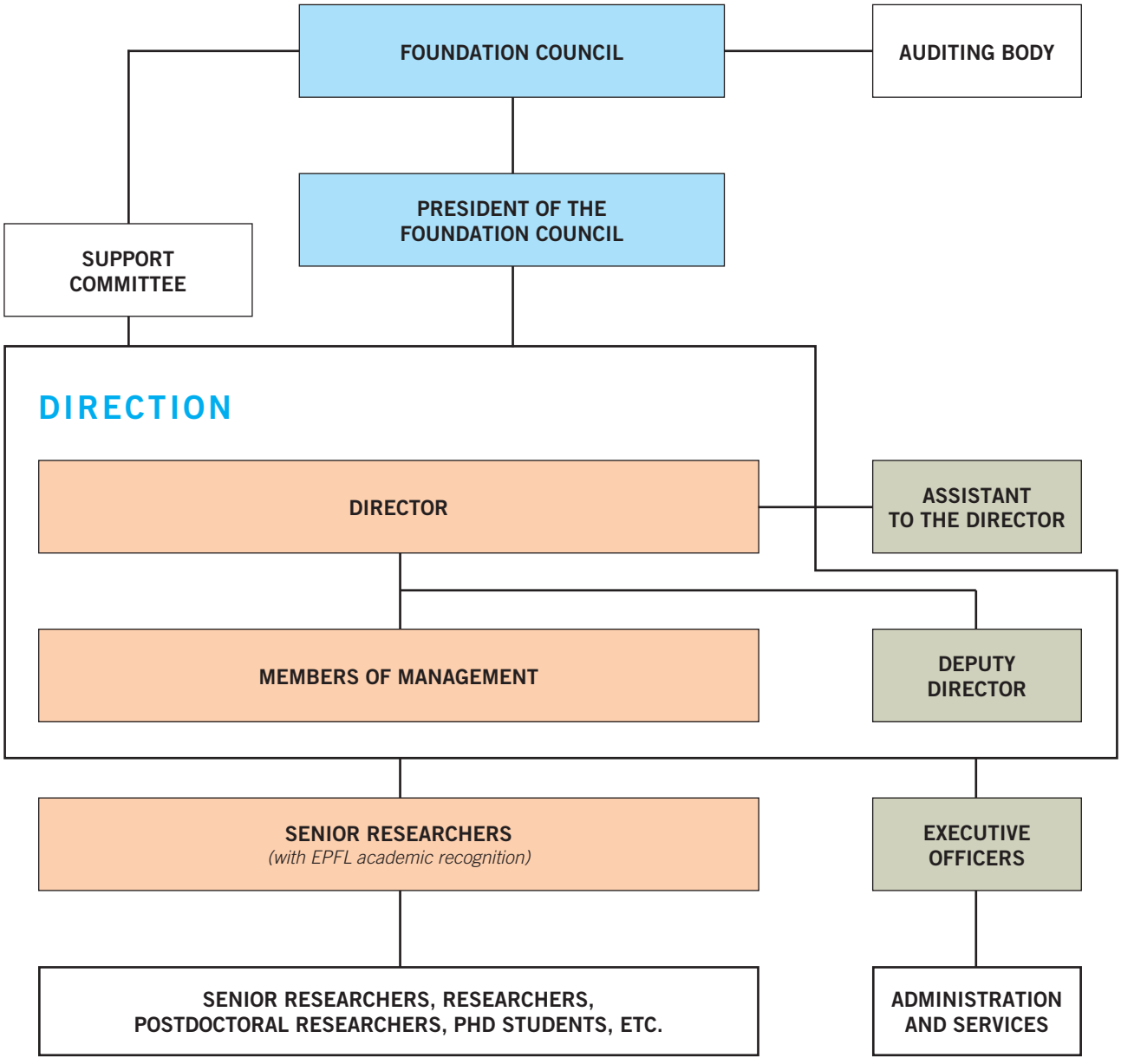
Following the agreement signed with the State Secretariat for Education and Research (SER), which provides for a gradual increase in the federal subsidy, the Canton of Valais and the Town of Martigny have agreed to provide together an almost equivalent amount, in accordance with the distribution given in the table above.

BALANCE SHEET

(Swiss francs)	31.12.2010	31.12.2011
ASSETS		
Cash	2,812,924.45	2,443,047.24
Accounts receivables	231,089.80	499,887.55
Accrued income and other	862,331.54	3,016,530.83
TOTAL CURRENT ASSETS	**3,906,345.79**	**5,959,465.62**
Equipment	446,073.15	523,402.89
Financial assets	50,000.00	10,000.00
TOTAL NON-CURRENT ASSETS	**496,073.15**	**533,402.89**
TOTAL ASSETS	**4,402,418.94**	**6,492,868.51**
LIABILITIES		
Accounts payable	279,750.32	461,687.65
Accrued expense	2,477,046.45	4,583,667.75
Provisions	471,000.00	301,000.00
TOTAL FOREIGN FUNDS	**3,227,796.77**	**5,346,355.40**
Share capital	40,000.00	40,000.00
Special reserve	1,000,000.00	1,000,000.00
Retained earnings	272,784.82	134,622.17
Net income	-138,162.65	-28,109.06
TOTAL OWN FUNDS	**1,174,622.17**	**1,146,513.11**
TOTAL LIABILITIES	**4,402,418.94**	**6,492,868.51**

ORGANIZATION

ORGANIZATIONAL CHART



The Scientific Board, comprised of all the professors and senior lecturers (MER), ensures the scientific management of Idiap, particularly regarding recruitment, positioning, and partnerships.

The Administrative Board is comprised of finance, human resources, industrial relations and public relations managers, as well as project, infrastructure and IT managers.

EMPLOYEES

Scientists

First Name, Last Name, Position, Country of Origin, Residence, Year of arrival

Oya Aran Karakus, Postdoc, Turkey, 2009
Afsaneh Asaei, Research Assistante, Iran, 2008
Constantin-Cosmin Atanasoaei, Research Assistant, Romania, 2008
Venkatesh Bala Subburaman, Research Assistant, India, 2007
Joan Isaac Biel Tres, Research Assistant, Spain, 2008
Hervé Bourlard, Director, Belgium, 1996
Barbara Caputo, Senior Research Scientist, Italy, 2005
Cheng Chen, Postdoc, China, 2010
Ivana Chingovska, Research Assistant, Macedonia, 2011
Ronan Collobert, Research Scientist, France, 2010
John Dines, Research Scientist, Australia, 2003
Trinh-Minh-Tri Do, Postdoc, Vietnam, 2009
Charles Dubout, Research Assistant, Switzerland, Renens, 2009
Stefan Duffner, Postdoc, Germany, 2008
Laurent El Shafey, Research Assistant, France, 2010
Rémi Emonet, Postdoc, France, 2010
Marc Ferras Font, Postdoc, Spain, 2011
François Fleuret, Senior Research Scientist, France, 2007
Marco Fornoni, Research Assistant, Italy, 2010
Kenneth Funes Mora, Research Assistant, Costa Rica, 2011
Philip Garner, Senior Research Scientist, England, 2007
Daniel Gatica-Perez, Senior Research Scientist, Mexico, 2002
Arjan Gijsberts, Postdoc, Netherlands, 2011
Maryam Habibi, Research Assistant, Iran, 2011
Najeh Hajlaoui, Postdoc, France, 2011
Alexandre Heili, Research Assistant, France, 2010
David Imseng, Research Assistant, Switzerland, Rarogne, 2009
Dinesh Babu Jayagopi, Research Assistant, India, 2007
Vasil Khalidov, Postdoc, Russia, 2010
Samuel Kim, Postdoc, South Korea, 2011
Danil Korchagin, Postdoc, Russia, 2008
Gwénolé Lecorvé, Postdoc, France, 2011
Leonidas Lefakis, Research Assistant, Greece, 2010
Riwal Lefort, Postdoc, France, 2011
Hui Liang, Research Assistant, China, 2008
Mathew Magimai Doss, Research Scientist, India, 2007
Sébastien Marcel, Senior Research Scientist, France, 2000
Christopher McCool, Postdoc, Australia, 2008
Thomas Meyer, Research Assistant, Switzerland, Martigny, 2010
Gelareh Mohammadi, Research Assistant, Iran, 2009
Petr Motlicek, Research Scientist, Czech Republic, 2005
Laurent Nguyen, Research Assistant, Switzerland, Nyon, 2011
Jean-Marc Odobez, Senior Research Scientist, France/Switzerland, Clarens, 2001
Dimitri Palaz, Research Assistant, Switzerland, Pully, 2011
Andrei Popescu-Belis, Senior Research Scientist, France/Romania, 2007
André Rabello Dos Anjos, Postdoc, Brazil, 2010
Ramya Rasipuram, Research Assistant, India, 2010
Edgar Francisco Roman Rangel, Research Assistant, Mexico, 2008
Lakshmi Saheer, Research Assistant, India, 2008
Dairazalia Sanchez-Cortes, Research Assistant, Mexico, 2009
Ashtosh Sapru, Research Assistant, India, 2011
Samira Sheikhi, Research Assistant, Iran, 2010
Serena Soldo, Research Assistante, Italy, 2009
Nicolae Suditu, Research Assistant, Romania, 2008
Gokul Thattaguppa Chittaranjan, India, 2010
Tatiana Tommasi, Research Assistant, Italy, 2008
Fabio Valente, Research Scientist, Italy, 2005
Jagannadan Varadarajan, Research Assistant, Indiy, 2008
Alessandro Vinciarelli, Senior Research Scientist, Italy, 1999
Roy Geoffrey Wallace, Postdoc, Australia, 2010
Majid Yazdani, Research Assistant, Iran, 2008
Sree Harsha Yella, Research Assistant, India, 2010

Development Engineers

Philip Abbet, Senior Dev. Engineer, Switzerland, Conthey, 2006
Olivier Bornet, Senior Dev. Engineer, Switzerland, Nendaz, 2004
Milos Cernak, Senior Dev. Engineer, Slovakia, 2011
Salim Kayal, Dev. Engineer, Switzerland, Ecublens, 2011
Christine Marcel, Dev. Engineer, France, 2007
Florent Monay, Dev. Engineer, Switzerland, Monthey, 2008
François Moulin, Dev. Engineer, Switzerland, Vollèges, 2009
Alexandre Nanchen, Dev. Engineer, Switzerland, Martigny, 2008
Flavio Tarsetti, Dev. Engineer, Switzerland, Martigny, 2008

Administrative staff

Céline Aymon Fournier, Public Relations, Switzerland, Fully, 2004
Valérie Devanthéry, Program Manager, Switzerland, Sion, 2008
Christophe Ecoeur, Financial Assistant, Switzerland, Collombey, 2010
Jean-Albert Ferrez, Deputy Director, Switzerland, Verbier, 2001
Pierre Ferrez, Program Manager, Switzerland, Verbier, 2004
François Foglia, Director Adjunct, Switzerland, Saxon, 2006
Edward-Lee Gregg, Financial Manager, United States, 2004
Sylvie Millius, Administrative Assistant, Switzerland, Vétroz, 1996
Yann Rodriguez, Industrial Relations, Switzerland, Martigny, 2006
Nadine Rousseau, Administrative Assistant, Belgium, 1998

System Engineers

Bastien Crettol, System Administrator, Switzerland, Sion, 2005
Norbert Crettol, System Administrator, Switzerland, Martigny, 2002
Cédric Dufour, System Administrator, Switzerland, Verbier, 2007
Frank Formaz, System Manager, Switzerland, Fully, 1998
Louis-Marie Plumel, System Administrator, France, 2011
Vincent Spano, Webmaster, Switzerland, Martigny-Combe, 2004

Interns

First Name, Last Name, Country of Origin, Home Institution

Idiap interns generally spend between six and ten months at the research institute. Some are students at EPFL (Ecole polytechnique fédérale de Lausanne) and do this work placement as part of their degree. Others come on student exchange programs set up with European projects in which Idiap participates.

Maël Bonvin, Switzerland, Collège des Creusets, Sion
Murali Mohan Chakka, India, Indian Institute of Technology, Madras, India
Mitra Fatemi, Iran, Sharif University of Technology, Tehran, Iran
Manon Fournier, Switzerland, Collège de l'Abbaye, St-Maurice
Mohsen Kaboli, Iran, KTH University, Stockholm, Sweden
Mary Knox, United States, ICSI Berkeley, California, USA
Teodora Kostic, Serbia, Belgrade University, Serbia
Jeevanthi Liyanapathirana, Sri Lanka, University of Colombo, School of Computing, Sri Lanka
Alvaro Marcos, Spain, University of Alcala, Spain
Mitchell McLaren, Australia, Queensland University of Technology, Brisbane, Australia
Mehdi Mirza Mohammadi, Iran, University of Barcelona, Spain
Mert Ozcan, Turkey, Département du Génie Electrique et Electronique (D-ITET), ETHZ, Zürich, Switzerland
Sriram Prasath Elango, India, National Institute of Technology (NIT), Bhopal, India
Moussa Sandou, Ivory Coast, EPFL, Lausanne
Georgios Skoumas, Greece, University of Cambridge, Darwin Collège, United Kingdom
Elham Taghizadeh, Iran, Sharif University of Technology, Tehran, Iran
Romain Tavenard, France, Université de Rennes I, IRISA-INRIA, France
Kelly Tiraboschi, Switzerland, Collège de l'Abbaye, St-Maurice
Hemant Tyago, India,
Fen Zheng, China, Karlsruhe Institut für Technology (KIT), Karlsruhe, Germany

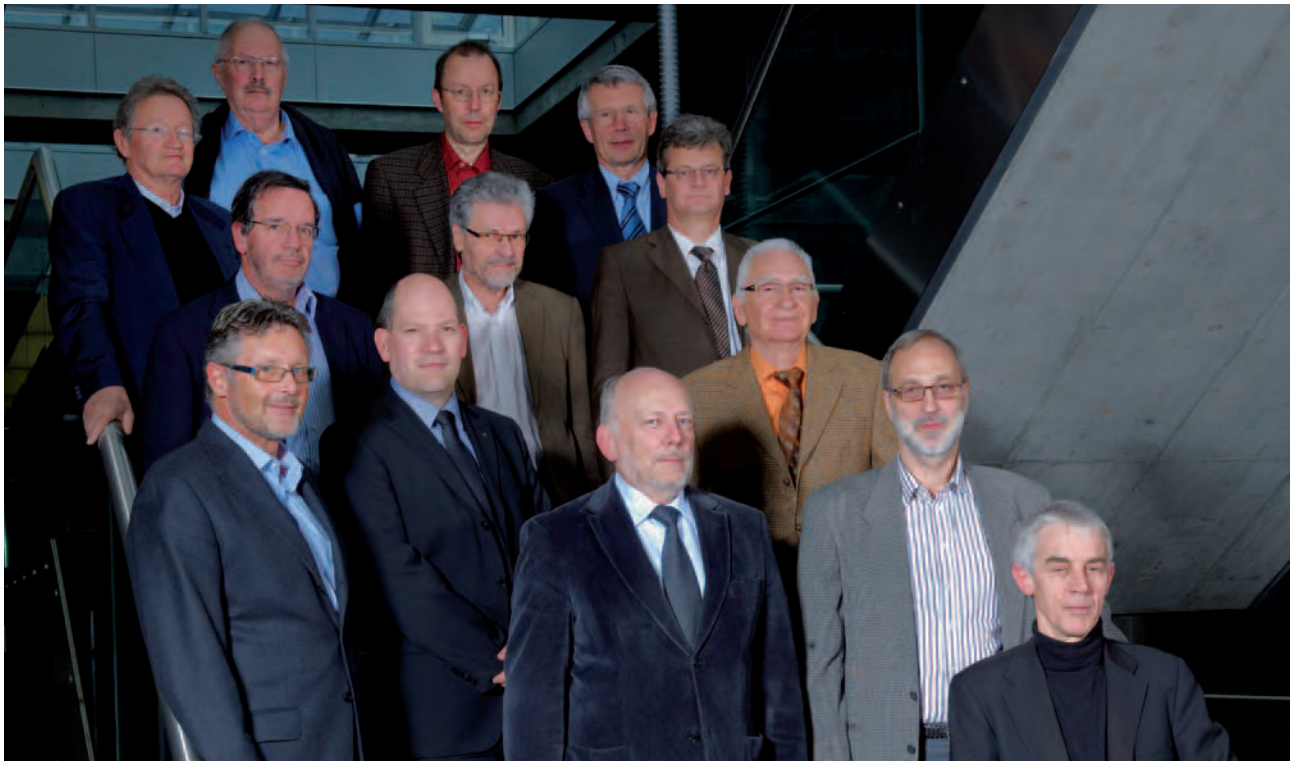
Visitors

First Name, Last Name, Home Institution

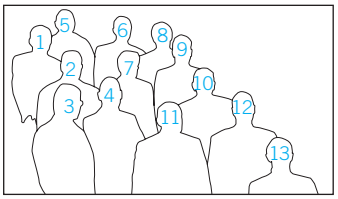
Visitors are researchers or manufacturers who only spend a few days or weeks at the institute, some to strengthen inter-institutional relationships and others to get an insight into the work carried out by the institute.

Hamid R. Abutalebi, Yazd University, Iran
Elie El Khoury, Université de Toulouse, France

FOUNDATION COUNCIL



The Foundation Council is responsible for the economic and financial management of Idiap. The Council defines the structure of the research institute, appoints its director, and generally defends its interests, ensuring the successful development of Idiap.



11 **Olivier Dumas,** President
Director of Electricité Emosson SA

3 **Jean-Daniel Antille,** Vice-President
Manager of the Regional Office for the Economic Development of French-speaking Valais

13 **Prof. Martin Vetterli,** Vice-President
Dean of the School of Information and Communications (IC), EPFL (Ecole polytechnique fédérale de Lausanne)

7 **Jean-Pierre Rausis,** Secretary
Managing Director of BERSY Consulting

12 **Prof. Hervé Bourlard**
Director of Idiap

4 **Dr. Jean-Albert Ferrez**
Deputy Director of Idiap

10 **Josy Cusani**
President of CimArk SA

1 **Prof. Jean-Jacques Paltenghi**
Adviser to the President,
EPFL (Ecole polytechnique fédérale de Lausanne)

5 **Pierre Crittin**
Notary

8 **Walter Steinlin**
Director of Swisscom Outlook
President of the Commission for Technology and Innovation (CTI)

9 **Stefan Bumann**
Head of Higher Education, State of Valais

2 **Prof. Christian Pellegrini**
Senior Member of the Foundation Council of Idiap
Honorary Professor in the Faculty of Sciences at the University of Geneva

6 **Daniel Forchelet**
Adjunct General Secretary CIIP (Conférence intercantonale de l'instruction publique de la Suisse romande et du Tessin)

Dr. Bertrand Ducrey (not pictured)
Director of Debio Pharmaceutical Research SA

Jean-René Germanier (not pictured)
National Councilor

Marc-Henri Favre (not pictured)
President of the Town of Martigny

ADVISORY BOARD

The Advisory Board is comprised 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 advice is frequently sought and proves to be invaluable when making decisions regarding research, training, and technology transfer.

Dr. Jordan Cohen
Independent Consultant, Spelamode
Half Moon Bay, CA, USA

Prof. Dr Donald Geman
Professor of Mathematics, Johns Hopkins University
Baltimore, MD, USA

Dr. John Makhoul
Chief Scientist, Speech and Signal Processing, BBN Technologies,
Cambridge, MA, USA

Prof. Dr Nelson Morgan
Deputy director (and former director) of the International Computer Science Institute (ICSI)
Berkeley, CA, USA

Dr. David Nahamoo
Senior Manager, Human Language Technologies, IBM Research
Yorktown Heights, NY, USA

Prof. Gerhard Sagerer
Rector, Bielefeld Universität
Germany

Dr. Roelof van Zwol
Senior Research Scientist, Multimedia, Audience Sciences, Yahoo! Research
Santa Clara, CA, USA

Prof. Dr. Bayya Yegnanarayana
rofessor and Microsoft Chair, International Institute of Information Technology (IIIT)
Hyderabad, India

"IDIAP IS AMONG THE BEST INSTITUTES I HAVE WORKED WITH IN OVER 30 YEARS OF EXPERIENCE."

Prof. Dr Bayya Yegnanarayana
Microsoft Chair, International Institute of Information Technology (IIIT), Hyderabad, India

At the end of 2011, your institute signed a Memorandum of Understanding (MoU) with Idiap. What does this signify for you?

The signing of the MoU between IIIT and Idiap makes official, from both sides, our collaboration of the past several years. It also allows us to clearly signify that this mutually beneficial collaboration will be actively pursued in future.

You have been a member of the Idiap Advisory Board since 2007. What are your thoughts on the evolution of this (small) research institute?

I have been observing the growth of Idiap for a long time, beginning a decade ago when three of my students joined the PhD program. In the meantime, as member of the Idiap Advisory Board, I have seen a clear progress in the Institute's research results as demonstrated by Idiap's high-quality scientific publications over the past few years.
I am also very impressed by the dedication of the Idiap scientists to addressing new challenges, not only related to speech and image signals, but also in social signal processing – a recently emerging field.

How would you rate the international standing of the institute?

In my opinion, Idiap is an exceptionally good research institute on the international level. I am not able to give any particular rating, but I feel that Idiap is among the best institutes I have worked with in over 30 years of experience.

What do you think of the humanistic dimension that Idiap brings, as often as possible, to its research? Of its goal to use research to improve the quality of life for human beings?

I think the research group at Idiap is consciously addressing issues that are most relevant to the current and future generations, especially regarding issues that come with the growth of technology.

Do you think that Switzerland, in spite of its small size and its position outside the European Commission, has a role to play in the world research?

This is an important point. Having known Switzerland and Idiap for the past several years, I strongly feel that places like Idiap should address issues that are relevant to larger populations. Some of the solutions that are applicable in smaller countries do not necessarily work in a complex country like India. What I have in mind is the communication issues in a complex multilingual society like in India, or the gap between new technology and society. These issues need to be addressed by institutes like Idiap. This would require, for both institutes, a presence in the partner country that goes beyond the current collaboration.

Would you like to add something?

I would like to see a center like Idiap set up an antenna in India in order to have a direct approach to socially relevant problems. The researchers could then be in direct contact with real conditions, instead of simulating the environment. This would be the best way to show the world the relevance of our combined research efforts. But I don't know how to make this happen.

MAIN PARTNERS

TOWN OF MARTIGNY

CANTON OF VALAIS

SWISS CONFEDERATION
State Secretariat for Education and Research (SER)

Loterie Romande

www.loterie.ch

swisscom

www.swisscom.com

Groupe Mutuel
Assurances
Versicherungen
Assicurazioni

Swiss Power Group.

www.groupemutuel.ch

EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

www.epfl.ch

the ark

www.theark.ch

ideark

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IDIAP RESEARCH AREAS: HUMAN AND MEDIA COMPUTING

To face its continuous growth and diversification in different, related, research directions, while still fostering internal multi-disciplinary collaborations, Idiap reorganized its internal structuring of its research themes along the following dimensions. Idiap has thus changed/adapted the way it presents itself and describes its current activities, to take into account the new areas of development not only towards human-computer interaction but also toward human-to-human interaction, collaboration, behavior, and innovation. Thus, after several (13) years of positioning itself under the general theme of "Multimodal human-computer interaction", Idiap decided to officially cover a larger research domain, now referred to as "**Human and Media Computing**".

Articulated around our current activities, "Human and Media Computing" now covers the following research themes:

- **Perceptual and cognitive systems**: Speech processing; Natural language understanding and translation; Document and text processing; Vision and scene analysis; Multimodal processing; Cognitive sciences and Robotics.

  Idiap combines its multi-disciplinary expertise to advance the understanding of human perceptual and cognitive systems, engaging in research on multiple aspects of human-computer interaction with computational artefacts such as natural language understanding and translation, document and text processing, vision and scene analysis (with a particular emphasis on human sensing), multimodal interaction, computational cognitive systems, robotics, and methods for automatically training such systems.

  As evidenced in the present report, new major trends and developments at Idiap are now directed towards multilingual speech processing (multilingual speech recognition and synthesis), text-level machine translation and, possibly later, speech-to-speech translation.

  Building on Idiap's expertise in audio-visual processing, machine learning and robotics, there is also more and more emphasis on new activities in monitoring and autonomous robots able to build semantic spatial representations for indoor environments, updating continuously such representation taking advantage of incoming data as well as of prior experience from other robots. Furthermore, we are making significant contributions in the emerging area of advanced prostheses, leveraging on Idiap's expertise in robotics, brain-computer interface and machine learning.

- **Social/human behavior**: Social media; Mobile media; Social interaction analysis; Social signal processing.

  This area spans methods for analyzing human and social behavior from a variety of information sources with the goals of understanding social phenomena and developing human-centered applications. Idiap has investigated new approaches for behavioral analysis in face-to-face communication, online interaction in social media sites like YouTube, and smartphone-mediated interaction.

  Continued projects include LS-CONTEXT (a long-term collaboration on smartphone sensing and data mining with Nokia Research that resulted in two Paper Awards in 2011); SONVB (a SNSF Sinergia interdisciplinary project featured in the Digital Life issue of the official SNSF Research Magazine); and VlogSense (funded by the NCCR IM2). New projects that started in 2011 include NISHA (in collaboration with NTT Communication Science Labs, Japan) and SOBE (a SNSF Ambizione Fellowship Grant). Idiap also worked together with the University of Geneva on an NCCR proposal towards creating a new type of Social Computer.

- **Information interfaces and presentation**: Multimedia information systems, User interfaces; System evaluation.

  Information processing by computers must be accompanied by human-computer interfaces that present information and receive input in an efficient and usable way, possibly acquiring information from users in a non-disruptive way. Current research directions at Idiap focus on multimedia information systems, search and recommendation, and interactive information retrieval, and several new projects are currently being initiated in those directions.

- **Biometric person recognition**: Face recognition (detection-localization–identification-verification); Speaker identification and verification; Multimodal biometric person recognition; Countermeasures to spoofing attacks.

  Biometric person recognition refers to the process of automatically recognizing a person using distinguishing behavioral patterns (gait, signature, keyboard typing, lip movement, hand-grip) or physiological traits (face, voice, iris, fingerprint, hand geometry, EEG, ECG, ear shape, body odor, body salinity, vascular).

  Idiap is currently a recognized leader in that field, fully exploiting our multidisciplinary expertise in image processing, computer vision, pattern recognition and machine learn-

ing. After the end of the MOBIO EU project, this leadership Idiap–EPFL Joint Development Plan – 2011 Activity Report (PART 1) page 9/35 was confirmed in 2011 by the granting of new large EU projects, like the ICT project TABULA RASA and the SECURITY project BEAT. In 2011, Idiap and EPFL also worked together to initiate a joint NCCR proposal for a "Swiss Center for Biometric Security".

- **Machine learning**: Statistical and neural network based machine learning; Computational efficiency, targeting real-time applications; Very large datasets; Online learning.

  Research in machine learning aims at developing computer programs able to learn from examples. Instead of relying on a careful tuning of parameters by human experts, machine-learning techniques use statistical methods to directly estimate the optimal setting, which can hence have a complexity beyond what is achievable by human experts.

  Today, Idiap is also recognized as a key leader in that field with new trends towards "collaborative machine learning", deep neural network architectures, and large-scale distributed learning algorithms. Real-life applications include end-to-end spoken-term detection (see the DeepSTD project), Natural Language Processing with a particular interest in semantic analysis (SemTex project, in collaboration with NEC Research, USA) and large-scale distributed web search (SODS).

1. Machine learning and signal processing

Leading researchers: François Fleuret, Barbara Caputo, Ronan Collobert

Machine learning still plays a central place in all Idiap's activities, both as a common tool to solve very large, real-life, real-scale problems, and as a research topic.

Machine learning is applied with great success to research areas such as the automatic analysis of social behavior, large-scale human behavior modeling, or autonomous cognitive agents, where we pioneer the use of sophisticated multi kernel online learning algorithms for building semantic representations of space. Generic tools developed at Idiap are publicly available through http://www.torch.ch, and keep being regularly enhanced and updated.

The MASH project (initiated and coordinated by Idiap) funded by the EU (http://mashproject.eu), and the VELASH project funded by the SNF, are investigating the collaborative development of machine learning with very large families of features extractors. They both aim at developing novel tools to allow large groups of individuals to design jointly very complex intelligent systems for computer vision and robotics. With a total workforce of more than 400 person-months, this research initiative will provide key results on the potential of such approaches for the next-generation artificial intelligence.

Innovative work on machine learning applied to the control of non-invasive prosthetics device has been initiated in 2011. The projects NinaPro, funded by SNF, and the ToAdapt project, funded by the Hasler foundation, aim at paving the way to the next generation of dexterous and easy to control prosthetic hands. Central to this progress will be the use of state of the art transfer learning algorithms, able to ease the burden of controlling the prosthesis by the patient.

Leveraging Unlabeled Data

Hand-labeling data remains an expensive task in many cases. It motivates research for leveraging the cheap and basically infinite source of unlabeled speech, text or images available in the digital world. Classical semi-supervised learning and transduction are machine learning classification techniques able to handle labeled and unlabeled data, which assume each unlabeled example belongs to one of the labeled classes that are considered. Finding ways to adapt and scale these methods to real large-scale problems is a challenge we are interested in, here at IDIAP. We are also investigating other ways to leverage unlabeled data, like for e.g. transfer learning (a fully unsupervised task can learn interesting representations for a supervised task).

Deep Learning

Real complex tasks require complex learning models. A wide range of approaches can be considered between two extremes: (i) use complex features and a simple learning algorithm, or (ii) use simple features and a complex learning algorithm. Deep architectures are an implementation of approach (ii), which stacks several layers of data representations with an increasing level of abstraction. Training these representations is extremely challenging as it implies training highly non-linear and non-convex models. At Idiap, we are currently interested in applications in Natural Language, Image and Speech processing.

Information Organization and Retrieval

With fast growing Internet resources, automatic information extraction and information organization from documents is crucial concern. Our research aims at marrying natural language processing and information retrieval in this context. It requires not only finding new fast natural language processing algorithms able to scale to billions of documents but also new techniques to implement semantic knowledge in document-query distances.

Online learning for autonomous systems

In order to be able to cope with the intrinsic complexity of realistic settings, robots need knowledge representations that are continuously updated in time. From the algorithmic point of view, this means developing approaches for online learning that maintain a good performance over time, have a low algorithmic complexity and can manage the large amount of incoming data without a memory explosion. This understanding has led to a kernel algorithm for high-level cue integration that permits to evaluate the confidence level of the prediction label on the incoming data. This knowledge permits the algorithm to decide how much information to use at each single step, and the development of approximate and exact discriminative methods for incremental and online learning that provide good accuracy while controlling the growth of the memory size and updating the internal representation at a speed compatible with the needs of intelligent agents.

2. Audio and speech processing

Leading researchers: Hervé Bourlard, Phil Garner, John Dines, Mathew Magimai Doss, Petr Motlicek, Fabio Valente, Ronan Collobert

Idiap keeps being recognized as one of the key leading institutions in audio and speech processing and retains an expertise in areas such as improved robustness, better modeling of the time/frequency structure of the speech signal, portability across new applications, automatic adaptation, confidence measures, keyword spotting, out-of-vocabulary words, acoustic modeling of temporal dynamics and speaker turn detection (using acoustic features and/or source localization features). Besides further development, and adaptation to multiple applications, the resulting leading edge software (acoustic feature extraction and continuous speech recognition) are currently being released through open source libraries:

- "Tracter" Audio processing (incl. beamforming, acoustic feature extraction): see http://juicer.amiproject.org/tracter/ for more information.
- "Juicer" Continuous Speech Recognition: http://juicer.amiproject.org/juicer/ for more information.

On the audio processing side, Idiap keeps being active in the field of speaker diarization, that is the task consisting in annotating temporal regions of audio recordings with labels indicating "who spoke when". The problem of diarizing audio and speech address two simultaneous tasks, 1) inferring the number of speaker/sources in the stream and 2) associating a label to each speech region. Diarization of real-world data still presents several challenges coming from the nature of the audio content itself (e.g., spontaneous conversations with several overlaps between speakers and short speaker turns) and of the quality of the recording (far-field audio recorded with microphone arrays or poor quality audio as in audio archives of cultural heritage).

A first version of the Information Bottleneck diarization system has been consolidated as toolkit and publicly released under GPL license (http://www.idiap.ch/scientificresearch/ resources/speaker-diarization-toolkit). The open source code is expected to grow in next years. On the research side, current efforts include:

- The use of multiple sources of information (localization information, combination of different diarization systems, robust speech features), investigated in the context of IM2.
- The diarization of spontaneous overlapping speech as it occurs in meetings (SNF-RODI project) or in debates (SSPnet project).
- The structuring and the segmentation of historical recordings from the Swiss cultural heritage archives (Hasler SESAME project).

Microphone arrays (currently being extended to ad-hoc microphone arrays) continue to be an important research topic. Idiap is well known for work in the past involving microphone arrays in meetings. Current requirements are focused more on social signal processing (in SSPnet and IM2), and on family scenarios (as in TA2). Recently the array work has followed two complementary threads. In the first thread, sparse techniques are being investigated. Such techniques capitalise on the unique spectral structure of speech to allow source separation and localisation using very few microphones. In the second complementary thread, we are looking at ad-hoc microphone arrays; i.e., those that can be formed from microphones positioned arbitrarily instead of in regular patterns. Ad-hoc arrays are potentially of great benefit when microphones on different devices can be pooled together, taking advantage of the way modern devices such as phones and tablets are used in meetings and social settings.

Our research interest in speech processing also involves automatic detection of keywords, i.e. to identify words (or phrases) of interest in unconstrained speech recordings. Several complementary approaches have been defined in last years, starting with although simple but real-time acoustic key-word spotter. Further, Large Vocabulary Continuous Speech Recognition (LVCSR) based key-word spotting system utilizing acoustic and language models built within the AMI and AMIDA projects (http://www.amiproject.org) was further improved and later exploited across different works, i.e., as an input in human interaction modeling.

Idiap has started collaboration with Armasuisse in domain of very low bit-rate speech coding. In the first phase of the project, a pilot application has been developed. The general idea is to exploit a speech recognizer on the encoder side to classify input speech into various units. At the decoder side, a speech synthesis takes part and the speech is re-created using a dictionary (representing the units classified at the encoder). In fact, various types of speech recognition and speech syntheses approaches were tested. In the first version of the speech coder, the ASR over automatically determined speech units was used together with Harmonic/Noise Model based speech synthesis. In the second version, word-based ASR was used followed by HMM based speech synthesis. Both approaches allow for speech compression with reasonable kind of quality of reconstructed speech with bit-rates starting from 200 bits/s.

Researchers from Idiap are involved in a project Kaldi (http://kaldi.sourceforge.net). The projects goal is to develop and implement a new open source platform for research and development around ASR and particularly LVCSR. Such the platform is intended to allow for applying new techniques in acoustic and language modeling.

In collaboration with Samsung Inc. (South Korea), Idiap has commenced a research in new acoustic modeling and acoustic adaptation techniques by using the Kaldi platform. The main goal of this collaboration is to focus on Subspace Gaussian Mixture Models (SGMMs) and to apply them in tasks such as "acoustic adaptation over different domains".

3. Image and video processing and analysis

Leading researchers: Daniel Gatica-Perez, Jean-Marc Odobez, François Fleuret, Barbara Caputo

Idiap keeps also being very active, and a recognized leader, in multiple areas of image and video processing and analysis, including: object modeling, algorithm robustness, data fusion (color, shape, motion) and feature selection, online learning and model adaptation, multi-object tracking (dynamics and data-likelihood modeling), behavioral models, joint tracking and event recognition, computational complexity, as exemplified below.

Person and face detection, tracking, and behavior characterization is one of the main research tracks in this area. Algorithms for the joint segmentation of faces, hair, clothes and background have been designed using principled probabilistic models, along with long term tracking techniques monitoring the creation or deletion of object tracks over time.

In another research line, we have continued with our work in collaboration with archaeologists for the analysis of Maya hieroglyphs, in the context of the CODICES project funded by the SNSF. We have studied representations based on sparse representations of shape, and have started work towards the automatic detection of glyphs in complex inscriptions.

As with other research tracks, many of the resulting algorithms are made publicly available, see the Idiap webpage http://www.idiap.ch/scientific-research/resources. As examples one can cite the TorchVision library (as part of Torch, http://torch-3vision.idiap.ch) dedicated to face and biometric processing algorithms, or the face color software that performs joint color segmentation of semantic face regions (http://www.idiap.ch/software/facecolormodel/).

4. Multimodal information management and indexing

Leading researcher: Andrei Popescu-Belis

Idiap is active in the domain of multimedia information management with multiple data streams (audio, video, documents). Research focuses on improving the access to multimodal information, through advanced indexing and retrieval methods. In particular, new approaches to search over networked multimedia data are proposed, taking into account various types of similarity between multimedia events. The Idiap Automatic Content Linking Device (ACLD) serves as a general framework for this line of research. The ACLD is a multimedia retrieval system, which accepts spoken queries (explicit or implicit) and can be run in real-time (e.g. to enrich a conversation) or offline (e.g. to enrich a past lecture). Several retrieval mechanisms have been explored to increase the robustness of the ACLD, related to the structure of its database of multimedia documents; an approach to interactive retrieval is currently under study.

5. Biometric person recognition

Leading researcher: Sébastien Marcel

Idiap keeps working on increasing robustness of person recognition techniques, mostly in face recognition and speaker recognition. In 2011, these efforts were taking place mainly in the context of two SNSF projects, as well as the FP7 projects MOBIO (both with Idiap as coordinator). Since 2011, Idiap is also coordinating the FP7 TABULA RASA project and was granted a new FP7 project called BEAT. The resulting research efforts are currently at the basis of several developments and technology transfer success, including one of Idiap's spin-off, KeyLemon (http://www.keylemon.com), enabling users to automatically lock/unlock their laptop based on their facial prints, as well as numerous contacts with industry including Safran Group, Kudelski or SONY.

The project TABULA RASA is studying the vulnerability of biometric systems to attacks at the sensor level, so-called spoofing attacks, and will develop countermeasures, paving the way for a new research direction within the biometric person recognition research theme: Trusted Biometrics under Spoofing Attacks.

The new project BEAT will propose a framework of standard operational evaluations for biometric technologies. This will be achieved mainly by developing an online and open platform to transparently and independently evaluate biometric systems against validated benchmarks. Finally, decision-makers and authorities will be informed about the progress that is made in biometrics, as the results will have an impact on standards.

In 2011, Idiap consolidated again his strong relationships with EPFL and others institutions in Switzerland during the preparation of a SNSF NCCR proposal (NCCR Biometrics). The NCCR Biometrics is a truly joint initiative between Idiap (Dr S. Marcel – biometric group) and EPFL (Prof. S. Vaudenay - LASEC laboratory) with Idiap as main leading house and EPFL as co-leading house, and demonstrates a successful implementation of the 2008-2011 Joint Development Plan.

6. Social and human behavior

Leading researchers: Daniel Gatica-Perez, Jean-Marc Odobez

This area is concerned with the automatic analysis of a variety of real-life human behaviors. This activity exploits expertise and synergies between key areas at Idiap including multi-sensor human behavior capture, machine learning, and perceptual processing. In 2011, the work in this domain spanned three main areas.

In the first place, we continued our work on large-scale behavior modeling from smartphone sensor data through the LS-CONTEXT (funded by Nokia Research) and the SNSF HAI projects. Using phone data of about two hundred users over more than one year of life, we investigated methods for the automatic discovery of interaction types within communities of phone users from sensor data; for the inference of personality traits of users from smartphone data sources; for the discovery of contextual factors that affect smartphone usage; and for the prediction of locations to be visited by users.

In the second place, our long-standing work on human interaction modeling has been continued in the context of several projects. The list includes the European HUMAVIPS project; the SONVB, ICS, and Ambizione projects funded by SNSF; the NCCR IM2; and the NISHA project funded by NTT Japan. HUMAVIPS seeks to endow humanoid robots with basic social skills necessary to deal with small groups of people. SONVB and NISHA investigate new analysis approaches for automatic social inference in face-to-face organizational scenarios. The Ambizione project investigates behavioral modeling in both face-to-face and online scenarios. ICS investigated methods to analyze privacy-preserving audio in mobile sensing scenarios. Finally, IM2 investigates new links among large-scale social video, nonverbal behavior, and crowdsourcing.

In the third place, in the context of the European VANAHIEM project, we have continued our investigation towards enhanced behavior recognition in surveillance context. To move one step beyond location-based activity analysis, we have designed algorithms for the joint inference of behavioral cues like head and body orientations. Despite the use of low-resolution images good results have been achieved. Exploitation of these models to infer meaningful behavioral patterns related to attention modeling (e.g., do people attend their luggage) and their Integration into applications deployed in real setting (Torino and Paris metros) will be conducted in 2012.

7. Social signal processing (SSP)

Leading researcher: Fabio Valente, Alessandro Vinciarelli, Hervé Bourlard

Social Signal Processing (SSP) is the new research domain that aims at understanding and modeling social interactions (human-science research), and at providing computers with similar abilities in human-computer interaction scenarios (technological research). This multidisciplinary research is carried within the SSPNet Network of excellence and the IM2-Individual Project 3. The work involves data collection and annotations, verbal and non-verbal feature extraction as well as modeling/inference of social phenomena. Ongoing activities cover conflicts and escalation detection, social role recognition and inferring personality traits.

Data annotation strategies based on crowd-sourcing and explicit annotator modeling was applied to obtain large amounts of annotations in short amounts of time and low costs. The annotations show, after post-processing, inter-annotator agreement close to the one obtained by expert annotators. Over 20 hours of data have been annotated in few weeks using Amazon Mechanical Turk. Those data will be used to organize an international challenge in social signal processing.

The main result in personality computing is the development of an approach capable not only of predicting how human listeners tend to perceive the personality of unacquainted speakers, but also to identify the vocal behavioral cues actually influencing personality perception. Ongoing work aims at assessing cross-cultural effects associated to the phenomenon.

The main result in conflict study has been the study of an automated system able to infer, the presence of conflict in a discussion, its intensity as well as the moment in which the conflict is raising. The system is based on state-of-the-art speech diarization for detecting interruptions, overlaps as well as various prosodic and stylistic features.

In parallel, several SSP oriented initiatives have been organized, as well as the launching of an IEEE Technical Committee on Social Signal Processing (http://www.ieeesmc.org/technicalcommittess/tc_ssp.html)

8. Multilingual processing of spoken and written information

Leading researchers: Andrei Popescu-Belis, John Dines, Phil Garner, Hervé Bourlard

Multilingual processing is becoming a key research theme in Europe, while being vastly underrepresented in a multilingual country like Switzerland. Building upon their expertise and activities in spoken language processing (and their know-how in multilingual spoken and written information processing), we still believe that Idiap is in a unique position to develop large activities towards multilingual speech-based document retrieval and machine translation technology.

The EU-FP7 EMIME Effective Multilingual Interaction in Mobile Environments (http://www.emime.org) project ended in 2011, but helped to define an approach to multilingual technology that continues at Idiap. We are working on acoustic modeling techniques that allow multiple languages to be handled in the same manner, and possibly in the same models. In this sense the multilingual requirement is not only defining applications, but is also influencing the underlying technology. One persuasive test case for this is the task of parliamentary transcription where, especially in out home canton of Valais, politicians can switch between languages in the same speech.

The COMTIS SNSF Sinergia project (www.idiap.ch/comtis) in Machine Translation (MT) has started in 2010, focusing on a problem that is less targeted in the current statistical MT paradigm: the translation of relationships between sentences. In collaboration with two teams in Geneva, from linguistics and computational learning, we have started analyzing collections of examples of various types of dependencies between sentences, such as rhetorical relations signaled by discourse connectives, which are problematic for current MT engines. Work towards their modeling and automatic disambiguation, in preparation for MT, is now under way.

SELECTION OF IDIAP'S KEY ACHIEVEMENTS IN 2011

1. Multilingual speech processing

Leading researchers: Hervé Bourlard, Mathew Magimai Doss, Fabio Valente, and Phil Garner

Idiap continued working on multilayer perceptron (MLP) based feature for automatic speech recognition (ASR) with an emphasis towards rapid development of flexible monolingual and multilingual speech recognition systems. To this end, in the framework of Kullback-Leibler divergence based acoustic modeling, our research focussed on

1. Non-native speech recognition: We proposed an approach to stochastically transform multilingual phone posterior probabilities to monolingual phone posterior probabilities for improving non-native speech recognition. In addition, we also investigated the use of multilingual phone posterior probabilities directly as feature observations. Experimental studies conducted on both phoneme-based and grapheme-based ASR systems showed that the use of multilingual phone posterior features significantly improves the performance of ASR system on non-native speech.
2. Grapheme-to-phoneme conversion: Based on our grapheme-based ASR work, we proposed a novel acoustic data driven grapheme-to-phoneme conversion approach that can effectively be used to develop lexicons for languages/tasks that have little or no lexical resources.
3. ASR system for under resourced languages: Along this line, we investigated development of ASR systems for under resourced languages by using resources from other languages (that are rich in terms of resources such as, acoustic data, lexicon etc.). Our initial work focussed on development of Greek ASR system using multilingual phone posterior features extracted by an MLP trained using resources from languages English, Swiss French, Swiss German, Italian and Spanish. We later extended the framework to develop ASR system for Afrikaans language. It was found that the use of data from other languages yield a better system for under resourced languages.

2. Speaker diarization

Leading researcher: Fabio Valente

A first version of the Information Bottleneck diarization system has been consolidated as toolkit and publicly released under GPL license (http://www.idiap.ch/scientific-research/resources/speaker-diarization-toolkit). The open source code is expected to grow in next years.

Research activities have shown that merging acoustic and location information estimated as very large vectors of delay features (up to hundreds features) using the IB approach can outperform state-of-the-art diarization performances by almost 20\% on conventional benchmark dataset. Furthermore the system has been extended to deal with spontaneous overlapping speech.

Diarization of spontaneous overlap stays one of the open problems in the field – we implemented a system based on a detection module followed by an exclusion-labeling module, which can reduce the error, by 10\% relative. Furthermore other methods based on including conversation information like speakers' roles; engagement and turn-taking patterns have shown to reduce the speaker error. An SNF project started in November 2011 is expected to further investigates correlations between diarization error and conversational phenomena and an Hasler project started in 2011 is currently investigating the application of speaker diarization methods to poor-quality recordings from the cultural heritage archives collected between the 60s and 80s in order to structure them in stories.

3. MASH collaborative platform for image feature development

Leading researcher: Francois Fleuret

Over the course of 2011, the European MASH project, headed by Idiap, deployed a first operational version of its open platform for the collaborative development of image feature extractors (http://mash-project.eu). The long-term goal of the project is to facilitate the joint work of very large teams around the development of complex machine learning systems.

The platform incorporates standard features for the communication between contributors, and novel development tools oriented towards machine learning. They allow participants to access feature extractors contributed by others, maintain their own collection, and make a part or the totality of it available publicly.

The resulting system thus integrates machine-learning techniques developed at Idiap, together with algorithms (or heuristics) developed by other members of the project, and allows collaborators to run experiments using their own contributions, or those of others, on both image classification, and goal-planning tasks. Large-scale experiments defined by the consortium members are ran on a regular basis to assess the overall progress of the project.

The underlying architecture has been designed from the ground up as distributed across multiple computers, allowing the platform to run experiments with a robotic arm located in Prague, Czech Republic, and to scale up the computation capabilities if necessary.

4. Temporal activity discovery from large sensor logs

Leading researcher: Jean-Marc Odobez

In 2011 Idiap has pursued its efforts in the design of mining algorithms for the unsupervised discovery of recurrent pattern in multivariate time series, where observed values are caused by the superposition of multiple phenomena that can occur concurrently and with no synchronization. This is a typical situation when multiple sensors are recording the activities of multiple objects/people, like for instance multimodal sensors (proximity, water, light sensors, etc.) in home automation (domotics) applications. Our model relies on a probabilistic representation where activities not only encode the co-occurrence information (as in all previous topic models) but also the order in which this information appears, and when the activities occur in the data.
Sparse techniques and Non-Parametric models have improved our inference methods and allowed to automatically discover the number of patterns hidden in the data.

The method was successfully applied to multi-camera data in both indoor and outdoor complex surveillance scenarios and microphone-array audio data of traffic scenes. Discovered activities correspond to recurrent trajectories and sequential patterns of different object classes (e.g. cars stopping at red light followed by pedestrian crossing the zebras). In the context of the EU VANAHEIM project, preliminary experiments have been conducted to exploit the methodology for the selection of video streams to be displayed in control rooms of large public spaces and direct the attention of operators towards interesting information. First evaluations of the task with ethnologists from Vienna University have shown the potential of the approach.

5. Large-scale human behavior modeling from mobile phones

Leading researcher: Daniel Gatica-Perez

We have developed methods to infer individual and social facets of smartphone users. As part of an on-going collaboration with Nokia Research, we first developed two frameworks to recover social interaction types from large-scale Bluetooth data, encoding in different ways statistical dependencies between observed and inferred variables. Our algorithms were tested on a longitudinal sample population of phone users. These two works received Paper Awards in 2011. In the second research line, we conducted what is perhaps the first study of the connections between self-reported personality traits (Big-Five model) and actual smartphone usage in daily life. This work is likely to open new questions both in social science and mobile computing research. This work received a Paper Award nomination in 2011.

6. Automatic content linking device

Leading researcher: Andrei Popescu-Belis

The Idiap Automatic Content Linking Device (ACLD) has been consolidated and its software framework has been redesigned to allow for a simpler, more flexible architecture that accommodates all the ongoing research in the ACLD framework. ACLD has now been installed and demonstrated in several settings, with real-time processing.

The ACLD provides its users with suggestions for documents (including audio-visual ones) that are related either to the content of an ongoing discourse or discussion (in the just-in-time version), or to the content of a recording that is viewed (in the offline version). The ACLD makes use of Idiap's Large Vocabulary Continuous Speech Recognition system (see above), both for processing the implicit queries and for analyzing the multimedia database. A portable demonstrator for a variety of scenarios (one speaker with headset, a conversation through a microphone array Microcone, lecture browser) and a variety of databases (lectures, scientific articles, the Web) has been designed and extensively used. The prototype is being enhanced with novel recommender algorithm and the possibility for interactive search.

7. Biometric person recognition

Leading researcher: Sébastien Marcel

In 2011 was the conclusion of the FP7 project MOBIO (Mobile Biometry). The experts of the European Union evaluated the project during its final review, reporting full success of this project. MOBIO was acknowledged for its leading edge position in biometric technology for mobile devices using face and speaker recognition.

One of the first key achievements was the development of a MOBIO prototype of face recognition embedded on an iPhone 4, probably one of the first face recognition systems on an iPhone 4.

A second achievement is the public release of the MOBIO database, a large corpus of audio/video samples recorded from mobile phones across multiple sites in Europe, to allow the development and the evaluation of mobile biometric face and speaker recognition technologies.

In 2011 was the kick-off of the FP7 project TABULA RASA and the development of a new research direction in Biometric Person Recognition: spoofing. Within a short period of time a great impact was achieved with the organization of an International competition on the topic, the publication of several papers, a couple of invited talks and the involvement into International ISO standards. In the context of TABULA RASA, a database has been released for research on anti-spoofing and is one of the rare public databases available on the subject. Finally, 2011 is also the year of the new EU BEAT project that was granted to Idiap as coordinator and which will start in 2012.

8. Improving family conferencing systems

Leading researchers: Phil Garner, Petr Motlicek, Jean-Marc Odobez, and Hervé Bourlard

Within TA2 FP7 EU project, Idiap participates in developing a real-time multimodal analysis system with "just-in-time" multimodal association and fusion for an unconstrained living room environment. The current system comprises the detection and tracking of up to 4 persons in both the audio and video modalities, and the analysis of their behaviors and interactions from the detection, localization and fusion of verbal (keyword spotting), paralinguistic (e.g. laughter), and non-verbal (e.g.attention focus) events. The system is designed to be possibly used in open, unconstrained environments like in next generation video conferencing systems that automatically "orchestrate" the transmitted video streams to improve the overall experience of interaction between spatially separated families and friends.

9. Hyper-events and new multimedia indexing systems

Leading researchers: Hervé Bourlard and Andrei Popescu-Beslis

2011 also saw the start of the new EU project inEvent (http://www.ineventproject.eu/) coordinated by Idiap. The main goal of inEvent is to develop new means to structure, retrieve, and share large archives of networked, and dynamically changing, multimedia recordings, mainly consisting here of meetings, videoconferences, and lectures. Exploiting, and going beyond, the current state-of-the-art in audio, video, and multimedia processing and indexing, inEvent is carrying research and development towards a system that addresses the above problem by breaking our multimedia recordings into interconnected "hyper-events" (as opposed to hypertext) consisting of a particular structure of simpler "facets", which are easier to search, retrieve and share. Building and adaptively linking such "hyper-events", as a means to search and link networked multimedia archives, will result in more efficient search system, in which information can be retrieved based on "insights" and "experiences" (in addition to the usual metadata).

MAIN PROJECTS IN PROGRESS

ACRONYM NAME, NAME	PARTNERS
EUROPEAN PROJECTS	
BBFOR2 Bayesian Biometrics for Forensics	Radboud University Nijmegen Universidad Autonoma de Madrid Politecnico di Torino Universiteit Twente University of York Katholieke Universiteit Leuven Högskolan i Halmstad Netherlands Forensic Institute Agnitio Voice Biometrics Netherlands organisation for applied scientific research (TNO)
HUMAVIPS Humanoids with Auditory and Visual Abilities in Populated Spaces	Institut National de Recherche en Informatique et Automatique The Czech Technical University Aldebaran Robotics Bielefeld University
InEvent Accessing Dynamic Networked Multimedia Events	Radvision Ltd IBM Israël Klewel SA Fraunhofer Heinrich-Hertz-Institute University of Edinburgh
MASH Massive Sets of Heuristics for Machine Learning	Centre National de la Recherche Scientifique Universität Potsdam Institut National de Recherche en Informatique et en Automatique The Czech Technical University
PASCAL2 Pattern Analysis, Statistical Modelling and Computational Learning	56 sites in the network
SCALE Speech Communication with Adaptive Learning	Universität des Saarlandes University of Edinburgh University of Sheffield Radboud University Nijmegen RWTH Aachen Motorola Limited UK Philips Eurice

DURATION (MONTH/YEAR)	WEB	COORDINATOR	CONTACT
01.10 – 12.13	http://lands.let.ru.nl/bbfor2	Stichting Katholieke Universiteit	Dr. Sébastien Marcel
02.10 – 01.13	http://humavips.inrialpes.fr/	Institut de Recherche en Informatique et en Automatique	Dr. Daniel Gatica-Perez Dr. Jean-Marc Odobez
11.11 - 10.14	http://www.inevent-project.eu	Idiap Research Institute	Prof. Hervé Bourlard
01.10 – 12.12	http://mash-project.eu	Idiap Research Institute	Dr. François Fleuret
03.08 – 02.13	www.pascal-network.org	University of Southampton	Dr. François Fleuret
01.09 – 12.12	www.scale.uni-saarland.de	Universität des Saarlandes	Prof. Hervé Bourlard

ACRONYM NAME, NAME	PARTNERS
SSPnet Social Signal Processing Network arelli	Imperial College of Science, Technology and Medicine University of Edinburgh University of Twente Università Di Roma Tre Queen's University Belfast DFKI INRIA Université de Genève Technische Universiteit Delft
TA2 Together Anywhere, Together Anytime	EURESCOM - European Institute for Research and Strategic Studies in Telecommunications GmbH British Telecommunications plc Alcatel-Lucent Bell NV Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. Goldsmiths' College Netherlands Organisation For Applied Scientific Research – TNO The Interactive Institute II Aktiebolag Stichting Centrum voor Wiskunde en Informatica Ravensburger Spieleverlag GmbH Philips Consumer Electronics BV Limbic Entertainment GmbH Joanneum Research Forschungsgesellschaft GmbH Brno University of Technology
TABULA RASA Trusted Biometrics under Spoofing Attacks	University of Oulu Universidad Autonoma de Madrid University of Southampton University of Cagliari EURECOM Chinese Academy of Sciences Starlab Barcelona S.L. MORPHO KeyLemon SA BIOMETRY.com AG Centre for Science, Society and Citizenship
VANAHEIM Video/Audio Networked Surveillance System Enhancement through Human-Centered Adaptive Monitoring	Multitel ASBL Institut National de Recherche en Informatique et Automatique Thales Communications France Thales Italia Gruppo Torinese Trasporti Régie Autonome des Transports Parisiens University of Vienna

DURATION (MONTH/YEAR)	WEB	COORDINATOR	CONTACT
02.09 – 01.14	www.sspnet.eu	Idiap Research Institute	Dr. Alessandro Vinci-
02.10 – 03.12	www.ta2-project.eu	Eurescom	Phil Garner
11.10 – 06.14	http://www.tabularasa-euproject.org	Idiap Research Institute	Dr. Sébastien Marcel
02.10 – 07.13	www.vanaheim-project.eu	Multitel ASBL	Dr. Jean-Marc Odobez

ACRONYM NAME, NAME	PARTNERS
SNSF PROJECTS	
COMTIS Improving the Coherence of Machine Translation Output by Modeling Intersentential Relations	University of Geneva/Department of Linguistics University of Geneva/Department of Computer Science
FlexASR Flexible Grapheme-Based Automatic Speech Recognition	
HAI-2010 Human Activity and Interactivity Modeling	
ICS-2010 Interactive Cognitive Systems	
NCCR IM2 Interactive Multimodal Information Management	Ecole polytechnique fédérale de Lausanne (EPFL) University of Geneva University of Fribourg University of Bern Swiss Federal Institute of Technology in Zurich (ETHZ)
MCM-FF Multimodal Computational Modeling of Nonverbal Social Behavior in Face to Face Interaction	
MULTI08EXT Multimodal Interaction and Multimedia Data Mining	
NINAPRO Non-Invasive Adaptive Hand Prosthetics	Institute of Robotics and Mechatronics HES-SO Valais
RODI Role based speaker diarization	Institute of Robotics and Mechatronics HES-SO Valais
SONVB Sensing and Analysing Organizational Nonverbal Behavior	University of Neuchâtel Dartmouth College
TRACOME Robust Face Tracking, Feature Extraction and Multimodal Fusion for Audio-Visual Speech Recognition	
UBM Understanding Brain Morphogenesis	Ecole polytechnique fédérale de Lausanne (EPFL) University of Basel
VELASH Very Large Sets of Heuristics for Scene Interpretation	

DURATION (MONTH/YEAR)	WEB	COORDINATOR	CONTACT
03.10 – 02.13	http://www.idiap.ch/comtis	Idiap Research Institute	Dr. Andrei Popescu-Belis
03.10 – 04.13		Idiap Research Institute	Dr. Mathew Magimai-Doss
10.10 – 09.12		Idiap Research Institute	Dr. Jean-Marc Odobez
10.10 – 09.12		Idiap Research Institute	Prof. Hervé Bourlard
01.02 – 12.13	www.im2.ch	Idiap Research Institute	Prof. Hervé Bourlard
11.11 – 10.14		Idiap Research Institute	Dr. Oya Aran Karakus
10.10 – 09.12		Idiap Research Institute	Prof. Hervé Bourlard
01.11 – 12.13	http://www.idiap.ch/project/ninapro	Idiap Research Institute	Dr. Barbara Caputo
11.11 – 10.14		Idiap Research Institute	Dr. Fabio Valente
06.10 – 05.13	www.idiap.ch/project/sonvb	Idiap Research Institute	Dr. Daniel Gatica-Perez
01.11 – 12.13		Ecole polytechnique fédérale de Lausanne (EPFL)	Dr. Jean-Marc Odobez
01.11 – 12.13		University of Basel	Dr. François Fleuret
09.09 – 08.12		Idiap Research Institute	Dr. François Fleuret

ACRONYM NAME, NAME	PARTNERS

SNSF PROJECTS (INDO–SUISSE)

CCPP
Cross Cultural Personality Perception

University of Geneva
International Institute of Information Technology, India

HASLER FOUNDATION

CLAS3
Cross-Lingual Adaptation for
Text to Speech Synthesis

SESAME
SEarching Swiss Audio MEmories

ARMASUISSE

PIRMIN
Personalized Information Recommendation
for Multimedia Archive Navigation

RECOD
Low bit-rate speech coding

In addition to the above projects a number of industrials projects (CTI, The Ark) and grants are ongoing at Idiap.

DURATION (MONTH/YEAR)	WEB	COORDINATOR	CONTACT
05.09 – 04.12	http://www.idiap.ch/project/ccpp	Idiap Research Institute	Dr. Alessandro Vinciarelli
11.11 – 08.12		Idiap Research Institute	Dr. John Dines
01.11 – 12.13		Idiap Research Institute	Dr. Fabio Valente
09.11 – 12.11		Idiap Research Institute	Dr. Andrei Popescu-Belis
09.11 – 12.11		Idiap Research Institute	Phil Garner

MAJOR PUBLICATIONS / CONFERENCES

This selection, from among the many publications of Idiap, illustrates the diversity of our research.

BOOKS, BOOK CHAPTERS AND JOURNAL PAPERS

Analysis of Verbal and Nonverbal Communication and Enactment: The Processing Issues
Anna Esposito, Alessandro Vinciarelli, Klara Vicsi, Catherine Pelachaud and Anton Nijholt
Springer Verlag, 2011

Analysis of Group Conversations: Modeling Social Verticality
Oya Aran and Daniel Gatica-Perez
in: Computer Analysis of Human Behavior, pages 293-322, Springer London, 2011

Call me Guru: user categories and large-scale behavior in YouTube
Joan-Isaac Biel and Daniel Gatica-Perez
in: Social Media Computing, Springer, 2011

Data-driven extraction of spectral-dynamics based posteriors
Fabio Valente
in: Handbook of Natural Language Processing and Machine Translation Handbook of Natural Language Processing and Machine Translation, Springer, 2011

Flickr Groups: Multimedia Communities for Multimedia Analysis
Radu-Andrei Negoescu and Daniel Gatica-Perez
in: Internet Multimedia Search and Mining, Bentham Science Publishers, 2011

Hand Gesture Analysis
Cem Keskin, Oya Aran and Lale Akarun
in: Computer Analysis of Human Behavior, pages 125-149, Springer London, 2011

Introduction to Sequence Analysis for Human Behavior Understanding
Hugues Salamin and Alessandro Vinciarelli
in: "Computer Analysis of Human Behavior" by A.Salah and T.Gevers (eds.), pages 21-40, Springer Verlag, 2011

Social Signal Processing: The Research Agenda
Maja Pantic, Roddy Cowie, Francesco D'Errico, Dirk Heylen, Marc Mehu, Catherine Pelachaud, Isabella Poggi, Marc Schroeder and Alessandro Vinciarelli
in: "Visual Analysis of Humans" by T.B.Moeslund, A.Hilton, V.Krueger and L.Sigal (eds.), pages 511-538, Springer Verlag, 2011

3D human pose recovery from image by efficient visual feature selection
Cheng Chen, Yi Yang, Feiping Nie and Jean-Marc Odobez
in: Computer Vision and Image Understanding, 115(3), 2011

A Fast Parts-based Approach to Speaker Verification using Boosted Slice Classifiers
Anindya Roy, Mathew Magimai.-Doss and Sébastien Marcel
in: IEEE Transactions on Information Forensics and Security, 2011

A Nonverbal Behavior Approach to Identify Emergent Leaders in Small Groups
Dairazalia Sanchez-Cortes, Oya Aran, Marianne Schmid Mast and Daniel Gatica-Perez
in: IEEE Transactions on Multimedia, 2011

A novel framework for noise robust ASR using cochlear implant-like spectrally reduced speech
Cong-Thanh Do, Dominique Pastor and André Goalic
in: Speech Communication, 2011

A real-time deformable detector
Karim Ali, Francois Fleuret, David Hasler and Pascal Fua
in: IEEE Transactions on Pattern Analysis and Machine Intelligence, 2011

An Information Theoretic Combination of MFCC and TDOA Features for Speaker Diarization
Deepu Vijayasenan, Fabio Valente and Hervé Bourlard
in: IEEE Transactions on Audio Speech and Language Processing, 19(2), 2011

Analyzing ancient Maya glyph collections with Contextual Shape Descriptors
Edgar Roman-Rangel, Carlos Pallan, Jean-Marc Odobez and Daniel Gatica-Perez
in: International Journal of Computer Vision, 94(1):101-117, 2011

Automatic Identification of Discourse Markers in Multiparty Dialogues: An In-Depth Study of Like and Well
Andrei Popescu-Belis and Sandrine Zufferey
in: Computer Speech and Language, 25(3):499-518, 2011

Cepstral normalisation and the signal to noise ratio spectrum in automatic speech recognition
Philip N. Garner
in: Speech Communication, 53(8):991--1001, 2011

Comparing machines and humans on a visual categorization test
Francois Fleuret, Ting Li, Charles Dubout, Emma K. Wampler, Steven Yantis and Donald Geman
in: Proceedings of the National Academy of Sciences, 2011

Current trends in multilingual speech processing
Hervé Bourlard, John Dines, Mathew Magimai.-Doss, Philip N. Garner, David Imseng, Petr Motlicek, Hui Liang, Lakshmi Saheer and Fabio Valente
in: Sadhana, 36(5):885–915, 2011

Discovering Routines from Large-Scale Human Locations using Probabilistic Topic Models
Katayoun Farrahi and Daniel Gatica-Perez
in: ACM Transactions on Intelligent Systems and Technology, 2(1), 2011

Estimating Dominance in Multi-Party Meetings Using Speaker Diarization
Hayley Hung, Yan Huang, Gerald Friedland and Daniel Gatica-Perez
in: IEEE Transactions on Audio, Speech, and Language Processing, 19(4):847 - 860, 2011

Fast Human Detection from Joint Appearance and Foreground Feature Subset Covariances
Jian Yao and Jean-Marc Odobez
in: Computer Vision and Image Understanding, 115(10):1414-1426, 2011

Finding Information in Multimedia Records of Meetings
Andrei Popescu-Belis, Denis Lalanne and Hervé Bourlard
in: IEEE Multimedia, 2011

Improving Control of Dexterous Hand Prostheses Using Adaptive Learning
Tatiana Tommasi, Francesco Orabona, Claudio Castellini and Barbara Caputo
in: IEEE TRANSACTIONS OF ROBOTICS, 2011

Learning a 3D Human Pose Distance Metric from Geometric Pose Descriptor
Cheng Chen
in: IEEE Transactions on Visualization and Computer Graphics, 17(11):1676-1689, 2011

Multi-Person Visual Focus of Attention from Head Pose and Meeting Contextual Cues
Silèye O. Ba and Jean-Marc Odobez
in: IEEE Trans. on Pattern Analysis and Machine Intelligence, 33(1):101-116, 2011

Multiple Object Tracking using K-Shortest Paths Optimization
Jerome Berclaz, Engin Turetken, Francois Fleuret and Pascal Fua
in: IEEE Transactions on Pattern Analysis and Machine Intelligence, 2011

Natural Language Processing (Almost) from Scratch
Ronan Collobert, Jason Weston, Léon Bottou, Michael Karlen, Koray Kavukcuoglu and Pavel Kuksa
in: Journal of Machine Learning Research, 12:2493-2537, 2011

Non-convex Regularized Bundle Method
Trinh-Minh-Tri Do and Thierry Artieres
in: Journal of Machine Learning Research, 2011

Performance Improvement of TDOA-Based Speaker Localization in Joint Noisy and Reverberant Conditions
Hamid Reza Abutalebi and Hossein Momenzadeh
in: EURASIP Journal on Advances in Signal Processing, 2011

Personalising speech-to-speech translation: Unsupervised cross-lingual speaker adaptation for HMM-based speech synthesis
John Dines, Hui Liang, Lakshmi Saheer, Matthew Gibson, William Byrne, Keiichiro Oura, Keiichi Tokuda, Junichi Yamagishi, Simon King, Mirjam Wester, Teemu Hirsimäki, Reima Karhila and Mikko Kurimo
in: Computer Speech and Language, 2011

Privacy-Sensitive Audio Features for Speech/Nonspeech Detection
Sree Hari Krishnan Parthasarathi, Daniel Gatica-Perez, Hervé Bourlard and Mathew Magimai.-Doss
in: IEEE Transactions on Audio, Speech, and Language Processing, 19(8), 2011

Privacy-sensitive recognition of group conversational context with sociometers
Dinesh Babu Jayagopi, Taemie Kim, Alex Pentland and Daniel Gatica-Perez
in: Springer Multimedia Systems Journal, 2011

Robustness of Group Delay Representations for Noisy Speech Signals
Sree Hari Krishnan Parthasarathi, Padmanabhan Rajan and Hema A Murthy
in: IJST (Springer), 14(4), 2011

Sensing the `Health State` of our Society
Anmol Madan, Manuel Cebrian, Sai Moturu, Katayoun Farrahi and Alex Pentland
in: IEEE Pervasive Computing, Special Issue on Large-Scale Opportunistic Sensing, 2011

Towards semi-supervised learning of semantic spatial concepts for mobile robots
Jesus Martinez-Gomez and Barbara Caputo
in: Journal of Physical Agents, 2011

Transcribing Mandarin Broadcast Speech Using Multi-Layer Perceptron Acoustic Features
Fabio Valente, Mathew Magimai.-Doss, Christian Plahl, Suman Ravuri and Wen Wang
in: IEEE Transactions on Audio, Speech, and Language Processing, 19(8), 2011

Transcribing meetings with the AMIDA systems
Thomas Hain, Lukas Burget, John Dines, Philip N. Garner, Frantisek Grezl, Asmaa El Hannani, Marijn Huijbregts, Martin Karafiat, Mike Lincoln and Vincent Wan
in: IEEE Transactions on Audio, Speech, and Language Processing, 2011

Using Modality Replacement to Facilitate Communication between Visually and Hearing-Impaired People
Konstantinos Moustakas, Dimitrios Tzovaras, Laila Dybkjaer, Niels Ole Bernsen and Oya Aran
in: IEEE Multimedia, 18(2):26-37, 2011

Using object affordances to improve object recognition
Claudio Castellini, Tatiana Tommasi, Nicoletta Noceti, Francesca Odone and Barbara Caputo
in: IEEE Transaction on Autonomous Mental Development, 2011

VlogSense: Conversational Behavior and Social Attention in YouTube
Joan-Isaac Biel and Daniel Gatica-Perez
in: Transactions on Multimedia Computing, Communications and Applications, 2011

CONFERENCE PAPERS

A Bimodal Sound Source Model for Vehicle Tracking in Traffic Monitoring
Patrick Marmaroli, Jean-Marc Odobez, Xavier Falourd and Hervé Lissek
in: European Signal Processing Conference, 2011

A BSS-based Approach for Localization of Simultaneous Speakers in Reverberant Conditions
Hamid Reza Abutalebi, Hedieh Heli, Danil Korchagin and Hervé Bourlard
in: Proceedings of the 19th European Signal Processing Conference (EUSIPCO), 2011

A Compressive Sensing Based Compressed Neural Network for Sound Source Localization
Mehdi Banitalebi Dehkordi, Hamid Reza Abutalebi and Hossein Ghanei
in: Proceedings of International Symposium on Artificial Intelligence and Signal Processing, 2011

A Corpus-based Contrastive Analysis for Defining Minimal Semantics of Inter-sentential Dependencies for Machine Translation
Thomas Meyer, Andrei Popescu-Belis, Jeevanthi Liyanapathirana and Bruno Cartoni
in: Proceedings of the GSCL2011 Workshop on "Contrastive Analysis - Translation Studies - Machine Translation: What can we learn from each other?", Hamburg, Germany, pages 1-5, 2011

A Joint Estimation of Head and Body Orientation Cues in Surveillance Video
Cheng Chen, Alexandre Heili and Jean-Marc Odobez
in: IEEE International Workshop on Socially Intelligent Surveillance and Monitoring, 2011

A Just-in-Time Document Retrieval System for Dialogues or Monologues
Andrei Popescu-Belis, Majid Yazdani, Alexandre Nanchen and Philip N. Garner
in: SIGDIAL 2011 (12th annual SIGDIAL Meeting on Discourse and Dialogue), Demonstration Session, Portland, OR, pages 350-352, 2011

A Large-Scale Database of Images and Captions for Automatic Face Naming
Mert Ozcan, Jie Luo, Vittorio Ferrari and Barbara Caputo
in: Proceedings of the 22nd British Machine Vision Conference, 2011

A Speech-based Just-in-Time Retrieval System using Semantic Search
Andrei Popescu-Belis, Majid Yazdani, Alexandre Nanchen and Philip N. Garner
in: Proceedings of the ACL-HLT 2011 System Demonstrations (49th Annual Meeting of the Association for Computational Linguistics), Portland, OR, pages 80-86, 2011

An Audio Visual Corpus for Emergent Leader Analysis
Dairazalia Sanchez-Cortes, Oya Aran and Daniel Gatica-Perez
in: Multimodal Corpora for Machine Learning: Taking Stock and Road mapping the Future, 2011

An Integrated Framework for Multi-Channel Multi-Source Localization and Voice Activity Detection
Mohammad J. Taghizadeh, Philip N. Garner, Hervé Bourlard, Hamid Reza Abutalebi and Afsaneh Asaei
in: The Third Joint Workshop on Hands-free Speech Communication and Microphone Arrays, 2011

Analysis and Comparison of Recent MLP Features for LVCSR Systems
Fabio Valente, Mathew Magimai.-Doss and Wen Wang
in: Proceedings of Interspeech 2011, 2011

Audio Spatio-Temporal Fingerprints for Cloudless Real-Time Hands-Free Diarization on Mobile Devices
Danil Korchagin
in: Proceedings of the 3rd Joint Workshop on Hands-Free Speech Communication and Microphone Arrays, Edinburgh, UK, 2011

Automated Quantification of Morphodynamics for High-Throughput Live Cell Imaging Datasets
German Gonzalez, Ludovico Fusco, Riwal Lefort, Fethallah Benmansour, Pascal Fua and Kevin C. Smith
in: 1st International SystemsX.ch Conference on Systems Biology, 2011

Automatic Time Skew Detection and Correction
Danil Korchagin
in: Proceedings International Conference on Signal Acquisition and Processing, Singapore, 2011

Boosting with Maximum Adaptive Sampling
Charles Dubout and Francois Fleuret
in: Proceedings of the Neural Information Processing Systems Conference, 2011

Building 'directional corpora' for unbiased contrastive analysis
Bruno Cartoni and Thomas Meyer
in: Proceedings of Corpus Linguistics Conference, Birmingham, UK, pages 29-30, 2011

Combined Estimation of Location and Body Pose in Surveillance Video
Cheng Chen, Alexandre Heili and Jean-Marc Odobez
in: AVSS, 2011

Competition on Counter Measures to 2-D Facial Spoofing Attacks
Murali Mohan Chakka, André Anjos, Sébastien Marcel, Roberto Tronci, Daniele Muntoni, Gianluca Fadda, Maurizio Pili, Nicola Sirena, Gabriele Murgia, Marco Ristori, Fabio Roli, Junjie Yan, Dong Yi, Zhen Lei, Zhiwei Zhang, Stan Z.Li, William Robson Schwartz, Anderson Rocha, Helio Pedrini, Javier Lorenzo-Navarro, Modesto Castrillón-Santana, Jukka Maatta, Abdenour Hadid and Matti Pietikainen
in: Proceedings of IAPR IEEE International Joint Conference on Biometrics (IJCB), Washington DC, USA, 2011

Contextual grouping: discovering real-life interaction types from longitudinal Bluetooth data
Trinh-Minh-Tri Do and Daniel Gatica-Perez
in: 12th International Conference on Mobile Data Management, 2011

Counter-Measures to Photo Attacks in Face Recognition: a public database and a baseline
André Anjos and Sébastien Marcel
in: International Joint Conference on Biometrics 2011, 2011

Cross-Lingual Speaker Discrimination Using Natural and Synthetic Speech
Mirjam Wester and Hui Liang
in: Proceedings of Interspeech, Florence, Italy, 2011

Deep Learning for Efficient Discriminative Parsing
Ronan Collobert
in: International Conference on Artificial Intelligence and Statistics, 2011

Detection-Based Multi-Human Tracking Using a CRF Model
Alexandre Heili, Cheng Chen and Jean-Marc Odobez
in: The Eleventh IEEE International Workshop on Visual Surveillance, 2011

Disambiguating discourse connectives using parallel corpora: senses vs. translations
Thomas Meyer, Charlotte Roze, Bruno Cartoni, Laurence Danlos, Sandrine Zufferey and Andrei Popescu-Belis
in: Proceedings of Corpus Linguistics Conference, Birmingham, UK, pages 104-105, 2011

Disambiguating Temporal-Contrastive Discourse Connectives for Machine Translation
Thomas Meyer
in: Proceedings of ACL-HLT 2011 Student Session, Association for Computational Linguistics, Portland, OR, pages 6, 2011

Engagement-based Multi-party Dialog with a Humanoid Robot
David Klotz, Johannes Wienke, Julia Peltason, Britta Wrede, Sebastian Wrede, Vasil Khalidov and Jean-Marc Odobez
in: Proceedings of the SIGDIAL 2011: the 12th Annual Meeting of the Special Interest Group on Discourse and Dialogue, pages 341-343, 2011

Environment - Application - Adaptation: a Community Architecture for Ambient Intelligence
Remi Emonet
in: International Conference on Ambient Computing, Applications, Services and Technologies, 2011

Exploiting Long-Term Observations for Track Creation and Deletion in Online Multi-Face Tracking
Stefan Duffner and Jean-Marc Odobez
in: IEEE Conference on Automatic Face and Gesture Recognition, 2011

Exploiting observers' judgements for nonverbal group interaction analysis
Gokul Chittaranjan, Oya Aran and Daniel Gatica-Perez
in: IEEE Conference on Automatic Face and Gesture Recognition, pages 6, IEEE, 2011

Extracting and Locating Temporal Motifs in Video Scenes Using a Hierarchical Non Parametric Bayesian Model
Remi Emonet, Jagannadan Varadarajan and Jean-Marc Odobez
in: IEEE Conference on Computer Vision and Pattern Recognition, 2011

Fast and flexible Kullback-Leibler divergence based acoustic modeling for non-native speech recognition
David Imseng, Ramya Rasipuram and Mathew Magimai.-Doss
in: Proceedings of the IEEE workshop on Automatic Speech Recognition and Understanding, Hawaii, USA, pages 348-353, 2011

Fast Speaker Verification on Mobile Phone data using Boosted Slice Classifiers
Anindya Roy, Mathew Magimai.-Doss and Sébastien Marcel
in: IAPR IEEE International Joint Conference on Biometrics, Washington DC, 2011

Finding Audio-Visual Events in Informal Social Gatherings
Xavier Alameda-Pineda, Vasil Khalidov, Radu Horaud and Florence Forbes
in: IEEE/ACM 13th International Conference on Multimodal Interaction, 2011

FlowBoost - Appearance Learning from Sparsely Annotated Video
Karim Ali, David Hasler and Francois Fleuret
in: Proceedings of the IEEE international conference on Computer Vision and Pattern Recognition, 2011

Grapheme-based automatic speech recognition using KL-HMM
Mathew Magimai.-Doss, Ramya Rasipuram, Guillermo Aradilla and Hervé Bourlard
in: Proceedings of Interspeech, 2011

GroupUs: Smartphone Proximity Data and Human Interaction Type Mining
Trinh-Minh-Tri Do and Daniel Gatica-Perez
in: 15th annual International Symposium on Wearable Computers, San Francisco, USA, 2011

HEAT: Iterative Relevance Feedback with One Million Images
Nicolae Suditu and Francois Fleuret
in: International Conference on Computer Vision, 2011

Hierarchical Tandem Features for ASR in Mandarin
Joel Pinto, Mathew Magimai.-Doss and Hervé Bourlard
in: Proceedings of Interspeech, 2011

How Comparable are Parallel Corpora? Measuring the Distribution of General Vocabulary and Connectives
Bruno Cartoni, Sandrine Zufferey, Thomas Meyer and Andrei Popescu-Belis
in: Proceedings of 4th Workshop on Building and Using Comparable Corpora, ACL, Portland, OR, pages 9, 2011

Humans as Feature Extractors: Combining Prosody and Personality Perception for Better Speaking Style Recognition
Gelareh Mohammadi and Alessandro Vinciarelli
in: Proceeding of IEEE Int Conference on Systems, Man, and Cybernetics - Special Sessions, 2011

Impact of Excitation Frequency on Short-Term Recording Synchronisation and Confidence Estimation
Danil Korchagin
in: Proceedings European Signal Processing Conference, Barcelona, Spain, 2011

Improving Articulatory Feature and Phoneme Recognition using Multitask Learning
Ramya Rasipuram and Mathew Magimai.-Doss
in: Artificial Neural Networks and Machine Learning - ICANN 2011, pages 299-306, Springer Berlin / Heidelberg, 2011

Improving non-native ASR through stochastic multilingual phoneme space transformations
David Imseng, Hervé Bourlard, John Dines, Philip N. Garner and Mathew Magimai.-Doss
in: Proceedings of Interspeech, Florence, Italy, pages 537-540, 2011

Inferring truth from multiple annotators for social interaction analysis
Gokul Chittaranjan, Oya Aran and Daniel Gatica-Perez
in: Neural Information Processing Systems (NIPS) Workshop on Modeling Human Communication Dynamics (HCD), pages 4, 2011

Information Bottleneck Features for HMM/GMM Speaker Diarization of Meetings Recordings
Sree Harsha Yella and Fabio Valente
in: Interspeech, Florence, Italy, pages 953-956, 2011

Integrating articulatory features using Kullback-Leibler divergence based acoustic model for phoneme recognition
Ramya Rasipuram and Mathew Magimai.-Doss
in: Proceedings IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP, pages 5192 - 5195, 2011

Inter-session Variability Modelling and Joint Factor Analysis for Face Authentication
Roy Wallace, Mitchell McLaren, Chris McCool and Sébastien Marcel
in: International Joint Conference on Biometrics, 2011

Joint Adaptive Colour Modelling and Skin, Hair and Clothing Segmentation Using Coherent Probabilistic Index Maps
Carl Scheffler and Jean-Marc Odobez
in: British Machine Vision Conference, British Machine Vision Association, Dundee, UK, 2011

Joint Optimization of Hidden Conditional Random Fields and Non Linear Feature Extraction
Antoine Vinel, Trinh-Minh-Tri Do and Thierry Artieres
in: Proceedings of International Conference on Document Analysis and Recognition, 2011

Just-in-Time Multimodal Association and Fusion from Home Entertainment
Danil Korchagin, Petr Motlicek, Stefan Duffner and Hervé Bourlard
in: Proceedings IEEE International Conference on Multimedia & Expo, Barcelona, Spain, 2011

Language dependent universal phoneme posterior estimation for mixed language speech recognition
David Imseng, Hervé Bourlard, Mathew Magimai.-Doss and John Dines
in: Proceedings IEEE International Conference on Acoustics, Speech and Signal Processing, Prag, CZ, pages 5012-5015, 2011

Language-Independent Socio-Emotional Role Recognition in the AMI Meetings Corpus
Fabio Valente and Alessandro Vinciarelli
in: Proceedings of Interspeech, 2011

Learning Structured Embeddings of Knowledge Bases
Antoine Bordes, Jason Weston, Ronan Collobert and Yoshua Bengio
in: Conference on Artificial Intelligence, 2011

Look at who's talking
Marco Cristani, Anna Pesarin, Alessandro Vinciarelli, Marco Crocco and Vittorio Murino
in: Proceedings of International Conference on Ambient Intelligence, pages 68-76, 2011

LP Residual Features for Robust, Privacy-Sensitive Speaker Diarization
Sree Hari Krishnan Parthasarathi, Hervé Bourlard and Daniel Gatica-Perez
in: Interspeech, 2011

Machine learning techniques to analyse complex, computer vision-extracted, dynamic cellular phenotypes
Riwal Lefort, Ludovic Fusco, Fethallah Benmansour, Kevin C. Smith, Olivier Pertz and Francois Fleuret
in: 1st International SystemsX.ch Conference on Systems Biology, 2011

Model-based Compressive Sensing for Multi-party Distant Speech Recognition
Afsaneh Asaei, Hervé Bourlard and Volkan Cevher
in: 2011 IEEE International Conference on Acoustics, Speech and Signal Processing, 2011

Morphodynamic profiling to explore spatio-temporal signaling networks regulating neurite outgrowth
Ludovic Fusco, Kevin C. Smith, Fethallah Benmansour, Riwal Lefort, Francois Fleuret, Pascal Fua and Olivier Pertz
in: 1st International SystemsX.ch Conference on Systems Biology, 2011

Multi-camera Open Space Human Activity Discovery for Anomaly Detection
Remi Emonet, Jagannadan Varadarajan and Jean-Marc Odobez
in: 8th IEEE International Conference on Advanced Video and Signal-Based Surveillance, 2011

Multi-party Speech Recovery Exploiting Structured Sparsity Models
Afsaneh Asaei, Mohammad J. Taghizadeh, Hervé Bourlard and Volkan Cevher
in: Proceedings of International Speech Communication Association, INTERSPEECH, 2011

Multiclass Transfer Learning from Unconstrained Priors
Jie Luo, Tatiana Tommasi and Barbara Caputo
in: Proceedings of the 13th International Conference on Computer Vision, 2011

Multilingual Annotation and Disambiguation of Discourse Connectives for Machine Translation
Thomas Meyer, Andrei Popescu-Belis, Sandrine Zufferey and Bruno Cartoni
in: Proceedings of 12th SIGdial Meeting on Discourse and Dialogue, Association for Computational Linguistics, Portland, OR, pages 10, 2011

Multistream Speaker Diarization through Information Bottleneck System Outputs Combination
Deepu Vijayasenan, Fabio Valente and Petr Motlicek
in: Proceedings of International Conference on Acoustics, Speech and Signal Processing, 2011

New world, New Worlds: Visual Analysis of Pre-Columbian Pictorial Collections
Daniel Gatica-Perez, Edgar Roman-Rangel, Jean-Marc Odobez and Carlos Pallan
in: Proceedings of the International Workshop on Multimedia for Cultural Heritage, Modena, Italy., Springer CCIS series book, 2011

People-Centric Mobile Sensing with a Pragmatic Twist: from Behavioral Data Points to Active User Involvement
Jan Blom, Daniel Gatica-Perez and Niko Kiukkonen
in: International Conference on Human-Computer Interaction with Mobile Devices and Services, 2011

Pervasive Sensing to Model Political Opinions in Face-to-Face Networks
Anmol Madan, Katayoun Farrahi, Daniel Gatica-Perez and Alex Pentland
in: Pervasive, San Francisco, 2011

Phoneme Recognition using Boosted Binary Features
Anindya Roy, Mathew Magimai.-Doss and Sébastien Marcel
in: IEEE Intl. Conference on Acoustics, Speech and Signal Processing 2011, 2011

Phonological Knowledge Guided HMM State Mapping for Cross-Lingual Speaker Adaptation
Hui Liang and John Dines
in: Proceedings of Interspeech, Florence, Italy, 2011

Posterior Features for Template-based ASR
Serena Soldo, Mathew Magimai.-Doss, Joel Praveen Pinto and Hervé Bourlard
in: Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing, Prague, Czech Republic, 2011

Recent Developments in Social Signal Processing
Albert Ali Salah, Maja Pantic and Alessandro Vinciarelli
in: Proceedings of the IEEE International Conference on Systems, Man and Cybernetics, pages 380-385, 2011

Searching the Past: An Improved Shape Descriptor to Retrieve Maya Hieroglyphs
Edgar Roman-Rangel, Carlos Pallan, Jean-Marc Odobez and Daniel Gatica-Perez
in: Proceedings of the ACM International Conference in Multimedia, Scottsdale, USA, ACM, 2011

Smartphone usage in the wild: a large-scale analysis of applications and context
Trinh-Minh-Tri Do, Jan Blom and Daniel Gatica-Perez
in: 13th International Conference on Multimodal Interaction, 2011

Social Focus of Attention as a Time Function Derived from Multimodal Signals
Danil Korchagin and Hamid Reza Abutalebi
in: Proceedings IEEE International Conference on Multimedia & Expo, Barcelona, Spain, 2011

Speaker Diarization of Meetings based on Speaker Role N-gram Models
Fabio Valente, Deepu Vijayasenan and Petr Motlicek
in: Proceedings of the International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2011

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Charles Dubout and Francois Fleuret
in: International Conference on Computer Vision, 2011

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Daniel Povey, Arnab Ghoshal, Gilles Boulianne, Lukas Burget, Ondrej Glembek, Nagendra Goel, Mirko Hannemann, Petr Motlicek, Yanmin Qian, Petr Schwarz, Jan Silovsky, Georg Stemmer and Karel Vesely
in: IEEE 2011 Workshop on Automatic Speech Recognition and Understanding, Hilton Waikoloa Village Big Island, Hawaii, US, IEEE Signal Processing Society, 2011

The MASH Project
Francois Fleuret, Philip Abbet, Charles Dubout and Leonidas Lefakis
in: European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, 2011

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Stefan Duffner, Petr Motlicek and Danil Korchagin
in: International Conference on Signal Acquisition and Processing, Singapore, 2011

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Ronan Collobert, Koray Kavukcuoglu and Clément Farabet
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in: Proceedings of the IEEE International Conference on Social Computing, pages 290-297, 2011

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Jesus Martinez-Gomez and Barbara Caputo
in: IEEE International Conference on Robotics and Automation, 2011

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Horesh Ben Shitrit, Jerome Berclaz, Francois Fleuret and Pascal Fua
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Fabian Nater, Tatiana Tommasi, Helmut Grabner, Luc Van Gool and Barbara Caputo
in: Visual Surveillance Workshop at ICCV, 2011

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Francesco Orabona and Jie Luo
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Fabio Valente, Alessandro Vinciarelli, Sree Harsha Yella and A. Sapru
in: Proceedings of the IEEE International Conference on Systems, Man and Cybernetics, pages 374-379, 2011

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Majid Yazdani and Andrei Popescu-Belis
in: Graph-based Methods for Natural Language Processing, 2011

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Gokul Chittaranjan, Jan Blom and Daniel Gatica-Perez
in: International Symposium on Wearable Computing, pages 8, 2011

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