



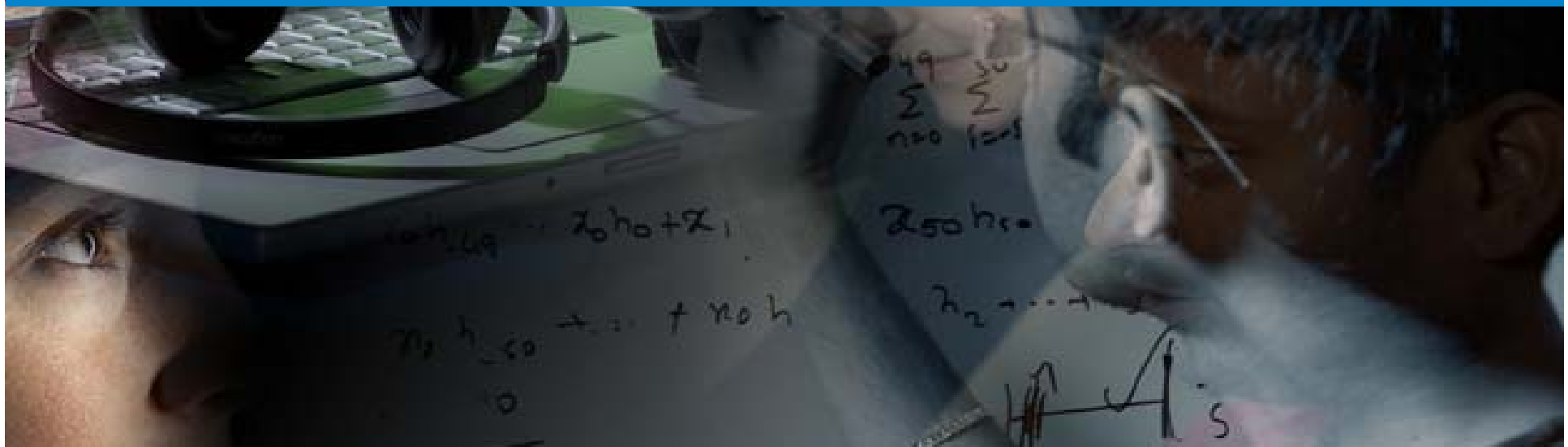
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Prof. Hervé Bourlard

Idiap, Director
EPFL, Professor

International Advisory Board Meeting, Idiap, September 2, 2011

Idiap Human & Media Computing





Agenda

- 08:00 - 08:30 **Hervé Bourlard**, *Welcome note, expectations from Idiap and IAB, overview of 2010-2011 activities.*
- 08:30 - 09:00 **Fabio Valente**, *An information theoretic approach to speaker diarization*
- 09:00 - 09:30 **Ronan Collobert**, *Natural language processing (almost) from scratch*
- 09:30 - 10:00 **Daniel Gatica-Perez**, *Reality mining for real: large-scale human behavior and smart phone data*
- *10:30-11:30 Coffee break*
- 10:30 - 11:00 **Barbara Caputo**, *Life long learning of semantic spatial concepts*
- 11:00 - 11:30 **Jean-Marc Odobez**, *What's going on? Discovering temporal motifs from sensors logs*
- 11:30 - 12:00 **François Fleuret**, *the MASH project: toward the collaborative design of hyper-complex learning software*
- 11:30 - 12:00 Private IAB session
- *12:30-13:30 Lunch*
- 13:30 - 16:00 Poster session
- 17:30 - late Idiap 20th anniversary gala dinner



Idiap Advisory Board

- Prof. Nelson Morgan
 - Director, International Computer Science Institute (ICSI), Professor, University of California at Berkeley, USA
- Dr David Nahamoo
 - Speech CTO & Strategist, Senior Manager, Human Language Technologies, IBM Research, New-York, USA
- Prof. Bayya Yegnanarayana
 - Professor and Microsoft Chair, International Institute of Information Technology (IIIT) Hyderabad, India
- Dr Roelof van Zwol
 - Senior Research Scientist, Multimedia, Audience Sciences, Yahoo! Research, Santa Clara
- Dr Jordan Cohen
 - Independent Consultant, SPELAMODE, CA, USA
- Dr John Makhoul
 - Chief Scientist, Speech and Signal Processing , BBN Technologies, Cambridge, MA, USA
- Prof. Donald Geman
 - Professor, Department of Applied Mathematics and Statistics, The Johns Hopkins University, Baltimore, Maryland
- Prof. Gerhard Sagerer
 - Professor and rector of Bielefeld University, Bielfeld, Germany

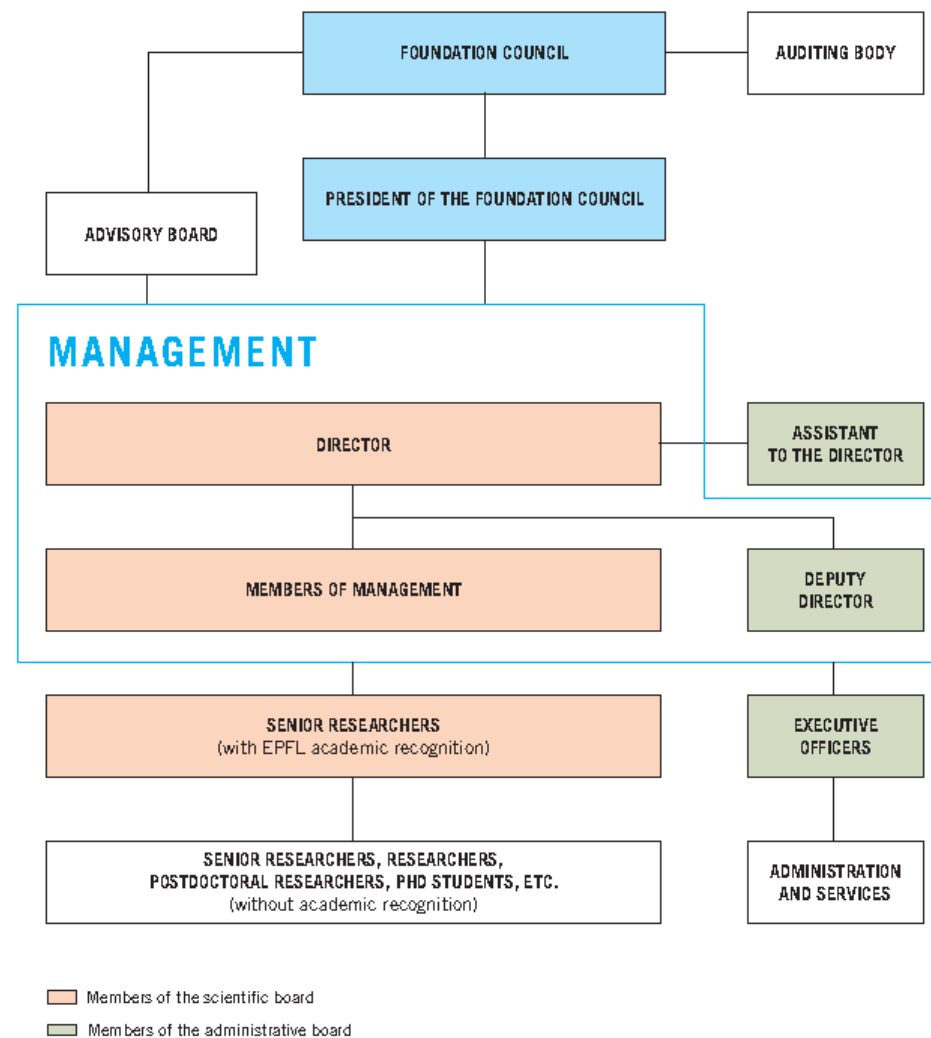




What do we expect from you?

- IAB members are chosen/nominated by Idiap's management and «approved» by the Idiap Foundation Council.
- According to our statutes, we expect between 7 and 9(max) members
 - *Typically 4 year terms (renewable)*
- IAB meets every other year
 - *But can also be consulted by email when needed*
- IAB members are advising Idiap's management on current activities, including scientific, academic and tech transfer activities
- The IAB meeting should result in a formal IAB report (around 2 pages) that can be shared with our funding bodies, as well as with EPFL.

Organization chart





Idiap + IdeArk Profile

Independent, not-for-profit research Institute

- Founded in 1991
- Around 100 collaborators (> 25 pays)
- Budget: around 10 MCHF
- Centre du Parc in Martigny (2300 m²)
- 37 research programs (>130 publications/year)
- Affiliated with EPFL (joint development plan) and University of Geneva
- Accredited (and co-funded) by the Federal Government, State and City, as part of the « ETH Strategic Domain »
- Host institution of CH National Centre of Competence in Research on « interactive multimodal information management » (IM2)



IdeArk SA (www.ideark.ch)

- Founded in 2006
- Technology incubator
- Around 12 start-ups
- 40 FTE employees

20 National Centres of Competence in Research



- Phase I (2002-2005):
 - SNFS funding: 15'400'000.- CHF
 - Self & third-party funding: 16'220'000.- CHF
- Phase II (2006-2009):
 - SNFS funding (Y3 20%, Y4 40% reduction): 11'900'000.- CHF
 - Self & third-party funding: 11'900'000.- CHF
- Phase III (2010-2013)
 - SNFS funding (40% of Phase II): 4'760'000.- CHF
 - Self & third-party funding: 4'765'000.- CHF



Idiap's 4 Funding Sources (1)

1. Public funding:

- *Federal: total budget multiplied by 4 over 2008-2011, but with annual linear increase*
 - *2012 funding = 2011 + 1.5%*
 - *2013-2016 to be confirmed in 2012*
- *State (VS), City (Martigny): regular (slight) increases, conditional on project and tech transfer successes*
- *All together, currently represents about 30% of the total funding*

2. Sponsored Research (CH and international)

- *Swiss NSF*
 - ✓ *IM2, and many other individual/collaborative projects*
 - ✓ *International research projects, e.g., with India, Russia and China*
- *Multiple EU projects*



Idiap's 4 Funding Sources (2)

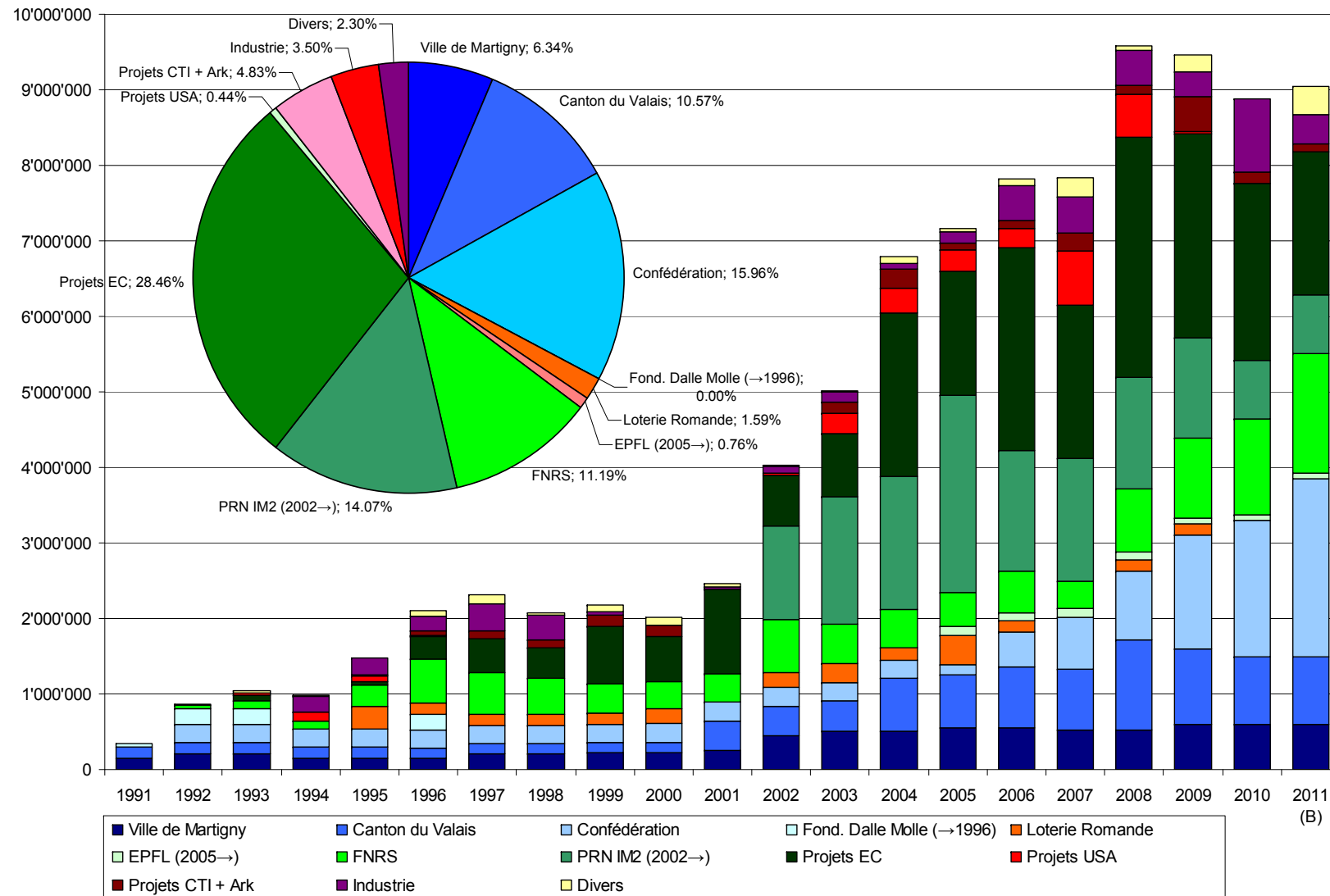
3. Industrial Contracts and Support

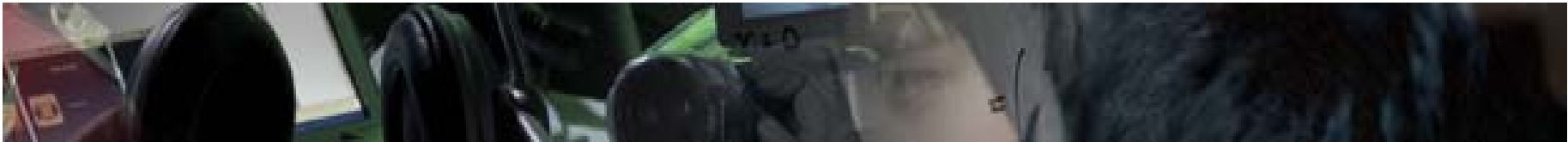
- *Research contracts (Nokia, Samsung, NTT, NEC, Thales, ArmaSuisse, etc)*
- *Corporate sponsorship program (Groupe Mutuel, Swisscom)*

4. Funded International Visitors, being extended to national programs

- Funded international visitors: e.g., through EU Marie-Curie grants
- National programmes: still under development (e.g., Russia, Japan), often related to research + technology transfer and IdeArk

Funding distribution over time





What's new in a nutshell (over the last 2 years)

1. Idiap-EPFL Joint Development Plan:

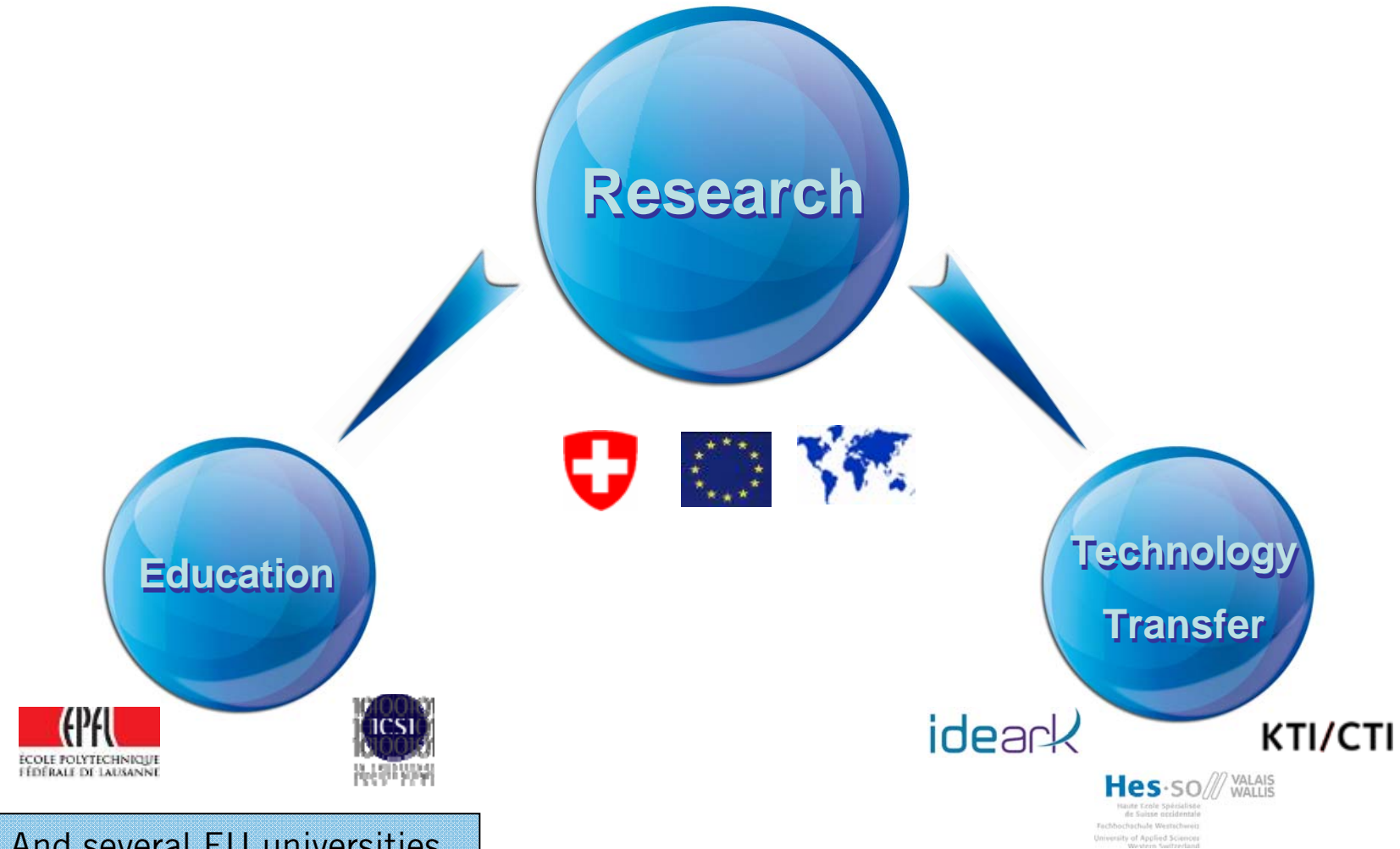
- Signed in June 2008
- Multiple implementation difficulties
- Currently:
 - 3 MER (*“Maîtres d’Enseignement et de Recherche”, Assistant Professors*): Daniel Gatica-Perez, Jean-Marc Odobez, François Fleuret
 - 1 Tenure-Track Assistant Professor: Volkan Cevher
 - Multiple academic activities: doctoral program, teaching of 8 courses, etc.

2. Several new research directions/trends: cognitive systems/robotics, social/human behavioral modeling and mobile/web social media, large scale networked collaboration and heuristics, multilingualism. *See below.*

3. New emphasis on research projects with industries

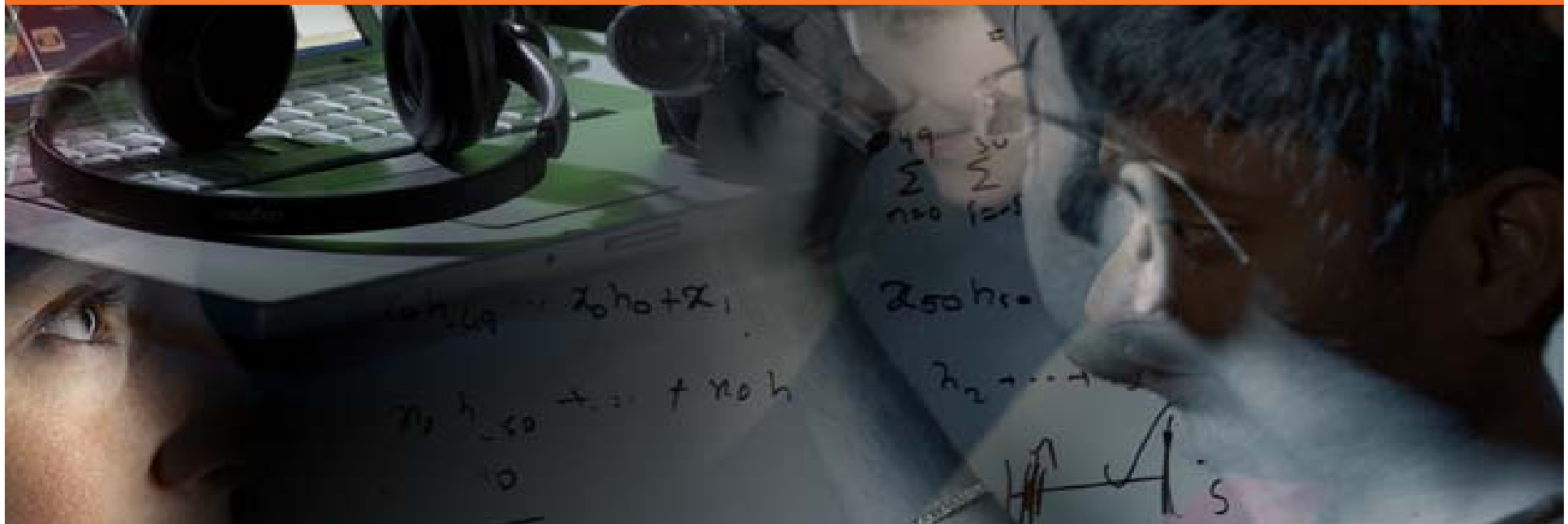
4. Increase in technology transfer activities

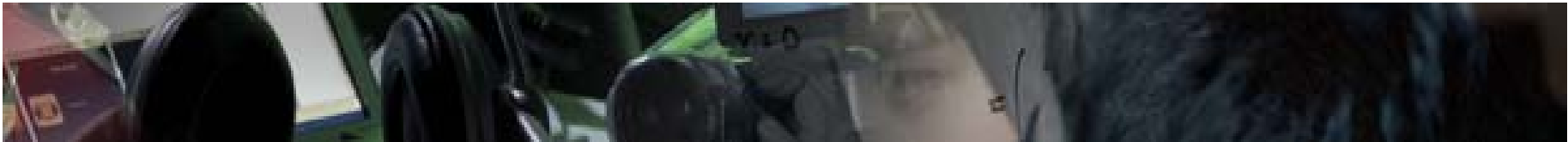
Missions



And several EU universities

R&D Activity Overview and New Trends



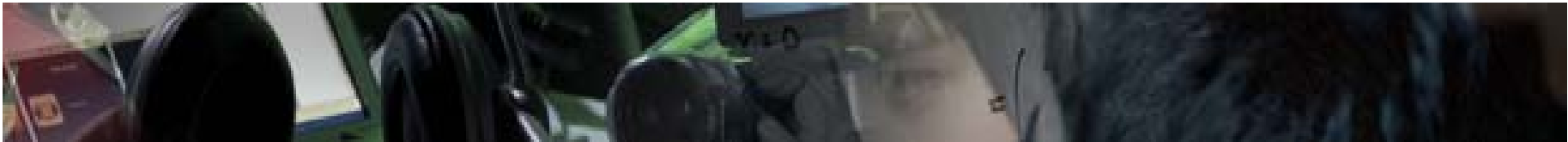


Human and media computing

All details of current activities available at:

<http://www.idiap.ch/scientific-research/themes>

- **Perceptual and cognitive systems**
 - Speech processing
 - Document and text processing
 - Natural language understanding and translation
 - Vision and scene analysis
 - Multimodal processing
 - Computational cognitive science
 - Online learning & categorization
- **Information interfaces and presentation**
 - Multimedia information systems
 - User interfaces
 - System evaluation
- **Biometric person recognition**
 - Speaker identification & verification
 - Face detection, tracking & recognition
 - Multimodal fusion
- **Social/human behavior**
 - Web social media
 - Mobile social media
 - Social interaction sensing
 - Social signal processing
 - Verbal and nonverbal communication analysis
- **Machine learning**
 - Statistical and neural network based ML (strong)
 - Computational efficiency, targeting real-time applications
 - Very large datasets
 - Online learning



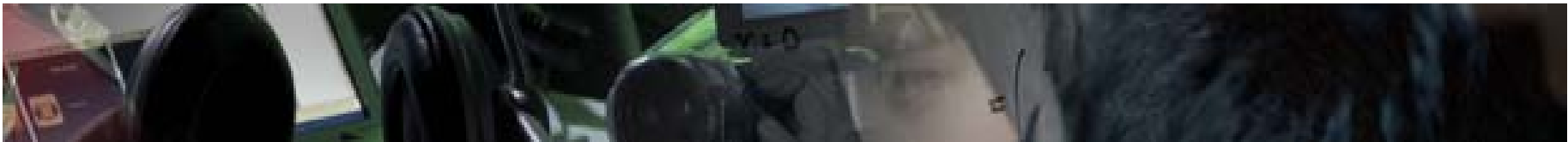
New trends (1): Multilingualism

- David Imseng (SNSF/MULTI): cross-lingual adaptation, multilingual speech recognition, accented speech recognition.
- COMTIS (SNSF/Synergia, Andrei Popescu Belis):
 - *Improving the coherence of machine translation output by modeling inter-sentential relations*
- EMIME (EU, Phil Garner et al):
 - *Effective Multilingual Interaction in mobile environments*
- Samsung:
 - *Domain/language adaptation using sub-space models*
- Swiss (VS and VD) parliaments:
 - *Finalizing contracts for session transcriptions in French and German*
 - *In collaboration with Koemei and Klewel*



New trends (2): Mobile and social media

- LS-CONTEXT (Nokia, Daniel Gatica-Perez)
 - *Mining large-scale, rich smartphone data: discovering personal and social context, personality types, and app usage patterns conditioned on location or social situation*
 - *In collaboration with Nokia Research Lausanne*
- VlogSense (IM2, Daniel Gatica-Perez)
 - *Characterizing video bloggers via behavioral descriptors; investigating relations between behavior, personality, and social media attention*
- SONVB (SNSF/Sinergia, Daniel Gatica-Perez)
 - *Inferring social categories (leadership, personality, performance) in organizational scenarios (from job interviews to job execution) with mobile phone sensing and infrastructure-based sensing*
 - *In collaboration with University of Neuchatel and Cornell University*
- Ambizione (SNSF, Oya Aran)
 - *Starting in December 2011*



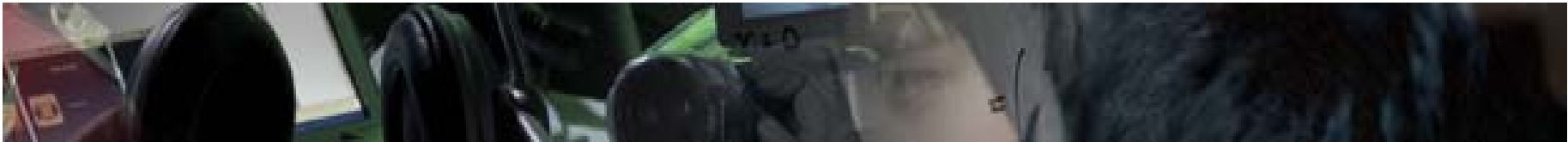
New trends (3): Collaborative Machine Learning

- MASH (EU project, 2010-2012, François Fleuret):
 - *Developing new tools to allow the collaborative development of very complex feature extractors for pattern recognition and action selection.*
- VELASH (SNSF, 2010-2012, François Fleuret):
 - *Exploiting very large feature sets for natural scene parsing.*
- CASUAL (FET EU project, passed the first selection):
 - *Reformulation of the supervision of machine learning and active-learning as collaborative games.*



New trends (4): Biometrics and Security

- MOBIO (EU ICT project, 2008-2010, S. Marcel):
 - *A/V Biometric person recognition on mobile devices (phones & tablets).*
- TABULA RASA (EU ICT project, 2010-2014, S. Marcel):
 - *Direct (spoofing) attacks to biometric systems.*
- BEAT (EU SEC project, 2012-2016, S. Marcel):
 - *Evaluation of biometrics performance (online platform), vulnerability robustness (attacks) and privacy preservation (cryptography)*
- A. Roy (SNSF, 2008-2011):
 - *Boosted Localized Binary Features for Speaker Recognition*



New trends (5): Social robots

- HUMAVIPS (EU ICT project, 2010-2013, Jean-Marc Odobez):
 - *Audio-Visual non-verbal communication behavior recognition algorithms for Group-Robot interaction modeling*
- NINAPRO (SINERGIA SNSF project, 2011-2013, B. Caputo):
 - *Augmented dexterity and boosted control learning curves for non invasive adaptive hand prosthetics*
- VISION@HOME (D-A-CH SNSF project, 2012-2014, B. Caputo):
 - *Situated, affordance-based visual categorization of objects in home settings*
- M. Fornoni (ICS-SNSF, 2010-2012):
 - *Visual Place Categorization for Semantic Spatial Modeling*

New Trends (6): The Social Computer

Meeting processing, ASR

Social control of healthcare and disease

Computer Processing Unit (CPU)
(Compute and data intensiveness of solution)

Conventional computation

Decentralized Social Computation:

Problems in this space have:

- Small, direct impact locally which is magnified when replicated/composed across global society
- or
- Huge, potential impact globally but need a social infrastructure to harness the local ingenuity and data of humans/sensors.

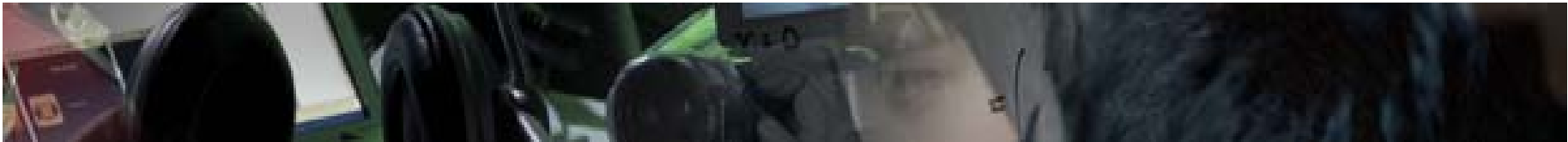
Social decentralised systems

E-Bay

Facebook

Brain Processing Unit (BPU)
(Social intensiveness of solution)

DARPA balloon challenge



Some recent awards

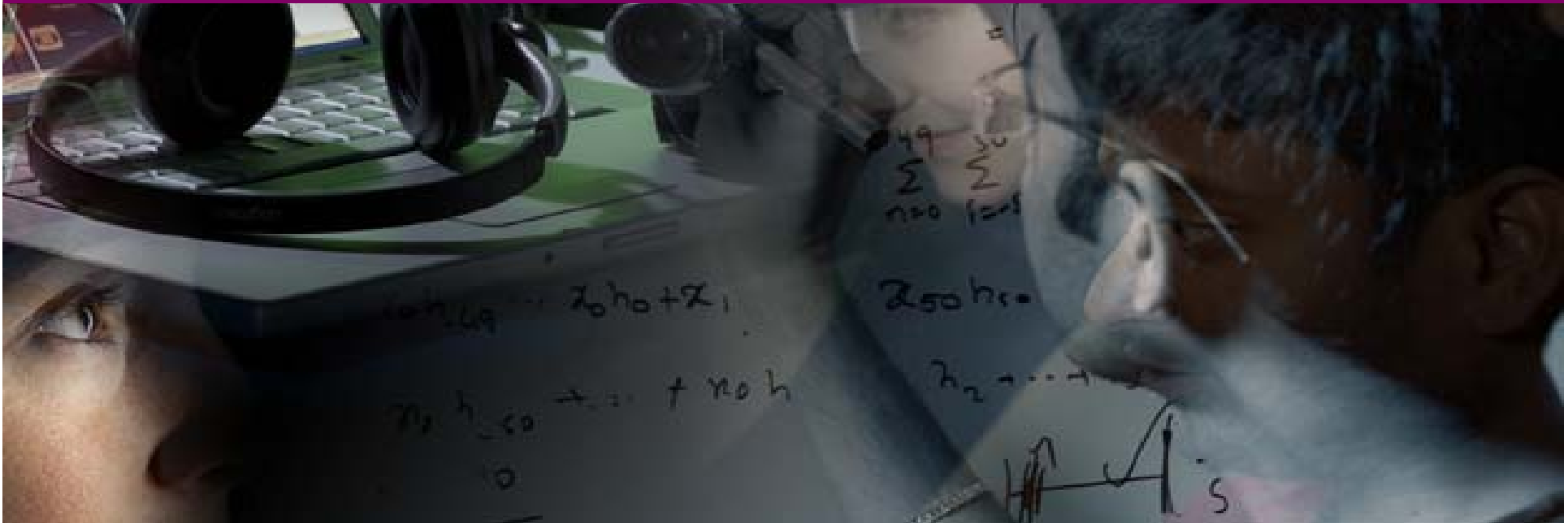
- Best Paper Award at the IEEE Int. Symposium on Wearable Computers (ISWC), San Francisco, June 2011:
 - GroupUs: Smartphone Proximity Data and Human Interaction Type Mining, by Trinh-Minh-Tri Do and Daniel Gatica-Perez.
 - *Who's Who with Big-Five: Analyzing and Classifying Personality Traits with Smartphones, by Gokul Chittaranjan, Jan Blom, and Daniel Gatica-Perez was also nominated for the same Best Paper Award...*
- Best Runner-up Paper Award at IEEE Intl. Conf. on Mobile Data Management, Lulea, June 2011 :
 - Contextual Grouping: Discovering Real-Life Interaction Types from Longitudinal Bluetooth Data, Trinh-Minh-Tri Do
- Best PhD student Paper Award at IEEE ICASSP'2011, Prague, May 2011
 - Model-based Compressive Sensing for Distant Multi-party Speech Recognition, Afsanei Asaei, co-authored with Hervé Bourlard and Volkan Cevher.



Through projects with industries, PME,
Spin-offs

Facilitated by TheArk initiative, including
IdeArk SA, Idiap Spin-offs

Technology Transfer



Showroom





Recent R&D contracts with industries

- Nokia
 - Large-Scale Human Context Discovery from Mobile Phones
- Samsung:
 - Domain Adaptation Using Sub-Space Models
- NEC:
 - Deep Learning for Semantic Text Analysis
- Thales:
 - Urban scene semantic analysis from long recording data
- NTT
 - Multimodal Communication Data Analysis
- ArmaSuisse
 - Low-bit Rate Speech Coding
 - Personalized Information Recommendation for Multimedia Archive Navigation



Funded collaborations with industries

Commission for Technology and Innovation (CTI) projects:

- Koemei SA
 - Task Adaptation and Optimisation for Conversational Speech Recognition
- KeyLemon
 - Face Authentication Robust to Replay Attacks
- Fastnet SA
 - Image Spam Classification

SNSF/IM2 “mini-projects” with industries:

- Koemei SA
 - YouBlog
- Klewel SA
 - Real-time multimodal conference webcast and mobile interaction



Thank you for your attention