Centre Universitaire d'Informatique

2017

Activity Report

CUI UNI GE

UNIVERSITÉ DE GENÈVE

Centre Universitaire d'Informatique

Battelle - Bâtiment A

7, route de Drize

CH-1227 Carouge

UNIVERSITÉ
DE GENÈVE

Foreword

The Centre Universitaire d'Informatique, funded in 1975, federates research and teaching activities at the University of Geneva. With more than 200 members of staff, we develop key research competences in several areas, particularly on: Artificial Intelligence, Virtual and Augmented Reality, Services for Smart Cities, Modelling and Simulation, Information Security, E-Health and Quality of Life, supported by more than 4.526 MCHF of externally funded money (42% of our total budget).

Key facts of 2017 include several reach out activities. We established the "Infoscope", a young public activity providing weekly workshops for schools and teachers in areas such as: algorithms, digitalising writers' manuscripts, programming games for mobile phones, and experiencing virtual and augmented reality. The Infoscope formally starts next year with a team of students all ready to go live. We also co-organised and participated to the "Digital Day" taking place at the Cornavin train station, a day dedicated to showing University of Geneva research involving digital activities. This was one of the many national places dedicated to engaging with the public with digital activities, all taking place the same day. At the international level, we organised in Geneva the European Dependability in Computing Conference in September.

On the teaching side, besides strong doctoral programs, we doubled the number of BSc, MSc students, with now more than 300 students across our various programs. We regularly develop new continuous education programs in line with the demands and needs of industry. We have new programs in digital transformation, data protection and internet of things.

Several awards punctuated our research, namely Prof. Thierry Pun has been elected to the Swiss Academy of Engineering Sciences, one of the four Swiss Academies of Sciences, and Ms Sarah Sabbagh received the Arditi prize in Computer Science for her master thesis in message encryption.

I seize this opportunity to thank all CUI members of staff, students and researchers for their hard work, commitment, innovation and research activities, all participating to our national and international visibility and excellence.

The coming years will see the development of interdisciplinary partnerships with other disciplines of the University of Geneva, and the establishment of links with the local industry and administration.

Prof. Giovanna Di Marzo Serugendo
Director of the CUI
University of Geneva

Organisation

Department of Computer Science

Director:
- **Bastien Chopard**

Academic Advisor:
- Stéphane Marchand-Maillet

Secretary:
- Anne-Isabelle Guintini

System Engineer:
- Daniel Agulleiro

Director:
- **Giovanna Di Marzo Serugendo**

Academic Advisor:
- Marc Pochon

Direction assistant:
- Elie Zagury

Secretaries:
- Marie-France Culebras
- Coralie Grossrieder
- Maëlle Rumbeli

Student secretary:
- Séverine Walter (from July 2017)
-

System Engineer:
- Nicolas Mayencourt

Humanities Computing Unit

Director:
- **Paola Merlo**

Academic Advisor:
- Sandra Rubal

Secretary:
- Eva Capitao

Information Service Science

Director:
- **Giovanna Di Marzo Serugendo**

Secretary:
- Marie-France Culebras

Information Science Institute

Director:
- **Dimitri Konstantas**

Medical Informatics

Director:
- **Antoine Geissbuhler**

Faculty of Science

Sections & Departments

Department of Computer Science

Faculty of Humanities

Sections & Departments

Humanities Computing Unit

RECTORATE

Geneva School of Social Sciences

Departments

Information Service Science

Geneva School of Economics and Management

Institutes

Faculty of Medicine

Sections & Departments

Medical Informatics
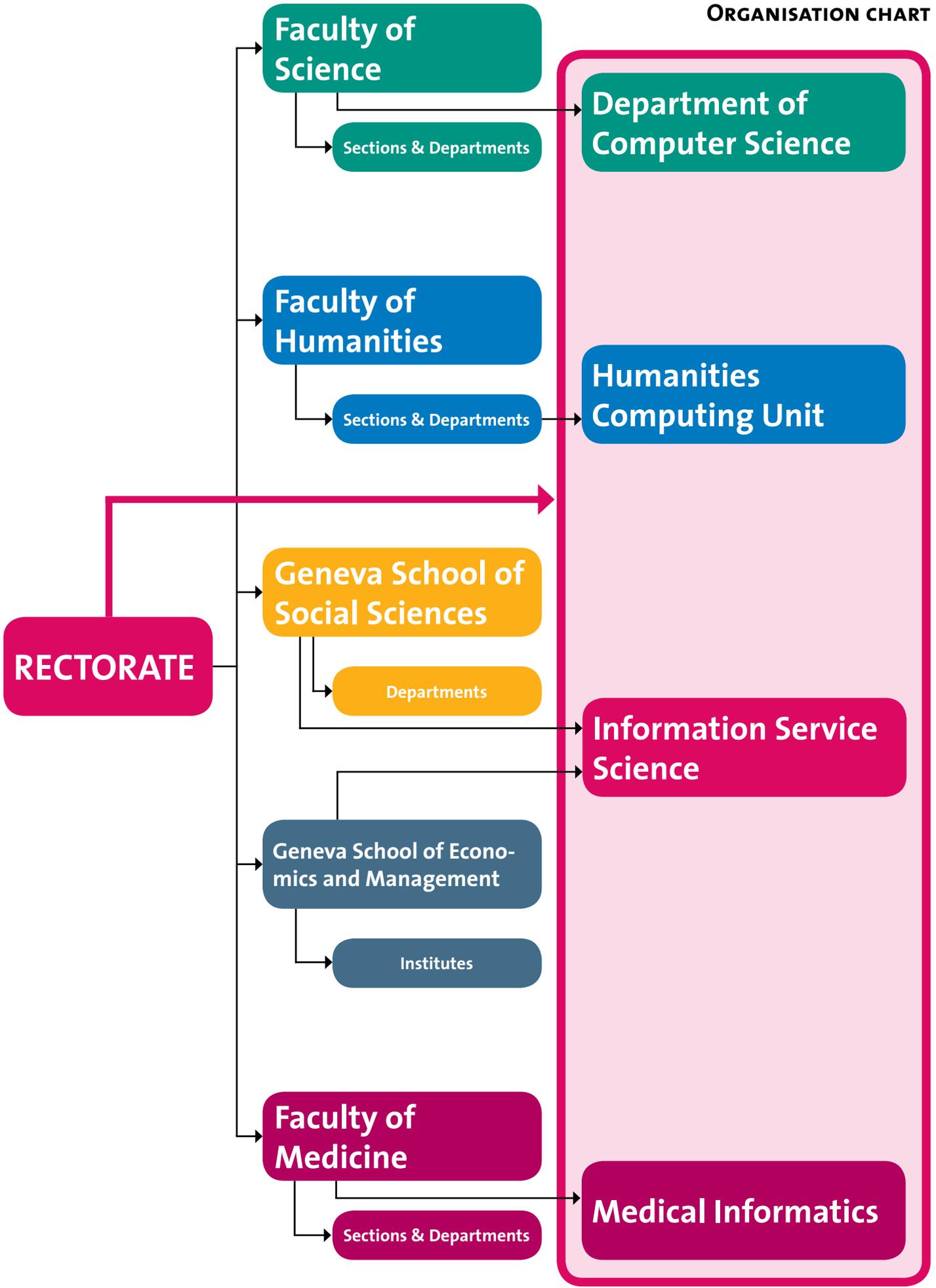
Centre Universitaire d'Informatique

CCC

Citizen
Cyberscience
Centre

Swiss Digital Day, Geneva, 2017 November 21th

Citizen Cyberscience Centre

At Citizen Cyberlab, we are developing methods and studying motivations for new forms of public participation in research. We are researchers from a diversity of backgrounds – history, informatics, learning, linguistics, medicine, physics, psychology and more. Jointly, we initiate projects and organise events that encourage citizens and scientists to collaborate in new ways to solve big challenges. From online crowdsourcing to in-person hackathons, we are exploring and expanding the limits of citizen science and human computation.

Citizen Cyberlab is based on a partnership between the **European Particle Physics Laboratory, CERN**, the **UN Institute for Training and Research, UNITAR**, and the **University of Geneva**, where several teams in different faculties contribute to the lab's activity. In the following, we report activities, events and publications by or involving CUI members of the Cyberlab team.

Team

Director
François Grey
Associate professor
H-index: 27

Senior researchers
Dr. Jose Luis Fernandez-Marquez
Dr. Thomas Maillart

Developers / Designers
Rosy Mondardini

Figure 1: League of Nations Archive
Crowdsourcing and AI to make the League of Nations archive accessible online

Figure 2: SDG Summer School
The SDG Summer School is all about team-based problem solving and hands-on prototype development.

Teaching

- **Open Science**, Bachelor
- **Sustainable Development and political agendas + bootcamp**, Master
- **Science, Expertise and Sustainable Development**, Master
- **Citizen Science on the Web**, Master

clcl.unige.ch

CUI UNIGE

CLCL

Computational Learning and Computational Linguistics

Swiss Digital Day, Geneva, 2017 November 21th

Computational Learning and Computational Linguistics

Domain activities

The Computational Linguistics and Computational Learning (CLCL) Research Group (http://clcl.unige.ch/) is an inter-faculty group that brings together academic staff and PhD students based in the Department of Linguistics in the Faculty of Humanities and the Department of Computer Science in the Faculty of Sciences.

The group is concerned with interdisciplinary research combining linguistic modelling with machine learning techniques. The scope of research includes fundamental issues in the statistical nature of language, fundamental issues in machine learning for structured prediction problems, and empirical evaluations that cross these two themes.

Today, machine learning is everywhere, and is one of the most sought-after skills by information technology employers. We apply it to language problems using very large amounts of multi-lingual data.

Our current research includes the development of adaptive data-driven systems for several parsing-based tasks, such as investigations of shallow levels of meaning representations and spoken-language understanding for dialogue systems, large-scale information extraction, and statistical machine translation. These systems span several languages (French, English, German, Italian, Spanish, Japanese, Arabic, Czech, Chinese, Catalan) and for some languages have reached state-of-the-art performance. These systems are based on our linguistic work on cross-lingual syntactic and semantic parallelism and on machine learning methods based on latent variable models, neural networks and graph-based learning.

Our current linguistic investigation address the problem of language universals. The quest for language universals — rules and principles that are the same for all languages in the world despite their great apparent diversity– has always captured the interest of linguists.

Work from our group that has identified or developed some strong quantitative tendencies across many languages on a large scale, such as a principle of minimal dependency length or the likelihood of external causer.

Team

Directors
Paola Merlo
Associate professor
H-index: 26

James Henderson
CC (UNIGE)
Principal Scientist,
Xerox Research
Centre Europe,
Idiap, Martigny
H-index: 23
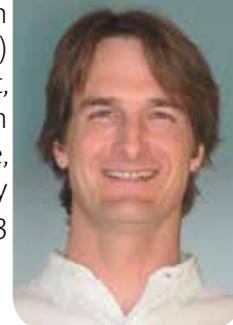
Instructor (Chargée de cours)
Dr. Aurélie Herbelot

Senior researchers
Dr. Corentin Ribeyre

Assistants (PhD students)
Kristina Gulordava
Alexandre Kabbach
Haozhou Wang

Administration
Eva Capitao

CLCL team in 2016

List of publications
Refereed papers in international journals

[1] QasemiZadeh, B., Kallmeyer, L. and Herbelot, A. 2017. Non-Negative Randomized Word Embeddings. In proceedings of Traitement automatique des langues naturelles (TALN2017).

Full refereed papers in Conference Proceedings

[2] C Moor, P Merlo, J Henderson, H Wang, CLCL (Geneva) DINN Parser: a Neural Network Dependency Parser Ten Years Later, Proceedings of the CoNLL 2017 Shared Task: Multilingual Parsing from Raw Text to Universal Dependencies, 228—236.

[3] Alexandre Kabbach, Corentin Ribeyre. myValencer: a Valence Patterns Search Engine for FrameNet. eLex 2017 conference, 19-21 September 2017, Leiden, Netherlands. 2017.

[4] Shekhar, R., Pezzelle, S., Herbelot, A., Nabi, M., Sanguineto, E. and Bernardi, R. 2017. Vision and Language Integration: Moving beyond Objects. In proceedings of the International Conference on Computational Semantics (IWCS2017), Montpellier, France.

[5] Herbelot, A. and Baroni, M. 2017. High-risk learning: acquiring new word vectors from tiny data. In proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP2017), Copenhagen, Denmark.

[6] Shekhar, R., Pezzelle, S., Klimovich, Y., Herbelot, A., Nabi, M., Sanguineto, E. and Bernardi, R. 2017. FOIL it! Find One mismatch between Image and Language caption. In proceedings of the 55th annual meeting of the Association for Computational Linguistics (ACL2017).

Books and book chapters

[7] Paola Merlo, Some Recent Results on Cross-Linguistic, Corpus-Based Quantitative Modelling of Word Order and Aspect, In Formal Models in the Study of Language, J. Blochowiak, C. Grisot, C. Laenzlinger (eds.), 451-464

Figure 2: Data flow of syntactic-semantic parsing

Research and technical reports

[8] James Henderson. Learning Word Embeddings for Hyponymy with Entailment-Based Distributional Semantics. ArXiv e-prints, arXiv:1710.02437 [cs.CL], 2017.

[9] Diana Nicoleta Popa and James Henderson. Bag-of-Vector Embeddings of Dependency Graphs for Semantic Induction. ArXiv e-prints, arXiv:1710.00205 [cs.CL], 2017.

[10] Alexandre Kabbach. Debugging Frame Semantic Role Labeling: Towards robust error analysis of statistical models for automatic frame semantic structure extraction. Memoir for the certificate of specialization in linguistics. 2017. University of Geneva.

Figure 1: Architecture of information extraction system

International and national advisory committees

- Paola Merlo, Member of the Executive Board for the Association for Computational Linguistics.

International and national Research Programs Committees

- Paola Merlo, Reviewer for ERC Starting and consolidator grant proposals
- James Henderson Proposal reviewer for ERC grants

PhD Thesis Committees

- Meghdad Farahmand, Computational Models of Learning the Idiosyncracy of Multiword Expressions, March 2017.
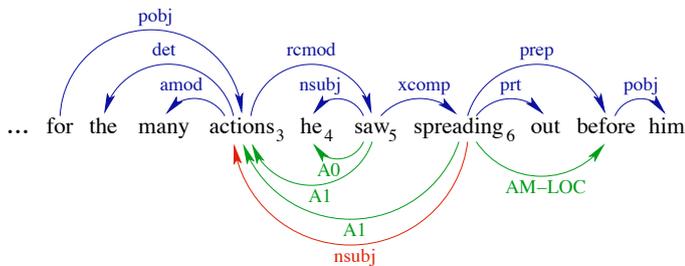
Figure 3: Syntactic and semantic analysis of sentences

MEMBER OF CONFERENCE/WORKSHOP PROGRAM COMMITTEES

Aurélie Herbelot:

- Program co-chair for *SEM 2017 (co-located with ACL, Vancouver, August 2017)

FUNDED RESEARCH PROJECTS

Participation to National projects

Complexity, variation and frequency in natural languages: The interfaces between linguistic theory, experimental psycholinguistics and computational linguistics

Principal Investigator: Paola Merlo

Period: 2016-2018

Granted by the réseau Langage et Communication, Université de Genève.

OTHERS

Refeereeing

- James Henderson, Transactions of the Association for Computational Linguistics, Computational Linguistics.
- Paola Merlo, Journal of language modelling, Italian journal for computational linguistics.
- Alexandre Kabbach, Secondary reviewer for CoNLL 2016 and EMNLP 2016

Editorial responsibilities

- Paola Merlo: Editor-in-chief of the journal Computational Linguistics, MIT Press.
- James Henderson, Associate editor, Transactions of the Association for Computational Linguistics.

Events organised in Geneva

- Journée des doctorants, Réseau langage et communication.
- Participation to the days of information on informatics in the regional high-schools.

Invited talks

- Paola Merlo The Merlo lectures, CRISSP lectures, UK Leuven, October, 2017.
- Keynote, Linguistic Symposium on Romance Languages, Delaware, April 2017.
- Paola Merlo, NCCR organization Workshop, Zürich, September 2017.
- James Henderson, Inducing representations for lexical entailment with entailment-based distributional semantics, Bochum, 24th October, 2017.
- Machine learning at EPFL seminar (ML@EPFL), Learning Representations of Abstractions in Text with Entailment Vectors, 9th November 2017.

Other

- Kristina Gulordava, Facebook internship, Fall, Paris FAIR.
- Open-source softwares
  https://valencer.io/#/
  and the corresponding
  https://github.com/akb89/myValencer
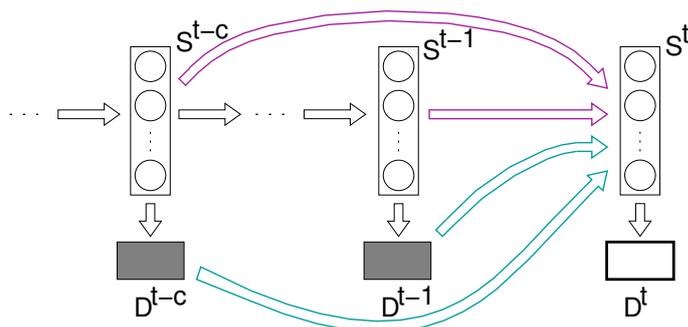
Figure 4: Neural network models for language

TEACHING

- **Algorithmique et programmation**, Bachelor, 6 ECTS, 65 hours, 15 students
- **Structure de données et langage orienté-objets**, Bachelor, 6 ECTS, 56 hours, 3 students
- **Artificial Intelligence: Principles and methods**, Bachelor, 4 ECTS, 56 hours, 18 students
- **Traitement automatique du langage: approches linguistiques et approches statistiques**, Master, 6 ECTS, 56 hours, 21 students
- **Empirical Methods in Natural Language Processing**, Master, 6 ECTS, 56 hours, 8 students
- **Nouvelles Technologies de l'Information et de la Communication**, Bachelor, 6 ECTS, 56 hours, 20 students

cvml.unige.ch

CVML

Computer Vision and Multimedia Laboratory

Swiss Digital Day, Geneva, 2017 November 21th

Computer Vision and Multimedia Laboratory

Domain activities

The **Computer Vision and Multimedia Laboratory** (CVML, http://cvml.unige.ch), divided into three groups, carries out research in multimedia data processing, multimedia data management and security, as well as in multimodal human-machine interaction. Research applies to media such as text, audio tracks, sounds, images and videos, and to physiological signals.

Information Retrieval and Machine Learning group (Viper, Prof. S. Marchand-Maillet, Prof. A. Kalousis, http://viper.unige.ch): develops strategies for the efficient modeling, indexing, retrieval and exploration of large-scale datasets. The group studies fundamental machine learning strategies to provide efficient and accurate understanding and access to large-scale collections of complex data. Research themes include information retrieval, recommendation systems, data analytics and exploration, learning over sequential and temporal data, structured and kernel learning, regularization techniques for neural networks. Applications are considered in the fields of data visualization, forecasting, IoT, chemoinformatics, biomedicine.

Stochastic Information Processing group (SIP, Prof. S. Voloshynovskiy, http://sip.unige.ch): studies various aspects of information theory and statistical (stochastic) information analysis and processing. The applications mostly cover object identification and authentication based on unclonable object features in large nonstructured databases originating from various imaging techniques, mass-spectrometry and bioinformatics. Current research also concerns privacy preserving search, indexing and multiclass classification.

Multimodal Interaction group (MMI, Prof. T. Pun, http://cvml.unige.ch/MMI): affective computing and multimodal interaction. Studies various forms of interaction between humans, computers, and environment. Used modalities: haptic, auditory, and based on physiological signals such as EEGs (electroencephalograms), EMG (electromyograms), blood pressure, galvanic skin resistance (GSR) and skin temperature, breathing rate. Current developments concern: affective state determination and emotion recognition and their use for affective computing, multimodal interaction, brain-computer interfaces, mobility aids for sight handicapped people and for the elderly. Member of the Swiss Center for Affective Sciences. Strong cooperation with faculties of psychology, literature, medicine.

The CVML has various specialized equipment and associated software:
- portable microscope with wireless communications for item identification and authentication;
- Computer cluster of 20 Dual Core 3GHz PCs each with 8 Gb RAM and 500Gb disk, inter-connected with GigaBit Ethernet.
- servers with high storage (overall 5Tb, Raid 5) and processing capabilities (1 Transtec Calleo (2 Xeon Dual Core, 12Gb RAM) and 2 SunFire X4150 (2 Quad-Core, 32Gb RAM each), all 64bits architecture).
- Biosemi Active II EEG acquisition system (http://www.biosemi.com/) with 64+16 electrodes, with other sensors to record heart rate, GSR, skin temperature, breathing rate, blood pressure, and EMGs;
- Guger Technology gTec gMobilab+ mobile physiological signals recording system (http://www.gtec.at/);
- Eckel C14 audiometric research chamber (http://www.eckel.ca/) with electromagnetic insulation (Faraday cage), 2.16m x 1.80m x 2.37m;
- eye gaze-tracker QuickGlance 2 (EyeTech Digital Systems);
- head-mounted display Emagin z800;
- stereo cameras: Videre Design STH-MDCS2, Bumblebee CCD BB2-03S2C-60;
- 3D time-of-flight camera SR4000 3D;
- combined 3D time-of-flight + luminance camera PMD CamCube 3.0 200x200 pixels;
- combined 3D + color camera Microsoft Kinect, Lytro, etc.;
- light field camera: Raytrix.

Team

Direction
Thierry Pun
Full professor
H-index: 52

Sviatoslav Voloshynovskiy
Associate professor
H-index: 29

Stéphane
Marchand-Maillet
Associate professor
H-index: 22

Alexandros Kalousis
Full professor
University of Applied
Studies, Geneva School of
Business Administration
H-index: 26

Senior researchers
Dr. Guido Bologna (also affiliated with University of Applied Studies, Geneva)
Dr. Guillaume Chanel (also affiliated with the Swiss Center for Affective Science)
Dr. Theodoros Kostoulas (also affiliated with the Swiss Center for Affective Science)
Dr. Mohammad Soleymani
Dr. Taras Holotyak
Dr. Phil Lopes
Dr. Edgar Roman-Rangel
Dr. Anna Aljanaki

Assistants (PhD students)
Lionel Blondé
François Bogacz
Séverine Cloix
Maurits Diephuis
Sohrab Ferdowsi
Magda Gregorova
Dimche Kostadinov
Amina Mollaysa
Michal Muszinsky
Xavier Ouvrard
Dimitris Dardanis
Jason Ramapuram
Soheil Rayat-Doost
Pablo Strasser
Chen Wang
Olga Taran
Shideh Rezaeifar
Behrooz Razeghi
Denis Ullmann

Administration
Coralie Grossrieder

PhD Thesis

- Séverine Cloix - Sparse Multi-View 3D Computer Vision: Application to Embedded Assistive Technologies – University of Geneva, Switzerland, June 2017.
- Maurits Diephuis - Micro-structure recognition on mobile platforms - University of Geneva, Switzerland, May 2017

List of publications

Refereed papers in international journals

[1] C. Wang, T. Pun, G. Chanel, «A Comparative Survey of Methods for Remote Heart Rate Detection From Frontal Face Videos», Front. Bioeng. Biotechnol. - Bionics and Biomimetics, to appear, DOI: 10.3389/fbioe.2018.00033 Frontiers in ICT, 4, 2017.

[2] M. Muszynski, T. Kostoulas, P. Lombardo, T. Pun, G. Chanel, «Aesthetic highlight detection in movies based on synchronization of spectators' reactions», ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), to appear.

[3] S. Cloix, T. Pun, D. Hasler, «2D point characterization for 3D keypoint detection using light field images», Journal of Real-Time Image Processing (JRTIP), Springer, subm. April 2017.

[4] M. Soleymani, M. Pantic, «Multimedia Implicit Tagging», Social Signal Processing, 26, 368, 2017. DOI: 10.1017/9781316676202 (book chapter).

[5] A. Aljanaki, Y. H. Yang, M. Soleymani, «Developing a benchmark for emotional analysis of music», PloS one, 12(3), 2017, e0173392. DOI:10.1371/journal.pone.0173392

[6] M. Larson, M., Soleymani, G. Gravier, B. Ionescu, G. J. Jones, «The Benchmarking Initiative for Multimedia Evaluation: MediaEval 2016», IEEE MultiMedia, 24(1), 2017, 93-96. DOI: 10.1109/MMUL.2017.9

[7] M. Soleymani, D. Garcia, D., B. Jou, B. Schuller, S. F. Chang, M. Pantic, «A survey of multimodal sentiment analysis», Image and Vision Computing, 2017. DOI:10.1016/j.imavis.2017.08.003

[8] D. Novak, G. Chanel, P. Guillotel, A. Koenig, (Eds.), «Toward Commercial Applications of Affective Computing», IEEE Trans. on Affective Computing, 8(2), 2017, 145-147. DOI: 10.1109/TAFFC.2017.2676318

[9] T. Kostoulas, G. Chanel, M. Muszynski, P. Lombardo, T. Pun, «Films, affective computing and aesthetic experience: Identifying emotional and aesthetic highlights from multimodal signals in a social setting», Human-Media Interaction, Specialty section, Frontiers in ICT, 2017, Front. ICT 4:11. doi: 10.3389/fict.2017.00011

[10] M. Soleymani, F. Villaro-Dixon, T. Pun, G. Chanel, «Toolbox for Emotional feature extraction from Physiological signals (TEAP)», Frontiers in ICT, section Human-Media Interaction, Vol. 4, Issue 1, 2017. doi: 10.3389/fict.2017.00001

[11] Nielsen, F., Sun, K., & Marchand-Maillet, S. (2017). On Holder Projective Divergences. Entropy, 19.

[12] Krulis, M., Osipyan, H., & Marchand-Maillet, S. (2017). Employing {GPU} architectures for permutation-based indexing. Multimedia Tools and Applications, 76.

Full refereed papers in Conference Proceedings

[13] Chen Wang, «Detecting and managing impressions for a more engaging virtual agent», Symbiotic 2017, The 6th Int. Workshop on Symbiotic Interaction, Doctoral Consortium, Dec. 18-19, Eindhoven, The Netherlands.

[14] P. Lopes, G.N. Yannakakis, A. Liapis, "Rank-Trace: Relative and Unbounded Affect Annotation", Proceedings of the Affective Computing and Intelligent Interactions Conference, San Antonio TX, USA, Oct. 23-26, 2017.

[15] S. Rayat-Doost, T. Pun, M. Soleymani, «Cross-modality interaction between EEG signals and facial expression», Doctoral Consortium, ICMI 2017, 19th Int. Conf. on Multimodal Interaction, Glasgow, Scotland, Nov. 13-17, 2017.

[16] G. Chanel, S. Avry, G. Molinari, M. Betrancourt, T. Pun, «Multiple users' emotion recognition: Improving performance by joint modeling of affective reactions», Special Session: Brain and physiological signals for multi-user modeling, ACII 2017, 7th Int. Conf. Affective Computing and Intelligent Interaction, San Antonio, Texas, USA, Oct. 23-26, 2017.

[17] Leimin Tian, M. Muszynski, C. Lai, J. D. Moore, T. Kostoulas, P. Lombardo, T. Pun and G. Chanel, «Recognizing induced emotions of movie audience: are induced and perceived emotions the same?», ACII 2017, 7th Int. Conf. Affective Computing and Intelligent Interaction, San Antonio, Texas, USA, Oct. 23-26, 2017.

[18] M. Soleymani, M. Riegler, P. Halvorsen. Multimodal Analysis of Image Search Intent: Intent Recognition in Image Search from User Behavior and Visual Content. In Proceedings of the 2017 ACM on International Conference on Multimedia Retrieval, June 2017, 251-259. ACM. DOI: 145/3078971.3078995

[19] S. Avry, G. Chanel, M. Betrancourt, T. Pun, G. Molinari, «Feedbacks de contrôle et de valeur dans un jeu vidéo de résolution de problèmes collaboratif : Effets sur les émotions et la collaboration», EIAH 2017, Environnements Informatiques pour l'Apprentissage Humain, 6-9 juin 2017, Strasbourg, France.

[20] D. McDuff, M. Soleymani, Large-scale Affective Content Analysis: Combining Media Content Features and Facial Reactions. In Automatic Face & Gesture Recognition (FG 2017), 2017 12th IEEE International Conference on. May 2017, 339-345. IEEE. DOI: 10.1109/FG.2017.49

[21] S. Avry, G. Chanel, T. Pun, G. Molinari, M. Bétrancourt, «The interplay between shared emotions and collaborative processes during a computer-supported creative problem-solving task», CSEDU 2017, 9th Int. Conf. on Computer Supported Education, April 21 - 23, 2017, Porto, Portugal. (Subm. Feb 2017)

[22] S. Avry, G. Chanel, T. Pun, G. Molinari, M. Bétrancourt, «An emotion awareness tool for the sharing of emotions: What impact on computer-supported collaborative processes?», CSCL 2017, The Int. Conf. on Computer-Supported Collaborative Learning, June 18th-21, 2017, Philadelphia, PA, USA.

[23] Roman-Rangel, E., & Marchand-Maillet, S. (2017). Visualizing weakly-annotated multi-label Mayan inscriptions with supervised t-{SNE}. In Content-Based Multimedia Indexing (CBMI2017), Florence, IT.

[24] Roman-Rangel, E., & Marchand-Maillet, S. (2017). Assessing Deep Learning Architectures for Vizualising Maya Hieroglyphs. In Mexican Conference on Pattern Recognition (MCPR2017), Mexico, MX.

[25] Nielsen, F., Sun, K., & Marchand-Maillet, S. (2017). K-means clustering with Holder Divergences. In Geometric Science of Information (GSI2017), Paris, FR.

[26] Gregorova, M., Kalousis, A., & Marchand-Maillet, S. (2017). Learning Predictive Leading Indicators for Forecasting Time Series Systems with Unknown Clusters of Forecast Tasks. In Asian Conference on Machine Learning (ACML2017), Soul, South Korea.

[27] Gregorova, M., Kalousis, A., & Marchand-Maillet, S. (2017). Forecasting and Granger modelling with non-linear dynamical dependencies. In ECML/PKDD 2017, Skopje, MD.

[28] D. Kostadinov, S. Voloshynovsky, and S. Ferdowsi, Joint learning of content fingerprint and content modulation, in Proc. of the 25th European Signal Processing Conferences, EUSIPCO, Kos, Greece, 28 August –September 2, 2017.

[29] B. Razeghi, S. Voloshynovskiy, D. Kostadinov, O. Taran, Privacy preserving identification using sparse approximation with ambiguization, IEEE Workshop on Information Forensics and Security - WIFS'17, Rennes, France, 4-7, December, 2017.

[30] O. Taran, S. Rezaeifar, O. Dabrowski, J. Schlechten, T. Holotyak, S. Voloshynovskiy, PharmaPack: Mobile fine-grained recognition of pharma packages, in Proc. of the 25th European Signal Processing Conferences, EUSIPCO, Kos, Greece, 28 August –September 2, 2017.

[31] S. Ferdowsi, S. Voloshynovskiy, D. Kostadinov, and T. Holotyak, Sparse Ternary Codes for similarity search have higher coding gain than dense binary codes, in Proc. 2017 IEEE International Symposium on Information Theory (ISIT) (ISIT'2017), Aachen, Germany, 2017.

[32] S. Ferdowsi, S. Voloshynovskiy and D. Kostadinov, A multi-layer image representation using regularized residual quantization: application to compression and denoising, IEEE International Conference on Image Processing, ICIP 2017, Beijing, China, Sept. 17-20, 2017.

[33] T. Charlon, A. Di Cara, S. Voloshynovskiy, and J. Wojcik, Replication of the principal component analyses of the human genome diversity panel, F1000Research, vol. 6, iss. 278, 2017.

[34] D. Kostadinov, S. Voloshynovsky, and S. Ferdowsi, Learning non-structured, overcomplete and sparsifying transform, in Proc. Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 5-8, Lisbon, Portugal, 2017.

[35] S. Ferdowsi, S. Voloshynovsky, and D. Kostadinov, Regularized Residual Quantization: a multi-layer sparse dictionary learning approach, in Proc. Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 5-8, Lisbon, Portugal, 2017.

Books and book chapters

[36] S. Voloshynovskiy, T. Holotyak, M. Diphuis, Physical object security: biometrics vs physical objects, Book chapter in book "User-Centric Privacy and Security in Biometrics" edited by C. Vielhauer, The institution of Engineering and Technology, IET publisher, 27 pages, 2017. http://digital-library.theiet.org/content/books/sc/pbse004e

Research and technical reports

[37] G. Molinari, S. Avry, G. Chanel, "Les émotions dans les situations de collaboration et d'apprentissage collaboratif médiatisées par ordinateur", Raisons éducatives, 21, 175-190, 2017.

[38] M. Muszynski, T. Kostoulas, P. Lombardo, T. Pun, G. Chanel, «Films, aesthetics and emotions - Interdisciplinary studies», Annual Research Forum, Swiss Center for Affective Sciences, Feb. 7, 2018, Geneva, Switzerland (poster).

[39] Chen Wang, T. Pun, G. Chanel, «A comparison of methods for remote heart rate detection from frontal face videos», Swiss Center of Affective Sciences, Closing Conference, May 18-19, 2017, Geneva, Switzerland (poster).

[40] M. Muszynski, T. Kostoulas, P. Lombardo, T. Pun, G. Chanel, «Evaluation of synchronization measures for aesthetic highlight detection in movies», Swiss Center of Affective Sciences, Closing Conference, May 18-19, 2017, Geneva, Switzerland (poster).

[41] Nielsen, F., Sun, K., & Marchand-Maillet, S. (2017). On Hölder projective divergences CoRR abs/1701.03916.

[42] Gregorova, M., Kalousis, A., & Marchand-Maillet, S. (2017). Forecasting and Granger modelling with non-linear dynamical dependencies CoRR abs/1706.08811.

[43] Ouvrard, X., Goff, J. L., & Marchand-Maillet, S. (2017). Networks of Collaborations: Hypergraph modeling and visualisation CoRR abs/1707.0015.

[44] Ouvrard, X., & Marchand-Maillet, S. (2017). Adjacency Matrix and Co-occurrence Tensor of General Hypergraphs: Two Well Separated Notions CoRR abs/1712.08189.

International and national advisory committees

- T. Pun: Member of the Steering Committee of the Swiss Center for Affective Sciences.
- S. Marchand-Maillet: Member of the Steering Committe for the International ACM Conference on Multimedia Retrieval (ICMR).
- S. Marchand-Maillet, Member of the Editorial Board of the International Journal of Multimedia Information Retrieval.
- S. Marchand-Maillet, Member of the Editorial Board of the ACM Transactions on Iformation Systems (ACM-TOIS, 2016-present)
- S. Voloshynovskiy, Elected associate member of the IEEE Information Forensics and Security Technical Committee (March 2015 – present).
- S. Voloshynovskiy, Founding member and board member of EURASIP Special Area Teams (SATs) in Biometrics, Data Forensics and Security (Aug. 2015 - present).
- M. Soleymani: Executive board for the Association for Advancement of Affective Computing (AAAC).

International and national Research Programs Committees

- G. Chanel, Since 2016, Member of the scientific evaluation panel "CE33 : Interaction, Robotics" of the French National Research Agency
- S. Marchand-Maillet: reviews projects from many European National funding agencies.

PhD Thesis Committees
Sviatoslav Voloshynovskiy:
- C. Fatnassi,2017, Head of jury, Univ. of Geneva (Switzerland)
- Y. Lin, 2017, EPFL (Switzerland)
- S. Cloix, 2017, Univ. of Geneva (Switzerland)
- M. Diephuis, 2017, Head of jury, Univ. of Geneva (Switzerland)

Conference organization as chair or co-chair
Sviatoslav Voloshynovskiy:
- ACM2017, ACM Information Hiding and Security Workshop 2017, Philadelphia, June 2017 (technical program co-chair).

Member of conference/workshop program committees
Thierry Pun:
- ACII 2017 (San Antonio, USA); IEEE SMC Int. Conf. on Companion Technol. 2017 (Ulm, Germany)

Guillaume Chanel:
- IEEE Conference on Automatic Face and Gesture Recognition, Xi'an, China, May 15-19, 2017; ACII 2017,San Antonio, USA

Sviatoslav Voloshynovskiy:
- IWDW2017, International Workshop on Digital Forensics and Watermarking (IWDW2017) in Magdeburg, Germany, August 23-25, 2016 (technical committee).
- WIFS2017, IEEE Workshop on Information Forensics and Security 2017, Rennes, France, (technical committee; co-organizer of a special session on Physical Object Identification and Authentication; chairman of session on Physical Layer Security (Information-Theoretic methods)).
- SPIE2017, Electronic Imaging 2017, Media watermarking, security and forensics 2017, San Francisco, USA, 2017, (program committee, chairman of Identification Technologies session).
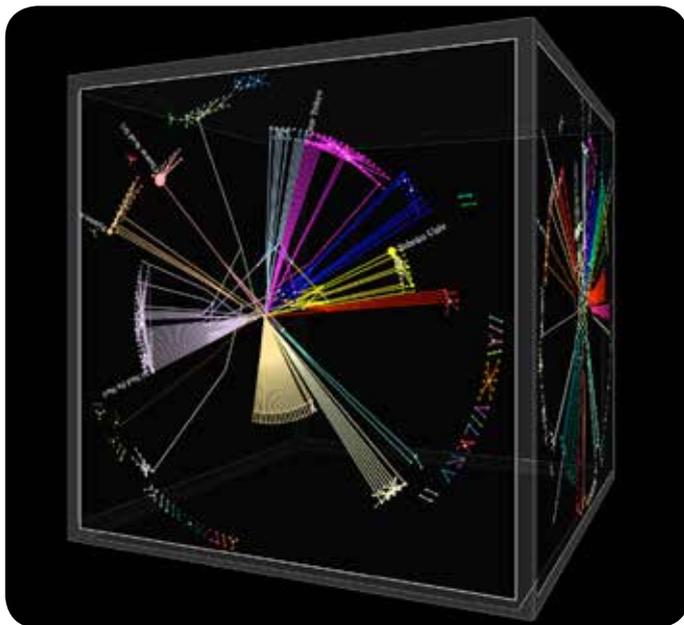

Figure 2: Visual Analytics for Big Data: Development of interfaces for visualising and manipulating complex data. Visualisation of hypergraphs (collaboration with CERN)
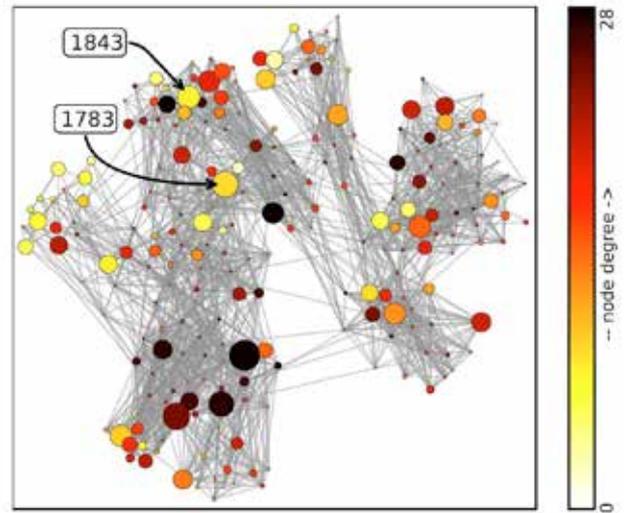

Figure 1: Social Network Analysis: characterization of influence. Study of the relationships and communication in a primary school playground

Refereeing
- G. Chanel: IEEE TAC - Transactions on Affective Computing

Editorial Responsabilities
Thierry Pun:
- Associate editor, Human-Media Interaction, specialty section of Frontiers in ICT, Frontiers in Psychology and Frontiers in Digital Humanities (Nature Publishing Group).

Mohammad Soleymani:
- Associate editor, IEEE Transactions on Affective Computing.
- Guest editor, Image and Vision Computing, Special Issue on Multimodal Sentiment Analysis and Mining in the Wild.

Sviatoslav Voloshynovskiy:
- Journal of Electronic Imaging
- IEEE Signal Processing Letters (since December 2015-) and Senior Associate Editor (since April 2016 -).
- ELSEVIER Journal on Computer Standards and Interfaces (since October 2009 -).
- EURASIP Journal on Information Security (Eurasip IJS)
- International Journal of Image and Graphics (IJIG)

Stéphane Marchand-Maillet:
- Associate Editor for the ACM Transactions of Information Systems (ACM-TOIS)

Invited talks
Guillaume Chanel:
- Key note speaker, "(Socio)-affective computing and its potential role in collaboration" Quantified Employe, Helsinki, 2017

Michal Muszynski:
- «Induced and perceived emotions in film viewing», Interdisciplinary Workshop / Journée d'étude Literature, Film and the Emotions / Littérature, cinéma et émotions, 19 July/juillet 2017, Geneva, Switzerland (invited talk).

Mireille Bétrancourt, Thierry Pun, G. Molinari, Guillaume Chanel:

- «EATMINT: Emotion awareness tools for mediated interaction», Swiss Center of Affective Sciences, Closing Conference, May 18-19, 2017, Geneva, Switzerland (invited talk).

Phil Lopes:

- "Winter School on Artificial Intelligence for Games", Invited Lecture, Barcelos, Portugal, Nov. 17-18, 2017.
- "ASYNC: Asynchronous Research on AI & Games", Invited Webinar Talk, Oct. 26, 2017. http://metamakersinstitute.com/events/async/

Thierry Pun:

- «Affective Computing», Invited Talk, Firmenich, Geneva, Switzerland, Jan. 11, 2017.

Stéphane Marchand-Maillet:

- Manifold Learning for Complex Visual Analytics, Blue Brain Lab, Geneva.
- Invariance in PB Indexing schemes: Application to the analysis of Mesoamerican Cultural Heritage, LIST, Luxembourg

Sviatoslav Voloshynovskiy:

- Digital security and privacy protection, invited talk, CNRS, «How to merge Big Data, people identification, content traceability and privacy?», Rennes, France, December 8, 2017.
- CeBIT2017, Digital security for physical world, Hanover, Germany, March 21, 2017. S. Voloshynovskiy, headed the UNIGE team presenting the SIP group developed technology as a Swiss representative at the CeBIT Swiss Pavilion, March 20-24, 2017 (key note presentation).

Funded research projects
Participation to European projects

IMPRESSIONS
Seconds that matter: Managing first impressions for a more engaging virtual agent
Nr. 200021E-164326 / 1, Lead Agency Framework
Joint French - Swiss project
French principal investigator: Prof. C. Pélachaud, Télécom-ParisTec.
Swiss principal investigator: Prof. T. Pun, Dr. G. Chanel
Period: July 2016 - June 2019

Participation to National projects

FNRS-SNSF, Swiss National Science Foundation:

Sensing Knowledge Emotions in Multimedia Discovery
Ambizione Grant PZ00P2_154981/1
Mohammad Soleymani
Period: January 2015 - December 2017

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Information-theoretic forensic physical object identification
SNF 200021-165672
Principal investigator: Prof. S. Voloshynovskiy, Computer Science Dpt., Univ. of Geneva.
Period: October 2016 - September 2018

___

CVML team, 2016 Nov. 1st
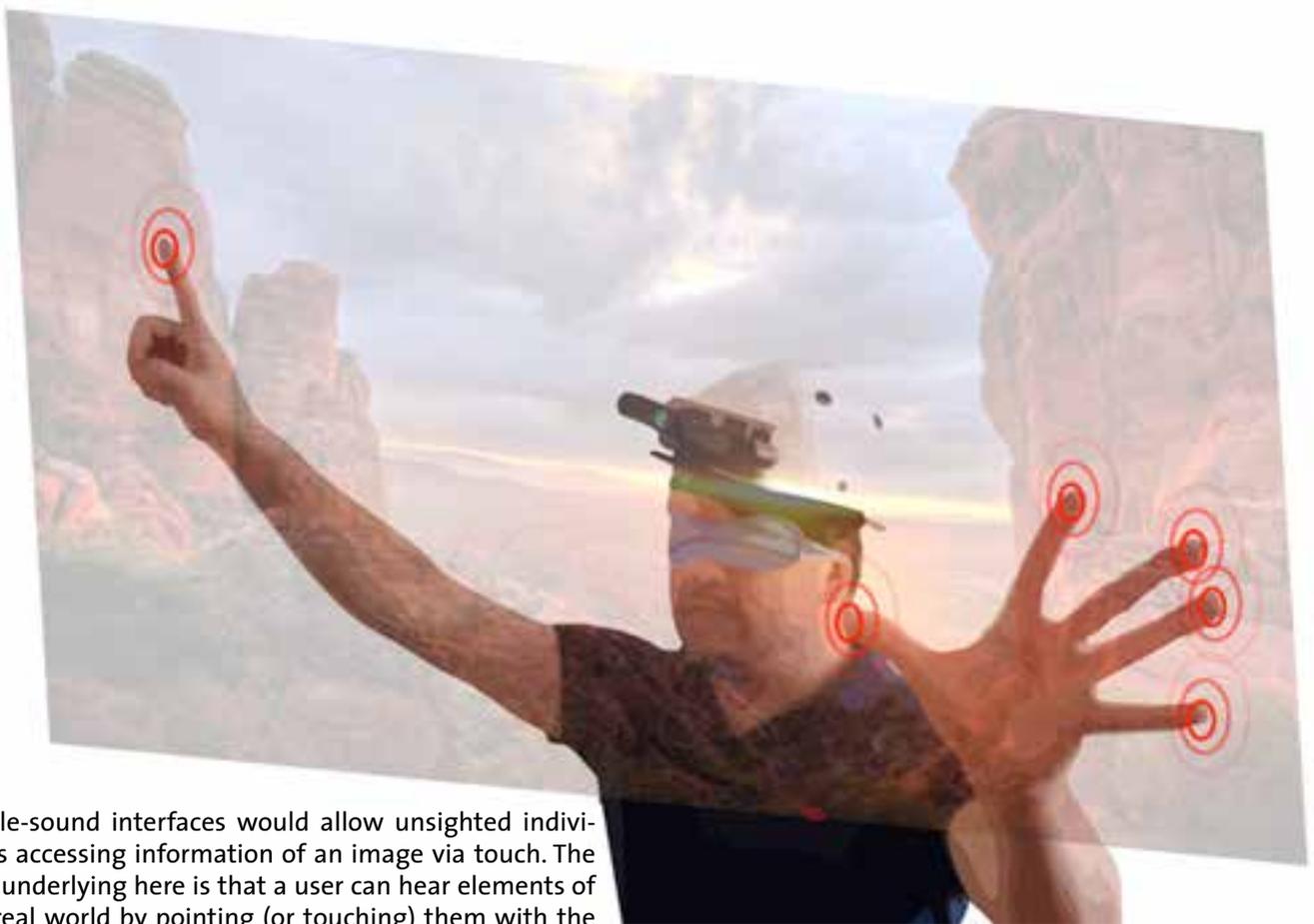
Tactile-sound interfaces would allow unsighted indivi-duals accessing information of an image via touch. The idea underlying here is that a user can hear elements of the real world by pointing (or touching) them with the fingers, as shown in this figure. Ideally, the user needs only to sweep (explore) the real world with his hands and fingers in order to get visual information. In an attempt to reproduce this idea, in See ColOr we capture the appearance of the real world into an image that is presented to the user through a tactile tablet. Thus, instead of naturally pointing into the real world, See ColOr's users need to carry a tablet and point (tap) into it in order to explore the sonified visual information. The implementation of this tablet-based interface will be discus in this section, whereas seminal ideas and early implementa-tions of the ideal model (tablet-free) will be exhibited later in the conclusion section of this work.

(left) The sonification in the local module is illustrated. There are 25 points and 25 sources in this module. To effects of visua-lization however, only 3 points and 8 sources are respectively displayed. Note that when the row of 25 pixels (points) related to the central part of the image is mapped into sound, it is also augmented to cover the whole azimuth-frontal auditory field. (right)An illustration of the sonification in the global module is presented. Now, only the pixel tapped with the finger-tip is sonified. Note that the use of spatialized sounds gives the user awareness of the lateral position of the point (from left to right), which is why in this illustration the source matches the position of the point horizontally though not in elevation. In other words, the source is put down on the azimuth plane, preserving only the horizontal position of the finger on the image. It is well known that rendering elevation is much more complicated than lateralization.

Figure 3: Privacy-preserving multimedia identification/retrieval architecture
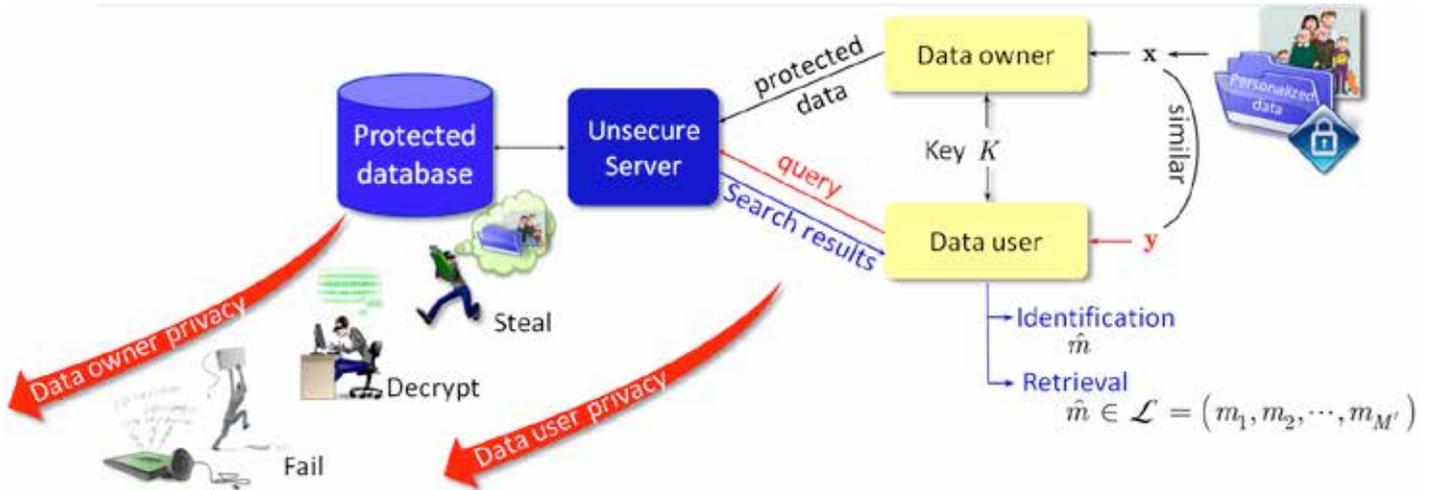
Emotional and aesthetic highlights detection in movies
SNF 205121_153239
Leading House: University of Geneva, Prof. D. Sander
Principal investigator: Prof. T. Pun, Prof. Patrizia Lombardo, Dr. Guillaume Chanel, Michal Muszynski
Period: October 2014 - September 2018

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Information-theoretic forensic physical object identification
SNF 200021-165672
Principal investigator: Prof. Sviatoslav Voloshynovskiy
Period: September 2016 - August 2018

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Machine Learning based Analytics for Big Data in Astronomy
SNF NRP75 project (407540_167158)
Joint project between the University of Geneva and Fachhochschule Nordwestschweiz.
Principal investigator for the entire project: Prof. S. Voloshynovskiy, Computer Science Dpt., Univ. of Geneva
Period: May 2017 - April 2020

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Identification for the Internet of Things
SNF project (20CH21_167543)
CHIST-ERA project with the Technical University of Eindhoven (PI of this project), the Netherlands, INRIA/IRISA-Rennes, France and the University of Geneva.
Principal investigator at the University of Geneva: Prof. S. Voloshynovskiy, Computer Science Dpt., Univ. of Geneva
Period: February 2017 - January 2020

Hasler Foundation

EyeWalker: Ultralight lowcost clipable vision system for mobility aids
Nr. 11083
Principal investigator: Prof. T. Pun
Partners: CSEM Neûchatel (E. Franzi, D. Hasler), HEIG-VD Yverdon (M. Kocher) HES-SO (G. Bologna)
Period: May 2015 – April 2016

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EEG artifact reduction using facial expression analysis and its applications to emotion recognition
Principal investigator: Dr. M. Soleymani, Univ. of Geneva.
Co-principal investigator: T. Pun
Period: January 2016 - December 2018

Others

Content fingerprinting and object recognition
CRADA: University of Geneva, U-nica Systems
Principal investigator: Prof. Sviatoslav Voloshynovskiy
Period: August 2014 - December 2018

———

PubliMAPE: (PUBLic Information MAPped to Environmental events)
Joint project between University of Geneva and Luxembourg Institute of Science and Technology (LIST).
Principal investigator: Dr. Pierrick Bruneau (LIST).
Prof. Stéphane Marchand-Maillet
Period: September 2017 - August 2020

———

CollSpotting: Visualisation of Large-Scale Collaboration Networks
Joint project between University of Geneva and CERN
Principal investigator: Dr. J-M Le Goff (CERN).
Prof. Stéphane Marchand-Maillet
Period: September 2016 - August 2019

Figure 4: Assessment of users emotional states by using multimodal physiological signals

Figure 5: Movie affective characterization using physiological signals and content analysis

Technology transfer

- **Spin-off: Anteleon Imaging S.A.R.L.** (founded August 2003, http://www.anteleon.com/), specialized in multimedia documents protection and management, watermarking, authentication and tamper proofing as well as brands protection.
- **U-nica Sytems**, AG (Malans) (http://www.u-nica.com) according to Collaborative and Research Agreement between the University of Geneva and U-nica Systems in the domain of physical object protections against counterfeiting based on the University of Geneva patented technology.
- **GEDECE, S.A.R.L.** Geneva (http://www.gedece.org) technology licencing and collaboration in the domain of physical objects security and image processing.

Open software and databases

CSEM 25
Title of the service/product/process: CSEM-25
Type: dataset of object classes
External partners involved in the development (if any): CSEM
Client or End user(s) : Computer vision community
Brief description: Captured with a Raytrix R5 camera, CSEM-25 is a multipurpose dataset of 5 object classes to address several aspects of computer vision applications using light field with a lens-grid-based representation.
Website: http://csem.ch/csem-25-db

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GIF interestingness database
Title of the service/product/process: GIF interestingness database
Type: dataset of GIFs
External partners involved in the development (if any): ETH Zurich
Client or End user(s) : Multimedia community
Brief description: It is a collection of GIFs with labels on emotions, aesthetics and interest.

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Image interestingness database
Title of the service/product/process: Image interestingness database

Type: dataset of 1005 images
External partners involved in the development (if any): none
Client or End user(s) : Computer vision and multimedia community
Brief description: It is a collection of photos with labels on emotion, aesthetics and interest.

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Emotion in Music database
Title of the service/product/process: Emotion in Music database
Type: dataset of more than 2700 songs
External partners involved in the development (if any): Academia Sinica, Taiwan, Utrecht University, the Netherlands
Client or End user(s) : Music information retrieval community, psychologists
Brief description: It is a collection of songs with creative commons license with dynamic and static emotional annotations.

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MAHNOB-HCI database
Title of the service/product/process: MAHNOB-HCI database
Type: database of emotional responses
External partners involved in the development (if any): Imperial College London, UK
Client or End user(s) : Researchers from affective computing, computer vision and psychology
Brief description: A database of emotional reactions to videos including, facial expressions, physiological signals and eye gaze.

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DEAP
Title of the service/product/process: DEAP
Type: database of emotional responses
External partners involved in the development (if any): Queen Mary University of London, UK, University of Twente, Netherlands, EPFL
Client or End user(s) : Researchers fro maffective computing, computer vision and psychology
Brief description: A database of emotional reactions to music videos including, facial expressions and physiological signals

TEAP
Title of the service/product/process: TEAP
Type: Toolbox (open source)
External partners involved in the development (if any): none
Client or End user(s) : Researchers from affective computing and physiological signal analysis
Brief description: A toolbox for extracting emotionally relevant features from physiological signals

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EATMINT
Title of the service/product/process: EATMINT database
Type: Database
External partners involved in the development (if any): none
Client or End user(s) : Researchers from affective computing and social signal processing
Brief description: A database for the analysis of collaboration from behaviors and physiological reactions

Others
- Thierry Pun: elected to the Swiss Academy of Engineering Sciences, one of the four Swiss Academies. Effective 1st January 2017. http://www.satw.ch/
- Thierry Pun: membre des Conseils de Fondation Unitec, du Fonds Général de l'Université.
- Dr. Ke Sun (PhD CVML 2015) received the 2017 award « Prix d'Excellence de l'UniGE" for his PhD dissertation.

Teaching
- **Human-computer interaction** (Affective computing and multimodal interaction part), Master, with Profs. G. Falquet et L. Moccozet. 56h practical work, approx. 10 students. 8 ECTS.
- **Digital image processing and synthesis**, Computer Science, 3rd year Bachelor, T. Pun, optional for Master and postgraduate students, 56h. course and 56h. practical work, approx. 15-20 students. 8 ECTS.
- **Introduction to algorithms**, Computer Science, 1st year Bachelor, 56h. course, 28h exercises and 56h. lab work, approx. 40-50 students, T. Pun
- **Avanced image processing**, Computer Science, Master, postgrades, 28h. course and 28h. practical work, approx. 8 students.
- **Elements of information theory**, Computer Science, 2nd year Bachelor, Master, postgrades, 28h. course and 28h. practical work, approx. 25 students.
- **Data mining**, Computer Science, 3rd year, Master in statistics, 1st year, 28h. course and 28h. practical work, aprox. 20 students.
- **Multimedia security and privacy**, Computer Science, Master, postgrades, 28h. course and 28h. practical work, approx. 8 students.
- **Information Retrieval**, Computer Science, Master, postgrades, 28h. course and 28h. practical work, approx. 15 students.
- **Information Analysis and Processing**, Computer Science, Master, postgrades, 28h. course and 28h. practical work, approx. 25 students.
- **Elements of multiuser information theory and wireless communications**, Computer Science, Master, postgrades, 28h. course and 28h. practical work, approx. 10 students.
- **Data Structures**, Computer Science, 1st year Bachelor, 56h. course and 56h. lab work, approx. 30 students.
- **Hands-on Programming** (practical complement to Data Structures), 1st year Bachelor. 56h Practical work, 20 students.
  - **Operating systems** (Systèmes informatiques), 2nd year Bachelor, 28h course, 28h exercices, 56h lab work, 15 students
  - **Computer Science Project**, Computer science, 3rd year Bachelor, 28 hours course and 56 hours lab. Approximately 10 students.
  - **Industrial Internships**, Summer Semester (3 months supervision), 5 students.
  - **Weekly Computer Vision and Multimedia seminars**, graduate students and senior researchers, 1h. per week, about 15 PhD students, post-docs, seniors, visitors.

Figure 6: GameEmo is an example of affective game developped in our laboratory, where the speed of the falling bricks is varied according to the user's feelings. If the person is too stressed, the speed decreases, while it increases when the user gets bored, all this resulting in an increase in the sense of flow and pleasure. In the photograph, one sees that the player is equipped with a non-intrusive Galvanic Skin Resistance sensor on two of the left-hand fingers; these are used to provide a real-time estimate of the stress level. That game has also been developed into a real arcade game currently part of a year-long exhibition at the Muséum of Natural History, Neuchâtel (http:http://www.museum-neuchatel.ch/). Developing such affective, engaging games is one example of affective computing.

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**Institute of
Information
Service
Science**

Swiss Digital Day, Geneva, 2017 November 21th

Institute of Information Service Science

Senior Researchers

Dr. Maher Ben Moussa
Dr. Matteo Ciman
Dr. Giuseppe Cosenza
Dr. Michel Deriaz
Dr. Mattia Gustarini
Dr. Jacques Guyot
Dr. Abdelaziz Khadraoui
Dr. Thomas Maillart
Dr. Dejan Munjin
Dr. Mehdi Snene
Dr. Vedran Vlajki

Scientific Collaborators

Florentina Olivia Balu
Anastasija Collen
Christophe Jeannette
Michael Mesfin
Dr. Niels Nijdam

Assistants / PhD Students

Hammoud Abbass
Sahar Aljalbout
Grigorios Anagnostopoulos
Evangelia Baka
Houssem Ben Mahfoudh
Allan Berrocal Rojas
Vincenzo Daponte
Francesco De Angelis
Alexandre De Masi
Marios Fanourakis
Meghdad Farahmand
Maxim Filatov
Sami Ghadfi
Athanasios Kyritsis
Aman Sabrina Nwatchouck A Koul
Mohammad Parhizkar
Arianna Religi
Simon Senecal
Camille Tardy
Yvain Tisserand
Christiana Tsiourti
Assane Wade

Developpers / Designers (PAT)

Marlène Arevalo-Poizat
Jonathan Bertaloccini
Nedjma Cadi-Yazli
Adnan Imeri
Panagiotis Kostopoulos
Michaël Reolon
Vincent Ricard
Mathieu Tappolet

Eleni Christodoulou
Invited professor
H-index: 16

Giovanna Di Marzo Serugendo
Full professor
H-index: 28

Gilles Falquet
Associate professor
H-index: 17

Verena Kantere
MER
H-index: 12

Dimitri Konstantas
Full professor
H-index: 28

Michel Léonard
Honorary professor
H-index: 21

Nadia Magnenat-Thalmann
Honorary professor
H-index: 85

Fellowships

Tsichrintzi Konstantina
Surafel Luleseged

Claudine Métral
MER

Laurent Moccozet
MER
H-index: 17

Jean-Henry Morin
Associate professor

Jolita Ralyté
MER
H-index: 20

Jean-Marc Seigneur
MER
H-index: 17

Katarzyna Wac
Invited professor
H-index: 20

Visiting Academic Guests

Antoine Burret
Anne-Françoise Cutting-Decelle
Zang Fanglue
Jean-Pierre Hurni
Thang Le Dinh
Tang Min
Yanlong Tang
Ruofeng Tong
Tommaso Venturini

Administration

Marie-France Culebras
Coralie Grossrieder

Domain activities

Services represent the most growing sector of the economy in industrialized nations. Services science is arising from the rapid development of services across the industrial world and the need to analyze and study the organization, deployment, maintenance and operation of those related IT based and IT supported services. Services Science represents an interdisciplinary approach to the systematic innovation in service systems, integrating management, social, legal and engineering aspects.

ISS is an inter-faculty research laboratory of the Centre Universitaire d'Informatique of the University of Geneva (iss.unige. ch). As a team of 65 staff members, we are active in research, technology watch, creativity and teaching. We are currently participating in 29 research projects (EU/Cost/CTI/SNF/Private funding) representing a funding of 3.3M/year.
By its very mission, ISS targets research-led innovative services exploiting information and digital technology, such as services for mobile users, for seniors, or for specific industry needs. We developed a series of solutions specifically targeting the seven application domains:
- Smart and Sustainable Cities
- Digital Humanities
- Environment
- Health and Quality of Life
- Information Security
- Indoor positioning
- Processing data coming from smartphone or wearable sensors

Our major areas of research cover:
- Autonomous Adaptive Services, Pervasive Services
- Services for mobile users
- Multimedia services
- Digital Rights Management and Policies for Services
- Knowledge Engineering, Semantic Web, Ontology
- M-health, E-Health, Ambient Assisted Living
- Multimedia Services, Virtual Reality, Augmented Reality
- Modeling, Business Process Methods
- Trust and Online Reputation Management
- Augmented Human
- Smart City Digital Management
- Service Law Compliance
- Geographical Information Systems
- E-Learning
- Social Networks Analysis, Predictive analytics
- Indoor positioning
- Processing data coming from smartphone or wearable sensors
- Data visualization in 3D city models
- Quality of data and semantic queries in volunteer geographic information

We are also part of the Hub in Environmental Informatics of the University of Geneva aiming at developing research and teaching in this area.

Our additional strong involvement in interdisciplinary think groups places us at the forefront of the technology watch in Services Science in Switzerland. We regularly contribute to creativity and innovation hands-on experiments targeted at industry. We also participate to a full range of academic programs in Information Systems and Services Science (BSc, Msc, Executive Programs and PhD).

Our international network includes many academic institutions, public administrations, creativity and innovation consultants, think tanks and services providers across Europe, Asia, North America.

Giovanna Di Marzo Serugendo - Collective Adaptive Systems

Collective Adaptive Systems refer to a form of complex systems where a large number of heterogeneous entities interact without specific external or internal central control, adapt their behaviour to environmental settings in pursuit of an individual or collective goal. Actual behaviour arises as an emergent property through swarm or collective intelligence.

Examples include understanding emergence and social behaviour of natural life (e.g. bacteria self-organising to overcome shortage of food), engineering swarm robotics, developing socio-technical systems and more generally developing services for smart and sustainable cities. We lead and develop research in three main areas:

- Studying natural systems (e.g. biological, social, human ones) and identifying essential models, mechanisms and interactions at work at the heart of those systems, mostly through agent-based models, simulations and design patterns.
- Designing and developing artificial collective adaptive systems and different forms of emergent behaviour (e.g. swarm robotics, ecosystems of spatial services for smart cities, higher-order emergence)
- Verifying the reliability and trustworthiness of those systems prior to their deployment in real-life settings.

Michel Deriaz - TaM group

Welcome to TaM, the Travelling and Mobility R&D team from the University of Geneva. We are specialized on indoor positioning as well as on processing data coming from smartphone or wearable's sensors. Most of our innovative solutions are developed on Android phones. To understand the users' needs and deploy our solutions in the market, we benefit from strong links with industrial partners.

The TaM group is a member of the Institute of Services Science (ISS) and belongs to the Computer Science Centre (CUI, for Centre Universitaire d'Informatique) from the University of Geneva. Our team is today composed of PhD candidates, scientists and developers. Some of us are used to work in private companies. We have the know-how to cover the complete lifecycle of a R&D project, from its initial idea to a fully operational prototype. By using agile development methods, we combine the advantages of fast prototyping, early involvement of users, and high-quality products.

Verena Kantere - Big Data management and analytics

The field of Big Data management and analytics includes techniques, algorithms and tools used to inspect collections of data to extract patterns, generalizations and other useful information. Big data analytics is very important in risk assessment, pharmaceutics, fraud detection, epidemiology, business process effectiveness, market analysis, anti-terrorism, etc. More importantly, large-scale analytical data processing has become a necessity in the majority of industries. Enabling engineers, analytics experts and scientists alike to tap the potential of vast amounts of business-critical data has grown increasingly important. Such data analysis demands a high degree of parallelism, in both storage and computation. Business datacenters host vast amounts of data, stored over large numbers of nodes with multiple storage devices, and process them using thousands or millions of cores.

Gilles Falquet, Laurent Moccozet and Claudine Métral - Knowledge Engineering KE@ISS

The Knowledge Engineering research group studies the representation, processing, and visualization of formalized and non-formalized knowledge resources. It's current research activities concentrate on the following topics:

- Defining models, operations, and algorithms for the management of heterogeneous knowledge resources (ontologies, terminologies, thesauri, text corpora, ...) in large knowledge repositories.
- Semantically enriching semi-formal knowledge organization systems to produce formal ontologies
- Extracting and representing scientific knowledge elements contained in scientific texts, and building systems for precise scientific information retrieval
- Studying 3D visualization techniques to represent data and knowledge associated to objects of 3D virtual environments with a focus on enriched 3D city models.
- Defining models and techniques for the visualization of scientific knowledge bases

The main application areas are: semantic digital libraries; manuscript indexing, retrieval, and interconnection; urban and geographic knowledge engineering; the extraction linguistic knowledge from large open resources; knowledge engineering and visualization for the digital humanities.

Michel Léonard - MATIS (Management and Technology of Information Services)

The Society/Company seems to become fully servitized. This trend induces huge fields of services to be immersed, and discovered. Consequently, a lot of human and collective activities will be interwoven with artificial activities, and one major concern about such a Society/Enterprise development depends on the quality of these interwoven activities. So, following our research approach in information systems, we centre our research on information – and not on software, like Web services – to explore activities emerging or transformed in enterprises or e-government, and to discover actionable knowledge, relevant to these servitized situations. Thus, we explore appropriate:

- Company organisations taking into account initiatives, responsibility,
- Design methods taking into account adaptability, agility, composition, compliance with   rules,
- Information base management systems (Ksterix),
- Transdisciplinary environments,
- Company evolution through IS evolution by means of services.

Thus, we work on the creation of Tiers-Lieux in the context of a new emerging kind of economy: the contributory economy. They will provide cognitive cross-pollination spaces for developing large services requiring multidisciplinary, multi-institutional, notably public and private, researchers and practitioners, in order to face the intricate situations, for instance with Big Data, Open Data, Smart Region. It is an interconnected grid of activities, platforms and methods aiming at accelerating exploration, development and market validation of new services. It will enable students and researchers to express, model and experiment specific requirements, and to be immerged in real situations.

Dimitri Konstantas - Mobile services

Mobile services and applications are today an indispensable part of our daily life. We are using our smartphones to access our mail, chat with friends and colleagues, take and store photographs and videos, obtain guidance and route information, play games, access the internet and even measure our daily activities and our physical performance and obtain highly personalized services and information. In other words, smartphones are today indispensable to all our daily activities. For the past few years we have been working in the development of mobile services and applications in different domains, including services for the elderly, services for civil engineers and security applications.

Since 2009 we have been applying the results of our research in the study and development of services for the aging society and for mobile services of elderly. In this context, in 2016 we have succeeded acquiring 4 European projects in the Ambient Assisted Living (AAL) program, 2 technology transfer projects (CTI), one FNRS project (memory condition of Eldrrly) and one H2020 (Security in IoT). Our work in the domain of ageing society concentrates in the study of lifestyle of senior persons (age 65 and more) and the creation of mobile services for monitoring the activities of the users and providing them proactive information regarding activities to do (realising the basic directive for senior persons : do not stay inactive), putting them in contact with other users with similar interests (socialisation), providing them the means for getting help from formal and informal care givers, and even advising them on diet and exercise. In this projects we collaborate with local (Geneva based) industrial partners that are offering services for seniors. The research results from the AAL and H2020 projects are then transfered, via the CTI technology transfer projects, towards commercial applications and services. Our research is carried out in four specialised Laboratories, the Conscious Analytics System Laboratory (CASlab), the Quality of Life Laboratory (QoL), the Travelling and Mobility Laboratory (TaM) and the Security Laboratory (SecLab).

Nadia Magnenat-Thalmann - MIRALab

MIRALab was founded in 1989 by Professor Nadia Magnenat-Thalmann and has brought together PhD students and researchers from different fields, such as computer science, 3D graphics, 3D simulation, social robotics, 3D fashion design, and cognitive science. This truly interdisciplinary group continues to work in the field of medical informatics, virtual worlds and virtual humans.

Since 1992, MIRALab has participated in more than 50 European Projects and contributes to the management of two International Conferences, CASA and CGI. Moreover, MIRALab produces 3D showcases for museums, galleries, such as fashion shows with virtual models and clothes. In 2017, MIRALab was working on the following projects: ANINEX, ITN-DCH, NOTRE and ViMM.

Jean-Henry Morin - Digital Rights & Policy

As our society and economy continues to move towards interwoven digital services and systems, blending the real and the artificial world, our research activities continue to investigate some of the complex challenges and issues towards a more sustainable and responsible digital society. Information Protection and Control (IPC) in general and the growing need for Data Protection have become recognized area where increased research is needed. We continue our work in those areas with a particular look at distributed ledger technologies (blockchain) as a mechanism to support new services and designs to support increasingly complex requirements. Major examples of these research issues we are currently working on include data marketplace ecosystems, dispute resolution and arbitration, data protection and digital rights and policy management.

From July 2016 to July 2017, Jean-Henry Morin is on sabbatical leave in South Korea where he is Invited Professor at Korea University Business School and Yonsei School of Business. During this time, he is also invited researcher at Fasoo.com where he investigates blockchain technologies in Information Security.

Jean-Marc Seigneur - Computational Trust & Augmented Human

For ages humans have used the human notion of trust as a mean to cope with uncertainty, to engage in an action in spite of the risk of a harmful outcome. More recently, computational models of trust, based on this human notion of trust, have been researched in order to be able to use trust in the digital world as well, between computers and/or digital accounts controlled by remote humans. In the near future, it is even envisioned that humans and computers merge together: Elon Musk has recently created a new venture for implants in human brain with the aim to help human beings merge with software and keep pace with advancements in artificial intelligence. It seems that there is an increasing trend towards augmenting humans not only to retrieve their abilities after being disabled but also beyond their normal abilities. We have contributed to this trend with the organization since 2010 of the augmented human international conferences focusing on scientific contributions towards augmenting human capabilities through technology. We are researching how these augmented human technologies can improve computational trust assessment not only of machines but also of humans.

Katarzyna Wac - Quality of Life Technologies

The key aim of the Quality of Life (QoL) technologies research area is to promote ICT technologies to improve QoL of individuals through rigorous scientific research, education, science communication and outreach. Particularly, given the current expertise of the team, its goal is to establish quality research in mobile networking systems delivering accurate and timely services to their users «anywhere-anytime-anyhow». The general approach is necessarily a transdisciplinary one, as many of the challenges in development and deployment phases of these systems need to be addressed considering not only the system and its Quality of Service (QoS) provided in an operational networking environment, but, as sometimes missing in the current research - the actual system end-users, approaching mobile networking not from the perspective of new hype technology, but from the perspective of new innovative ways to achieve some pre-defined goal. These end-users have thus different services" requirements, expectations and perceptions of the Quality of Experience (QoE), including system's usability, efficiency and effectiveness. In transdisciplinary research projects, we aim to establish innovative methodologies to demonstrate the value of mobile networking systems improving the QoS, the QoE and ultimately the QoL outcomes of its end-users, and society at large. The QoL team currently contributes to research on mobile networking systems deployed in healthcare (denoted as 'mHealth') for personal well-being, active and healthy ageing and ambient assisted living by leveraging personal, big data approaches (like 'quantified-self' one) in Living Lab settings.

PhD Thesis

- Francesco Luca De Angelis, A Logic-Based Coordination Middleware for Self-Organising Systems: distributed reasoning based on many-valued logics, July, 2017
- Assane Wade, A Framework for Opinion Change Mining in Social Networks : Tracking Opinion Change on Twitter, July, 2017
- Messaoud Hammouya, STATISTIQUE PUBLIQUE : DES DONNÉES AUX CONNAISSANCES – Une approche orientée services pour la gestion des connaissances, May, 2017
- Panagiotis Kostopoulos, From fall detection to stress pattern using smart devices, October 19th, 2017
- Grigorios Anagnostopoulos, Addressing Crucial Issues of Indoor Positioning Systems, November 23th, 2017
- Camille Tardy, Introducing spatial coverage in a semantic repository model, January 2017
- Meghdad Farahmand, Computational models of learning the idiosyncrasy of multiword expressions, March 2017
- David Juan Garcia, Patient-specific multi-parametric computational model of lower limb muscle function from PET/MRI studies, September 20, 2017

List of publications
Refereed papers in international journals
Giovanna Di Marzo Serugendo and team:

[1] F.L. De Angelis, G. Di Marzo Serugendo, and A. Szalas. Paraconsistent rule-based reasoning with graded truth values. IfCoLog Journal of Logics and their Applications, 2017.

[2] Surafel Tilahun, Giovanna Di Marzo Serugendo. Cooperative Multi-Agent System for Parking Availability Prediction based on Time Varying Dynamic Markov Chains. Journal of Advanced Transportation. Volume 2017 (2017), Article ID 1760842, 14 page, doi: 10.1155/2017/1760842.

[3] F. L. De Angelis, G. Di Marzo Serugendo. SmartContent—Self-Protected Context-Aware Active Documents for Mobile Environments. IET Electronics Electronics 2017, 7, 17; doi:10.3390/electronics6010017

Gilles Falquet and Claudine Métral and team:

[4] de Ribaupierre, H., Falquet, G. (2017) Extracting discourse elements and annotating scientific documents using the SciAnnotDoc model: A use case in gender documents. to appear in International Journal on Digital Libraries.

Abdelaziz Khadraoui and team:

[5] Adnan Imeri, Abdelaziz Khadraoui, Thang Le Dinh, Djamel Khadraoui: Personalization of Legal and Ethical Information in ICT Platforms: The Approach of Legal Decision Tree. Computer and Information Science 10(1): 77- (2017).

[6] Amina Cherouana, Latifa Mahdaoui, Abdelaziz Khadraoui: BPM-base framework for e-government processes improvement: legal requirements integration. International Journal of Intelligent Information and Database Systems (IJIIDS) 10(1/2): 21-50 (2017).

[7] Adnan Imeri, Abdelaziz Khadraoui, Djamel Khadraoui: A Conceptual and Technical Approach for Transportation of Dangerous Goods in Compliance with Regulatory Framework. Journal of Software (JSW) 12(9): 708-721 (2017).

Nadia Magnenat-Thalmann and team:

[8] L. Tian, N. Magnenat Thalmann, D. Thalmann, J. Zheng, The Making of a 3D-Printed, Cable-Driven, Single-Model, Lightweight Humanoid Robotic Hand, Frontiers in Robotics and AI, DOI: 10.3389/frobt.2017.00065, pp. 65, December 04, 2017

[9] W. Gu, G. Seet, N. Magnenat Thalmann, Perception-Link Behavior Model: Supporting a Novel Operator Interface for a Customizable Anthropomorphic Telepresence Robot, Robotics, Vol. 6, Issue 3, DOI: 10.3390/robotics6030016, pp. 16, July 20, 2017

[10] S. Stüvel, N. Magnenat Thalmann, D. Thalmann, F. van der Stappen, A. Egges, Torso Crowds, IEEE Transactions on Visualization and Computer Graphics, (IP:1.4), Vol. 23, Issue. 7, pp. 1823 - 1837, DOI: 10.1109/TVCG.2016.2545670, July 2017

[11] J. Hou, L.P. Chau,N. Magnenat Thalmann and Y. He, Sparse Low-Rank Matrix Approximation for Data Compression, IEEE Transactions on Circuits and Systems for Video Technology,(IF: 2.254), Vol. 27, Issue. 5, DOI: 10.1109/TCSVT.2015.2513698, pp. 1043 - 1054, May 2017

[12] H. Xu, S. Guo, J. Yao and N. Magnenat Thalmann, Approximating Interior Bounded Box of 3D Character Mesh Model based on Its Skeleton and Symmetry, International Journal of Intelligent Computing and Cybernetics (IJICC) (IF: 2.254), Vol. 10, Issue. 3, DOI: 10.1108/IJICC-01-2017-0003, pp. 332 - 347, March 2017

[13] S. Guo, H. Xu, N. Magnenat Thalmann, J. Yao, Customization and fabrication of the appearance for humanoid robot, The Visual Computer, (IP: 1.09), Vol 33 (1), pp. 63-74, 2017

Jolita Ralyté and team:

[14] Ralyté, J. and Blay-Fornarino, M. (2017) Introduction. Numéro spécial « De la gestion des documents à la recherché d'information ». Document Numérique 20(2), Lavoisier, 2017

[15] Blay-Fornarino, M. and Ralyté, J. (2017) Editorial. Numéro spécial « Recherches & retours d'expériences en systèmes d'information ». Ingénierie des systèmes d'information 22(2), Lavoisier, 2017.

Jean-Marc Seigneur and team:

[16] «Numerical Investigation of the Early Flight Phase in Ski-Jumping", N. Gardan, A.,Schneider, G. Polidori, H. Trenchard, J.-M. Seigneur, F. Beaumont and F. Fourchet, Journal of Biomechanics, Elsevier, 2017.

Figure 1: QoSIS: Quality of Service-Information System predicts and prescribes the best networking option for a mobile service user

[17] «Wi-Trust : Computational Trust and Reputation Management for Stronger Hotspot 2.0 Security», J.-M. Seigneur, Journal of ICT Standardization, Vol. 4, Issue 3, River Publishers, 2017.

[18] «Design and Validation of a Trust-based Opportunity-enabled Risk Management System», A. Aldini, J.-M. Seigneur, X. Titi, J. Guislain, C. Ballester Lafuente, Information & Computer Security, Vol. 25 Iss: 1, Emerald Group Publishing, 2017.

Katarzyna Wac and team:

[19] Acerini, M., Wac, K., Bang, P., Lehwalder, D. (2017). «Optimizing Patient Management and Adherence for Children Receiving Growth Hormone», Frontiers in Endocrinology, 8(1):313, November 2017. Impact Factor: 3.675

[20] Wac, K., Rivas, H., Fiordelli, M. (2017). «Quality of Life Technologies: Special Issue», IEEE Computer, March 2017. Impact Factor: 1.755

Full refereed papers in Conference Proceedings

Michel Deriaz and team:

[21] Enhanced Still Presence Sensing with Supervised Learning over Segmented Ultrasonic Reflections, Abbass Hammoud, Athanasios I. Kyritsis, Michel Deriaz and Dimitri Konstantas, in The Eighth International Conference on Indoor Positioning and Indoor Navigation (IPIN 2017), Sapporo, Japan, 2017.

[22] A Multiobjective Optimization Methodology of Tuning Indoor Positioning Systems, Grigorios G. Anagnostopoulos, Michel Deriaz and Dimitri Konstantas, in The Eighth International Conference on Indoor Positioning and Indoor Navigation (IPIN 2017), Sapporo, Japan, 2017.

[23] Navigational needs and requirements of hospital staff: Geneva University Hospitals case study, Grigorios G. Anagnostopoulos, Michel Deriaz, Jean-Michel Gaspoz, Dimitri Konstantas and Idris Guessous, in The Eighth International Conference on Indoor Positioning and Indoor Navigation (IPIN 2017), Sapporo, Japan, 2017.

[24] Power Hopping: an Automatic Power Optimization Method for Ultrasonic Motion Sensors, Abbass Hammoud, Grigorios G. Anagnostopoulos, Athanasios I. Kyritsis, Michel Deriaz, Dimitri Konstantas, in The Fourteenth International Conference on Ubiquitous Intelligence and Computing (UIC-2017), San Francisco, USA, 2017.

[25] UltraSense: a Self-Calibrating Ultrasound-Based Room Occupancy Sensing System, Abbass Hammoud, Michel Deriaz, Dimitri Konstantas, in The Eighth International Conference on Ambient Systems, Networks and Technologies (ANT-2017), Madeira, Portugal, 2017.

[26] "Getting lost" in hospital is a source of stress among staff members, Grigorios Anagnostopoulos, Michel Deriaz, Jean-Michel Gaspoz, Dimitri Konstantas, Idris Guessous, in The 2017 SGIM Annual Meeting: Resilience & Grit - Pursuing Organizational Change & Preventing Burnout in GIM, Washington DC, USA, 2017.

Giovanna Di Marzo Serugendo and team:

[27] Mohammad Parhizkar, Giovanna Di Marzo Serugendo. An Agent-Based Model for Collective Behaviors of Social Amoeba Dictyostelium discoideum Morphogenesis: Aggregation Phase. The 2nd International Symposium on Swarm Behavior and Bio-Inspired Robotics. SWARM'17. Kyoto, Japan, Oct-Nov 2017.

[28] Giovanna Di Marzo Serugendo. Spatial Edge Services- From Coordination Model to Actual Applications. Keynote Talk. Conference on Coordination Languages and Models, Coordination 2017, Neuchâtel, June 2017

[29] Assane Wade, Giovanna Di Marzo Serugendo. A Model of Extracting Pattern in Social Network Data Using Topic Modelling, Sentiment Analysis and Graph Databases. Fourth International Conference on Data Mining and Databases (DMDB2017), Vienna, Austria, 2017.

[30] Francesco L. De Angelis, Giovanna Di Marzo Serugendo, Barbara Dunin-Keplicz, Andrzej, Szalas Heterogeneous Approximate Reasoning with Graded Truth Values. In International Joint Conference on Rough Sets, Olsztyn, Poland, 2017.

Figure 2: ViMM project – Dissemination and Communication platform © MIRALab

Figure 3: Augmented reality with FoxyTour

[31] G. Di Marzo Serugendo, N. Abdennadher, H. Ben Mahfoudh, F. De Angelis, R. Tomaylla. Spatial Edge Services. Global IoT Summit, Geneva, 2017.

Gilles Falquet and Claudine Métral and team:

[32] Aljalbout, S., Falquet, G. (2017) Un modèle pour la représentation des connaissances temporelles dans les documents historiques : Applications sur les manuscrits de F.Saussure. In Proc. 28es Journées francophones d'Ingénierie des Connaissances (IC 2017), Caen, July 2017.

Dimitri Konstantas:

[33] Athanasios I. Kyritsis, Michel Deriaz and Dimitri Konstantas, , Enhanced Still Presence Sensing with Supervised Learning over Segmented Ultrasonic Reflections, Abbass Hammoud, in The Eighth International Conference on Indoor Positioning and Indoor Navigation (IPIN 2017), Sapporo, Japan, 2017.

[34] Grigorios G. Anagnostopoulos, Michel Deriaz and Dimitri Konstantas, A Multiobjective Optimization Methodology of Tuning Indoor Positioning Systems in The Eighth International Conference on Indoor Positioning and Indoor Navigation (IPIN 2017), Sapporo, Japan, 2017

[35] Abbass Hammoud, MichelDeriaz, DimitriKonstantas, UltraSense: A Self-Calibrating Ultrasound-Based Room Occupancy Sensing System, 8th International Conference on Ambient Systems, Networks and Technologies, ANT-2017 and the 7th International Conference on Sustainable Energy Information Technology, SEIT 2017, 16-19 May 2017, Madeira, Portugal, Elhadi Shakshuki (Ed.)

[36] Kostopoulos P., Kyritsis A.I., Deriaz M., Konstantas D. (2017) Stress Detection Using Smart Phone Data. In: Giokas K., Bokor L., Hopfgartner F. (eds) eHealth 360°. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 181. Springer, Cham

[37] Abbass Hammoud, Grigorios G. Anagnostopoulos, Athanasios I. Kyritsis, Michel Deriaz, Dimitri Konstantas, Power Hopping: an Automatic Power Optimization Method for Ultrasonic Motion Sensors, in The Fourteenth International Conference on Ubiquitous Intelligence and Computing (UIC-2017), San Francisco, USA, 2017.

Nadia Magnenat-Thalmann and team:

[38] D. Chakraborty, Y. Tahir, Z. Yang, T. Maszczyk, J. Dauwels, D. Thalmann, N. Magnenat Thalmann, Assessment and Prediction of Negative Symptoms of Schizophrenia from RGB+D Movement Signals, IEEE 19th International Workshop on Multimedia Signal Processing (MMSP) 2017, Luton, UK, October 16-18, 2017

[39] Y. Tisserand, L. Cuel and N. Magnenat Thalmann, Automatic 3D garment positioning based on surface metric, Proceedings of the 30th ACM International Conference on Computer Animation and Social Agents (CASA 2017), Vol. 28, Issue. 3-4, K-Hotel Seoul, Seoul, South Korea, May 22-24, 2017

Laurent Moccozet:

[40] Enriched Interactive Videos for Teaching and Learning, C. Benkada, L. Moccozet, Information Visualisation (IV), 21st International Conference, IEEE Xplore, 2017.

Jolita Ralyté and team:

[41] Ralyté, J., and Léonard, M. (2017) Evolution Models for Information Systems Evolution Steering. In: The Practice of Enterprise Modeling, Proceedings of 10th IFIP WG 8.1. Working Conference PoEM 2016, LNBIP 305, pp. 1-5, Springer.

[42] Lopez Cuesta, L., Behutiye, W., Karhapää, P., Ralyté, J., Franch, X., and Oivo, M. (2017) Agile Quality Requirements Management Best Practices Portfolio: A Situational Method Engineering Approach. In: Felderer, M. et al. (eds) Product-Focused Software Process Improvement. PROFES 2017, LNCS 10611, pp. 548-555, Springer.

Jean-Marc Seigneur and team:

[43] «Use case of linking a managed basket of fiat currencies to crypto-tokens», J.-M. Seigneur, H. d'Hautefort and G. Ballocchi, First Meeting of the ITU Focus Group on Digital Currency including Digital Fiat Currency, Beijing, China, ITU, 2017.

[44] «Enhancing RADIUS based multifactor-factor authentication systems with RESTful API for self-service enrolment», E. Huseynov and J.-M. Seigneur, Proceedings of the 11th IEEE International Conference on Application of Information and Communication Technologies, IEEE, 2017.

Katarzyna Wac and team:

[45] Tsiourti, C. Weiss, A., Wac, K., Vincze, M. (2017). Designing Emotionally Expressive Robots: A Comparative Study on the Perception of Communication Modalities, 5th International Conference on Human-Agent Interaction (HAI), Bielefeld, Germany, October 2017.

[46] Khoury, H., Morton, J., Boillat, T., Wulfovich, S., Wac, K., Rivas, H., (2017). Do Wearable Activity Trackers Enhance the Outcomes of Bariatric Surgery?, 34th ASMBS Annual Meeting at ObesityWeek, Washington, DC, USA, November 2017.

Full refereed papers in Workshop Proceedings
Gilles Falquet and Claudine Métral and team:

[47] Aljalbout, S., Falquet, G. (2017) A Semantic Model for Historical Manuscripts. In proc. Third International Workshop on Semantic Web for Scientific Heritage at ESWC'17. Portoroz, Slovenia, May 2017.

Katarzyna Wac and team:

[48] Ciman, M., Wac, K., (2017). Automatic Stress Assessment Using Smartphone Interaction Data, International Conference on the Scientific Analysis of Mobile Phone Datasets (NetMob), Milan, Italy, April 2017.

Books and book chapters
Giovanna Di Marzo Serugendo and team:

[49] Giovanna Di Marzo Serugendo. Spatial Edge Services – From Coordination Model to Actual Applications. Coordination Models and Languages, Coordination'17, LNCS 10319, pp. 3-17. Springer (2017)

Nadia Magnenat-Thalmann and team:

[50] S.R.S. Prabaharan, N. Magnenat Thalmann, V.K. Bhaaskaran, Frontiers in Electronic Technologies, Springer, 161 p., Hardcover, ISBN 978-981-10-4235-5, 2017

[51] J.K. Burgoon, N. Magnenat Thalmann, M. Pantic, A. Vinciarelli, Social Signal Processing, Cambridge University Press, 440 p., Hardcover, ISBN-10: 1107161266, ISBN-13: 978-1107161269, 2017

[52] M. Ioannides, N. Magnenat Thalmann, G. Papagiannakis, Mixed Reality and Gamification for Cultural Heritage, Springer, 1st Edition., 2017, 309 illus., 279 in color., Hardcover, ISBN: 978-3-319-49606-1, 2017

[53] M. Becker and N. Magnenat Thalmann, Muscle Tissue Labeling of Human Lower Limb in Multi-Channel mDixon MR Imaging: Concepts and Applications, IEEE/ACM Transactions on Computational Biology and Bioinformatics, IEEEpublisher, DOI: 10.1109/TCBB.2015.2459679, pp. 290-299, 2017

[54] N. Magnenat Thalmann, L. Tian and F. Yao, Nadine: A Social Robot that Can Localize Objects and Grasp Them in a Human Way, Frontiers in Electronic Technologies, Springer, pp. 1-23, 2017

Jolita Ralyté and team:

[55] Ralyté, J. Roelens, B. and Demeyer, S. (Eds.): Proceedings of PoEM 2017 Doctoral Consortium and Industry Track Papers presented at the 10th IFIP WG8.1 working conference on the Practice of Enterprise Modelling – PoEM 2017, Leuven, Belgium, November 22-24, 2017. CEUR-WS Vol. 2027, http://ceur-ws.org/Vol-2027/.

[56] Franch, X., Ralyté, J., Matulevicius, R., Salinesi, C. and Wieringa, R. (Eds.): Proceedings of the Forum and Doctoral Consortium Papers Presented at the 29th International Conference on Advanced Information Systems Engineering, CAiSE 2017, Essen, Germany, June 12-16, 2017. CEUR-WS Vol. 1848, http://ceur-ws.org/Vol-1848/.

Figure 4: ITN-DCH project – Demonstration on Site © MIRALab

Figure 5: Robot Eva playing in the Roten Fabrik Theatre at Zürich © MIRALab

[57] Knauss, E., Susi, A., Ameller, D., Berry, D.M., Dalpiaz, F., Daneva, M., Daun, M., Dieste, O., Forbrig, P., Groen, E.C., Herrmann, A., Horkoff, J., Meshesha Kifetew, F., Kirikova, M., Knauss, A., Maeder, P., Massacci, F., Palomares, C., Ralyté, J., Seffah, A., Siena, A., Tenbergen, B. (Eds.): Joint Proceedings of REFSQ-2017 Workshops, Doctoral Symposium, Research Method Track, and Poster Track co-located with the 22nd International Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2017), Essen, Germany, February 27, 2017. CEUR-WS Vol. 1796, http://ceur-ws.org/Vol-1796/.

[58] Léonard, M. and Ralyté, J. (2017): Handling the Evolution of Information Systems: An Overview of Challenges and Prospective Solutions. In: Cabot J., et al. (eds.) Conceptual Modeling Perspectives. Springer, Cham, pp. 215-229.

Jean-Marc Seigneur and team:

[59] «Proceedings of the 8th Augmented Human International Conference», J.-M. Seigneur and S. Nanayakkara, ICPS, ACM, 2017.

[60] «e-Reputation and Online Reputation Management Survey», J.-M. Seigneur, book chapter of «Computer and Information Security Handbook», Third Edition, Morgan Kauffman, Elsevier, ISBN: 978-0-12-803843-7, 2017.

[61] «Context-Aware Multi-Factor Authentication», E. Huseynov and J.-M. Seigneur, book chapter of «Computer and Information Security Handbook", Third Edition, Morgan Kauffman, Elsevier, ISBN: 978-0-12-803843-7, 2017.

[62] «On the road to privacy and data protection-friendly security technologies in the workplace. A case-study of the MUSES Trust and Risk Analysis Engine», Y. S. M. Van Der Sype, J. Guislain, J.-M. Seigneur and X. Titi, book chapter of "Data Protection and Privacy: (In)visibilities and Infrastructures", ISBN-13: 978-3319507958, Law, Governance and Technology Series, Book 36, Springer, 2017.

Katarzyna Wac and team:

[63] Rivas, H. and Wac, K. (2018). Digital Health: Scaling Healthcare to the World, Series: Health Informatics, Springer Nature, Dordrecht, the Netherlands. (online first in 2017

[64] Wac, K. (2018). From Quantified Self to Quality of Life, chapter in: Digital Health: Scaling Healthcare to the World, Series: Health Informatics, Springer Nature, Dordrecht, the Netherlands. (online first in 2017)

[65] Boillat, T., Rivas, H., Wac, K. (2018). Healthcare on a Wrist': Increasing Diet Program Compliance Through Checklists on Wearables in Obesity (Self-)Management Programs, chapter in: Digital Health: Scaling Healthcare to the World, Series: Health Informatics, Springer Nature, Dordrecht, the Netherlands. (online first in 2017)

Research and technical reports

Gilles Falquet and Claudine Métral and team:

[66] Aljalbout, S., Falquet, G. (2017) A Semantic Model for Historical Manuscripts. https://arxiv.org/abs/1802.00295

[67] Filhol, M., Falquet, G. (2017) Synthesising Sign Language from semantics, approaching «from the target and back». https://arxiv.org/abs/1707.08041

Nadia Magnenat-Thalmann and team:

[68] Several technical reports for the following projects: ANINEX, ITN-DCH, NOTRE and ViMM.

International and national advisory committees

Giovanna Di Marzo Serugendo:
- Member (2016-2017) – Geneva Canton Committee for the "SmartCanton" project
- Committee Member (2014-2018) – Commission Consultative en matière de protection des données, transparence et archives publiques (CCPDTA)
- Committee Member (2014-2018) – Conseil académique HEPIA

Nadia Magnenat-Thalmann:
- 2013-2017: Member of the Scientific Council of the Institute of Mines-Telecom, Paris, France
- 2016-2019: Member of the IAB Committee of the Computer Science Dpt of Technical University of Vienna
- 2013-2018: Expert on the advanced grant panel in Computer Science, European Research Council (ERC)
- 2007-2017: Expert and reviewer of the Seventh Framework Programme FP7, European Commission

Jean-Marc Seigneur:
- Since 2013: Expert for European Network and Information Security Agency (ENISA)

Katarzyna Wac:
- Katarzyna Wac, Member of the Board of Directors of the International Society for Quality-of-Life Studies (ISQOLS), USA

International and national research programs committees

Giovanna Di Marzo Serugendo:
- EU COST Actions – Expert Reviewer - November 2017
- NWO Complexity – Programmable Self-Organisation, The Netherlands – Assessment Committee - November 2017-April 2018
- Projects funded by Austrian Science Fund (FWF) (2017)
- Member (2014,2017) – Commission de nomination Hepia
- Swiss Alliance for Data-Intensive Services, InnoSuisse – Board Management member (2016-)

Gilles Falquet:
- Evaluator for the EU ERC grants

Dimitri Konstantas:
- Since 2004 : Expert Evaluator for the Commission of the European Union
- Since 2005 : Expert evaluator for the Canadian National research foundation
- Since 2009: Expert evaluator for the Greek Ministry of Education
- Since 2002: Expert evaluator for the Dutch National research foundation
- Since 2002: Member of the eMobility ETP

Nadia Magnenat-Thalmann:
- ICCV2017, International Conference on computer vision 2017, Oct 22-29, 2017, Venice, Italy
- IEEE-ICCT 2017, 17th IEEE International Conference on Communication Technology, Chengdu, China, October 2017
- CYBERWORLDS 2017, Chester, UK, September 2017
- CASA 2017, the 30th International Conference on Computer Animation and Social Agents Seoul, South Korea, May 2017
- MMEDIA 2017, The Ninth International Conferences on Advances in Multimedia, Venice, Italy, April 2017
- VISIGRAPP 2017, Porto, Portugal, February 2017

Jean-Marc Seigneur:
- Since 2017: Member of the College of Expert Reviewers, European Science Foundation

Katarzyna Wac:
- Evaluator of research projects submitted to the Academy of Finland, Research Council for Natural Sciences and Engineering ("User-Centered Health Technology and Digital Health Services" call), Finland
- Evaluator of research projects submitted to National Medical Research Council, Ministry of Health, Singapore
- Evaluator of research projects submitted to Foundation for Polish Science, Poland
- Evaluator of research projects submitted to Research Promotion Foundation, Cyprus

# Visualization of enrichment information in enriched 3D city models
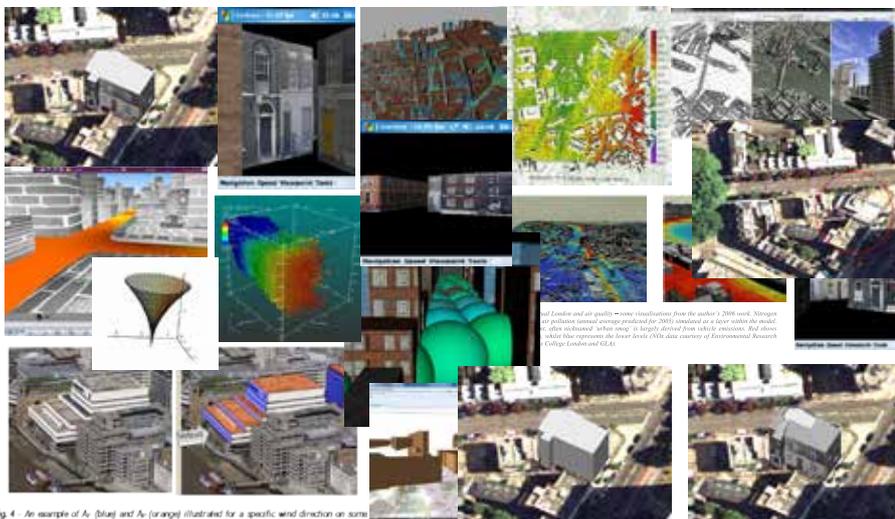
Figure 6: Data and knowledge visualization techniques in urban models

PhD Thesis committees

Giovanna Di Marzo Serugendo:

- Adja Ndeye Sylla - Support intergiciel pour la conception et le déploiement adaptatifs fiables, application aux bâtiments intelligents – Université Grenoble Alpes , External Examiner, December 2017
- Sebastien Ziegler - Internet of Things and IPv6 Convergence: Towards a Universal and Interoperable IPv6-based Framework for the Internet of Things, University of Geneva, Phd in Information Systems, 2017, Jury Member
- Alexandre Perles -An Adaptive Multi-Agent System for the Distribution of Intelligence in Electrical Networks, University Toulouse 3 Paul Sabatier, External Examiner, February 2017

Gilles Falquet:

- Mohamed Nassime Hadjadj, Rapporteur, Université Paris-Saclay, Paris

Nadia Magnenat-Thalmann:

- David Garcia, Supervisor, University of Geneva, Switzerland

Jolita Ralyté:

- Opponent and Secretary of the PhD Defence Committee: María Fernanda Granda Juca, PhD Thesis in Computer Science "Testing-Based Conceptual Schema Validation in a Model-Driven Environment", supervised by Prof. Nelly Cóndori-Fernández, Prof. Tanja E. J. vos and Prof. Óscar Pastor López, Universitat Politècnica de València, Valencia, Spain, defended September 8th 2017.

Conference organization as chair or co-chair

Giovanna Di Marzo Serugendo:

- General Chair – European Conference on Dependability (EDDC'17) –Geneva, September 2017

Jolita Ralyté:

- Track Chair: CAiSE 2017 Forum at the 29th International Conference on Advanced Information Systems Engineering, Essen, Germany, June 12-16, 2017.
- Doctoral Consortium Chair: Doctoral Consortium at PoEM 2017 – 10th IFIP WG8.1 Working Conference on Practice of Enterprise Modelling, Leuven, Belgium, November 22-24, 2017.
- Doctoral Consortium Chair: Doctoral Consortium at REFSQ 2017 – 23rd International Working Conference on Requirements Engineering: Foundation for Software Quality, Essen, Germany, February 27 – March 2, 2017.

Jean-Marc Seigneur:

- Program Co-Chair, Augmented Human International Conference, Samsung Research Center America, March 16-18 2017

Katarzyna Wac:

- Designing Quality of Life-driven Mobile Information Technologies, Workshop at the 24th Conference of the International Society for Quality of Life Research (ISO-QOL), October 2017
- 11th International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth), Dr. Wac is also a Workshops Chair, May 2017
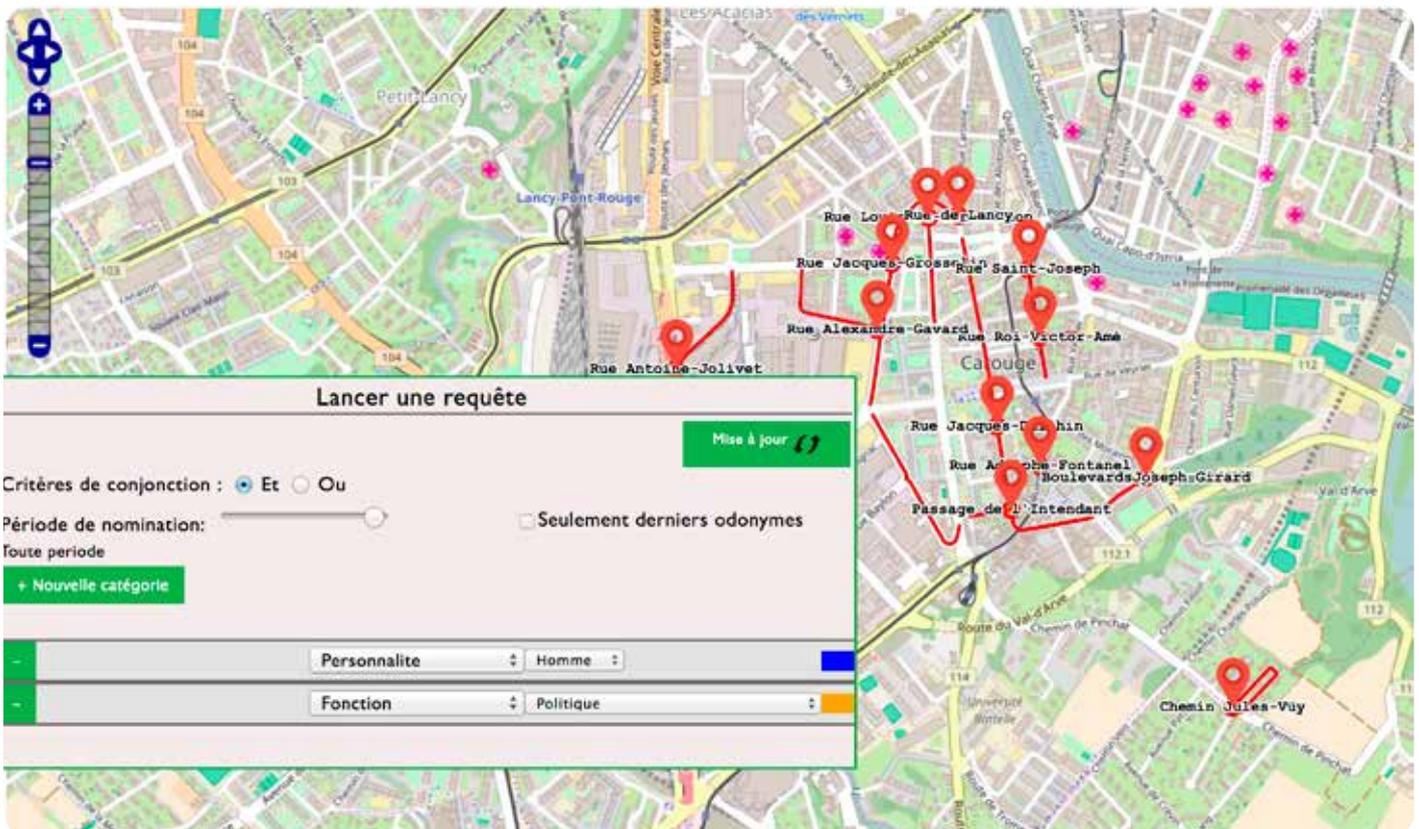

Figure 7: Visualisation of dynamical and toponymical challenges for the Swiss City of Carouge

Figure 8: ThinkData home page (http://thinkdata.ch)

Member of conference/workshop program committees

Abdelaziz Khadraoui:
- 3rd International conference on networking and advanced systems, ICNAS'2017, Annaba, 13-14 December 2017
- 11th IEEE International Conference on Research Challenges in Information Science, RCIS 2017, 10-12 May 2017, Brighton, UK
- 6th International Conference on Operations Research and Entreprise Systems, ICORES 2017, Porto, Portugal, 23-25 February, 2017

Nadia Magnenat-Thalmann:
- ICCV2017, International Conference on computer vision 2017, Venice, Italy, Oct 22-29, 2017
- IEEE-ICCT 2017, 17th IEEE International Conference on Communication Technology, Chengdu, China, October 2017
- CYBERWORLDS 2017, Chester, UK, September 2017
- CGI2017, Computer Graphics Internatinal, Yokohama, Japan, June 27-30, 2017
- CASA 2017, the 30th International Conference on Computer Animation and Social Agents Seoul, South Korea, May 2017
- MMEDIA 2017, The Ninth International Conferences on Advances in Multimedia, Venice, Italy, April 2017
- 12th Asia Conference on Healthcare and Health Insurance, Panel on «Roles of the Different Players in the Healthcare Ecosystem in Ensuring Affordability, Accessibility and Sustainability», Mandarin Orchard Hotel, Singapore, March 20-21, 2017(http://www3.asiainsurancereview.com/ConferenceDocuments/17-Asia%20Healthcare.pdf)
- VISIGRAPP 2017, Porto, Portugal, February 2017

Laurent Moccozet:
- Member of the scientific committee for the International, Conference on Education and New Developments, since 2013
- Member of the program committee of the International workshop on Interactive Environments and Emerging Technologies for e-Learning since 2015
- Reviewer for the ISPRS International Journal of Geo-Information
- Reviewer for the International Journal of Educational
- Technology in Higher Education

Jolita Ralyté:
- CAiSE 2017 – 29th International Conference on Advanced Information Systems Engineering, Essen, Germany, June 12-16, 2017.
- RCIS 2017 – 11th IEEE International Conference on Research Challenges in Information Science, Brighton, UK, May 10-12, 2017.
- ER 2017 – 36th International Conference on Conceptual Modeling, Valencia, Spain, November 6-9, 2017.
- EMMSAD 2017 – International Conference on Exploring Modeling Methods in Systems Analysis and Design, 12-13 June 2017, Essen, Germany.
- PoEM 2017 – 10th IFIP WG8.1 Working Conference on Practice of Enterprise Modelling, Leuven, Belgium, November 22-24, 2017.
- IEEE CBI 2017 – 19th IEEE Conference on Business Informatics Thessaloniki, Greece, July 24-27, 2017.
- IESS 2017 – International Conference on Exploring Services Science, Roma, Italy, May 24-26, 2017.
- INFORSID 2017 – 35ème Congrès Informatique des Organisations et Systèmes d'Information et de Décision, Toulouse, France, May 30 – June 2, 2017.
- APCCM 2017 – 13th International Workshop on Service-oriented Enterprise Architecture for Enterprise Engineering, Geelong, Victoria, Australia, January 31 – February 3, 2017.

- SoEA4EE 2017 – 9th International Workshop on Service-oriented Enterprise Architecture for Enterprise Engineering, in conjunction with EDOC, Québec, Canada, October 10, 2017
- MReBA 2017 – 4th International Workshop on Conceptual Modeling in Requirements and Business Analysis co-located with ER 2017, Valencia, Spain, November 6-9, 2017.
- ASDENCA 2017 – 3rd International Workshop on Advances in Services DEsign based on the Notion of Capability, co-located with CAiSE 2017, Essen, Germany, June 12, 2017.
- QMMQ 2017 – 4th International Workshop on Quality of Models and Models of Quality, co-located with ER 2017, Valencia, Spain, November 6-9, 2017.
- QLOD 2017 – Aatelier Qualité des Données du Web, joint à la conférence francophone Extraction et Gestion des Connaissances - EGC 2017, France, 2017.
- 10th SIGSAND/PLAIS EuroSymposium, Gdansk-Sopot, Poland, September 22nd, 2017.
- ICServ2017 – 5th International Conference on Serviceology, Vienna, Austria, July 2017.
- Doctoral Consortium at RCIS 2017 – 11th IEEE International Conference on Research Challenges in Information Science, May 10-12, 2017.

Jean-Marc Seigneur:
- ACM Augmented Human 2017

Katarzyna Wac:
- ACM CHI (reviewer)
- IEEE EMBC (Associate Editor)
- I-SPAN
- ISOQOL
- ACM
- DigitalHealth
- QoMEX
- AugmentedHuman
- EAI PervasiveHealth
- NetMob
- SoftCom

Refereeing

Giovanna Di Marzo Serugendo:
- Science of Computer Programming, Elsevier

Gilles Falquet:
- Journal of Location Based Services
- International Journal of Information Technology & Decision Making
- Journal on Data Semantics

Nadia Magnenat-Thalmann:
- Jury of Ph.D. thesis for New Zealand, France, Sweden, Switzerland and Germany.
- European Union, FP7 Projects, Brussels.
- Research Grants Council of Singapore.
- Natural Sciences and Engineering Research Council of Canada.
- National Science Foundation USA.
- Swiss National Research Foundation.
- Austrian Research Foundation.
- ACM SIGGRAPH
- IEEE Transactions on Visualization and Computer Graphics
- IEEE Computer Graphics and Applications
- IEEE Computer, Communications of ACM
- The Visual Computer, Computer Graphics Forum
- Computer Vision, Graphics and Image Processing
- Presence
- International Journal of Human-Computer Studies
- Computers and Graphics
- cyberworlds conference
- ICAART (International Conference on Agents and Artificial Intelligence)
- Enactive conference
- Multimedia Modelling conference
- International Conference on Entertainment Computing (ICEC)
- International Conference on Signal Processing, Image Processing and Pattern Recognition
- GRAPP ("International Conference on Computer Graphics Theory and Applications)
- Conference on Affective Computing and Intelligent Interaction (ACII 2010)
- EG Workshop on 3D Object Retrieval
- IEEE Virtual Reality Conference 2010
- Computer Graphics International
- CASA conference
- SIGGRAPH/EUROGRAPHICS Symposium on Computer Animation, etc
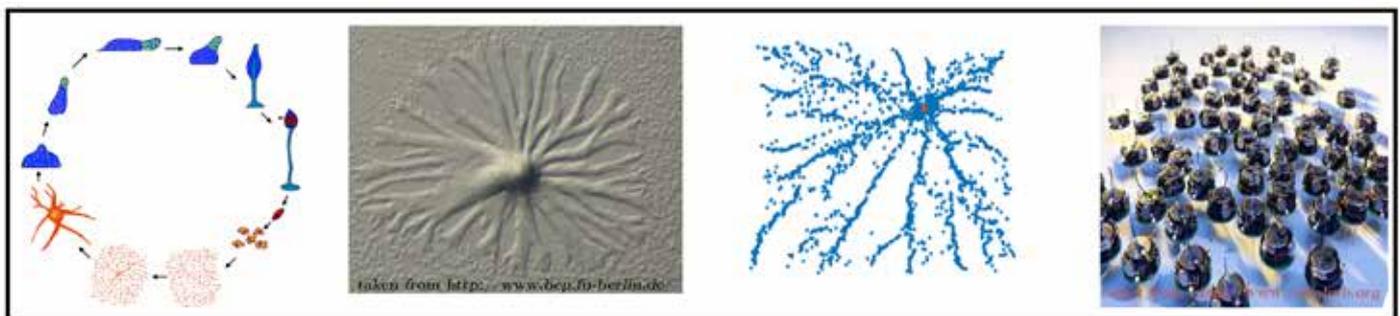
Figure 9: Social Amoeaba Dictyostelium Discoideum as an inspiration for engineering swarm robotics

Claudine Métral:
- Computers, Environment and Urban Systems (CEUS)

Jolita Ralyté:
- IJISMD – International Journal of Information Systems Modeling and Design
- IJISSS – International Journal of Information Systems in the Service Sector
- REEN – Requirements Engineering Journal
- BISE – Business & Information Systems Engineering
- CAIS – Communications of the Association for Information Systems
- IJIIT – International Journal of Intelligent Information Technologies
- SOSYM – Software and Systems Modeling
- INFSOF – Information and Software Technology
- DKE – Data & Knowledge Engineering
- ISI – Ingénierie des Systèmes d'Information
- DECSUP - Decision Support Systems

Jean-Marc Seigneur:
- Augmented Human Research (Springer Journal)

Katarzyna Wac:
- IEEE Transactions on Mobile Computing
- International Journal of Technology and Human Interaction (IGI Global)
- International Journal of Medical Informatics (Elsevier)
- Human-Computer Interaction (Frontiers ICT)
- Human-Media Interaction (Frontiers in Psychology)

Editorial responsabilities

Giovanna Di Marzo Serugendo:
- Editorial Board Member: Multiagent and Grid Systems - An International Journal. ISSN: 1574-1702.
- Editorial Board Member: International Journal of Intelligent Information and Database Systems. I n d e r - Science.
- Editorial Board Member (2013 -) - TCAASA
-

Nadia Magnenat-Thalmann:
- Since 2014: Associate Editor, Frontiers in Robotics, Nature Publisher
- Since 2010: Editorial Adviser of the journal of Graphical Models published by Elsevier
- Since 2000: Editor-in-Chief of the Journal The Visual Computer published by Springer Verlag, Germany
- Since 2000: Editor of the Journal of Computational Geometry published by Elsevier, Holland
- Since 1990: Co-founder and Co-editor-in-chief, Computer Animation and Virtual Worlds, John Wiley and Sons.

Laurent Moccozet:
- Member of the scientific committee for the International Conference on Education and New Developments since 2013
- Member of the program committee of the International workshop on Interactive Environments and Emerging Technologies for e-Learning
- Member of the program committee of the Augmented Human International Conference since 2016
- Reviewer for the ISPRS International Journal of Geo-Information
- Reviewer for the International Journal of Educational Technology in Higher Education
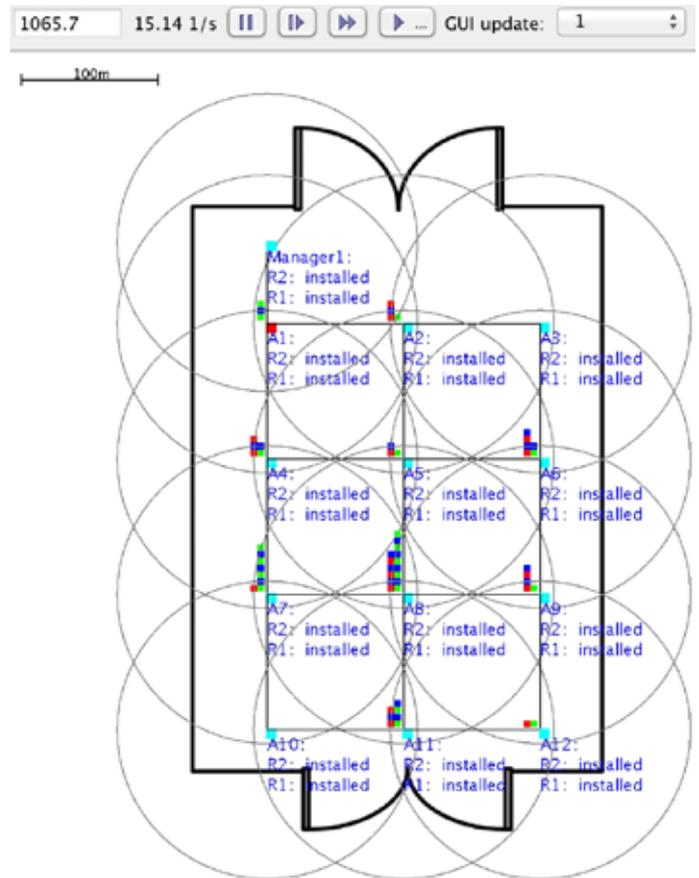
Figure 10: A Spatial Service for real-time hazard detection in a chemical factory - a solution using a logic-based coordination model

Jean-Henry Morin:
- Associate Editor of the Asia Pacific Journal of Information Systems (APJIS), ISSN 2288-5404, Since 2014.
- Editorial board member of the Journal of Service Science Research (JoSS), ISSN: 2093-0720, Springer, Journal no. 12927, since 2009.
- Editorial board member of the International Journal On Advances in Systems and Measurements, ISSN: 1942-261x, IARIA, since 2008.

Jolita Ralyté:
- Guest Editor for Document Numérique 20(1), Lavoisier, 2017. Numéro special « De la gestion des documents à la recherché d'information ».
- Guest Editor for Ingénierie des systèmes d'information 22(1), Lavoisier, 2017. Numéro special « Recherches & retours d'expériences en systèmes d'information ».
- Editorial Board Member for IJISMD – International Journal of Information Systems Modeling and Design
- Editorial Board Member for IJISSS – International Journal of Information Systems in the Service Sector

Jean-Marc Seigneur:
- Co-Editor in Chief, Springer Journal "Augmented Human Research"

Katarzyna Wac:
- Co-Editor, IEEE Computer, Special Issue on 'Quality of Life Technologies' (with Prof. H. Rivas and Dr. M. Fiordelli), Impact Factor: 2.0

Working groups / Standard Bodies participation

Giovanna Di Marzo Serugendo:
- ERCIM SERENE Working Group – Member

Jean-Henry Morin:
- Co-founder and President-Elect of the Association for Information Systems (AIS) Swiss chapter, Since June 2013.
- Membre du Conseil Scientifique de La Muse, Fondation pour la Créativité Entrepreneuriale (FCE), Genève.
- Membre commission d'experts, VigiSwiss, Swiss Data Center Association, since Feb 2016.
- Membre du comité d'organisation du Forum Economie Numérique du Canton de Genève.
- Co-founder and President of ThinkServices, Think(do) Tank on Services Science and Innovation, Geneva, Since 2010. Leader of the ThinkGroup on Data, Society and Transparency, initiator of ThinkData (http://thinkdata.ch/)
- Member of the Researchers cooperative cooperation Social-IN3
- Swiss Representative to the IFIP TC14 on Entertainment Computing
- ThinkGroup ThinkServices sur Cloud Societal Responsibility. http://tg-csr.org/

Jean-Marc Seigneur:
- Expert Member for the ITU Study Groups on Blockchain, Distributed Ledger Technologies and Digital Currencies

Katarzyna Wac:
- Dr Wac is an Associate Expert of the International Telecommunication Union (ITU) European Regional Initiative for mHealth (since 2012).
- Associate Expert of the International Telecommunication Union (ITU), ITU Academy on Quality of Service Training Program (QoSTP), ITU, Geneva, Switzerland

Events

Giovanna Di Marzo Serugendo:
- General Chair – European Conference on Dependability (EDDC'17) –Geneva, September 2017
- Projet Geofab – Lancement du premier appel à projet – April 2017 – Uni Bastions, Geneva

Nadia Magnenat-Thalmann:
- Cultural Heritage workshop Thematic Area 6 "Discovery" In the framework of the EU project ViMM , Batelle - University of Geneva, Switzerland, December 15, 2017


Figure 11: ViMM project – Dissemination and Communication platform © MIRALab

Centre Universitaire d'Informatique
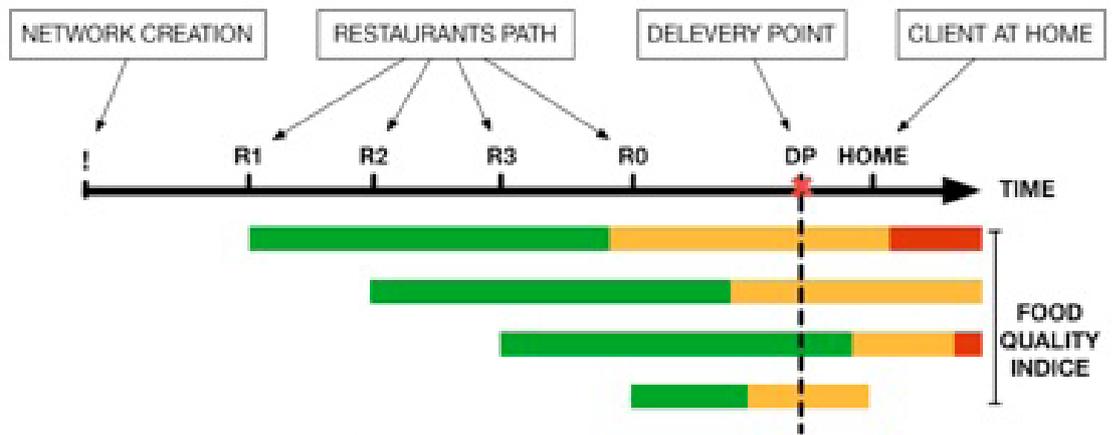
Figure 12: Modelling of food quality index in a multi-restaurant delivery (ISS TaM)

Invited talks

Michel Deriaz:
- Scanet (Swiss Consulting Association): «Succès académique, fiasco commercial», January 31th 2017
- HES-SO Lausanne: Preparing HES-SO participation in AAL Call 2017, February 6th, 2017
- SGG/SSG (Schweizerische Gesellschaft für Gerontologie / Société Suisse de Gérontologie): Presentation of all my projects linked to senior people, during 75 minutes, February 28th, 2017
- Cercle Silver Economie: Presentation of the FoxyFood-Delivery project, March 5th, 2017

Giovanna Di Marzo Serugendo:
- CERNOpenLab Iot Workshop – Smart Services for Urban Environments - Dec 2017
- Equality Café – Faculty of Medecine - Analyser pour mieux comprendre – Nov 2017
- Quinzaine de l'Urbanisme: Visualisation de la dynamique des enjeux toponymiques – prototype pour la Ville de Carouge
- Quinzaine de l'Urbanisme: Intervention table ronde: peut-on prédire les tendances avec le géo-big data - modéliser c'est prévoir
- Panelist – WSIS 2017 – Data Skills for Knowledge Societies, Geneva, ITU, 2017
- Evidence-based policy making. Politiques publiques à l'ère du numérique – University of Geneva
- Coordination'2017 – Keynote speaker – Spatial edge services, Neuchâtel, June 2017

Nadia Magnenat-Thalmann:
- Invited talk at The International Conference on Nextgen Electronic Technologies: Silicon to Software, Imaging and Computer Graphics Theory and Applications (ICNETS2), «Social robotics: Who are they and what are their applications? Case study with NTU Nadine robot», VIT University, Chennai Campus, India, March 23–25, 2017 (https://www.icnets2.com/dump/keynote-speakers)
- Invited talk at The 12th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2017), «The Future of Social Robots - A Case Study with Nadine Humanoid Robot», Porto, Portugal, February 27–March 01, 2017 (http://www.visigrapp.org/KeynoteSpeakers.aspx?y=2017)
- Invited talk at The Second edition of iMagination Week 2017: Shaping the City of Tomorrow, «Social Robots as companions of real people», ESSEC Business School, Singapore, January 10, 2017 (http://www.essec.edu/media/asia-pacific/news/press_release_-_imagination_week_2017_-_singapore.pdf)

Katarzyna Wac:
- 11.2017 Connecté Pour Mieux Vivre, Careers and Opportunities Network Cafe titled «Nouvelles Technologies de l'information: En Finir Avec Les Préjugés», University of Geneva, Switzerland.
- 10.2017 Keynote : "mHealth in Patient Care: Hype or Hope?", 46th Symposium on Clinical Pharmacy (ESCP), Heidelberg, Germany
- 6.2017 "mHealth Innovations to Quality of Life Improvements", Data Analytics Research Seminar, Nestle Research Center, Switzerland.
- 4.2017 "From Quantified Self to Quality of Life", Research Seminar: Tracking Experience – Enhancing Lives?, University of Copenhagen, Denmark.
- 4.2017 Katarzyna Wac (Discussant), Using eHealth and mHealth Methods to Promote Healthy Behaviors among Women, Scientific Papers Session at: 38th Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine (SBM 2017), San Diego, CA, USA

Participation in TV and radio programs

Michel Deriaz:
- SIC Notícias, during the AAL Forum in Coimbra

Jean-Marc Seigneur:
- La Première RTS, Business e-Reputation, Geneva, 13/03/2017 - https://www.avisdexperts.ch/experts/jean_marc_seigneur

Nadia Magnenat-Thalmann:
- From EVA to Nadine (Les progrès de l'intelligence artificielle ont fait émerger une nouvelle génération de robots) - RTS.ch - Swiss News TV, 10 jan 2017, 7 :30 pm

Katarzyna Wac:
- Le self-tracking: mieux se connaître par les chiffres, (Eng. "Self-Tracking: Better Self- Knowledge via Numbers") RTS 19h30 News, Invited: Dr. K. Wac, TV reportage, Switzerland, March 2017

Press release
Giovanna Di Marzo Serugendo:
- Le Temps – Comment les géo-données nourissent les start-ups - September 16th 2017, https://www.letemps.ch/economie/2017/10/24/startup-se-basent-geodonnees
- ICT Journal – Interview, http://www.ictjournal.ch/interviews/2017-03-30/giovanna-di-marzo-serugendo-unige-nous-souhaitons-encore-renforcer-les-liens
- Politiques publiques à l'ère du numérique, http://www.tdg.ch/geneve/actu-genevoise/etat-penche-defis-numeriques/story/16294618

Nadia Magnenat-Thalmann:
- Vieillir? Jamais sans mon robot - RTS Radio Télevision Suisse, 01 Feb 2017, French
- Les progrès de l'intelligence artificielle ont fait émerger une nouvelle génération de robots - RTS Radio Télevision Suisse, 14 Jan 2017, French

Honours and scientific awards
Katarzyna Wac:
- 2017 – 2018: Distinction of Society of Behavioral Medicine Leadership Institute, USA

Others
Giovanna Di Marzo Serugendo:
- Digital Day, Geneva Train Station (21th Nov. 2017)
- GE = CI2 (22th Nov. 2017)

Nadia Magnenat-Thalmann:
- The robot Eva playing in the Roten Fabrik Theatre at Zurich, Feb 2017 (https://www.youtube.com/watch?v=ISFD76N1FZI)

Jolita Ralyté:
- Steering Committee Member of CAiSE – International Conference on Advances Information Systems Engineering, since 2012.
- Steering Committee Member of PoEM – IFIP WG8.1 Working Conference on Practice of Enterprise Modelling, since 2015.
- Steering Committee Member of INFORSID – Congrès Francophone d'INFormatique des ORganisation et Systèmes d'Information et de Décision, since 2014.
- Steering Committee Member of RCIS – IEEE International Conference on Research Challenges in Information Science, since 2017.
- Chair of the IFIP WG 8.1: Design and Evaluation of Information Systems, 2016 - 2018.

Funded research projects
Participation to European projects

AAPELE
Architectures, Algorithms and Platforms for Enhanced Living Environments
EU COST Action, AAPELE-IC1303
Period: November 2013 - November 2017
Web site: http://www.cost.eu/domains_actions/ict/Actions/IC1303

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ACROSS
Autonomous Control For A Reliable Internet Of Services
EU COST Action, ACROSS-IC1304
Period: November 2013 – November 2017
Web site: http://www.cost.eu/domains_actions/ict/Actions/IC1304

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ANINEX
User Centred Computer Animation Techniques for Next Generation Digital Creation and Modelling
EU FP7 project, ID 612627
Partners: National Centre for Computer Animation, Bournemouth University – United Kingdom, MIRALab, University of Geneva – Switzerland, National Laboratory for Information Science and Technology, Tsinghua University – China, The State Key Laboratory of Computer Science, Institute of Software, Chinese Academy of Sciences – China, The State Key Laboratory of Computer Aided Design and Computer Graphics, Zhejiang University – China
Period: December 2013 - November 2017
Web site: http://cordis.europa.eu/project/rcn/109867_en.html

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ASAP
Architectures, Algorithms and Platforms for Enhanced Living Environments
EU FP7-ICT Grant 619706
Partners: Université de Genève, Institute of Communication and Computer Systems (Greece), Queen's University Belfast (UK), Internet Memory Research (France), WIND Telecomunicazioni (Italy), webLyzard technology (Autria)
Period: March 2014 - February 2017
Web site: http://www.asap-fp7.eu/

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CoME
European Ambient Assisted Living project «Caregivers and Me"
AAL-CoME AAL-2014-127
Partners: HI iberia (Spain), IRBLLeida (Spain), University of Geneva (Switzerland) (Katarzyna Wac), Vigisense (Switzerland), ConnectedCare (Netherland), Pannon Business Network (Hungary)
Period: 2015 – 2018
Web site: http://come-aal.eu/

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EDLAH2
AAL project
Partners: karisgroup (England), Université du Luxembourg (Luxembourg), Université de Genève (Switzerland), EverdreamSoft (Switzerland), terzStiftung (Switzerland)
Period: June 2016 - 2018
Website: http://edlah2.eu

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Figure 13: Confidential channel over MANET

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GeoFab du Grand Genève
InterReg project
Principal Investigator: Giovanna Di Marzo Serugendo
Period: July 2016 - December 2019
Website: https://www.geofab-grandgeneve.org/

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GrowMeUp
EU H2020 project
Partners: Artificial Perception Team (Portugal), University of Cyprus (Cyprus), University of Geneva (Switzerland), ProbaYes (France), PAL Robotics (Spain), CiTARD Services Ltd (Cyprus), Caritas Ciocesana de Coimbra (Portugal), Zuyderland (Netherland)
Period: February 2015 - January 2018
Website: http://www.growmeup.eu/

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ITN-DCH
Initial Training Network for Digital Cultural Heritage: Projecting our Past to the Future
EU FP7 project
Partners: MIRALab, University of Geneva - Switzerland, Cyprus University of Technology - Cyprus, National Technical University of Athens - Greece, Universitaet Stuttgart – Germany, Foundation for Research and Technology Hellas – Greece, Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.v. - Germany, Katholieke Universiteit Leuven – Belgium, Fondazione Bruno Kessler – Italy, Centre National de la Recherche Scientifique - France, Universidad de Murcia - Spain, Univerzav Ljubljani - Slovenia, Arctron 3d Vermessungstechnik-und Softwareentwincklungs Gmbh - Germany, 7Reasons Medien Gmbh - Germany, The University of Warwick – United Kingdom
Period: October 2013 - September 2017
Web site: http://www.itn-dch.org/

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KEYSTONE
Semantic keyword-based search on structured data sources
EU COST Action IC1302
Partners: Gilles Falquet, Stéphane Marchand-Maillet (mgt committee and working group members)
Period: October 2013 - October 2017
Web site: http://www.keystone-cost.eu

Many-Me
Social Interactive Care System to support the wellbeing of people living with dementia
AAL Project (AAL/Call2016/1/2017)
Partners: Drimpy, CPX, UNIGE, EKKOTEK, ASM, terzStiftung, EURAG, MOB, Materia Group
Period: March 2017 - February 2020
Web site: http://many-me.eu/

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MiraculousLife
Miraculous Life for elderly Independent Living
EU FP7-ICT project Grant 611421
Partners: AIT, UniGe, UCY, ORBIS, Fh-IGB, Noldus, Citard, Zoobe, MRPS
Period: February 2014 - February 2017
Web site: http://miraculous-life.eu/

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NOTRE
Network for Social Computing Research
EU FP7 project
Partners: Cyprus University of Technology (CUT) – Cyprus, Foundation For Research and Technology Hellas (FORTH-ICS) – Greece, IMDEA Networks Institute (IMDEA) – Spain, MIRALab, University of Geneva (UNIGE) – Switzerland, University of Dusseldorf (UDUS) – Germany
Period: January 2016 - December 2018
Web site: http://notre.socialcomputing.eu

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SmartHeat
AAL project
Partners: Université de Genève (Switzerland), Modosmart S.L. (Spain), MX-SI S.L. (Spain), Sensor ID s.n.c. (Italy), terzStiftung (Switzerland), Eurag (Austria), Gluk Advice B.V. (Netherland), Teamnet International (Romania)
Period: 2015 - 2018
Website: http://www.smartheat-aal.eu

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SpONSOR
SOlutioN for Supporting occupation in the life of Older adults
AAL project
Partners: Luxembourg Institute of Science and Technology (Luxembourg), Coherent Streams (Switzerland), Fondation Suisse pour les Téléthèses (Switzerland), University of Geneva ISS (Switzerland), InTech (Luxembourg), Consiglio Nazionale delle Ricerche (Italy), I+ S.r.l. (Italy), Netwell Centre and Casala, Dundalk Institute of Technology (Itreland)
Period: May 2014 - August 2017
Website: http://sponsor-aal.eu/Home

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SPIRIT
Security and PrIvacy foR the Internet of Things
CHIST-ERA European project, R
EPSRC Reference EP/P015956/1
Partners: University of Kent - School of Engineering and Digital Arts, University of La Rochelle - L3i Laboratory, University of Essex - School of Computer Science and Electronic Engineering, University of Geneva - Centre for Computer Science (CUI)
Period: January 2017 - December 2019
Website: http://cui.unige.ch/spirit

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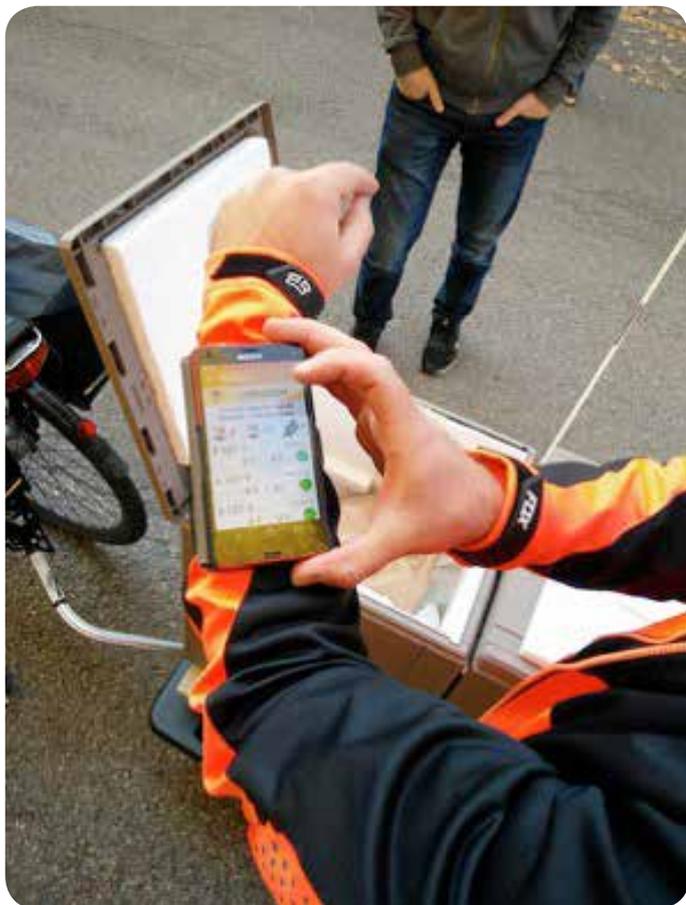
ViMM
Virtual Multimodal Museum
EU H2020 project
Partners: Cyprus University of Technology (CUT) – Cyprus, Foundation For Research and Technology Hellas (FORTH-ICS) – Greece, 7Reasons Medien Gmbh - Germany, MIRALab, University of Geneva (UNIGE) – Switzerland, Stifung Preussischer Kulturesizt – Germany, Universidad Pompeu Fabra – Spain, 7scenes – Netherlands
Period: October 2016 - March 2019
Web site: http://vi-mm.eu/

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Vizier
The Elderly Friendly Interface to Modern Online Services and Internet of Things Appliances
AAL project
Partners: University of Geneva (Project coordinator), Dublin City University, Myhomecare, NetUnion sàrl, Verhaert New Products & Services NV, Acapela Group S.A., Familiehulp vzw, VIVA Association, Salaso Health Solutions Ltd.
Period: 2016 - 2018
Web site: http://aalvizier.eu

Participation to National projects

Finding lost objects in a warehouse with Beacons Low Energy (BLE)
Private mandate
Principal Investigator: Giovanna Di Marzo Serugendo
Period: March - June 2016

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FoxyFoodDelivery
Period: February 2017 - July 2018

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IDDASS
Interests detection during a shopping session
CTI Project
Period: 2016 - 2017
Website: http://tam.unige.ch/projects/iddass.html

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MIQmodel
Context-aware Mobile Internet Quality Model
SNSF-157003
Period: 2015 - 2019
Website: http://p3.snf.ch/Project-157003

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Figure 14: Runner dish validation to inform how delivery has been completed (ISS TaM)

PRedict Solar Uv Exposure (PuRSUE)

Ground UV irradiance and 3D rendering techniques to predict anatomical solar UV exposure in Skin cancer research and prevention
SNF project 152803
Institute for Work and Health, Lausanne University Hospital, MeteoSwiss
Period: August 2014 - January 2018
Website:
http://p3.snf.ch/Project-152803

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Recover@home

A monitoring solution to be used at home by people who undergo lower body orthopaedic surgery
CTI Project
Period: 2016 - 2018
Website: http://tam.unige.ch/projects/recoverathome.html

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Swiss Alliance for Data-Intensive Services

KTI NTN Project
Management Board Member: Giovanna Di Marzo Serugendo
Period: 2017 - 2019
Website: http://www.data-service-alliance.ch/

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ThinkDesign

Developing Design Thinking as an academic skillset
University of Geneva – Yonsei University co-fund
Period: September 2015 - August 2018

TEACHING

Giovanna Di Marzo Serugendo:
- **Self-organising Mechanisms and Design Patterns for Engineering Self-Organising Applications – A Smart Environment Application**, ISS, Master University Lyon (France)
- **Bases de données**, ISS, Bachelor course, 6 ECTS, 14 hours, 30 students
- **Contextualisation, qualité des services et mashup**, ISS, Bachelor course, 3 ECTS, 28 hours, 15 students
- **Design Science Research**, ISS, Master course, 3 ECTS, 84 hours, 20 students
- **Problèmes des sociétés contemporaines: économie et société numériques** , ISS, Bachelor course, 6 ECTS, 84 hours, 200 students
- **Projets transverses I, II**
- **Digital participation – platforms and issues** (CAS)
- **Self-adaptive systems**, ISS, Master course, 4 ECTS, 42 Hours, 6 students
- **Outils collaboratifs d'environnements logiciels**, ISS, Bachelor
- **Requirements Analysis**, ISS, Bachelor
- **Evidence-Based Policy-Making**, Master with Tsinghua University

Dimitri Konstantas:
- **Réseaux de communication**, ISS, Bachelor, 48 hours, 12 students
- **Mobile Systems and Services**, ISS, Master, 48 hours, 10 students
- **Design of Multimedia Services**, ISS, Master, 48 hours, 12 students
- **Technologies for Services**, ISS, Master, 48 hours, 11 students
- **InfoSec (program director)**, ISS, Continuing education, 24 hours, 30 students
- **Systèmes d'information et sciences des services**, ISS, Master 2 Gestion d'entreprise / Continuing education, 24 hours, 20 students
- **MAS SCN (program director)**, Continuing education, 6 students

Laurent Moccozet:
- **Service Innovation Lab**, ISS, Master, 3 ECTS, 28 hours, 8 students
- **Introduction à la programmation**, ISS, Bachelor, 6 ECTS, 56 hours, 20 students
- **Services et technologies multimédia**, ISS, Bachelor, 6 ECTS, 56 hours, 60 students
- **Introduction à la sience des services**, ISS, Bachelor, 6 ECTS, 56 hours, 300 students
- **Interaction multimodale et affective**, CUI, Master, 6 ECTS, 56 hours

Figure 15: SIC Notícias, during the AAL Forum in Coimbra

Figure 16: TaM team in 2017

Figure 17: ThingVibe, Internet of Things (IoT) social network and application store

Jean-Henry Morin:
- **Introduction à la Sécurité, Ethique et Règlementation des Services**, ISS, Bachelor course, 3 ECTS, 28 hours, 50 students
- **Design Science**, ISS, Bachelor course, 6 ECTS, 56 hours, 14 students (2016: Giovanna Di Marzo Serugendo)
- **Systèmes d'Information d'Entreprise**, ISS, Bachelor course, 6 ECTS, 56 hours, 10 students
- **Informatique et Systèmes d'Information I, Public Management**, ISS, Master course, 3 ECTS, 28 hours, 20 students
- **Selected Topics, Advanced Seminar on Industrial & Emerging issues**, ISS, Master course, 3 ECTS, 28 hours, 16 students
- **Service Innovation Lab**, ISS (shared with Laurent Moccozet), 3 ECTS, 28 hours, 9 students
- **Design Science & Design Thinking**, CUSO Doctoral Program in Computer Science, in cooperation with Prof. Yves Pigneur, University of Lausanne, 5 days program, 35 hours, 12 students
- **Introduction to Management Information Systems** (English), Undergraduate Level, Credit Hours 3(3), 80 students, Korea University Business School
- **Internet Business and Electronic Commerce** (English), Undergraduate Level, Credit Hours 3(3), 53 students, Korea University Business School
- **Design Thinking for Innovation**, Undergraduate Level, co-teaching with Prof. Kil-Soo Suh, Credit Hours 3(3), 40 students, Yonsei School of Business
- **Emerging Trends & Development in Global IT Industry** (English), Graduate Level, TRENDS & DEVELOPMENT IN GLOBAL IT INDUSTRY (English), GMBA, Module 2, 41 students, Korea University Business School

Jolita Ralyté:
- **Workshop 1 – Measuring, Evaluating, and Monitoring Sustainable Development**, Master in Innovation, Human Development and Sustainability, Faculty of Social Sciences, 12 ECTS, 224 hours, 24 students
- **CAS MATIS-MESSI**, Modelling of Information Systems and Services, Continuing education, 10 ECTS, 8 students
- **CAS MATIS-DSI**, Management of Information Systems and Services , Continuing education, 10 ECTS, 9 students

Jean-Marc Seigneur:
- **e-Réputation - Courses and Tutorials**, Master, 6 ECTS, 52 hours, 20 students

Gilles Falquet:
- **Algorithmics and Data Management**, ISS, Master in Business Analytics, 6 ECTS, 56 hours, 12 students
- **Semantic Web technologies**, ISS, Master, 6 ECTS, 56 hours, 20 students, participation for 28 hours
- **Knowledge organisation systems**, ISS, Master, 6 ECTS, 56 hours, 10 students, participation for 28 hours
- **Systèmes d'information de l'environnement**, Master en sciences de l'environnement (MUSE) course, 3 ECTS, 28 hours, 55 students, participation for 4 hours

Claudine Métral:
- **Semantic Web technologies**, ISS, Master, 6 ECTS, 56 hours, 20 students, participation for 28 hours
- **Knowledge organisation systems**, ISS, Master, 6 ECTS, 56 hours, 14 students, participation for 28 hours
- **Systèmes d'information de l'environnement**, Master en sciences de l'environnement (MUSE) course, 6 ECTS, 10 hours, 55 students, participation for 4 hours
- **GEOTOOLS-DB: Modélisation des bases de données spatiales,** Certificat complémentaire en géomatique, Service course, 3 ECTS, 28 hours, 30 students
- **Space-City: Modèles urbains 3D,** Master en sciences de l'environnement (MUSE), Service course, 3 ECTS, 28 hours, 12 students

Centre Universitaire d'Informatique

latl.unige.ch

CUI UNIGE

LATL

Laboratory for the Analysis and Technology of Language

Swiss Digital Day, Geneva, 2017 November 21th

Laboratory for the Analysis and Technology of Language

Domain activities

LATL (http://www.latl.unige.ch) has been active in the field of natural language processing since the early 1990's. Its main research focus has been the development of a multilingual syntactic parsing model (the Fips parser), as well as the development of large lexicons and dictionaries. A whole series of applications based on the parser has also been developed, including the Its-2 machine translation system, FipsCo a collocation extraction system and the Twic word in context translation system for on-line documents.

The Fips parser is currently available for several of the main European languages (English, French, German, Italian and Spanish), with several other languages at various stages of development (Romanian, Greek, Japanese). In 2017 the LATL continued the development of the parsers for the above languages with a special focus on Modern Greek. It is based on a grammatical model inspired by Chomsky's generative grammar and on an object-oriented design for its implementation. The parser and its rich lexical database (Figure 1) are used in a number of applications, including machine translation (Figure 4), terminology extraction, speech-to-speech translation, and computer-assisted language learning.

In 2017, the LATL was deeply involved in the organisation of the Parseme Shared task on automatic identification of verbal mutliword expression. The first edition held in April 2017 in Valencia (Spain) and the next edition is planned for August 2018 (co-located with COLING 2018)

In collaboration with the Knowledge Engineering group, the LATL works on a project of digital edition of Ferdinand de Saussure's manuscripts. A system for visualizing, annotating and transcribing Saussure's manuscripts is already completed.

LATL participates in the research project led by Prof. Christian Lovis (Faculty of Medicine) on the automatic processing of medical language, in the framework of the multi-faculty project Language and Communication

Team

Director
Eric Wehrli
Full professor
H-index: 23

Senior researchers
Dr. Vasiliki Foufi
Dr. Yves Scherrer
Jean-Philippe Goldman
Luka Nerima

Assistants (PhD students)
Asheesh Gulati
Maria Ivanova
Sharid Loáiciga
Kamel Nebhi
Lorenza Russo

Administration
Coralie Grossrieder
Eva Capitao

Figure 1: Translation of Word in Context (TWiC) is a reading aid system for readers of materiel in foreign languages. Here in use on the Tages Anzeiger newspaper Website
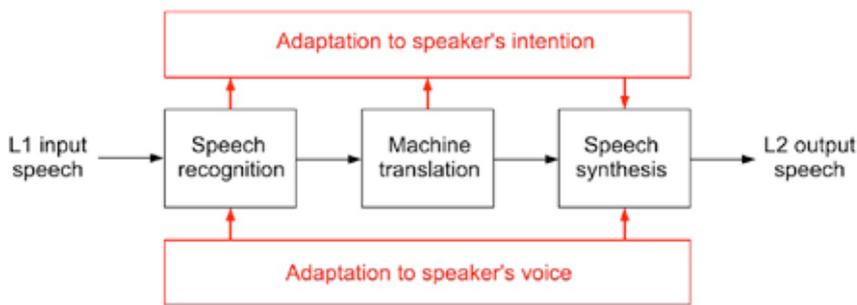
Figure 2: General concept of speech-to-speech machine translation, with SIWIS adaptations in red.

PhD Thesis

- Sharid Loáiciga, Pronominal Anaphora and Verbal Tenses in Machine Translation, May, 2017

List of publications

Full refereed papers in Conference Proceedings

[1] Boula de Mareüil, P., Scherrer, Y., & Goldman, J. -P. (2017). Combien d'accents en français? Focus sur la France, la Belgique et la Suisse. In Elmiger, D. & Racine, I. & Zay, F. (Ed.) Processus de différenciation: des pratiques langagières à leur interprétation sociale - Actes du colloque VALS-ASLA 2016, Vol. 1. Neuchâtel: Bulletin suisse de linguistique appliquée, Centre de linguistique appliquée.

[2] Foufi V., Nerima L. & E. Wehrli. 2017. Parsing and MWE Detection: Fips at the PARSEME Shared Task. In Proceedings of the 13th Workshop on Multiword Expressions (MWE 2017), 54–59, Valencia, Spain, April 4. 2017 Association for Computational Linguistics.

[3] Foufi V., Nerima L. & E. Wehrli. 2017. Automatic Annotation of Verbal Collocations in Modern Greek. EURO-PHRAS 2017, London, UK, November 13-14, 2017, pp. 36-44

[4] Rabus, A., & Scherrer, Y. (2017). Lexicon Induction for Spoken Rusyn – Challenges and Results. In Proceedings of the 6th Workshop on Balto-Slavic Natural Language Processing.

[5] Scherrer, Y., & Rabus, A. (2017). Multi-source morphosyntactic tagging for Spoken Rusyn. In Proceedings of the Fourth Workshop on NLP for Similar Languages, Varieties and Dialects.

[6] Zampieri, M., Malmasi, S., Ljubesic, N., Nakov, P., Ali, A., Tiedemann, J., Scherrer, Y., et al. (2017). Findings of the VarDial Evaluation Campaign 2017. In Proceedings of the Fourth Workshop on NLP for Similar Languages, Varieties and Dialects.

Books and book chapters

[7] Foufi V., Nerima L. & E. Wehrli. 2017. Parsing and MWE Detection. In Yannick Parmentier & Jakub Waszczuk (eds.) Representation and parsing of multiword expressions, 225–246. Berlin: Language Science Press.

International and national advisory committees

- Yves Scherrer, Consultant for the MADAR (Multi-Arabic Dialect Applications and Resources) project, funded by the National Priority Research Program of the Qatar Research Foundation, 2014-2017

Figure 3: VoiceÄpp Interface for dialect prediction based on automatic speech recognition.

Member of conference/workshop program committees

- Luka Nerima: Shared task on automatic identification of verbal multiword expressions, Organized as part of the MWE 2017 workshop co-located with EACL 2017, April 4, 2017, Valencia, Spain
- Yves Scherrer: VarDial - Fourth Workshop on NLP for Similar Languages, Varieties and Dialects, EACL 2017, Valencia, Spain

Events organised in Geneva

- Luka Nerima: Workshop Les manuscrits de Saussure, parmi d'autres. Problèmes, stratégies et solutions d'édition pour les archives numériques, in conjunction with the Colloquium Le cours de linguistique générale. 1916-2016. L'émergence, Januray 12-13, 2017, Geneva.

Participation in TV and Radio Programs

- Mathieu Avanzi: RTS, Geneva, March 29, 2017, https://www.rts.ch/info/regions/8503266-bienne-ou-sierre-un-jeu-en-ligne-vous-defie-de-localiser-les-accents-romands.html

Press release

Many press releases in Swiss papers (webpage https://www.tonaccent.ch/tour-de-suisse/fr/about/media) :

- 29th March 2017 - article dans Le Nouvelliste
- 29th March 2017 - article dans La Liberté
- 30th March 2017 - article par la RTS
- 30th March 2017 - article sur ArcInfo.ch
- 30th March 2017 - article dans Le 24h
- 31th March 2017 - article dans La Tribune de Genève
- 31th March 2017 - interview pour le TJ de la RTS
- 4th April 2017 - interview sur BNJ FM
- 17th April 2017 - article dans le magazine Coop
- July 2017 - série de 5 portraits parlés RTS Info

Funded research projects
Participation to European projects

PARSEME: Parsing and Multi-word Expressions
COST action IC 1207
Partners: 28 European countries
Period: March 2013 - April 2017
Website: http://typo.uni-konstanz.de/parseme/

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MIAPARLE : Méthode interactive d'aide à la prononciation pour l'apprentissage d'une langue étrangère
INNOGAP – UNITEC

Participation to National projects

Knowledge engineering models and tools for the digital scholarly publishing of manuscripts
Swiss NSF interdisciplinary project
Principal Investigator: Gilles Falquet (CUI - UNIGE)
Partners: Claire Forel (FTI - UNIGE), Luka Nerima (CUI – UNIGE)
Period: April 2015 – April 2017
Website: http://fds.unige.ch/

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Donnez votre français à la science
Funded by DGLFLF (Délégation générale à la langue française et aux langues de France)
Principal Investigator: J.Ph. Goldman (CUI - UNIGE) and Y. Scherrer (CUI - UNIGE)
Period: 2016 - 2017
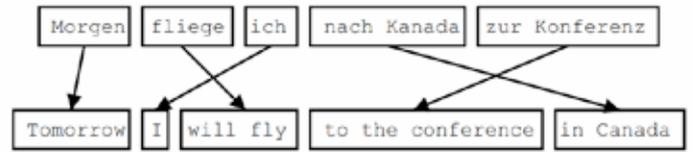
Figure 4: Word alignment in a bilingual parallel corpora

Technology transfer

LATL.ch is a technology start-up specialized in the development of linguistic software components. Closely associated with LATL laboratory, LATL.ch develops and commercializes products based on fundamental research conducted in the university lab. Two companies use its POS-Tagger: Acapela Group, a European Speech synthesis company, and ShareWizMe, a French innovative company specialized in real time analysis of contributions (ideas, feedback, comments).

Others
Invited courses

- Eric Wehrli, University of Strasbourg, France, November 2017, Polylexical Expression Processing, Machine translation Collocation and Anaphora Resolution

Oral presentations

- Foufi V., Gaudet-Blavignac C., Wehrli E., & C. Lovis. 2017. Translating patient related narratives into SNOMED-CT to enable interoperability of healthcare data. Workshop Eclavit, Paris, November 24-25, 2017.
- Gaudet-Blavignac C., Foufi V., Wehrli E., & C. Lovis. 2017. Lexicosemantic resources and corpora for the automatic translation of Electronic Health Records (EHRs) into SNOMED-CT. Deuxième journée du Réseau Thématique Langage & Communication Langage & Communication, Genève, September 14, 2017.
- Goldman, J-P and Scherrer, Y. 2017. Méthode de crowdsourcing pour la documentation de la variation régionale du français. Deuxième journée du Réseau Thématique Langage & Communication Langage & Communication, Genève, September 14, 2017.
- Goldman, J-P and Schwab, S. 2017. MIAPARLE : Méthode interactive d'aide à la prononciation pour l'apprentissage d'une langue étrangère: aspects prosodiques. Deuxième journée du Réseau Thématique Langage & Communication Langage & Communication, Genève, September 14, 2017.
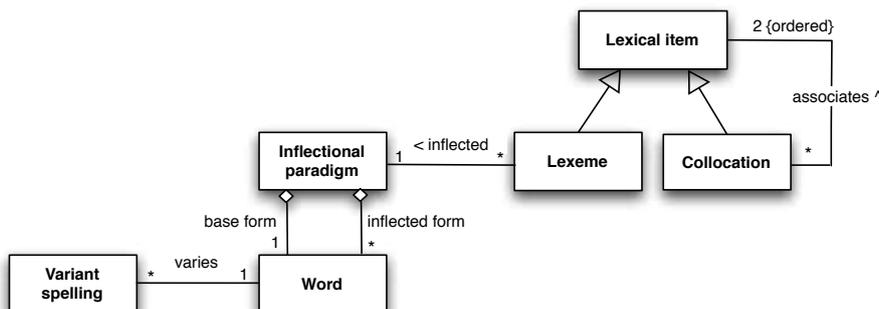

Figure 5: The lexical database schema of the Fips parsing system.
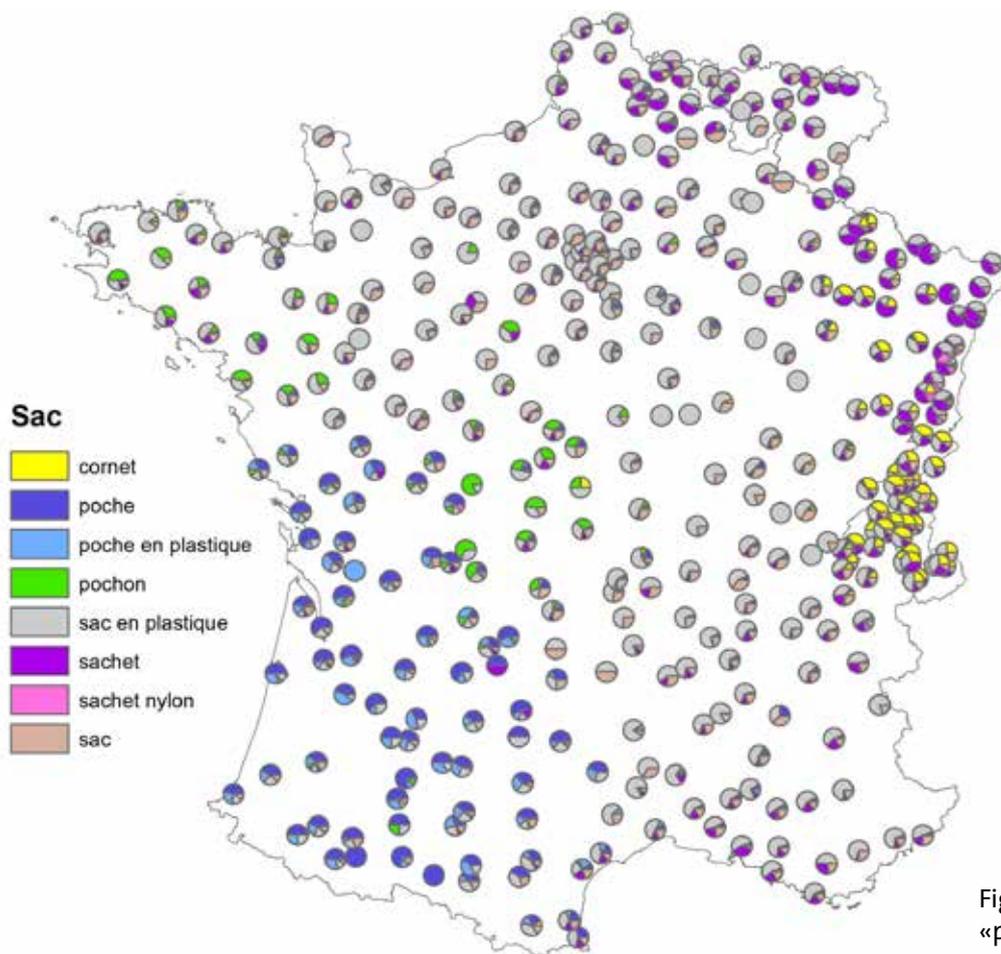
Figure 6: The denominations of the «plastic bag» in regional French, according to the results of [6]

Teaching

Luka Nerima:

- **Databases**, Computer Science for the Humanities, Bachelor, 3 ECTS, 112 hours, 12 students
- **Databases - Laboratory sessions**, Computer Science for the Humanities, Bachelor, 3 ECTS, 56 hours, 12 students
- **Information Systems and Service Modeling**, Computer Science for the Humanities, Bachelor, 3 ECTS, 28 hours, 32 students
- **Information Systems and Service Modeling - Laboratory sessions**, Computer Science for the Humanities, Bachelor, 3 ECTS, 28 hours, 12 students
- **Informatics I: Web programming**, Computer Science for the Humanities, Bachelor, 3 ECTS, 28 hours, 46 students
- **Informatics II - Java seminar**, Computer Science for the Humanities, Bachelor, 3 ECTS, 28 hours, 4 students
- **Informatics II - Object Oriented Project**, Computer Science for the Humanities, Bachelor, 6 ECTS, 56 hours, 16 students
- **Empirical Methods in Natural language Processing Project**, Master, 6 ECTS, 56 hours, 3 students
- **Information and Communication Technology**, Computer Science for the Humanities, Bachelor, & Master, 12 ECTS, 112 hours, 20 students

Asheesh Gulati:

- **Informatics I: Web programming - Laboratory sessions**, Computer Science for the Humanities, Bachelor, 3 ECTS, 28 hours, 46 students
- **Natural language processing, linguistic and empirical approaches**, Master, 2 ECTS, 28 hours, 20 students

PIG

Proteome Informatics Group

www.sib.swiss/

CUI UNIGE

Swiss Digital Day, Geneva, 2017 November 21th

Proteome Informatics Group

Domain activities

The Proteome Informatics Group (PIG) is involved in bioinformatics. Bioinformatics is a recently created discipline in which computer technology is applied to the understanding and effective use of biological data (see http://www.sib.swiss/bioinformatics-for-all/what-is-bioinformatics). At PIG, we concentrate on the study of proteins that are the active molecules of the cell. Extracting and studying proteins from a cell or a tissue requires the use of sophisticated experimental methods which generate large datasets. The analysis of this experimental data entails the identification and quantification of proteins, the determination of their cellular location, modifications, interactions and, ultimately, their function. This information is crucial to decipher cellular processes. This strongly motivates our group to develop software and databases that support data analysis and knowledge discovery in cooperation with Life scientists. These resources are made available through the ExPASy server (http://www.expasy.org). Our software tools mainly support experimental mass spectrometry data analysis, focused on the detection of posttranslational modifications. Our databases store knowledge of carbohydrates attached to proteins as well as protein-carbohydrate interactions.

Team

Director
Frédérique Lisacek
MER
H-index: 29

Senior researchers
Dr. Alessandra Gastaldello

Assistants (PhD students)
Davide Alocci
Emma Ricart
Thibault Robin
Thomas Stricker (co-direction)
François Bonnardel (co-tutelle with University Grenoble-Alpes)

Developers / Designers
Julien Mariethoz

Internship Fellow
Elena Barletta (UniGe)
Renaud Costa (PolyTech, Nice-Sophia Antipolis)

PIG team in 2016

List of publications

Refereed papers in international journals

[1] Horlacher O, Jin C, Alocci D, Mariethoz J, Müller M, Karlsson NG, Lisacek F (2017) Glycoforest 1.0 Anal Chem 89(20):10932-10940 (http://dx.doi.org/10.1021%2Facs.analchem.7b02754)

[2] Domagalski M, Alocci D, Almeida A, Kolarich D, Lisacek F (2017) PepSweetener: a web-based tool to support manual annotation of intact glycopeptide MS spectra, Proteomics- Clinical applications (special issue on glycoproteomics and glycomics) (http://dx.doi.org/10.1002%2Fprca.201700069)

[3] Tiemeyer M, Aoki K, Paulson J, Cummings R, York W, Karlsson N, Lisacek F, Packer NH, Campbell MP, Aoki N, Fujita A, Matsubara M, Shinmachi D, Tsuchiya S, Yamada I, Pierce M, Ranzinger R, Narimatsu H, Aoki-Kinoshita K (2017) GlyTouCan: an accessible glycan structure repository. Glycobiology 27(10):915-919

[4] Vizcaíno JA, Walzer M, Jiménez RC, Bittremieux W, Bouyssié D, Carapito C, Corrales F, Ferro M, Heck AJR, Horvatovich P, Hubalek M, Lane L, Laukens K, Levander F, Lisacek F, Novak P, Palmblad M, Piovesan D, Pühler A, Schwämmle V, Valkenborg D, van Rijswijk M, Vondrasek J, Eisenacher M, Martens L, Kohlbacher O (2017) A community proposal to integrate proteomics activities in ELIXIR. F1000Research 6:875

[5] Oldrati V, Hulo N, Allard PM, Glauser G, Koua D, Arrell M, Nentwig W, Lisacek F, Wolfender JL, Kuhn-Nentwig L, Stöcklin R (2017) Peptidomic and transcriptomic profiling of four distinct spider venoms. PLOS One 12(3):e0172966

[6] Alghanem B, Nikitin F, Stricker T, Duchoslav E, Luban J, Strambio-De-Castillia C, Müller M, Lisacek F, Varesio E, Hopfgartner (2017) Optimization by Infusion of Multiple Reaction Monitoring Transitions for Sensitive Peptides LC-MS Quantification. Rapid Commun Mass Spectrom 31(9):753-761

[7] Ricard-Blum S, Lisacek F (2017) Glycosaminoglycanomics: where we are. Glyconjugate J. 34(3):339-349.

Books and book chapters

[8] Campbell MP, Aoki-Kinoshita K, Lisacek F, York W, Packer NH (2017) Chapter 52: Glycoinformatics, Essentials of Glycobiology, 3rd edition, Eds: A Varki, RD Cummings, JD Esko, HH Freeze, P Stanley, CR Bertozzi, GW Hart, ME Etzler, NH Packer. Cold Spring Harbor (NY)

[9] Mariethoz J, Khatib K, Alocci D, Mannic T, Campbell MP, Packer NH, Mullen EH, Lisacek F (2017) SugarBindDB in A Practical Guide to Using Glycomics Databases, ed: K. Aoki-Kinoshita, Springer Japan, pp247-260

[10] Campbell MP, Peterson RA, Gasteiger E, Lisacek F, Packer NH (2017) Exploring the UniCarbKB Database, A Practical Guide to Using Glycomic Databases, ed. KF. Aoki-Kinoshita, Springer, Japan, pp 197-214

[11] Lisacek F, Mariethoz J, Alocci D, Rudd PM, Abrahams JL, Campbell MP, Packer NH, Ståhle J, Widmalm G, Mullen E, Adamczyk BV, Rojas Macias MS, Chunsheng J, Karlsson NG (2017) Chapter 21: Databases and associated tools for glycomics and glycoproteomics in Methods in Molecular Biology (High throughput glycan and glycopeptide analysis) 1503:235-264, eds: G.Lauc, M.Wuhrer, Springer

[12] Campbell MP, Peterson RA, Gasteiger E, Mariethoz J, Lisacek F, Packer NH (2017) Navigating the glycome space and connecting the glycoproteome, in Methods in Molecular Biology (Protein Bioinformatics: from Protein Modifications and Networks to Proteomics) 1558:139-158, eds: C. Arighi, C. Wu, K. Ross, Springer

International and national advisory committees

- F.Lisacek member of the Advisory Board of the MIRAGE project, http://www.beilstein-institut.de/en/projects/mirage, Beilstein Institute, Frankfurt, Germany

International and national Research Programs Committees

- F. Lisacek grant submission reviewer, Research Foundation - Flanders (FWO: http://www.fwo.be), Brussels, Belgium, April 2017
- F. Lisacek grant submission reviewer, Research Council of Canada (www.nserc-crsng.gc.ca), Ottawa, Canada, December 2017

PhD Thesis Committees

- Bas Jansen, Evaluator (F. Lisacek), University of Leiden, NL
- Mani Mundalar, Evaluator (F. Lisacek), University of Glasgow, UK
- Julien Briyois, Member of jury (F.Lisacek), University of Geneva

Conference organization as chair or co-chair

- F. Lisacek organised and chaired "Bioinformatics for bridging glycomics with other –omics" Workshop part of the 13th Basel Computational Biology Conference (BC2), Basel, Switzerland, September 12th 2017

Member of conference/workshop program committees

- F. Lisacek in Program committee of NETTAB 2017 (International Workshop NETTAB 2017 «Methods, tools & platforms for Personalized Medicine in the Big Data Era»), http://www.igst.it/nettab/2017/, Palermo, Italy, October 16th-18th
- F. Lisacek in Program committee and track chair of BC2-2017 ([BC]2 Basel Computational Biology Conference 2017), http://www.bc2.ch, Basel, Switzerland, September 12th-15th
- F. Lisacek in Program committee of Bioinformatics and Artificial Intelligence workshop at IJCAI 2017 (26th International Joint Conference on Artificial Intelligence) bai@IJCAI2017, http://bioinfo.uqam.ca/IJCAI_BAI2017/, Melbourne, Australia, August 20th

Refereeing

- F. Lisacek regular reviewers for Journal of Proteome Research (JPR), PROTEOMICS, Journal of Proteomics, Nucleic Acid Research, Bioinformatics, Molecular&Cellular Proteomics

Editorial Responsabilities
- Editorial Board Member, PLOS One, Peer J, Biochimica et Biophysica Acta (BBA): Proteins and Proteomics, Clinical Applications in Proteomics

Invited talks
- Beilstein Glyco-Bioinformatics Symposium, Berlin, Germany, June 2017
- Beilstein Open Science Symposium, Rüdesheim, Germany, May 2017
- 12th Jenner Glycobiology and Medicine Symposium, Dubrovnik, Croatia, May 2017

Funded research projects
Participation to European projects

GastricGlycoExplorer: Systems glycobiology of gastric cancer
Partner of ITN (FP7-PEOPLE-2012-ITN)
(coordinator NG Karlsson, Uni. Gothenburg, Sweden)
Period: May 2013 - May 2018

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Une étude bioinformatique des lectines, classification et identification dans les génomes
Co-PI with A. Imberty (CNRS-CERMAV) of PhD grant of the Glyco@Alps programme (Initiative d'Excellence, Grenoble Alpes University)
Period: October 2017 - October 2020

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CarboMet: Metrology of Carbohydrates for Enabling European Bioindustries
Work Package co-chair of Coordination and Support Action (H2020-FETOPEN-2-2016) coordinated by S. Flitsch (Uni. Manchester, UK).
Period: February 2017 - February 2021

Open software and databases

Glycomics@ExPASy
Title of the service/product/process: Glycomics@ExPASy, Bioinformatics services on ExPASy server fully hosted at SIB
Type: Databases + data analysis and search tools
External partners involved in the development (if any): CSEM
External partners involved in the development: University of Gothenburg, Sweden + University of Macquarie, NSW, Australia
Client or End user(s) : Life Science community
Brief description: The Glycomics@ExPASy backend is built on top of three databases (Host-pathogen interactions, Experimental mass spectrometry data of glycans and Glycoproteins). Tools are developed around the databases. They are either dedicated to solve a specific question (information extraction) or can be used in several applications and across the databases (data mining).
Website: http://www.expasy.org/glycomics

Teaching
- **Protein expression and interaction**, Master, 42h, 4 ECTS
- **Introduction to Systems Biology** , Master, 40h, 3 ECTS
- **Elements of bioinformatics**, Master, 42h, 5 ECTS
- **Bioinformatics**, Bachelor, 28h, 2 ECTS
- **Principes de fonctionnement des ordinateurs**, 14h, 4 ECTS (Thibault Robin, tutor)
- **Systèmes informatiques**, 28h, 5 ECTS (Davide Alocci, tutor)

Figure 1: ?

smv.unige.ch
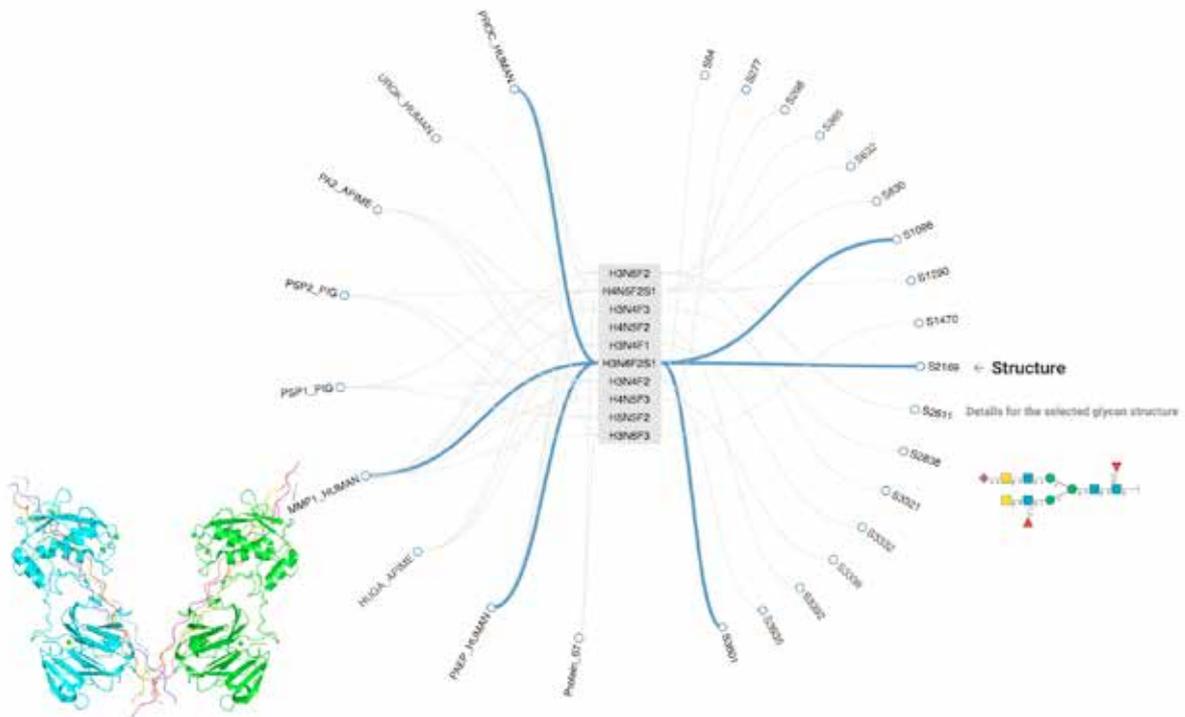
SMV

Software Modeling and Verification

Swiss Digital Day, Geneva, 2017 November 21th

Software Modeling and Verification

Domain activities

Symbolic Model Checking was developed with the idea of verifying complex high level models with a reasonable amount of work for the user. In particular we propose to separate the model to the informa- tions for performing efficiently model checking (clustering, anonymization, partial unfolding). The introduction of new kind of decision diagrams (fh -DD) based on a generalization of the Shannon decom- position principles allow us to perform model checking for models with huge combinatorial explosion of states (around 10E4500 symbolic states). We are currently exploring the systematic use of rewriting of set of terms principles based on decision diagrams and operational control based on strategies as a metalevel in model checkers.

We currently develop several tools such as StrataGEM for the set rewriting principles, Stew as an abstraction over StrataGEM and Ardoises a meta-environment for managing formalisms and their verification tools. We also continue to organize a model checking contest in the conference Petri Nets in order to be able to compare existing model checkers on significant benchmarks. We also study programming language construction that check that the use of memory is alias safe. This language SafeScript is extending JavaScript in an elegant way. We also develop methods to adapt our formalisms (CREST) to the domain of modeling and verification of cyber-physical systems.

Several application domain have been covered by the team such as the development of a domain specific language for computing on sets (Trexmo Tool for the SECO). This language is applied successfully for expressing various models of toxicology analysis in the context of health in the workplace.

Team

Director
Didier Buchs
Full professor
H-index: 18

Senior researchers
Dr. Alban Linard
Dr. Steve Hostettler

PhD students
Sahar Aljalbout
Eric Harth
Stefan Klikovits
Dimitri Racordon

Administration
Maëlle Rümbeli
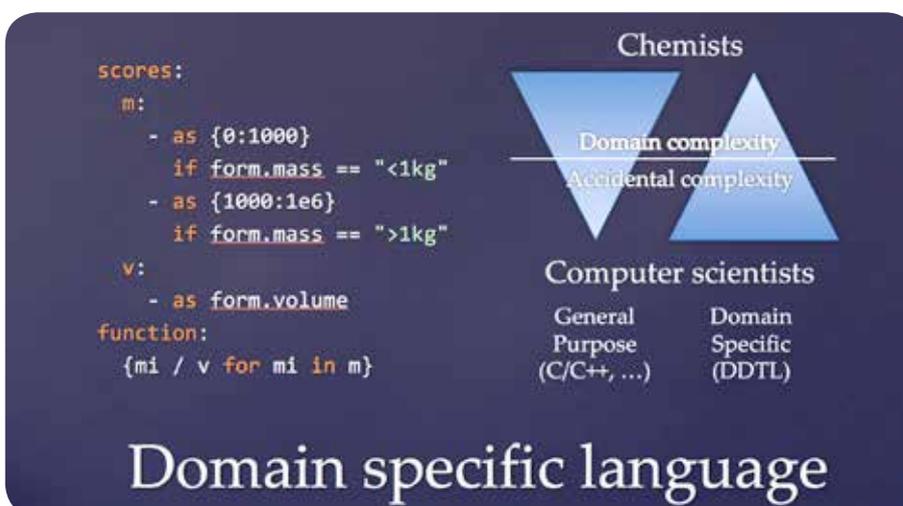
Figure 1: TREXMO is a tool built for chemical safety assessment, using multiple models of exposure. It is the result of a joined effort between the University of Geneva, the Institute for Work and Health and the State Secretariat for Economic Affairs.

Because the result of these models can vary for a given situation, it is desirable to have a tool able to run a scenario against multiple models with little to no user overhead. However, building such a tool can be rather complex, because of the complexity induced by the models translations, which is beyond the expertise of chemists.

In order to address this issue, we offered them a domain specific language that hides out this "accidental complexity" and let them deal with their "domain complexity".

List of publications
Refereed papers in international journals

[1] Bruno Barroca and Vasco Amaral and Didier Buchs, Semantic languages for develop- ing correct language translations, Software Quality Journal, 26(2), pp: 417-453. 2018, https://doi.org/10.1007/s11219-016-9352-4

Refereed papers in Conference Proceedings

[2] Didier Buchs, Stefan Klikovits, Alban Linard, Romain Mencattini, and Dimitri Racordon. A model checker collection for the model checking con- test using docker and machine learning. In Proceedings of the 39th Petri net conference, pages 385–395 Springer Verlag, 2018.

[3] Joachim Denil, Stefan Klikovits, Pieter J. Mosterman, Antonio Vallecillo, and Hans Vangheluwe. The experiment model and validity frame in m&s. In Proceedings of the Symposium on Theory of Modeling & Simulation: DEVS Integrative M&S Symposium, part of the 2017 Spring Simulation Multiconference, SpringSim '17, Virginia Beach, Virginia, USA, April 23- 26, 2017, pages 109–120, 2017.

[4] Stefan Klikovits, David P. Y. Lawrence, Manuel Gonzalez-Berges, and Didier Buchs. Automated test case generation for the CTRL program- ming language using pex: Lessons learned. In Ivica Crnkovic and Elena Troubitsyna, editors, Software Engineering for Resilient Systems - 8th In- ternational Workshop, SERENE 2016, Gothenburg, Sweden, September 5- 6, 2016, Proceedings, volume 9823 of Lecture Notes in Computer Science, pages 117–132. Springer, 2016.

[5] Alban Linard and Didier Buchs. Ardoises: Collaborative & interactive editing using layered data. In 17th International Conference on Application of Concurrency to System Design, ACSD 2017, Zaragoza, Spain, June 25- 30, 2017, pages 136–145. IEEE Computer Society, 2017.

Refereed papers in Workshop Proceedings

[6] Stefan Klikovits, Joachim Denil, Alexandre Muzy, and Rick Salay. Modeling frames. In Burgueno et al. [2], pages 315–320.

[7] Loli Burgueno, Jonathan Corley, Nelly Bencomo, Peter J. Clarke, Philippe Collet, Michalis Famelis, Sudipto Ghosh, Martin Gogolla, Joel Greenyer, Esther Guerra, Sahar Kokaly, Alfonso Pierantonio, Julia Rubin, and Davide Di Ruscio, editors. Proceedings of MODELS 2017 Satellite Event: Workshops (ModComp, ME, EXE, COMMitMDE, MRT, MULTI, GEMOC, MoDeVVa, MDETools, FlexMDE, MDEbug), Posters, Doctoral Symposium, Educator Symposium, ACM Student Research Competition, and Tools and Demonstrations co-located with ACM/IEEE 20th Interna- tional Conference on Model Driven Engineering Languages and Systems (MODELS 2017), Austin, TX, USA, September, 17, 2017, volume 2019 of CEUR Workshop Proceedings. CEUR-WS.org, 2017.

[8] Stefan Klikovits, Alban Linard, and Didier Buchs. CREST - A continuous, reactive systems DSL. In Burgueno et al. [2], pages 286–291.

[9] Stefan Klikovits, Manuel Gonzalez-Berges, and Didier Buchs. Towards lanuguage independent (dynamic) symbolic execution. In Proceedings of the 24th PhD Mini-Symposium, pages 50–53. Budapest University of Tech- nology and Economics, Department of Measurement and Information Systems, 2017.

[10] Dimitri Racordon and Didier Buchs. Extracting formal specifications to strenghten type behaviour testing. CoRR, abs/1708.05194, 2017.

PhD Thesis committees

- Francesco De Angelis, A Logic-Based Coordination Middleware for Self-Organising Systems: dis- tributed reasoning based on many-valued logic, PhD, Geneva, july 2017.

Conference organization as chair or co-chair

- Didier Buchs, General Chair of Model Checking Contest @ Petri Nets 2017, june 2017, Zaragoza., Spain.

Member of conference program committees

- Program Committee of PNSE 2017, june 2017, Zaragoza, Spain.
- Program Committee of Petri Nets 2017, june 2017, Zaragoza, Spain.

Figure 2: Synchronisation diagrams for the co-simulation in cyber-physical systems (PN= Petri net model, CBD= causal block diagram)
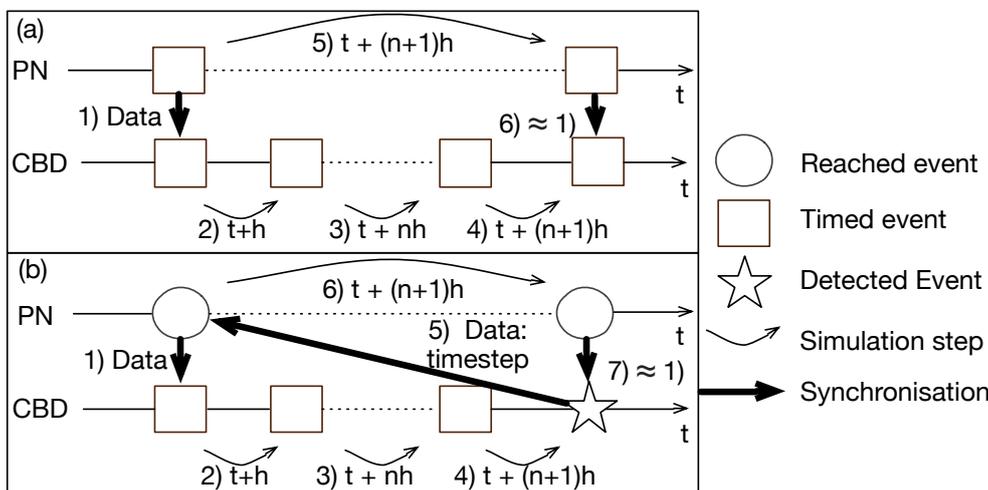
TEACHING
- **Software Engineering Course**, Computer Science, Bachelor, 4 ECTS, 56 hours, 14 students
- **Formal Tools for Modelling Systems**, Computer Science, Bachelor, 4 ECTS, 56 hours, 60 students
- **Semantics of Programming Languages**, Computer Science, Bachelor, 4 ECTS, 56 hours, 20 students
- **Modeling and Verification**, Computer Science, Master, 4 ECTS, 56 hours, 20 students
- **Advanced Formal Tools** (Optional), Computer Science, Master, 4 ECTS, 56 hours, 4 students
- **Computer Science Project**, Computer Science, 3rd year Bachelor, 28h course and 56h. lab work, 15 students

Figure 3: Layer model depicting the connection of field objects, frontend controllers (e.g. PLCs) and Operator Work Stations through SCADA (Supervisory Control and Data Acquisition) applications at CERN LHC

spc.unige.ch

CUI UNIGE

SPC

Scientific and Parallel Computing

Swiss Digital Day, Geneva, 2017 November 21th

Scientific and Parallel Computing

Websites: http://spc.unige.ch - http://cui.unige.ch/~chopard - http://epicells.unige.ch

Domain activities

A main research activity concerns the study of complex systems, in particular the development of new numerical methods to model and simulate phenomena in natural sciences, economics, social systems and bio-medical applications. Cellular automata, Lattice Boltzmann and multi-agent techniques are central tools to address theses questions. Parallel programs and algorithms are developed to implement the simulation on large PC clusters, supercomputers or GPUs to discover, explain or reproduce new phenomena. In particular we keep developing and improving the PALABOS software, a powerful open-source Lattice Boltzmann solver. We are also strongly involved in the development of HPC resources for UNIGE, in particular through our active participation to CADMOS and the management of the university cluster Baobab.

Biomedical applications and multiscale problems are an important research direction. In the H2020 CompBioMed we are partner of a center of excellence formation High Performance biomedical simulations. In particular we developed numerical models for the transport of red blood cells and platelets, in order to study various pathologies.

We have started a new H2020 projecet, INSIST (IN-Silico trials for treatment of acute Ischemic Stroke) whose goal is to build a population ov virtual patien on which new treatment for stoke (thrombolysis or thrombectomy) can be tested in silico. We also progressed in the modeling of biological tissues, both as the continuation of the SystemX EpiPhysX project that with a new FNS Sinergia project.

Team

Director
Bastien Chopard
Full professor
H-index: 44

Senior researchers
Dr. Jean-Luc Falcone
Dr. Jonas Latt
Dr. Orestis Malaspinas

PhD students
Anthony Boulmier
Federico Brogi
Gregor Chliamovitch
Raphaël Conradin
Christos Kotsalos
Pierre Kunzli
Sha Li
Francesco Marson
Aziza Merzouki
Yann Thorimbert

Administration
Anne-Isabelle Giuntini

SPC team in 2017

PhD Thesis

- Gregor Chliamovitch, Information Theory and Maximum Entropy Principles in Non-Equilibrium Statistical Physics, May 9, 2017
- Federico Brogi, The Lattice Boltzmann Method for the Study of Volcano Aeroacoustic Source Processes, Mai 3, 2017

List of publications

Refereed papers in international journals

[1] Gauthier Wissocq, Nicolas Gourdain, Orestis Malaspinas, Alexandre Eyssartier, Regularized characteristic boundary conditions for the Lattice-Boltzmann methods at high Reynolds number flows, Journal of Computational Physics Volume 331, 15 February 2017, Pages 1–18

[2] Bastien Chopard, Daniel Ribeiro de Sousa, Jonas Latt, Frank Dubois, Catherine Yourassowsky, Pierre Van Antwerpen, Omer Eker, Luc Vanhamme, David Perez-Morga, Guy Courbebaisse and Karim Zouaoui Boudjeltia, A physical description of the adhesion and aggregation of platelets. R. Soc. open sci. 4:170219, 2017. http://dx.doi.org/10.1098/rsos.170219

[3] Sébastien Leclaire, Andrea Parmigiani, O. Malaspinas, Bastien Chopard and Jonas Latt. Generalized three-dimensional lattice Boltzmann color-gradient method for immiscible two-phase pore-scale imbibition and drainage in porous media. Physical Review E, Vol.95, No.3, 033306, 2017. DOI: 10.1103/PhysRevE.95.033306

[4] F. Brogi, O. Malaspinas, B. Chopard, C. Bonadonna. Lattice Boltzmann Method for computational aeroacoustics. The Journal of the Acoustical Society of America (JASA), 2017, (Vol.142, No.4). DOI: 10.1121/1.5006900, https://arxiv.org/abs/1710.02065

[5] Mohamed Ben Belgacem and Bastien Chopard, Muscle-HPC: a new High Performance API to couple multiscale parallel applications. Future Gen. Comp. Sys., 67, 72--82, 2017 on-line version: http://dx.doi.org/10.1016/j.future.2016.08.009

[6] Gregor Chliamovitch, Lino Velasquez, Jean-Luc Falcone and Bastien Chopard, Assessing Complexity using Maximum Entropy Models, International Journal of Parallel, Emergent and Distributed Systems. pp 1-19. 2017. http://dx.doi.org/10.1080/17445760.2017.1337901

[7] Sébastien Leclaire, Andrea Parmigiani, Bastien Chopard and Jonas Latt,. Three-dimensional lattice Boltzmann method benchmarks between color-gradient and pseudo-potential immiscible multi-component models. Int.J.Mod.Phys. C. vol 28(7), 1750085-1--30, 2017. http://dx.doi.org/10.1142/S0129183117500851

[8] Aziza Merzouki, Orestis Malaspinas, Aanastasiya Trushko, Aur\'elien Roux and Bastien Chopard. Influence of cell mechanics and proliferation on the buckiling of simulated tissues using a vertex model. NACO, 2017, pp 1--9. http://www.springer.com/-/1/AV1xkLkgvMFoNfTGt-6R, https://doi.org/10.1007/s11047-017-9629-y

[9] Sha Li, Jonas Latt and Bastien Chopard. Model for pressure drop and flow deflection in the numerical simulation of stents in aneurysm. International Journal for Numerical Methods in Biomedical Engineering. DOI: 10.1002/cnm.2949, 2018

[10] Yann Thorimbert, Jonas Latt and Bastien Chopard. Coupling of lattice Boltzmann shallow water model with lattice Boltzmann free-surface model. International Journal for Numerical Methods in Fluids. 2017. In revision.

[11] Gregor Chliamovitch, Orestis Malaspinas and Bastien Chopard. Kinetic Theory beyond the Stosszahlansatz. Entropy, 19,381, 2017, doi:10.3390/e19080381

[12] Xavier Meyer, Elisabeth Delevoye and Bastien Chopard. Study of fluid flow within the hearing organ. https://arxiv.org/abs/1709.06792 2017.

[13] Anton Golub and Bastien Chopard and Alexandre Dupuis and Jan Rupnik and Mario Karlovcec and Krzysztof Suchecki and Janusz Holyst. Modelling the impact of retweet feedback on Twitter activity. Physica A, submitted, 2017.

[14] Ritabrata Dutta, Bastien Chopard, J. Latt, K. Zouaoui Boudjeltia and Antonietta Mira. Parameter estimation of platelets deposition: Approximate Bayesian computation with high performance computing. http://arxiv.org/abs/1710.01054\\ Frontiers in Physiology, 'Advanced HPC-based Computational Modeling in Biomechanics and Systems Biology', submitted, 2017.

Full refereed papers in Conference Proceedings

[15] Anthony Boulmier, Ioana Banicescu, Florina M. Ciorba and Nabil Abdennadher, An Autonomic Approach for the Selection of Robust Dynamic Loop Scheduling Techniques. ISPDC'17

International and national advisory committees

- Advisory board for the H2020 ComPat project, (http://www.compat-project.eu/), 2015-2018
- CADMOS, Director of the steering committee
- CUSO, Representative for the Doctorate program in computer science
- SwiNG, Representative of UNIGE
- COINF, Representative of the Faculty of Sciences

International and national Research Programs Committees

Scientific evaluation of three international project:
- AMIDEX (FR)
- NWO-Sara (NL)
- CECAM (EU)

PhD thesis committees

- Kirill Lykov, rapporteur, USI, Lugano, 5th September 2017
- Lai Nguyen, examiner, ESISAR Grenoble-INP, Valence, 19th December 2017

Conference organization as chair or co-chair

- CADMOS Day, co-chair, Lausanne, Nov. 17,[th] 2017

Member of conference program committees

- DSFD 2017, Erlangen, July 2017
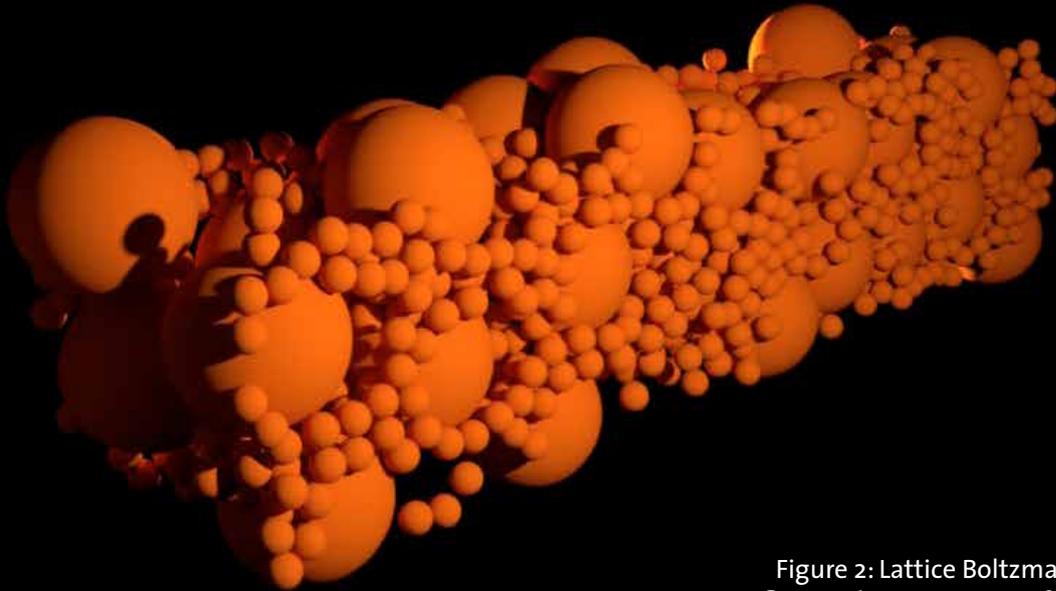
Figure 2: Lattice Boltzmann simulation of a flow with suspensions of different diameter (Yann Thorimbert & Dimitri Kontaxaxis)

Funded research projects
Participation to European projects

CompBioMed: A Centre of Excellence in Computational Biomedicine
H2020-EU.1.4.1.3, grant agreement No 675451
Partners: University College London, University of Edinbugh, Barcelona Supercomputing Center, University of Geneva, CBK Sci Con Limited, LifeTec Group, Evotec AG, Janssen, University of Amsterdam, SURFsara, University of Oxford, University of Sheffield, University Pompeu Fabra, Acellera, Bull (atos)
Web Site: http://www.compbiomed.eu/
Period: October 2016 - September 2019

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INSIST: IN-Silico trials for treatment of acute Ischemic Stroke
H2020, grant agreement No 777072
Partners: Academic Medical Center (Amsterdam, The Netherlands), University of Amsterdam (The Netherlands), Erasmus Medical Centre (The Netherlands), University of Oxford (UK), Neuravi (Ireland), National University of Ireland Galway (Ireland), Catholic University of Leuven (Belgium), Politecnico di Milano (Italy), University of Geneva (Switzerland), Institut de Recherches Internationales Servier (France), Lomonosov Moscow State University (Russia)
Website: https://www.insist-h2020.eu/
Period: 2017 - 2021

Participation to National projects

Optimal deployment of multiscale applications on a HPC infrastructure
PACS Project
Coordinator: Bastien Chopard (UNIGE)
Partners: Co-PIs: Costanza Bonadonna (UNIGE), Paul Albuquerque (HES)
Period: July 2014 - December 2017

———

SystemX : EpiPhysiX
Coordinator: M. Milinkovitch (UNIGE)
Partners: M. Gonzales, A. Roux (UNIGE), A. Wagner (UNIZH)
Website: http://www.systemsx.ch/
Period: 2013 - 2017

———

Direct numerical simulation of three-phase crystallien suspensions in magmatic flows
FN 200021_165984
Principal Investigator: Jonas Latt
Period: June 2016 - May 2018

———

A 3D Cell-Based Simulation Framework for Morphogenetic Problem
Sinergia
Partner: ETHZ
Period: 2017 - 2021

———

Modeling settling-driven gravitational instabilities from volcanic clouds
SNF 200021_169463
Principal Investigator: Costanza Bonadonna
Period: 3 years

Others

Refeereeing
- Referee for many intenational journals

Editorial responsibilities
- Int. J. of Mod Phys, Editorial Board Member
- J. of Computational Sciences (JoCS), Editorial Board Member
- J. of Cellular Automata, Editorial Board Member
- Natural Computing Journal (NACO), Editorial Board Member

Invited talks
- University of Tokyo (RCAST), April 11th, The Lattice Boltzmann method and its applications
- University of Tohoku, Sendai, Japan, March 23th, A physical description of platelets deposition
- University of Brown, June 22th, Computer models and numerical simulations of complex systems

Teaching
- **Méthodes Heuristiques d'apprentissage et d'optimisation**, Computer Science, Master, 6 ECTS, 70 hours, 20 students
- **Parallelisme**, Computer Science, Bachelor, 4 ECTS, 56 hours, 15 students
- **Algorithmique**, Computer Science, Bachelor, 4 ECTS, 56 hours, 15 students
- **Algorithme paralleles/probabilistites**, Computer Science, Master, 4 ECTS, 56 hours, 6 students
- **Modélisation et simulation de phénomènes naturels**, Computer Science, Master, 4 ECTS, 56 hours, 15 students
- **Systèmes Informatiques fonctionalités**, Computer Science, Bachelor, 84 hours, 5 ECTS, 15 students
- **Programmation pour biologistes**, Computer Science, Bachelor, 84 hours, 3.5 ECTS, 58 students
- **Introduction à l'infromatique pour mathématiciens**, Computer Science, Bachelor, 75 hours, 4 ECTS, 40 students
- **CADMOS HPC Course**, Computer Science, Advanced Course, 20 hours, 20 students

Supervision of Master thesis
- Jayro Aldaz: Modélisation numérqiue 3D d'un tissu épithelial
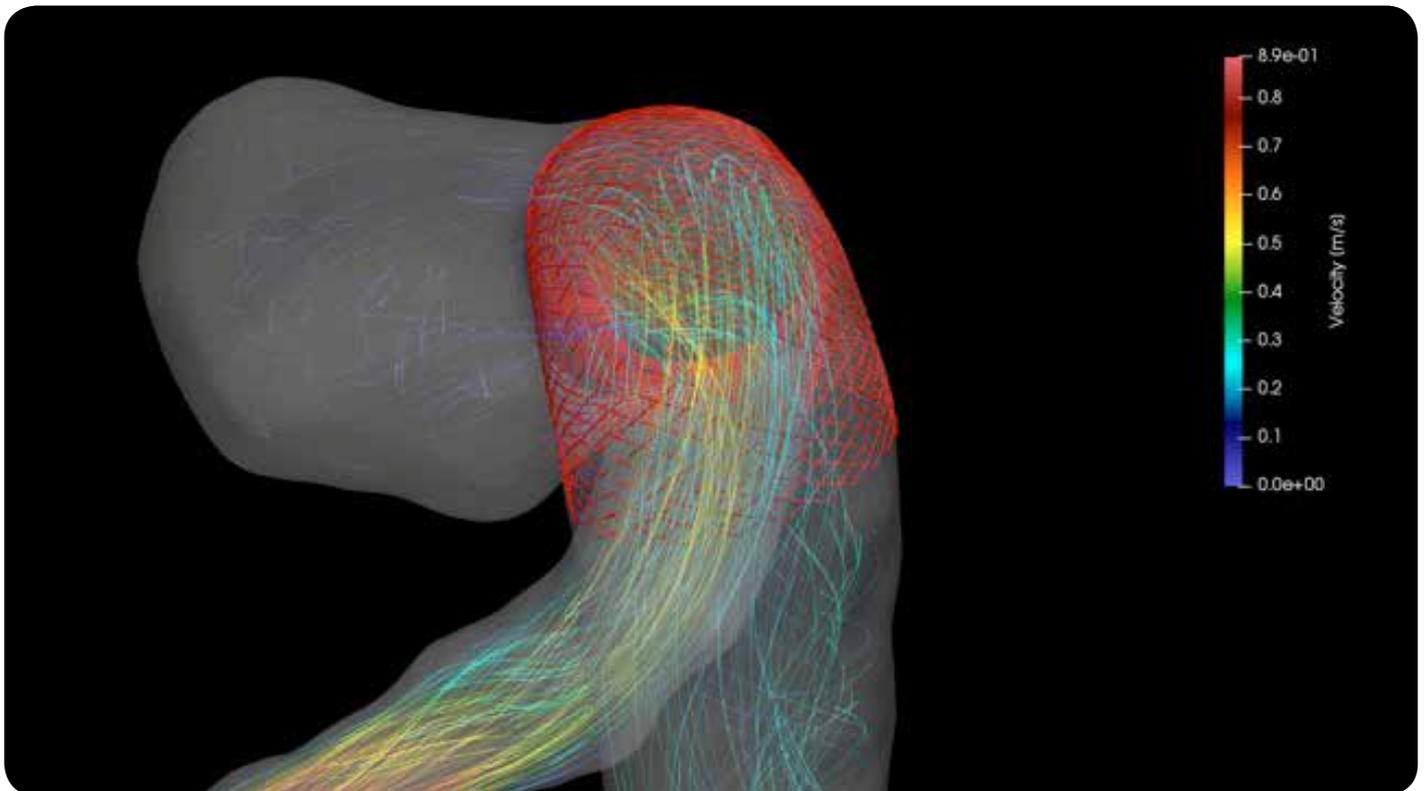
Figure 3: bloodflow in a cerebral aneuyrsm with a flow diverter (Sha Li & Dimitri Kontaxaxis

TCS

Theoretical Computer Science

tcs.unige.ch

Swiss Digital Day, Geneva, 2017 November 21th

Theoretical Computer Science

Domain activities

Experimental driven research on Topology Control Protocols for Wireless Sensor Networks (WSN) using transmission power and throughput rate feedback schemes. The goals include link qualification in terms of symmetry and coherence and link quantification. Transmission power constitutes the link «generator» and throughput rate the link «regulator» to meet the qualitative and quantitative criteria for links between WSN nodes .

Research on designing a geographic routing algorithm for large scale networks, which is an extension to the Virtual Raw Anchor Coordinate localization based geographic routing. The goal is to perform routing in wireless ad-hoc network in a hierarchical manner, where in the top level routing is done between two geographic regions and in the bottom level performing routing to the exact node. A randomized protocol is designed and evaluated with simulations.

Design of a distributed publish/subscribe algorithm for an ubiquitous sensing scenario. We consider unstructured and free-geocoordinates sensing networks in which no network protocol is provided. Our solution, which avoids implying all the nodes of the network in the dissemination process, uses a distributed notification service defined by Directional Random Walks (DRW). A DRW is a probabilistic technique able to go forward into the network following a loop-free path. The principle assumed in our research is that two lines in a plane cross.

Also research on Future Networks, Internet of Things and Crowdsensing. Our efforts focus on problem modeling aspects and incentive formulation regarding the crowd participation in tasks that aim at optimizing spatial and temporal coverage issues.

Also, research on radiation aware wireless networking; studying the cumulative impact on ERM caused by multiple wireless sources in terms of numbers, topology, protocol, etc.

Team

Director
José Rolim
Full professor
H-index: 25

Senior researchers
Dr. Pierre Leone (MER)
Dr. Konstantinos Marios Angelopoulos
Dr. Marios Karagiannis
Dr. Ricardo Wehbe

Senior Lecturer
Eduardo Solana

Assistants (PhD students)
Julia Buwaya
Stéphane Kündig

Administration
Coralie Grossrieder

Figure 1: Testing experimental algorithms and models on Wireless Sensor Networks (WSN)
© Orestis Evangelatos

List of publications

Refereed papers in international journals

[1] Cristina Muñoz, Pierre Leone: A Distributed Event-Based System based on Compressed Fragmented-Iterated Bloom Filters. Future Generation Comp. Syst. 75: 108-127 (2017)

Full refereed papers in Conference Proceedings

[2] Z. Zhao, S. Kundig, J. Carrera, B. Carron, T. Braun and J. Rolim, «Indoor Location for Smart Environments with Wireless Sensor and Actuator Networks,» 2017 IEEE 42nd Conference on Local Computer Networks (LCN), Singapore, Singapore, 2018, pp. 535-538.

[3] Julia Buwaya and José Rolim. Atomic Routing Mechanisms for Balance of Costs and Quality in Mobile Crowdsensing Systems. In Proceedings of IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), June 2017.

[4] N. Foukia, D. Billard and E.Solana. Privacy Verification Chains for IoT. Network and System Security: 11th International Conference, NSS 2017, Helsinki, Finland, August 21–23, 2017, Proceedings (pp.737-752)

[5] C. Muñoz, L. Wang, E. Solana and J. Crowcroft. I(FIB)F: Iterated Bloom Filters for Routing in Named Data Networks. Conference on Networked Systems (NetSys 2017). March 13-17, 2017. Göttingen, Germany. Best Paper Award.

Full refereed papers in Workshop Proceedings

[6] Julia Buwaya and José Rolim. Mobile Crowdsensing from a Selfish Routing Perspective. In IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPS Workshops): IEEE Workshop on Parallel and Distributed Processing for Computational Social Systems (ParSocial), May 2017.

Books and book chapters

[7] Klaus Jansen, José D. P. Rolim, David Williamson, Santosh Srinivas Vempala: Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques, APPROX/RANDOM 2017, August 16-18, 2017, Berkeley, CA, USA. LIPIcs 81, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik 2017, ISBN 978-3-95977-044-6

[8] Angelopoulos, K., Nikoletseas, S., Raptis, T. and Rolim, J., 2017. User Incentivization in Mobile Crowdsensing Systems. In: Habib Ammari, ed. In The Philosophy of Mission-Oriented Wireless Sensor Networks. Springer.

[9] Pierre Leone and Kasun Samarasinghe, Geometric Routing without coordinates but Measurements, In: Habib Ammari, ed. In The Philosophy of Mission-Oriented Wireless Sensor Networks. Springer. Accepted for publication

PhD Thesis committees

• Dr. Angelopoulos: Member of the Ph.D. examination committee of Dr. Grigoris Anagnostopoulos, "Addressing crucial issues of indoor positioning systems", University of Geneva, 2017.

Conference organization as chair or co-chair

Jose Rolim

• DCOSS 2017 IEEE International Conference on Distributed Computing in Sensor Systems, Ottawa, Canada, May 2017 - chair steering committee

• APPROX 2017 – 20th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems – UC Berkeley, August 2017 - chair steering committee

• RANDOM 2017 - 21st International Workshop on Randomization and Computation - UC Berkeley, August 2017 -chair steering committee

• SEA 2017– 16th International Symposium on Experimental Algorithms –May 2017–London, UK- chair steering committee

• ALGOSENSORS 2017 - 13th International Workshop on Algorithms for Sensor Systems, Wireless Ad Hoc Networks and Autonomous Mobile Entities –Vienna, Austria - member steering committee

• IPDPS 2017 - 29th IEEE International Parallel & Distributed Processing Symposium. May 2017, Orlando, US - member steering committee

Member of conference program committees

Jose Rolim

• FCT2017 -21st International Symposium on Fundamentals of Computation Theory, September 11-13, 2017 -Bordeaux, France

• ICEESI 2017- The 2017 International Conference on Emerging Electronic Solutions for IoT, Penang, Malaysia - October 9 to October 10, 2017

Pierre Leone

• MobiWac 2017, 15th ACM International Symposium on Mobility Management and Wireless Access Miami Beach, USA -- November 21-25, 2017

• UBICOMM 2017, The Eleventh International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies November 12 - 16, 2017 - Barcelona, Spain

• INTERNET 2017, The Ninth International Conference on Evolving Internet July 23 - 27, 2017 - Nice, France

• VEHICULAR 2017, The Sixth International Conference on Advances in Vehicular Systems, Technologies and Applications July 23 - 27, 2017 - Nice, France

Funded research projects
Participation to National projects

Swiss Sense Synergy
FNSR CRSII2-154458
Principal Investigator: José Rolim
Partners: University of Bern, University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Chalmers University of Technology
Website: http://www.swiss-sense-synergy.ch
Period: January 2015 - December 2017

Others
Refeereeing
• Pierre Leone: Theoretical Computer Science Journal, TCS.

Editorial responsibilities
Pierre Leone
• Member of the Editorial Board of the Ad-Hoc Sensor and Wireless Networks, http://www.oldcitypublishing.com/journals/ahswn-home/ahswn-editorial-board/
• Member of the Editorial Board of the journal Algorithms, http://www.mdpi.com/journal/algorithms

Events organised in Geneva
• Entrepreneurship and technology development: examples and tools, october 31st 2017, CUSO Doctoral Program in Computer Science Pierre Leone in collaboration with Prof. Bastien Chopard

Invited talks
• Eduardo Solana: Disruptive Technologies - What are the Risks, Opportunities and Game-Changers of Businesses Adoption for Security? Panel Session. CISO 360 Congress 2017. 5-7 July 2017. Barcelona

Participation in TV and Radio Programs
• Our SNF project "SwissSenseSysnergy" has been mentioned on the radio on RTS La 1ère on June 12, 2017 «Un projet d'étude suisse s'intéresse à l'analyse des données collectées par les smartphones», Program: Journal 12h / Le 12h30 / L'invité du 12.30, https://avenue.argusdatainsights.ch/Kundenartikel_ab_2016_08_31/2017/06/3700 3/65664067.mp3

Figure 2: Designing Topology Control Protocols for Wireless Sensor Networks (WSN) © Orestis Evangelatos
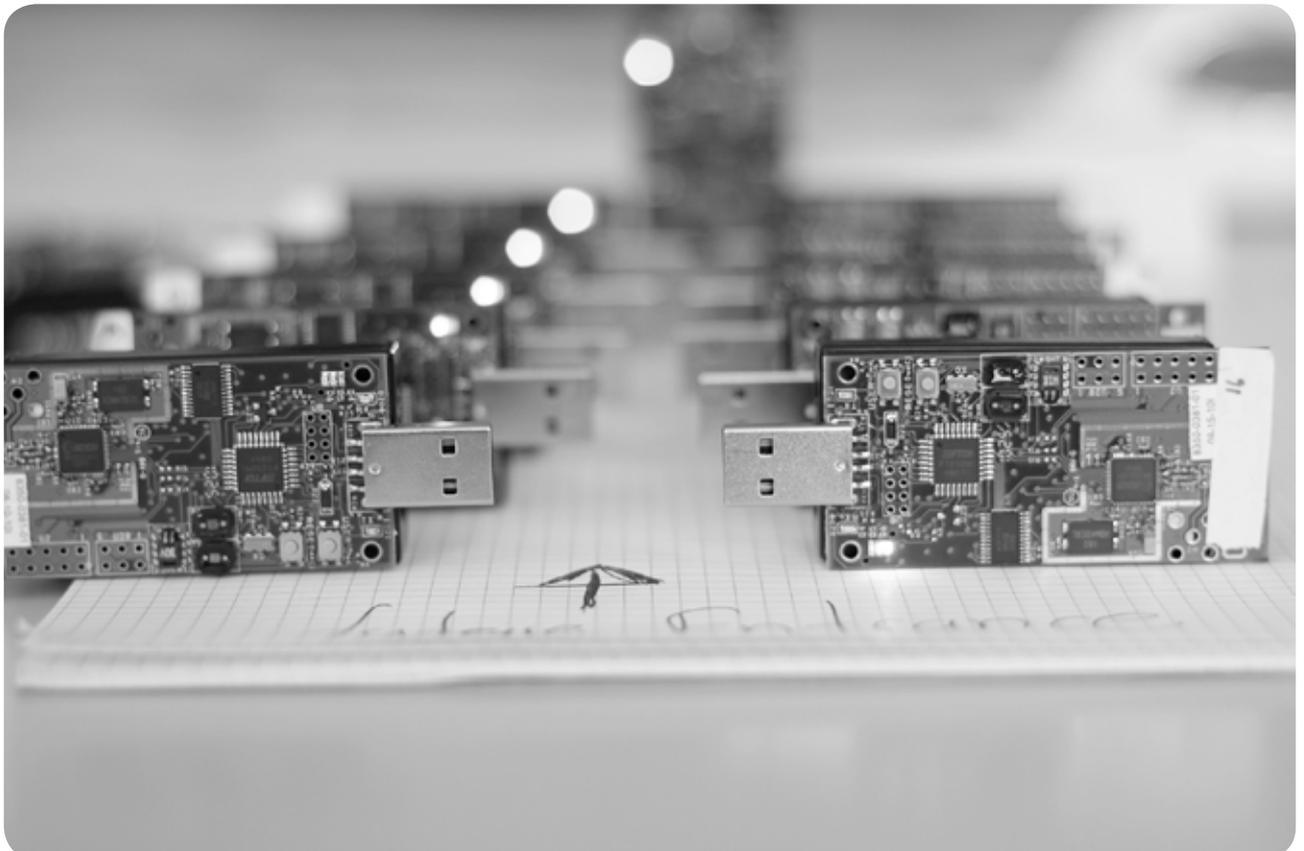
Press Release

- Smarter use of mobile data, SNF Newsroom, http://www.snf.ch/en/researchinFocus/newsroom/Pages/news-170612-press-release-smarter-use-of-mobile-data.aspx (June 12, 2017)
- Tracking Noise in the Bay Area with UNIGE, press release by Swissnex San Francisco (May 8, 2017), https://www.swissnexsanfrancisco.org/category/news/
- Julia Buwaya, mobile crowdsensing researcher, nextrends magazine by Swissnex San Francisco, https://nextrends.swissnexsanfrancisco.org/julia-buwaya-mobile-crowdsensing-researcher/, (April 18, 2017)
- Our SNF project SwissSenseSysnergy has been mentioned in several media contributions, an extended list can be found here: https://avenue.argusdatainsights.ch/public/455/pressreview/prv-eba41906-e91f-42db-9155-ddcea6776ede.pdf?636334789035100000

Honours and scientific awards

- Julia Buwaya with partial work "Competing Crowds" (http://crowd.unige.ch) of her PhD project among the three University of Geneva Digital Fellows at Swissnex San Francisco in 2017 (https://www.unige.ch/international/en/collaborations-et-partenariats/digital-fellows)
- Julia Buwaya received travel grand ($400) from the IEEE Computer Society Technical Committee on Parallel Processing (TCPP)
- Prix Arditi 2017 en Informatique attribué à Mme. Sarah Sabbagh pour son travail pour l'obtention du Master en Sciences Informatique intitulé: «XOR Message Encryption Based on JPEG Perturbed Quantization Steganography». Travail sous la direction d'Eduardo Solana.

Public exhibitions and performances

- Julia Buwaya, co-organizer and speaker at public event "SciComm Studio @swissnex San Francisco», May 18, 2017 (https://www.swissnexsanfrancisco.org/event/scicomm-studio-002-podcasts-sounds-and-crowds/)
- Julia Buwaya, invited speaker (presenting her PhD project and our SNF project) at "Geneva Networking Reception" of the Swiss Business Hub USA, Consulate General of Switzerland in the presence of Mr. Pierre Maudet, State Councilor in charge of the Department of Security and Economy for the State of Geneva, May 3, 2017 (https://geneva-networking-reception.splashthat.com/)

Courses and tutorials

- Julia Buwaya, concepting and holding workshops for school children on "Applis et smartphones - influencer la façon dont les données sont collectées"at "Elargis tes Horizons" (http://www.elargisteshorizons.ch/index.php?option=com_content&view=article&id=307:24-les-ordinateurs-controlent-ils-le-monde-applis-et-smartphones-influencer-la-facon-dont-les-donnees-sont-collectees&catid=39&lang=fr&Itemid=371)
- Julia Buwaya mentored 4 school student interns at CUI (June 22, 2017)

TEACHING

- **Complexité et calculabilité**, Computer Science, Bachelor, TP, 4 ECTS, 56 hours, 65 students
- **Langages Formels**, Computer Science, Bachelor, TP, 4 ECTS, 56 hours, 50 students
- **Logiciels et réseaux informatiques**, Computer Science, Bachelor, 6 ECTS, 112 hours, 70 students
- **Réseaux informatiques**, Computer Science, Bachelor, 4 ECTS, 56 hours, 18 students
- **Programmation des Systèmes, systèmes concurrents et distribués, réseaux informatiques**, Computer Science, Semester lecture, 4 ECTS
- **Cryptographie et sécurité**, Computer Science, Bachelor, 4 ECTS, 56 hours, 35 students
- **Securité des Systèmes Informatiques**, Computer Science, Master, 4 ECTS, 56 hours, 10 students

Highlights

Géofab Grand Genève

Lancement du Géofab du Grand Genève : des géodonnées dédiées aux projets innovants franco-suisse.

Aider les entrepreneurs établis de part et d'autre de la frontière à créer de nouveaux services numériques grâce aux géodonnées du Grand Genève : c'est l'ambition du projet Interreg « Géofab du Grand Genève », porté conjointement par l'Université de Genève (UNIGE) et le Pôle Métropolitain du Genevois Francais, avec le support du Canton de Genève, du Canton de Vaud et l'accompagnement de nombreux partenaires techniques et institutionnels.

Les institutions publiques françaises et suisses du Grand Genève et leurs partenaires experts dans les domaines des données géographiques et cadastrales, ont choisi de mettre l'Aménagement et le Développement Economique au coeur d'un nouveau projet Interreg France Suisse : « Géofab du Grand Genève ». François Longchamp, Président du GLCT Grand Genève, Président du Conseil d'Etat de la République et Canton de Genève, Gabriel Doublet, Vice-président de l'ARC Syndicat mixte du Genevois français et Yves Flückiger, Recteur de l'UNIGE, Université de Genève ont ainsi lancé ce mardi 4 avril le premier appel à candidatures pour un accès privilégié aux données numériques géographiques et des journées d'expertise, dédié aux porteurs de projets français ou suisses, privés ou publics.

Sur tout le territoire du Grand Genève, un grand nombre de données numériques spatiales, cadastrales, géographiques, accessibles en opendata, a été collecté et structuré avec une rigueur scientifique tant par le Système d'Information du Territoire à Genève (SITG), Swisstopo, etc. côté suisse que par l'Institut national de l'information géographique et forestière (IGN) côté français. Ces « géodonnées » seront accessibles gratuitement pendant deux ans et fournies par les experts aux lauréats.

Le principe de Géofab ? Faciliter l'exploitation de ces « géodonnées » en sélectionnant et soutenant des projets numériques innovants franco-suisse par le biais de 4 appels à projets sur 2 ans.

L'initiative Géofab du Grand Genève a l'ambition:

- d'aider des porteurs de projet publics et privés à mettre sur le marché leurs services numériques innovants;
- de favoriser l'accès aux données numériques géographiques auprès des porteurs de projet sur le périmètre géographique du Grand Genève;
- de développer le marché du numérique à une échelle transfrontalière.

Des lauréats accompagnés dans leurs démarches

Suivant la qualité et l'évaluation des dossiers déposés, les porteurs de projets lauréats du concours pourront être accompagnés et bénéficier de :

Entrepreneurs, PME, TPE, start-ups, chaque porteur de projet, quelque-soit sa taille et son domaine peut déposer un dossier de candidature directement sur le site internet www.geofab-grandgeneve.org

G. Di Marzo Serugendo / ISS

- 20 jours d'expertises « développement de services », permettant de mettre sur le marché un service numérique, dans les 9 à 18 mois, ou d'améliorer une solution commerciale; éventuellement à un projet académique de développer un démonstrateur dans les 9 à 18 mois. Prix décerné aux 2 meilleurs.
- 5 jours d'expertises « coups de pouce de l'expertise », permettant d'apporter des compétences spécifiques supplémentaires à un projet. Prix décerné aux 4 autres lauréats.

Un annuaire d'experts constitué par les membres du Géofab permettra de répondre aux besoins spécifiques de chaque projet retenu. Les lauréats pourront sélectionner dans cet annuaire les expertises dont ils auront besoin.

Machine Learning based Analytics for Big Data in Astronomy

S. Voloshynovskiy / CVML - SIP

The IRIS Satellite

The Interface Region Spectrograph Imager (IRIS) was launched in 2013 to investigate the energy budget and transfer in the solar atmosphere. Equipped with not just a camera, but also a spectrograph, IRIS can provide us with valuable physical insights.

Since its launch, IRIS has collected a few tens of terabytes, including a multitude of solar flares. The large size of the data provides us with a unique opportunity to apply a broad range of big data techniques for the analysis.

2017-07-14T09:29:45   credits: Zhao et al / NASA / IRIS / BBSO

Astronomical observations produce a wealth of data in excess of several TB per day. Clearly, even a fraction of such data cannot be analyzed manually. In this project, we will investigate the use of big data analytics tools such as machine learning techniques applied to astronomical data. Specifically, we will consider observations of solar flares – magnetic eruptions that influence the whole solar system and cause space weather phenomena on Earth such as blackouts and problems in aircraft communication and GPS positioning.

So far, flares are neither understood, nor can they be reliably predicted. The problem is that the patterns found in flares and in their temporal evolution are diverse and most complex and the data volume too large to analyze manually. A huge first step towards a better understanding of the underlying physics and the development of space weather forecasting is to systematically identify, collect, and characterize the different spatio-temporal patterns in solar physics data. Here, efficient big data analytics tools such as machine learning techniques are crucial.

We propose an interdisciplinary approach to set up, customize, and optimize analytics capabilities for big data applications in astronomy. The project team consists of astronomers, experts in machine learning and statistical image processing, and specialists in data management systems for Big Data astronomy projects. This interdisciplinary approach will allow for a drastic improvement in the level of science questions that can be addressed and will, in turn, lead to a quantum leap in the understanding of the physics of solar flares and the quality of space weather predictions.

In a first step, various existing state of the art machine-learning techniques for clustering, classification, and outlier detection will be applied. In a second step, we will develop algorithms customized to the science question to be addressed and to the statistics of the input data. For the processing and the analysis of the big data, we will setup a big data analytics system suited for optimizing machine learning algorithms to use cases in astronomy but also in other science domains.

While applied for solar data, our results could be of interest not only for any kind of astronomical data, but also for other applications that have in common a large amount of unlabeled and unstructured data daily produced by distributed sources. Several domains will benefit from our results:

Solar Physics by developing models for flare analysis and prediction, which nowadays cannot be fully exploited due to their Big Data nature,
Machine Learning and Image Processing by contributing to both theory and practice, and
Applications with Big Data by setting up a framework to analyze and classify large datasets, which are of high value not only to other domains in astronomy, but also for example to genomics and medical diagnostics.

Joint project between the University of Geneva and Fachhochschule Nordwestschweiz (SNF NRP75 project (407540_167158))

Identification for the Internet of Things

S. Voloshynovskiy / CVML - SIP

Owner $\mathbf{X} \in \mathcal{X}^{N \times M}$
$\mathbf{X} = \{\mathbf{x}(1), ..., \mathbf{x}(m), ..., \mathbf{x}(M)\}$

Encoder
$\mathbf{a}(m) = T_{\lambda_x}(\mathbf{W}\mathbf{x}(m)) \bigoplus \mathbf{n}$

Public Storage $\mathbf{A} \in \mathcal{A}^{L \times M}$
$\mathbf{A} = \{\mathbf{a}(1), ..., \mathbf{a}(m), ..., \mathbf{a}(M)\}$

$p(\mathbf{y}(m) \mid \mathbf{x}(m))$

Probe
$\mathbf{y} = \mathbf{x}(m) + \mathbf{z}$
$\mathbf{y} = \acute{\mathbf{x}}$
Data User

Encoder
$\mathbf{b} = T_{\lambda_y}(\mathbf{W}\mathbf{y})$

$\mathbf{b}$ (Private Decoding)
$\mathbf{p}$ (positions) (Pubic Decoding)

Schematic Decoding
$d(\mathbf{a}(m), \mathbf{b}) \leq \gamma L$
$1 \leq m \leq M$

List
$\mathcal{L}(\mathbf{y})$
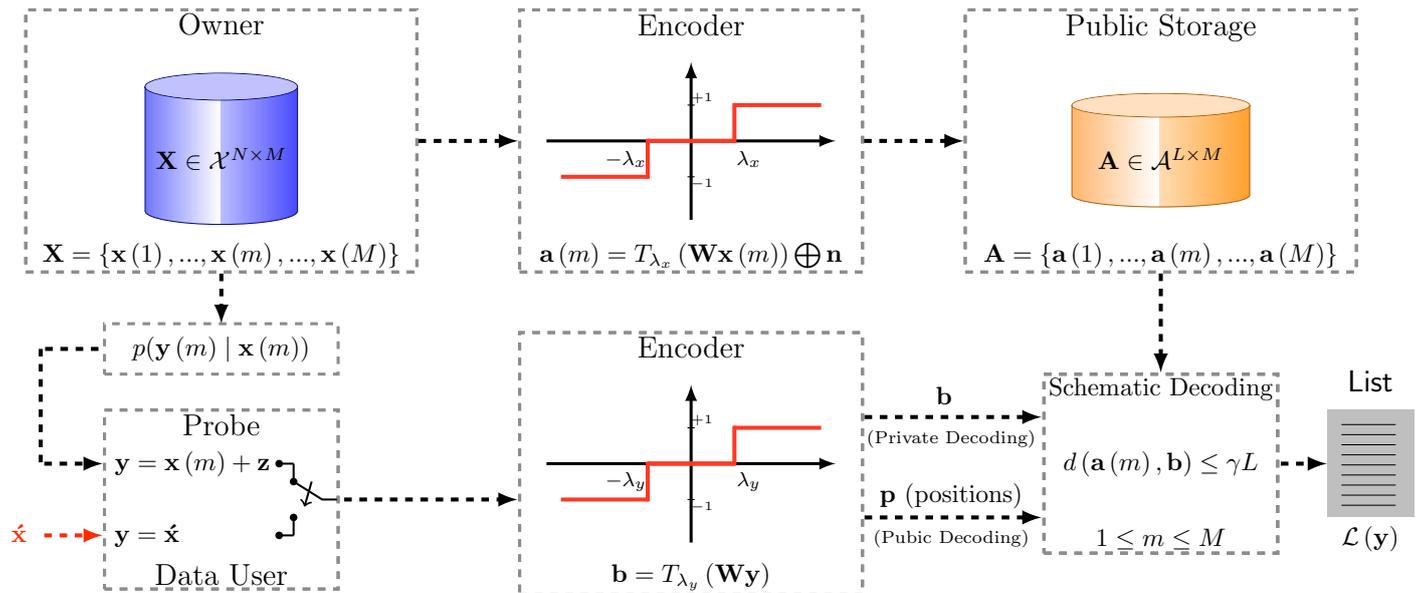
The IoT will contain a huge number of devices and objects that have very low or nonexistent processing and communication resources, coupled to a small number of high-power devices. The weakest devices, which are most ubiquitous, will not be able to authenticate themselves using cryptographic methods. Other important tasks in the IoT will be to verify if an object is authentic, or to identify an object. Our plan is to address these issues using Physical Unclonable Functions (PUFs). PUFs, and especially Quantum Readout PUFs, are ideally suited to the IoT setting because they allow for the authentication and identification of physical objects without requiring any crypto or storage of secret information. Furthermore, we foresee that back-end systems will not be able to provide security and privacy via cryptographic primitives due to

the sheer number of IoT devices. Our plan is to address these problems using privacy-preserving database structures and algorithms with good scaling behaviour. Approximate Nearest Neighbour (ANN) search algorithms, which have remarkably good scaling behaviour, have recently become highly efficient, but do not yet have the right security properties and have not yet been applied to PUF data. Summarised in a nutshell, the project aims to improve the theory and practice of technologies such as PUFs and ANN search in the context of generic IoT authentication and identification scenarios.

Original Domain

Public Domain
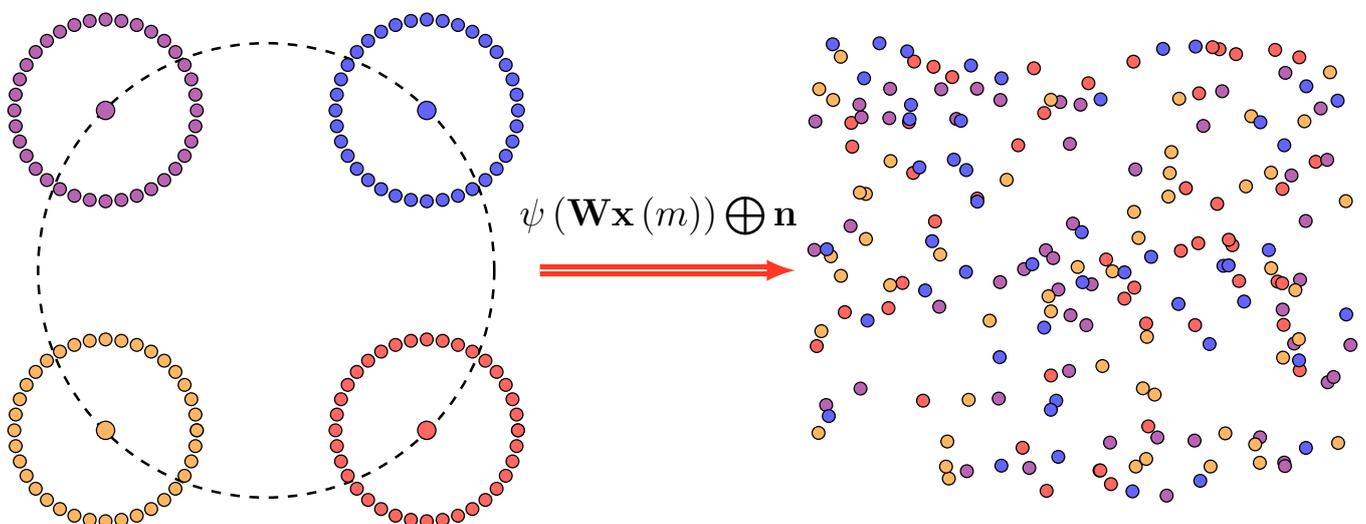
$\psi(\mathbf{W}\mathbf{x}(m)) \bigoplus \mathbf{n}$

Information-theoretic forensic physical object identification

S. Voloshynovskiy / CVML - SIP

Paper microstructures =PUFs

Package 1

Package 2

Package M

Individually unique PUFs

= unique identifier for Track&Trace

Visibly packages look identical
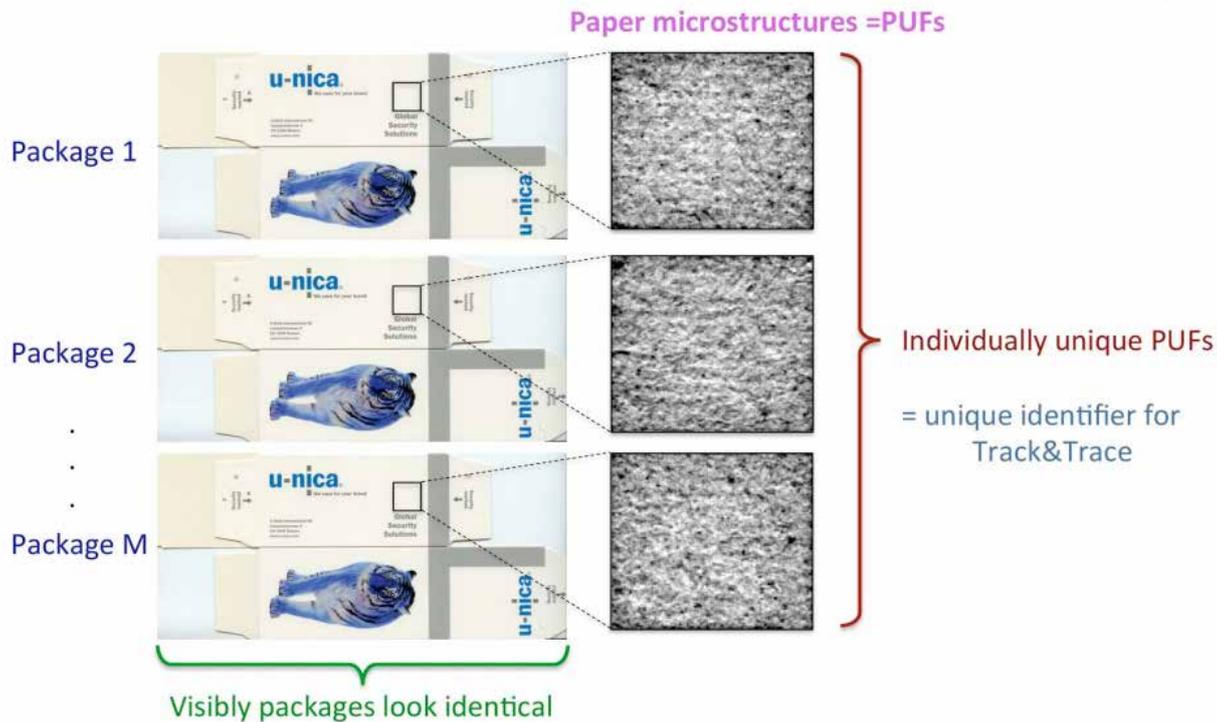
Modern societies consume enormous quantities of various products that are produced, manufactured, delivered and distributed at different geographical locations. Some products have a certain value associated either with its luxury expression or life importance, e.g., pharma and life-care products. Due to these reasons, there are always individuals or even companies that aim to benefit from the established reputation of famous brands by producing look-alike or even high-quality forged objects. The market loss and brand reputation not withstanding, counterfeited products such as fake pharmaceuticals are simply dangerous. Naturally, the end consumer has a vested interest in knowing exactly what he/she buys and consumes. As such there is a great interest in the development of physical object identification technologies allowing fast and accurate object identification by end users without any special equipment or know-how on how to differentiate a genuine product from a counterfeited one.

Aims of the research project

Our main goal is to extend and further develop a new information-theoretic framework for physical object identification in the high-dimensional space of forensic features and apply it to practical systems. This goal will be achieved based on a novel interpretation of links between the encoding techniques, machine learning and forensic identification, which will be theoretically introduced and explored in this project. More particularly, in the scope of this proposal, we will investigate the following subjects: (s) information-theoretic analysis of physical object identification performance, complexity and memory storage; (b) creation and enrollment of databases of original and fake objects and (c) practical implementation, optimization and validation.

Properties of PUFs: Close PUFs = close fingerprints
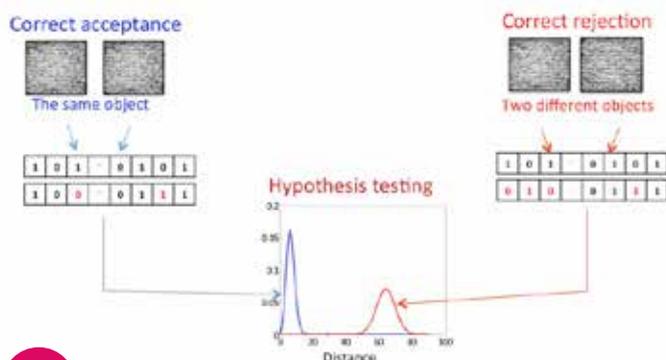
Correct acceptance

The same object

Correct rejection

Two different objects

Hypothesis testing

Distance

http://sip.unige.ch/projects/snf-200021-165672/about-project/

Many-Me
Social Interactive Care System to support the wellbeing of people living with dementia

M. Deriaz, J. Bertolaccini / TaM Lab

Every 3 seconds, someone in the world develops dementia, this brings the total of new cases of dementia to 9.9 million people a year. There is an estimate of 46.8 million people who are living with dementia worldwide in 2015.

What makes the Many-Me solution particular is the fact that it addresses not only the PwD, but also formal and informal caregivers.

The Many-Me solution is composed by 2 launcher apps, one for PwD and the other for caregivers. Each launcher app integrates 4 modules developed by 4 different AAL technical partners.
1.- Recommendation (by Compexin in Romania)
2.- Community (by Ekkotek in Cyprus)
3.- Personal Health Record (by Drimpy in Netherlands)
4.- Angel (by UNIGE)
Theses applications are tested by end-users in Netherlands (MOB), Austria (EURAG), Switzerland (TerzStiftung), Cyprus(Materia Group). The main dissemination task is handled by ASM in Poland.

The Angel module by UNIGE

This module is an emergency tool running on a smartphone, that continuously monitors patients when going outside of their home, in order to detect when they get lost. The research community agrees that PwD that get lost, usually follow the same class of patterns that belongs to: Wandering behaviour (see figure). Thanks to discussions with end-users we added also a "freezing" detection. Which corresponds to the user staying around his position for more than a given period of time. This research work leads to a conference paper, written by Abbass Hammoud, for SpliTech2018 on e-Health part.

Regarding the application itself, it was pointed out that people with dementia are not able to evaluate by themselves if they are lost or not, if they need help, etc... So we inform relatives of the patient first, and then they decide if they think that the patient is lost or not, needs help or not, they can also forward the call to a formal caregiver. (See screenshots)

MANYME
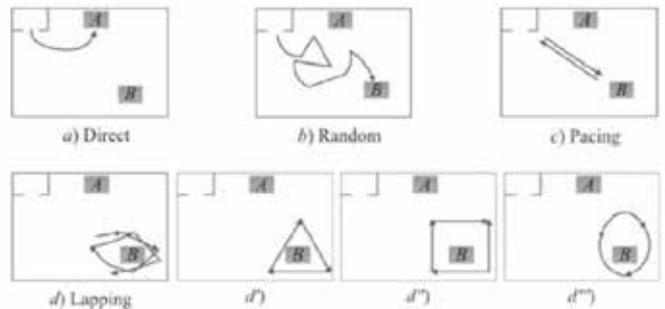
Figure 1.   Travel patterns of people with dementia.
a) Direct   b) Random   c) Pacing   d) Lapping   d')   d'')   d''')

PATIENT'S PHONE

INFORMAL CAREGIVER'S PHONE

CAREGIVER'S PHONE

http://tam.unige.ch/projects/
http://many-me.eu/
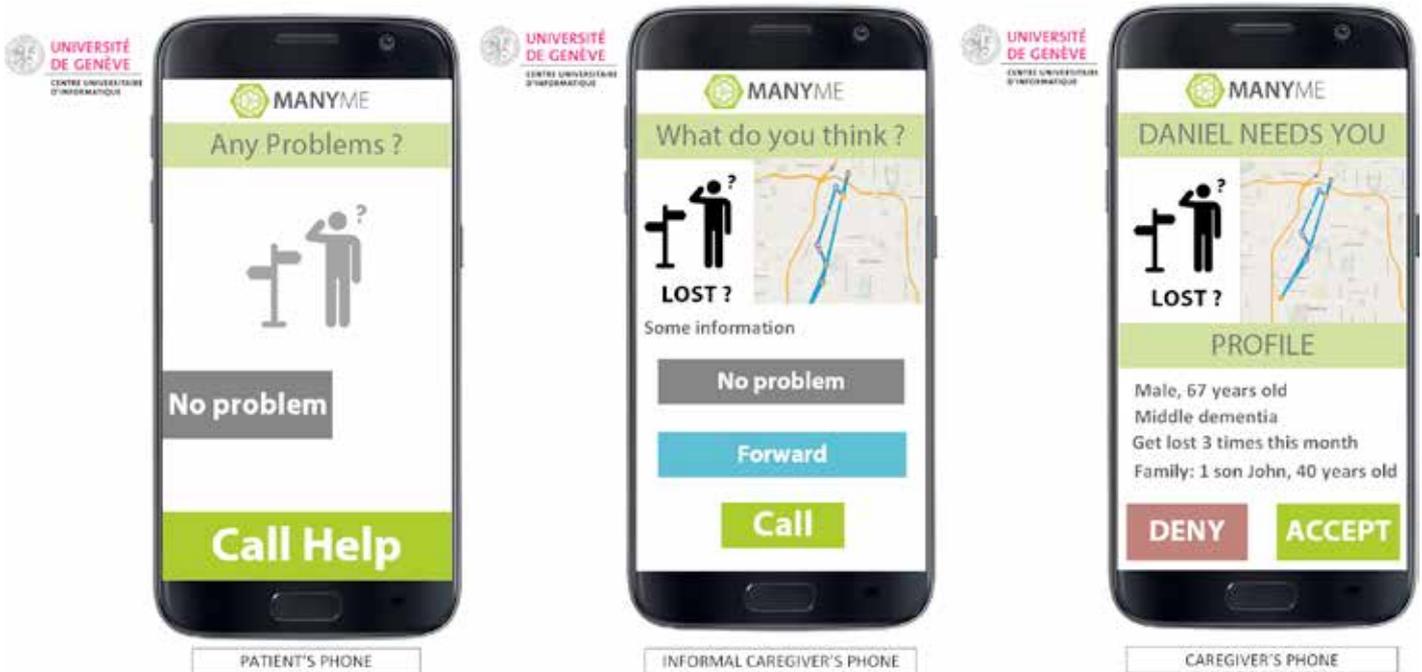
Yumy Food Delivery

M. Deriaz, J. Bertolaccini / TaM Lab
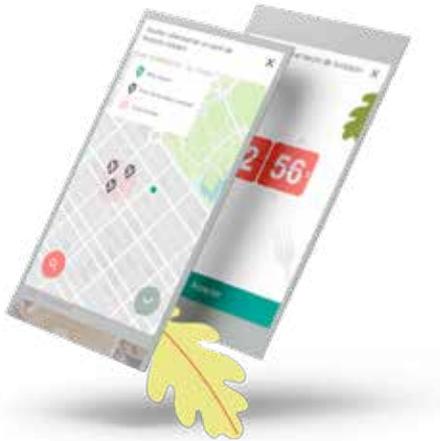
When food complexity logistics become clear

FoxyFoodDelivery is a service allowing to order food from several different restaurants with reduced delivery costs. The innovation relies on a multi-objective optimization algorithm able to mutualise the different neighbouring orders and to plan the tasks in an optimal way. Restaurants increases their margin, deliverymen have more flexibility in working hours, final clients have more choices for lower prices.

Many competitors in this huge market share a common point: the whole process, from ordering to delivery at the client's place, is not autonomously treated. The part of human interactions, at many different levels, is important and leads to decisions that are not optimal. Consequently this poor organisation leads to a waste of time, and so the cost of the delivery is still important. Our goal was to completely remove the human decision factor, using instead an algorithm based on Multi-Objective Optimization in order to organise the full process of delivery.

In October 2017, so 9 months after project starting, we were able to proceed to trials with 60 reals customers, 7 partner restaurants, and 4 runners to deliver orders. We have been in production mode during 9 days, for 11 services including lunch time, evening meals, during the week and also the week-end. Our goal was to test our modelling and complete logistics under representative commercial conditions. Runners were riding Geneva state, on electric bikes with a cart holding two insulated boxes, for hot and cold dishes. The video below shows some recordings done during a full delivery session.

After a second successful trial at the end of the project, in July 2018, the full project has been transfered to our partner Novag SA that runs now the project under the name **Yumy**.

http://tam.unige.ch/projects/foxyfooddelivery/
https://yumy.app/
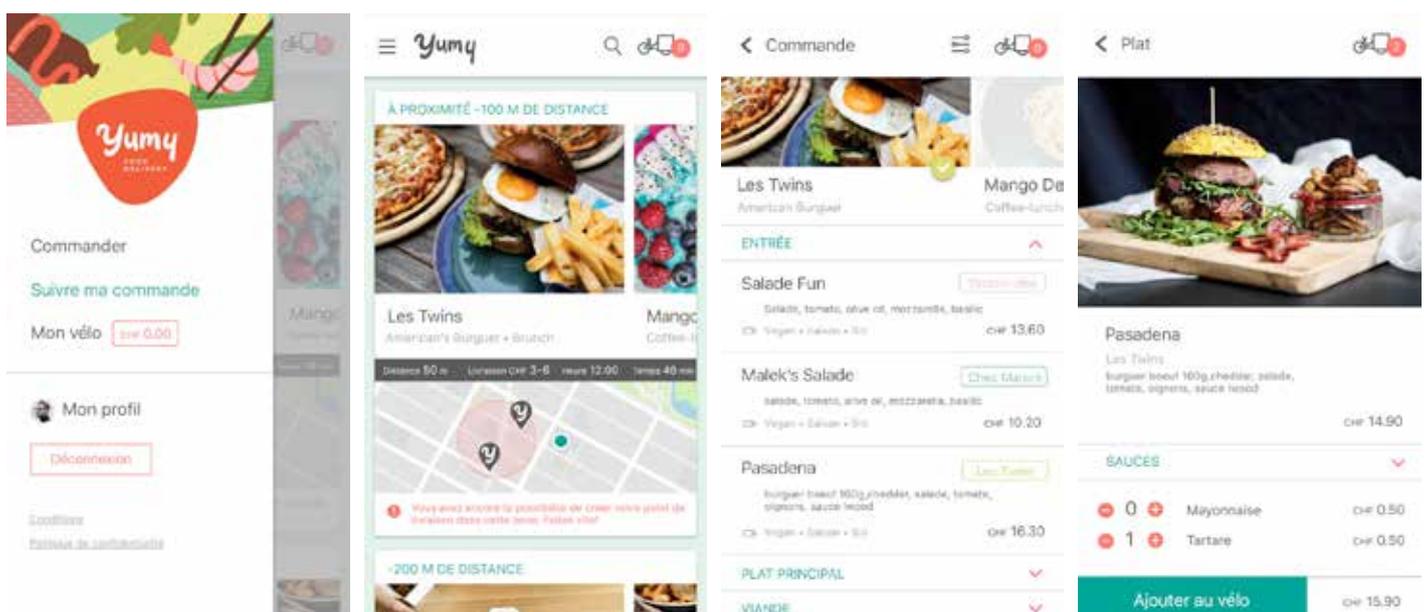
Thesis completed

Grigorios Anagnostopoulos

Doctor ès Social Sciences, mention Information Systems

23th November, 2017

Directors: Prof. Dimitri Konstantas
Dr. Michel Deriaz

## Addressing Crucial Issues of Indoor Positioning Systems

Over the last decade, the proliferation of Location-Based Services offered by smartphones has created the growing need for indoor positioning systems (IPS), in an increasing number of environments. Visitors of hospitals, airports, shopping centers and museums are being guided indoors, enjoying services related to their indoor location. Location-Based Services assist users not only in orienting themselves indoors and finding their destination, but also utilize the location of users as context to support a wide range of possible services. The quasi-ubiquitous presence of position estimates indoors is offered bymodern indoor positioning systems.

The goal of this Thesis is to propose novel methodologies to address crucial issues of indoor positioning systems. The problems addressed in this work aremet throughout the whole life cycle of an IPS conception, realisation and operation, from designing innovative positioning methodologies to defining novel evaluation and tuning methodologies. Therefore, this Thesis initially investigates and reports the user needs and requirements concerning the wayfinding problems at a relevant and important use case: Geneva's University Hospitals (HUG). Following, it proposes innovative solutions that construct a robust indoor positioning system, along with ways of seamlessly switching from indoor to outdoor positioning. In order to strengthen theo
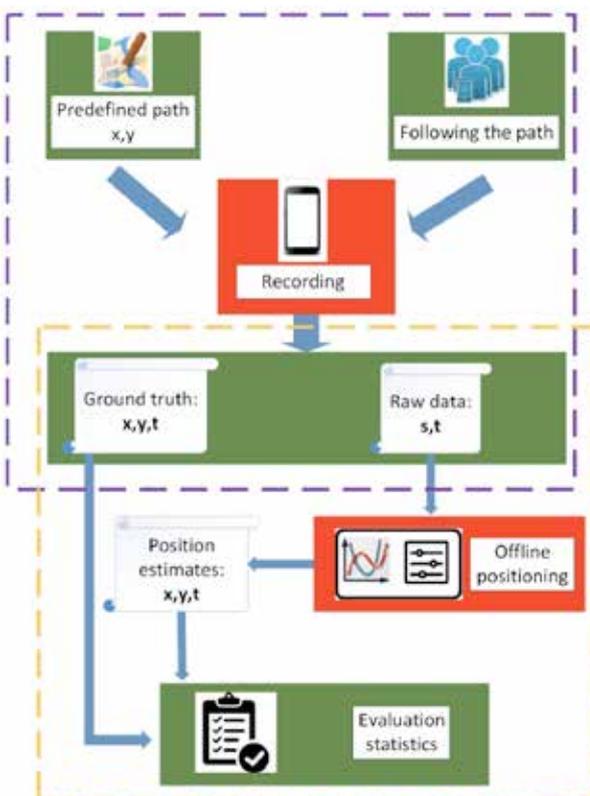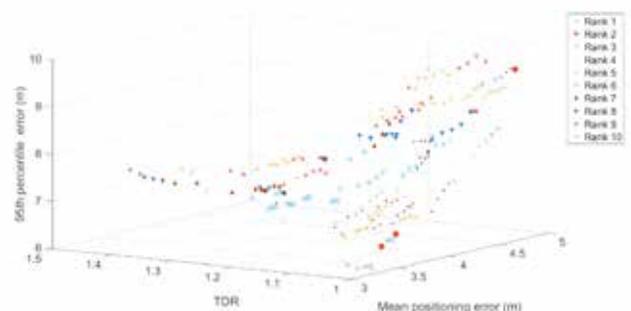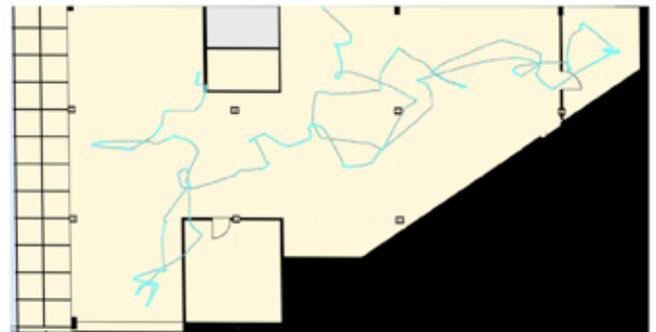
robustness of the system and reduce the required calibration effort, algorithms of automatic recalibration of the system are proposed and analyzed, addressing the problems of device and environment diversity. Moreover, well-definedmethodologies of evaluating, comparing and optimally tuning positioning systems are proposed, addressing the most trending issues of the indoors positioning community. More specifically, an evaluation methodology for indoor positioning systems is proposed, as well as formal procedures for optimally tuning a positioning system, in an automatic way. Lastly, multiobjective optimization techniques are introduced in order to offer generic tunings based on a more holistic evaluation. In this way, the proposed methodologies of this Thesis define an innovative, complete roadmap for designing an innovative IPS, from designing and creating a robust indoor positioning system, to optimally tuning it in an automatic way and producing precise performance reports.

Federico Brogi

Doctor ès Sciences, mention interdisciplinary Computer Science and Physics

3th May, 2017

Directors: Prof. Bastien Chopard,
Prof. Costanza Bonadonna

The Lattice Boltzmann Method for the study of volcano aeroacoustic source processes

The assessment and mitigation of volcanic risk is mainly related to our ability to derive key eruptive source parameters in real time. Low-frequency acoustic signal generated by explosive eruptions is considered one of the most promising techniques to provide this information in real-time from remote stations. However, a better knowledge of the relationship between the source of volcano infrasound and the volcanic fluid dynamics is still required. In this thesis, the Lattice Boltzmann method (LBM) is investigated as a powerful computational tool to study volcano aeroacoustic source processes. This includes the development and validation of an optimized LBM for aeroacoustic computations, its application to study the generation of acoustic transients by moderate discrete explosive events and the evaluation of a hybrid LBM approach, which can be used to better understand the role of key aspects, e.g. temperature and particle loading, on the source of acoustic signals in volcanic explosive eruptions.

Thesis completed

Gregor Chliamovitch

Doctor ès Sciences, mention interdisciplinary Computer Science and Physics

9th May, 2017

Directors: Prof. Bastien Chopard,
Prof. Peter Wittwer

Information theory and maximum entropy principles in non-equilibrium statistical physics

Complexity is often envisaged as the impossibility of reconstructing the whole of a system from the knowledge of its parts. When a probabilistic description is in order, a mathematically rigorous way to formalize this intuition is to rely on the principle of maximum entropy as a tool to infer probability distributions from structural or observational constraints. This thesis aims at evaluating this heuristic criterion in three different contexts. First, we consider the case where the transition matrix generating a discrete and finite Markov process has to be rebuilt from observed autocorrelation, with an emphasis on short historical samples. Second, we examine how maximum entropy methods and information theory can be linked to complexity as usually expressed in the particular context of cellular automata. The last part reconsiders key assumptions underlying kinetic theory of gases from the perspective of information theory, aiming in particular at generalizing Boltzmann's molecular chaos hypothesis.

Centre Universitaire d'Informatique
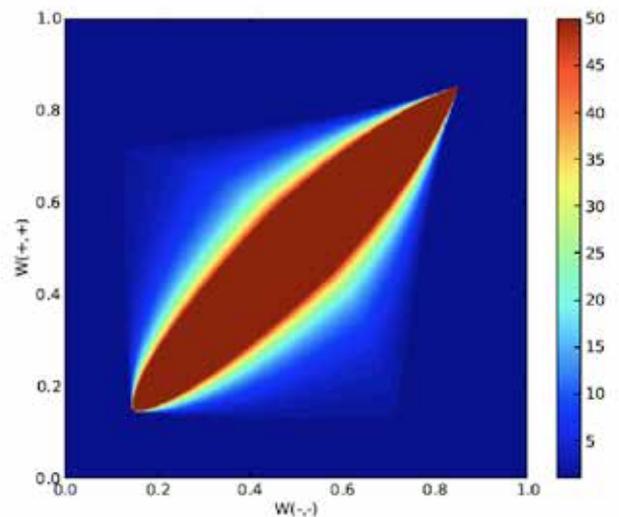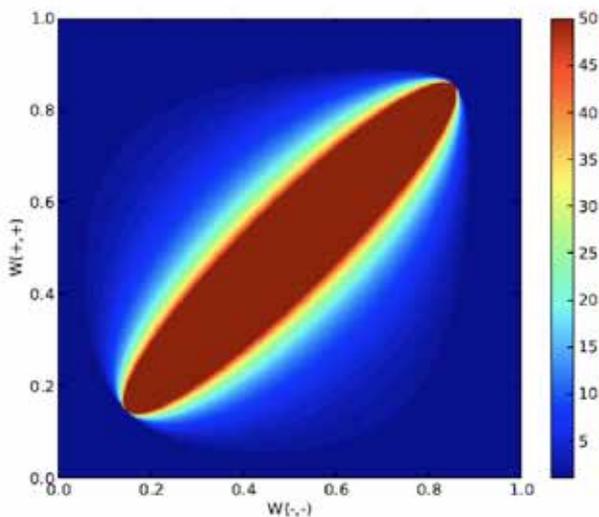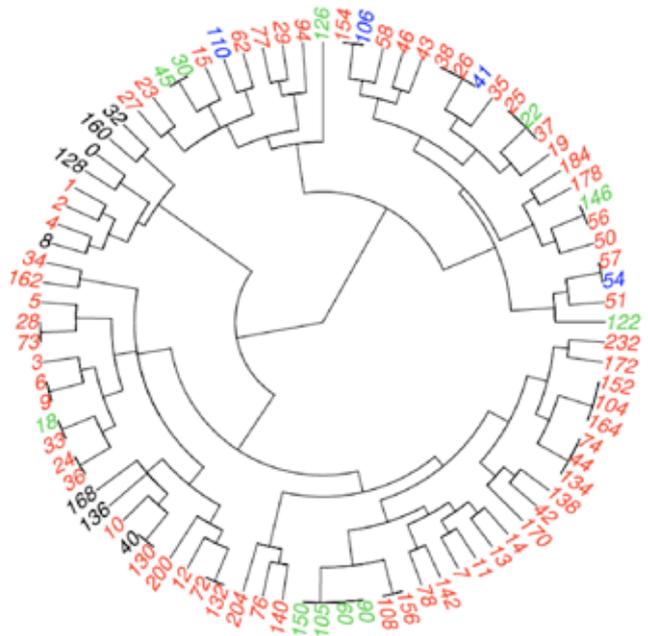
Séverine Cloix

Doctor ès Science, mention Computer Science

19th June, 2017

Director: Prof. Thierry Pun
Co-Director: Dr. David Hasler

Sparse multi-view 3D computer vision : application to embedded assistive technologies

The advances in computing power and the aordability of today's imaging sensors gave rise to the development of complex and highly ecient algorithms. The domain of 3D computer vision has beneted from this growth for a broad range of applications, including assistive technologies. The latter eld is of high concern, especially for the elderly. At the same time, the United Nations yearly reports the trends in population aging. It reveals the necessity to develop solutions that compensate impairment due to old age including the one related to mobility. Today's assistive devices, however, are bulky and require large batteries to run for just a couple of hours. This is how the EyeWalker project came out along with the research studies reported in this thesis, whose common objective is to design new computer-vision-based approaches dedicated to embedded and real-time applications with limited resources.

The EyeWalker project aims at developing a low-cost, ultra-light computer-vision-based device for rollator users with mobility problems. Thereby this thesis proposes novel strategies for rapid object detection and recognition under practical constraints. These limitations are for example the number of sensors and their resolution, algorithm complexity and mobile battery-life. We dened use cases based on data collected from occupational therapists. We could therefore narrow the research scope to specic objects and obstacles detection from o-the-shelf stereo and plenoptic cameras. The research work thus investigates two areas of computer vision from multi-view imaging, namely exploiting (i) sparse 3D keypoint clouds from stereo vision and (ii) light eld imaging for low-complexity and ecient algorithms.
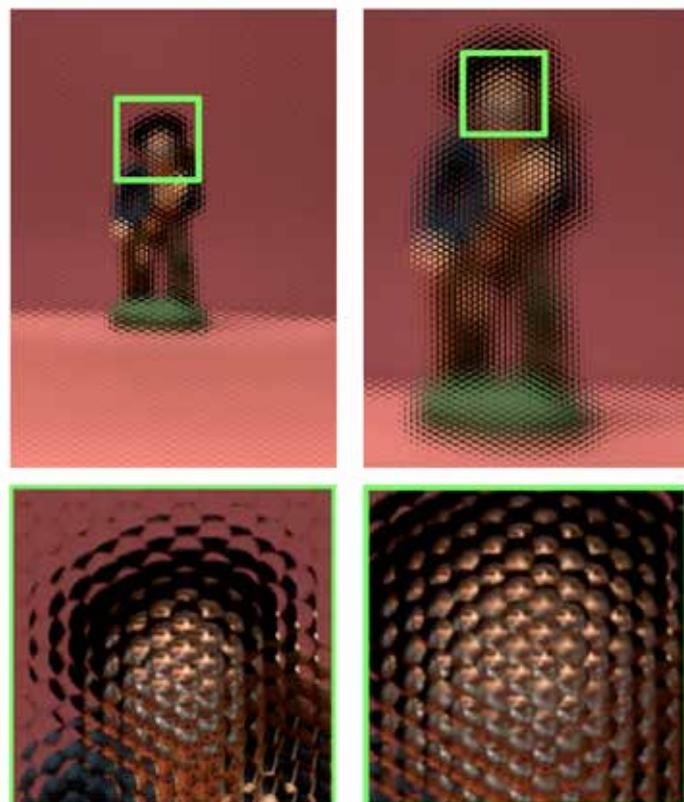
We address the problems of detecting obstacles and specic objects for aids to navigation. We propose two approaches using sparse 3D object cues from stereo vision in a boosting classication framework. The rst estimates poses of a 3D object to reduce the ambiguity of its appearance for its detection in a 2D image. The second allows specic 2D and 3D feature extraction for obstacle detection. We also present a method to detect generic descending stairs. We studied the inuence of two parameters on the algorithm performance: the reduction of the image resolution and the type of imaging systems, i.e. passive and active stereo cameras in various illumination conditions. We analyzed the power consumption versus the resolution with regard to considerations on hardware and embedded real-time programming. It assesses the robustness and the low computation time of our algorithm.

Regarding (ii), the recent advances in optics and light eld vision have given rise to o-the-shelf plenoptic cameras that embed the equivalent of about 7900 viewpoints. We present a state-of-the-art scale-invariant object recognition method using a Raytrix ® camera evaluated on a novel and versatile light eld dataset. A nal study presents a method to characterize 2D points using the surrounding rays captured by a light eld. Applied to a single pixel, it independently gives an accurate depth estimate and predicts if it is a keypoint lying on a region of depth discontinuities. The low complexity of the algorithm makes it an ideal candidate for real-time applications intended for embedded platforms.

In conclusion this thesis is in the opposite direction of the recent trend for big data. It highlights the capabilities of exploiting sparse cues from multiple views to eciently perform computer vision tasks. While we faced the limits of sparse 3D point clouds from low-resolution sensors to estimate poses of planar objects in 3D space, we have demonstrated the practical performance of such sets of points to detect descending stairs in real-time on a low-power embedded vision system. By drastically increasing the number of views with an o-the-shelf plenoptic camera, our approaches to object recognition and 3D keypoint detection position our research among the state-of-the-art work on light eld for computer vision. In addition to the continuous improvement in mobile computing power, the low-complexity of all the proposed methods comply with restrictive technical requirements to design not only aordable and useful assistive devices for the elderly but also navigation and surveillance systems, and retrotting in existing manufacturing lines for quality inspection to name a few.

Thesis completed

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Francesco Luca De Angelis

Doctor ès Social Sciences, mention Information Systems

July, 2017

Director: Prof. Giovanna Di Marzo Serugendo

A Logic-Based Coordination Middleware for Self-Organising Systems: distributed reasoning based on many-valued logics

Chemical-based coordination models have proven useful to engineer self-organising and self-adaptive systems. Formal assessment of emergent global behaviours in self-organising systems is still an issue, most of the time emergent properties are being analysed through extensive simulations. This thesis aims at integrating logic programs into a chemical-based coordination model in order to engineer self-organising systems as well as assess their emergent properties. Our model is generic and accommodates various logics. By tuning the internal logic language we can tackle and solve coordination problems in a rigorous way, without renouncing to important engineering properties such as compactness, modularity and reusability of code.

Contributions of the thesis:

- Coordination model: we designed and implemented a coordination model named Logic Fragment Coordination Model (LFCM), which realises the notion of coordination in terms of logic inference. Within the model, agents interact in a predictable way through interactions of logic programs; in this way, coordination of entities resembles a reasoning process carried out on distributed information.

- LFCM Virtual Machine: we also provided a full implementation of the model, that can be used to execute applications in heterogeneous distributed systems (e.g. laptops, tablets, embedded devices, etc.). The platform is delivered with the LFCM-TheOne, a prototyping tool that is able to simulate several full instances of the LFCM middleware into simulated scenarios. Given that LFCM-TheOne is fully compatible with the LFCM middleware, entire applications tested with such a tool can be directly deployed on real devices such as laptops and embedded systems.
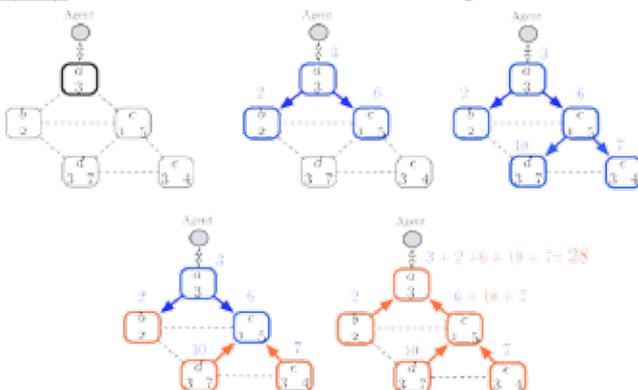
- Many-valued logics and approximate reasoning: we have developed a logic language named RLN, based on a extendible family of many-valued logics. RLN allows to perform graded paraconsistent reasoning, providing the logical machinery to handle multiple truth-values as well as uncertain or unknown values.

- Run-time assessment: we explored the potentialities of a logic language for run-time evaluation of graph-based spatial properties in distributed systems. The language encapsulates spatial statements into spatial formulae, which are evaluated distributively through spatial operators. Spatial formulae contain combinations of logic programs that can be directly interpreted by the middleware to infer information about the local state of nodes. Such information is then combined at a global level to assess spatial properties.

Results show the feasiblity of the approach to assess various run-time properties in decentralised systems. A preliminary factory hazard assessment of properties on-the-fly showed the potential of the deployed middleware in realistic scenarios.
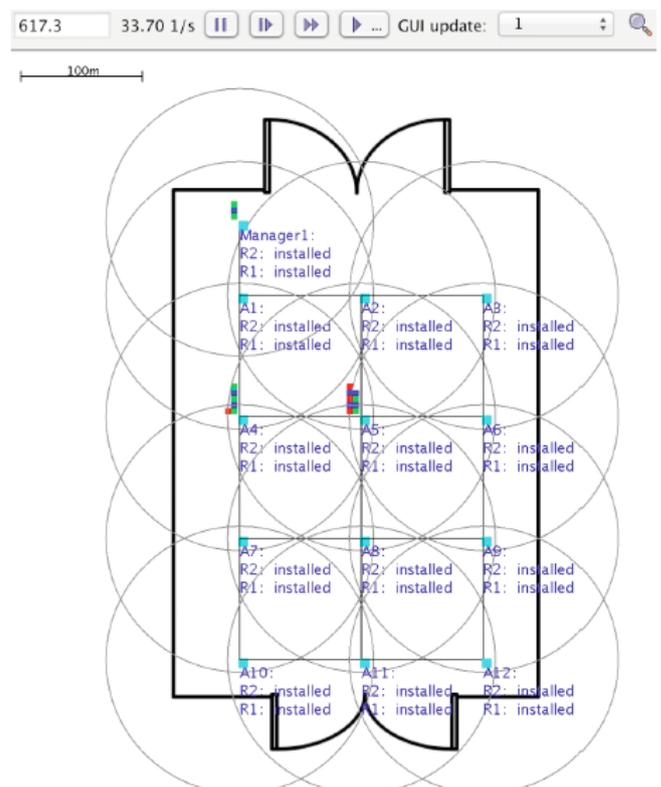
Maurits Diephuis

Doctor ès Sciences, mention Computer Science

29th May, 2017

Director: Prof. Sviatoslav Voloshynovskyy

MICRO-STRUCTURE BASED PHYSICAL OBJECT IDENTIFICATION ON MOBILE PLATFORMS

Physical object protection includes all techniques to identify or authenticate objects to determine their origin. High quality counterfeited products are ever more prevalent and widespread nowadays. Luxurious items have always been popular targets, but the last two decades, driven by ever cheaper and sophisticated manufacturing technology, have also seen fake medication, fake industrial and aerospace parts.

Popular countermeasure techniques tend to invasively alter an object, for example by adding markings, holograms, chips or using expensive printing techniques. These techniques hinge on the assumption that they are either to hard or to expensive to replicate.

In this thesis we envision a dierent approach to physical object protection based on the microscopic surface structure of the object's surface. This micro-structure is both unique to the object and currently non-cloneable and thus serves as natural identier. More-over, micro-structure based security schemes have relatively cheap enrollment, are non-invasive leaving the original object untouched. Lastly, verication can be done by ordinary consumers without any particular expertise.

This thesis will extend the state-of-the-art in several important ways. It shows a number of methods to allow micro-structure based object protection on hand-held mobile platforms, both for enrollment and verication without any kind of modication of the acquisition device or lighting. Secondly, the developed algorithms only require the object to be in the eld of view and do not need any aid, such as a priori known printed mark on the package, to acquire and extract the sought micro-structure.

The process that enables this is not trivial. Optically acquired micro-structures are visually poor, lack edges and salient regions. Further serious degradation is caused by the mobile phone, the angle under which it is held, and under what lighting. Lastly, while one can expect the number of enrolled objects to be huge, there are only but a few acquisitions available per unique sample, to learn from. This thesis proposes a number of solutions for micro-structure verication and frameworks in which they can be applied, explicitly modeling user selectable parameters and environmental factors that in uence the design and performance of micro-structure based authentication and identication frameworks.

Firstly, this thesis demonstrates how micro-structures may be matched based on so called robust features and geometry. Specically, it proposes an anity based algorithm that can match small sets of points, of which over 50% are outliers.

Secondly, a novel robust descriptor was developed and is patent pending: Sketchprint. Specically designed to robustly identify distorted micro-structures, it requires no training, is relatively stable and information rich, and requires but a small number of enrolled descriptor vectors per sample. As it both captures geometrical and micro-structure information from its region of interest, it doesn't require any exhaustive geometrical re-ranking or aggregation.

Tangent to Sketchprint, to address aggregation and compact descriptor representations, a statistical model of a Bag-of-Word content identication model has been built and theoretically analyzed. It captures all relevant parameters, from the type and quantity of the used descriptors, the desired robustness to noise, architectural choices such as the deployed type of pooling, and ties those into the predicted nal system performance. This model has also been empirically veried.
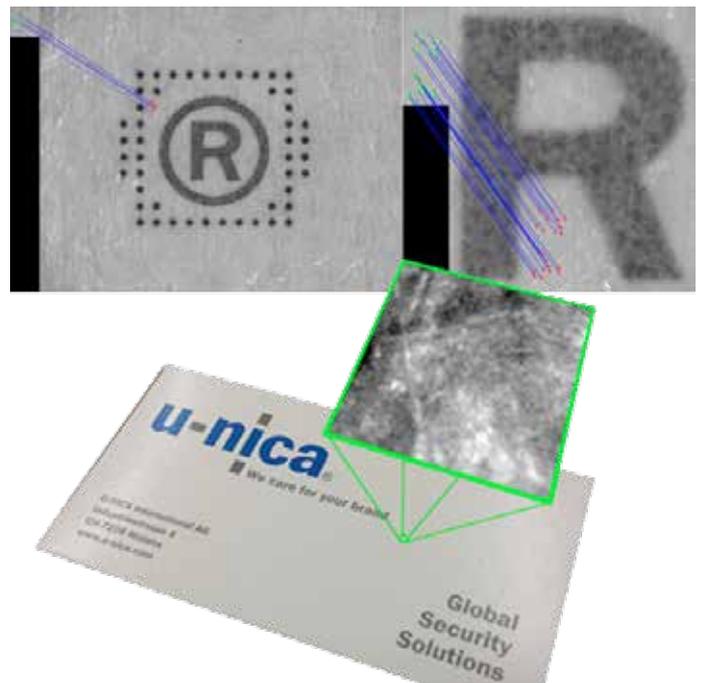
Meghdad Farahmand

Doctor ès Sciences, mention Computer Science

17th July, 2017

Director: Prof. Stéphane Marchand-Maillet
Do-Director: Prof. Gilles Falquet

COMPUTATIONAL MODELS OF LEARNING THE IDIOSYNCRASY OF MULTIWORD EXPRESSIONS

Idiosyncrasy is an important property of the language that enables it to be productive and at the same time prevents it from growing infinitely large. Idiosyncrasymeans having a peculiar statistical, semantic or syntactic behavior. Idiosyncratic phrases are commonly referred to as Multiword Expressions (MWEs) and have application in most natural language processing (NLP) tasks. The ability to identify and generate MWEs is essential for an NLP system designed to interact in and understand human language. Presently,most models of identifying idiosyncrasy suffer from a low precision. In order to improve the quality of MWE-related systems, more formal definitions of idiosyncrasy as well as more complex computational models need to be developed. This work attempts to define idiosyncrasy on statistical and distributional grounds and study it froma computational perspective. It also presents various models for identifying different types ofMWEs with a focus on nominal MWEs.
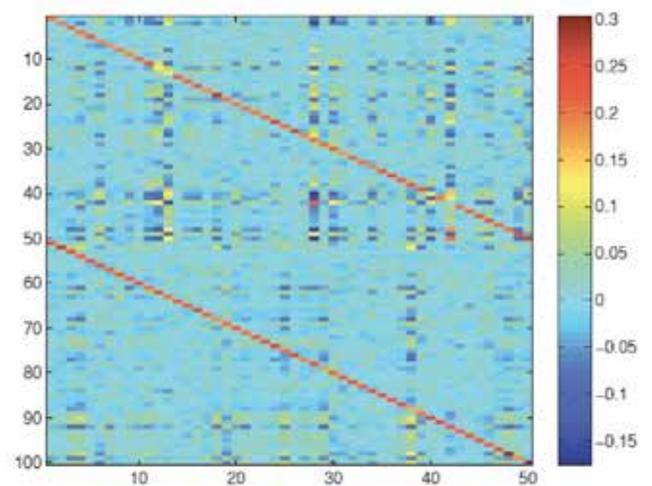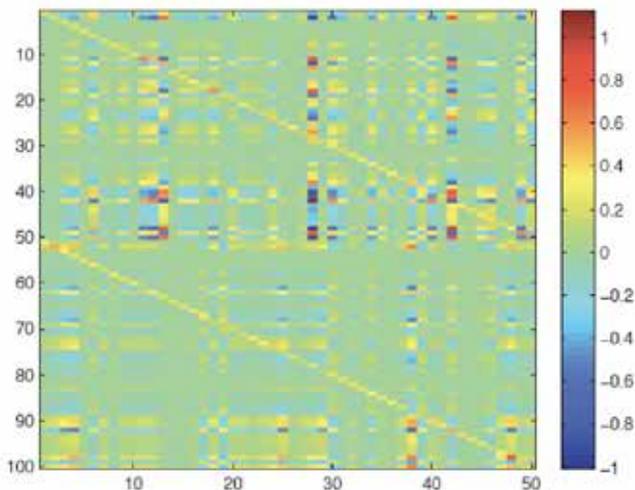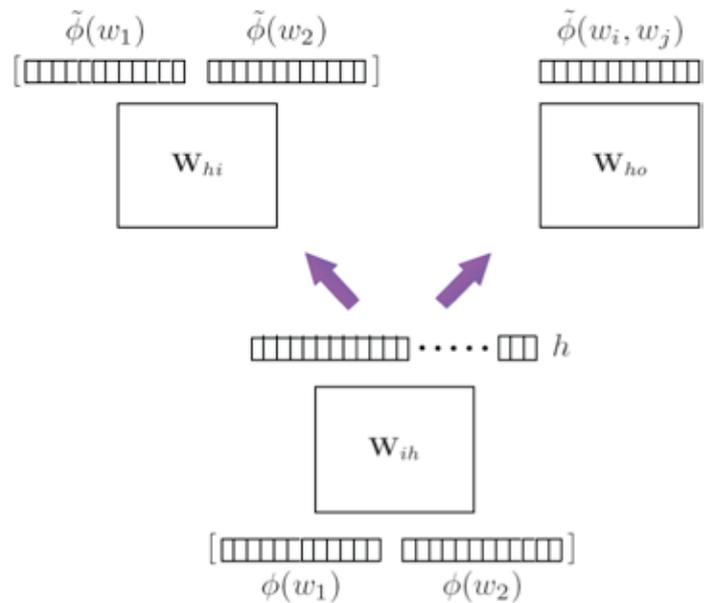
David Garcia Juan
Doctor ès Sciences, mention Interdisciplinary
20th September, 2017

Co-Director: Prof. Nadia M-Thalmann
Co-Director: Prof. José Rolim

Patient-specific multi-parametric computational model of lower limb muscle function from PET/MRI studies

The purpose of the present study is to investigate and develop a patient-specific multi-dimensional model of the lower limb muscles that combines three-dimensional anatomical data and functional dynamic information about muscle deformation from Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) images.

Muculoskeletal disorders (MSDs) are a group of pathologies that affect different parts of the musculoskeletal system like bones, muscles or tendons. Due to the strong relationship between the current rising of world population aging and MSDs spreading, these pathologies will represent in the forthcoming years a big economical burden and a significant challenge to the health systems of developed countries. Among MSDs, Osteoarthritis (OA), and most particularly Knee osteoarthritis (KOA), is one of the most widely diffused MSDs over the world population. OA is caused by the inflammation and by a partial or total loss of the cartilage in the joints, causing stiffness in the affected joint and producing severe pain in the subject suffering the disease, up to a complete incapability to perform daily common tasks. Quadriceps muscles are strongly correlated with knee function, and their weakness or impairment can lead to an abnormal knee function that could result in the development or progression of KOA. The investigation of muscle function or recovery has been historically addressed with manifold techniques. Self-reported questionaries and performance studies are still currently employed for preliminary evaluation of patient status or recovery. Other techniques, such as biopsy, Electromiography (EMG) or Maximum Voluntary Isometric Contraction (MVIC), have been employed to provide valuable information that have extended our knowledge about skeletal muscles behavior. However, more quantitative data are required to accurately evaluate muscle function from a scientific point of view. Imaging techniques like MRI and PET, capable to perform invivo studies of the body and acquire anatomical and metabolic muscle features in a non-invasive way, have changed our understanding about skeletal muscles and pushed further our knowledge about their function.

Muscle Cross-sectional area (CSA) and Muscle Volume (MV) have been extensively reported in literature to have a strong correlation with muscle strength, a strictly linked characteristic to muscle function that has been extensively exploited to evaluate muscle impairment or recovery after surgery. Up to date, MRI studies assessing muscle CSA and MV have addressed the assessment of these anatomical muscle parameters using a static approach. Extracting these features exclusively from static images implies missing the dynamic information, which could complete our understanding of muscle behavior when performing a specific task or exercise. Current dynamic studies assessing muscle deformation of the skeletal muscles are limited to the investigation of two-dimensional images in a single plane. This limitation does not allow performing three-dimensional reconstructions of the muscle that could completely characterize it. PET imaging has also been demonstrated to be a valuable tool capable to provide meaningful information about muscle activation.

The multidimensional model developed in this study allows extracting anatomical and functional muscle features such as CSA and MV leveraging on a novel dynamic approach. The creation of three-dimensional reconstructions of the complete skeletal muscle while performing dynamic tasks allows exploring the dynamic evolution of muscular anatomical characteristics, up to now widely assessed only in static studies, up to the best of our knowledge. By combining this information to metabolic data from PET studies, a unique dataset will be inferred, allowing to address the study of MSDs from a new perspective with respect to the conventionally adopted approaches in the musculoskeletal research field, thus potentially leading to new therapies and improved surgical techniques.
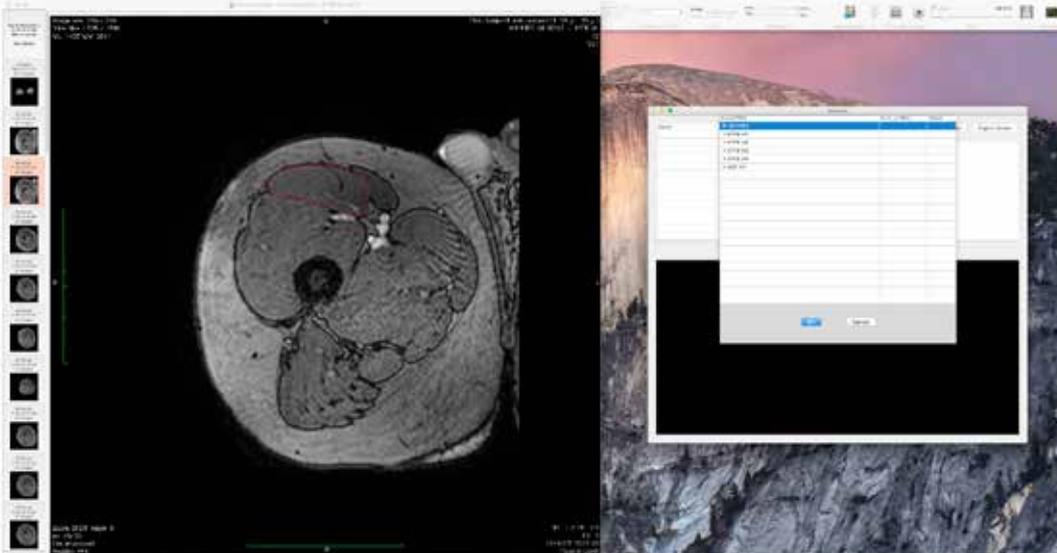
Thesis completed

Messaoud Hammouya

Doctor ès Social Sciences, mention Information Systems

7th July, 2017

Co-Director: Prof. Giovanna Di Marzo Serugendo
Co-Director: Dr. Mehdi Snene

Statistique publique : des données aux connaissances : une approche orientée services pour la gestion des connaissances

This research is contextualized in the field of public statistics. It addresses the issue of knowledge management based on services. It specifically proposes to define, discover, describe and model knowledge management services.

First, we argue that public statistics has entered a new paradigm: the informational paradigm, where knowledge management is at the heart of the business of public statistics. From this point of view, the question that arises is how to change the information systems of national and international statistical institutes (NSIs) that are not configured for knowledge management to statistical knowledge management systems? To address this issue, we have placed our research work in a service-oriented approach to overcome the theoretical and organizational limitations and difficulties encountered by the different traditional approaches to knowledge management. Second, we mobilized and articulated theoretical elements (knowledge management processes, concepts of knowledge, services, intentional services, and organizational memory) to develop an original conceptual and methodological framework for knowledge management based on services. The approach we propose is based on formal definitions of knowledge services and knowledge management services, knowledge management services modeling and a knowledge management system model. Finally, we have developed and highlighted the main contributions of this thesis: (1) formal and detailed definitions of knowledge management services, (2) a reference Framework, (3) modeling for management services

Knowledge, (4) taxonomy of these services, (5) a service-based knowledge management system model for the implementation of knowledge management services in NSIs, and finally (6) strategic managerial recommendations for NSIs.

Accéder	Codifier	Élaborer	Générer	partager	Suivre
Accumuler	Collecter	Encourager	Hiérarchiser	Percevoir	Susciter
Actualiser	Combiner	Enrichir	Identifier	Présenter	Synthétiser
Adapter	comprendre	Évoluer	Informer	Préserver	transférer
Appliquer	Conclure	exercer	Interpréter	Produire	Transformer
Apprendre	Conserver	Exploiter	Localiser	Promouvoir	Transmettre
Aquérir	Créer	Exprimer	Manager	Réaliser	utiliser
Archiver	Découvrir	Faciliter	Mesurer	Récupérer	Visualiser
Articuler	Dialoguer	Faire suivre	Mettre à jour	Repérer	
assimiler	diffuser	Filtrer	Mettre en forme	Sécuriser	
Capturer	Discuter	Formaliser	Modéliser	Sélectionner	
Caractériser	Disséminer	Former	Motiver	Standardiser	
Cartographier	Distribuer		Organiser	Stocker	
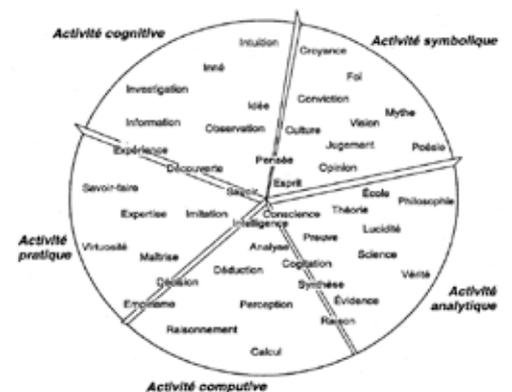
Externalisation :	Impl. Vers Expl.	(production de ressources; ou connaissances formalisées pour d'autres).	
Socialisation :	Impl. Vers Impl.	(interactions entre acteurs).	
Internalisation :	Expl. Vers Impl.	(Appropriation des connaissances explicites).	
Combinaison :	Expl. Vers Expl.	(Conversion d'une connaissance explicite en une connaissance explicite).	

Oscar Jimenez-del-Toro

Doctor ès Sciences, mention Computer Science

18th May, 2017

Director: Prof. Henning Muller
Director: Prof. Stéphane Marchand-Maillet

Quantitative analysis of medical images: finding relevant regions-of-interest for medical decision support

Medical imaging techniques are able to show internal structures of the human body that would otherwise remain hidden without invasive procedures i.e. surgery. Medical professionals rely on these images to detect and characterise illnesses that could be present in patient studies. Doctors learn to establish correlations between visual image patterns and the structural organisation of human anatomy in the search for subtle variations that could indicate the presence of disease. However, in the past decades the number of medical images inspected daily in health centers, as well as the complexity of imaging parameters have increased tremendously. The time to interpret these imaging studies as part of their daily workload is limited, leading occasionally to a failed detection in difficult cases and errors in the interpretation. An efficient quantitative analysis could improve health care by enabling a more objective interpretation of these studies.

Clinical decision support and computer–aided diagnosis systems have been proposed to generate objective and repeatable measurements that could increase the reliability of medical images assessments. Some of these semi– and fully automatic methods have already been included in the clinical workflow, reducing errors and inter–operator variability. A fundamental step in the development of these systems is to initially locate anatomical structures and relevant areas where a more thorough image analysis should be performed. The main goal of this thesis is to propose and evaluate novel methods that detect and quantify regions–of–interest (ROIs) in medical images. By segmenting anatomical structures in full patient scans and measuring visual features in preselected regions, medical professionals can then prioritise their attention to the more significant structures in the images.

A large data set that comprehends the natural anatomical variability and complexity of medical data is then required to train and test medical algorithms designed for real clinical scenarios. Biomedical image analysis challenges provide large data sets to participants and promote an objective comparison of medical algorithms with shared goals. As an outcome of these challenges, the advantages and limitations of diverse strategies are identified, thus increasing the understanding of the visual descriptors associated to anatomical structures and diseases. Challenges in medical image annotation and medical case–based retrieval were organised within a research group (VISCERAL) and are reviewed as a scientific contribution of this work. A cloud–based evaluation framework where various segmentation algorithms can be benchmarked is presented, as well as the comparison of their results to the visual interpretation of radiologists.

In this thesis, the different steps implemented in the detection and annotation of ROIs are discussed along with their corresponding set of measurements from handcrafted and deep learning features. Particularly, a hierarchic anatomical structure segmentation method was developed aiming to exploit the individual anatomical variations present in limited data sets of manually annotated structures. The method obtained promising results in the VISCERAL Anatomy benchmarks for the segmentation of large and high–contrasted anatomical structures and showed a notable advantage in the segmentation of smaller and harder to detect structures e.g. gallbladder and adrenal glands. Moreover, multimodal (using both text and visual data) medical case–based retrieval systems are proposed both for radiology and digital pathology data. These tools were designed to navigate large scale hospital repositories including medical reports and 3D patient scans, retrieving relevant information from automatically selected regions–of–interest. The correct selection of visual features from the computed ROIs could benefit clinical decision support systems with more consistent evaluations of the medical images and a better comprehension of the underlying pathological processes.
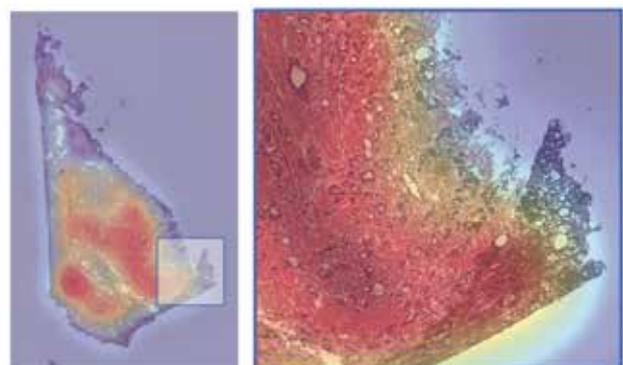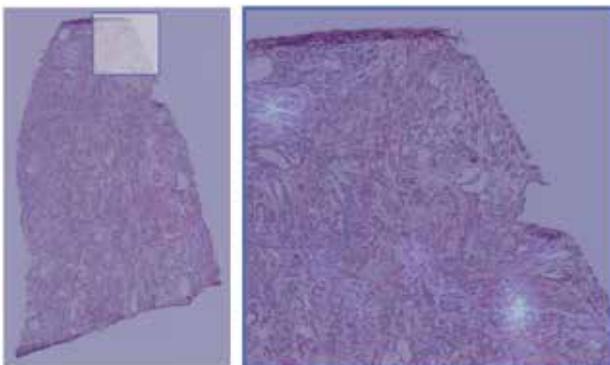
Panagiotis Kostopoulos

Doctor ès Economy and Management, mention Information Systems and Service Science

19th October, 2017

Co-Director: Prof. Dimitri Konstantas
Co-Director: Dr. Michel Deriaz

From fall detection to stress pattern using smart devices

Smart mobile services and applications are ubiquitous in our lives. The act of taking preventative or necessary medical procedures to improve a person's wellbeing is called healthcare. The use of smart devices is getting more attention in healthcare day by day. Medical applications make smartphones useful tools in the practice of evidence-based medicine at the point of care, in addition to their use in mobile clinical communication.

As people get older, they tend to become more and more vulnerable to physical disabilities and mental illnesses. In order to prevent the deterioration of their quality of life we have invented applications that help elderly to sustain their activities of daily living (ADL). More specifically, we have made research in two important domains of e-health which are the fall detection and the stress detection. The falls and the stress are two of the main health problems that elderly people are facing nowadays. These two serious health problems can cause a wide spectrum of other health related consequences that deteriorate the quality of life of elderly people and make them vulnerable to various health related and so problems.

The purpose of this thesis is the description of the contribution of a fall detection system and a stress detection system in the daily life of elderly people. Firstly, we present a practical real time fall detection system running on a smartwatch called F2D. Falls among older people remain a very important public healthcare issue. In the majority of fall events external support is imperative in order to avoid major consequences. Therefore, the ability to automatically detect these fall events could help reduce the response time and significantly improve the prognosis of fall victims. In F2D data from the accelerometer is collected, passing through an adaptive threshold-based algorithm which detects patterns corresponding to a fall. A decision module takes into account the residual movement of the user, matching a detected fall pattern to an actual fall. Unlike traditional systems which require a base station and an alarm central, F2D works completely independently. To the best of our knowledge, this is the first fall detection system which works on a smartwatch, being less stigmatizing for the end user. The fall detection algorithm has been tested by Fondation Suisse pour les Téléthèses (FST), the project partner who is responsible for the commercialization of our system. Moreover by testing with real data we have a fall detection system ready to be deployed on the market. Finally, the last module of F2D is the location module which makes our system very useful for nursing homes that host elderly people.

Thanks to the knowledge that we acquired by extracting useful information from the sensors of smart devices and more specifically by detecting falls from a smartwatch, we enhanced our know-how analyzing and extracting patterns from raw sensor data. The next implementation of our expertise and second main element of this thesis is the detection of stress patterns by analyzing smartphone data.

Therefore, secondly we present a novel stress detection system which aims to detect stress and burn-out risks by analyzing the behaviors of the users via their smartphone. The main purpose of our stress detection system is the use of the mobile sensor technology for detecting stress. In particular, we collect data from people's daily phone usage, gathering information about the sleeping pattern, the social interaction and the physical activity of the user. We combine the information gathered from these main dimensions of wellbeing and we provide a relaxation score to the end-user, making him aware about his stress level. To the best of our knowledge, this is the first system that computes a stress score based on different dimensions of human wellbeing. The main innovation of this work is addressed in the fact that the way the stress level is computed is as less invasive as possible. Our solution relies only on the daily phone usage of people. Also we acquire the ground truth for the importance of each dimension of wellbeing for each individual by asking the users. This leads us to a personalized model which focuses on the personality of each individual user. Our stress detection algorithm was the key element of an Active and Assisted Living (AAL) project called StayActive as well and it has been evaluated in a real world environment with people working in the public transportation company of Geneva (Transports Publics Genevois).

Both of the systems that are presented in this thesis have been used in applications that will be available on the market, transferring directly the scientific research into a commercial product. Also both of the systems have been tested with real end-users and therefore the research has gone one step further, beyond the lab trials. Finally, people coming from the research community and the industrial world have shown great interest in our research results. Therefore, our research results led to two new Commission for Technology and Innovation (CTI) projects. We collaborate with one of the biggest clinic groups in Switzerland, Hirslanden, working on a project called Recover@home. The main idea of this project is to build a solution to monitor a patient while at home. Moreover we collaborate with Hirslanden for extending our stress detection system in a project called Stress and Burnout (SaB). The main innovation of SaB will be an algorithm computing a stress level by combining biosignals from a wearable device, behavioral information from a smartphone, as well as subjective answers to standard medical questionnaires.

To recapitulate, in this thesis we present two e-health applications. We begin with a fall detection system and we continue with a stress detection system. Last but not least we present the new research directions and projects that have been created based on our expertise of detecting patterns from raw sensor data, collected from smart devices.

Sharid Loaiciga Sanchez

Doctor ès Humanities, mention Linguistics

5th May, 2017

Director: Prof. Eric Wehrli

PRONOMINAL ANAPHORA AND VERBAL TENSES IN MACHINE TRANSLATION

Coherence and cohesion are discursive properties of a text. They hold together pieces of information, making the text comprehensible, and not just a group of sentences put together. In our work, we investigate two different linguistic devices of cohesion and coherence, i.e., pronouns and verb tenses, and their implications for machine translation. We look at two different approaches for pronoun translation: rule-based translation with classic anaphora resolution and cross-lingual pronoun prediction without anaphora resolution. Concerning verb tenses, we assess the usefulness of grammatical tense and boundedness to improve their machine translation. All our experiments concern the translation from English to French, but they can potentially be applied to other language pairs.

Literary corpus

French Translations of 'it' used for eventual anaphora

German Translations of 'it' used for eventual anaphora

Journalistic corpus
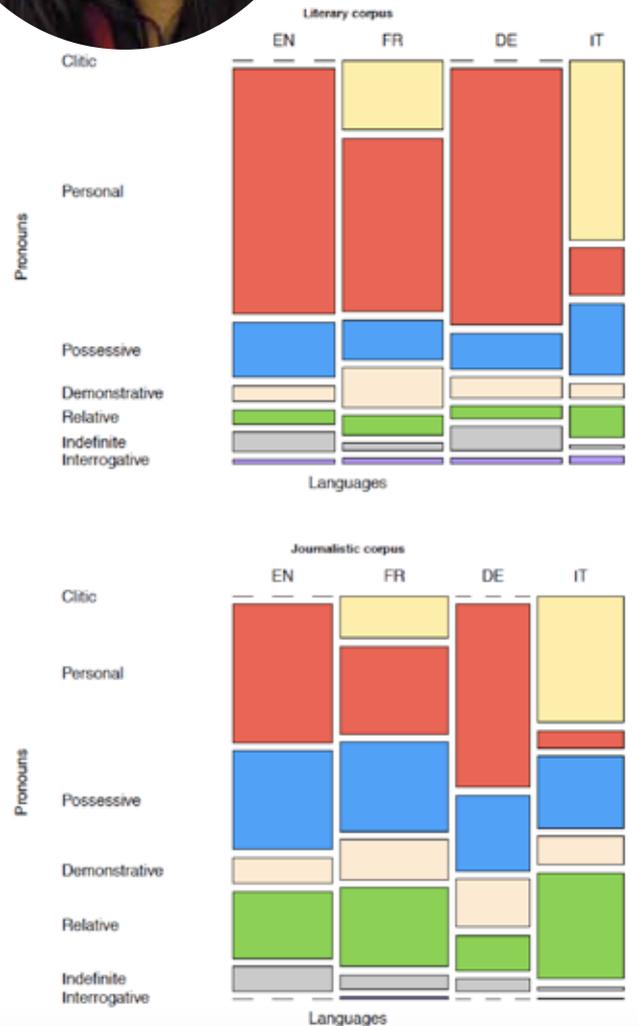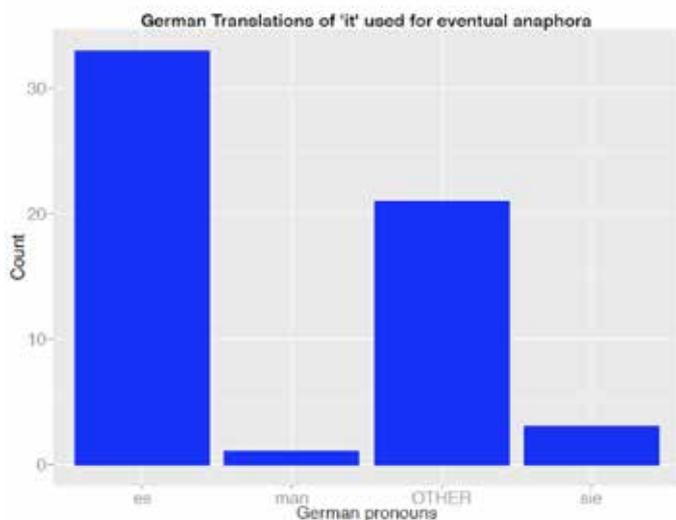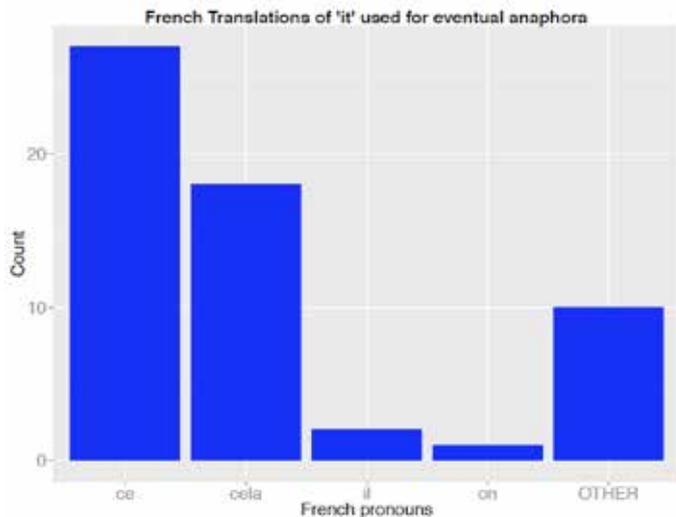
TARGET↓	themselves	myself	ourselves	himself	itself	total
OTHER	2		1	1	2	6
NULL	2			2	6	10
eux-mêmes	3					3
eux	1					1
leur	1					1
se	5		1	5	3	14
ils	2					2
me		2				2
nous			1			1
nous-mêmes			1			1
notre			1			1
lui-même				3	1	4
total	16	2	5	11	12	46

Thesis completed

Camille Tardy

Doctor ès Economy and Management, mention Information Systems and Service Science

30th January, 2017

Co-Director: Prof. Gilles Falquet
Co-Director: Dr. Laurent Moccozet

Introducing Spatial Coverage in a Semantic Repository Model

In this thesis, we propose a model for semantic digital libraries with a geospatial context and a definition of coverage as key concept. We present the document and spatial resource model. We define the annotation model and more particularly the geographic coverage that detail and define the location of each resource taking into account its type. Finally, we present the query model and matching process where the geospatial context is an essential feature.

To validate this model, we develop some use cases and implementation. We first focus on annotating documents and precisely locating the documents within the spatial resource. To do so, we describe the implementation of the annotation model, presented in the digital library model, especially the geo- semantic knowledge resources alignment.

Then we present the methodology and implementation of a new technique to extract geographic information and place semantic from tags issued of volunteered geographic information (VGI) sources. This technique is based on a categorisation system, with a non-statistical knowledge-based approach. This extraction can partly automate the definition of the geographic coverage for the digital library resources, or be used to enhance semantically or complete 3D models and geo services.

Centre Universitaire d'Informatique

Assane Wade

Doctor ès Social Sciences, mention Information Systems

28th July, 2017

Director: Prof. Giovanna Di Marzo Serugendo

A framework for opinion change mining in social networks: tracking opinion change on Twitter

The increased prominence of social media in society has prompted studies in many research fields, such as social network analysis (SNA), natural language processing (NLP), data mining, etc. Issues worthy of study include cascades in the network (i.e. shapes of re-tweets), information diffusion, influencer detection, recommendation systems or opinion mining. These studies provide coarse-grained tracking of opinions across an overall network. As of yet, there are no specific studies focusing on fine-grained opinion changes tracking, e.g. for a given topic or for a network fragment.

Our research applies information systems paradigms to the study of social networks.

In online social networks, connected users are exposed to the content of their connections (friends in Facebook, friends and followers in Twitter, etc.) during the diffusion of information. Opinions constitute a portion of the information exchanged between users in social networks. The opinions of a friend may influence a particular user's opinion, leading it to change over time. In addition, users generally express themselves on multiple topics. It is therefore important to discriminate to which topic the post belongs.

The focus of this thesis is the analysis of opinion change inside social networks. We propose a framework of opinion change based on design science research in information systems. The proposed framework highlights the main concepts, the model and the process of opinion change. In addition, we use topic modelling to classify content by topic or theme, sentiment analysis to extract opinions from the content. Based on the topic classification, we isolate network fragments of a user and his followees to track the opinion changes of this particular group. We also provide a generic graph database model that stores the follower graph, the metadata and content. We set criteria to define the notion of a discussion and to identify discussion patterns. The proposed definition of a discussion is composed of a series of statistical values and charts applied to each network fragment. We propose a method to extract discussion patterns and a method to compare and extract patterns from within social network datasets.

We present an instantiation of the framework of opinion change for Twitter. We show the key elements of the implementation (language and procedure) adapted for tweets analysis. We evaluated our framework using two datasets crawled on Twitter, a mixed dataset (crawled from April 16, 2016 to April 21, 2016) and a political dataset (crawled from November 28, 2016 to December 08, 2016). We have successfully applied the framework to these datasets. Regarding the topic modelling, we identify hashtag-based pooling as the best pooling method for our purpose. During the course of our research, we have identified many discussion patterns from our two datasets.

Preliminary results show that the political dataset presents more opinionated tweets than our mixed dataset. Such opinion change analysis can be useful for studying customer behavior for marketing purposes, for studying voter behavior for electoral purposes, for enriching recommendation tools and for studying information diffusion inside social networks.

Proposals for future research include: instantiations to other social networks (e.g. Instagram), real-time analysis instead of batch analysis, and deep analysis of discussions to extract recurrent patterns.

Sébastien Ziegler

Doctor ès Economy and Management, mention Information Systems and Service Science

11th September, 2017

Director: Prof. Dimitri Konstantas
Co-Director: Prof. José Rolim

Internet of Things and IPv6 convergence: towards a universaland interoperable IPv6-based framework for the Internet of Things

Forester Research, comme la prochaine grande vague technologique dans le domaine des technologies de l'information, de l'économie et de la société en général. Avec plus de 50 milliards d'appareils connectés d'ici 2020, l'Internet des Objets sera massif et omniprésente. Cependant, afin de réaliser son plein potentiel, l'Internet des Objets devra surmonter ses limitations actuelles, telles que le manque d'interopérabilité, comme l'a souligné l'Union Internationale des Télécommunications (UIT) depuis 2005 [1]. Parallèlement, Internet est confronté à sa plus importante transformation depuis plus de trente ans avec l'adoption et la transition vers un nouveau protocole Internet : IPv6 [2]. Dans cette thèse, je démontre que cette transition constitue à la fois une continuité et une transformation fondamentale d'Internet. Je commence par analyser le potentiel d'IPv6 pour soutenir la convergence d'un Internet des Objets hétérogène vers un écosystème évolutif et interopérable. Je formule 5 conjectures sur la scalabilité d'IPv6 pour l'Internet des Objets. Je propose ensuite un framework IPv6 hautement scalable et interopérable pour l'Internet des Objets basé sur trois améliorations technologiques complémentaires: - Un Plan d'Adressage IPv6 Universel pour l'Internet des Objets, proposant une nouvelle approche dans l'adressage et l'interprétation des adresses IPv6; - Un Modèle de Référence pour l'Intégration Multi-Protocolaire de l'Internet de Objets à travers IPv6, englobant les différentes couches du modèle OSI; - Un Extension Header IPv6 pour la Privacy afin de renforcer la sécurité et la protection des données transmises par IPv6 en général et pour les données de l'Internet des Objets en particulier. Une partie de ce développement a été soumise avec succès à l'UIT et a servi de base à deux projets de Recommandation et à un Supplément.
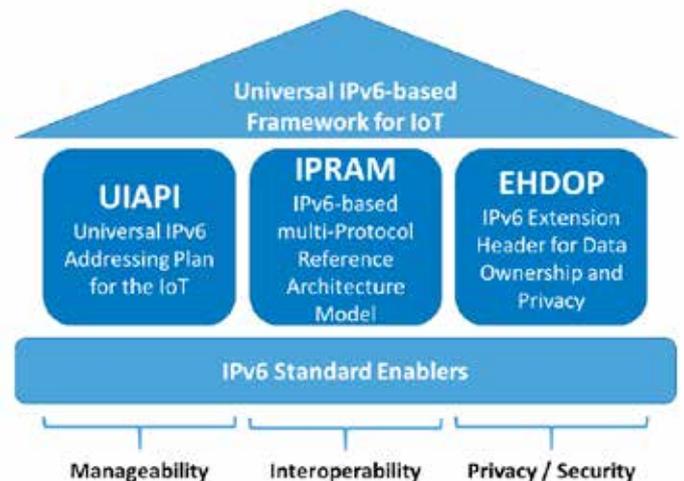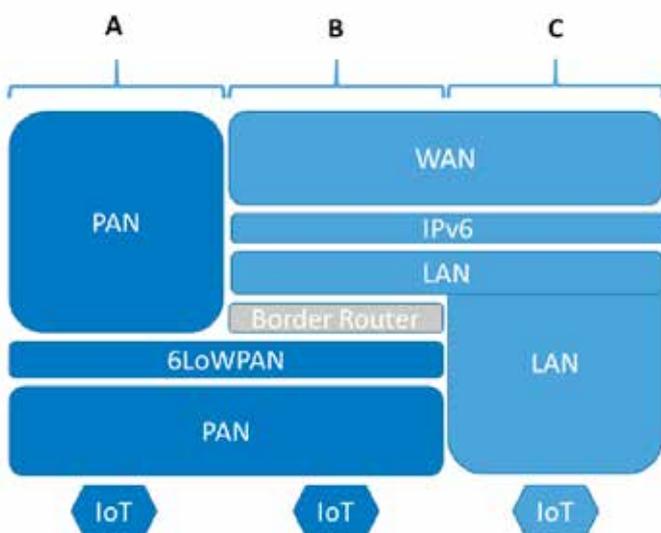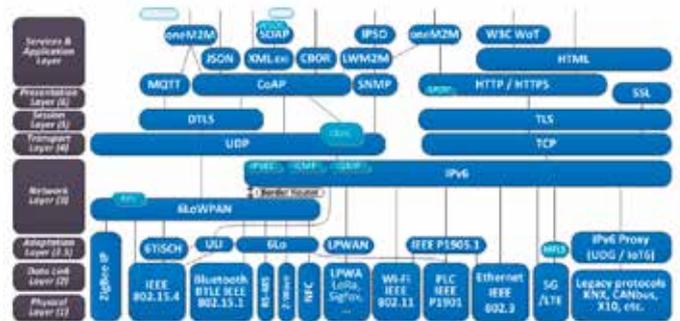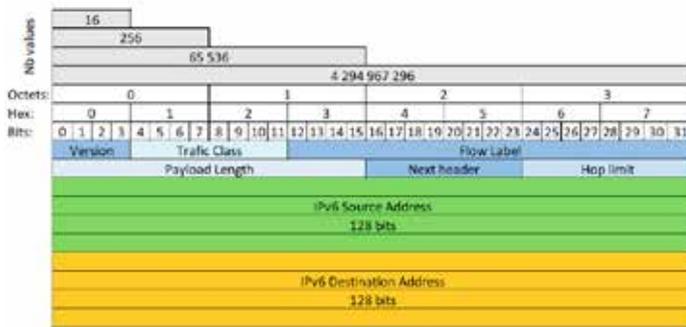
Doctorat thesis: Univ. Genève, 2017 - GSEM 45 - 2017/09/11

http://archive-ouverte.unige.ch/unige:105757

Administrative Staff

Marie-France
Culebras

Anne-Isabelle
Giuntini

Coralie
Grossrieder

Maëlle
Rümbeli

Séverine
Walter

The administrative staff of CUI is dedicated to serving at its best the community of researchers, teachers and students. Essentially covering four domains :

Administration: Its role is to manage the CUI budget, logistics, communication, etc. It also manages the Web site, the production of documents (activity report, flyers, etc.) as well as the organization and coordination of public and promotional events such as the book and student fair (Salon du Livre et de l'Etudiant)
- **Elie Zagury** is direction assistant.

Secretariat: Works at the departments level of CUI. Hiring and contract renewals of doctoral students as well as all the tasks related to CUI operations are handled by the secretariat. It also provides a perfect connection to major University services such as HR, accounting, etc.
- **Marie-France Culebras** is secretary;
- **Anne-Isabelle Giuntini** is part-time secretary (50%);
- **Coralie Grossrieder** is secretary;
- **Maëlle Rümbeli** is part-time secretary (50%);
- **Séverine Walter** is part-time (40%) student secretary, since July 2017.

IT: Two systems-engineers manage the basic computer infrastructure of CUI (data storage, backups, servers, network, etc.) using Linux, Mac and Windows. Their help and support is appreciated daily by the whole CUI community. This service works closely with the University IT Division.
- **Nicolas Mayencourt** is system-engineer;
- **Daniel Agulleiro** is system-engineer.

Daniel
Agulleiro

Nicolas
Mayencourt

Elie
Zagury

Library: The CUI Library provides services and tasks as any specialized library of an universitary center. It is part of the library network of the University of Geneva (http://www.unige.ch/biblio/sciences/infos/cui.html) and is proud to offer some specifities in its field. Its current collection contains approximately 10'000 books and 25 specialized print journals.
- **Amélia Marcelino** is head librarian.

Amélia
Marcelino

Centre Universitaire d'Informatique

Financial Report

CUI

Staff	CHF 926'684.-
• Academic	CHF 298'643.-
• Administrative and Technical	CHF 452'749.-
• Employer's social contributions	CHF 175'292.-
Operating costs - Investment	CHF 62'800.-
Operating costs - Others	CHF 182'950.-
CUI subtotal	**CHF 1'172'434.-**

Faculty of sciences (Computer Science Department)

Staff	CHF 3'107'551.-
• Academic	CHF 2'367'513.-
• Administrative and Technical	CHF 152'858.-
• Employer's social contributions	CHF 587'180.-
Operating costs - Investment	CHF 74'074.-
Operating costs - Others	CHF 33'840.-
Sciences subtotal	**CHF 3'215'465.-**

Geneva School of economics and management

Staff	CHF 730'329.-
• Academic	CHF 588'657.-
• Employer's social contributions	CHF 141'672.-
Economics and management subtotal	**CHF 730'329.-**

Geneva School of Social Sciences

Staff	CHF 576'573.-
• Academic	CHF 466'264.-
• Employer's social contributions	CHF 110'309.-
Social Sciences subtotal	**CHF 576'573.-**

Faculty of humanities (Unit of Computer Science for the Humanities)

Staff - Academic, incl. Charges (estimation)	CHF 579'389.-
Operating costs	CHF 20'000.-
Humanities subtotal	**CHF 599'389.-**

TOTAL BUDGET	**CHF 6'294'190.-**

External funding obtained by the professors — Credit

CUI

UE-funded Projects	CHF 1'266'052.-
Swiss-funded Projects	CHF 1'117'590.-
CUI subtotal	**CHF 2'383'642.-**

Faculty of sciences (Computer Science Department)

UE-funded Projects	CHF 149'256.-
Swiss-funded Projects	CHF 1'274'675.-
Sciences subtotal	**CHF 1'423'931.-**

Geneva School of economics and management

UE-funded Projects	CHF 411'249.-
Swiss-funded Projects	CHF 299'013.-
Economics and management subtotal	**CHF 710'262.-**

Geneva School of Social Sciences

UE-funded Projects	CHF 0.-
Swiss-funded Projects	CHF 0.-
Social Sciences subtotal	**CHF 0.-**

Faculty of humanities (Unit of Computer Science for the Humanities)

UE-funded Projects	CHF 0.-
Swiss-funded Projects	CHF 8'332.-
Humanities subtotal	**CHF 8'332.-**

TOTAL CREDIT — **CHF 4'526'167.-**

Swiss Digital Day
Geneva
2017 November 21th

Cornavin rail station (Geneva)

Swiss Digital Day
Geneva
2017 November 21th

Prof. François Grey (CUI and Swiss Digital Day coordinator for UNIGE), Pierre Maudet (Conseiller d'Etat)

Swiss Digital Day
Geneva
2017 November 21th

RTS podium

Swiss Digital Day
Geneva
2017 November 21th

Didier Rey (Swiss Digital Day coordinator), Alain Berset, Prof. Sviatoslav Voloshynovskyy (Computer Science)

Swiss Digital Day
Geneva
2017 November 21th

Houssem Ben Mahfoudh (CUI PhD student)

Swiss Digital Day
Geneva
2017 November 21th

Dr. Giuseppe Cosenza (Linguistic), Luka Nerima (Linguistic), a visitor

Swiss Digital Day
Geneva
2017 November 21th

Photographs - Right side: Prof. Denis Hochstrasser (UNIGE vice-rector)

Swiss Digital Day
Geneva
2017 November 21th

Dr. Taras Holotyak (Computer Science), Sohrab Ferdowsi (Computer Science), Denis Ullman, Prof. Sviatoslav Voloshynovskyy

Swiss Digital Day
Geneva
2017 November 21th

Dr. Tarras Holotyak (Computer Science), Artiom Missiri (Alumni CUI student), Dinara Sanikidze (Alumni CUI student)

Swiss Digital Day
Geneva
2017 November 21th

Prof. Giovanna Di Marzo Serugendo (CUI director), Alain Berset (2018 Confederation President)

illustrations

CUI UNIGE

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