



RESEARCH CENTER
Grenoble - Rhône-Alpes

FIELD

Activity Report 2018

Section Highlights of the Team

Edition: 2019-03-07

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ARIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Damien Stehlé was nominated IUF junior member.

5.1.2. Book

Publication of the second edition of the “Handbook of Floating-Point Arithmetic” [43].

BEST PAPERS AWARDS :

[42]

G. VILLARD. *On Computing the Resultant of Generic Bivariate Polynomials*, in "ISSAC 2018, 43rd International Symposium on Symbolic and Algebraic Computation, New York, USA, July 16-19, 2018", New York, United States, July 2018, <https://hal.archives-ouvertes.fr/hal-01921369>

CASH Team

5. Highlights of the Year

5.1. Highlights of the Year

- CASH has been validated as a *équipe projet commune* (EPC) by the *comité des projets*.
- We designed a dataflow transformation which always recovers all the FIFO in our dataflow model (DPN) after a loop tiling [1], [9], a program transformation widely used in automatic parallelization. This is an important enabling transformation which reinforces DPN as an intermediate representation in the CASH HLS project.
- We obtained new results on the comparison between different forms of synchronisation on futures, bringing a better understanding on the impact dataflow synchronisation and future typing on program synchronisation.

CONVECS Project-Team (section vide)

CORSE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Christodoulis, G., Broquedis, F., Muller, O., Selva, M., Desprez, F., *An FPGA target for the StarPU heterogeneous runtime system*. ReCoSoC 2018

BEST PAPERS AWARDS :

[25]

G. CHRISTODOULIS, M. SELVA, F. BROQUEDIS, F. DESPREZ, O. MULLER. *An FPGA target for the StarPU heterogeneous runtime system*, in "13th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (RECOsoc 2018)", Lille, France, IEEE, July 2018, p. 1-8, <http://hal.univ-grenoble-alpes.fr/hal-01858951>

DATASPHERE Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Kavé Salamatian has been awarded in 2018 a President's International Fellowship of the Chinese Academy of Sciences.

PRIVATICS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Cédric Lauradoux, Vincent Roca with the participation of Claude Castelluccia have created a MOOC on Privacy which has been followed this year by more than 20000 persons.

SPADES Project-Team (section vide)

ELAN Team (section vide)

MISTIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Scholarships:

- Alexandre Constantin supervised by S. Girard (MISTIS) and M. Fauvel (INRA Toulouse) was granted a PhD scholarship on "Analyse de séries temporelles massives d'images satellitaires: Applications à la cartographie des écosystèmes" from CNES and the IDEX Université Grenoble Alpes – Initiatives de Recherche Stratégiques (IRS).
- Meryem Bousebata supervised by S. Girard (MISTIS) and G. Enjolras (CERAG Grenoble) was granted a PhD scholarship on "Bayesian estimation of extreme risk measures: Implication for the insurance of natural disasters" from the IDEX project named [Risk@UGA](#).

Projects:

- In the context of another IDEX project named [Data@UGA](#), a 2-year multi-disciplinary project entitled "Tracking and analysis of large population of dynamic single molecules" was granted in November 2018 to MISTIS in collaboration with the GIN, coordinated by F. Forbes (MISTIS) and V. Stoppin-Mellet (GIN).

Editorial and publishing activities:

- A new book entitled *Handbook of mixture analysis*, edited at CRC Press by Gilles Celeux (Inria), Sylvia Frühwirth-Schnatter (Wien University), and Christian P. Robert (Université Paris-Dauphine) is now available (December 2018). Florence Forbes and Julyan Arbel have written 2 of the chapters in the book [49], [51].
- Marianne Clausel and Jean-Baptiste Durand co-published a chapter [48] on generative models in data science in the book *Data Science. Cours et exercices*, edited by Eyrolles (Paris).
- Stéphane Girard and Julyan Arbel have co-edited a book of proceedings following the Summer School Stat4Astro they organized in Autrans in 2017 [64].

New appointments:

- Stéphane Girard has been hired as a research collaborator by the CMAP (Centre de Mathématiques Appliquées de l'école Polytechnique) in the context of the Chair Stress Test, RISK Management and Financial Steering, led by the French Ecole polytechnique and its Foundation and sponsored by BNP Paribas.

NANO-D Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- This year we have very successfully participated in the blind assessment of protein structure prediction methods exercise **CASP13**. We have evaluated the performance of several knowledge-based potentials for protein model quality and protein docking, small-angle scattering approaches Pepsi-SAXS and Pepsi-SANS, cross-linking developments, methods based on normal mode analysis and more. Our team was ranked 1st in three data-assisted CASP13 sub-challenges (SAXS, SANS, and crosslinks), and got into the top-10 predictors in the main category of the prediction of regular targets. We were also interviewed on this subject by the Le Figaro newspaper [88].
- The OneAngström startup was created this year around the development of the SAMSON software platform. Four team members have joined the startup : Stephane Redon, Jocelyn Gate, Dmitriy Marin, and Yassine Naimi.
- Our Ananas analytical symmetry detection method [70] was used in the official assessment of protein assemblies in CASP13 and was also transferred to the PDBe European resource for the collection, organisation and dissemination of data on biological macromolecular structures [30].

4.1.1. Awards

- Our paper "Analytical symmetry detection in protein assemblies. II. Dihedral and cubic symmetries" covered the September 2018 issue of the Journal of Structural Biology [20].
- Our paper "A novel fast Fourier transform accelerated off-grid exhaustive search method for cryo-electron microscopy fitting" covered the the August 2017 issue of Journal of Applied Crystallography [58].
- Our paper "NOLB: Nonlinear Rigid Block Normal Mode Analysis Method" covered May 2017 issue of Journal of Chemical Theory and Computation [57].
- Our predictions were ranked 1st in the SAXS-assisted category of the CASP13 protein structure prediction challenge (**cumulative SAXS-assisted z-scores**).
- Our predictions were ranked 1st in the SANS-assisted category of the CASP13 protein structure prediction challenge (**cumulative SANS-assisted z-scores**).
- Our predictions were ranked 1st in the X-link-assisted category of the CASP13 protein structure prediction challenge (**cumulative X-link-assisted z-scores**).

NECS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The team organized the international ERC Scale-FreeBack workshop on “Analysis and Control of Large-Scale Complex Networks”, Grenoble, September 10-11th, 2018 (<http://scale-freeback.eu/workshop-on-analysis-and-control-of-large-scale-complex-networks-10-11-sept-2018-grenoble/>)
- P. Frasca is Senior Member of the IEEE

TRIPPO Team (section vide)

AIRSEA Project-Team (section vide)

BEAGLE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

We had several remarkable publications in 2018, including 3 in the highest standard journals and 2 best paper awards.

Cui Y, Yang Y, Ni Z, Dong Y, Cai G, Foncelle A, Ma S, Sang K, Tang S, Li Y, Shen Y, Berry H, Wu S and Hu H (2018). Astroglial-Kir4.1 in Lateral Habenula Drives Neuronal Bursts to Mediate Depression. *Nature* 554:323-327 [15]

Davin AA, Tannier E, Williams TA, Boussau B, Daubin V, Szollosi GJ (2018) Gene transfers can date the tree of life, *Nature ecology and evolution*, vol. 2 pp.904-909. [16]

Berta Verd, Erik Clark, Karl R Wotton, Hilde Janssens, Eva Jiménez-Guri, Anton Crombach, Johannes Jaeger (2018) A damped oscillator imposes temporal order on posterior gap gene expression in *Drosophila* *PLoS biology* 16 (2), e2003174 [35]

5.1.1. Awards

BEST PAPERS AWARDS :

[28]

V. F. LIARD, D. P. PARSONS, J. ROUZAUD-CORNABAS, G. BESLON. *The Complexity Ratchet: Stronger than selection, weaker than robustness*, in "ALIFE 2018 - the 2018 conference on artificial Life", Tokyo, Japan, July 2018, p. 1-8 [DOI : 10.1162/ISAL_A_00051], <https://hal.archives-ouvertes.fr/hal-01882628>

[26]

S. PEIGNIER, C. RIGOTTI, A. ROSSI, G. BESLON. *Weight-based search to find clusters around medians in subspaces*, in "SAC 2018 - ACM Symposium On Applied Computing", Pau, France, Proceedings of the 33rd ACM Symposium On Applied Computing, April 2018, p. 1-10, <https://hal.archives-ouvertes.fr/hal-01869974>

DRACULA Project-Team (section vide)

ERABLE Project-Team (section vide)

IBIS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Two new projects with participation from IBIS started this year: the ANR project RIBECO and the IXXI project MuSE (Section 7.2). The web application WellInverter was made available through the new cloud of the French Institute of Bioinformatics (IFB) (Section 5.2). A publication summarizing several conference contributions on the stochastic modeling and inference of gene regulatory networks was published in the main control journal *Automatica* this year [16].

MOSAIC Team

4. Highlights of the Year

4.1. Highlights of the Year

The year 2018 was marked by the following events:

- **Creation of the team.** The team MOSAIC started in January 2018 at the Inria Grenoble Rhône-Alpes Research Center and is part of the laboratoire de reproduction des plantes (RDP research unit) at ENS de Lyon campus. Romain Azaïs joined the team in March 2018 and Guillaume Cerutti was hired as an Inria research engineer in September 2018.
- **Edition of *Statistical Inference for Piecewise-deterministic Markov Processes*.** Piecewise-deterministic Markov processes form a class of stochastic models with a sizeable scope of applications. Such processes are defined by a deterministic motion punctuated by random jumps at random times, and offer simple yet challenging models to study. The issue of statistical estimation of the parameters ruling the jump mechanism is far from trivial. Responding to new developments in the field as well as to current research interests and needs, the book “Statistical Inference for Piecewise-deterministic Markov Processes” edited by Romain Azaïs and Florian Bouguet [10] gathers 7 chapters by different authors on the topic. The idea for this book stemmed from a workshop organized in Nancy in the 2016-17 winter.
- **Invited talk at the Jacques Monod conference in Roscoff.** Christophe Godin was invited in Sep 2018 at the prestigious Jacques Monod series of international conferences in Roscoff, France, to present an overview of the current research on phyllotaxis. The talk was entitled *Phyllotaxis at the era of molecular and computational biology: the revival of an old enigma* and prepared with Teva Vernoux.
- **First prototype of the software platform Gnomon.** A first, fully functional, prototype of the Gnomon software platform, dedicated to the modeling and simulation of plant and animal morphogenesis, was developed during a series of intensive coding sessions in Lyon and Sophia-Antipolis. This new concept of platform dedicated to the study of morphogenesis was presented in November 2018 to a panel of modelers and biologists at the RDP lab, who will contribute next year to the further testing and refining the platform. This prototype is a clear milestone and results from a strong collaboration between the Inria software engineering group from Sophia-Antipolis (who provides the software architecture kernel - DTK) and the Mosaic team and is supported by Inria (Action de Développement Technologique, ADT).

NUMED Project-Team (section vide)

STEPP Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

The STEEP research team has initiated in 2016 a series of conferences-debates entitled “Understanding & Acting” (« Comprendre et agir ») that examines sustainability issues in order to help researchers and citizens to increase their awareness of the various issues at stake in order to initiate relevant individual and collective actions. The presentations are captured on video and then made directly accessible on the YouTube Channel “Comprendre et Agir”. At the end of 2018 the YouTube channel reached more than **150,000 views with a rate of integral viewings remaining at above 25%**. This rate is quite important since the YouTube videos of the conferences last between 35 and 45 minutes. Our Youtube channel now has more than 2000 subscribers.

AGORA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Walid Bechkit holds the PEDR (2017-2021).
- Khaled Boussetta obtained his HDR from the University Paris 13, in December 2018.
- Khaled Boussetta holds the PEDR (2018-2022).
- Khaled Boussetta was promoted MCF *Hors Classe* in September 2018.
- Hervé Rivano holds the PEDR (2017-2021).
- Razvan Stanica holds the PEDR (2016-2020).
- Pascale Vicat Blanc joined Agora as Inria Senior Researcher, in September 2018.

AVALON Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Henri Casanova, Arnaud Legrand, Martin Quinson and Frédéric Suter. "SMPI Courseware: Teaching Distributed-Memory Computing with MPI in Simulation" received the "Best Paper Award" of the Workshop on Education for High-Performance Computing (EduHPC-18).
- Anchen Chai, Sorina Camarasu-Pop, Tristan Glatard, Hugues Benoit-Cattin and Frédéric Suter. "Evaluation through Realistic Simulations of File Replication Strategies for Large Heterogeneous Distributed Systems" received the "Best Workshop Paper on Heterogenous Systems" of the 24th International European Conference on Parallel and Distributed Computing (EuroPar'2018).

BEST PAPERS AWARDS :

[15]

H. CASANOVA, A. LEGRAND, M. QUINSON, F. SUTER. *SMPI Courseware: Teaching Distributed-Memory Computing with MPI in Simulation*, in "EduHPC-18 - Workshop on Education for High-Performance Computing", Dallas, United States, November 2018, p. 1-10, <https://hal.inria.fr/hal-01891513>

[17]

A. CHAI, S. CAMARASU-POP, T. GLATARD, H. BENOIT-CATTIN, F. SUTER. *Evaluation through Realistic Simulations of File Replication Strategies for Large Heterogeneous Distributed Systems*, in "EuroPar 2018 - 24th International European Conference on Parallel and Distributed Computing ; Workshop HeteroPar 2018", Turin, Italy, Lecture Notes in Computer Science (LNCS), August 2018, forthcoming, <https://hal.archives-ouvertes.fr/hal-01887369>

CTRL-A Project-Team (section vide)

DANTE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Machine Learning & Data Science for Complex and Dynamical Models

The Dante team is part of a consortium (including the LIP, the Physics Lab from ENS de Lyon, the LabHC from U. Jean Monnet and LIRIS from U. Lyon 1) that got funded a 4 years project within the call “Scientific Breakthrough” of **IDEX de Lyon**.

With a total envelope of 1.2M euros, the project "mACHine LeArning & Data sciEnce for coMplex and dynamIcal models" (ACADEMICS) combines **Machine Learning (ML) and Data Science (DS)** for the purpose of scientific research into two challenging directions:

1. **Computing and information processing** – develop new theoretical frameworks and learning algorithms adapted to difficult scientific contexts involving heterogeneous, irregular, error-prone, dynamic and complex data, while taking into account prior knowledge whenever it is relevant.
2. **Complex and dynamic models learning** – leverage the synergy between ML and DS to devise data-driven models in two scientific domains: **climate modeling**, and **quantitative understanding of social systems**. Focusing on these two case studies, the project will tackle the key issue of how to learn intricate models from numerous, heterogeneous and dynamic data.

The **research program** is elaborated along specific scientific issues that can reasonably lead to significant results within the 3-year lifetime of the project. The two case studies are instrumental to frame the way ML and DS can combine to yield relevant models. The methodological axes are:

- **Representation and model learning for complex data:** How to find sparse latent spaces for complex data or graphs, and how to learn compressed models? How to identify exceptional phenomena?
- **Estimation and learning from multi-source and/or dynamic data:** How to transfer a model learned from *source* data to related but different *target* data? How to learn from multi-source complex data?
- **Distributed and adaptive machine learning for graphs and complex models:** How to design distributed optimization-based learning? How to develop adaptive and distributed model inference in high dimension?

In close connexion with these methodological questions, the climate modeling use-case raises the central interrogation of **how to learn effective dynamic models**, firstly in a nonparametric way by means of ML tools and secondly, by mixing several data sources (from observations and simulations). As for computational social science, the challenge is **to embed together in ML approaches, individual features, global structures and dynamics of social networks**. The goal here, is to benefit from their complementarity to infer latent correlations, to identify behavioral mechanisms and to better model emergent social phenomena.

5.1.2. Books on Dynamic Networks by Márton Karsai

After a book chapter on *Control Strategies of Contagion Processes in Time-varying Networks* in Temporal Network Epidemiology in collaboration with Nicola Perra [65], a full book on *Bursty Human Dynamics* was just released at the end of the year in collaboration with Hang-Hyun Jo and Kimmo Kaski [40].

5.1.3. Awards

- Márton Karsai received the Junior Scientific Award of the Complex System Society, Sept. 2018.
- Márton Karsai, awarded Fellow of the ISI Foundation (Torino, Italy), 2018.
- Samuel Unicomb (PhD of Márton Karsai) obtained the best poster award at the NetSci’18 conference in Paris in June 2018.

DATAMOVE Project-Team (section vide)

POLARIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Bruno Gaujal joined the scientific committee of the GDR IM (Informatique Mathématique).
- Arnaud Legrand co-created a MOOC on “Recherche reproductible : principes méthodologiques pour une science transparente” hosted on the FUN platform <https://www.fun-mooc.fr/courses/course-v1:inria+41016+session01bis/about>.

5.1.1. Awards

- The paper by Nicolas Gast and co-authors received the Best Paper Award at ACM SIGMETRICS 2018.
- The paper by Patrick Loiseau and co-authors was nominated for the Best Paper Award at ACM FAT* 2018.
- The work on “Multi-Agent Online Learning with Imperfect Information” by Panayotis Mertikopoulos and co-authors was shortlisted for the INFORMS George Nicholson Best Student Paper Award.
- Panayotis Mertikopoulos received an Outstanding Reviewer Award at NIPS 2018.
- Benjamin Roussillon was co-laureate of the “Prix de mémoire de master 2018 en RO/AD” (best MSc thesis in operations research) from ROADEF for his Master thesis on “Development of adversarial classifiers using Bayesian games” under the supervision of Patrick Loiseau.

BEST PAPERS AWARDS :

[24]

N. GAST, B. V. HOUDT. *A Refined Mean Field Approximation*, in "ACM SIGMETRICS 2018", Irvine, France, June 2018, 1, <https://hal.inria.fr/hal-01891642>

[30]

T. SPEICHER, M. ALI, G. VENKATADRI, F. RIBEIRO, G. ARVANITAKIS, F. BENEVENUTO, K. P. GUMMADI, P. LOISEAU, A. MISLOVE. *Potential for Discrimination in Online Targeted Advertising*, in "FAT 2018 - Conference on Fairness, Accountability, and Transparency", New-York, United States, February 2018, vol. 81, p. 1-15, <https://hal.archives-ouvertes.fr/hal-01955343>

ROMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Anne Benoit was the program chair of 32nd IEEE IPDPS conference (IEEE International Parallel & Distributed Processing Symposium), held in Vancouver, Canada, May 21–25, 2018.
- Bora Uçar was the general chair of 32nd IEEE IPDPS conference (IEEE International Parallel & Distributed Processing Symposium), held in Vancouver, Canada, May 21–25, 2018.

5.1.1. Awards

BEST PAPERS AWARDS :

[29]

T. HÉRAULT, Y. ROBERT, A. BOUTEILLER, D. ARNOLD, K. B. FERREIRA, G. BOSILCA, J. DON-GARRA. *Optimal Cooperative Checkpointing for Shared High-Performance Computing Platforms*, in "APDCM", Vancouver, Canada, 2018, <https://hal.inria.fr/hal-01968441>

SOCRATE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Various

Two new workshop organized by the team in relation with CorteXlab:

- First French GNU Radio days: <https://gnuradio-fr-18.sciencesconf.org/>
- ISP-IoT : First Winter School on Information Theory and Signal Processing for Internet of Things : <https://isp-iot.sciencesconf.org>

4.1.2. Awards

The PhD of Victor Quintero (former PhD in Socrate) received the best PhD award in the area of digital society in Nov 2018.

Samir M. Perlaza is Visiting Research Collaborator (Honorific Position) Oct. 2018; Term 2018 - 2019. Department of Electrical Engineering, Princeton University

Samir M. Perlaza has been awarded a “Make our Planet Great Again” Fellowship, Sep. 2018 by Embassy of France in the United States of America and Thomas Jefferson Foundation in New York, NY.

The article *Karatsuba with Rectangular Multipliers for FPGAs* , presented by Florent de Dinechin, obtained the Best Paper Award of the Arith 2018 conference in Amherst, MA.

BEST PAPERS AWARDS :

[17]

M. KUMM, O. GUSTAFSSON, F. DE DINECHIN, J. KAPPAUF, P. ZIPF. *Karatsuba with Rectangular Multipliers for FPGAs*, in "ARITH 2018 - 25th IEEE International Symposium on Computer Arithmetic", Amherst, United States, IEEE, June 2018, p. 13-20, Best paper award [DOI : 10.1109/ARITH.2018.8464809], <https://hal.inria.fr/hal-01773447>

Chroma Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Best student paper, 15th International Conference on Control, Automation, Robotics and Vision, Nov 2018, Singapore, Singapore (ICARCV 2018), Pavan Vasishtha, Dominique Vaufreydaz, Anne Spalanzani

5.1.2. Other highlights of 2018

- Success for several project applications in the field of Autonomous Vehicles : ANR "Hianic", PIA Ademe "CAMPUS", FUI "STAR" and "TORNADO".
- In 2018, Chroma published several papers in Artificial Intelligence A+ ranked conferences: CVPR [21], NIPS [27], ICML [26], AAMAS [32].
- Strong involvement of Chroma in the IEEE/RSJ IROS 2018 Conference (Madrid, October 2018, more than 4000 people): C. Laugier was Program co-chair and co-organized three interconnected events on Autonomous Vehicles: a one day Workshop having attracted more than 360 people ⁰, an Industrial Forum involving international companies (e.g. Renault, Nvidia, Baidu, EasyMile, Ambarella, etc) and having attracted about 80 people, and an Autonomous Vehicles Demonstration involving 5 international teams (including Chroma with our Autonomous Renault Zoe car) ⁰ [46].
- First participation to the international RoboCup competition (Montréal, Juin, 2018) : we created the 'LyonTech' team to compete in the robocup@Home Pepper league. We ranked 5th over 21 participants. LyonTech is composed of members from Chroma (F. Jumel, L. Matignon, J. Saraydaryan, O. Simonin, C. Wolf) and two engineers from CPE Lyon (R. Leber) and LIRIS lab/CNRS (E. Lombardi). In October 2018, we qualified for the next RoboCup final, to be organized in Sydney, on July 2019.
- Participation in several International Award Committees (C. Laugier): Several IEEE/RSJ IROS 2018 Award Committees (Best Paper Award, Fellow Award, Harashima Award, Distinguished Service Award, Young Professional Award), IEEE ICARCV 2018 Best Paper Award Committee, IEEE Chapter Award Committee 2018.
- French Robotics GDR : co-animation of the new GT « Apprentissage et Robotique » by Christian Wolf (with David Filiat), started in November 2018 ; O. Simonin will chair, with F. Charpillat (Inria Larsen), the next National Conference on Robotics Research (JNRR), on October 2019.

BEST PAPERS AWARDS :

[36]

P. VASISHTA, D. VAUFREYDAZ, A. SPALANZANI. *Building Prior Knowledge: A Markov Based Pedestrian Prediction Model Using Urban Environmental Data*, in "ICARCV 2018 - 15th International Conference on Control, Automation, Robotics and Vision", Singapore, Singapore, November 2018, p. 1-12, <https://arxiv.org/abs/1809.06045> , <https://hal.inria.fr/hal-01875147>

⁰See website: <http://project.inria.fr/ppniv18>

⁰see website: <http://avdemo.car.upm-csic.es/>

IMAGINE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This is a transition year where the team has been actively involved in starting new projects with new PhD students along new research directions, which will be further emphasized in the future team ANIMA, due to start after the termination of the IMAGINE team in July 2019.



Figure 1. Filming rehearsals of Jean-Francois Peyret's La fabrique des monstres, Théâtre de Vidy, Lausanne, January 2018.

We are now actively involved in the Performance Lab, a joint cross-disciplinary research program of IDEX Univ. Grenoble Alpes. In this new project started in January 2018 for three years, we will investigate "digital dramaturgies" mixing real-time computer graphics, augmented and virtual reality with live performances. We will also continue to develop our Kino Ai video capture, analysis and editing system.

As a follow-up to ADT ULTRAHD, we recorded three weeks of rehearsals from the play "La fabrique des monstres", a theatre adaptation of Mary Shelley's Frankenstein by Jean-Francois Peyret (Fig. 1). Our Kino Ai system was used to automatically generate six hours of cinematographic rushes from those recordings. Those rushes were edited by professional film editors into three short documentaries and published online (see [episode 1](#), [episode 2](#) and [episode 3](#) to watch the full movies).

5.1.1. Awards

In December 2018, PhD laureate Guillaume Cordonnier was awarded the prestigious ETH Zurich Postdoctoral Fellowship and will join the Computer Graphics Lab's simulation group in 2019.

5.1.2. Patents

As part of Youna Le Vaou's CIFRE PhD thesis with PSA, we filed a joint patent application:

Y La Vaou, S Masfrand, M Mika, S Hahmann, J-C Léon: Procédé de modification de la forme d'un objet virtuel tridimensionnel représenté dans un espace immersif et système immersif mettant en œuvre ledit procédé, December 2018.

This new result will also be submitted for publication at an international conference in 2019.

MAVERICK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- the paper "MNPR: A Framework for Real-Time Expressive Non-Photorealistic Rendering of 3D Computer Graphics" [13], co-authored by Santiago Montesdeoca, Hock Soon Seah, Amir Semmo, Pierre Bénard, Romain Vergne, Joëlle Thollot and Davide Benvenuti, has received the "Best Paper Award" during the conference Expressive 2018.
- the paper "High-performance By-Example Noise using a Histogram-Preserving Blending Operator" [4], co-authored by Eric Heitz and Fabrice Neyret, has received the "Best Paper Award" during the conference High-performance Graphics 2018.
- the paper "A New Microflake Model with Microscopic Self-Shadowing for Accurate Volume Downsampling" [5], co-authored by Guillaume Loubet and Fabrice Neyret, has received the "Best Paper Award" during the conference Eurographics 2018.

MOEX Project-Team (section vide)

MORPHEO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

MORPHEO created holograms for an augmented reality application developed for the clothing retailer Zara. This application enables the brand's customers to enjoy a virtual and interactive shopping experience via their smartphones in one of the 120 stores across the world taking part in this experiment. Last January, all of the holograms presented in the Zara AR application were captured using the Kinovis 4D platform. The challenge with regard to the acquisition of the 12 sequences created was to accurately reproduce the models in sweeping movements and with complex clothing effects due to the materials and styles chosen.

PERCEPTION Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- As an ERC Advanced Grant holder, Radu Horaud was awarded a Proof of Concept grant for his project Vision and Hearing in Action Laboratory (VHIALab). The project started in February 2018 for a duration of 12 months. Software packages enabling companion robots to robustly interact with multiple users are being developed.
Website: <https://team.inria.fr/perception/projects/poc-vhialab/>
- The 2018 winner of the prestigious ACM Special Interest Group on Multimedia (SIGMM) Rising Star Award is Perception team member Dr. Xavier Alameda-Pineda. The award is given in recognition of Xavier's contributions to multimodal social behavior understanding.
Website: http://sigmm.org/news/sigmm_rising_star_award_2018
- A book was published by Academic Press (Elsevier), entitled "Multimodal Behavior Analysis in the Wild", co-edited by Xavier Alameda Pineda, Elisa Ricci (Fondazione Bruno Kessler and University of Trento) and Nicu Sebe (University of Trento). The book gathers 20 chapters written by 75 researchers from all over the world [53].

PERVASIVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

James Crowley has received the ICMI Sustained Achievements award at the 2018 International Conference on Multimodal Interaction at Boulder Colorado in Oct. 2018.

THOTH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Alberto Bietti received the Jean-Claude Dodu 2018 prize at Journées SMAI-MODE, Autrans.
- Pauline Luc was one of the top-200 reviewers at NeurIPS 2018.
- Grégory Rogez and Cordelia Schmid received an Amazon Academic Research Award.
- Cordelia Schmid received the Koenderink prize for fundamental contributions in computer vision that have withstood the test of time at ECCV 2018.

5.1.2. Dissemination

- The team co-organized PAISS 2018, an international AI summer school in Grenoble. This event brought together 200 participants representing 44 different nationalities. The participants were selected from 700 applications, with 60% students, 15% academics, and 25% industrials. 25% of these participants were women.

TYREX Project-Team (section vide)