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## Program for Thurs 22 Sep (Chair: Zhenyu Liao)

- 9:00–9:10** Welcome speech, **Robert C. Qiu**, IEEE Fellow, EIC, HUST
- 9:10–9:50** Robust statistics and clustering - Application to signal and image processing, **Frédéric Pascal**, CentraleSupélec, Paris-Saclay
- 9:50–10:30** Context-Tree-Based Lossy Compression, **Sheng Yang**, CentraleSupélec, Paris-Saclay
- 10:30–10:40** Virtual Coffee Break
- 10:40–11:20** Learning without labels on multivariate biosignals: From unsupervised to self-supervised learning, **Alexandre Gramfort**, Inria Saclay, Paris-Saclay
- 11:20–12:00** Identifying, prediction, and control in non-Gaussian stochastic dynamical systems, **Ting Gao**, Dept. Math, HUST

## Program for Fri 23 Sep (Chair: Yacine Chitour)

- 9:00–9:05** Brief introduction, **Yacine Chitour**, L2S, Paris-Saclay
- 9:05–9:45** Topological Data Analysis to improve learning models: an introduction and a few examples, **Frédéric Chazal**, Inria Saclay, Paris-Saclay
- 9:45–10:25** Unrolled Variational Bayesian Algorithm for Image Blind Deconvolution, **Émilie Chouzenoux**, Inria Saclay, Paris-Saclay
- 10:25–10:40** Virtual Coffee Break
- 10:40–11:20** Modelling crowd behavior through mean field games, **Guilherme Mazanti**, Inria Saclay, Paris-Saclay
- 11:20–12:00** Conditional gradient method for mean-field type problems, **Laurent Pfeiffer**, Inria Saclay, Paris-Saclay

## Contact and Thanks

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# HUST-UPSaclay Workshop on “Mathematics for Data Science”

September 22-23, 2022, Online

Zoom Meeting ID: 899 8850 3630

Password: 807842

9:00-12:00 Paris time

15:00-18:00 Beijing time

Co-organized by

Huazhong University of Science and Technology (HUST), China

and

Université Paris-Saclay (UPSaclay), France

## Biographies of the speakers (Thurs 22 Sep)

**Frédéric Pascal** is Full Professor in AI at L2S lab, CentraleSupélec, University Paris-Saclay. Between March 2008 and December 2011 (resp. Jan. 2012 – Dec. 2013), he was an Assistant Professor (resp. Associate Professor) in SONDRRA, CentraleSupélec. Between Aug. 2013 and Aug. 2014, he was a Visiting Associate Professor in the ECE department at the National University of Singapore. Between Jan. 2017 and Dec. 2018, he was the head of the “Signals and Statistics” group of L2S. Since Dec. 2019, he has been the coordinator of activities in artificial intelligence at CentraleSupélec, and the chairholder of the Givaudan chair on data sciences. Since Sept. 2017, he is in the executive committee of the DATAIA institute as the Program Coordinator, and he was appointed as Co-Director of the institute in April 2021. Between 2019 and 2021, he is the Vice Chair of the Data Science Initiative of the IEEE Signal Processing Society. Frederic Pascal served as an Associate Editor for the IEEE Transactions on Signal Processing (2015-2018), for the EURASIP Journal on Advances in Signal Processing (2015-2021) and for Elsevier Signal Processing (2018-2021). His research interests contain estimation, detection and classification for statistical signal processing and applications in radar and image processing. He is the author/coauthor of more than one hundred papers in the top journals and conferences in Signal Processing, Image Processing and Statistics.

**Sheng Yang** received the B.E degree in electrical engineering from Shanghai Jiaotong University, China, in 2001, and both the engineer degree and the M.Sc. degree in electrical engineering from Telecom ParisTech, France, in 2004, respectively. In 2007, he obtained his Ph.D. from Université de Pierre et Marie Curie. From October 2007 to November 2008, he was with Motorola Research Center in Gif-sur-Yvette, France, as a senior staff research engineer. Since December 2008, he has joined CentraleSupélec, Paris-Saclay University, where he is currently a full professor. From April 2015, he also holds an honorary associate professorship in the department of electrical and electronic engineering of the University of Hong Kong. He received the 2015 IEEE ComSoc Young Researcher Award for the Europe, Middle East, and Africa Region. He was an associate editor of the IEEE transactions on wireless communications from 2015 to 2020. He is currently an associate editor of the IEEE transactions on information theory.

**Alexandre Gramfort** is a research director at Inria since 2017, the French national institute for digital sciences. He was formerly Assistant Professor at Telecom Paris, Institut Polytechnique de Paris. His field of expertise is statistical machine learning, signal processing and scientific computing applied primarily to multivariate signals in neuroscience. His work is strongly interdisciplinary at the interface with statistics, computer science, convex optimization, software engineering and neuroscience. He is known for his work on the scikit-learn open source software that he contributed to write since 2010 at Inria, as well as the MNE-Python software that he started while at Harvard in 2011. In 2015, he was awarded an ERC Starting Grant. His current research interests are related to self-supervised learning, automatic data augmentation, contrastive learning and multiview learning.

**Ting Gao** obtained her Ph.D. from Illinois Institute of Technology in 2015. She has worked as a senior data scientist and machine learning algorithm engineer in the big data product development department of MZ, a famous US hand game company and Twitter, a social network company. She has developed several recommendation systems based on deep reinforcement learning and deep learning, as well as real-time bidding models for online learning of big data streams. Now she is with the School of Mathematics and Statistics of Huazhong University of Science and Technology, and her main research interests include the identification of non-Gaussian stochastic dynamical systems, prediction and optimal control of effective dynamics, and applications in information communication and financial mathematics. She has published in Chaos and SIAM series journals.

## Biographies of the speakers (Fri 23 Sep)

**Frédéric Chazal** is Directeur de Recherche (senior researcher) at INRIA Saclay Ile-de-France since 2007 and the head of the DATAIA Institute at Université Paris-Saclay since 2021. After a Ph.D. in pure mathematics, he oriented his research to computational geometry and topology for data sciences. He is leading the DataShape team at INRIA, a group working on Topological Data Analysis, a recent and rapidly growing field at the crossing of mathematics, statistics, machine learning and computer science. Frederic’s contributions to the field go from fundamental mathematical aspects to algorithmic and applied problems. He published more than 90 papers in major computer sciences conferences and mathematics journals, he co-authored 2 reference books and 3 patents. He is the Editor-in-Chief of the Journal of Applied and Computational Topology, and he is or has been, also an associate editor of 3 other international journals: Discrete and Computational Geometry, SIAM Journal on Imaging Science, Graphical Models. During the last few years Frederic has been heading several national and international research projects on geometric and topological methods in statistics, machine learning and AI. He is also the scientific head of joint industrial research projects between Inria and several companies such as Fujitsu or the French SME Sysnav.

**Émilie Chouzenoux** received the engineering degree from Ecole Centrale, Nantes, France, in 2007, and the Ph.D. degree in signal processing from the Institut de Recherche en Communications et Cybernétique (IRCCyN, UMR CNRS 6597), Nantes, in 2010. Between 2011 and 2019, she was a Maître de conférences at the University of Paris-Est Marne-la-Vallée, Champs-sur-Marne, France (LIGM, UMR CNRS 8049). Since September 2019, she has been a Researcher at Inria Saclay, in CVN lab at CentraleSupélec, University Paris Saclay, France. She is an Associated Editor of IEEE Transactions in Signal Processing, and of SIAM Journal on Mathematics of Data Science. Since January 2020, she has been the PI of the ERC Starting Grant MAJORIS. Her research interests are in large scale optimization algorithms for inverse problems and machine learning problems of image processing.

After his Engineering degrees from the São Carlos School of Engineering, University of São Paulo, Brazil, and from École Polytechnique, France, **Guilherme Mazanti** obtained his Master’s degree on Applied Mathematics at École Polytechnique in 2013 and his Ph.D. on Applied Mathematics also at École Polytechnique, University Paris-Saclay, in 2016, after defending his thesis on the stability and control of linear switched systems in finite and infinite dimensions. From September 2016 until August 2019, he was a postdoctoral fellow at the Laboratory of Mathematics of Orsay, University of Paris-Sud, working mostly on the analysis of minimal-time mean field games. From September 2019 until September, 2020, he was a postdoctoral researcher in a joint project of the Polytechnic Institute of Applied Sciences, of Inria Saclay, and of CentraleSupélec’s Laboratory of Signals and Systems (L2S), working on the stabilization of time-delay systems. He is currently a researcher at Inria, at the Saclay research center, and part of the team “Dynamical Interconnected Systems in Complex Environments”. He is also a member of the L2S at CentraleSupélec. His main research interest is on control theory, with several research topics lying between applied mathematics and engineering, such as stabilization and asymptotic behavior of time-delay systems, control and stabilization of hyperbolic PDEs, mean field games, and switched systems.

**Laurent Pfeiffer** received an engineering degree, a master degree, and a doctorate in applied mathematics from Ecole Polytechnique (Palaiseau, France) in 2009, 2010, and 2013. He was post-doc at Inria Sophia-Antipolis and then assistant professor at the University of Graz (Austria) from 2014 to 2019. He has been a researcher at Inria Saclay since 2019. He is a member of the DISCO Inria-team at the Laboratory of Signals and Systems at CentraleSupélec and teaches at Ensta-Paris. His research focuses on the analysis and the numerical resolution of optimal control problems and mean field games.