Curriculum Vitae

Zhenyu LIAO

Present Address
CentraleSupélec, L2S
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Personal information
Date of Birth: 28/08/1992
Sex: Male
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Education

- **Ph.D.** in Statistics and Machine Learning, L2S, CentraleSupélec, France 2016-present
  - Thesis: A Random Matrix Approach to Deep Neural Networks Analysis.
  - Supervisors: Prof. Romain Couillet, Prof. Yacine Chitour.
- **M.Sc.** in Signal and Image Processing, CentraleSupélec/Paris-Sud (11), France 2014-2016
- **B.Sc.** in Electronic Engineering, Paris-Sud (11), France 2013-2014
- **B.Sc.** in Optical & Electronic Information, HUST, Wuhan, China 2010-2014

Internship

- **Research intern,** LANEAS Group, CentraleSupélec, France. Summer 2016
  - Research intern: random matrix analysis of support vector machines.
  - Supervisor: Prof. Romain Couillet
- **Research intern,** IEF, Paris-Sud-CNRS, France. Summer 2015
  - Research intern: modeling and circuits design of a thermoelectric system.
  - Supervisors: Damien Querlioz and JérômSaint Martin
- **Intern,** FiberhomeTech, China. Summer 2014
  - Teaching assistant in a technical conference on telecommunication.
  - Supervisor: Prof. Zhiyong TAO

Tutorials and invited talks

- Invited talk on "Recent Advances in Random Matrix Theory for Machine Learning and Neural Nets", workshop of the Matrix series on "Random matrix theory faces information era", Kraków, Poland, 2019.
- Invited talk on "Dynamical aspects of Deep Learning" (with Y. Chitour), Séminaire d'Automatique du plateau de Saclay of iCODE, Paris, France, 2019.
- Invited talk on "Recent Advances in Random Matrix for Neural Networks", workshop on deep learning theory, Shanghai Jiao Tong University, Shanghai, China, 2018.
- Tutorial on "Random Matrix Advances in Machine Learning and Neural Nets" (with R. Couillet and X. Mai), The 26th European Signal Processing Conference (EUSIPCO'18), Roma, Italy, 2018.

Teaching

- 2017-2018: Lab work of Signal and System 1, with Prof. Laurent Le Brusquet, Department of Signal and Statistics, CentraleSupélec: 54 hours.

Academic activities

Paper review

- International Conference of Machine Learning (ICML)
- IEEE Transactions on Signal Processing
- Neural Processing Letters

Publications

Conferences

- X. Mai, **Z. Liao**, "High Dimensional Classification via Empirical Risk Minimization: Improvements and Optimality", (submitted to) The 36th International Conference on Machine Learning (**ICML'19**), Long Beach, CA, USA.
- X. Mai, **Z. Liao**, R. Couillet, "A Large Scale Analysis of Logistic Regression: Asymptotic Performance and New Insights", IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP'19**), Brighton, UK, 2019.
- R. Couillet, **Z. Liao**, X. Mai, "Classification Asymptotics in the Random Matrix Regime", The 26th European Signal Processing Conference (**EUSIPCO'18**), Rome, Italy, 2018.
- **Z. Liao**, R. Couillet, "The Dynamics of Learning: A Random Matrix Approach", The 35th International Conference on Machine Learning (**ICML 2018**), Stockholm, Sweden, 2018.
- **Z. Liao**, R. Couillet, "On the Spectrum of Random Features Maps of High Dimensional Data", The 35th International Conference on Machine Learning (**ICML 2018**), Stockholm, Sweden, 2018.
- **Z. Liao**, R. Couillet, "Une Analyse des Méthodes de Projections Aléatoires par la Théorie des Matrices Aléatoires" (in French), Colloque **GRETSI'17**, Juan Les Pins, France, 2017.
- **Z. Liao**, R. Couillet, "Random Matrices Meet Machine Learning: A Large Dimensional Analysis of LS-SVM", IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP'17**), New Orleans, USA, 2017.

Journals

- Y. Chitour, **Z. Liao**, R. Couillet, "A Geometric Approach of Gradient Descent Algorithms in Neural Networks", 2018.
- C. Louart, **Z. Liao**, R. Couillet, "A Random Matrix Approach to Neural Networks", The Annals of Applied Probability (**AAP**) 28 (2), 1190-1248, 2018.
- **Z. Liao**, R. Couillet, "A Large Dimensional Analysis of Least Squares Support Vector Machines", IEEE Transactions on Signal Processing (**IEEE-TSP**) 67 (4), 1065-1074, 2019.

Research interests

- Machine Learning
- Random Matrix Theory
- Signal Processing

References

- **Prof. Romain Couillet**
  - Full Professor at CentraleSupélec, University Paris-Saclay, Paris, France.
  - Holder of the UGA IDEX GSTATS DataScience Chair at GIPSA-lab, University of Grenoble-Alpes, France.
  - Mail: romain.couillet@gipsa-lab.grenoble-inp.fr
- **Prof. Yacine Chitour**
  - Full Professor at Pairs-Sud, University Paris-Saclay, Paris, France.
  - Director of the iCODE institute, University Paris-Saclay, Paris, France.
  - Mail: yacine.chitour@l2s.centralesupelec.fr

Updated on January, 2019.
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