

# Zhenyu LIAO

## Curriculum Vitae

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📄 Male, Chinese citizen, born in 28/08/1992.  
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### Education

- 2014 **B.Sc.** Optical & Electronic Information **Huazhong university of Science and Technology**, China.
- 2014 **B.Sc.** Electronic Engineering **University Paris-Sud**, France.
- 2016 **M.Sc.** Signal and Image Processing **CentraleSupélec & University Paris-Sud**, France.
- 2019 **Ph.D.** Statistics and Machine Learning **L2S, CentraleSupélec**, France.

### Awards and prizes

- 2nd prize of the **ED STIC Ph.D. Student Award** of University Paris-Saclay.

### Tutorials and invited talks

- Invited talk on “Random Matrix Viewpoint of Learning with Gradient Descent”, **DIMACS, Workshop on Randomized Numerical Linear Algebra, Statistics, and Optimization**, Rutgers University, 2019.
- 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 institute*, Paris, France, 2019.
- Invited talk on “Recent Advances in Random Matrix for Neural Networks”, *Workshop on deep learning theory*, Shanghai Jiao Tong University, 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.

## Publications

### Papers in conference proceedings

1. **Zhenyu Liao** and Romain Couillet. On Inner-Product Kernels of High Dimensional Data (invited paper to special session). In: *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP’19)*. 2019.
2. Xiaoyi Mai, **Zhenyu Liao**, and Romain Couillet. A Large Scale Analysis of Logistic Regression: Asymptotic Performance and New Insights. In: *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP’19)*. IEEE. May 2019, pp.3357–3361.
3. Romain Couillet, **Zhenyu Liao**, and Xiaoyi Mai. Classification Asymptotics in the Random Matrix Regime (invited paper to special session). In: *The 26th European Signal Processing Conference (EUSIPCO’18)*. IEEE. Sept. 2018, pp.1875–1879.
4. **Zhenyu Liao** and Romain Couillet. The Dynamics of Learning: A Random Matrix Approach. In: *Proceedings of the 35th International Conference on Machine Learning (ICML’18)*. Vol. 80. PMLR, July 2018, pp.3072–3081.
5. **Zhenyu Liao** and Romain Couillet. On the Spectrum of Random Features Maps of High Dimensional Data. In: *Proceedings of the 35th International Conference on Machine Learning (ICML’18)*. Vol. 80. PMLR, July 2018, pp.3063–3071.
6. **Zhenyu Liao** and Romain Couillet. Random Matrices Meet Machine Learning: A Large Dimensional Analysis of LS-SVM. In: *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP’17)*. IEEE. Mar. 2017, pp.2397–2401.

### Journal papers

1. Xiaoyi Mai and **Zhenyu Liao**. High Dimensional Classification via Empirical Risk Minimization: Improvements and Optimality. (*submitted to*) *IEEE Transactions on Signal Processing* (2019).
2. Yacine Chitour, **Zhenyu Liao**, and Romain Couillet. A Geometric Approach of Gradient Descent Algorithms in Neural Networks. (*submitted to*) *Journal of Differential Equations* (2019).
3. **Zhenyu Liao** and Romain Couillet. A Large Dimensional Analysis of Least Squares Support Vector Machines. *IEEE Transactions on Signal Processing* **67**(4) (Feb. 2019), 1065–1074.
4. Cosme Louart, **Zhenyu Liao**, and Romain Couillet. A Random Matrix Approach to Neural Networks. *The Annals of Applied Probability* **28**(2) (Apr. 2018), 1190–1248.

## Peer reviewing activities

- Neural Information Processing Systems (**NeurIPS**)
- International Conference of Machine Learning (**ICML**)
- AAAI Conference on Artificial Intelligence (**AAAI**)
- International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (**CAMSAP**)
- IEEE Transactions on Signal Processing (**IEEE-TSP**)
- Neural Processing Letters (**NPL**)

## Teaching duties

2017 Signal and system 1 lab work with **Prof. Laurent Le Brusquet**, **CentraleSupélec** 54 hours.

## References

- **Prof. Romain Couillet**
  - Full Professor at CentraleSupélec, University Paris-Saclay, Paris, France.
  - Holder of the UGA IDEX GSTATS DataScience Chair, University of Grenoble-Alpes, France.
  - ✉ [romain.couillet@gipsa-lab.grenoble-inp.fr](mailto: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.
  - ✉ [yacine.chitour@l2s.centralesupelec.fr](mailto:yacine.chitour@l2s.centralesupelec.fr)