Romain Couillet (36 y/o, French)

CONTACT INFORMATION

Full Professor at ParisSaclay University
CentraleSupélec, LSS Signals and Statistics Group

3 rue Joliot-Curie
91192 Gif sur Yvette Cédex
France

Voice: (033) 624 986 976
E-mail: romain.couillet@centralesupelec.fr
WWW: romaincouillet.hebfree.org

Chair Position at Grenoble-Alpes University
Head of the UGA IDEX DataScience Chair GSTATS (Gipsa-lab)

11 rue des Mathématiques
38400 Saint-Martin d'Hères
France

Voice: (033) 624 986 976
E-mail: romain.couillet@gipsa-lab.grenoble-inp.fr
WWW: romaincouillet.hebfree.org

RESEARCH SUMMARY

Fields of interest: statistics, signal processing, machine learning, wireless communications, graph theory, random matrix theory.

Abstract: My research work consists in the theoretical analysis and the development of new algorithms in large dimensional systems, with applications to statistics, signal processing, wireless communications, statistical finance, and recently to machine learning and graph theory. My interest is mostly in the field of random matrix theory which appropriately models many such systems (multi-user MIMO systems in wireless communications, large antenna arrays in array processing, graph adjacency matrices and kernel matrices). The main findings of my work consist (chronologically) in the following: (i) in wireless communications: derivation of the capacity of MIMO-MAC systems and linearly-precoded broadcast channels with many antennas, (ii) in signal processing: derivation of improved detection and estimation methods for array processing in impulsive noise, (iii) in statistics: the analysis of the random matrix asymptotic of robust scatter estimators along with multiple applications to robust detection and estimation, and (iv) in machine learning: an original analysis framework of kernel spectral clustering algorithms for large dimensional datasets as well as a new approach to study non-linear random matrix models common to neural network modelling.

These works led to more than thirty publications in international math and engineering journals (most of them in Journal of Multivariate Analysis, IEEE Trans. on Information Theory, and IEEE Trans. on Signal Processing), more than fifty articles published in international conferences, and a 650-page book published by Cambridge University Press. In 2011, I received the best 2010 PhD thesis award delivered by EEA/GdR ISIS/GRETSI. In 2012, M. Debbah (PI) and myself received an ERC Starting Grant (project MORE), and I myself received in 2014 an ANR Young Researcher Grant (ANR4GRAPH project). In 2013, I was awarded the CNRS Bronze Medal in section "science of information and its interactions" and the IEEE ComSoc Outstanding Young Researcher prize for the Europe/Middle-East/Africa region.

PROFESSIONAL
EXPERIENCE

Université Grenoble–Alpes, Saint-Martin d'Hères, France.

GSTATS IDEX DataScience Chair Holder　　　　　**April 2018 - Present**
- Research in applied random matrix theory for large dimensional statistics and machine learning.
- Teaching in data science masters.

CentraleSupélec, Gif sur Yvette, France.

Full Professor　　　　　　　　　　　**January 2016 - Present**
Assistant Professor　　　　　　　**January 2011 - December 2015**
- Research in mathematics applied to statistics, machine learning, and signal processing.
- Teaching in undergrad, master 2 (SAR and MVA) and PhD levels.

ST-Ericsson, Sophia Antipolis, France.

Development Engineer and PhD student　　**September 2007 - December 2010**
- Research in cognitive radios, random matrix theory, probability, applied to future multiple antenna-based standards.
- Specific applications to mobile terminal synchronization, performance evaluation for the 3GPP-Long Term Evolution and 3GPP-LTE Advanced standards.

PUBLICATION
RECORD

Google scholar figures as of Feb. 2019

Overall	1 book, 3 chapters, 50+ journals, 70+ conferences, 4 patents.
Citations	$\sim$ 3000 (five best: 678, 511, 142, 101, 86)
h-index	24
i10-index	52

AWARDS

CNRS Bronze Medal.

2013 CNRS Bronze Medal in section "science of information and its interaction"
- Awarding my work in Signal Processing and Wireless Communications as a young researcher since 2008.
- *Year*: 2013.

IEEE ComSoc Young Researcher Award.

2013 IEEE ComSoc Outstanding Young Researcher Award for the EMEA Region
- Awarding my work in Communications-related topics as a young researcher since 2008.
- *Year*: 2013.

Best PhD Thesis Award.

EEA/GdR ISIS/GRETSI 2011 Award of the Best 2010 Thesis
- "Application of random matrix theory to future wireless flexible networks"
- *Year*: 2011.

Best Student Paper Award.

Best Student Paper Award of EUSIPCO 2019 conference

- "Random Matrix-Improved Estimation of the Wasserstein Distance between two Centered Gaussian Distributions"
- *Recipients*: T. Malik, R. Couillet.
- *Year*: 2019.

Best Student Paper Award.

Second prize of the 2012-2013 IEEE Australia Council Student Paper Contest

- "Large System Analysis of Linear Precoding in MISO Broadcast Channels with Confidential Messages"
- *Recipients*: G. Geraci, R. Couillet, J. Yuan, M. Debbah, I. B. Collings.
- *Year*: 2013.

Best Student Paper Award.

Best Student Paper Award Final of the 2011 Asilomar Conference

- "Asymptotic Analysis of Double-Scattering Channels"
- *Recipients*: J. Hoydis, R. Couillet, M. Debbah.
- *Year*: 2011.

Best Student Paper Award.

Best Student Paper Award of the 2008 ValueTools Conference

- "The Space Frontier: Physical Limits of Multiple Antenna Information Transfer"
- *Recipients*: R. Couillet, S. Wagner, M. Debbah, A. Silva.
- *Year*: 2008.

TEACHING
EXPERIENCE

Université Grenoble-Alpes, Grenoble, France.

Introduction to convex optimization   **Since 2018**

- Master 2 level (master SIGMA), lectures, 15 hours
- Scientific Communication (master SIGMA), lectures, 6 hours

Scientific Communication   **Since 2018**

- PhD level (EEATS doctoral school), lectures, 18 hours

ENS ParisSaclay, Cachan, France.

Random matrix theory and machine learning applications   **Since 2013**

- Master 2 level, lectures, 15 hours

CentraleSupélec, Gif sur Yvette, France.

Introduction to random matrix theory   **Since 2012**

- Master 2 level, seminar lecture, 12 hours

Theoretical foundations of flexible radio networks   **Since 2012**

- Master 2 level, seminar lecture, 12 hours

Techniques of scientific writing   **Since 2012**

- Undergraduate and PhD levels, lectures, 18+12 hours

Practical lectures in signals, filtering, and statistics   **Since 2012**
- Undergraduate and PhD levels, lectures, 18+12 hours

Introduction to random matrix theory   **Fall 2009/2011**
- PhD level, lectures, 18 hours

Polytech Nice-Sophia, Sophia-Antipolis, France.

Digital communications   **Spring 2010**
- Master level, lectures, 24 hours

Digital filtering   **Spring 2010**
- Master level, practical lessons, 60 hours

EDUCATION   **Université d'Orsay**, Saclay, France.   **January 2011 - February 2015**

HDR diploma in Physics
- Title: Robust estimation methods in the large random matrix regime
- Jury: A. Hero, L. Pastur, J-Y. Tourneret (evaluators), F. Benaych-Georges, P. Bondon, M. McKay, E. Ollila.

CentraleSupélec, Gif sur Yvette, France.   **January 2008 - November 2010**

Ph.D. in Physics (Telecommunications), November 2010
- Title: Application of random matrix theory to future wireless flexible networks
- Advisor: Professor Mérouane Debbah
- Jury: P. Loubaton, X. Mestre (evaluators), M. Debbah, P. Duhamel, W. Hachem, A. Moustakas, J. Silverstein.

Telecom ParisTech, Paris, France.   **September 2004 - June 2007**

M.S., System of Communications (SiCom), (mention TB), March 2008
- Wireless communications
- Image processing
- Blind detection techniques

Eurecom Institute, Sophia Antipolis, France.   **September 2005 - June 2007**

M.S., Telecommunication Engineering, September 2007
- Mobile communications
- Embedded systems
- Computer science

Lycée Louis le Grand, Paris, France.   **September 2001 - June 2004**

Preparation to Engineering School

Recruitment Juries and Project Evaluations

Jury member for young scientist recruitment (CRCN) at INRIA-GRA (Grenoble center) **2018, 2019, 2020**

Reviewer for European Research Council (ERC-StG grants) **since 2018**

Reviewer for multiple French ANR projects (approx 2/year) **since 2015**

Reviewer for multiple Belgium FRS-FNRS projects (approx 2/year) **since 2018**

Reviewer for the Academy of Finland (reviews + 2-day decision in Helsinki) **2015**

Evaluator for "L'Oréal-UNESCO for Women in Science" International and French "Jeunes Talents" Prizes **2020, 2021**

IEEE

IEEE Senior Member (member since 2007) **since 2015**

IEEE TSP Associate Editor **since 2015**

IEEE STPM Technical Committee Member **since 2015**

Special Session Chair of IEEE CAMSAP'19 **2019**

Technical Area Chair of IEEE Asilomar'16 **2016**

Organizer of 4 special sessions in IEEE Asilomar'13, SSP'14, Asilomar'16, SSP'16

GRETSI

Member of the GRETSI association **since 2011**

Editor for special issue "Matrices aléatoires" of TS magazine **2015**

GDR ISIS

Co-organizer of GdR day "Estimation et traitement statistique en grande dimensions" **2013**

J1. C. Louart, R. Couillet "A Concentration of Measure Approach to Large Dimensional Robust Statistics", (submitted to) Annals of Applied Probability, 2020.

J2. K. Elkhalil, A. Kammoun, R. Couillet, T. Al-Naffouri, M-S. Alouini, "A Large Dimensional Analysis of Regularized Discriminant Analysis Classifiers" (to appear) IEEE Transactions on Signal Processing, 2020.

J3. L. Dall'Amico, R. Couillet, N. Tremblay, "A unified framework for spectral clustering in sparse graphs", (submitted to) Journal of Machine Learning Research, 2020.

J4. C. Louart, R. Couillet, "Concentration of Measure and Large Random Matrices with an application to Sample Covariance Matrices", (submitted to) Random Matrix Theory and Applications, 2019.

J5. X. Mai, R. Couillet, "Consistent Semi-Supervised Graph Regularization for High Dimensional Data", (submitted) Journal of Machine Learning Research, 2019.

J6. R. Couillet, M. Tiomoko, S. Zozor, E. Moisan, "Random matrix-improved estimation of covariance matrix distances", Journal of Multivariate Analysis, vol. 174, pp. 104531, 2019.

J7. X. Mai, R. Couillet, "A Random Matrix Analysis and Improvement of Semi-Supervised Learning for Large Dimensional Data", Journal of Machine Learning Research, vol. 19, no. 79, pp. 1-27, 2018.

J8. A. Kammoun, R. Couillet, "Subspace Kernel Clustering of Large Dimensional Data" (submitted to) Annals of Applied Probability, 2017.

J9. L. Yang, M. McKay, R. Couillet, "High-Dimensional MVDR Beamforming: Optimized Solutions based on Spiked Random Matrix Models", IEEE Transactions on Signal Processing, vol. 66, no. 1, pp. 1933-1947, 2018.

J10. A. Karadimitrakis, A. L. Moustakas, R. Couillet, "Gallager Bound for MIMO Channels: Large-N Asymptotics" IEEE Transactions on Wireless Communications, vol. 17, no. 2, pp. 1323-1330, 2018.

J11. N. Auguin, D. Morales, M. McKay, R. Couillet, "Large-dimensional behavior of regularized Maronna's M-estimators of covariance matrices" IEEE Transactions on Signal Processing, vol. 66, no. 13, pp. 3529–3542, 2018.

J12. C. Louart, Z. Liao, R. Couillet, "A Random Matrix Approach to Neural Networks" Annals of Applied Probability, vol. 28, no. 2, pp. 1190–1248, 2018.

J13. Z. Liao, R. Couillet, "A Large Dimensional Analysis of Least Square Support Vector Machines" IEEE Transactions on Signal Processing, vol. 67, no. 4, pp. 1065-1074, 2018.

J14. R. Couillet, H. Tiomoko Ali, "Improved spectral community detection in large heterogeneous networks" Journal of Machine Learning Resarch, vol. 18, no. 225, pp. 1–49, 2018.

J15. R. Couillet, M. McKay, "Optimal block-sparse PCA for high dimensional correlated samples" (submitted to) Journal of Multivariate Analysis, 2016.

J16. R. Couillet, G. Wainrib, H. Sevi, H. Tiomoko Ali, "The asymptotic performance of linear echo state neural networks" Journal of Machine Learning Research, vol. 17, no. 178, pp. 1-35, 2016.

J17. R. Couillet, F. Benaych-Georges, "Kernel Spectral Clustering of Large Dimensional Data" Electronic Journal of Statistics, vol. 10, no. 1, pp. 1393-1454, 2016.

J18. F. Benaych-Georges, R. Couillet, "Spectral Analysis of the Gram Matrix of Mixture Models" ESAIM: Probability and Statistics, DOI http://dx.doi.org/10.1051/ps/2016007, 2016.

J19. R. Couillet, Estimation robuste et matrices aléatoires, revue Traitement du Signal, vol. 33, no. 2-3, pp. 273-320, 2016.

J20. R. Couillet, G. Wainrib, Perspectives en matrices aléatoires et grands réseaux, revue Traitement du Signal, vol. 33, no. 2-3, pp. 351-376, 2016.

J21. M. Sadeghi, L. Sanguinetti, R. Couillet, Y. Chau, "Large System Analysis of Power Normalization Techniques in Massive MIMO", IEEE Transactions on Vehicular Technologies, vol. 66, no. 10, pp. 9005-9017, 2017.

J22. M. Sadeghi, L. Sanguinetti, R. Couillet, Y. Chau, "Reducing the Computational Complexity of Multicasting in Large-Scale Antenna Systems", IEEE Transactions on Wireless Communications, vol. 16, no. 5, pp. 2963-2975, 2017.

J23. L. Sanguinetti, R. Couillet, M. Debbah, "Large System Analysis of Base Station Cooperation for Power Minimization" IEEE Transactions on Wireless Communications, vol. 15, no. 8, pp. 5480-5496, 2016.

J24. A. Abboud, F. Iutzeler, R. Couillet, H. Siguerdidjane, M. Debbah, "Distributed Production-Sharing Optimization and Application to Power Grid Networks," IEEE Transactions on Signal and Information Processing over Networks, vol. 2, no. 1, pp. 1628, 2016.

J25. A. Kammoun, R. Couillet, F. Pascal, M.-S. Alouini, "Optimal Design of the Adaptive Normalized Matched Filter Detector using Regularized Tyler Estimator" IEEE Transactions on Aerospace and Electronic Systems, vol. 54, no. 2, pp. 755–769, 2018.

J26. A. Kammoun, R. Couillet, F. Pascal, M.-S. Alouini, "Convergence and Fluctuations of Regularized Tyler Estimators" IEEE Transactions on Signal Processing, vol. 64, no. 4, pp. 1048-1060, 2016.

J27. D. Morales-Jimenez, R. Couillet, M. McKay, "Large Dimensional Analysis of Robust M-Estimators of Covariance with Outliers" IEEE Transactions on Signal Processing, vol. 63, no. 21, pp. 5784-5797, 2015.

J28. L. Yang, R. Couillet, M. McKay, "A Robust Statistics Approach to Minimum Variance Portfolio Optimization" IEEE Transactions on Signal Processing, vol. 63, no. 24, pp. 6684–6697, 2015.

J29. R. Couillet, A. Kammoun, F. Pascal, "Second order statistics of robust estimators of scatter. Application to GLRT detection for elliptical signals" Elsevier Journal of Multivariate Analysis, vol. 143, pp. 249-274, 2015.

J30. A. Müller, R. Couillet, E. Bjørnson, S. Wagner, M. Debbah, "Interference-Aware RZF Precoding for Multi-Cell Downlink Systems" IEEE Transactions on Signal Processing, vol. 63, no. 15, pp. 3959-3973 2015.

J31. R. Couillet, "Robust spiked random matrices and a robust G-MUSIC estimator" Elsevier Journal of Multivariate Analysis, vol. 140, pp. 139-161, 2015.

J32. R. Couillet, M. McKay, "Large Dimensional Analysis and Optimization of Robust Shrinkage Covariance Matrix Estimators" Elsevier Journal of Multivariate Analysis, vol. 131, pp. 99-120, 2014.

J33. Y. Chitour, R. Couillet, F. Pascal "On the convergence of Maronna's M-estimators of scatter" IEEE Signal Processing Letters, vol. 22, no. 6, pp. 709-712, 2014.

J34. R. Couillet, F. Pascal, J. W. Silverstein, "The Random Matrix Regime of Maronna's M-estimator with elliptically distributed samples", vol. 139, pp. 56-78, Elsevier Journal of Multivariate Analysis, 2015.

J35. J. Vinogradova, R. Couillet, W. Hachem, "Estimation of Toeplitz covariance matrices in large dimensional regime with application to source detection large", IEEE Transactions on Signal Processing, vol. 63, no. 18, pp. 4903-4913, 2015.

J36. R. Couillet, W. Hachem, "Analysis of the limiting spectral measure of large random matrices of the separable covariance type", Random Matrix Theory and Applications, vol. 3, pp. 1-23, 2014.

J37. J. Hoydis, R. Couillet, P. Piantanida, "The Second-Order Coding Rate of the MIMO Rayleigh Block-Fading Channel," IEEE Transactions on Information Theory, vol. 61, no. 12, pp. 6591-6622, 2015.

J38. J. Vinogradova, R. Couillet, W. Hachem, "Statistical Inference in Large Antenna Arrays under Unknown Noise Pattern," IEEE Transactions on Signal Processing, vol. 61, no. 22, pp. 5633-5645, 2013.

J39. F. Chapon, R. Couillet, W. Hachem, X. Mestre, "The outliers among the singular values of large rectangular random matrices with additive fixed rank deformation," Markov Processes and Related Fields, vol. 20, pp. 183-228, 2014.

J40. R. Couillet, F. Pascal, J. W. Silverstein, "Robust Estimates of Covariance Matrices in the Large Dimensional Regime," IEEE Transactions on Information Theory, vol. 60, no. 11, 2014.

J41. G. Geraci, R. Couillet, J. Yuan, M. Debbah, I. B. Collings, "Large System Analysis of Linear Precoding in MISO Broadcast Channels with Confidential Messages," IEEE Journal on Selected Area in Communications, vol. 31, no. 9, pp. 1660-1671, 2013. **Second prize of the 2012-2013 IEEE Australia Council Student Paper Contest.**

J42. J. Hoydis, R. Couillet, M. Debbah, "Iterative Deterministic Equivalents for the Capacity Analysis of Communication Systems," Technical Report.

J43. R. Couillet, S. Medina Perlaza, H. Tembine, M. Debbah, "Electrical Vehicles in the Smart Grid: A Mean Field Game Analysis," IEEE Journal on Selected Areas in Communications: Smart Grid Communications Series, vol. 30, no. 6, pp. 1086-1096, 2012.

J44. J. Yao, R. Couillet, J. Najim, M. Debbah, "Fluctuations of an Improved Population Eigenvalue Estimator in Sample Covariance Matrix Models," IEEE Transactions on Information Theory, vol. 59, no. 2, pp. 1149-1163, 2013.

J45. R. Couillet, M. Debbah,"Signal Processing in Large Systems: a New Paradigm," IEEE Signal Processing Magazine, vol. 30, no. 1, pp. 24-39, 2013.

J46. R. Couillet, W. Hachem, "Fluctuations of spiked random matrix models and failure diagnosis in sensor networks," IEEE Transactions on Information Theory, vol. 59, no. 1, pp. 509-525, 2013.

J47. A. Kammoun, R. Couillet, J. Najim, M. Debbah, "Performance of capacity inference methods under colored interference," IEEE Transactions on Information Theory, vol. 59, no. 2, pp. 1129-1148, 2013.

J48. R. Couillet, J. Hoydis, M. Debbah, "Random beamforming over quasi-static and fading channels: A deterministic equivalent approach," IEEE Transactions on Information Theory, vol. 58, no. 10, pp. 6392-6425, 2012.

J49. S. Wagner, R. Couillet, M. Debbah, D. T. M. Slock, "Large System Analysis of Linear Precoding in MISO Broadcast Channels with Limited Feedback", IEEE Transactions on Information Theory, vol. 58, no. 7, pp. 4509-4537, 2012.

J50. R. Couillet, J. W. Silverstein, Z. Bai, M. Debbah, "Eigen-Inference for Energy Estimation of Multiple Sources", IEEE Transactions on Information Theory, vol. 57, no. 4, pp. 2420-2439, 2011.

J51. R. Couillet, M. Debbah, J. W. Silverstein, "A Deterministic Equivalent for the Analysis of Correlated MIMO Multiple Access Channels", IEEE Transactions on Information Theory, vol. 57, no. 6, pp. 3493-3514, 2011.

J52. R. Couillet, M. Debbah, "A Bayesian Framework for Collaborative Multi-Source Signal Sensing", IEEE Transactions on Signal Processing, vol. 58, no. 10, pp. 5186-5195, 2010.

J53. R. Couillet, A. Ancora, M. Debbah, "Bayesian Foundations of Channel Estimation for Cognitive Radios", Advances in Electronics and Telecommunications, vol. 1, no. 1, pp. 41-49, 2010.

J54. R. Couillet, M. Debbah, "Le téléphone du futur : plus intelligent pour une exploitation optimale des fréquences" Revue de l'Electricité et de l'Electronique, no. 6, pp. 71-83, 2010.

J55. R. Couillet, M. Debbah, "Mathematical foundations of cognitive radios", Journal of Telecommunications and Information Technologies, no. 4, 2009.

J56. R. Couillet, M. Debbah, "Outage performance of flexible OFDM schemes in packet-switched transmissions", Eurasip Journal on Advances on Signal Processing, Volume 2009, Article ID 698417, 2009.

CONFERENCE PUBLICATIONS

C1. M. Seddik, R. Couillet, M. Tamaazousti, "A Random Matrix Analysis of Learning with α-Dropout", International Conference on Machine Learning (ICML'20), Artemiss workshop, Graz, Autria, 2020.

C2. M. Seddik, C. Louart, R. Couillet, M. Tamaazousti, "The Unexpected Deterministic and Universal Behavior of Large Softmax Classifiers", (submitted to) Conference on Neural Information Processing Systems (NeurIPS'20), Vacouver, Canada, 2020.

C3. L. Dall'Amico, R. Couillet, N. Tremblay, "Community detection in sparse time-evolving graphs with a dynamical Bethe-Hessian", (submitted to) Conference on Neural Information Processing Systems (NeurIPS'20), Vacouver, Canada, 2020.

C4. Z. Liao, R. Couillet, M. Mahoney "A random matrix analysis of random Fourier features: beyond the Gaussian kernel, a precise phase transition, and the corresponding double descent", (submitted to) Conference on Neural Information Processing Systems (NeurIPS'20), Vacouver, Canada, 2020.

C5. T. Zarrouk, R. Couillet, F. Chatelain, N. Le Bihan, "Performance-Complexity Trade-Off in Large Dimensional Statistics", International Workshop on Machine Learning for Signal Processing (MLSP'20), Espoo, Finland, 2020.

C6. M. Seddik, R. Couillet, M. Tamaazousti "Random Matrix Theory Proves that Deep Learning Representations of GAN-data Behave as Gaussian Mixtures", International Conference on Machine Learning (ICML'20), Graz, Autria, 2020.

C7. M. Tiomoko, H. Tiomoko, R. Couillet "Deciphering and Optimizing Multi-Task and Transfer Learning: a Random Matrix Approach", (submitted to) International Conference on Machine Learning (ICML'20), Graz, Austria, 2020.

C8. L. Dall'Amico, R. Couillet, N. Tremblay "Optimal Laplacian Regularization for Sparse Spectral Community Detection", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'20), Barcelona, Spain, 2020.

C9. M. Tiomoko, C. Louart, R. Couillet "Large Dimensional Asymptotics of Multi-Task Learning", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'20), Barcelona, Spain, 2020.

C10. L. Dall'Amico, N. Tremblay, R. Couillet "Optimized Deformed Laplacian for Spectrum-based Community Detection in Sparse Heterogeneous Graphs", Neural Information Processing Systems (NeurIPS'19), Vancouver, Canada, 2019.

C11. Z. Liao, R. Couillet, "On Inner-product Kernels of High Dimensional Data", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C12. R. Couillet, "High Dimensional Robust Classification: A Random Matrix Analysis", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C13. R. Couillet, "A Random Matrix Analysis and Optimization Framework to Large Dimensional Transfer Learning", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C14. A. Kadavankandy, R. Couillet, "Asymptotic Gaussian Fluctuations of Spectral Clustering Eigenvectors", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C15. C. Louart, R. Couillet, "A concentration of measure perspective to robust statistics", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C16. M. Tiomoko, R. Couillet, "Estimation of Covariance Matrix Distances in the High Dimension Low Sample Size Regime", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'19), Guadeloupe, France, 2019.

C17. M. Tiomoko, R. Couillet, "Random Matrix-Improved Estimation of the Wasserstein Distance between two Centered Gaussian Distributions", European Signal Processing Conference (EUSIPCO'19), A Coruna, Spain, 2019. **Best student paper award**

C18. M. Seddik, M. Tamaazousti, R. Couillet, "Kernel Random Matrices of Large Concentrated Data: The Example of GAN-Generated Image", .IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C19. M. Tiomoko, F. Bouchard, G. Ginholac, R. Couillet "Random Matrix Improved Covariance Estimation for a Large Class of Metrics", International Conference on Machine Learning (ICML), Long Beach, USA, 2019.

C20. L. Dall'Amico, R. Couillet "Community Detection in Sparse Realistic Graphs: Improving the Bethe Hessian", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C21. X. Mai, R. Couillet "Revisiting and Improving Semi-Supervised Learning: A Large Dimensional Approach", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C22. H. Tiomoko Ali, S. Liu, Y. Yilmaz, R. Couillet, I. Rajapakse, A. Hero, "Latent Heterogeneous Multilayer Community Detection", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C23. Z. Liao, X. Mai, R. Couillet "A Large n, p Analysis of Logistic Regression: Asymptotic Performance and New Insights", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C24. M. Tiomoko, R. Couillet, S. Zozor, E. Moisan, "Improved Estimation of the Distance between Covariance Matrices", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'19), Brighton, UK, 2019.

C25. R. Couillet, Z. Liao, X. Mai, "Classification Asymptotics in the Random Matrix Regime", European Signal Processing Conference (EUSIPCO'18), Rome, Italy, 2018.

C26. M. Seddik, M. Tamaazousti, R. Couillet, "A Kernel Random Matrix-Based Approach for Sparse PCA", International Conference on Learning Representations (ICLR'19), New Orleans, USA, 2019.

C27. X. Mai, R. Couillet, "Semi-Supervised Spectral Clustering", Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2018.

C28. Z. Liao, R. Couillet, "The Dynamics of Learning: A Random Matrix Approach", International Conference on Machine Learning, Stockholm, Sweden, 2018.

C29. Z. Liao, R. Couillet, "On the Spectrum of Random Features Maps of High Dimensional Data", International Conference on Machine Learning, Stockholm, Sweden, 2018.

C30. H. Tiomoko Ali, A. Kammoun, R. Couillet, "Random matrix-improved kernels for large dimensional spectral clustering", Statistical Signal Processing Workshop (SSP'18), Freiburg, Germany, 2018.

C31. L. Yang, M. R. McKay, R. Couillet, "Random Matrix-Optimized High-Dimensional MVDR Beamforming", Statistical Signal Processing Workshop (SSP'18), Freiburg, Germany, 2018.

C32. C. Louart, R. Couillet, "A Random Matrix and Concentration Inequalities Framework for Neural Networks Analysis", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'18), Calgary, Canada, 2018.

C33. H. Tiomoko Ali, A. Kammoun, R. Couillet, "Random matrix asymptotic of inner product kernel spectral clustering", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'18), Calgary, Canada, 2018.

C34. K. Elkalil, A. Kammoun, R. Couillet, T. Al-Naffouri, M.-S. Alouini, "Asymptotic Performance of Regularized Quadratic Discriminant Analysis Based Classifiers", IEEE International Workshop on Machine Learning for Signal Processing (MLSP'17), Roppongi, Tokyo, Japan, 2017. **Best student paper award finalist**

C35. 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.

C36. X. Mai, R. Couillet, "The counterintuitive mechanism of graph-based semi-supervised learning in the big data regime", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'17), New Orleans, USA, 2017.

C37. C. Louart, R. Couillet, "Harnessing neural networks: a random matrix approach", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'17), New Orleans, USA, 2017.

C38. H. Tiomoko Ali, R. Couillet, "Random Matrix Improved Community Detection in Heterogeneous Networks", Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2016.

C39. R. Couillet, A. Kammoun, "Random Matrix Improved Subspace Clustering", Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2016.

C40. R. Couillet, G. Wainrib, H. Sevi, H. Tiomoko Ali, "A Random Matrix Approach toRecurrent Neural Networks", International Conference on Machine Learning (ICML), New York, USA, 2016.

C41. A. Kammoun, R. Couillet, F. Pascal, M. Slim-Alouini, "Optimal Design of Adaptive Normalized Matched Filter For Large Antenna Arrays", IEEE Statistical Signal Processing Workshop (SSP), Palma de Majorca, Spain, 2016.

C42. N. Auguin, D. Morales, M. R. McKay, R. Couillet, "Robust Shrinkage M-estimators of Large Covariance Matrices", IEEE Statistical Signal Processing Workshop (SSP), Palma de Majorca, Spain, 2016.

C43. R. Couillet, G. Wainrib, H. Sevi, H. Tiomoko Ali, "Training performance of echo state neural networks", IEEE Statistical Signal Processing Workshop (SSP), Palma de Majorca, Spain, 2016.

C44. H. Tiomoko Ali, R. Couillet, "Performance analysis of spectral community detection in realistic graph models", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'16), Shangai, China, 2016.

C45. R. Couillet, F. Benaych-Georges, "Understanding Big Data Spectral Clustering", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Cancun, Mexico, 2015.

C46. L. Yang, R. Couillet, M. R. McKay, "Minimum Variance Portfolio Optimization in the Spiked Covariance Model", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Cancun, Mexico, 2015.

C47. L. Sanguinetti, R. Couillet, M. Debbah, "Base Station Cooperation for Power Minimization in the Downlink: Large System Analysis", IEEE Global Communications Conference (GLOBECOM'15), San Diego, USA, 2015.

C48. R. Couillet, M. S. Greco, J-P. Ovarlez, F. Pascal, "RMT for Whitening Space Correlation and Applications to Radar Detection", IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Cancun, Mexico, 2015.

C49. D. Morales-Jimenez, R. Couillet, M. McKay, "Large dimensional analysis of Maronna's M-estimator with outliers", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'15), Brisbane, Australia, 2015.

C50. A. Kammoun, R. Couillet, F. Pascal, "Second order statistics of bilinear forms of robust scatter estimators", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'15), Brisbane, Australia, 2015.

C51. G. Katz, P. Piantanida, R. Couillet, "Joint Estimation and Detection Against Independence", Fifty-second Allerton Conference on Communication, Control, and Computing, Allerton, IL, USA, 2014.

C52. R. Couillet, M. McKay, "Robust covariance estimation and linear shrinkage in the large dimensional regime", IEEE International Workshop on Machine Learning for Signal Processing (MLSP'14), Reims, France, 2014.

C53. L. Yang, R. Couillet, M. McKay, "Minimum variance portfolio optimization with robust shrinkage covariance estimation", Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2014.

C54. P. Vallet, X. Mestre, Ph. Loubaton, R. Couillet, "Asymptotic analysis of Beamspace-MUSIC in the context of large arrays", IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM'14), A Coruna, Spain, 2014.

C55. R. Couillet, A. Kammoun, "Robust G-MUSIC", European Signal Processing Conference (EUSIPCO'14), Lisbon, Portugal, 2014.

C56. J. Vinogradova, R. Couillet, W. Hachem, "Estimation of Large Toeplitz Covariance Matrices and Application to Source Detection", European Signal Processing Conference (EUSIPCO'14), Lisbon, Portugal, 2014.

C57. R. Couillet, F. Pascal, "Robust M-estimator of scatter for large elliptical samples", IEEE Worshop on Statistical Signal Processing (SSP'14), Gold Coast, Australia, 2014.

C58. A. Abboud, R. Couillet, M. Debbah, H. Siguerdidjane, "Asynchronous alternating direction method of multipliers applied to the direct-current optimal power flow problem," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'14), Florence, Italy, 2014.

C59. A. Pelletier, R. Couillet, J. Najim, "Second-Order Analysis of the Joint SINR distribution in Rayleigh Multiple Access and Broadcast Channels," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2013.

C60. A. Müller, E. Björnson, R. Couillet, M. Debbah, "Analysis and management of heterogeneous user mobility in large-scale downlink systems," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2013.

C61. J. Hoydis, R. Couillet, P. Piantanida, "Bounds on the Second-Order Coding Rate of the MIMO Rayleigh Block-Fading Channel," IEEE International Symposium on Information Theory, Istanbul, Turkey, 2013.

C62. G. Geraci, R. Couillet, J. Yuan, M. Debbah, I. Collings, "Secrecy Sum-Rates with Regularized Channel Inversion Precoding under Imperfect CSI at the Transmitter," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'13), Vancouver, Canada, 2013.

C63. R. Couillet, F. Pascal, J. W. Silverstein, "A Joint Robust Estimation and Random Matrix Framework with Application to Array Processing," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'13), Vancouver, Canada, 2013.

C64. J. Vinogradova, R. Couillet, W. Hachem, "A new method for source detection, power estimation, and localization in large sensor networks under noise with unknown statistics," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'13), Vancouver, Canada, 2013.

C65. M. de Mari, R. Couillet, M. Debbah, "Concurrent data transmissions in green wireless networks: when best send one's packets?," (Invited paper) IEEE International Symposium on Wireless Communication Systems (ISWCS'12), Paris, France, 2012.

C66. A. Müller, J. Hoydis, R. Couillet, M. Debbah, "Optimal 3D Cell Planning: A Random Matrix Approach," IEEE Global Communications Conference (GLOBE-COM'12), Anaheim, Caligornia, USA, 2012.

C67. J. Hoydis, R. Couillet, P. Piantanida, M. Debbah, "A Random Matrix Approach to the Finite Blocklength Regime of MIMO Fading Channels," IEEE International Symposium on Information Theory, Boston, Massachusetts, USA, 2012.

C68. M. Rezaee, R. Couillet, M. Guillaud, G. Matz, "Sum-Rate Optimization for the MIMO IC under Imperfect CSI: a Deterministic Equivalent Approach," IEEE International Workshop on Signal Processing Advances for Wireless Communications, Cesme, Turkey, 2012.

C69. J. Hoydis, A. Müller, R. Couillet, M. Debbah, "Analysis of Multicell Cooperation with Random User Locations Via Deterministic Equivalents," Eighth Workshop on Spatial Stochastic Models for Wireless Networks, Paderborn, Germany, 2012.

C70. R. Couillet, E. Zio, "A subspace approach to fault diagnostics in large power systems" (Invited Paper) IEEE International Symposium on Communications, Control, and Signal Processing (ISCCSP'12), Rome, Italy, 2012.

C71. A. Kammoun, M. Kharouf, R. Couillet, J. Najim, M. Debbah, "On the fluctuations of the SINR at the output of the Wiener filter for non centered channels: the non Gaussian case," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'12), Kyoto, Japan, 2012.

C72. R. Couillet, P. Bianchi, J. Jakubowicz, "Decentralized convex stochastic optimization with few constraints in large networks," IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'11), San Juan, Puerto Rico, 2011.

C73. R. Couillet, S. Medina Perlaza, H. Tembine, M. Debbah, "A mean field game analysis of electric vehicles in the smart grid," IEEE International Conference on Computer Communications (INFOCOM'12), Orlando, FL, USA, 2012.

C74. J. Hoydis, R. Couillet, M. Debbah, "Asymptotic Analysis of Double-Scattering Channels," IEEE Asilomar Conference (ASILOMAR'11), Pacific Grove, CA, USA, 2011. **Best student paper award finalist**

C75. R. Couillet, W. Hachem, "Local Failure Localization in Large Sensor Networks," IEEE Asilomar Conference on Signals, Systems, and Computers (ASILOMAR'11), Pacific Grove, CA, USA, 2011.

C76. R. Couillet, M. Guillaud, "Performance of Statistical Inference Methods for the Energy Estimation of Multiple Sources," (Invited Paper) IEEE Statistical Signal Processing Workshop (SSP'11), Nice, France, 2011.

C77. A. Kammoun, R. Couillet, J. Najim, M. Debbah, "Performance of fast rate adaption techniques in interference-limited networks," IEEE Global Communications Conference (GLOBECOM'11), Houston, TX, USA, 2011.

C78. J. Yao, R. Couillet, J. Najim, E. Moulines, M. Debbah, "CLT for eigen-inference methods in cognitive radios," IEEE International Conference on Acoustics, Speech and Signal Processing, Prague, Czech Republic, 2011.

C79. J. Hoydis, R. Couillet, M. Debbah, "Deterministic Equivalents for the Performance Analysis of Isometric Random Precoded Systems," IEEE International Conference on Communications, Kyoto, Japan, 2011.

C80. J. Hoydis, J. Najim, R. Couillet, M. Debbah, "Fluctuations of the Mutual Information in Large Distributed Antenna Systems with Colored Noise," Forty-Eighth Annual Allerton Conference on Communication, Control, and Computing, Allerton, IL, USA, 2010.

C81. R. Couillet, H. V. Poor, M. Debbah, "Self-organized spectrum sharing in large MIMO multiple-access channels," IEEE International Symposium on Information Theory, Austin TX, USA, 2010.

C82. R. Couillet, J. W. Silverstein, M. Debbah, "Eigen-inference for multi-source power estimation," IEEE International Symposium on Information Theory, Austin TX, USA, 2010.

C83. S. Wagner, R. Couillet, D. T. M. Slock, M. Debbah, "Optimal Training in Large TDD Multi-user Downlink Systems under Zero-forcing and Regularized Zero-forcing Precoding," IEEE Global Communication Conference, Miami, 2010.

C84. S. Wagner, R. Couillet, D. T. M. Slock, M. Debbah, "Large System Analysis of Zero-Forcing Precoding in MISO Broadcast Channels with Limited Feedback" IEEE International Workshop on Signal Processing Advances for Wireless Communications, Marrakech, Morocco, 2010.

C85. R. Couillet, M. Debbah, "Information theoretic approach to synchronization: the OFDM carrier frequency offset example", Advanced International Conference on Telecommunications, Barcelona, Spain, 2010.

C86. R. Couillet, M. Debbah, "Uplink capacity of self-organizing clustered orthogonal CDMA networks in flat fading channels" IEEE Information Theory Workshop Fall'09, Taormina, Sicily, 2009.

C87. R. Couillet, M. Debbah, J. W. Silverstein, "Asymptotic Capacity of Multi-User MIMO Communications" IEEE Information Theory Workshop Fall'09, Taormina, Sicily, 2009.

C88. R. Couillet, M. Debbah, J. W. Silverstein, "Rate region of correlated MIMO multiple access channel and broadcast channel" IEEE Workshop on Statistical Signal Processing, Cardiff, Wales, UK, 2009.

C89. R. Couillet, M. Debbah, "Mathematical foundations of cognitive radios" U.R.S.I.'09, Warsaw, Poland, 2009.

C90. R. Couillet, M. Debbah, "A maximum entropy approach to OFDM channel estimation", IEEE International Workshop on Signal Processing Advances for Wireless Communications, Perugia, Italy, 2009.

C91. R. Couillet, M. Debbah, "Bayesian inference for multiple antenna cognitive receivers", IEEE Wireless Communications & Networking Conference, Budapest, Hungary, 2009.

C92. R. Couillet, M. Debbah, "Flexible OFDM schemes for bursty transmissions", IEEE Wireless Communications & Networking Conference, Budapest, Hungary, 2009.

C93. R. Couillet, S. Wagner, M. Debbah, "Asymptotic Analysis of Correlated Multi-Antenna Broadcast Channels", IEEE Wireless Communications & Networking Conference, Budapest, Hungary, 2009.

C94. R. Couillet, S. Wagner, M. Debbah, A. Silva, "The Space Frontier: Physical Limits of Multiple Antenna Information Transfer", ValueTools, Inter-Perf Workshop, Athens, Greece, 2008. **Best student paper award**

C95. R. Couillet, M. Debbah, "Free deconvolution for OFDM multicell SNR detection", IEEE Personal, Indoor and Mobile Radio Communications Symposium, Cognitive Radio Workshop, Cannes, France, 2008.

Books and book chapters

- **Random Matrix Methods for Wireless Communications** [book]

  Theoretical random matrix tools (finite dimensional analysis, limiting spectral laws, free probability, deterministic equivalents, statistical inference) and applications to wireless communications (SU-MIMO, MU-MIMO, CDMA, detection, estimation, channel modelling).
  - *Authors:* R. Couillet and M. Debbah
  - *Publisher:* Cambridge University Press
  - *Year:* 2011

- **Mathematical Foundations for Signal Processing, Communications and Networking** [book chapter]

  Chapter "Random matrix theory" on random matrix theory and especially statistical inference methods.
  - *Chapter authors:* R. Couillet, M. Debbah
  - *Publisher:* CRC Press, Taylor & and Francis Group
  - *Year:* 2011

- **Orthogonal Frequency Division Multiple Access Fundamentals and Applications** [book chapter]

  Chapter "Fundamentals of OFDMA Synchronization" on theoretical considerations and application tools for time offset and frequency offset regulation in OFDM and OFDMA systems.
  - *Chapter authors:* R. Couillet, M. Debbah
  - *Publisher:* Auerbach Publications, CRC Press, Taylor & and Francis Group
  - *Year:* 2010

Tutorials

- R. Couillet, T. Malik, M. A. Seddik, "Random Matrix Advances in Large Dimensional Statistics, Machine Learning and Neural Nets", European Signal Processing Conference (EUSIPCO'19), A Coruna, 2019.

- R. Couillet, Z. Liao, X. Mai, "Random Matrix Advances for Machine Learning", European Signal Processing Conference (EUSIPCO'18), Rome, 2018.

- R. Couillet, H. Tiomoko Ali "Random Matrices for Big Data Signal Processing and Machine Learning", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'17), New Orleans, USA, 2017.

- R. Couillet, "Random Matrices, Robust Estimation, and Applications", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'15), Brisbane, Australia, 2015.

- R. Couillet, A. Kammoun, "Future Random Matrix Tools for Large Dimensional Signal Processing", European Conference on Signal Processing (EUSIPCO), Lisbon, Portugal, 2014.

- R. Couillet, M. Debbah, "Random Matrix Advances in Signal Processing", IEEE International Workshop on Signal Processing Advances in Wireless Communications, Darmstadt, Germany, 2013.

- R. Couillet, M. Debbah, "Random Matrix Theory for Signal Processing Applications", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'11), Prague, Czech Republic, 2011.

- R. Couillet, M. Debbah, "Random Matrices in Wireless Flexible Networks", International ICST Conference on Cognitive Radio Oriented Wireless Networks and Communications (Crowncom'10), Cannes, France, 2010.

- R. Couillet, M. Debbah, "Eigen-Inference Statistical methods for Cognitive Radio", European Wireless, Lucca, Italy, 2010.

VISITING APPOINTMENTS	**Hong-Kong University of Science and Technology**, Hong-Kong. **June 2014**

Collaboration work with Professor M. McKay,

- Department of Electronic and Computer Engineering
- Project Topic: robust estimation in large financial data

North Carolina State University, North Carolina, USA. **Nov. 2009**

Collaboration work with Professor J. W. Silverstein,

- Department of Mathematics
- Project Topic: random matrix theory for multi-source energy detection

WORKSHOP ORGANIZATION

Workshops and Special Sessions in international and French symposia

- *International*: Special Session Chair (IEEE CAMSAP, 2019), Special Session "Random Matrices in Signal Processing and Machine Learning" (IEEE SSP, 2016), Special Session "Random Matrix Advances in Signal Processing" (IEEE SSP, 2014), Special Session "Random Matrices and Applications" (IEEE Asilomar, 2013).
- *France*: GdR day "Estimation et traitement statistique en grande dimension" (2013).

PROJECTS

Participation to French and European research projects

- *Europe*: ERC Starting Grant MORE (2012-2017) [co-PI], FP7 NEWCOM# (2012-2015), FET FP7 HIATUS (2012-2015), FP7 NEWCOM++ (2009-2011).
- *France*: UGA IDEX DataScience Chair (2018-2020) [PI], ANR RMT4GRAPH (2014-2017) [PI], ANR DIONISOS (2012-2016) [co-PI], ANR SESAME (2008-2012).

PATENTS

Patents owned by ST-Ericsson

- R. Couillet, M. Debbah, **No. 08368028.0** "Process and apparatus for performing initial carrier frequency offset in an OFDM communication system"

- R. Couillet, M. Debbah, **No. 08368023.1** "Method for short-time OFDM transmission and apparatus for performing flexible OFDM modulation"

- R. Couillet, S. Wagner, **No. 09368025.4** "Precoding process for a transmitter of a MU-MIMO communication system"

- R. Couillet, **No. 09368030.4** "Process for estimating the channel in an OFDM communication system, and receiver for doing the same"

PHD STUDENTS   PhD students under my supervision.

Cosme Louart   2018-2021
- fully advised by mysefl
- "Concentration of measure theory for deep learning"
- Defense expected in September 2021
- Grant: CEA-list, ED EEATS

Lorenzo Dall'Amico   2018-2021
- co-advised (50%) with N. Tremblay and T. Hueber.
- "Statistical physics and graph mining"
- Defense expected in September 2021
- Grant: ED EEATS grant, Grenoble

Malik Tiomoko   2018-2021
- fully advised by myself
- "Large dimensional statistical learning"
- Defense expected in September 2021
- Grant: ED STIC grant, ParisSaclay

Mohamed Seddik   2017-2020
- fully advised by myself
- "Random matrices for deep networks"
- Defense expected in September 2020
- Grant: CEA-list

Zhenyu Liao   2016-2019
- co-advised (80%) with Y. Chitour
- "Random matrix theory for machine learning and neural networks"
- Defended in September 2019
- Grant: Fondation Supélec

Xiaoyi Mai   2016-2019
- fully advised by myself
- "Random matrix methods for large dimensional machine learning"
- Defense expected in September 2019
- Grant: DIGICOSME Grant, University ParisSaclay

Hafiz Tiomoko Ali   2015-2018
- fully advised by myself
- "Community detection in large random graphs"
- Defended in September 2018
- Grant: ANR RMT4GRAPH

Gil Katz **2013-2016**

- co-advised (33%) with P. Piantanida and M. Debbah
- "Interactive Communication for Distributed Computing"
- Defended in September 2016
- Grant: ERC MORE

Azary Abboud (postdoc à l'INRIA) **2012-2015**

- co-advised (50%) with M. Debbah
- "Distributed optimization for Smart Grids"
- Defended in September 2015
- Grant: Fondation Supélec

Julia Vinogradova (postdoc at Linköping University) **2011-2014**

- co-advised (50%) with W. Hachem
- "Large random matrices, statistical inference, and future wireless communication networks"
- Defended in September 2014
- Grant: DIGITEO

Axel Müller (research engineer at HUAWEI) **2011-2014**

- co-advised (50%) with M. Debbah
- "Random matrix applications to multi-cell wireless communication networks"
- Defended in September 2014
- Grant: Intel

MISCELLANEOUS   *Languages*: French (mother language), English (fluent), German (school level).