Julien Boussard

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EDUCATION

PhD, Columbia University Statistics Department **Sept 2019 - Present**

I am a third year PhD student in statistics at Columbia University, advised by Professor Liam Paninski. My research lies at the intersection of statistics, computational neuroscience. I focus on analyzing large-scale neural recordings and developing data-driven approaches to analyze and decode electrophysiological recordings. I model real-world physical data using tools and techniques from signal processing, optimization, probabilistic modeling, machine learning, and dynamical systems. I am a researcher at the International Brain Laboratory.

PhD classes: Neural Data Analysis, Computation and the Brain, Machine Learning and Climate Change, Computational Statistics, Nonparametric Theory in Machine Learning, Statistical Inference Theory, Topics in Applied Statistics

Statistics Master, Stanford University **Sept 2017 - March 2019**

Studying Theoretical and Applied Statistics: Theory of Probabilities, Modern Applied Statistics, Deep Learning, Reinforcement Learning, Introduction to Neuro-Engineering, Theoretical Models of the Neocortex.

Research Projects: Decoding Neural Data with Recurrent Neural Network for Brain-Machine Interfaces, Risk-Sensitive Bayes-Adaptive Decision Making in Continuous Spaces, Predicting Subjective Sleep Quality from EEG signals.

Graduate Degree in Applied Mathematics, École Polytechnique **Sept 2014 - March 2017**

France's leading engineering school. Studying Machine Learning, Statistics, Computer Science and Probabilities.

Classe Préparatoire MP*, Lycée Condorcet, Paris **Sept 2012 - July 2014**

Intensive two-year preparatory course for highly selective exams to top French engineering schools. Rigorous in-depth study of mathematics and physics.

PUBLICATIONS

- Spike sorting pipeline for the International Brain Laboratory, International Brain Laboratory*, Kush Banga, Julien Boussard, Gaëlle A. Chapuis, Mayo Faulkner, Kenneth D. Harris, Julia M. Huntenburg, Cole Hurwitz, Hyun Dong Lee, Liam Paninski, Cyrille Rossant, Noam Roth,Nicholas A. Steinmetz,Charlie Windolf, Olivier Winter, *2022*
- Three-dimensional spike localization and improved motion correction for Neuropixels recordings, Julien Boussard*, Erdem Varol*, Hyun Dong Lee, Nishchal Dethe, Liam Paninski. *Advances in Neural Information Processing Systems 34. NeurIPS 2021*
- Decentralized Motion Inference and Registration of Neuropixel Data, Erdem Varol*, Julien Boussard*, Nishchal Dethe, Olivier Winter, Anne Urai, The International Brain Laboratory, Anne Churchland, Nick Steinmetz, Liam Paninski. *ICASSP 2021 - 2021 IEEE International Conference on Acoustics, Speech and Signal Processing*
- Learning interpretable continuous-time models of latent stochastic dynamical systems, Lea Duncker, Gergo Bohner, Julien Boussard, Maneesh Sahani. *Proceedings of the 36th International Conference on Machine Learning, ICML 2019.*
- Predicting Subjective Sleep Quality Using Recurrent Neural Networks, Julien Boussard, Mykel J. Kochenderfer, Jamie M. Zeitzer. *2019 IEEE Signal Processing in Medicine and Biology Symposium (SPMB)*

EXPERIENCE

Teaching Assistant, Columbia University Statistics Department **September 2019 - Present**

- I have been a teaching assistant for the following courses at Columbia:
  - GU5206: Computational Statistics and Introduction to Data Science (Fall 2019, Spring 2020)
  - GR5242: Advanced Machine Learning (Fall 2020)
  - UN1101: Introduction to Statistics (Spring 2021)
  - W5701: Probability and Statistics for Data Science (Fall 2021)
  - GU4001: Introduction to Probability and Statistics (Spring 2022)

Research Internship, Gatsby Computational Neuroscience Unit **June 2018 - September 2018**

- Worked with Professor Maneesh Sahani. Developed a variational inference and learning algorithm for latent stochastic differential equations with high-dimensional point-process observations in order to model neural population dynamics.

Research Assistant, Stanford Intelligent Systems Laboratory **April 2018 - June 2018**

- Worked with Professor Mykel Kochenderfer and Jamie Marc Zeitzer, Associate Professor at Stanford Center for Sleep Sciences and Medicine. Predicted Subjective Sleep Quality analyzing EEG data and derived sleep variables provided by the Sleep Heart Health Polysomnography dataset.

Software Engineering Internship, STOIC, New-York **March 2017 - August 2017**

- Part of the Research and Development team. Implemented various distributed Machine Learning algorithms in Javascript and C++, such as logistic regression, k-means clustering and support vector machines. The STOIC users can use these algorithms to run fast machine learning analysis on their own large datasets.

Summer Internship, Société Générale, New-York **June 2016 - August 2016**

- Summer intern analyst in the Flow Strategies and Solutions team. Developed weekly quantitative and macroeconomic trading strategies. Analyzed trading strategies using time-series and statistical analysis. Created several VBA pricing functions for derivative products. Developed a method to determine the best trades on ETFs.

Teaching Assistant, Lycée Condorcet, Paris **Sept 2015 - March 2016**

- Gave mathematics lessons for students preparing the exam for French engineering schools.

Order of Malta, Paris **Sept 2014 - March 2015**

- Work experience at the Headquarters of First Aid and Social Assistance of the Order of Malta. Organized first aid events and helped the Paris Fire Brigade as a first aider. Volunteered in an emergency shelter for homeless people. Gave French lessons to undocumented migrants.

SKILLS AND INTERESTS

- Languages : French (Native), English (Proficient), Spanish (Intermediate)
- Computer Programming : Python, Matlab, R, C++, Java
- Music : Completed the three cycles of Conservatoire de Paris with honors in double bass. Double bass player for the orchestra of Conservatoire de Paris. Completed the two cycles of Conservatoire de Paris with Honors in Music Theory.