

Liam Toran

San Francisco

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Education

École Normale Supérieure de Lyon

Lyon, France

Master's Degree in Applied Mathematics

2016–2018

- Studied courses include advanced statistics and machine learning, numerical methods, statistical physics, stochastic calculus, dynamical evolution equations, harmonic fluid dynamics and the Boltzmann gaz equation.

École Normale Supérieure de Lyon

Lyon, France

Bachelor's Degree in Computer Science & Mathematics

2014–2016

- Also graduated from junior level classes in Physics.
- Entered through top 1% placing in nation-wide exams.

Experience

Université de Nice Côte d'Azur

Nice, France

Research Assistant Intern

2019

6-month at the J.A.Dieudonné lab team at the University of Nice.

My work was centered on the modelization and simulation of Dynamical Branching Networks, for instance social media networks or fungus growth.

- Learned about new models and uses of stochastic and partial differential equations in population dynamics and implemented state of the art numerical fluid simulation techniques through Python;
- Solved the relationship between physical constants and wave speed for the model of dynamical branching networks.

Knight Lab, UCSD

San Diego, USA

Machine Learning Research Assistant Intern

2017–2018

5-month Internship in the Knight Lab Microbiology team at the Biomedical Research Institute of UCSD.

My work was centered on analysing and understanding compositional microbiological datasets, especially when a horseshoe type effect appears after SVD dimensionality reduction.

- Implemented different statistical and compositional analysis methods through Python and its scientific libraries and applied them to the Knight Lab compositional datasets;
- Co-authored a research article about the horseshoe effect, explaining how it arises in various datasets, and how learn from it to **build a better metric for data sets with an underlying gradient**:

See: [Uncovering the Horseshoe Effect, Morton - Toran](#) which has 11 citations.

Inria

Grenoble, France

Computer Graphics Research Assistant Intern

2016

3-month Internship in the BiPoP team at Inria, a French mathematics and computer science research institute.

My work was centered on the modelization, simulation, control and optimisation of nonsmooth systems, applied on the example of cloth's move simulation with implicit contact and exact Coulomb friction.

- Solved examples of Coulomb friction problems in Python;
- Made an enumerative type solving of a new formulation of the Coulomb friction problem and implemented it using C and C++. The resulting solver was **ten times faster** than the previous one and later led to the following research article:

See: [An Implicit Frictional Contact Solver for Adaptive Cloth Simulation](#)

Miscellaneous

Math & Physics Tutoring for University Students

2018–2019

Skills

Programming: Python (Jupyter, Pandas, Scikit-Learn, Keras, PyTorch, Matplotlib, Seaborn, ...), C, C++.

SQL, LaTeX, Git, Excel, MatLab.

Platforms: Linux (as a daily driver and professional use), Windows, Android.

Languages: English & French : **Fluent**, Japanese : Basic