Fabrice **Lécuyer**

PhD Student in Complex Networks at LIP6 Sorbonne

PhD project (2020 – ongoing)

Title	*Sorting nodes to scale to massive real-world datasets*
Supervisors	Lionel Tabourier & Clémence Magnien
Description	As we have access to arbitrarily big networks collected from various fields (biology, social ties, trade, web), graph algorithms can only scale if they have linear complexity. One promising idea is to sort nodes according to specific graph properties (degree, centrality, degeneracy, etc) to improve experimental runtime and theoretical bounds.

- Implement and compare existing orders.
- Define new orders leveraging properties of real graphs.
- Reduce complexity of algorithms for networks with such properties.
- Find generative models for these properties.

2021 **[Replication] Speedup Graph Processing by Graph Ordering**,
Fabrice Lécuyer, Maximilien Danisch, Lionel Tabourier, ReScience, [DOI].

Research experience

2020 **Dynamic community detection**, *Data Science Team, LIRIS*, Lyon.
six months Detect and analyse communities in fine-grained dynamical networks. Transpose static models to link streams. Confront them to various quality functions of the literature. Design scalable methods, test them on real and synthetic datasets. [report]

2017 **Hospital network modelling**, *Barabási lab, Northeastern*, Boston.
three months Model health trajectories based on millions of hospital admissions. Manipulate different models of mobility such as gravity or radiation, and compare them to census data. Study the correlation between social groups and specific diseases. [report]

2016 **Disability communication software**, Lyon, project with ten Master students.
one year Design a communication system for people with paralysis. Program electroencephalography headsets, define fast means of expression with linguists. Involve many health professionals and participate in two hackathons.

2016 **Biological regulatory networks**, *Institute in Cybernetic*, Nantes.
two months Analyse gene interaction networks and theoretical inference graphs. Parse real data about protein activation and inhibition, simulate the behaviour of multi-genes systems. [report in French]

Education

2015–2020 **Master in Computer Science**, *Ecole Normale Supérieure de Lyon*, France.
- Major in theoretical computer sciences: graph theory, algorithmic, probability, complexity, algebra...
- Minor in complex systems: network theory, epidemiology, thermodynamics, data processing...

2018–2019 **Gap year for travels and personal projects**.
Months-long backpacking experiences with minimum planning and equipment, to get a sight of different landscapes, political systems and languages, to meet people with different priorities and customs.

2017–2018 **Erasmus: Bachelor in Physics**, *Ludwig Maximilian Universität of Munich*, Germany.
Major: theoretical and applied physics. Minor: German language.

2013–2015 **Classes préparatoires in Science**, *Lycée Saint-Louis*, Paris, France.
Intensive preparation in maths, physics and computer sciences for competitive admission into leading schools of science and engineering. Admission in *ENS Lyon*, top-ranking research-oriented school.

Work experience

2021–Now	**PhD students representative**, *LIP6*, Paris.
	Meet with the direction of the lab to work on administrative and scientific issues that PhD students face.
2020–Now	**Teaching assistant**, *Sorbonne Université*, Paris.
	○ Algorithmics: complexity, iteration and recursion, binary trees, graphs.
	○ Python101: learn mathematical programming using a restricted version of Python.
2019-2020	**Oral examiner in theoretical physics**, *Prépa CPE Chartreux*, Lyon.
2017–2018	**Frontend Software Developer**, *Carsync Fleet Management, Vispiron GmbH*, Munich.
	Develop a new Angular2 product interface with a team of full-time developers.
2009–2013	**Web developer freelance**, *online game Terre de Feu*.
	Design and develop backend and frontend from scratch. Manage a community of hundreds of players.

Other

Computer	**c++, python, js, angular, sql, html5, css3, git, c**, LaTeX, php, caml, linux, excel. . .
Languages	**French** (native), **English** (fluent C_2), German (advanced C_1), Spanish (intermediate B_2).
Music	Piano teacher; classical singer (Munich Unichor, Paris Music Academy); violist, accordionist.
Interests	Sustainability, international relations, linguistics. . .