Levy Nicolas

PhD student in computer science

nicolaspierrelevy@gmail.com
perso.ens-lyon.fr/nicolas.levy
nicolaspierrelevy
thenlevy

Experience

2020–2023 **PhD in Computer Science**, *Ens de Lyon, France*

supervisor Nicolas Schabanel (nicolas.schabanel@ens-lyon.fr)

Development of ENSnano, a software for designing 3D DNA nanostructures. ENSnano is a software for designing 3D DNA nanostructures that is focused on flexibility and ease of use.
During my PhD, I accomplished the following achievements:

- I autonomously developed a large software project.
  - I came up with a software architecture that allows the editing of the structure in two synchronized 2D and 3D interfaces.
  - I Designed and implemented various data structures to represent DNA nanostructures.
  - Due to the relative youth of the Rust programming language, I had to manage a project depending on libraries that are still under active development. I also contributed to some of those libraries (iced, ultraviolet).
- I Designed and implemented an ergonomic and efficient user interface for designing DNA nanostructures. The ease of use of ENSnano was saluted by the DNA nanotechnology community, and the paper introducing the software [1] was awarded the *best student paper award* at the 27th International conference on DNA Computing and Molecular Programming. I was also awarded the *best student presentation award* at the same conference.
- I designed and implemented a model for curved 3D DNA nanostructures. This model was experimentally validated by the successful realisation of structures that were impossible to design with the previously available tools [2].

Teaching Experience

2022-2023 **Tutorials in the C programming language for students preparing the *Aggrégation d'informatique* (a competitive examination to become a teacher in higher education)**

2021-2022 **Tutorials in the C programming language for BSc students**, *ENS de Lyon, France*

I supervised several tutorials in the C programming language. The supervised project were: An assembler, a disassembler, a mini shell and a mini process scheduler

2021-2022 **Supervision of an OCaml programing project for BSc students**, *ENS de Lyon, France*

I supervised students in their project of writing in OCaml an interpreter for a subset of the OCaml Language

Internships

First semester of 2020 **Improvement of codenano (6 months)**, *ENS de Lyon, France. Under the suppervision of Nicolas Schbanel*

I improved the 3D interface of codenano.
Skills practiced: Rust, Graphics programming (webGL)

Spring 2019 **Development of codenano (3 months)**, *Hamilton Institute, Maynooth University, Ireland. In the research team of Damien Woods*

I worked on Codenano, a web-based tool for developing DNA nanostructures. Codenano can be seen as a prototype for ENSnano. The DNA nanostructures were described by a rust program written by the user instead of being designed in a GUI [**?**].
Skills practiced: Rust

Fall 2017 **Development of a python interface for the MaBoSS software.** , *Laboratoire de Recherche en Informatique, Université Paris-Saclay, France. Under the supervision of Loïc Paulevé*

MaBoSS is a C++ software for simulating continuous/discrete time Markov processes, applied on a Boolean network. I started the devolopment of pyMaBoSS, a python interface to MaBoSS [3, 4]. The project has been forked and is still beign worked on.
Skills practiced: Python

Spring 2017 **Development of a statistical analysis tool for a Yeast Two Hybrid method (2 months)**, *Laboratoire de Biologie et Modélisation de la Cellule, Lyon, France. Under the supervision of Martin Spichty*

I developed a pipeline to analyse the data produced by Yeat Two Hybrid experiments [5].
Skills developed: Python, statistical analysis.

Education

2018–2020 **MSc in Fundamental Computer Science**, *ENS de Lyon, France*, validated with honors

2017–2018 **First year of MSc in Biostatistics and Computational Biology**, *Université Paris-Sacaly, France*

2016–2017 **BSc in Biology**, *ENS de Lyon, France*

2015–2016 **BSc in Fundamental Computer Science**, *ENS de Lyon, France*, validated with highest honors

2013–2015 **Classe préparatoire MPSI/MP***, *Lycée Kléber, Strasbourg, France*

Itensive two years of mathematics and physics study to prepare for the competitive examination of french *Grandes Écoles*

Computer skills

Programming languages

- Extensive project experience: Rust
- Some project and/or teaching experience: C, OCaml, Python
- Basic knowledge: Java, C++, Haskell

Other

- Strong understanding of algorithmic and the theoretical foundations of computer science
- Good command of Git
- Good experience with working in a Linux environment

Spoken Languages

French Native

English C2 level certified by the Cambridge Advanced Exam

Publications

[1] Nicolas Levy and Nicolas Schabanel. Ensnano: a 3d modeling software for DNA nanostructures. In *DNA27-27th International Conference on DNA Computing and Molecular Programming*, 2021.

[2] Nicolas Levy, Allan Mills, Gaëtan Bellot, and Nicolas Schabanel. Rule-of-thumb-free geometry-driven design of arbitrary complex curved DNA origami with ENSnano. In *DNA28-28th International Conference on DNA Computing and Molecular Programming*, 2021.

[3] Aurélien Naldi, Céline Hernandez, Nicolas Levy, Gautier Stoll, Pedro T Monteiro, Claudine Chaouiya, Tomáš Helikar, Andrei Zinovyev, Laurence Calzone, Sarah Cohen-Boulakia, et al. The colomoto interactive notebook: accessible and reproducible computational analyses for qualitative biological networks. *Frontiers in physiology*, 9:680, 2018.

[4] Nicolas Levy, Gautier Stoll, Pedro T Monteiro, Claudine Chaouiya, TomA A Helikar, Andrei Zinovyev, Laurence Calzone, Sarah Cohen-Boulakia, Denis Thieffry, et al. The colomoto interactive notebook: Accessible and reproducible computational analyses for qualitative biological networks. *Frontiers in Physiology*, 2018.

[5] David Cluet, Blandine Vergier, Nicolas-Pierre Levy, Lucie Dehau, Alexandre Thurman, Ikram Amri, and Martin Spichty. Titration of apparent in-cellula affinities of protein-protein interactions. *ChemBioChem*, 23(4):e202100640, 2022.