Leo Blondel

PhD

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About me

With a Ph.D. in Computational Biology from Harvard University and a Master from the Ecole Normale Superieure (ENS) ULM I research different computational methods around developmental biology. I Co-Founded the Non Profit organization Just One Giant Lab to promote Open Science across the world and try to make the planet a little bit better and fairer. JOGL is the first research and innovation laboratory accessible to anybody, operating as a distributed, open and massive mobilisation platform for volunteer-based, IP-free task solving. With an expertise in Data Science and Machine Learning I focused my studies on sequence data and image analysis. I am an advocate of interdisciplinary projects and believe in collective inteligence as the key to solving complex problems. I have been involved with the european union parliament on science policy surrounding green energy transition. Finally, I am an Open Science and Open Source advocate through participation in multiple projects. Child of the cypherpunk hacker subculture.

Interests

Researcher, Geek, Hacker, Maker, I thrive to make this world more just and fair for all living being, including humans.

Education and experiences

2014-2021 M.A & Ph.D. in Computational Biology — Harvard University

Thesis: Computational approaches to developmental biology. *From genes to organisms, a multi scale exploration of arthropods evo devo through genomics, morphospace, development and network approaches.*

2017-2021 Founder and CTO of JOGL — NGO

Just One Giant Lab (JOGL), is the first research and innovation laboratory accessible to anybody, operating as a distributed, open and massive mobilisation platform for volunteer-based, IP-free task solving. JOGL helps sync humanity onto solving our most urgent and important problems using Open Science, Responsible Innovation and Continuous Learning.

2013-2014 Diplome Universitaire — University Paris 6 and Harvard University

Designed a confocal microscopy screen and automated image analysis pipelines to study the stress response of iPS cells at the single cell resolution.

2009-2013 Licence L3 and Master in Developmental and System Biology — Ecole Normal Superieure (ENS) ULM Paris

Master 2 Thesis: *Inference of protein-ligand binding energy model using indirect measurement from high-throughput mutagenesis.*

Master 1 Thesis: *Analysis of transdifferentiations using gene regulatory networks and genetic algorithm and Functional co-culture of motor neuron and myotubes.*

2007-2009 Licence L1/L2 — University Montpellier II

Physics and Biology track, including two internships at the Montpellier CNRS campus in Immunology and Biochemistry.

2006-2007 Classe Preparatoire: PCSI — Lycee Joffre

Classe Preparatoires are the french track preparaing for the competitive entry exam of the Grandes Ecoles.

Fellowships

2021-2022 Independant post-doctoral short term fellow — CRI: Center for interdisciplinary research Paris

Awards

2019 Best Poster: Visualizing embryo development in Virtual Reality

2013 LERU BRIGHT: Selected participant to work with EU parliement on Green Energy transition

Skills

Evo-Devo

Developmental biology

Microscopy

Computer Science

Data Science ML AI

Teaching

Management

3D printing

geek⋆5 hacker⋆3

Programming

Python

Javascript

Ruby on Rails

Unity C#

C++

CUDA

Languages

French

English

Spanish

Japanese

German

(*)[Scale from 1 (Beginner) to 5 (Expert).]

Technical expertise

Data Sciences During my Ph.D. I honed many skills regarding data analytics pipelines from small scale datasets, to terabytes of data. I have a strong expertise in sequence data analysis as well as microscopy image segmentation and volumetric data analysis.

- Data analytics
- Machine Learning
- Computer Vision
- Systems biology
- Modeling
- HPC Computing

Biology My studies helped me develop a strong expertise in the fields of Developmental biology, Evo-devo, Stem cell biology and Evolutionary biology. Throughout my research career I kept running experiments to generate datasets that would be later analysed through computational pipelines.

- Microdissections
- BL3 cell culture
- Single-Cell Sequencing
- Microfluidics

Microscopy Seeing is beleiving, and microscopy has always been a fascination of mine, I have built many microscopes, from simple white light ones, to lightsheet setups.

- Taught microscopy at Harvard
- High speed LightSheet microscopy
- Confocal microscopy
- Super resolution microscopy

Open-source projects

I contributed to multiple open source projects over the years. My most signicant contributions are the inception, creation and direction of the JOGL platform along with many published small repository on GitHub.

JOGL As the CTO and Founder of Just One Giant Lab, I managed and directed the team of developpers behind the JOGL platform. I notably created the system architecture and coded a large part of the Backend as well as the entire infrastructure and DevOps pipeline.

LightSheetUtils A series of script to convert between different light sheet formats formats. Also includes volumetric manipulation tools, data preprocessing, and data cleaning.

Iterative-HMMER A tool to perform a sliding window HMMER analysis accross kingdoms of life for Horizontal Domain Transfer detection. Created for and used in paper: Bacterial contribution to genesis of the novel germ line determinant oskar

Microscopy VR This is a Unity 3D app to observe Volumetric data in VR. The goal of this application is to load volumetric data produced by LightSheet Microscopes, Confocal Zstacks, or other form of microscopy such as MRI and CT Scans. You are projected in a room, where you can load your datasets, and handle, manipulate, observe and adjust the rendering settings in real time.

Full publications list

2021 The iGEM competition, a dataset towards understanding team-success in scientific competitions.
Leo Blondel, Abhijeet Krishna, Marc Santolini
scientific data paper in preparation

2021 A large scale laboratory notebook analysis predicts team success in a scientific competition.
Marc Santolini, Leo Blondel, Abhijeet Krishna, Megan J. Palmer, Albert-Laszlo Barabasi
in preparation

2021 Quantified us: a group-in-the-loop approach to team network reconstruction.
Leo Blondel, Raphael Tackx*, Marc Santolini*
UbiComp21 conference proceedings Accepted

2021 Evolution of a cytoplasmic determinant: evidence for the biochemical basis of functional evolution of a novel germ line regulator
Leo Blondel, Savandara Besse, Cassandra G Extavour
MBE bioRxiv doi: 10.1101/2021.04.26.441385

2020 Computational Approaches to Developmental Biology.
Leo Blondel
PhD thesis ProQuest Dissertations & Theses Global: 2504861409

2020 Topology-driven protein-protein interaction network analysis detects genetic modules regulating reproductive capacity.
Tarun Kumar, Leo Blondel*, Cassandra G Extavour*
Elife doi: 10.7554/eLife.54082

2020 Bacterial contribution to genesis of the novel germ line determinant oskar.
Leo Blondel, Tamsin E M Jones, Cassandra G Extavour
Elife doi: 10.7554/eLife.45539

2020 Team performance and improvement in a science and engineering competition.
Marc Santolini, Leo Blondel, Abhijeet Krishna, Megan J. Palmer, Albert-Laszlo Barabasi
Conference Proceeding ACM Collective Inteligence 2020

2019 Ancestral and offspring nutrition interact to affect life history traits in Drosophila melanogaster.
Joe B. Deas, Leo Blondel, Cassandra G. Extavour
Proceedings of the royal society B doi: 10.1098/rspb.2018.2778

2018 Epidemium: A multidisciplinary community to tackle cancer using big and open data.
Mehdi Benchoufi, Marc Fournier, David Magrez, Gaspard Macaux, Vanessa Barué, Alicia Mansilla Sanchez, Olivier de Fresnoye, Romain Fillaudeau, Ozanne Tauvel-Mocquet, Nassera Chalabi, Jean Frédéric Petit-Nivard, Leo Blondel, Marc Santolini, Béchir Ben Hadj Yahia
Journal of Clinical Oncology doi: 10.1200/JCO.2018.36.15

2017 Team success in the iGEM scientific competition.
Marc Santolini, Abhijeet Krishna, Christos Ellinas, Leo Blondel, Thomas E.Landrain, and Albert-Laszlo Barabasi
Conference Proceeding 6th International Conference on Complex Networks and Their Applications