

LOÏC LANNELONGUE PHD AFHEA

Researcher in Biomedical Data Science

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📍 Cambridge, UK

EDUCATION & ACADEMIA

Research Associate in Biomedical Data Science

Dept. of Public Health and Primary Care, University of Cambridge

📅 Since April 2022

📍 UK

Machine learning for personalised medicine and development of sustainable computational science.

- College Post-Doctoral Associate

Jesus College, Cambridge

📅 Since October 2022

- Associate of the Senior Common Room

King's College, Cambridge

📅 Since October 2022

In the same period, I have also been involved in various initiatives related to the environmental impact of computational science. Among others:

- External Advisor

Wellcome Trust & RAND Europe

📅 Sept 2022 – Sept 2023

Study into the role of the Wellcome Trust (and other stakeholders) to advance sustainable health research.

- Advisor

LEAF

Advised on the creation of the LEAF framework for dry lab (initially designed for wet labs).

PhD in Health Data Science

University of Cambridge

📅 Oct 2018 – March 2022

📍 UK

Inference frameworks in computational biology: from protein-protein interaction networks using machine learning to carbon footprint estimation. Supervised by Prof. Michael Inouye.

Recipient of the MRC-DTP Industrial Strategy Studentship in Artificial Intelligence. Clare Hall College.

MSc in Statistical Science

University of Oxford

📅 Oct 2017 – Sept 2018

📍 UK

Statistics, statistical machine learning, mathematical genetics, computational statistics. Thesis: "A Bayesian perspective on Trees of Predictors" (supervised by Prof. Mihaela van der Schaar)

Awarded with Distinction (First). Mansfield College.

Diplôme d'ingénieur (BSc and MSc) in Applied Maths

ENSAE Paris

📅 Oct 2015 – June 2017

📍 Paris, France

TEACHING

Associate Fellow

Advance HE

Teaching Associates' Programme at the Cambridge Centre for Teaching and Learning.

Undergraduate supervisions

University of Cambridge

I have supervised a number of students across the departments of mathematics, computer science and medicine

- Statistics (Maths Part 1A, 1B and II)
- Bioinformatics (CS Part II)
- Data Science (CS Part 1B), Machine Learning and Bayesian Inference (CS Part II)
- Foundations of Evidence-Based Medicine (1st year medics and vets)

I have also participated in the evaluation of 4th year projects for medical students.

Guest lectures

Machine Learning for Sciences

In these lectures, I discussed how can scientists and clinicians use Machine Learning tools in their work, and what are the ethical challenges that come with it (with a focus on biology).

- University of Cambridge, UK (2019)
- Baker Heart and Diabetes Institute, Australia (2020)

The carbon footprint of computational research

In these lectures, I discuss sustainability in computational science with students (undergraduates and postgraduates).

- MRes Sensor CDT, University of Cambridge, UK (2021, 2022)
- BSc Bioscience's Climate Week, University of Exeter, UK

Outreach

Cambridge HE+

Lecture "Artificial Intelligence, with great power comes great responsibility"

Tremplin (Paris, France)

Statistics, Data Science, Econometrics, Economics.

Classe Préparatoire

Lycée Saint Louis

📅 Oct 2013 – June 2015 📍 Paris, France

Mathematics and theoretical Physics, specialising in Mathematics and Computer Science

INDUSTRY EXPERIENCE

Below are past internships I completed during my studies.

Data Analyst intern

Amazon EU

📅 June – September 2017 📍 Luxembourg

The EU Placement team is in charge of overseeing and optimising the location of Amazon's stock in Europe.

- Data analysis and statistical modelling (R, Excel).
- Big Data technologies (Redshift, Oracle, ETL Manager).

Data Scientist intern

Sidetrade

📅 June – August 2016 📍 France

Creation of an algorithm which aims at identifying companies based on partial information such as names or addresses using text analysis and machine learning.

PUBLICATIONS

📄 Journal Articles

Of special interest:

- L. Lannelongue and M. Inouye. "Construction of in silico protein-protein interaction networks across different topologies using machine learning", *bioRxiv* (Feb. 2022, in review).
- L. Lannelongue, J. Grealey, and M. Inouye. "Green Algorithms: Quantifying the Carbon Footprint of Computation", *Advanced Science* (May 2021).
- L. Lannelongue, J. Grealey, A. Bateman, and M. Inouye. "Ten simple rules to make your computing more environmentally sustainable", *PLOS Computational Biology* (Sep. 2021).

All publications (chronologically):

- Y. Xu, ..., L. Lannelongue, ... M. Inouye. "An atlas of genetic scores to predict multi-omic traits", *bioRxiv* (Apr. 2022, in review).
- L. Lannelongue and M. Inouye. "Construction of in silico protein-protein interaction networks across different topologies using machine learning", *bioRxiv* (Feb. 2022, in review).
- J. Grealey, L. Lannelongue, W.-Y. Saw, J. Marten, G. Méric, S. Ruiz-Carmona, and M. Inouye. "The Carbon Footprint of Bioinformatics", *Molecular Biology and Evolution* (Feb. 2022 (preprint Mar. 2021)).
- L. Lannelongue, J. Grealey, A. Bateman, and M. Inouye. "Ten simple rules to make your computing more environmentally sustainable", *PLOS Computational Biology* (Sep. 2021).
- L. Lannelongue, J. Grealey, and M. Inouye. "Green Algorithms: Quantifying the Carbon Footprint of Computation", *Advanced Science* (May 2021 (preprint July 2020)).

Undergraduate-level scientific courses (in mathematics and physics).

ACADEMIC SERVICE

Recruitment panel

HDR-UK PhD program

📅 2021

Course organising committee

Foundations of Evidence-Based Practice

📅 2020-21 📍 Cambridge

MRC-DTP committee (student representative)

📅 2020-21 📍 Cambridge

LANGUAGES

English 

French 

Italian 

Spanish 

German 

STUDENT SOCIETIES

Outstanding Contribution Award

University of Cambridge Sports Award

📅 2022 📍 Cambridge

Steering committee member

Cambridge Zero Postgraduate Academy

📅 2022 – now 📍 Cambridge

Student Sport Advisory Group committee member

Cambridge University Sports

📅 2021 – now 📍 Cambridge

President, Men's Captain

CU Modern Pentathlon Club

📅 2019 – now 📍 Cambridge

Organisation of the club, training, leading the teams at Varsity, fundraising etc. I was awarded a Full Blue for my performance in the Varsity Matches against Oxford (which eclipses a Half-Blue awarded by Oxford for my performance against Cambridge).

- J. Roos, C. Aubanel, Z. Niewiadomska, L. Lannelongue, C. Maenhoudt, and A. Fontbonne. "Triplex doppler ultrasonography to describe the uterine arteries during diestrus and progesterone profile in pregnant and non-pregnant bitches of different sizes", *Theriogenology* (Jan. 2020).
- M. Inouye and L. Lannelongue. "Gene Regulatory Networks to Explain Coronary Artery Disease Heritability", *Journal of the American College of Cardiology* (Jun. 2019).

📡 Science Communication

- L. Lannelongue. "Carbon footprint: the (not so) hidden cost of high performance computing", *ITNOW* (Jan. 2022).
- L. Lannelongue. "Data scientists déconnectés - machine learning et covid-19", *Variance ENSAE* (Jul. 2021).
- L. Lannelongue, J. Grealey and M. Inouye. "Green algorithms for health data science", *HDR-UK* (Mar. 2020).

🎧 Podcasts and Interviews

- James Dacey. "Cutting the carbon footprint of supercomputing in scientific research", *Physics World's podcast* (May 2022).
- Michael Allen. "The huge carbon footprint of large-scale computing", *Physics World* (Mar. 2022).
- Adriana Wolf Perez and Nikoline Borgermann. "In 27 min you will want to change how you use IT in science (and in life)", *The Caring Scientist: Mission Sustainable* (Jun. 2021).
- Victoria Corless. "Measuring computers' carbon footprint with 'Green Algorithms'", *Advanced Science News* (May 2021).

TALKS AND CONFERENCES

Most slides and recordings are available on my website

Keynotes, invited talks and panels

- "The carbon footprint of computational science: how bad is it and what can we do about it?". Invited talk at the Cambridge Centre for Data-Drive Discovery. *October 2022*.
- "The environmental impacts of computational biology: how bad is it and what can we do about it?". Invited talk at the University of Exeter. *September 2022*.
- "Training the next generation of sustainable computational scientists". Keynote talk at the Education in Biology track at ISMB 2022 (Madison, WI, USA). *July 2022*.
- "Addressing the carbon footprint of science". Talk at the Cambridge Mathematics of Information in Healthcare Hub's engagement event. *July 2022*
- "The carbon footprint of large scale computations". Industry-oriented webinar organised by SQream. *June 2022*.
- "Addressing the carbon footprint of computational science" at the 2022 Sustainable Research Symposium (Utrecht, NL). *May 2022*.
- "The (not so) hidden carbon footprint of scientific computation" at the *CPR Goes Green* seminar, University of Copenhagen. *April 2022*.
- "Energy impacts of ML AI" at the Lancaster Data Science Institute. *February 2022*.
- "AI and Sustainability", panelist at the *SGAI-2021 International Conference on Artificial Intelligence*. *December 2021*.
- "Green Computing made easy" at the *Computational Biology Going Green* special session. ISMB/ECCB 2021.

Student Representative

MRC-DTP

📅 2020 - 2021

📍 Cambridge

Welcoming the new cohorts, planning for future years. I was also in charge of organising the first MRC-DTP Symposium in October 2021 (80 participants).

Fellow-Student Interactions Officer

Clare Hall

📅 2020 - 2021

📍 Cambridge

I organised weekly seminars where students, fellows and life members present their work.

President

ENSAE Junior Études

📅 2016 - 2017

📍 ENSAE Paris

Strategy Advisory Board member

ENSAE Junior Études

📅 2017 - now

ENSAE Junior Études is a student-run consultancy specialising in data science and economics. It was a 16 people team overseeing over 50 consultants.

OTHER INTERESTS

Photography

Modern Pentathlon

Equestrian

Contributed talks

About the Green Algorithms project:

- CSHL Meeting on Biological Data Science, 2020.
- Varsity Sci conference between Oxford and Cambridge, 2020.
- 6th European Student Council Symposium, ISCB 2020.

On protein-protein interactions:

- CEU Scientific meeting, Dept of Public Health and Primary Care, 2022
- PhD presentations, Dept of Public Health and Primary Care, 2021
- Cambridge-Baker System Genomics Initiative launch event, 2019

Posters and flash talks

- **Construction of in silico protein-protein interaction networks across different topologies using machine learning.** ISMB 2022 (Madison, WI, USA), 2022.
- **Green Algorithms: Quantifying the carbon impact of genomics.** Wellcome Genome Campus conference *Genome Informatics*, 2020.
- **Using Machine Learning to predict protein-protein interaction networks.** Cambridge Network Days, 2019.