

Alexandra Lefebvre

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Current and former positions

- Since Oct. **Postdoctoral researcher, IBENS (ENS) & LJLL (Sorbonne Université)**, France.
2022 Advisors: Amaury Lambert & Vincent Maréchal.
- Sept. 2021 – **ATER (Contractual assistant professor), LPSM (Sorbonne Université)**, France.
August 2022 Department of mathematics.

Education

- Jan. 2018 – **PhD in Applied Mathematics, LPSM (Sorbonne Université)**, France.
Jan. 2022 Supervisors: Grégory Nuel & Patrick Bénisiglio. Funding: La Ligue Contre le Cancer.
Probabilistic graphical models for statistical genetics and survival analysis. Application to the Lynch syndrome.
- 2016 – 2017 **Master 2 in Biostatistics – Public health, Université Paris-Sud, Paris-Saclay**, France, Mention TB.
Research internship (Jan.-July 2017) at Institut Curie & LPSM.
Supervisors: Grégory Nuel & Antoine de Pauw. Funding: Institut Curie.
Probability of genetic predisposition and individual cancer risk predictions conditional on a family history, with competing risks. Application to the breast/ovarian syndrome.
- 2015 – 2016 **University Diploma (DU) in Statistics for Life Sciences, Université Paris-Sud, Paris-Saclay**, France, Mention TB.
& **2nd year Bachelor in Mathematics**, Sorbonne Université, France.
- 2002 – 2003 **Master 1 in Cell biology, major Molecular biology & Genetics, Université de Versailles Saint-Quentin-en-Yvelines, Paris-Saclay**, France.
Research internship (Jan. - Feb. 2003) at INRA, Jouy-en-Josas, France.
Supervisor : Jean-François Eléouët.
Determining the role of the PI 3-kinase pathway in apoptosis inhibition induced by the bovine and human respiratory syncytial virus. Identifying viral proteins involved and their action in the phosphorylation of the proteins of the pathway.

Research interests

- . Computational statistics, probabilistic graphical models (Bayesian networks, hidden Markov models, ...), survival analysis, statistical genetics.
- . Applications to biomedical data, cancer and viral genetics.

Published articles

- 2020 **Overcoming the challenges associated with universal screening for Lynch syndrome in colorectal and endometrial cancer**, Benusiglio P., Coulet F., Lefebvre A., Duval A. and Nuel G., Genetics in Medicine, Vol. 22, p. 1422-1423, (opinion paper).
- 2018 **A sum-product algorithm with polynomials for computing exact derivatives of the likelihood in Bayesian networks**, Lefebvre A. and Nuel G., Proceedings of Machine Learning Research, Vol. 72, p. 201-212.
- 2017 **Computing individual risks based on family history in genetic diseases in the presence of competing risks**, Nuel G., Lefebvre A. and Bouaziz O., Computational and Mathematical Methods in Medicine, Vol. 2017, article ID 9193630.

Teaching

Total : 235 hours

- 2022 – 2023
 - Risk inference in genetic counseling, Master 1 in Genetic counseling, Université de Paris, Faculté de Santé, UFR de Médecine (lecture + practicals).
- 2021 – 2022
 - Statistics with R, Master 2 in Statistics, Sorbonne Université (lecture - course refresher).
 - Statistical modeling, Master 1 in Mathematics and applications, Sorbonne Université (practicals).
 - Analysis of multivariate data, ISUP 1, 1st year students in the institut of Statistics, Sorbonne Université, equivalent of a 3rd year graduate programm (tutorials).
 - Data sciences, Bachelor 1, Sorbonne Université (tutorials + practicals).
- 2018 – 2020
 - Linear algebra & Introduction to probability, Bachelor 1, Sorbonne Université (tutorials).

Consulting

- Sept. 2018 – **Institut Carnot SMILES**, Sorbonne Université, Paris, France.
- June 2019 Consulting mission for **France Active** (Montreuil, France), pioneer in solidarity finance. Development of a model based on survival analysis for predicting risks of default of companies.

Communications

Invited talks (symposium, conferences, seminars and committees)

- May 2022 **Mathématiques et Informatique Appliquées seminar**, AgroParisTech, INRAE, Université Paris-Saclay, France.
- June 2021 **AI and data science for biology**, i-bio & SCAI, Sorbonne Université, Paris, France.
- June 2021 **Interdisciplinary seminar**, Institut supérieur du calcul et des données (ISCD), Sorbonne Université, Paris, France.
- Jan. 2021 **Young Statisticians and Probabilists (YSP)**, online.
- June 2020 **Interplay between Oncology, Mathematics and Numerics: focus on pre-treatment studies (IBOMaN)**, online.

March 2020 **Comité Oncogénétique des tumeurs Digestives de l'Ile-de-France** (CODIF), Institut Curie, Paris, France.

March 2019 **Mathématiques pour la Biologie seminar**, Institut de mathématiques de Toulouse, France.

Contributed talks

Sept. 2022 **International Society for Gastrointestinal Hereditary Tumors biennial meeting** (InSiGHT), Jersey City, NJ, USA.

Feb. 2020 **Mathematics of Complex Systems in Biology and Medicine**, Centre International de Rencontres Mathématiques (CIRM), Marseille, France.

June 2019 **PhD student seminar of LPSM**, Sorbonne Université, Paris, France.

April 2019 **Rencontre des jeunes statisticiens**, Porquerolles, France.

Jan. 2019 **Statistical Methods for Post Genomic Data** (SMPGD), Barcelona, Spain.

Sept. 2018 **Groupe de recherche Statistiques et Santé**, Nantes, France.

Sept. 2018 **The International Conference on Probabilistic Graphical Models** (PGM), Budapest, Czech Republic.

June 2018 **International Workshop on Applied Probability** (IWAP), Prague, Hungary.

May 2018 **Journées Francophones sur les Réseaux Bayésiens et les Modèles Graphiques Probabilistes** (JFRB), INRAE, Toulouse, France.

April 2018 **European Mathematical Genetics Meeting** (EMGM), Cagliari, Italy.

Jan. 2018 **Statistical Methods for Post Genomic Data** (SMPGD), Montpellier, France.

July 2017 **Statistical Analysis of Multi-Outcome Data** (SAM), Liverpool, United Kingdom.

Posters

Jan. 2020 **Assises de génétique humaine et médicale**, Tours, France (Flash oral poster presentation).

March 2019 **International Society for Gastrointestinal Hereditary Tumors biennial meeting** (InSiGHT), Auckland, New Zealand (poster presented by P. Benusiglio).

July 2018 **International Biometric Conference** (IBC), Barcelona, Spain.

Jan. 2018 **Assises de génétique humaine et médicale**, Nantes, France.

Computer and languages

Programming R & fundamentals in Python.

Languages French (mother tongue), English (fluent +), German (intermediate -).

Organization

Jan. 2021 – Co-organizer of the Seminar *Stochastics and Biology* (Modélisation aléatoire du vivant), LPSM, Sorbonne Université, Paris, France.

Sept. 2018 – Co-organizer of the PhD student seminar, LPSM, Sorbonne Université, Paris, France.
August 2019

Additional work experience

2012 – 2015 **IDEXX Laboratories**, Alfortville, Saint-Denis, France & Hoofddorp, the Netherlands. Company specialized in products and services for companion animal veterinarians, livestock and poultry veterinarians, water and dairy product testing.

2006 – 2008 Technical support for in-clinic (veterinarians) analyzers, non-medical client counselor for in-lab analyses, responsible of the training of customer support representatives.