Johannes Lutzeyer

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EDUCATION

Imperial College London

Oct. 2015 – Feb. 2020 PhD in Statistics (funded by: EPSRC) — supervised by Prof. Andrew T. Walden
"Network Representation Matrices and their Eigenproperties: A Comparative Study"
- Topic includes: community detection, graphical and latent space modelling, and spectral analysis.
- Lecture subjects include: Deep Learning; Wavelets and Applications; Topics in Large Dimensional Data Processing; Graph Theory; Random Matrix Theory; Statistical Methods for Big Data.
- Undertaking research work to solve advanced statistical and mathematical problems, contributing to and understanding the current statistical research literature and communicating technical solutions clearly in written and oral form.

Oct. 2014 – Sept. 2015 MSc Statistics (Distinction, funded by: "Studienstiftung des deutschen Volkes")
- Thesis title: "Automated Control Point Image Registration" – supervised by Dr. Edward A. K.Cohen.
- Main Subjects: Non-Parametric Smoothing and Wavelets; Time Series; Computational Statistics; Applied Statistics; Bayesian Data Analysis; Statistics for Extreme Events; Graphical Models.
- Built up a very well founded applied and theoretical knowledge of Statistics. It ensures complete understanding of the basis and comprehension of the advanced issues in Statistics.

Oct. 2011 – June 2014 BSc Mathematics (First Class Honours)
- Main Subjects: Scientific Computation (Introduction to C); Statistical Pattern Recognition; Group Theory; Applied Probability; Statistical Modelling; Stochastic Simulation; Games Risks and Decisions.
- These subjects provide me with a good basis to analyse data and understand statistical models. This degree equips me with the skill to systematically break up and solve problems.

European Baccalaureate (Final Grade: 92%)

Sept. 2001 – July 2011 European School Brussels Woluwe
- Subjects included: Mathematics, Physics, Chemistry, Biology, Philosophy and ICT.

WORK EXPERIENCE

Assistant Professor in the Data Science and Mining (DaSciM) Team

Sept. 2022 – Present Laboratoire d'Informatique (LIX), École Polytechnique, Institut Polytechnique de Paris
- Conducting research in the areas of Graph Representation Learning and Graph Neural Networks.
- Co-coordinating the "Projects Scientifique Collectif (PSC)" in the second year of the Cycle Ingénieur polytechnicien program in Computer Science.
- Contributing to the teaching of: Machine & Deep Learning (B3/M1), Advanced Learning for Text and Graph Data (M2), Data Science Starter Program, Image Analysis and Computer Vision (B3/M1), Machine Learning (B2), Advanced Deep Learning (B3/M1).
- Organising and running weekly seminar series (speaker recruitment, advertisements, chairing sessions).
- Co-supervising two PhD students, one M1 intern and three B3 student projects.

Postdoctoral Researcher in the Data Science and Mining (DaSciM) Team

March 2020 – Aug. 2022 Laboratoire d'Informatique (LIX), École Polytechnique, Institut Polytechnique de Paris
- Conducting research in the areas of Graph Representation Learning and Graph Neural Networks.
- Awarded Seal of Excellence from the European Commission for a MSCA proposal submitted to H2020 and assisting in the submission of 1 ANR and 3 CAP Digital funding proposals.
- Responsible for the project management of DaSciM's research collaboration with SEPHORA & LVMH.
- Organising and running weekly seminar series (speaker recruitment, advertisements, chairing sessions).
- Closely collaborating with and participating in the supervision of two M1 and five PhD students.
- Contributing to the groups' teaching effort in four different courses.

Oct. 2014 – Sept. 2019 **Graduate Teaching Assistant (GTA) and Tutor**
Imperial College London
- Awarded Associate Fellowship of the Higher Education Academy (AFHEA) for my conscious approach and significant contribution to the Department's teaching.
- GTA tasks include: preparing and delivering lectures on test solutions, demonstrating in problem classes, providing feedback to lecturers to improve the courses and marking of coursework and exams.
- Privately tutored an MSc Statistics student in "Fundamentals of Statistical Inference."

June 2015 – Sept. 2019 **Subwarden**
Gabor Hall, Imperial College London
- Responsible for supporting students suffering from mental instability/health issues, scheduling and leading of discipline meetings and running of large-scale events with 50-400 attendees.
- Holding an emergency phone acting as a point of first contact.
- Reviewing subwarden and senior applications and being part of the interview panel on 12 occasions.
- Requires a high amount of teamwork in the warden team and effective leadership to coordinate the team of 8 UG seniors in order to run social hall events.
- Training courses: Mental Health First Aid, Emergency First Aid at Work, Fire Prevention, Subwarden training day (learning how to lead discussions in a range of scenarios aided by professional actors).

July – Aug. 2014 **Business Intelligence Intern**
Rocket Internet, Berlin
- Worked in a team to build and maintain the business reporting system of several start-ups. This included extracting data from several sources, loading it to a data warehouse and then processing it.
- Independently designed and coded a quality assurance tool guaranteeing integrity of database loads.
- Further developed ability to work under pressure and facilitated frictionless communication in a team.

July 2012 – June 2015 **Hall Senior**
Falmouth & Keogh Hall, Imperial College London
- Worked in a team of 10 students and one lecturer to help 150 new students in our hall to settle in London and organised and ran large scale events such as: trips to European capitals and parties.
- Requires a great deal of teamwork, crowd management and ability to organise large events.

ACHIEVEMENTS

Invited Talks
- "Path Neural Networks: Expressive and Accurate Graph Neural Networks," (*Plenary talk*), 2nd ELLIS UnConference, July 2023. Link to Event Page.
- "Recent Advances in Graph Neural Networks," Graphs Guild of Lloyds Banking Group, July 2023.
- "Message Passing In Graph Neural Networks," Learning on Graphs Meetup Paris, June 2023. Link to Event Page.
- "Recent Trends in Graph Representation Learning," Seminar Series of the Laboratoire Modélisation, Information & Systèmes in Amiens, June 2023.
- "Advances in Graph Representation Learning: The Graph Ordering Attention Networks," Seminaire Palaisien, February 2023. Link to Event Page.
- "Different Approaches To Message Passing In Graph Neural Networks," Amazon Graph Machine Learning Reading Group, January 2023.
- "Graph Representation Learning via Graph Neural Networks," LIX Seminar Series, October 2022. Link to Event Page & Recording.
- "Graph Ordering Attention Networks," Learning on Graphs and Geometry Reading Group, June 2022. Link to Event Page & YouTube Recording.
- "Graph Shift Operators and Their Relevance to Graph Neural Networks" (*Keynote talk*), Recent Advances in Graph Machine Learning Workshop, March 2022. Link to Event Page.
- "Learning Parametrised Graph Shift Operators," Learning on Graphs and Geometry Reading Group, January 2022. Link to Event Page & YouTube Recording.
- "Extending the Davis-Kahan theorem for the comparison of embedding spaces spanned by eigenvectors," LIX Data Science & Machine Learning Seminar, February 2020. Link to Event Page.

Funding
- "Artificial Intelligence Methodology and Resources to Accelerate Drug Discovery," *Carnot Label Grant*, 18 months, 60 000€, 2022.
- "Thirty-seventh Conference on Neural Information Processing Systems," *Biomedical Engineering (BME) Conference Fellowship, E4H, EUR – Bertip (ANR 18EURE0002)*, 3 700€, 2022.

Prizes

- Member of the winning team: "Medical data dive" – 5 day hackathon, Imperial College London, 2019.
- Winton Capital Prize for overall best student in my MSc cohort, 2015.
- Warner Prize for best MSc project in my MSc cohort, 2015.

Memberships

- Alumni of German National Academic Foundation ("Studienstiftung des deutschen Volkes"), which has a very competitive selection process. Active membership Jan. 2012 - Sept. 2015.
- Member of the alumni organization "Club der Ehemaligen der Deutschen Schüler Akademien" after being selected to participate in a 2-week course on Complex Chemistry in 2010.

Summer Academies

- "Scientific Computing in the age of Exascale" – 2-week-long academy to which I contributed a presentation entitled: "Fault tolerant GMRES and Inner-Outer solvers," Krakow, 2014.
- "Randomised Algorithms and Randomness" – 2-week-long academy to which I contributed a presentation entitled: "Multiplicative hashing and the closest pair problem in linear time," Görlitz, 2013.

PUBLICATIONS

Peer-reviewed Publications

- G. Michel, G. Nikolentzos, J. F. Lutzeyer & M. Vazirgiannis, "Path Neural Networks: Expressive and Accurate Graph Neural Networks," *Proceedings of the 40th International Conference on Machine Learning (ICML)*, 2023.
- B. Doerr, A. Dremaux, J. F. Lutzeyer & A. Stumpf, "How the move acceptance hyper-heuristic copes with local optima: drastic differences between jumps and cliffs," *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, 2023.
- M. Chatzianastasis, J. F. Lutzeyer, G. Dasoulas & M. Vazirgiannis, "Graph Ordering Attention Networks," *AAAI Conference on Artificial Intelligence (AAAI)*, 2023.
- G. Salha-Galvan, J. F. Lutzeyer, G. Dasoulas, R. Hennequin & M. Vazirgiannis, "New Frontiers in Graph Autoencoders: Joint Community Detection and Link Prediction," *NeurIPS New Frontiers in Graph Learning Workshop*, 2022.
- A. R. Ramos Vela, J. F. Lutzeyer, A. Giovanidis & M. Vazirgiannis, "Improving Graph Neural Networks at Scale: Combining Approximate PageRank and CoreRank," *NeurIPS New Frontiers in Graph Learning Workshop*, 2022.
- A. Qabel, S. Ennadir, G. Nikolentzos, J. F. Lutzeyer, M. Chatzianastasis, H. Bostrom & M. Vazirgiannis, "Structure-Aware Antibiotic Resistance Classification Using Graph Neural Networks," *NeurIPS AI for Science Workshop*, 2022.
- G. Salha-Galvan, J. F. Lutzeyer, G. Dasoulas, R. Hennequin & M. Vazirgiannis, "Modularity-Aware Graph Autoencoders for Joint Community Detection and Link Prediction," *Neural Networks*, vol. 153, pp. 474–495, 2022.
- J. F. Lutzeyer*, C. Wu* & M. Vazirgiannis, "Sparsifying the Update Step in Graph Neural Networks," *ICLR Workshop on Geometrical and Topological Representation Learning*, 2022. *equal contribution
- M. E. A. Seddik, C. Wu, J. F. Lutzeyer & M. Vazirgiannis, "Node Feature Kernels Increase Graph Convolutional Network Robustness," *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2022.
- G. Dasoulas*, J. F. Lutzeyer* & M. Vazirgiannis, "Learning Parametrised Graph Shift Operators," *International Conference of Learning Representations (ICLR)*, 2021. *equal contribution
- J. F. Lutzeyer & A. T. Walden, "Comparing Spectra of Graph Shift Operator Matrices," *International Conference on Complex Networks and their Applications*, 2020.

Published Preprints

- J. F. Lutzeyer & A. T. Walden, "Extending the Davis-Kahan theorem for comparing eigenvectors of two symmetric matrices I: Theory," *arXiv:1908.03462*, 2019.
- J. F. Lutzeyer & A. T. Walden, "Extending the Davis-Kahan theorem for comparing eigenvectors of two symmetric matrices II: Computation and Applications," *arXiv:1908.03465*, 2019.
- J. F. Lutzeyer & E. A. K. Cohen, "Correcting the estimator for the mean vectors in a multivariate errors-in-variables regression model," *arXiv:1510.03600*, 2015.

TEACHING EXPERIENCE

2023 "*INF554: Machine and Deep Learning*" (150 B3/M1 students, École Polytechnique)
36 hours – teaching labs (Python).
"*INF537: Image Analysis and Computer Vision*" (60 B3/M1 students, École Polytechnique)
23 hours – teaching lectures (2 hours) and labs (21 hours, Python);
marking oral (27) and written assessments (120).
"*CSE204: Machine Learning*" (80 B2, École Polytechnique)
22 hours – teaching labs (Python); marking oral (9) and written assessments (200).
"*Data Science Starter Program*" (20 professionals, École Polytechnique Executive Education)
3.5 hours – teaching lectures.
"*INF592: Internship in Data Science*" (10 B3/M1 students, École Polytechnique)
10 hours – member of 10 defense juries.
"*Research Internship*" (1 M1 student, École Polytechnique)
12 weeks – drafted project abstract; supervised student in weekly meetings.

2022 "*Advanced Learning for Text and Graph Data*" (60 M2 students, MVA Master)
6 hours – teaching labs (Python).
"*INF554: Machine and Deep Learning*" (150 B3/M1 students, École Polytechnique)
36 hours – teaching labs (Python); marking oral (15) and written assessments (22).
"*INF537: Image Analysis and Computer Vision*" (60 B3/M1 students, École Polytechnique)
23 hours – teaching lectures (2 hours) and labs (21 hours, Python);
marking oral (27) and written assessments (120).
"*Data Mining*" (15 M1 students, SPEIT - ParisTech Shanghai Jiao Tong Partnership)
3 hours – teaching labs (Python).
"*Data Science Starter Program*" (20 professionals, École Polytechnique Executive Education)
17.5 hours – teaching lectures (14 hours) and labs (3.5 hours, Python).
"*Research Internship*" (1 M1 student, École Polytechnique)
15 weeks – co-drafted project abstract; co-supervised student in weekly meetings.

2021 "*Advanced Learning for Text and Graph Data*" (60 M2 students, MVA Master)
8 hours – teaching labs (Python); marking oral (11) and written assessments (33).
"*INF554: Machine and Deep Learning*" (150 B3/M1 students, École Polytechnique)
18 hours – teaching labs (Python); marking oral (14) and written assessments (23).
"*Data Mining*" (11 M1 students, SPEIT - ParisTech Shanghai Jiao Tong Partnership)
7.5 hours – teaching labs (Python); marking written assessments (11).
"*Data Science Starter Program*" (20 professionals, École Polytechnique Executive Education)
35 hours – teaching lectures (14 hours) and labs (21 hours, Python).

2020 "*Advanced Learning for Text and Graph Data*" (60 M2 students, MVA Master)
4 hours – teaching labs (Python); marking oral (6) and written assessments (16).
"*INF554: Machine and Deep Learning*" (150 B3/M1 students, École Polytechnique)
18 hours – teaching labs (Python); marking oral (14) and written assessments (16).
"*Data Science Starter Program*" (20 professionals, École Polytechnique Executive Education)
14 hours – teaching labs (Python).

2017 "*M2S1: Probability and Statistics II*" (200 B2 students, Imperial College London)
11 hours – lecturing test solutions (1 hour); teaching labs(10 hours);
marking written assessments (135).
"*M34S2: Statistical Modelling II*" (100 B3/M1 students, Imperial College London)
10 hours – teaching labs (`R`); marking written assessments (30).
"*M1S: Probability and Statistics I*" (250 B1 students, Imperial College London)
second marking 2 hour exams for all 250 students.

2016 "*M1S: Probability and Statistics I*" (250 B1 students, Imperial College London)
10 hours – teaching labs; marking written assessments (135);
invigilating January exam.
"*M2S2: Statistical Modelling I*" (150 B2 students, Imperial College London)
second marking 2 hour exams for all 150 students.

2015 "*M1S: Probability and Statistics I*" (250 B1 students, Imperial College London)
10 hours – teaching labs; marking written assessments (135).
"*M345S8: Time Series*" (112 B3/M1 students, Imperial College London)
marking written assessments (112).
"*Drop-In Problem Class*" (250 B1/B2 students, Imperial College London)
10 hours – teaching labs.
"*Student Tutorial*" (5 B1 students, Imperial College London)
10 hours – teaching tutorials with freedom to design content.

REVIEWING ACTIVITY

2023 *Conference on Neural Information Processing Systems*, (6 reviews)

2022 - Present *Transactions on Intelligent Systems and Technology*, ACM (3 reviews)
2022 *Book Proposal on a Topic Related to Graphs*, Cambridge University Press (1 review)
2022 *Learning on Graphs Conference*, (2 reviews)

2021 - Present *Transactions on Knowledge and Data Engineering*, IEEE (13 reviews)
2021 - Present *Applied Intelligence*, Springer (18 reviews)
2021 - Present *Neurocomputing*, Elsevier (4 reviews)

2021 *Mathematics*, MDPI (3 reviews)
2021 *Symmetry*, MDPI (2 reviews)
2021 *Semantic Web Journal*, IOS Press (2 reviews)
2019 *Nonlinear Theory and Its Applications*, IEICE (2 reviews)

PERSONAL SKILLS

Languages German (mother tongue), English (Fluent), French (Intermediate)

Computer Proficient use of Python (Tensorflow, PyTorch), `R`, MATLAB, SQL, C and Maple.

Communication
- Interpersonal skills (gained as a Subwarden responsible for UG student welfare, when working with business partners of Rocket Internet and as Representative on open day events at Imperial College).
- International and multilingual communication (highly international environment at the European School of Brussels, at Imperial College London and at École Polytechnique).
- Public speaking, e.g., lecturing test solutions to 200 UG students at Imperial College London & labs to 150 UG students at École Polytechnique.

Organisational / Managerial
- Experienced organiser and self-confident (after planning and running numerous big scale events).
- Leadership (leading the hall senior team and as Imperial Ambassador at a Robotics Summer School).