Johannes Lutzeyer

ightharpoonup johannes[dot]lutzeyer[at]polytechnique.edu

EDUCATION		
Oct. 2015 – Feb. 2020	Imperial College London 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.	
Sept. 2001 – July 2011	European Baccalaureate (Final Grade: 92%) European School Brussels Woluwe - Subjects included: Mathematics, Physics, Chemistry, Biology, Philosophy and ICT.	
WORK EXPERIENCE		
Sept. 2022 – Present	Assistant Professor in the Data Science and Mining (DaSciM) Team Laboratoire d'Informatique (LIX), École Polytechnique, Institut Polytechnique de Paris Conducting research in the areas of Graph Representation Learning and Graph Neural Networks. Co-responsible for the MScT in "AI and Advanced Visual Computing" at École Polytechnique. Co-coordinating the "Projects Scientifique Collectif (PSC)" in the second year of the Cycle Ingénieur polytechnicien program in Computer Science. Co-supervising four PhD students, three M1 interns and two X3 student projects.	
March 2020 – Aug. 2022	Postdoctoral Researcher in the Data Science and Mining (DaSciM) Team 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. 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 - Graduate Teaching Assistant (GTA) and Tutor

Sept. 2019 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 – Subwarden

Sept. 2019 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. Business Intelligence Intern

- 2014 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 - Hall Senior

June 2015 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.

Invited Talks

- "Frustration Tolerance and Other Skills To Aquire,", LIX PhD and PostDoc Seminar "Dreams vs Reality", May 2025.
- "We Need Metrics for the Localisation and Factorisation of Learning Tasks on Graphs,", NITMB Workshop on "New Developments in the Theory and Methodology of Graph Neural Networks", April 2025. Link to Event Page.
- "Understanding Virtual Nodes in Graph Neural Networks: Oversmoothing, Oversquashing and Node Heterogeneity," (Keynote talk), GdR Day on Learning and Graphs, March 2025. Link to Event Page.
- "An Analysis of Virtual Nodes in Graph Neural Networks," GeomeriX Group Seminar, March 2025. Link to Event Page.
- "Methodological Advances in Graph Neural Networks," Ericsson Research, December 2024.
- "Graph Learning for and with Graph Neural Networks," (Keynote talk), GdR Graph Learning Day, June 2024. Link to Event Page.
- "Recent Advances in Graph Neural Network Robustness," AIDRC Seminar Series, May 2024. Link to Event Page.
- "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.

Invited Talks (Continued)

- "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

- "GraspGNNs: Graph Shift Operators for, in and from Graph Neural Networks," ANR JCJC (Coordinator), 335 279€, 2025.
- "DGSP: Dynamical Graph Signal Processing," ANR PRC (Scientific Team Member), 355 071€, 2025.
- "Artificial Intelligence Methodology and Resources to Accelerate Drug Discovery," (Continuation Project) Carnot Label Grant, 18 months, 60 000€, 2024.
- "HistoGraph: Multi-Site Multi-Modal Histopathological Diagnostic Support using Graph Representations," ANR PRC (Scientific Manager), 167 980€, 2024.
- "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

- Top Reviewer Award, Learning on Graphs Conference (LOG), 2024.
- Best Reviewer Award, International Conference on Machine Learning (ICML), 2024.
- Top Reviewer Award, Conference on Neural Information Processing Systems (NeurIPS), 2023.
- 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.

Event Organisation

- Co-organiser of the Paris Learning on Graphs Meetup accompanying the Learning on Graphs Conference (LOG), 2023 & 2024. Link to Event Page.
- Organiser of weekly DaSciM seminar series (speaker recruitment, advertisements, chairing sessions).

Thesis Committees

- Member of the Comité de Suivi of Jérémie Dentan, Ecole Polytechnique, IP Paris, September 2025.
- Member of the Comité de Suivi of Hugo Attali, Paris Sorbonne Nord, LIPN, September 2024.
- Member of the Comité de Suivi of Andjela Todorovic, LTCI, Telecom Paris, IPP, June 2024.
- Reviewer at the PhD Defense of Admir Selimovic, ETH Zurich, May 2024.
- Member of the Comité de Suivi of Nouamane Arhachoui, Sorbonne Université, LIP6,
 October 2023 & 2024.

Memberships

- Professional member of the Association for Computing Machinery (ACM), Jan. 2023 Dec. 2023.
- 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.

Peer-reviewed Publications

Y. Abbahaddou, F. D. Malliaros, J. F. Lutzeyer, A. M. Aboussalah & M. Vazirgiannis, "Graph Neural Network Generalization with Gaussian Mixture Model Based Augmentation," *International Confer*ence on Machine Learning (ICML), 2025.

- A. Bendahi, B. Doerr, A. Fradin & J. F. Lutzeyer, "Speeding Up Hyper-Heuristics With Markov-Chain Operator Selection and the Only-Worsening Acceptance Operator," *International Joint Conference on Artificial Intelligence (IJCAI)*, 2025.
- N. Kormann, M. Ramuz, Z. Nisar, N. S. Schaadt, H. Annuth, B. Doerr, F. Feuerhake, T. Lampert & J. F. Lutzeyer, "HIEGNet: A Heterogenous Graph Neural Network Including the Immune Environment in Glomeruli Classification," Medical Imaging with Deep Learning Conference (MIDL), 2025.
- J. Southern, F. Di Giovanni, M. Bronstein & J. F. Lutzeyer, "Understanding Virtual Nodes: Over-smoothing, Oversquashing, and Node Heterogeneity," International Conference on Learning Representations (ICLR), 2025.
- S. Ennadir, J. F. Lutzeyer, M. Vazirgiannis & E. H. Bergou, "If You Want to Be Robust, Be Wary of Initialization," Conference on Neural Information Processing Systems (NeurIPS), 2024.
- Y. Abbahaddou, S. Ennadir, J. F. Lutzeyer, M. Vazirgiannis & H. Boström, "Bounding the Expected Robustness of Graph Neural Networks Subject to Node Feature Attacks," *International Conference* on Learning Representations(ICLR), 2024.
- S. Ennadir, Y. Abbahaddou, J. F. Lutzeyer, M. Vazirgiannis & H. Boström, "A Simple and Yet Fairly Effective Defense for Graph Neural Networks," Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI), 2024.
- Y. Abbahaddou, J. F. Lutzeyer & M. Vazirgiannis, "Graph Neural Networks on Discriminative Graphs of Words," NeurIPS New Frontiers in Graph Learning Workshop, 2023.
- 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.

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"Advanced Deep Learning" (132 B3/M1 students, École Polytechnique)
2025
           12 hours – teaching lectures (6 hours) and labs (6 hours, Python);
                      marking oral (22) and written assessments (44).
       "Deep Learning" (32 B3/M1 students, SPEIT Shanghai Jiao Tong University)
           24 hours – teaching lectures (12 hours) and labs (12 hours, Python);
                      marking oral assessments (13).
       "CSE204: Machine Learning" (99 B2, École Polytechnique)
            4 hours – teaching labs (Python).
       "INF592: Internship in Data Science" (3 B3/M1 students, École Polytechnique)
            3 hours – member of 3 defense juries.
       "Advanced Deep Learning" (53 B3/M1 students, École Polytechnique)
2024
           12 hours – teaching lectures (6 hours) and labs (6 hours, Python);
                      marking oral (10) and written assessments (13).
       "Deep Learning" (26 B3/M1 students, SPEIT Shanghai Jiao Tong University)
           24 hours – teaching lectures (12 hours) and labs (12 hours, Python);
                      marking oral assessments (10).
       "Advanced Learning for Text and Graph Data" (128 M2 students, MVA Master)
           8 hours – teaching labs (Python); marking oral (18) and written assessments (64).
       "INF554: Machine and Deep Learning" (150 B3/M1 students, École Polytechnique)
           36 hours – teaching labs (Python).
       "CSE204: Machine Learning" (80 B2, École Polytechnique)
           22 hours – teaching labs (Python); marking oral assessments (6).
       "INF592: Internship in Data Science" (2 B3/M1 students, École Polytechnique)
            2 hours – member of 2 defense juries.
2023
       "Advanced Learning for Text and Graph Data" (132 M2 students, MVA Master)
           8 hours – teaching labs (Python); marking oral (16) and written assessments (67).
       "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, Ecole 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, Ecole Polytechnique)
           12 hours – member of 12 defense juries.
       "Research Internship" (1 M1 student, École Polytechnique)
           12 weeks – drafted project abstract; supervised student in weekly meetings.
       "Advanced Learning for Text and Graph Data" (80 M2 students, MVA Master)
2022
           6 hours – teaching labs (Python); marking oral (11) and written assessments (40).
       "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)
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15 weeks – co-drafted project abstract; co-supervised student in weekly meetings.

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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).
       "M2S1: Probability and Statistics II" (200 B2 students, Imperial College London)
2017
           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.
       "M1S: Probability and Statistics I" (250 B1 students, Imperial College London)
2015
           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.
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"Advanced Learning for Text and Graph Data" (60 M2 students, MVA Master)

REVIEWING ACTIVITY

2021

2025 2025	Area Chair at International Conference on Machine Learning (ICML) (12 papers) Research Proposal, French National Research Agency – ANR (1 review)
2024 - Present 2024 2024	Area Chair at Conference on Neural Information Processing Systems (NeurIPS) (26 papers) International Conference on Machine Learning (ICML) (6 reviews) [Award] Expert Systems With Applications, Elsevier (1 review)
2023 - Present 2023 - Present 2023	Transactions on Machine Learning Research (TMLR) (2 reviews) International Conference on Learning Representations (ICLR) (5 reviews) Conference on Neural Information Processing Systems (NeurIPS) (6 reviews) [Award]
2022 2022 - Present 2022 - Present	Book Proposal on a Topic Related to Graphs, Cambridge University Press (1 review) Transactions on Intelligent Systems and Technology, ACM (3 reviews) Learning on Graphs Conference (6 reviews) [Award in 2024]
2021 - Present 2021 - Present 2021 - Present	Transactions on Knowledge and Data Engineering, IEEE (14 reviews) Applied Intelligence, Springer (18 reviews) Neurocomputing, Elsevier (4 reviews)

2021 2021 2021 2019	Mathematics, MDPI (3 reviews) Symmetry, MDPI (2 reviews) Semantic Web Journal, IOS Press (2 reviews) 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). 	