Fernando Moreno-Pino, PhD

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Positions

- **Oxford-Man Institute, University of Oxford** — Oxford, UK
  Postdoctoral Researcher — *Aug. 2023 - Present*
  - **Summary**: My research lies at the intersection of deep learning, probabilistic Machine Learning (ML), and quantitative finance. I have led multiple first-author research projects on ML methods for spatio-temporal and sequential modeling and their application in quantitative finance, publishing in top venues in both fields.
  - **(Some) current projects**: Rough paths theory for efficient spatio-temporal Transformers for very long time-series, spectral robust contrastive learning for noisy time-series, and survival analysis of limit orders in the LOB.
- **Mathematical Institute, University of Oxford** — Oxford, UK
  Teaching Assistant — *Aug. 2023 - Present*
  - **Summary**: Teaching the deep learning course at the MSc in Mathematical and Computational Finance, University of Oxford.
- **Universidad Carlos III de Madrid** — Madrid, Spain
  Research & Teaching Associate, Signal Processing and Learning Group — *Sep. 2018 - July 2023*
  - **Supervisor**: Prof. Dr. Antonio Artés Rodríguez.
  - **Summary**: I collaborated with Universidad Carlos III de Madrid in teaching and research activities.
- **Oxford-Man Institute, University of Oxford** — Oxford, UK
  Visiting Researcher. Founded by MAN Group — *May 2022 - Oct. 2022*
  - **Supervisor**: Dr. Stefan Zohren.
  - **Summary**: Studying and developing of novel neural-based methods for the problems of assets' volatility forecasting and estimation of fill probabilities in Limit Order Books (LOB).
- **Universidad Carlos III de Madrid** — Madrid, Spain
  Research Assistant, Signal Processing and Learning Group — *Dec. 2017 - Sep. 2018*
  - **Supervisor**: Prof. Dr. Antonio Artés Rodríguez.
  - **Summary**: My work focused on applying Machine Learning techniques for the Human Activity Recognition (HAR) problem.
- **Universidad de Málaga** — Málaga, Spain
  Research Assistant, Department of Programming Languages and Computer Science — *Jan. 2016 - Sep. 2016*
  - **Supervisor**: Prof. Dr. Pedro Merino Gómez.
  - **Summary**: Research on low latency communication systems software at the MORSE Research Group.

Education

- **Universidad Carlos III de Madrid** — Madrid, Spain
  PhD Candidate in Probabilistic Machine Learning and Deep Learning (Cum Laude). — *Sep. 2018 – May. 2023*
  - **Dissertation**: "Deep Attentive Time Series Modelling for Quantitative Finance"
  - **Advisors**: Prof. Dr. Antonio Artés Rodríguez and Dr. Pablo Martínez Olmos.
  - **Research**: My research included probabilistic machine learning methods, signal processing techniques integration into deep-learning architectures, the development of deep neural networks (as Transformer-based models) for time-series modelling and forecasting, and the application of ML techniques to quantitative finance-related problems. Previously, I worked with heterogeneous models for high dimensional data.
- **Universidad Carlos III de Madrid** — Madrid, Spain
  M.Sc. in Telecommunications Engineering (Electrical Engineering) — *Sep. 2016 – Jul. 2018*

- **Universidad de Málaga** Málaga, Spain
  B.Sc. in Telecommunications Engineering (Electrical Engineering) *Sep. 2012 – Jul. 2016*
  - **Graduated with Honors**: Best academic record of the class.

Publications

- **Moreno-Pino, F.***, Arroyo, Á.*, Waldon, H.*, Dong, X., Cartea, Á. (2024). Rough Transformers: Lightweight and Continuous Time Series Modelling through Signature Patching. In Advances in Neural Information Processing Systems 38 (NeurIPS), 2024.
- **Moreno-Pino, F.**, Zohren, S. (2022). DeepVol: Volatility Forecasting from High-Frequency Data with Dilated Causal Convolutions. In Quantitative Finance, Taylor & Francis, 2024.
- **Moreno-Pino, F.***, Arroyo, Á.*, Waldon, H.*, Dong, X., Cartea, Á. (2024). Rough Transformers: Lightweight Continuous-Time Sequence Modelling with Path Signatures. In "Next Generation of Sequence Modeling Architectures" workshop, ICML 2024.
- **Moreno-Pino, F.***, Arroyo, Á.*, Waldon, H.*, Dong, X., Cartea, Á. (2024). Rough Transformers for Continuous and Efficient Time-Series Modelling. In "Learning from Time Series for Health" workshop, ICLR 2024.
- **Moreno-Pino, F.**, Olmos, P. M., & Artés-Rodríguez, A. (2023). Deep Autoregressive Models with Spectral Attention. In Pattern Recognition, Elsevier, 2023.
- Jiménez Rama, Ó., **Moreno-Pino, F.**, Ramírez, D., Olmos, P.M. (2023). Interpretable Spectral Variational AutoEncoder (ISVAE) for time series clustering. arXiv preprint arXiv:2310.11940.
- Arroyo, Á*., Cartea, Á., **Moreno-Pino, F.*** & Zohren, S. (2023). Deep Attentive Survival Analysis in Limit Order Books: Estimating Fill Probabilities with Convolutional-Transformers. Presented at Euro Working Group on Commodities and Financial Modelling (EWGCFM) 2023 & in Quantitative Finance, Taylor & Francis, 2023.
- Martínez-García, M.*, **Moreno-Pino, F.***, Olmos, P. M., & Artés-Rodríguez, A. (2023). Sleep Activity Recognition and Characterization from Multi-Source Passively Sensed Data. arXiv preprint arXiv:2301.10156.
- **Moreno-Pino, F.**, Martínez-García, M., Olmos, P. M., & Artés-Rodríguez, A. (2022). Heterogeneous Hidden Markov Models for Sleep Activity Recognition from Multi-Source Passively Sensed Data. Accepted at ML4H 2022, collocated with NeurIPS.
- **Moreno-Pino, F.**, Sükei, E., Olmos, P. M., & Artés-Rodríguez, A. (2022). PyHHMM: A Python Library for Heterogeneous Hidden Markov Models. arXiv preprint arXiv:2201.06968, submitted to the Journal of Machine Learning Research, Machine Learning Open Source Software section.
- Ríos-Muñoz, G. R., **Moreno-Pino, F.**, Soto, N., M. Olmos, P. , Artés-Rodríguez, A., Ferández-Avilés, F., & Arenal, A. (2020). Hidden Markov Models for Activity Detection in Atrial Fibrillation Electrograms. In 2020 Computing in Cardiology (pp. 1-4). IEEE.
- **Moreno-Pino, F.**, Porras-Segovia, A., López-Esteban, P., Artés, A., & Baca-García, E. (2019). Validation of Fitbit Charge 2 and Fitbit Alta HR against polysomnography for assessing sleep in adults with obstructive sleep apnea. Journal of Clinical Sleep Medicine, 15(11), 1645-1653.

Others

- **Moreno-Pino, F.**, Artés-Rodríguez, A. (2019). Human Activity Recognition in Psychiatric Patients through Heterogeneous Hidden Markov Models. Machine Learning Summer School (MLSS), Moscow, Russia (Poster).
- **Moreno-Pino, F.**, Artés-Rodríguez, A. (2018). Sleep Activity Recognition through Hidden Markov Models. Data Science Summer School (DS3), Paris, France (Poster).

*Denotes co-first authors with equal contributions.

Teaching

- **Engineering Science, University of Oxford** — Oxford, UK
  Tutor at the Intelligent Earth Centre for Doctoral Training — *Jan. 2025 – Present*
  - **Deep Learning for Time Series Forecasting**: 2025 – Present.
- **Magdalen College, University of Oxford** — Oxford, UK
  Tutor at the "Oxford Study Abroad Programme" for Visiting BSc and MSc Students — *Sep. 2023 – Present*
  - **Deep Learning**: 2024 – Present.
- **Mathematical Institute, University of Oxford** — Oxford, UK
  Teaching Assistant at the MSc in Mathematical and Computational Finance — *Sep. 2023 – Present*
  - **Deep Learning** : 2023 – Present.
- **BBVA** — Madrid, Spain
  Teaching Staff, Associated with Fundación Universidad Carlos III — *Sep. 2021 – Present*
  - **Advanced Machine Learning and Feature Engineering Course**: 2022 – Present
  - **Natural Language Processing (NLP) Course**: 2021 – Present
- **Universidad Carlos III de Madrid** — Madrid, Spain
  Reader (Lecturer) & Teaching Assistant –Bachelor in Electrical Engineering — *Sep. 2018 – July 2023*
  - **Signals and Systems**: 1st Semester 2023 (30 hours).
  - **Machine Learning II**: 1st Semester 2021 (38 hours).
  - **Bayesian Machine Learning, Modern Theory of Detection and Estimation**: 1st Semester 2018 – 2019 (61 hours).
  - **Communications Theory**: 1st Semester 2018 – 2019, 2023 (102 hours).
  - **Linear Systems**: 1st Semester 2018 (11 hours).

Honor and Awards

- **MAN Group & OMI's Visitors Programme Fellowship (2022)**: My research visit at Oxford-Man Institute during my PhD was funded by the OMI's Visitors Programme (7200£).
- **UC3M Research Mobility Fellowship (July-October 2022)**: Fellowship to conduct research at the University of Oxford (4716€).
- **FPU Research Mobility Fellowship (May-July 2022)**: Fellowship to conduct research at the University of Oxford (4095€).
- **FPU Grant (2018-2022)**: My PhD was funded by the Spanish Ministry of Education after a nationwide competitive selection process (60996,12€).
- **Research Fellowship, Signal Processing and Learning Group, Universidad Carlos III de Madrid (2017)**: Awarded funding to support research for my M.Sc. dissertation (€5,250).
- **Talentia Scholarship by "Junta de Andalucía" (2017, declined)**: Two years scholarship to complete the Master of Engineering at Cornell University's New York campus (62092,68€).
- **'Premios Extraordinarios de Fin de Estudios' (2016)**: This prize rewards the student with the best academic record, granted by Universidad de Málaga for my Bachelor studies.
- **'Premios Ingenio', Finalist (2016)**: These prizes award the best thesis of the year on the field of Telecommunications Engineering, in the Region of Andalusia, Spain.
- **Research Fellowship, Department of Computer Science and Programming Languages, Universidad de Málaga (2016)**: Awarded funding to support research for my B.Sc. dissertation (€2,074).

Reviewing

- **Neural Networks**: Since 2025.
- **Neural Information Processing Systems (NeurIPS)**: Since 2024 (Reviewer and workshop proposals reviewer).
- **Journal of Applied Mathematical Finance**: Since 2024.
- **Artificial Intelligence and Statistics (AISTATS)**: Since 2023.
- **Artificial ACM International Conference on AI in Finance (ICAIF)**: Since 2023.
- **Journal of Quantitative Finance**: Since 2023.
- **Pattern Recognition**: Since 2022.
- **AAAI Conference on Artificial Intelligence**: Since 2022.
- **IEEE Transactions on Neural Networks and Learning Systems**: Since 2021.
- **Journal of Biomedical and Health Informatics (JBHI)**: 2020-2023.

Committees

- **International Conference on AI in Finance (ICAIF)**: 2023 (Program Committee).

Talks

- **SIAM Conference on Financial Mathematics and Engineering** — Miami, US
  Generative AI in Finance — *[Upcoming] Jul. 2025*
- **Department of Engineering Mathematics, University of Bristol** — Bristol, UK
  Rough Transformers — *[Upcoming] Jun. 2025*
- **Quantitative Risk Management and Mathematical Finance, University of Vienna** — Vienna, Austria
  Neural Dynamical Systems for Time-Series Data — *Apr. 2025*
- **Invited Talk at Citi Bank** — New York, US
  Rough Transformers: Lightweight and Continuous Time Series Modelling through Signature Patching — *Mar. 2025*
- **The Alan Turing Institute & Mathematical Institute, University of Oxford** — London, UK
  Bridging Rough Paths and Deep Learning: New Frontiers [Video] — *Nov. 2024*
- **Oxford-Man Institute, University of Oxford** — Oxford, UK
  Deep Autoregressive Models with Spectral Attention — *Mar. 2024*
- **Signal Processing and Learning Group, Universidad Carlos III de Madrid** — Madrid, Spain
  Deep Attentive Time Series Modelling for Quantitative Finance — *Apr. 2023*
- **Oxford-Man Institute, University of Oxford** — Oxford, UK
  DeepVol: Volatility Forecasting from High-Frequency Data with Dilated Causal Convolution — *Oct. 2022*
- **Signal Processing and Learning Group, Universidad Carlos III de Madrid** — Madrid, Spain
  Deep Autoregressive Models with Spectral Attention — *Oct. 2021*

Conferences, Summer Schools, and Others

- **NeurIPS** — Vancouver, Canada
  Conference on Neural Information Processing Systems — *Dec. 2024*
- **ICML** — Vienna, Austria
  International Conference on Machine Learning — *Jul. 2024*
- **ICLR** — Vienna, Austria
  International Conference on Learning Representations — *May. 2024*
- **AISTATS** — Valencia, Spain
  Artificial Intelligence and Statistics — *Apr. 2023*
- **AI for Global Goals - University of Oxford** — Oxford, United Kingdom
  ML x Finance — *Aug. 2022*
- **University of Sheffield** — Sheffield, United Kingdom [Online]
  The Gaussian Process Summer School — *Sep. 2021*
- **University of Sheffield** — Sheffield, United Kingdom [Online]
  The Gaussian Process Summer School — *Sep. 2020*
- **Liège Université** — Liége, Belgium [Online]
  Machine Learning Frontiers in Precision Medicine (MLFPM) — *Sep. 2020*
- **ETH Zürich** — Basel, Switzerland
  Machine Learning Frontiers in Precision Medicine (MLFPM) — *Sep. 2019*
- **Skoltech** — Moscow, Russia
  Machine Learning Summer School (MLSS) — *Aug. 2019 – Sep. 2019*
- **École Polytechnique** — Paris, France
  Data Science Summer School (DS3) — *Jun. 2018*

Courses

- **University of California, Santa Cruz** — Coursera [Online]
  Bayesian Statistics: From Concept to Data Analysis, 4 weeks course — *Jul. 2021*
- **DeepLearning.AI** — Coursera [Online]
  Structuring Machine Learning Projects, 3 weeks course — *May 2018*
- **DeepLearning.AI** — Coursera [Online]
  Improving DNNs: Hyperparameter Tuning, Regularization and Optimization, 2 weeks course — *May 2018*
- **Universidad Internacional Menéndez Pelayo** — Barcelona, Spain
  English Inmersion Course — *Apr. 2018*
- **DeepLearning.AI** — Coursera [Online]
  Neural Networks and Deep Learning, 4 weeks course — *Mar. 2018*
- **Stanford University** — Coursera [Online]
  Machine Learning, 11 weeks course — *Feb. 2018*
- **University of Washington** — Coursera [Online]
  Machine Learning: Classification, 7 weeks course — *Nov. 2017*
- **University of Washington** — Coursera [Online]
  Machine Learning: Regression, 6 weeks course — *Oct. 2017*
- **University of Washington** — Coursera [Online]
  Machine Learning Foundations, 6 weeks course — *Jul. 2017*
- **Nvidia Corporation, CUDA Fellows Program & Universidad de Málaga** — Málaga, Spain
  Technical Training Course: Parallel Programming of the GPU with CUDA — *Jul. 2016 – Aug. 2016*

Languages

- **Spanish**: Native language.
- **English**: Advanced, TOEFL:102/120.
- **French**: Basic.

Projects

- **Heterogeneous Hidden Markov Model**: Python implementation of a HMM model capable of managing heterogeneous and missing data: **https://github.com/fmorenopino/HeterogeneousHMM**, **https://pyhhmm.readthedocs.io/**.
- **VoIP calls**: C implementation of a Voice over IP calls' service (point-to-point audio conference). RTP over UDP was used: **https://github.com/fmorenopino/c_calls**.

Programming Skills

- **Languages**: Python, Matlab, C, C++ **Technologies**: Pytorch, Keras, Sklearn, Jupyter, Git, LaTeX

Referees

- Dr. Álvaro Cartea, University of Oxford, UK.
- Dr. Stefan Zohren, University of Oxford, UK.
- Dr. Antonio Artés Rodríguez, Universidad Carlos III de Madrid, Spain.
- Dr. Pablo Martínez Olmos, Universidad Carlos III de Madrid, Spain.