

# Fernando Moreno-Pino, PhD



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## POSITIONS

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- **Oxford-Man Institute, University of Oxford** Oxford, UK  
Aug. 2023 - Present
    - **Summary:** My research lies at the intersection of Deep Learning, Probabilistic Machine Learning, and Quantitative Finance. I have led multiple first-author research projects on Machine Learning 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  
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  
Sep. 2018 - July 2023
    - **Research & Teaching Associate, Signal Processing and Learning Group**
      - **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  
May 2022 - Oct. 2022
    - **Visiting Researcher. Founded by MAN Group**
      - **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.
  - **Universidad Carlos III de Madrid** Madrid, Spain  
Dec. 2017 - Sep. 2018
    - **Research Assistant, Signal Processing and Learning Group**
      - **Supervisor:** Prof. Dr. Antonio Artés Rodríguez.
      - **Summary:** My work focused on applying Machine Learning techniques for the Human Activity Recognition problem.
  - **Universidad de Málaga** Málaga, Spain  
Jan. 2016 - Sep. 2016
    - **Research Assistant, Department of Programming Languages and Computer Science**
      - **Supervisor:** Prof. Dr. Pedro Merino Gómez.
      - **Summary:** I worked at the MORSE Research Group during my Bachelor Thesis, focused on developing communication systems software.

## EDUCATION

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- **Universidad Carlos III de Madrid** Madrid, Spain  
Sep. 2018 – May. 2023
    - **PhD Candidate in Probabilistic Machine Learning and Deep Learning (Cum Laude).**
      - **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 DNN methodologies (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 in high dimensional data for the problem of Human Activity Recognition.

- **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.

\* Denotes co-first authors with equal contributions.

## OTHERS

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- **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).

## TEACHING

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- **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

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- **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 doctoral studies were funded by the Spanish Ministry of Education through competitive selection process (60996,12€).
- **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.

## REVIEWING

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- **Conference and Workshop on Neural Information Processing Systems (NeurIPS)**: Since 2024 (Reviewer and workshop proposals reviewer).
- **Artificial Intelligence and Statistics (AISTATS)**: Since 2023.
- **Artificial ACM International Conference on AI in Finance (ICAIF)**: 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

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

## SUMMER SCHOOLS AND OTHERS

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• <b>AI for Global Goals - University of Oxford</b>	Oxford, United Kingdom
• <i>ML x Finance</i>	<i>Aug. 2022</i>
• <b>University of Sheffield</b>	Sheffield, United Kingdom [Online]
• <i>The Gaussian Process Summer School</i>	<i>Sep. 2021</i>
• <b>University of Sheffield</b>	Sheffield, United Kingdom [Online]
• <i>The Gaussian Process Summer School</i>	<i>Sep. 2020</i>
• <b>Liège Université</b>	Liège, Belgium [Online]
• <i>Machine Learning Frontiers in Precision Medicine (MLFPM)</i>	<i>Sep. 2020</i>
• <b>ETH Zürich</b>	Basel, Switzerland
• <i>Machine Learning Frontiers in Precision Medicine (MLFPM)</i>	<i>Sep. 2019</i>
• <b>Skoltech</b>	Moscow, Russia
• <i>Machine Learning Summer School (MLSS)</i>	<i>Aug. 2019 – Sep. 2019</i>
• <b>École Polytechnique</b>	Paris, France
• <i>Data Science Summer School (DS3)</i>	<i>Jun. 2018</i>

## COURSES

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

## LANGUAGES

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

## PROJECTS

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- **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](https://github.com/fmorenopino/c_calls).

## PROGRAMMING SKILLS

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- **Languages:** Python, Matlab, C, C++
- **Technologies:** Pytorch, Keras, Sklearn, Jupyter, Git, L<sup>A</sup>T<sub>E</sub>X

## REFEREES

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- 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.