Sara Pérez Vieites

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RESEARCH EXPERIENCE

Postdoctoral Researcher — Sep. 2022 – Present
CERI Systèmes Numériques, IMT Nord Europe — *Villeneuve d'Ascq, France*

Research Assistant — Dec. 2016 – May 2022
Department of Signal Theory & Communications, Universidad Carlos III de Madrid — *Leganés, Madrid, Spain*

Development of **Bayesian filtering methods**, from a practical and theoretical point of view, in order to perform accurate **parameter estimation and prediction of time-varying high-dimensional systems**.

Ph.D. internship — April 2019 – July 2019
University of Reading — *Reading, UK*

Analysis of different **stochastic parameterizations** to improve the behaviour of simplified models.

Research collaboration — Jan. 2019
MeteoGalicia — *Santiago de Compostela, Spain*

Study of **atmospheric modeling** (mainly WRF) in order to apply parameter estimation and/or filtering techniques.

Research collaboration — July 2018
Centre Tecnològic de Telecomunicacions de Catalunya (CTTC) — *Barcelona, Spain*

Study of adaptive **state partitioning** in nonlinear Bayesian filtering to improve performance in **high-dimensional systems**.

TEACHING EXPERIENCE

Teaching Assistant — Sep. 2017 – Jan. 2019
Department of Signal Theory & Communications, Universidad Carlos III de Madrid

Teach and organize English and/or Spanish lab sessions for 2nd year bachelor students of **Linear Systems** and **Analysis of Electrical Networks**.

INDUSTRY EXPERIENCE

Trainee — June 2015 – Aug. 2015
Gradiant, Technology Centre of Telecommunications of Galicia — *Vigo, Spain*

Analysis and development of different **human feature recognition** techniques.

Trainee — June 2014 – Aug. 2014
R Cable y Telecomunicaciones Galicia, S.A. — *A Coruña, Spain*

Study and **maintenance of telecommunication network deployment** of R Cable.

EDUCATION

Ph.D. in Multimedia and Communications — Sep. 2017 – Jan. 2022
Universidad Carlos III de Madrid

Thesis: *Nested filtering methods for Bayesian inference in state space models*

Mathematics of Planet Earth Centre for Doctoral Training Summer School — 24 - 28 June 2019
Met Office — *Exeter, UK*

Course on **multiscale analysis of atmosphere-ocean flows and related numerical issues**.

CRISM Summer School in Computational Statistics — 9-13 June 2018
Warwick University — *Warwick, UK*

Course on **computational statistics**, with a series of lectures based on Monte Carlo, MCMC, Quasi-Monte Carlo, Sequential Monte Carlo and other methods.

Master's Degree in Multimedia and Communications Sept. 2015 – Sep. 2017
Universidad Carlos III de Madrid

Master specialized in topics such as **machine learning, computer vision, audio processing and signal processing** for communications.

Master's Degree in Telecommunications Engineering Sep. 2015 – Sep. 2017
Universidad Carlos III de Madrid
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Bachelor's Degree in Telecommunication Technologies Engineering 2011 – 2015
Universidade de Vigo *Vigo, Spain*

PROJECTS

Advanced Bayesian computation methods for modelling and inference in complex dynamical networks Mar. 2019 – Feb. 2022

Office of Naval Research (award no. N00014-19-1-2226)
PI: Joaquín Míguez Arenas

PRACTICO-CM Computational Psychiatry and Comprehensive Behaviour Models Jan. 2019 – Dec. 2019

Comunidad Autónoma de Madrid. Consejería de Educación e Investigación (award no. Y2018/TCS-4705)
PI: Antonio Artés Rodríguez

LANGUAGES AND TECHNOLOGICAL SKILLS

- Use of MATLAB to implement and assess different parameter estimation and state tracking algorithms such as sequential Monte Carlo methods, Kalman filters and recursive maximum likelihood methods.

- Use of Linux/bash in order to run and distribute the simulations of the previous algorithms as well as simulations of the Weather Research and Forecasting (WRF) model.

- Use of Python to preprocess meteorology data obtained from the base stations of Galicia, Spain.

  Computer Languages: MATLAB, Python, SQL, Java, C
  Software and tools: Linux/bash, Git, LaTeX, WRF
  Libraries: Scikit-learn, TensorFlow, Pandas, Matplotlib, NumPy, SciPy, os
  Languages: English (C1 level), French (B1 level), Spanish (native), Galician (native)

PUBLICATIONS

Journal publications

Pérez-Vieites, S., & Míguez, J. (2021). *Nested Gaussian filters for recursive Bayesian inference and nonlinear tracking in state space models.* Signal Processing, 189, 108295.

Pérez-Vieites, S., Mariño, I. P., & Míguez, J. (2018). *Probabilistic scheme for joint parameter estimation and state prediction in complex dynamical systems.* Physical Review E, 98(6), 063305.

Manuscripts under preparation

Pérez-Vieites, S., Molina-Bulla, H., & Míguez, J. (2022). *Nested smoothing algorithms for inference and tracking of heterogeneous multi-scale state-space systems.* arXiv preprint arXiv:2204.07795.

Conference papers

Pérez-Vieites, S., & Míguez, J. (2020). *A nested hybrid filter for parameter estimation and state tracking in homogeneous multi-scale models.* In 2020 IEEE 23rd International Conference on Information Fusion (FUSION) (pp. 1-8). IEEE.

Pérez-Vieites, S., & Míguez, J. (2020). *Kalman-based nested hybrid filters for recursive inference in state-space models.* In 2020 28th European Signal Processing Conference (EUSIPCO) (pp. 2468-2472). IEEE.

Pérez-Vieites, S., Vilà-Valls, J., Bugallo, M. F., Míguez, J.,& Closas, P. (2019). *Second Order Subspace Statistics for Adaptive State-Space Partitioning in Multiple Particle Filtering.* In 2019 IEEE 8th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) (pp. 609-613). IEEE.

Participation in conferences

5th Workshop in Sequential Monte Carlo Methods 2022 (SMC 2022)	4 - 6 May 2022
Poster presentation	*Madrid, Spain*
9th Spanish Workshop on Signal Processing, Communications & Inf. Theory (SIC 2022)	3 May 2022
Poster presentation	*Madrid, Spain*
28th European Signal Processing Conference (EUSIPCO 2020)	18 - 22 Jan. 2021
Poster presentation	*Online*
23rd Conference on Information Fusion (FUSION 2020)	6 - 9 July 2020
Poster presentation	*Online*
27th European Signal Processing Conference (EUSIPCO 2019)	2 - 7 Sep. 2019
Poster presentation and 3 minutes thesis talk	*A Coruña, Spain*
Workshop on Stochastic Parameterizations and Their Use in Data Assimilation	1 - 5 July 2019
Attendee	*Imperial College London, UK*
SIAM-IAM student chapter conference	7 June 2019
Poster presentation	*University of Reading, UK*
LMS Invited Lecture Series & CRISM Summer School in Computational Statistics	9-13 June 2018
Poster presentation	*Warwick University, UK*
ISBA 2018 World Meeting	24-29 June 2018
Poster presentation	*Edinburgh, UK*
Particle methods and Data assimilation workshop	8-10 May 2018
Attendee	*London, UK*
7th IEEE Spanish Workshop on Signal Processing, Inform. Theory & Communications	23 Jan. 2018
Poster presentation	*San Sebastián, Spain*
Sequential Monte Carlo Workshop 2017 (SMC 2017)	30 Aug. - 1 Sep. 2017
Poster presentation	*Uppsala, Sweden*

Funding and academic awards

Runner up poster presentation	7 June 2019
SIAM-IMA student chapter conference, University of Reading	*Reading, UK*
PIPF grant (Personal Investigador Pre-doctoral en Formación) for Ph.D. students	Sep. 2017
Universidad Carlos III de Madrid	

Additional Activities

- Local Arrangements Committee Member at the 5th Workshop in Sequential Monte Carlo Methods, SMC 2022 (Madrid, Spain).

- Reviewer at IEEE Transactions on Signal Processing (TSP), IEEE Signal Processing Letters and Foundations of Data Science in 2022.

- Reviewer at the 30th European Signal Processing Conference, EUSIPCO 2022.