Sofía Miñano

Senior Research Software Engineer

sfmig.github.io
sofiaminano
sfmig

Experience

Jan 2024 - present — **Sainsbury Wellcome Centre & Gatsby Unit**, *UCL (London, UK)*

Part of the Neuroinformatics Unit, developing tools to accelerate neuroscience research.

- movement: a Python toolbox to analyse trajectories from animal pose estimation.
- fiddler crab project: building custom detectors to track 100s of camouflaged crabs in the field.
- brainglobe benchmarks: defined and benchmarked realistic user-workflows for brainglobe's cellfinder.
- Computational Movement Disorders Lab: technical advisor, exploring the potential of state-of-the-art computer vision methods to study hyperkinetic disorders, such as dystonia, tics and tremor.

Oct 2022 - Dec 2023 — **Advanced Research Computing Centre**, *UCL (London, UK)*

Research Software Engineer in the Collaborations team.

- s2fft: differentiable and accelerated spherical transforms with *JAX*.
- gut randomiser: a Blender add-on to define realistic and diverse gut geometries for synthetic datasets.
- beekeeper: a dash/plotly dashboard to generate metadata for scientific videos.

Jul - Sep 2022 — **DeepLabCut AI Residency**, *EPFL Campus Biotech (Geneva, Switzerland)*

Summer resident with the development team of DeepLabCut.

- Designed a prototype app in HuggingFace, integrating DeepLabCut and MegaDetector.
- Investigated active learning approaches to accelerate model training.
- Carried out a study on the effect of different data augmentation methods on model performance.

Sep 2017 - May 2022 — **PhD in Interdisciplinary Biosciences**, *University of Oxford (Oxford, UK)*

Visually guided flight in Harris' hawks: a computer vision approach **[link]**

Supervisors: Prof. Graham K. Taylor (Biology), Dr. Stuart Golodetz (Computer Science).

- Developed a time-independent algorithm for fast and reliable labelling of motion capture markers.
- Implemented a method to reconstruct the perspective of a hawk in flight, combining mocap data and SLAM 3D meshes of the lab. [GitHub repo] [IJCV paper].
- Investigated hawks' attention in perching and obstacle avoidance, using synthetic reconstructions of the birds' visual inputs. [bioRxiv paper] [Poster].
- Developed an attractor-repeller model to characterise the hawks' flight paths around obstacles.

Jun - Aug 2019 — **Google DeepMind**, *Science team (London, UK)*

Research scientist intern in a wildlife conservation project.

- Investigated weakly and semi-supervised approaches for a species detector.
- Developed processing pipelines for the *Snapshot Serengeti* dataset.
- Project featured as a blog post in the DeepMind website.

Jun - Sep 2017 — **Next Limit**, *R&D Department (Madrid, Spain)*

Intern with the RealFlow team, Next Limit's fluids simulation software.

- Developed collective behaviour models, building on the classic Reynolds rules.
- Introduced bio-inspired obstacle avoidance behaviours.
- Integrated the models in RealFlow's UI.

Education

Sep 2014 - Feb 2017 — **MSc in Aerospace Engineering**, *TU Delft (Delft, The Netherlands)*

- Programme highlights: control theory, aerodynamics, aircraft design optimisation.
- *MSc thesis*: ***Gust tailoring in a wind tunnel for bird and MAV flight experiments***
  - Built a closed-loop tool to design custom gust profiles in a wind tunnel.
  - Included a six-month stay in the LentinkLab at Stanford University.
  - Awarded *Cum Laude*.

Sep 2010 - Jun 2014 — **BSc in Aerospace Engineering**, *Technical University of Madrid (Madrid, Spain)*

- Programme highlights: linear algebra, calculus, physics, fluid dynamics, numerical methods.
- *BSc thesis*: ***Flexible reconfiguration of an horizontal tailplane assembly line***
- Graduated top 5% of my year (GPA: 8.9/10).
- Internship in 2014 at AIRBUS, in the A330 engineering support team.

Publications

conference Duporge, I.*, **Miñano, S.***, Sirmpilatze, N., Tatarnikov, I., Wolf, S., Tyson, A. L., Rubenstein, D. (2025) *Tracking the flight: exploring a computational framework for analyzing escape responses in plains zebras*. *CV4Animals workshop at CVPR 2025*. (* denotes equal contribution) [link].

journal **Miñano, S.**, Golodetz, S., Cavallari, T. & Taylor, G. K. (2022). *Through hawks' eyes: synthetically reconstructing the visual field of a bird in flight*. *International Journal of Computer Vision*. [link].

journal Kempton, J.A., Brighton, C.H., France, L.A., Klein Heerenbrink, M., **Miñano, S.**, Shelton, J., & Taylor, G. K. (2023). *Visual versus visual-inertial guidance in hawks pursuing terrestrial targets*. *Journal of the Royal Society Interface*. [link].

journal Brighton, C.H., Kempton, J.A., France, L.A., Klein Heerenbrink, M., **Miñano, S.**., & Taylor, G.K.(2023). *Obstacle avoidance in aerial pursuit*. *Current Biology*. [link].

Selected presentations at scientific meetings

Sept 2023 **HHMI Janelia Conference "Simulated bodies: whole body biomechanical models"**
Poster: *"Supporting animal behaviour research as a Research Software Engineer"* [conference website]

Jan 2022 **Society for Integrative and Comparative Biology 2022 - Annual Meeting**
Received **Best Student Presentation Award** for Neurobiology, Neuroethology, and Sensory Biology.

Jun 2021 **Computer Vision and Pattern Recognition 2021 - 1st CV4Animals workshop**
Selected for oral presentation: *"Analysis of visual attention of a Harris' hawk in flight, using a synthetic reconstruction of its visual field"*

Soft skills

Teaching
- NIU Open software week: prepared & presented *Deep learning for vision primer* (August 2025)
- Software Skills courses at the Sainsbury Wellcome Centre: *Introduction to software development in Python* and *Video-based analysis of animal behaviour* (September 2024)
- Learn2Discover courses: created material for *Introduction to neural networks* (August 2023).
- Cajal Neurokits: instructor for *Modern Approaches to Behavioral Analysis* (Fall 2022 & 2023).

Leadership & teamwork
- Co-admin for the Neuroinformatics Unit's participation in Google Summer of Code 2025.
- Co-founder of the *Charlas RSE en español*, to promote and showcase the role of Research Software Engineers in the Spanish-speaking community worldwide.
- Co-founder of the Deep Learning and Computer Vision journal club in ARC (October 2022).
- Reviewer for the *Journal of Open Source Software* since January 2024.
- Oxford Hack 2019 finalist, with a tiger behaviour classifier trained on web-scrapped images.

Outreach
- With the Sainsbury Wellcome Centre and the Fem biobío initiative, discussed careers in STEM with visiting high school students from Chile (May 2024).
- With Empower Her Voice & the Santa Maria Foundation charities, promoted science careers to girls from disadvantaged backgrounds from Colombia (April 2018).

Computational skills

Languages Python, MATLAB, R, Labview
Deep learning PyTorch, Lightning, TensorFlow, JAX
3D modelling Blender (including Python scripting)
Other Git, Bash, GitHub Actions, LaTeX

Academic awards

Jan 2016 **BBSRC studentship and departmental scholarship**, *University of Oxford*
Awarded as part of the Oxford Interdisciplinary Bioscience DTP, a 4-year graduate programme in interdisciplinary life sciences.

Aug 2015 **Justus and Louise van Effen Grant**, *TU Delft*
For students in the top 10% of their programmes who wish to carry out research abroad.

Aug 2015 **Prof. H.J. van der Maas Fund Grant**, *TU Delft*
Awarded by the Prof. H.J. van der Maas foundation.

Sept 2011/13 **Award for Excellent Academic Performance 2011 & 2013**, *Technical University of Madrid*

Sept 2011/13 **Scholarship for Academic Excellence 2011 & 2013**, *Community of Madrid government*

Jun 2009 **Cambridge Certificate of Proficiency in English (C2) - Grade A (maximum grade)**