Luigi Petrucco

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Experience

Research

Mar 2022 – present
EMBO Researcher, *Istituto Italiano di Tecnologia*, Rovereto, Italy
Studying the biological bases of pursuit behavior.
- Multi-camera 3D pose estimation: segmentation (CNNs), triangulation, denoising
- Behavior segmentation with (JAX-accellerated) autoregressive hidden Markov models;
- Processing of large scale electrophysiology datasets on HPC/AWS;

Sept 2017 – Apr 2022
Ph.D. Researcher, *Max Planck Institute of Neurobiology, TUM*, München, Germany
Studying ring attractor networks in the fish brain.
- Time series analysis for neural data: filtering, dimensionality reduction, clustering;
- Processing large scale volumetric imaging data from lightsheet microscopy (registration/alignment/segmentation/signal extraction)

Software development

Sept 2022 – Apr 2024
External Consultant, *ICOP S.p.A.*, Udine, Italy
- Package for Excel data parsing and aggregation for financial consolidation
- Testing, versioning, and deployment of Python applications on the company server.

Sept 2020 – Apr 2022
Founder and developer, *Brainglobe*
A Python ecosystem for neuroanatomy.
- brainglobe-atlasapi download/versioning/load brain atlases (stacks, meshes, ontologies)
- brainglobe-space Transformations between anatomical spaces
- brainrender Fast visualizations of neuronatomical data using VTK
- Received more than 400k $ in funding.

Other projects
- Stytra: a Python library for image segmentation and closed-loop virtual reality (performant > 400 Hz online analysis with OpenCV, multiprocessing, Qt)

Teaching

Apr 2022 – present
***Python for Neuroscience* Lecturer**, *Università di Trento*, Trento, Italy
I started a Python course for Ph.D. students in Cognitive and Brain Sciences.

Education

2016–2022
Ph.D. in Neuroscience, *Ludwig Maximilian Universität (LMU)*, München, Germany

2011–2016
M.S. Scuola Normale Superiore, *Scuola Normale Superiore*, Pisa, Italy
Advanced courses in Math (calculus, algebra, probability) and Physics.

2014–2016
B.S/M.S. in Neuroscience, *University of Pisa*, Pisa, Italy, (MS: 110/110 cum laude; BS: 110/110 cum laude)

Programming skills

	Level	Skill	Years	Comment
Languages:	■■■■■	Python	9	*Extensive experience with scientific stack, OpenCV, PyTorch, Qt, live applications*
	■■■■□	MATLAB	2	*Repented*
	■■■□□	C#	2	*Some project with ReactiveX*
	■■□□□	HTML/CSS	6	
Databases	■■■□	MongoDB, MySQL	3	
CI/CD	■■■■■	Travis/GH Actions	9	*Extensive use. Testing, PIPy deployment.*
Programs	■■■■■	Microsoft Office suite	20	
	■■■■□	Blender / Illustrator / Photoshop / InDesign	8	*Graphic design enthusiast*

Awards and Funding

2024 **PhD Thesis Prize**, *FENS-Kavli Network*
Best European PhD Thesis in Neuroscience 2022-2024.

2023 **EMBO Postdoctoral Fellowship**, *European Molecular Biology Organization (EMBO)*
Two years postdoc funding (130k €).

2022 **Talk invitation**, *Computational and Systems Neuroscience Conference (CoSyNe) 2022*
Abstract selected from the top 3%

2011 **Scuola Normale Superiore Scholarship**, *Scuola Normale Superiore*

Languages

Italian (native), English (proficient), German (beginner)

Selected publications

[1] Luigi Petrucco, Hagar Lavian, You Kure Wu, Fabian Svara, Vilim Štih, and Ruben Portugues. Neural dynamics and architecture of the heading direction circuit in zebrafish. *Nature neuroscience*, 26(5):765–773, 2023.

[2] Vilim Štih, Luigi Petrucco, Andreas M Kist, and Ruben Portugues. Stytra: An open-source, integrated system for stimulation, tracking and closed-loop behavioral experiments. *PLoS computational biology*, 15(4):e1006699, 2019.

[3] Federico Claudi, Luigi Petrucco, Adam Tyson, Tiago Branco, Troy Margrie, and Ruben Portugues. Brainglobe atlas api: a common interface for neuroanatomical atlases. *Journal of Open Source Software*, 5(54):2668–2668, 2020.

[4] Federico Claudi, Adam L Tyson, Luigi Petrucco, Troy W Margrie, Ruben Portugues, and Tiago Branco. Visualizing anatomically registered data with brainrender. *Elife*, 10:e65751, 2021.