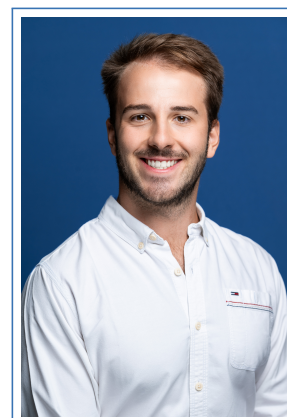


Simone Betteti

University of Padua
[Scholar Link](#)



Education

- 2022-2025 **Ph.D. Information Engineering**, *University of Padua*, Padova, IT, Project: Mathematical Models for the Virtual Brain.
- 2019-2022 **M.Sc. Mathematical Engineering**, *University of Padua*, Padova, IT, Graduation mark: 110 Cum Laude/110; GPA: 28.97/30.
Thesis: '[The Relationship Between MSR and Network Properties in Simple Neural Networks of the Cortex](#)'
- 2016-2019 **B.Sc. Psychological Science**, *University of Padua*, Padova, IT, Graduation mark: 110 Cum Laude/110; GPA: 28.15/30.
Thesis: '[Structure Development in Dynamically Pruned Artificial Neural Networks](#)'

Language

Italian	Native
English	C2
French	A1

Computer skills

Python	Full professional use
Matlab	Full professional use
Java	Beginner
SLURM	Intermediate level user
LaTeX	Full professional use

Soft skills

- **Effective Communication:** Clear, effective and concise exposition of ideas.
- **Learning:** Fast and adaptive learner.
- **Problem-Solving & Critical Thinking:** Careful analysis of the problem and precise design of solutions.
- **Collaboration & Teamwork:** Engaging and inclusive attitude.
- **Leadership & Initiative:** Result-driven ownership of projects, with a focus on empowering team members to maximize their output.
- **Time Management & Organization:** Prioritize tasks efficiently to meet tight deadlines.

Publications

Journals and Proceedings

- 1 **Betteti S., Baggio G., Bullo F., and Zampieri S.**, *"Input-Driven Dynamics for Robust Memory Retrieval in Hopfield Networks"*, Science Advances 11(17), 2025.
doi: 10.1126/sciadv.adu6991
- 2 **Betteti S., Baggio G., and Zampieri S.**, *On the capacity of continuous-time Hopfield models*, 2024 63rd IEEE Conference on Decision and Control, 2024.
doi: 10.1109/CDC56724.2024.10886497

Pre-prints

- 1 **Betteti S., and Bullo F.**, *"Contraction and concentration of measures with applications to theoretical neuroscience"*, arXiv, 2025.
doi: 10.48550/arXiv.2504.05666
- 2 **Betteti S., Baggio G., Bullo F., and Zampieri S.**, *"Firing Rate Models as Associative Memory: Excitatory-Inhibitory Balance for Robust Retrieval"*, arXiv (under review), 2024.
doi: 10.48550/arXiv.2411.07388

Internships

September **Research visit**, Center for Control, Dynamical Systems and Computa-
2024, June tion, UCSB, Santa Barbara, CA.
2025 Achievements (in progress):

- Study of classical rate models for associative memory and modern Hopfield architectures for the improvement of transformer models.
- Study of stochastic processes and their associated probability measure, with a close focus on its convergence properties.
- Study of the equilibrium tracking problem for systems with noise, where the equilibrium trajectory depends on the first moment of the stochastic process.

Supervisors: Prof. [Zampieri S.](#), Prof. [Bullo F.](#), Prof. [Baggio G.](#)

August- **Thesis**, Kavli Institute for Systems Neuroscience, NTNU, Trondheim.
December Achievements:

- 2021
- Spike series analysis by means of Multiscale Relevance (MSR).
 - Development of spiking neural networks exhibiting sustained chaotic activity.
 - Analysis of the dependence of MSR on topological network properties.

Supervisors: Prof. [Suweis S.S.](#), Prof. [Roudi Y.](#)

- February- **Project/Thesis**, *Computational Cognitive Neuroscience Lab*, Padova.
July Achievements:
2019
 - Development of an evolutionary pruning process for a Deep Belief Network (DBN).
 - Development of equally effective DBNs architectures with high sparsity (.15 active synaptic connections at the end of training).
 - Assessment of topological similarities between synaptic explosion/pruning in biological neuronal development and DBNs.**Supervisors:** Prof. [Testolin A.](#), Prof. [Suweis S.S.](#)

Summer Schools

- July 2024 **Summer School**, *SIDRA*, Bertinoro, IT.
Achievements:
 - Study of nonlinear ordinary differential equations (ODEs) by means of Lyapunov theory.
 - Application of suitable controls to steer the system towards the set of fixed points for the ODE dynamics.
- September **Fall School**, *EITN School In Computational Neuroscience*, Paris, FR.
2023 Achievements:
 - Comprehensive study of biophysical, mean field, and whole brain models.
 - Simulation of synaptic dynamics for single neurons.
- August 2021 **Summer School**, *Mathematical Methods in Computational Neuroscience*, Online.
Lectures on:
 - Reinforcement Learning.
 - Dimensionality Reduction techniques.
 - Automata.
 - Spiking Neural Networks.
- September **Summer School**, *Computational and Theoretical Models in Neuroscience*, Venice, IT.
2019 Achievements:
 - Study of signaling in Neuronal populations.
 - Inference of functional and physiological connectivity from time series of neuronal clusters' signaling.