

WORK EXPERIENCE & EDUCATION

05|2022 Postdoctoral Research Fellow

to date Computational and Biological Learning Lab, Department of Engineering,
University of Cambridge, United Kingdom.
Collaborators: Prof. Dr. Máté Lengyel, Dr. Yashar Ahmadian.

05|2022 Ph.D. in Computational Neuroscience

“Plasticity of Inhibition in Recurrent Circuits.”
Goethe University, Frankfurt am Main, Germany.
from 09|2019 Max Planck Institute for Brain Research, Advisor: Prof. Dr. Julijana Gjorgjieva.
from 09|2015 Frankfurt Institute for Advanced Studies, Advisor: Prof. Dr. Jochen Triesch.

04|2015 Bachelor of Science, Physics

“Cubic Learning Rules for Unsupervised Self-Limiting Hebbian Learning in Artificial Neural Networks.”
Goethe University, Frankfurt am Main, Germany.

09|2014 Term Abroad at the University of Birmingham

Courses in Psychology and Computer Science. University of Birmingham, Birmingham, United Kingdom.

JOURNAL PAPERS

- 2022** “Synapse-type-specific competitive Hebbian learning forms functional recurrent networks,”
S. Eckmann & J. Gjorgjieva, *bioRxiv*. (doi.org/10.1101/2022.03.11.483899)
- 2020** “Active Efficient Coding Explains the Development of Binocular Vision and its Failure in Amblyopia,”
S. Eckmann, L. Klimmasch, B. E. Shi, J. Triesch, *PNAS*. (doi.org/10.1073/pnas.1908100117)
- 2015** “The Fisher Information as a Neural Guiding Principle for Independent Component Analysis,”
R. Echeveste, S. Eckmann, C. Gros, *Entropy*. (doi.org/10.3390/e17063838)

GRANTS & AWARDS

- 03|2023 Newton International Fellowship** (£133,000)
Personal grant by The Royal Society (UK) to study “Inhibition stabilized hippocampal circuits.”
To be held for two years at the University of Cambridge.
- 03|2022 NAISYS Travel Award** (\$500)
Granted in support of attending the NAISYS conference 2022 in Cold Spring Harbour, NY, USA.
- 06|2019 C3N Summer School** (Full stipend, 4 weeks)
“Cellular, Computational and Cognitive Neuroscience,” Princeton, New Jersey, USA.
- 02|2019 COSYNE Travel Award** (\$1000)
Granted to attend the COSYNE conference 2019 in Lisbon, Portugal.
- 08|2018 Logistics of Neuronal Function Summer School** (Full stipend, 2 weeks)
“Giersch International Symposium & Summer School,” Frankfurt, Germany.
- 09|2016 Visual Neuroscience Summer School** (Full stipend, 2 weeks)
“From Spikes to Awareness,” Schloss Rauischholzhausen, Germany.
- 09|2014 Goethe University Strategic Partnership Program** (€2,825)
Scholarship granted by the German Academic Exchange Service (DAAD) to study one term in the UK.

INVITED TALKS

- 10|2021 Search Symposium, Cognitive Science Department**
“Computation and learning in biological neural networks,” Osnabrück, Germany.
- 05|2021 Bernstein SmartSteps Seminar Series**
“A theory for Hebbian Learning in recurrent E-I networks,” online.
- 12|2020 Computational and Biological Learning Lab, Institute Seminar**
“A theory for Hebbian Learning in recurrent E-I networks,” Cambridge, UK.
- 11|2020 sinc(i) – Research Institute for Signals, Systems and Computational Intelligence, Institute Seminar**
“A theory for Hebbian Learning in recurrent E-I networks,” Santa Fe, Argentina.
- 09|2020 Max Planck Institute for Brain Research, Institute Seminar**
“A theory for Hebbian Learning in recurrent E-I networks,” Frankfurt am Main, Germany.
- 08|2018 Computational and Mathematical Models in Vision, Conference Talk**
“An active efficient coding model of the development of amblyopia,” St. Pete Beach, Florida, USA.

CONFERENCE CONTRIBUTIONS

- 08|2022 EVCM - European Visual Cortex Meeting**
“Synapse-type-specific competitive Hebbian learning forms functional recurrent networks,”
S. Eckmann, J. Gjorgjieva. Seeon, Germany.
- 04|2022 NAISYS - From Neuroscience to Artificially Intelligent Systems**
“Unsupervised competitive Hebbian learning explains the emergence of functional recurrent E-I networks,” S. Eckmann, J. Gjorgjieva. Cold Spring Harbor, New York, USA.
- 02|2021 COSYNE - Computational and Systems Neuroscience Conference**
“A theory for Hebbian plasticity in recurrent E-I networks,”
S. Eckmann, J. Gjorgjieva. Online.
- 09|2020 Bernstein Computational Neuroscience Conference**
“Hebbian learning of stable receptive fields in recurrent E-I networks,”
S. Eckmann, J. Gjorgjieva. Online. (doi.org/10.12751/nncn.bc2020.0077)
- 02|2019 COSYNE - Computational and Systems Neuroscience Conference**
“Stable memories despite large spontaneous synaptic fluctuations,”
S. Eckmann, S. S. Jhutti, J. Triesch. Lisbon, Portugal.
- 08|2018 ECVP - European Conference on Visual Perception**
“A computational model of the development and treatment of anisometropic amblyopia,”
S. Eckmann, L. Klimmasch, B. E. Shi, J. Triesch. Trieste, Italy.
- 05|2018 VSS - Vision Science Society Annual Conference**
“A model of the development of anisometropic amblyopia through recruitment of interocular suppression,” S. Eckmann, L. Klimmasch, B. E. Shi, J. Triesch. St. Pete Beach, Florida, USA.
- 05|2017 VSS - Vision Science Society Annual Conference**
“A computational model for the joint development of accommodation and vergence control,”
J. Triesch, S. Eckmann, and B. E. Shi. St. Pete Beach, Florida, USA.

07|2015 CNS - Annual Computational Neuroscience Meeting

“Should Hebbian learning be selective for negative excess kurtosis?”
C. Gros, S. Eckmann, and R. Echeveste. Prague, Czech Republic.

06|2015 EITN - European Institute for Theoretical Neuroscience Workshop on Learning and Plasticity

“An Objective Function for Hebbian self-stabilizing Plasticity Rules,”
R. Echeveste, S. Eckmann, and C. Gros. Paris, France.

05|2015 OCCAM - Osnabrück Computational Cognition Alliance Meeting

“From Stationarity to ICA: an Objective Function for Hebbian self-stabilizing Plasticity Rules,”
R. Echeveste, S. Eckmann, and C. Gros. Osnabrück, Germany.

TEACHING EXPERIENCE

2023 Teaching Assistant in Computational Neuroscience (Graduate level)

Grading of midterm papers on “The asynchronous & irregular state of cortical circuits.”

2017 Teaching Assistant in Theoretical Neuroscience (Graduate level)

Conducting accompanying tutorials based on the text book “Theoretical Neuroscience” (Dayan & Abbot).
Design, correction and presentation of exercises. Grading of final exams.

2013 Teaching Assistant in Theoretical Physics (Undergraduate level)

Conducting tutorials in theoretical electrodynamics. Presentation of exercises. Grading of final exams.

MENTORING

2022 Abraham Alsawaf (Thesis)

„Homeostatic scaling in recurrent E-I networks.“

2020 Ashish Rao Mangalore (Internship)

„Noise quenching in plastic Stabilized Supralinear Networks.“

2019 Melanie Tinz (Internship)

„Stochastic trafficking of synaptic resources affect spine lifetimes.“

2019 Nils Möbus (Thesis)

„An introduction to Principle Component Analysis.“

2019 Suneet Singh Jhutti (Thesis – now PhD student with Prof. Esteban Hernandez-Vargas)

„Neuronal balance through homeostatic mechanisms on different timescales.“

2018 Marius Vieth (Internship – now PhD student with Prof. Jochen Triesch)

„Synaptic lifetimes in recurrent neural networks.“

SERVICE & LEADERSHIP

2023 COSYNE workshop organiser: “Shaping circuit functions via plastic and diverse inhibition.”

2023 Reviewer for COSYNE 2023.

2021 Co-initiator of the cross-disciplinary initiative “Learning in Spiking Neural Networks” at Goethe University.

2018 Initiator and organiser of the “Computational Neuroscience Journal Club” at FIAS.