

## WORK EXPERIENCE & EDUCATION

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### 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

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**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, *Entropy*. (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

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### 03|2023 Newton International Fellowship (£133,000)

*start date* 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

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- 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

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- 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](https://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

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**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

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**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

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**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.