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WORK EXPERIENCE & EDUCATION

02|2022 Postdoctoral Research Fellow

Computational and Biological Learning Lab, Department of Engineering,
University of Cambridge, United Kingdom.

Collaborators: Prof. Dr. Máté Lengyel, Dr. Yashar Ahmadian.

from 03|2023 Royal Society Newton International Fellow

02|2022 Fast track 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

2024 “Synapse-type-specific competitive Hebbian learning forms functional recurrent networks,”

S. Eckmann, E. J. Young, J. Gjorgjieva, **PNAS** – doi.org/10.1073/pnas.2305326121

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 Royal Society Newton International Fellowship

Personal grant by The Royal Society to study “Inhibition stabilized hippocampal circuits.”

To be held for two years at the University of Cambridge.

03|2022 NAISYS Travel Award

Granted in support of attending the NAISYS conference 2022 in Cold Spring Harbour, NY, USA.

06|2019 C3N Summer School

Cellular, Computational and Cognitive Neuroscience, Princeton, New Jersey, USA.

02|2019 COSYNE Travel Award

Granted to attend the COSYNE conference 2019 in Lisbon, Portugal.

08|2018 Logistics of Neuronal Function Summer School

Giersch International Symposium & Summer School, Frankfurt am Main, Germany.

09|2016 Visual Neuroscience Summer School

From Spikes to Awareness, Schloss Rauischholzhausen, Germany.

09|2014 Goethe University Strategic Partnership Program

Scholarship granted by the German Academic Exchange Service (DAAD) to study one term in the UK.

INVITED & CONTRIBUTED TALKS

- 09|2024 **Bernstein Computational Neuroscience Conference**
"Theta-modulated memory encoding and retrieval in recurrent hippocampal circuits," Frankfurt, Germany
- 07|2024 **UKNC – UK Neural Computation Conference**
"A neural circuit model for inhibition-stabilized memory encoding and retrieval," Sheffield, UK.
- 06|2024 **Junior Scientists Workshop on Recent Advances in Theoretical Neuroscience**
"Structured inhibition-stabilized supralinear networks," Trieste, Italy.
- 05|2024 **Cambridge Memory Meeting**
"A neural circuit model for theta-modulated memory encoding and retrieval," Cambridge, UK
- 03|2024 **Champalimaud Centre for the Unknown, Petreanu Lab, Group Meeting**
"Top-down modulated surround suppression," Lisbon, Portugal.
- 10|2021 **Search Symposium, Cognitive Science Department, Osnabrück, Germany**
"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, Group Meeting, Department of Engineering**
"A theory for Hebbian Learning in recurrent E-I networks," Cambridge, UK.
- 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**
"An active efficient coding model of the development of amblyopia," St. Pete Beach, Florida, USA.

CONFERENCE CONTRIBUTIONS

- 02|2024 **COSYNE – Computational and Systems Neuroscience Conference**
"Inhibition-stabilized supralinear memory ensembles,"
S. Eckmann, Y. Ahmadian, M. Lengyel. Lisbon, Portugal.
- 02|2023 **COSYNE – Computational and Systems Neuroscience Conference**
"Input-dominated Hebbian learning enables image-computable E-I networks,"
S. Eckmann, Y. Ahmadian, M. Lengyel. Montreal, Canada.
- 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 Conference**
"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.
- 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, 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, 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, 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, C. Gros. Osnabrück, Germany.

TEACHING EXPERIENCE

- 2023/24** **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*
 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

- 2024** **Rebeca Ianov Vitanov** – *PhD Thesis*
 “Functional models of cortical circuits”
- 2023** **Edward James Young** – *PhD Thesis*
 “Homeostatic scaling in recurrent neural networks”
- 2023** **Mete Hergul** – *Thesis project*
 “Normalization in recurrent neural networks”
- 2022** **Abraham Alsawaf** – *Thesis project, afterwards MD student*
 “Homeostatic scaling in recurrent E-I networks.”
- 2019** **Nils Möbus** – *Thesis project*
 “An introduction to Principal Component Analysis.”
- 2019** **Suneet Singh Jhuty** – *Thesis project, afterwards PhD student with Prof. Esteban Hernandez-Vargas*
 “Neuronal balance through homeostatic mechanisms on different timescales.”
- 2018** **Marius Vieth** – *Internship project, afterwards PhD student with Prof. Jochen Triesch*
 “Synaptic lifetimes in recurrent neural networks.”

SERVICE & LEADERSHIP

- 2023-24** Reviewer for COSYNE – Computational and Systems Neuroscience Conference
- 2023** COSYNE workshop organiser: “Shaping circuit functions via plastic and diverse inhibition.”
- 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.