

Heike Stein

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Laboratoire de Neurosciences Cognitives & Computationnelles/Group for Neural Theory
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Research Interests

motor learning, working memory, cerebellum, cortico-cerebellar interactions, population dynamics

Current Position

2020 – pres. **Postdoc**
ENS Paris
EMBO postdoctoral fellow
PI: Alex Cayco-Gajic, PhD
Projects: Cortico-cerebellar interactions during motor learning, population coding in cerebellar molecular layer interneurons

Education

2016 – 20 **PhD in Computational Neuroscience**
Universitat de Barcelona
Marie Skłodowska-Curie/“la Caixa”-INPhINIT doctoral fellow
Supervisor: Albert Compte, PhD
Thesis “*Synaptic and circuit mechanisms of working memory and their dysfunction in anti-NMDA receptor encephalitis and schizophrenia*”, defended with Latin honors on November 13th, 2020.

2013 – 16 **MSc in Cognitive and Affective Neuroscience**
Technische Universität Dresden
Thesis in Statistical Methods in Cognitive Neuroscience, “*A dynamic field theory approach to delayed intentions and intention deactivation*”, 3.7/4.0.

2012 – 13 **Erasmus semester**
Universidad Pontificia Comillas Madrid

2009 – 13 **BSc in Psychology**
Eberhard Karls Universität Tübingen
Thesis in Knowledge and Media Psychology, “*Application of the elaboration likelihood model on learning with wikis*”, 3.5/4.0.

Previous Research Positions

- 2016 – 20 **Predoctoral Researcher**
IDIBAPS Barcelona
Project “Working memory in anti-NMDA receptor encephalitis and schizophrenia”
PI: Albert Compte, PhD
- 2013 – 15 **Research Assistant**
DFG Center “Volition and Cognitive Control” Dresden
Project “Adaptive regulation of cognitive control in dual-task performance”
PI: Rico Fischer, PhD
- 2014 – 15 **Intern**
Technische Universität Dresden
Project “Comorbidity of atopic dermatitis and ADHD”
supervisor: Katharina Trikojat, PhD
- 2011 – 12 **Research Assistant**
Knowledge Media Research Center Tübingen
Project “Knowledge acquisition with multimedia”
PI: Katharina Scheiter, PhD

Courses

- 2019 MBL Methods in Computational Neuroscience, Woods Hole, MA (August 2019)
- 2017 The Computational and Cognitive Neuroscience Summer School, NYU Shanghai (July 2017)
- 2017 The Mathematics of Memory School, Centre de Recerca Matemàtica Barcelona (January 2017)
- 2016 Reviewing Core Statistics, Centre de Recerca Matemàtica Barcelona (November - December 2016)

Fellowships and Grants

- 2021 EMBO Postdoctoral Fellowship
Postdoctoral projects at ENS Paris
- 2019 Travel Grant, William Randolph Hearst Foundation
for the participation at the MBL Methods in Computational Neuroscience Course
- 2018 Travel Grant, Universidad de Barcelona
for the participation at SFN Neuroscience 2018
- 2017 Marie Skłodowska-Curie/“la Caixa”-INPhINIT Fellowship
PhD studies at IDIBAPS Barcelona

Publications

- 2021 **Stein, H.** Why does the neocortex need the cerebellum for working memory? *The Journal of Neuroscience* (in press).
- Stein, H.***, Barbosa, J.*, & Compte, A. Towards biologically constrained attractor models of schizophrenia. *PsyArXiv*, doi:10.31234/osf.io/uxg2a (2021).
- Barbosa, J.*, **Stein, H.***, Summerfield, C., Soto-Faraco, S., & Hyafil, A.. A practical guide for studying human behavior in the lab. *PsyArXiv*, doi:10.31234/osf.io/tcmvp (2021).
- 2020 **Stein, H.***, Barbosa, J.*, Rosa-Justicia, M., Prades, L., Morató, A., Galan-Gadea, A., Ariño, H., Martínez-Hernández, E., Castro-Fornieles, J., Dalmau, J. & Compte, A. Reduced serial dependence suggests deficits in synaptic potentiation in anti-NMDAR encephalitis and schizophrenia. *Nature Communications* 11, 4250 (2020).
- Barbosa, J.*, **Stein, H.***, Martínez, R.L., Galan-Gadea, A., Li, S. Dalmau, J. Adam, K.C.S, Valls-Solé, J., Constantinidis, C. & Compte, A.. Interplay between persistent activity and activity-silent dynamics in the prefrontal cortex underlies serial biases in working memory. *Nature Neuroscience* 23, 1016–1024 (2020).

Conference Contributions

- 2019 **Stein, H.**, Barbosa, J., Dalmau, J., & Compte, A. NMDA-receptor dysfunction disrupts serial biases in spatial working memory. Poster presented at Bernstein Conference, Berlin, Germany. September, 2019.
- Stein, H.**, Barbosa, J., Dalmau, J., & Compte, A. NMDA-receptor dysfunction disrupts serial biases in spatial working memory. Poster presented at the Conference on Cognitive Computational Neuroscience, Berlin, Germany. September, 2019.
- Stein, H.**, Barbosa, J., Galan, A., Morató, A., Prades, L., Rosa, M., Arino, H. Dalmau, J., & Compte, A. Synaptic dysfunctions underlying reduced working memory serial bias in autoimmune encephalitis and schizophrenia. Workshop presentation at the Organization for Computational Neurosciences, Barcelona, Spain. July, 2019.
- 2018 **Stein, H.**, Lozano-Soldevilla, D., Dalmau, J., & Compte, A. Glutamatergic modulation of working memory precision and serial biases. Poster presented at SFN Neuroscience, San Diego, California. November, 2018.
- Stein, H.**, Lozano-Soldevilla, D., Dalmau, J., & Compte, A. Glutamatergic modulation of spatial working memory. Poster presented at the FENS Forum of Neuroscience, Berlin, Germany. July, 2018.
- 2016 **Stein, H.**, Walser, M., & Scherbaum, S. A dynamic field theory approach to prospective memory and intention deactivation. Poster presented at the Conference of Experimental Psychologists (TeaP), Heidelberg, Germany. March, 2016.

Invited Talks and Seminars

- 2018 Seminar at the Bernstein Center for Computational Neuroscience, Berlin, Germany (invited by J.-D. Haynes).
- 2018 Seminar at Charité University Hospital, Berlin, Germany (invited by C. Finke).
- 2018 Seminar at UCSD, Department of Psychology, San Diego, CA (invited by J. Serences).
- 2019 Seminar at Yale University, New Haven, CT (invited by J. Murray).
- 2020 Seminar at the Group for Neural Theory, École Normale Supérieure, Paris, France (invited by A. Cayco-Gajic).
- 2021 Seminar (virtual) at Champalimaud Center for the Unknown, Lisbon, Portugal (invited by Z. Mainen).

Supervision and Mentoring

- 2018 – 20 Alba Morató (BSc Psychology, BSc Statistics): Decoding working memory from fMRI in patients with autoimmune encephalitis and schizophrenia
- 2018 – 19 Laia Prades (MSc Psychology, BSc Biomedical Science): Working memory biases in patients with schizophrenia

Science Communication

- 2018 – 20 "Neurochats" Seminar Series, BARCCSYN, Barcelona
Organization of talk series given by and for early-career researchers in the Barcelona Cognitive, Computational and Systems Neuroscience (BARCCSYN) community (@neurochatsbcn)
- 2019 Generació Ciència, IDIBAPS, Barcelona
Organization of neuroscience outreach activity for high-school students
- 2018 Festa de la Ciència, Parc de la Ciutadella, Barcelona
Organization of neuroscience outreach activity for the general public
- 2017 BARCCSYN Community Retreat
Organization of retreat, including its scientific program, social events, and outreach activity