

Mathis Richter

Postdoctoral Researcher

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SUMMARY

Researcher and software engineer with expertise in neural cognitive systems; Postdoc in neuromorphic computing; Ph.D. on the link between language and perception; published 15 peer-reviewed articles, receiving two best paper awards; co-developed a graphical C++ framework for neural modeling; two exchange years during high school (USA) and university (UK).

EXPERIENCE

Postdoctoral Researcher

[Institute for Neural Computation, Ruhr-University Bochum](#)

07/2018 – Ongoing Bochum, Germany

- Researching the connection between dynamic field theory (DFT) and spiking neural networks on Intel's Loihi chip
- Developing Python framework for DFT architectures on Loihi
- Developed neuromorphic state-machine for iCub (Intel Labs Day 2020)
- Continued teaching, publication, funding, and organizational efforts
- <https://scholar.google.com/citations?user=lwAVM2QAAAAJ>

Research Associate

[Institute for Neural Computation, Ruhr-University Bochum](#)

10/2011 – 06/2018 Bochum, Germany

- Researched how language understanding links to perceptual processes in the human brain and in artificial neural networks
- Developed fully neural models of cognition based on dynamic field theory
- Published 15 peer-reviewed manuscripts (journals & conferences)
- Gave 3 oral and 4 poster presentations at international conferences
- Initiated and co-developed C++ framework cedar for neural modeling, used by the entire lab and in teaching (cedar.ini.rub.de)
- Lead organization of 4 international summer schools with 20 participants
- Teaching (lectures, lab courses in Matlab); supervising Master students

Research Assistant

[Institute for Neural Computation, Ruhr-University Bochum](#)

10/2008 – 09/2011 Bochum, Germany

- Designed and implemented a prototype for the framework cedar (Python)
- Designed, and oversaw the modernization of the institute's website
- Teaching assistance (correcting exercises)

OTHER EXPERIENCE

Machine Learning Course

3-month course by Stanford University on Coursera (07/2019 - 10/2019).

Telluride Neuromorphic Cognition Engineering Workshops

3-week workshops in 2012 and 2014. Implemented dynamic neural fields in spiking neurons. Built a system to extract the direction of object motion using a neuromorphic DVS camera. Developed a neural model to control grasping movements on a NAO robot.

Bochumer GNU/Linux User Group

Founded and lead a local Linux user group with about 10 members (2005-2009). Organized installation parties, PGP key signing parties, tutorials, and small lectures in a local hacking space.

EDUCATION

Dr.-Ing. Engineering (Ph.D. equivalent)

[Ruhr-University Bochum](#)

10/2011 – 06/2018 Bochum, Germany

- Supervisor: Prof. Dr. Gregor Schöner
- Grade: magna cum laude / very good

M.Sc. Applied Computer Science

[Ruhr-University Bochum](#)

04/2010 – 09/2011 Bochum, Germany

- Grade: 93 %

Computer Science, Exchange Year

[University of Birmingham](#)

10/2007 – 06/2008 Birmingham, UK

B.Sc. Applied Computer Science

[Ruhr-University Bochum](#)

10/2004 – 09/2010 Bochum, Germany

- Grade: 81 %

High School Exchange Year

[East Union High School](#)

08/2000 – 06/2001 Afton, IA, USA

AWARDS

Best Modeling Paper: Higher Cognition

CogSci 2016; 4 prizes on 480 accepted papers

Best Paper

ICANN 2014; 1 prize on 108 accepted papers

Top 5% of Class

M.Sc. Applied Computer Science, 2011

TECHNOLOGIES

C++	Python	Matlab	Git	CMake
Linux	L ^A T _E X			

LANGUAGES

German	Native	●●●●●
English	Professional Proficiency	●●●●●
French	Beginner	●●●●●

Grounding spatial language in perception by combining concepts in a neural dynamic architecture

[42nd Annual Conference of the Cognitive Science Society](#)

Daniel Sabinasz, Mathis Richter, Gregor Schöner

📅 2020 🔗 <https://cogsci.mindmodeling.org/2020/papers/0112/index.html>

A neural dynamic architecture that autonomously builds mental models

[40th Annual Conference of the Cognitive Science Society](#)

Parthena Kounatidou, Mathis Richter, Gregor Schöner

📅 2018 🔗 <https://cogsci.mindmodeling.org/2018/papers/0138/index.html>

A neural dynamic model generates descriptions of object-oriented actions

[Topics in Cognitive Science](#)

Mathis Richter, Jonas Lins, Gregor Schöner

📅 2017 🔗 <https://doi.org/10.1111/tops.12240>

Developing dynamic field theory architectures for embodied cognitive systems with cedar

[Frontiers in Neurorobotics](#)

Oliver Lomp, Mathis Richter, Stephan K. U. Zibner, Gregor Schöner

📅 2016 🔗 <https://doi.org/10.3389/fnbot.2016.00014>

A neural dynamic model parses object-oriented actions

[38th Annual Conference of the Cognitive Science Society](#)

Mathis Richter, Jonas Lins, Gregor Schöner

📅 2016 🔗 <https://cogsci.mindmodeling.org/2016/papers/0337/index.html>

Best Modeling Paper Award: Higher Cognition; lead to 2017 publication in Topics in Cognitive Science

A neural dynamic architecture resolves phrases about spatial relations in visual scenes

[24th International Conference on Artificial Neural Networks](#)

Mathis Richter, Jonas Lins, Sebastian Schneegans, Gregor Schöner

📅 2014 🔗 https://link.springer.com/chapter/10.1007/978-3-319-11179-7_26

Best Paper Award

Autonomous neural dynamic to test hypotheses in a model of spatial language

[36th Annual Conference of the Cognitive Science Society](#)

Mathis Richter, Jonas Lins, Sebastian Schneegans, Yulia Sandamirskaya, Gregor Schöner

📅 2014 🔗 <https://cogsci.mindmodeling.org/2014/papers/492/>

A robotic architecture for action selection and behavioral organization inspired by human cognition

[IEEE/RSJ Intl. Conference on Intelligent Robots and Systems](#)

Mathis Richter, Yulia Sandamirskaya, Gregor Schöner

📅 2012 🔗 <https://doi.org/10.1109/IROS.2012.6386153>

A neural-dynamic architecture for behavioral organization of an embodied agent

[IEEE Intl. Conference on Development and Learning](#)

Yulia Sandamirskaya, Mathis Richter, Gregor Schöner

📅 2011 🔗 <https://doi.org/10.1109/DEVLRN.2011.6037353>