

Dominik Dold, M.Sc.

🏠 born in Titisee-Neustadt, Germany

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🌐 <https://dodo47.github.io/>

🎓 computational neuroscience, machine & deep learning, AI, statistics



Work experience

- 2016 – 📌 **Research Assistant.** Petrovici group for bio-inspired AI, U. Heidelberg.
- 2017 – 2018 📌 **Guest Researcher.** Senn group for comp. neuroscience, U. Bern.
- 2014 – 2015 📌 **Research Assistant.** Evers group for theo. quantum dynamics, MPIK Heidelberg.

Summer schools

- June 2019 📌 **DS³ Data Science Summer School.**
Five-day school co-organised by the École polytechnique & the DATAIA Institute.
- March 2019 📌 **IRCN Course in Neuro-Inspired Computation.**
Invited after application. Four-day course offered by the U. Tokyo.

Training

- August 2019 📌 **Team Communication – Key Roles and Intercultural Contexts Workshop.**
- March 2019 📌 **University Leadership and Management (Epigeum).**
Courses: Leadership and management, Managing people, Strategic planning.
- February 2019 📌 **Business management course "Grundlagenwissen BWL".**
- October 2018 📌 **Computational Physics with GPUs.**
- April 2017 📌 **Machine learning in science and industry.**
Courses offered by the Heidelberg Graduate School for Physics.

Skills

- Languages 📌 very good writing, reading and communication skills in english
- Coding 📌 PYTHON & tensorflow, Matlab, Mathematica, C(++), HTML
- Software 📌 familiar with Linux bash shell and Windows systems, version control (git), integrated testing (jenkins), job scheduler (slurm, moab)
- Design 📌 L^AT_EX, Microsoft Office, Microsoft Powerpoint, Inkscape, Gimp
- Teaching 📌 co-supervised one master's thesis and supervised lecture tutorials, physics experiments for students and soft skill courses for first-year students
- Social 📌 organised the Journal Club of my research group during my Ph.D.

Communication & presentation skills

Selected talks

- 2019 📌 **Invited talk at Huawei**
Huawei Research Center, Hangzhou, China.
Invited by Liao Jianxing & Dr. Yansong Chua.

Communication & presentation skills (continued)

- **Selected talk at Cosyne 2019**
Cosyne Conference 2019, Lisbon, Portugal.
Selected from submitted abstracts.
- 2018 ■ **Invited talk at INI (ETH)**
ETH Institute of Neuroinformatics, Zurich, Switzerland.
Invited by Dr. João Sacramento.
- **Intel Neuromorphic Research Community (INRC) Workshop**
Workshop, hosted by Intel, Reykjavik, Iceland.
Invited as INRC Project Representative.
- **Neuroplasticity: From Bench to Machine Learning**
Workshop, Institute of Advanced Studies, U. Surrey, England.
Selected from submitted abstracts.
- **From Neuroscience to Machine Learning**
Workshop, European Institute for Theoretical Neuroscience, France.
Invited as a replacement for Prof. Dr. Walter Senn.

Poster presentations

- 2019 ■ **Bernstein Conference 2019** in Berlin, Germany.
- **CNS Conference 2019** in Barcelona, Spain.
- **DS³ Data Science Summer School** in Paris, France.
- **IRCN Course in Neuro-Inspired Computation** in Tokyo, Japan.
- 2018 ■ **Bernstein Conference 2018** in Berlin, Germany.
- **EMBO Dendrites Workshop 2018** in Heraklion, Greece.
- 2017 ■ **Bernstein Conference 2017** in Göttingen, Germany.
- **CNS Conference 2017** in Antwerp, Belgium.

Awards

- 2019 ■ **First prize in the finals of the 2019 International Collegiate Competition for Brain-Inspired Computing (ICCBC 2019)** at Tsinghua University in Beijing, China.

Education

- 2016 – ■ **Dr. rer. nat., Heidelberg Graduate School for Physics, Germany.**
- 2014 – 2016 ■ **M.Sc. in Physics, Heidelberg University, Germany.**
Thesis title: *Stochastic Computation in Spiking Neural Networks Without Noise.*
- 2010 – 2014 ■ **B.Sc. in Physics, Heidelberg University, Germany.**
Thesis title: *Energy Conservation in Fano Spectral Line Shape Control.*
- 2001 – 2010 ■ **Abitur, Gymnasium am Romäusring, Villingen-Schwenningen.**

Research publications, theses & proposals

Journal articles and preprints

- 1 Senn*, W., Dold*, D., Binas, J., Schindler, K., Bengio, Y., Sacramento, J. & Petrovici, M. A. (2020). Lagrangian dynamics of dendritic microcircuits enables real-time error backpropagation across cortical areas. *in prep.*
- 2 Billaudelle*, S., Stradmann*, Y., Schreiber*, K., Cramer*, B., Baumbach*, A., Dold*, D., ... Hartel, A. et al. (2019). Versatile emulation of spiking neural networks on an accelerated neuromorphic substrate. *arXiv preprint arXiv:1912.12980*.
- 3 Göltz, J., Baumbach, A., Billaudelle, S., Breitwieser, O., Dold, D., Kriener, L., ... Petrovici, M. A. (2019). Fast and deep neuromorphic learning with time-to-first-spike coding. *arXiv preprint arXiv:1912.11443*.
- 4 Kungl, A. F., Schmitt, S., Klähn, J., Müller, P., Baumbach, A., Dold, D., ... Kleider, M. et al. (2019). Accelerated physical emulation of bayesian inference in spiking neural networks. *Frontiers in Neuroscience*, 13, 1201.
- 5 Dold*, D., Bytschok*, I., Kungl, A. F., Baumbach, A., Breitwieser, O., Senn, W., ... Petrovici*, M. A. (2019). Stochasticity from function – why the bayesian brain may need no noise. *Neural Networks*, 119, 200–213.
- 6 Bytschok*, I., Dold*, D., Schemmel, J., Meier, K. & Petrovici*, M. A. (2017). Spike-based probabilistic inference with correlated noise. *arXiv preprint arXiv:1707.01746*.

Theses

- 1 Zenk, M. (2018). *Spatio-temporal predictions with spiking neural networks*. Master's thesis, co-supervised by Dold, D. Heidelberg University.
- 2 Dold, D. (2016). *Stochastic computation in spiking neural networks without noise*. Master's thesis. Heidelberg University.
- 3 Dold, D. (2014). *Energy conservation in fano spectral line shape control*. Bachelor thesis. Heidelberg University.

Proposals

- 1 Jordan, J., Dold, D., Petrovici, M. A. & Senn, W. (2018). Real-time error-backpropagation for deep cortical microcircuits in spiking neuromorphic systems. Intel INRC grant.

References

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