# Sebastian Dick | CV

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## EDUCATION

**Stony Brook University** — **Stony Brook, NY**
*Ph.D. student, Physics* — *2016–present*

**Stony Brook University** — **Stony Brook, NY**
*M.A., Physics* — *2014–2015*

**University of Wurzburg, Germany** — **Wurzburg, Germany**
*B.Sc. with distinction, Physics* — *2011–2014*

## RESEARCH

**Stony Brook University** — **Stony Brook, NY**
*Research Assistant, Advisor: Dr. Marivi Fernandez-Serra* — *May 2017–present*

- Machine learning (ML) and Density Functional Theory (DFT): Investigating how both can work together to achieve faster and more accurate electronic-structure calculations. Implementing a neural network with Tensorflow that uses the self-consistent charge density to correct DFT for systems containing water.
- Ab-initio Molecular Dynamics: Implementing a new ML enhanced ab-initio molecular dynamics algorithm promising substantial speed-up compared to classical approaches.
- Open source toolkit: Integrating these methods into a Python library that extends the Atomic Simulation Environment (ASE) enabling researchers to use our techniques together with any electronic structure code.

**University of Wurzburg** — **Wurzburg, Germany**
*Independent research under Dr. Ronny Thomale* — *Aug 2015–Aug 2016*

- Studied symmetry protected topological phases and conformal field theory
- Developed a C++ code ed_ising that allows for the exact diagonalization of 1-d quantum Hamiltonians under various symmetries and boundary conditions

**Stony Brook University** — **Stony Brook, NY**
*Master thesis research, Advisor: Dr. Lukasz Fidkowski* — *Jan–Jul 2015*

- Analyzed short-range entangled topological phases protected by time-reversal symmetry
- Proved that the microscopic model for these phases proposed by Chen et al. and the non-linear sigma model effective field theory are equivalent.

**University of Wurzburg** — **Wurzburg, Germany**
*Bachelor thesis research, Advisor: Dr. Ronny Thomale* — *Jan–Jul 2014*

- Worked with a group-internal Fortran code called FRG that uses the Functional Renormalization Group approach to study phase transitions in strongly correlated systems
- Studied the dependence of high temperature superconductivity in cuprates on doping.

## PROFESSIONAL DEVELOPMENT

**Parallel Computing in Molecular Sciences** — **Berkeley, CA**
*MolSSI Summer School and Workshop* — *Aug 2018*

**The Mathematical Theory of Deep Neural Networks** — **Princeton, NJ**
*Symposium* — *Mar 2018*

**Software Carpentry** — **Stony Brook, NY**
*Instructor training program* — *Jan 2018*
Became a certified Software Carpentry Instructor

**IWOMP** **Stony Brook, NY**
*OpenMP Tutorial* *Sep 2017*
Tutorial accompanying the 13th International Workshop on OpenMP

**MolSSI** **Virginia Tech, VA**
*Summer School* *Jul 2017*
Summer school at the Molecular Science Software Institute on good software development practices and scientific computing.

## TEACHING EXPERIENCE

**Stony Brook University** **Stony Brook, NY**
*Teaching Assistant* *Aug 2016–May 2017*
Taught life science and physics students in the lab sections of introductory physics courses and graded their activities

**University of Wurzburg** **Wurzburg, Germany**
*Teaching Assistant* *Oct–July 2016*
Taught recitation for a course on mathematical methods for physicists. Supported and graded students in the theoretical condensed matter physics graduate seminar.

## PRESENTATIONS

**Gordon Research Conference on Water and Aqueous Solutions** **Holderness, NH**
*Poster presentation* *Jul 2018*
Presented poster: Combining DFT and Machine Learning: towards faster and more accurate ab-initio calculations of water

**Joint Science Meeting** **Stony Brook, NY**
*Poster presentation* *May 2018*
Presented poster: Improving DFT calculations of water with Machine Learning

## EXTRA-CURRICULAR ACTIVITIES

**Tutor**
*Tutored high school students in mathematics, physics and english* *2016–2017*

**Initiative Junge Forscherinnen und Forscher e.V.** **Wurzburg, Germany**
*Teacher* *Jan–July 2016*
Non profit organization dedicated to teaching high school students physics and nano-science with modern classroom experiments

**University of Wurzburg** **Wurzburg, Germany**
*Physics Student Council Member* *Feb 2012–July 2014*
Supporting and counseling physics students. Representing students' interests towards university administration.

## AWARDS

**"Seed" Software Fellowship** **Blacksburg, VA**
*MolSSI* *Jan-Jul 2019*

**Jr. Researcher Award** **Stony Brook, NY**
*Institute for Advanced Computational Science* *Sep 2018*

**DAAD Stipend**
*USA Exchange Program* *Sep 2014*
Stipend to partly cover expenses related to the exchange program during which I obtained my Master's degree at Stony Brook University. The stipend was granted based on academic performance at the University of Wurzburg.

## LANGUAGES

German (native), English (fluent verbal and written), Italian and French (basic verbal and written)

## PROGRAMMING SKILLS

Python, C++, Fortran, OpenMP, MPI, Tensorflow, MySQL, Bash