

Steffen Brünle

Assistant Professor
Leiden University – Leiden Institute of Chemistry – Biophysical Structural Chemistry
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Date of Birth: 20 December 1985 | Place of Birth: Darmstadt, Germany

Education

- 04/2013 – 09/2017 **Ph.D.**, Goethe University, Frankfurt am Main, Germany
Subject: Chemistry
Ph.D. thesis: Max Planck Institute of Biophysics, Frankfurt am Main, Germany
Department: Molecular Membrane Biology (Prof. Dr. Dr. h.c. Hartmut Michel)
Focus: Structural Biology (Molecular Biology/Biochemistry/Biophysics)
- 07/2006 – 09/2012 **Diploma**, Saarland University, Saarbruecken, Germany
Subject: Biology with emphasis on human and molecular biology
Diploma thesis: Department of Structural Biology (Prof. Dr. Roy Lancaster)
Focus: Structural Biology (Molecular Biology/Biochemistry/Biophysics)

Current and previous research positions

- 08/2021 - Present **Assistant Professor**, Leiden University, Leiden, Netherlands
Institute: Leiden Institute of Chemistry (Prof. Dr. H.S. Overkleeft)
Department: Biophysical Structural Chemistry
Focus:
 - Structural investigation of allosteric modulation and biased signalling in GPCRs using single particle cryo-EM and classical / serial X-ray crystallography
 - Time-resolved X-ray crystallography using synchrotron radiation and free-electron lasers (XFEL)
- 09/2017 – 07/2021 **Postdoctoral Fellow**, Paul Scherrer Institute, Villigen, Switzerland
Division: Biology and Chemistry (Prof. Dr. Gebhard Schertler)
Department: Laboratory of Biomolecular Research (Prof. Michel. O. Steinmetz)
Supervisor: Dr. Jörg Standfuss
Focus:
 - Structural Biology / Drug discovery project on the human Chemokine Receptor 7 in collaboration with the pharmaceutical company F. Hoffmann-La Roche (Dr. Roger Dawson)
 - Identification of a novel regulatory mechanism in Chemokine Receptors (PI)
 - Serial / time-resolved X-ray crystallography using synchrotron radiation and free-electron lasers (XFEL) with natural and synthetic photoswitches

Funding:
 - PSI-FELLOW (Marie Skłodowska-Curie COFUND Fellowship – International Call)
 - SNF SPARK Grant (National Call, Role: PI)

- 04/2013 – 10/2017 **Ph.D. Thesis**, Max Planck Institute of Biophysics, Frankfurt am Main, Germany
- Department: Molecular Membrane Biology (Prof. Dr. Dr. h.c. Hartmut Michel)
 Supervisor: PD Dr. Ulrich Ermler
 Thesis title: “Structural and mechanistic insights into the molybdenum storage protein”
 Focus:
 - Biochemical and biophysical (X-ray crystallography/ Cryo-EM / HDX-MS) characterization of an ATP-driven molybdenum storage mechanism
 - Structural elucidation of the flavodoxin-like enzyme RosB via X-ray crystallography
 - Serial X-ray crystallography using synchrotron radiation
 Funding:
 - IMPRS (International Max Planck Research School) Fellowship (International Call)
- 08/2011 – 06/2012 **Diploma Thesis**, Saarland University, Saarbrücken, Germany
- Department: Structural Biology (Prof. Dr. Roy Lancaster)
 Supervisor: Prof. Dr. Roy Lancaster
 Thesis title: “Production and characterization of variants of the Quinol:Fumerate-Reductase from *Wolinella succinogenes*”
 Focus:
 - Mutational and Biochemical characterization of the terminal membrane-bound Quinol:Fumarate-Reductase of the anaerobic fumarate respiration.
 - Anaerobic cultivation of bacteria crystallization


Grants, Fellowships and Awards

- 06/2020 **Selected Speaker in the Next Gen Science Session – Online Science Days Lindau Nobel Laureate Meeting**
 Among 24 selected young scientists – International Call
- 03/2020 **Selected Participant of the 70th Lindau Nobel Laureate Meeting**
 Among the 650 most qualified applicants – International Call
- 02/2020 – 02/2021 **Swiss National Science Foundation (SNF) Spark, Role: Principle Investigator**
 1-year Grant to explore a novel regulatory concept for chemokine receptors.
 (Total of 100.000 CHF) – National Call
- 09/2017 – 09/2019 **PSI-FELLOW (Horizon 2020 Marie Skłodowska-Curie COFUND)**
 2-year PostDoc Fellowship (Total of ~270.000 CHF) – International Call
- 04/2013 – 04/2017 **International Max Planck Research School (IMPRS) of Structure and Function of Biological Membranes Fellowship**
 4-year PhD Fellowship (Total of ~130.000 Euro) – International Call
- 08/2010 – 12/2010 **German Academic Exchange Service (DAAD) ERASMUS**
 4-months Intern Fellowship (Total of ~2.000 Euro) – National Call

Student Supervision and Teaching Activities

- Supervision:
 - **Undergraduate student:** MPI of Biophysics, 01/2014 – 06/2014
 - **Graduate student:** PSI, 08/2020 – 07/2021
 - **Visiting scientist:** PSI, 01/2021 – 07/2021
- Teaching: **Biophysical chemistry practical course**, 5th Semester Biochemistry students (Goethe University); X-ray crystallography theory and data collection practicals at an X-ray generator home source (2014, 2015, 2016 - 1 week each)

Publications

1. Skopintsev, P., ..., **Brünle, S.**, et. al. Femtosecond to millisecond structural changes in a light-driven sodium pump. *Nature* **583**, 7815 (2020)
2. **Brünle, S.***  et. al. Molybdate pumping into the molybdenum storage protein via an ATP-powered piercing mechanism. *PNAS*, **116** (52), 26497-26504 (2019)
3. Jaeger, K.* & **Bruenle, S.***, et al. Structural Basis for Allosteric Ligand Recognition in the Human CC Chemokine Receptor 7. *Cell* **178**, 5 (2019)
4. Weinert, T., ..., **Brünle, S.**, et al. Proton uptake mechanism in bacteriorhodopsin captured by serial synchrotron crystallography. *Science* **365**, 6448 (2019)
5. Nogly, P., ..., **Brünle, S.**, et al. Retinal isomerization in bacteriorhodopsin captured by a femtosecond x-ray laser. *Science* **361**, 6398 (2018).
6. **Brünle, S.*** & Poppe, J.*, Hail, R., Demmer, U. & Ermler, U. The Molybdenum storage protein – a bionanolab for creating experimentally alterable polyoxomolybdate clusters. *Journal of Inorganic Biochemistry*, **189**, 172-179 (2018)
7. Poppe, J.* & **Brünle, S.***, Hail, R., Wiesemann, K., Schneider, K. and Ermler, U. The Molybdenum Storage Protein: A soluble ATP hydrolysis-dependent molybdate pump. *FEBS J*, **285**, 4602-4616 (2018)
8. Konjik, V.* & **Brünle, S.*** et al. The Crystal Structure of RosB: Insights into the Reaction Mechanism of the First Member of a Family of Flavodoxin-like Enzymes. *Angew. Chem. Int. Ed. Engl.* **56**, 1146–1151 (2017).
9. Weinert, T., Olieric, N., Cheng, R., **Brünle, S.** et al. Serial millisecond crystallography for routine room-temperature structure determination at synchrotrons. *Nature Communications* **8**, 542 (2017).

*: First author and joint first author positions

 : Co-Corresponding Author

Research in the News

1. **technologynetworks.com:** Breaking Science News - Preventing the Spread of Certain Cancers – <https://bit.ly/2meNrpj>
2. **slac.stanford.edu:** Scientists Make the First Molecular Movie of One of Nature’s Most Widely Used Light Sensors - <https://stanford.io/2RG67fC>
3. **hs-mannheim.de:** Forscher der Fakultät für Biotechnologie sind schneller als die internationale Konkurrenz aus USA - <https://bit.ly/2ADQgVl>

Conferences, Workshops and Oral Presentations

- 2020: **Lindau Nobel Laureate Meetings – Selected oral presentation**
“Online Science Days 2020 – Next Gen Science Session”
- 2019: **GPCR Workshop, Hawaii – Poster presentation**
- 2019: **GPCR International Meeting, Montpellier – Poster presentation**
“8th Annual Meeting of GDR3545”
- 2019: **University of Oslo – Invited oral presentation** as a guest of Prof. Hartmut Lücke
- 2018: **Rhein-Knee Regiomeeting on Structural Biology – Selected oral presentation**
“Structural basis for allosteric ligand recognition in the human CC chemokine receptor 7”
- 2016: **EMBO Conference – Poster presentation**
“Molecular Machines: Integrative Structural and Molecular Biology”
- 2014: **FEBS Practical & Lecture Course**
BioCrys2014: “Fundamentals of Modern Methods of BioCrystallography”
- 2014: **Hirschegg Summer School – Selected oral presentation**