

CURRICULUM VITAE

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ACADEMIC APPOINTMENTS

3/2023 - present **Research Group Leader “Biomolecular EPR spectroscopy and signal transduction”**
Institute for Drug Discovery, University of Leipzig Medical School, Leipzig, Germany
Interdisciplinary Center for Bioinformatics, University of Leipzig, Leipzig, Germany

7/2021 - 3/2023 **Assistant Research Professor & Principal Investigator**
Stein Eye Institute, University of California, Los Angeles

11/2018 - 6/2021 **Research Scientist**
Hubbell Laboratory, University of California, Los Angeles

EDUCATION & TRAINING

11/2013 - 11/2018 **Postdoctoral Training**, Hubbell Laboratory, University of California, Los Angeles
Elucidation of common structure/function relationships of GPCR signaling based on the rhodopsin model system by means of EPR spectroscopy.

11/2012 - 10/2013 **Postdoctoral Training**, Hofmann/Heck Laboratory, Charité – Universitätsmedizin Berlin
Development of a titration assay to determine binding affinities of conformational states in equilibrium.

11/2006 - 10/2012 **Ph.D. in Biophysics**, Humboldt Universität zu Berlin – *summa cum laude*
Advisors: Drs. KP Hofmann/ FJ Bartl. Thesis title: “*Spectroscopic investigations of visual rhodopsin*”

10/2005 - 9/2006 **Diploma in Physics** (minor in Mathematics), Freie Universität Berlin – *very good*
Advisor: Dr. M Heyn. Thesis title: “*Investigation of the effect of UV light on the conformation of light-activated rhodopsin.*”

2002 **Pre-diploma in Physics** (minor in Chemistry), Georg August Universität Göttingen

GRANTS, FELLOWSHIPS & AWARDS

1/2024 - 12/2027 **SFB 1423**, Collaborative Research Center
Principal Investigator, Total €60.000 (€140.000/year)
German Research Foundation
“The role of conformational dynamics for Y receptor activation”

10/2023 - 6/2027 **Hyp*Mol**, Transregional Collaborative Research Center
Principal Investigator, Total €265.000 (€70.000/year)
German Research Foundation
“Flavomaquettes with observer spin label for hyperpolarized EPR spectroscopy”

4/2021 - 3/2023 **R01 GM137081**, Principal Investigator
Total \$1,599,000 (\$319.800/year), accepted for 2 years
National Institute of General Medical Sciences (NIGMS)
“Exploring the Conformational Landscape of G protein Coupled Receptors”

2018 **Travel Award**, 18th International Conference on Retinal Proteins
Toronto, Canada

- 2014 [Postdoctoral Research Fellowship](#), German Research Foundation
- 2015 “Developing a common framework of structure/function relationships for G protein coupled receptors using site-directed spin labeling and EPR-spectroscopy”.
- 2012 **Poster Prize**, 15th International Conference on Retinal Proteins
Monte Verita – Ascona, Switzerland
- 2006 **Student Research Fellowship**, Charité - Universitätsmedizin Berlin
“Time-resolved FTIR spectroscopy of rhodopsin deactivation”

SELECTED PUBLICATIONS (*co-first author, ‡corresponding author)

- Belyaeva J, **Elgeti M**[‡]. (2024) Exploring protein structural ensembles: Integration of sparse experimental data from electron paramagnetic resonance spectroscopy with molecular modeling methods. *eLife*, accepted
- Zhao J, **Elgeti M**^{*‡}, O’Brien ES, Sár CP, El Daibani A, Heng J, Sun X, White E, Che T, Hubbell WL, Kobilka BK, Chen C. (2024) Ligand Efficacy Modulates Conformational Dynamics of the μ -Opioid Receptor. *Nature*, 1–7.
- Khan F, **Elgeti M**^{*‡}; Grandfield S, Paz A, Marcoline FV, Wright EM, Grabe M, Hubbell WL, Abramson J (2023) Membrane Potential Increases Outward-facing Accessibility and Transport Rate of the Sodium-Glucose Transporter. *Nature Communications*, 14 (1), 7511.
- Chen M, Kálai T, Cascio D, Bridges MD, Whitelegge JP, **Elgeti M**, Hubbell WL (2023) A Highly Ordered Nitroxide Side Chain for Distance Mapping and Monitoring Slow Structural Fluctuations in Proteins. *Applied Magnetic Resonance*.
- Elgeti, M**[‡] and Hubbell, WL. (2021) DEER Analysis of GPCR Conformational Heterogeneity. *Biomolecules*, 11:778.
- Lerch, MT, Matt RA, Masureel M, **Elgeti M**, Kumar KK, Hilger D, Foys B, Kobilka BK, Hubbell WL (2020) Viewing Rare Conformations of the β_2 -Adrenergic Receptor with Pressure-Resolved DEER Spectroscopy. *Proceedings of the National Academy of Sciences of the U.S.A.* 117:31824–31.
- McMahon C, Staus DP, Wingler LM, Wang J, Skiba MA, **Elgeti M**, Hubbell WL, Rockman HA, Kruse AC, Lefkowitz RJ (2020). Synthetic Nanobodies as Angiotensin Receptor Blockers. *Proceedings of the National Academy of Sciences of the U.S.A.* 117:20284–91.
- Wingler LM, **Elgeti, M**^{*}, Hilger, D, Latorraca, NR, Lerch, MT, Staus, DP, Dror, RO, Kobilka, BK, Hubbell, WL, Lefkowitz, RJ (2019). Angiotensin Analogs with Divergent Bias Stabilize Distinct Receptor Conformations. *Cell* 176:468–78.
- Elgeti, M**[‡], Kazmin, R, Rose, AS, Szczepek, M, Hildebrand, PW, Bartl, FJ, Scheerer, P, Hofmann, KP (2018). The Arrestin-1 Finger Loop Interacts with Two Distinct Conformations of Active Rhodopsin. *The Journal of Biological Chemistry* 293:4403–10.
- Kazmin R, Rose, AS, Szczepek, M, **Elgeti, M**, Ritter, E, Piechnick, R, Hofmann, KP, Scheerer, P, Hildebrand, PW, Bartl, FJ (2015). The Activation Pathway of Human Rhodopsin in Comparison to Bovine Rhodopsin. *The Journal of Biological Chemistry* 290:20117–27.
- Sommer ME, **Elgeti, M**, Hildebrand, PW, Szczepek, M, Hofmann, KP, Scheerer, P (2015). Structure-Based Biophysical Analysis of the Interaction of Rhodopsin with G protein and Arrestin. *Methods in Enzymology* 556:563–608.
- Szczepek, M, Beyrière, F, Hofmann, KP, **Elgeti, M**, Kazmin, R, Rose, AS, Bartl, FJ, von Stetten, D, Heck, M, Sommer, ME, Hildebrand, PW, Scheerer, P (2014). Crystal Structure of a Common GPCR-Binding Interface for G protein and Arrestin. *Nature Communications* 5:4801.
- Rose AS, **Elgeti, M**, Zachariae, U, Grubmüller, H, Hofmann, KP, Scheerer, P, Hildebrand, PW (2014). Position of Transmembrane Helix 6 Determines Receptor G protein Coupling Specificity. *Journal of the American Chemical Society* 136:11244–7.

Elgeti, M[‡], Rose, AS, Bartl, FJ, Hildebrand, PW, Hofmann, KP, Heck, M (2013). Precision vs Flexibility in GPCR Signaling. *Journal of American Chemical Society* 135:12305–12.

Elgeti, M[‡], Kazmin, R, Heck, M, Morizumi, T, Ritter, E, Scheerer, P, Ernst, OP, Siebert, F, Hofmann, KP, Bartl, FJ (2011). Conserved Tyr223(5.58) Plays Different Roles in the Activation and G-protein Interaction of Rhodopsin. *Journal of the American Chemical Society* 133:7159–65.

Ritter E, **Elgeti, M**, Bartl FJ (2008). Activity Switches of Rhodopsin. *Photochemistry Photobiology* 84:911–20.

Elgeti, M, Ritter E, Bartl FJ (2008). New Insights into Light-Induced Deactivation of Active Rhodopsin by SVD and Global Analysis of Time-Resolved UV/Vis- and FTIR-Data. *Zeitschrift für Physikalische Chemie* 222:1117–29.

Ritter E, **Elgeti, M***, Hofmann KP, Bartl FJ (2007). Deactivation and Proton Transfer in Light-Induced Metarhodopsin II/Metarhodopsin III Conversion: A Time-Resolved Fourier Transform Infrared Spectroscopic Study. *The Journal of Biological Chemistry* 282:10720–30.

MANUSCRIPTS SUBMITTED OR IN PREPARATION

Helabad MB, Belyaeva J, **Elgeti M**. Targeting Hidden Conformational States of the Type 1 Angiotensin II Receptor. *In preparation*

Elgeti M, Wingler LM, Lefkowitz RJ, Hubbell WL. Segmental Coupling in G protein Coupled Receptors Revealed by Pressure-Resolved DEER. *In preparation*

Elgeti M. The Affinity Framework of Molecular Efficacy. *In preparation*

INVITED TALKS (selection)

9/2024 *The affinity framework of molecular efficacy.*
Annual Meeting of the German Biophysical Society
Leipzig, Germany

9/2024 *Studying membrane protein conformational dynamics using EPR spectroscopy and integrative modeling.*
45th FGMR Annual Meeting and Joint Conference of the German, Danish, Polish, and Swedish Magnetic Resonance Communities
University of Rostock, Germany

11/2022 *Exploring the conformational landscapes of G protein coupled receptors with EPR spectroscopy.*
50th Middle German Magnetic Resonance Meeting
Leipzig University, Germany

11/2020 *GPCR conformational dynamics investigated by double electron-electron resonance (DEER).*
Institute for Drug Discovery (virtual)
Leipzig University

10/2019 *Structural underpinnings of biased agonism in G protein coupled receptors.*
Symposium of the Collaborative Research Center 1078
Free University Berlin, Germany

9/2018 *A structure/function framework of GPCR activation based on the rhodopsin model.*
18th International Conference on Retinal Proteins
Hockley Valley Resort, Toronto, Canada

1/2018 *Protein flexibility and its important role in signal transduction.*
Basic Sciences Seminars
University of California, Los Angeles, United States

- 7/2015 *Precision vs. flexibility in GPCR signaling: A case study of visual rhodopsin.*
"Unifying Concepts in Catalysis" Colloquium
Technical University Berlin, Germany
- 10/2012 *GPCR signaling investigated by FTIR spectroscopy.*
15th International Conference on Retinal Proteins
Monte Verita – Ascona, Switzerland
- 10/2010 *Signal transfer from rhodopsin to its G protein: Insights from spectroscopic and structural studies.*
14th International Conference on Retinal Proteins
University of California, Santa Cruz, United States
- 6/2010 *The different roles of Tyr223^{5.58} for the activation and G protein interaction of bovine rhodopsin.*
Symposium of the Collaborative Research Center 498
Free University Berlin, Germany

TEACHING & MENTORING

- Summer 2024 Coordinator and lecturer **“From the active substance to the medicinal product”** (11-BCH-0815)
M.Sc. Biochemistry, Leipzig University Medical School
- Winter 2023/24 Coordinator and lecturer for laboratory course **“Inorganic chemistry BIO-103”**, B.Sc. Biology, University of Leipzig
- Summer 2023 Coordinator and lecturer for laboratory course **„Fluoreszenz-Spektroskopie”**
M.Sc. Pharmacy, Leipzig University Medical School
- Summer 2023 Lecturer for Scientific Module **“Integration of Experimental Data with Artificial Intelligence for the Investigation of Membrane Proteins”** <https://research.uni-leipzig.de/vanderbilt/>
- Summer 2023 Coordinator and lecturer **“From the active substance to the medicinal product”** (11-BCH-0815)
M.Sc. Biochemistry, Leipzig University Medical School
- Winter 2022/23 Lecture and laboratory course **“EPR Spectroscopy”**
Modul Strukturanalytik, B.Sc. Biochemistry
- Summer 2017 **Supervision of Undergraduate Student Research Project** (Chem99)
“Conformational equilibria of a ligand-free GPCR investigated by EPR spectroscopy”
University of California, Los Angeles
- Summer 2017 **“Entering Mentoring” Training Program**
University of California, Los Angeles
<https://bioscience.ucla.edu/ucla-entering-mentoring-training-program/>
- Spring 2017 **Course Development and Educational Leadership Training Program**
University of California, Los Angeles
<https://www.biomedpostdoc.ucla.edu/bioscience-postdoc-educational-leadership-program/>
- 11/2006 - 11/2012 **Teaching Assistant**, Biophysics (M.Sc. program)
Humboldt University Berlin
Biophysics of signal transduction (Laboratory course)
- 11/2006 - 05/2012 **Teaching Assistant**, Medical School
Charité – Universitätsmedizin Berlin
Introduction to experimental physics (Lecture and Laboratory course)
Maintenance of the online learning platform Blackboard

2011

Author/Instructor, www.chemgapedia.de

“*Analysis of a protein microswitch using FTIR difference spectroscopy*“

Course available online at www.chemgapedia.de (in German)

ACADEMIC SERVICE

9/2023 Organizing Committee [Hyp23](#) International Conference on Hyperpolarization.

Ad hoc reviewer:

Applied Magnetic Resonance

Biomolecules

Biology

Helvetica Chimica Acta

Journal of Biological Chemistry

Journal of Physical Chemistry B

Marine Drugs

Molecules

Pharmaceuticals

Proceedings in the National Academy of Sciences of the U.S.A

Nature - Signal Transduction and Targeted Therapy

eLife - Early Career Reviewer in Structural Biology and Molecular Biophysics