Curriculum Vitae

Dr. Jörg Standfuss

Nationality:	German	Email:	joerg.standfuss@psi.ch
Date of Birth:	October 1st, 1974	Tel:	+41-56-310-2586
Family status:	Married, one child	Address:	Paul Scherrer Institute Biology and Chemistry
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Professional Experience

Since 10/2019	**Deputy Head Laboratory of Biomolecular Research** Paul Scherrer Institute, Biomolecular Research, Villigen PSI, Switzerland
Since 01/2018	**Responsible for SwissFEL Biolabs** Support facility for serial crystallography at SLS and SwissFEL Paul Scherrer Institute, Biomolecular Research, Villigen PSI, Switzerland
Since 07/2014	**Group Leader (tenured)** Time-resolved crystallography Paul Scherrer Institute, Biomolecular Research, Villigen PSI, Switzerland
01/2010 – 06/2014	**Project Leader** Stabilization of GPCR signaling complexes Paul Scherrer Institute, Biomolecular Research, Villigen PSI, Switzerland
01/2006 -12/2009	**Marie-Curie and EMBO Long-Term Fellow** Molecular mechanisms of G protein-coupled receptor activation Medical Research Council, Laboratory of Molecular Biology, Cambridge, UK
04/2005 -12/2005	**Postdoctoral fellow** Structural basis for energy transfer in the plant light-harvesting complex II Max-Planck Institute of Biophysics, Structural biology, Frankfurt, Germany

Education

06/2000 - 03/2005	**Dr. phil. nat. in Biochemistry** Crystal structure the plant light harvesting complex II University of Frankfurt / Max-Planck Institute of Biophysics, Frankfurt, Germany Under supervision of Prof. W. Kühlbrandt
05-1995 - 05/2000	**Diploma in Biology with focus on Biophysics** Stabilizing trimers of the plant light harvesting complex II University of Mainz / Max-Planck Institute of Biophysics, Frankfurt, Germany Under supervision of Prof. W. Kühlbrandt

Research Grants

2019 - 2022	**National Cluster of Excellence** Methods in ultrafast science and technology (MUST) phase III
2018 - 2022	**Swiss National Science Foundation** Tracking the structural dynamics of ligand-protein interactions using X-ray free electron lasers, *invited to excellence program for automatic grant renewal*
2018	**Swiss National Science Foundation R'Equip** Tunable nanosecond laser for serial crystallography at SLS and SwissFEL
2015 - 2018	**Swiss National Science Foundation** Structural dynamics of 7TM proteins probed by serial femtosecond crystallography
2016 – 2019	**Commission for Technology and Innovation CTI (Co-applicant)** Development of X-ray diffraction instrument using ultrasound acoustic levitation
2013 - 2016	**Hoffmann-La Roche** Novel structure-based approaches for the cure of retinitis pigmentosa
2011 - 2015	**Hoffmann-La Roche (Co-applicant)** Structures of G protein receptor complexes
2012 - 2015	**Swiss National Science Foundation** Structural impact of pathological mutations on the GPCR rhodopsin and its complex with arrestin
2010 - 2013	**Swiss National Science Foundation (Co-applicant)** Linking G protein-coupled receptor structure to signaling output
2011	**Swiss National Science Foundation R'Equip (Co-applicant)** Upgrading the biophysical facility at the PSI with an analytical ultracentrifuge equipped with fluorescence detection system

Scientific Societies

Since 2011	**German Association of University Professors and Lecturers**
2007 - 2010	**American Association for the Advancement of Science**
2006 - 2009	**Research Associate to Darwin College, University of Cambridge**
2001 - 2004	**International Max-Planck Research School**

Fellowships and Awards

06/2015	**Group Leader EMBL Hamburg and European XFEL** (offer turned down) Laboratory Head of the XFEL-based Biology Infrastructure (XBI) facility
01/2009 - 12/2009	**EMBO Long-Term Fellowship** Postdoctoral fellowship funding my work at the MRC-LMB
01/2007 - 12/2008	**Marie Curie Intra-European Fellowship** Postdoctoral fellowship funding my work at the MRC-LMB
01/2005	**Departmental award for the structure determination of LHC-II** Max-Planck Institute of Biophysics

Teaching Experience

Since 2019	**Lecture at the University of Zurich** "Molecular Cell Biology, Module Cell cycle"
Since 2011	**Training and mentoring of PhD students** as Principal Investigator in the Life Science Graduate School Zürich (Villigen PSI, Switzerland)
2011 - 2015	**Assistant in the ETH Zürich practical course** "Macromolecular Structure and Biophysics" (Villigen PSI, Switzerland)
2006 - 2010	**Training and day-to-day supervision of PhD and visiting students** at the MRC-Laboratory of Molecular Biology (Cambridge, UK)
2004 - 2005	**Training and day-to-day supervision the PhD student** who continued my work on the light harvesting complex II at the Max-Planck Institute of Biophysics (Frankfurt, Germany)
2000 - 2005	**Supervision of a technical assistant and several visiting students** at the Max-Planck Institute of Biophysics (Frankfurt, Germany)
1998 - 1999	**Weekly tutoring lessons** for students following the module "Molecular Genetics" at the Johannes-Gutenberg University (Mainz, Germany)
1998 - 1999	**Assisting in the two week practical course** "Molecular Genetics" at the Johannes-Gutenberg University (Mainz, Germany)

Other Relevant Experience

Since 2017	**Member of the PSI research committee (FoKo)** Internal advisory and review board for grant applications
Since 2016	**Principal investigator in the NCCR MUST**
Since 2014	**Coordination of SwissFEL applications in the Biology and Chemistry Division**
Since 2014	**Peer review of scientific articles** Including articles in Science, Nature, Nature Com., NSMB, PNAS and IUCrJ
Since 2014	**Oral contribution or session chair at around 30 meetings within the last five years**
Since 2012	**Supervised and graduated four PhD students**
Since 2012	**Principal investigator in the Life Science Zurich Graduate School**
2016	**Co-founder InterAx Biotech AG** Spin-off based on PhD thesis and patent from my group
2014 - 2015	**PSI mentoring program**
2014 - 2015	**PSI leadership workshops** Conflict management, Resource management, Leadership I+II, Management by objectives
2012	**Member of the organization committee** of the 15th International Conference on Retinal Proteins

Publications

corresponding and last author articles marked*, 3495 citations, h-index 22
https://scholar.google.ch/citations?user=XumPuuYAAAAJ&hl=en

Peer Reviewed Papers

1) Structural basis for allosteric ligand recognition in the human CC chemokine receptor 7
Jaeger K, Bruenle S, Weinert T, Guba W, Muehle J, Miyazaki T, Weber M, Furrer A, Haenggi N, Tetaz T, Huang CY, Mattle D, Vonach J, Gast A, Kuglstatter A, Rudolph M, Nogly P, Benz J, Dawson R, **Standfuss J***, (2019), *Cell*, 178 (5), 1222–1230

2) Proton uptake mechanism in bacteriorhodopsin captured by serial synchrotron crystallography
Weinert T, Skopintsev P, James D, Dworkowski F, Panepucci E, Kekilli D, Furrer A, Brünle S, Mous S, Ozerov D, Nogly P, Wang M, **Standfuss J***, (2019), *Science*, 365 (6448), 61-65

3) Improving high viscosity extrusion of microcrystals for time-resolved serial femtosecond crystallography at x-ray lasers
James D, Weinert T, Skopintsev P, Furrer A, Gashi D, Tanaka T, Nango E, Nogly P, **Standfuss J***, (2019), *J Vis Exp*., doi: 10.3791/59087

4) Arrestin-1 engineering facilitates complex stabilization with native rhodopsin.
Haider RS, Wilhelm F, Rizk A, Mutt E, Deupi X, Peterhans C, Mühle J, Berger P, Schertler GFX, **Standfuss J**, Ostermaier MK. (2019), *Sci Rep,* 9, 439

5) Distinct G protein-coupled receptor phosphorylation motifs modulate arrestin affinity and activation and global conformation
Mayer D, Damberger FF, Samarasimhareddy M, Feldmueller M, Vuckovic Z, Flock T, Bauer B, Mutt E, Zosel F, Allain FHT, **Standfuss J**, Schertler GFX, Deupi X, Sommer ME, Hurevich M, Friedler A, Veprintsev DB (2019), *Nat Commun*, 10, 1261

6) Crystal structure of rhodopsin in complex with a mini-Go sheds light on the principles of G protein selectivity
Tsai CJ, Pamula F, Nehmé R, Mühle J, Weinert T, Flock T, Nogly P, Edwards PC, Carpenter B, Gruhl T, Ma P, Deupi X, **Standfuss J**, Tate CG, Schertler GFX, (2018) *Science Advances*. 9:eaat7052.

7) Retinal isomerization in bacteriorhodopsin captured by a femtosecond X-ray laser
Nogly P, Weinert T, James D, Carbajo S, Ozerov D, Furrer A, Gashi D, Borin V, Skopintsev P, Jaeger K, Nass K, Båth P, Bosman R, Koglin J, Seaberg M, Lane T, Kekilli D, Brünle D, Tanaka T, Wu W, Milne C, White T, Barty A, Weierstall U, Panneels V, Nango E, Iwata S, Hunter M, Schapiro I, Schertler G, Neutze R, **Standfuss J***, (2018), *Science, 10.1126/science.aat0094*

8) A ligand channel in pharmacologically stabilized rhodopsin
Mattle D, Kuhn B., Aebi J, Bedoucha M, Grozinger N, Alker A, Rudolph M, Schmid G, Schertler G, Hennig M, **Standfuss J***, Dawson R (2018), *PNAS,* 115, 3640-3645

9) Opportunities for ultrafast science at SwissFEL
Abela R, Beaud P, van Bokhoven JA, Chergui M*, Feurer T, Haase J, Ingold G, Johnson SL, Knopp G, Lemke H, Milne CJ, Pedrini B, Radi P, Schertler G, **Standfuss J**, Staub U, Patthey L, (2018), *Structural Dynamics*, 6, 061602

10) Serial millisecond crystallography for routine room-temperature structure determination at synchrotrons
Weinert T, Olieric N, Cheng R, Bruenle S, James D, Ozerov D, Gashi D, Vera L, Marsh M, Jaeger J, Dworkowski F, Panepucci E, Basu S, Skopintsev P, Dore A, Geng T, Cooke R, Liang M, Prota A, Panneels V, Nogly P, Ermler U, Schertler G, Hennig M, Steinmetz M, Wang M, **Standfuss J***, (2017), *Nat. Commun*., 8, 542

11) A three-dimensional movie of structural changes in bacteriorhodopsin
Nango E, Royant A, Kubo M, Nakane T, Wickstrand C, Kimura T, Tanaka T, Tono K, Song C, Tanaka R, Arima T, Yamashita A, Kobayashi J, Hosaka T, Mizohata E, Nogly P, Sugahara M, Nam D, Nomura T, Shimamura T, Im D, Fujiwara T, Yamanaka Y, Jeon B, Nishizawa T, Oda K, Fukuda M, Andersson R, Båth P, Dods R, Davidsson J, Matsuoka S, Kawatake S, Murata M, Nureki O, Owada S, Kameshima T, Hatsui T, Joti Y, Schertler G, Yabashi M, Bondar AN, **Standfuss J,** Neutze R, Iwata S (2016), *Science*, **23**, 1552-1557

12) Lipidic cubic phase injector is a viable crystal delivery system for time-resolved serial crystallography
Nogly P, Panneels V, Nelson G, Gati C, Kimura T, Milne C, Milathianaki D, Kubo M, Wu W, Conrad C, Coe

J, Bean R, Zhao Y, Bath P, Dods R, Harimoorthy R, Beyerlein KR, Rheinberger J, James D, DePonte D, Li Chufeng, Sala L, Garth JW, Hunter MS, Koglin JE, Berntsen P, Nango E, Iwata S, Chapman HN, Fromme P, Frank M, Abela R, Boutet S, Barty A, White TA, Weierstall U, Spence J, Neutze R, Schertler G, **Standfuss J*** (2016), *Nat. Commun.,* 22, 12314

13) Structural role of the T94I rhodopsin mutation in congenital stationary night blindness
Singhal A, Guo Y, Matkovic M, Schertler G, Deupi X, Yan EC, **Standfuss J*** (2016), *EMBO R.,* 10, 1431-1440

14) Functional map of arrestin binding to phosphorylated opsin, with and without agonist
Peterhans C, Lally C, Ostermaier M, Sommer M, **Standfuss J*** (2016), *Sci. Rep.,* 6, 28686

15) Crystal structure of rhodopsin bound to arrestin by femtosecond X-ray laser
Kang Y, Zhou X, Gao X, He Y, Liu W, Ishchenko A, Barty A, White T, Yefanov O, Han G, Xu Q, de Waal P, Ke J, Tan M, Zhang C, Moeller A, West G, Pascal B, Van Eps N, Caro L, Vishnivetskiy S, Lee R, Suino-Powell K, Gu X, Pal K, Ma J, Zhi X, Boutet S, Williams G, Messerschmidt M, Gati C, Zatsepin N, Wang D, James D, Basu S, Roy-Chowdhury S, Conrad C, Coe J, Liu H, Lisova S, Kupitz C, Grotjohann I, Fromme,R, Jiang Y, Tan M, Yang H, Li J, Wang M, Zheng Z, Li D, Howe N, Zhao Y, **Standfuss J,** Diederichs K, Dong Y, Potter C, Carragher B, Caffrey M, Jiang H, Chapman H, Spence J, Fromme P, Weierstall U, Ernst O, Katritch V, Gurevich V, Griffin P, Hubbell W, Stevens R, Cherezov V, Melcher K, Xu H (2015), *Nature*, 523, 561-7

16) Batch crystallization of rhodopsin for structural dynamics using an X-ray free-electron laser
Wu W, Nogly P, Rheinberger J, Kick L, Gati C, Nelson G, Deupi X, **Standfuss J**, Schertler G, Panneels V (2015), *Acta Crystallogr F,* 71, 856–860.

17) Lipidic cubic phase serial millisecond crystallography using synchrotron radiation
Nogly P, James D, Wang D, White T, Zatsepin N, Shilova A, Nelson G, Liu H, Johansson L, Heymann M, Jaeger K, Metz M, Wickstrand C, Wu W, Bath P, Berntsen P, Oberthuer D, Panneels V, Cherezov V, Chapman H, Schertler G, Neutze R, Spence J, Moraes I, Burghammer M, **Standfuss J*,** Weierstall U (2015), *IUCrJ*, 2, 168-72

18) Crystallization scale preparation of a stable GPCR signaling complex between constitutively active rhodopsin and G-protein
Maeda S, Sun D, Singhal A, Foggetta M, Schmid G, **Standfuss J**, Hennig M, Dawson R, Veprintsev D, Schertler G (2014), *PLoS ONE*, 9, 98714

19) Functional map of arrestin-1 at single amino acid resolution
Ostermaier M, Peterhans C, Jaussi R, Deupi X, **Standfuss J***, (2014), *PNAS,* 255, 1825-1830

20) AAscan, PCRdesign and MutantChecker: A Suite of Programs for Primer Design and Sequence Analysis for High-Throughput Scanning Mutagenesis
Sun D, Ostermaier M, Heydenreich F, Mayer D, Jaussi R, **Standfuss J**, Veprintsev D (2013), *PLoS ONE,* 8, 78878

21) Constitutively active rhodopsin mutants causing night blindness are effectively phosphorylated by GRKs but differ in arrestin-1 binding
Vishnivetskiy S, Ostermaier M, Singhal A, Pannels V, Homan K, Glukhova A, Sligar S, Tesmer J, Schertler G, **Standfuss J***, Gurevich V (2013), *Cell Sig,* 25, 2155-2162

22) Insights into the molecular causes of congenital stationary night blindness based on the structure of G90D rhodopsin
Singhal A, Ostermaier M, Vishnivetskiy S, Pannels V, Homan K, Tesmer J, Veprintsev D, Deupi X, Gurevich V, Schertler G, **Standfuss J*** (2013), *EMBO R,* 14, 520-526

23) Stabilized G protein-binding site in the structure of constitutively active Metarhodopsin-II
Deupi X, Edwards P, Singhal A, Nickle B, Oprian D, Schertler G, **Standfuss J*** (2012), *PNAS,* 109, 119-124

24) Preparation of an activated rhodopsin/transducin complex using a constitutively active mutant of rhodopsin
Xie G, D'Antona A, Edwards P, Fransen M, **Standfuss J**, Schertler G, Oprian D, (2011)**,** *Biochemistry,* 50, 10399-10407

25) The structural basis of agonist induced activation in constitutively active rhodopsin
Standfuss J, Edwards P, D'Antona A, Fransen, M, Oprian D, Schertler G (2011), *Nature,* 471, 656-660

26) Crystal structure of plant light-harvesting complex shows the active, energy-transmitting state
Barros T, Royant A, **Standfuss J.**, Dreuw A and Kühlbrandt W (2009), *EMBO J*, 28, 298-306

27) Structural impact of the E113Q counterion mutation on the activation and deactivation pathways of the G protein-coupled receptor rhodopsin
Standfuss J, Zaitseva E, Mahalingam M and Vogel R (2008), *J Mol Biol*, 380, 145-157

28) Crystal structure of a thermally stable rhodopsin mutant
Standfuss J, Xie G, Edwards P, Burghammer M, Oprian D and Schertler, G (2007), *J Mol Biol*, 372, 1179-1188

29) Carotenoid radical cations as a probe for the molecular mechanism of nonphotochemical quenching in oxygenic photosynthesis
Amarie S, **Standfuss J**, Barros T, Kühlbrandt W, Dreuw A and Wachtveitl J (2007), *J Phys Chem B*, 111, 3481-3487

30) A comparison of the three isoforms of the light-harvesting complex II using transient absorption and time-resolved fluorescence measurements
Palacios MA, **Standfuss J**, Vengris M, van Oort BF, van Stokkum IH, Kühlbrandt W, van Amerongen H and van Grondelle R (2006), *Photosynth Res*, 88, 269-285

31) Mechanisms of photoprotection and nonphotochemical quenching in pea light-harvesting complex at 2.5 Å resolution
Standfuss J, Terwisscha van Scheltinga AC, Lamborghini M and Kühlbrandt W (2005), *EMBO J*, 24, 919-928

32) The three isoforms of the light-harvesting complex II: spectroscopic features, trimer formation, and functional roles
Standfuss J, and Kühlbrandt W (2004), *J Biol Chem*, 279, 36884-91

Review Articles

33) Membrane protein dynamics studied by X-ray lasers – or why only time will tell
Standfuss J* (2019), *Curr Opin Struct Biol,* 57, 63-71

34) Bacteriorhodopsin: structural insights revealed using X-ray lasers and synchrotron radiation
Wickstrand C, Nogly P, Nango E, Iwata S, **Standfuss J,** Neutze R, (2019) *Annual Rev Biochem,* 88

35) Structural Biology: Signalling under the microscope
Tsai CJ and **Standfuss J***, Glässer EM (2017), *Nature,* 546, 36-37

36) Serial crystallography at synchrotrons and X-ray lasers
Standfuss J* and Spence J (2017), *IUCrJ,* 23, 100-101

37) Time-resolved structural studies with serial crystallography: A new light on retinal proteins
Panneels V, Wu W, Tsai C-J, Nogly P, Rheinberger J, Jaeger K, Cicchetti G, Gati C, Kick LM, Sala, L, Capitani G, Milne C, Padeste C, Pedrini B, Li X-D, **Standfuss J**, Abela R, Schertler G (2015), *Structural Dynamics,* 2, 041718

38) Light-driven Na(+) pumps as next-generation inhibitory optogenetic tools
Nogly P and **Standfuss J*** (2015), *Nat Struct Mol Biol*, 22, 351–353

39) Viral chemokine mimicry
Standfuss J* (2015), *Science*, 347**,** 1071-02

40) Molecular Mechanisms of phosphorylation dependent arrestin activation
Ostermaier M, Schertler G, **Standfuss J*** (2014), *Curr Opin Struct Biol,* 29, 143-151

41) Conserved activation pathways in G protein coupled receptors
Deupi X, **Standfuss J**, Schertler G* (2012), *Biochemical Society Transactions*, 40, 383-388

42) Structural insights into agonist-induced activation of G-protein-coupled receptors
Deupi X* and **Standfuss J*** (2011), *Curr Opin Struct Biol*, 21, 541-551

Book Contributions

43) Serial millisecond crystallography of membrane proteins
Jäger K, Dworkowski F, Nogly P, Milne C, Wang M, **Standfuss J*** (2016), *Advances in Experimental Medicine and Biology,* 922, 137-49

44) Mammalian expression, purification and crystallization of rhodopsin variants
Mattle D, Singhal A, Schmid G, Dawson R, **Standfuss J*** (2014), *Methods in Molecular Biology*, 1271, 39-54

45) G protein-coupled receptor activation based on X-ray structural studies
Veprintsev D, Deupi X, **Standfuss J**, Schertler G (2013), *Encyclopedia Biophysica*, Published Online

46) Structure of β-adrenergic receptors
Brueckner F, Chayne P, Tsai CJ, **Standfuss J**, Deupi X, Schertler G (2013), *Methods in Enzymology*, 520, 117-51

47) Practical aspects in expression and purification of membrane proteins for structural analysis
Vinothkumar K, Edwards PC, **Standfuss J*** (2013), *Methods in Molecular Biology*, 955, 17-30

48) Structure of full-length arrestin2 in a dimeric crystal form
Zhou, HG, **Standfuss J**, Watson KA, Krasel C (2010), Naunyn-Schmiedebergs Arch. Pharmacol., 381, 13-13

49) Molecular basis of nonphotochemical quenching; The role of the major light harvesting complex II
Amarie S, Barros T, **Standfuss J**, Dreuw A, Kühlbrandt W and Wachtveit J (2007), Ultrafast Phenomena XV 88, 501

Patents

50) Mutateable ligand-GPCR binding at single amino acid resolution
Ostermaier M, Schertler G, **Standfuss J*** (2014), *European Patent Office*. EP13171505.4

Invited Seminars and Session Chairs within the last five years

09/2019	**DFG Roundtable Discussion Photoreceptors** (Ringberg, Germany)
08/2019	**International Conference on Photobiology** (Barcelona, Spain)
06/2019	**International Conference on Ultrafast Structural Dynamics** (Daejeon, Korea)
05/2019	**NSLS-II User Meeting** (Brookhaven National Laboratory, USA)
02/2019	**BioXFEL conference** (San Diego, USA)
01/2019	**ESRF Users Meeting 2019** (Grenoble, France)
12/2018	**National Tsing Hua University** (Biochemistry Department Seminar, Hsinchu, Taiwan)
09/2018	**17th International Conference on Retinal Proteins** (Ontario, Canada)
03/2018	**British Crystallographic Association Meeting** (University of Warwick, UK)
03/2018	**Gordon Research Conference "Photosensory Receptors and Signal Transduction"** (Il Ciocco, Italy)
01/2018	**5th Ringberg Workshop on Structural Biology with FELs** (Ringberg, Germany)
10/2017	**DFG Roundtable Discussion Photoreceptors** (Ringberg, Germany)
09/2017	**Annual Meeting Swiss Society of Crystallography** (Geneve, Switzerland)
08/2017	**24th International Union of Crystallography Meeting** (Hyderabad, India)
04/2017	**SPring-8 Angstrom Compact Free Electron Laser** (Hyogo, Japan)
04/2017	**Photonics Workshop** (Windisch, Switzerland)
03/2017	**IGER International Symposium on Physics of Life** (Nagoya, Japan)
10/2016	**16th International Conference on Retinal Proteins** (Potsdam, Germany)
10/2016	**Rhine-Knee Regional Meeting on Structural Biology** (Schöntal, Germany)
08/2016	**2nd European Meeting on Phototransduction** (Ascona, Switzerland)
08/2016	**30th European Crystallography Meeting** (Basel, Switzerland)

02/2016	**SPring-8 Angstrom Compact Free Electron Laser** (Hyogo, Japan)
01/2016	**3rd Annual BioXFEL conference** (San Juan, Puerto Rico)
11/2015	**4th Annual meeting of the GDR3545: GPCRs, from physiology to drugs** (Toulouse, France)
10/2015	**LCLS Users Meeting** (Stanford University, USA)
08/2015	**11th Symposium on Trends in Structural Biology** (Zürich, Switzerland)
03/2015	**Arizona State University**, Physics Department (Prof. John Spence, Tempe, USA)
10/2014	**16th International Conference on Retinal Proteins** (Nagahama, Japan)
03/2014	**Gordon Research Conference "Ligand recognition and Molecular Gating"** (Ventura, USA)