

Prof. Dr. Georg Büldt

Former Director (retired 2011) of the
Institute of Complex Systems (ICS)
ICS-5: Molecular Biophysics



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Curriculum Vitae

- 1969 Diploma in Physics at the Technical University Berlin
- 1972 Dissertation (Dr. rer. nat.) in Physical Chemistry, University of Mainz
- 1978 Habilitation in Biophysics at the Biocenter of the University of Basel, Switzerland
- 1982 – 1992 C2-Professor at the Physics Department of the Free University Berlin
- 1993 – 2008 C4-Professor for Physical Biology at the Heinrich-Heine-University Düsseldorf, Germany
- 1993 – 2011 Director at the Institute of Complex Systems (ICS) of the Research Center Jülich, ICS-5: Molecular Biophysics
- 1996 Offer of a chair in Biophysics at the Johann-Wolfgang-Goethe University Frankfurt, which was rejected
- 2004 – 2010 Speaker of the Virtual Institute for Structural Biology (VIBS)

- 2011 – 2013 Founding Director of the Laboratory of Advanced Studies of Membrane Proteins at Moscow Institute of Physics and Technology (MIPT)
- Since 2014 Continuation as a Director of this Laboratory

Advisory Boards

- 1996 – 2004 Elected Referee for Biophysics and Biophysical Chemistry of DFG
- 1998 – 2001 Member of the Advisory Board for Science and Technology of the Research Center GKSS in Geesthacht, Germany
- 2003 – 2014 Member of the Advisory Board of the Max-Planck-Institute for Biophysics in Frankfurt/Main
- 2003 – 2008 Member of the Strategierat of the Research Reactor FRM II of the Technical University in München
- 2005 – 2008 Member of the Advisory Board of Max-Planck-Groups at DESY in Hamburg
- 2005 – 2011 Member of the Advisory Board of the Grenoble Partnership for Structural Biology (PSB), France

Main Fields of Scientific Activity

Systems:

Membranes: lipid and protein structures.

Transport of ions across membranes.

Early optogenetics: Transfer of bacteriorhodopsin into the inner mitochondrial membrane.

Synthesis and folding of proteins at ribosomes.

Methods:

X-ray, neutron and electron diffraction on 2D and 3D protein crystals.

Crystal structures of intermediate states in the working cycle of proteins.

Micro-spectroscopy on single crystals trapped in intermediate states.

Inelastic neutron scattering on equilibrium fluctuations in proteins.

Single molecule fluorescence spectroscopy.

Optical tweezers experiments of polypeptide synthesis at ribosomes.

Selected Publications

- G. Büldt, H.U. Gally, A. Seelig, J. Seelig and G. Zaccai
Neutron diffraction studies on selectively deuterated phospholipid bilayers
Nature 271, 182-184 (1978)
- H.J. Sass, G. Büldt, E. Beckmann, F. Zemlin, M. van Heel, E. Zeitler, J.P. Rosenbusch, D.L. Dorset and A. Massalski
Densely packed β -structure at the protein-lipid interface of porin is revealed by high resolution cryo-electron microscopy
J. Mol. Biol. 209, 171-176 (1989)
- N.A. Dencher, D. Dresselhaus, G. Zaccai and G. Büldt
Structural changes in bacteriorhodopsin during proton translocation revealed by neutron diffraction
Proc. Natl. Acad. Sci. USA 86, 7876-7879 (1989)
- M.H.J. Koch, N.A. Dencher, D. Oesterhelt, H.-J. Plöhn, G. Rapp and G. Büldt
Time-resolved X-ray diffraction study of structural changes associated with the photocycle of bacteriorhodopsin
MBO J. 10, 521-526 (1991)
- V. Hildebrandt, M. Ramezani-Rad, U. Swida, P. Wrede, S. Grzesiek, M. Primke and G. Büldt
Genetic transfer of the pigment bacteriorhodopsin into the eukaryote *Schizosaccharomyces pombe*
FEBS Lett. 243, 137-140 (1989)
- V. Hildebrandt, F. Polakowski and G. Büldt
Purple fission yeast: Overexpression and processing of the pigment bacteriorhodopsin in *Schizosaccharomyces pombe*
Photochem. Photobiol. 54, 1009-1016 (1991)
- A. Hoffmann, V. Hildebrandt, J. Heberle and G. Büldt
Photoactive mitochondria: *In vivo* transfer of a light-driven proton pump into the inner mitochondrial membrane of *Schizosaccharomyces pombe*
Proc. Natl. Acad. Sci. USA 91, 9367-9371 (1994)
- D.J. Müller, C.-A. Schoenenberger, G. Büldt and A. Engel
Immuno atomic force microscopy of purple membrane
Biophys. J. 70, 1796-1802 (1996)
- J. Granzin, U. Wilden, H.-W. Choe, J. Labahn, B. Krafft and G. Büldt
X-ray crystal structure of arrestin from bovine rod outer segments
Nature 391, 918-921 (1998)
- H.J. Sass, G. Büldt, R. Gessenich, D. Hehn, D. Neff, R. Schlesinger, J. Berendzen and P. Ormos
Structural alterations for proton translocation in the M state of wild-type bacteriorhodopsin
Nature 406, 649-653 (2000)

V.I. Gordeliy, J. Labahn, R. Efremov, R. Moukhametzianov, J. Granzin, R. Schlesinger, G. Büldt, T. Savopol, A.J. Scheidig, J.P. Klare and J.M. Engelhard
Molecular basis of transmembrane signalling by sensory rhodopsin II-transducer complex
Nature 419, 484-487 (2002)

R. Moukhametzianov, J.P. Klare, R. Efremov, C. Baeken, A. Göppner, J. Labahn, M. Engelhard, G. Büldt and V.I. Gordeliy
Development of the signal in sensory rhodopsin and its transfer to the cognate transducer
Nature 440, 115-119 (2006)

R. Efremov, V.I. Gordeliy, J. Heberle and G. Büldt
Time-resolved microspectroscopy on a single crystal of bacteriorhodopsin reveals lattice induced differences in the photocycle kinetics
Biophys. J. 91, 1441-1451 (2006)

A. Katranidis, D. Atta, R. Schlesinger, K.H. Nierhaus, T. Choli-Papadopoulou, I. Gregor, M. Gerrits, G. Büldt and J. Fitter
Fast biosynthesis of GFP molecules: a single-molecule fluorescence study
Angew. Chemie Int. Ed. 48, 1758-1761 (2009)

V. Borshchevskiy and G. Büldt
Structural biology: Active arrestin proteins crystallized
Nature 497, 45-46 (2013)

A. Katranidis, W. Grange, R. Schlesinger, T. Choli-Papadopoulou, D. Brüggemann, M. Hegner, G. Büldt
Force measurements of the disruption of the nascent polypeptide chain from the ribosome by optical tweezers
FEBS Lett. 585, 1859-1863 (2011)

F. Wruck, A. Katranidis, K.H. Nierhaus, G. Büldt and M. Hegner
Translation and folding of single proteins in real time
Proc. Natl. Acad. Sci. USA 114, E4399-E4407 (2017)