

## 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: Membrane proteins and proteins of signal amplification cascades; mechanisms for the transport of protons and signals across membranes; protein folding.

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 (visible, infrared); inelastic neutron scattering on equilibrium fluctuations in proteins, single molecule fluorescence spectroscopy.

## 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  $\beta$ -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. Plehn, G. Rapp and G. Büldt  
Time-resolved X-ray diffraction study of structural changes associated with the photocycle of bacteriorhodopsin

*EMBO J.* **10**, 521-526 (1991)

V. Hildebrandt, K. Fendler, J. Heberle, A. Hoffmann, E. Bamberg and G. Büldt  
Bacteriorhodopsin expressed in *Schizosaccharomyces pombe* pumps protons over the plasma membrane

*Proc. Natl. Acad. Sci. USA* **90**, 3578-3582 (1993)

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. Fitter, N.A. Dencher, G. Büldt and R.E. Lechner

Internal molecular motions of bacteriorhodopsin: Hydration induced flexibility studied by quasielastic incoherent neutron scattering using oriented purple membranes

*Proc. Natl. Acad. Sci. USA* **93**, 7600-7605 (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)

S. Grudinin, G. Büldt, V. Gordeliy and A. Baumgaertner

Water molecules and hydrogen-bonded networks in bacteriorhodopsin – Molecular dynamics simulations on the ground state and M-intermediate

*Biophys. J.* **88**, 3252-3261 (2005)

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)