Curriculum Vitae

Beat Rolf Vögeli
Department of Biochemistry and Molecular Genetics
University of Colorado Denver
12801 East 17th Avenue
RC1-South, Room L18-9103
Aurora, Colorado 80045, USA

Tel: +1 (303) 724-1627
Mobile: +1 (720) 365-8385
e-mail: beat.vogeli@ucdenver.edu
homepage:
http://www.ucdenver.edu/academics/colleges/medicalschool/departments/biochemistry/Faculty/PrimaryFaculty/Pages/vogeli.aspx

Education

Ph. D. in Natural Sciences (Dr. sc. nat.) at the Institut für Physikalische Chemie, ETH Zürich (Swiss Federal Institute of Technology), 2005

Diploma in Physics (Dipl. phys. ETH) at ETH Zürich (Biophysics and Particle Physics), 2001

Professional Experience

Assistant Professor

Department of Biochemistry and Molecular Genetics, University of Colorado Denver, USA, 2017-present

Privatdozent (Junior Research Faculty)

Institut für Physikalische Chemie, ETH Zürich, Switzerland, 2014-2016

Oberassistent

Institut für Physikalische Chemie, ETH Zürich, Switzerland, in the research group of Prof. **Roland Riek**, 2011-2014

Post-Doctoral Associate

Institut für Physikalische Chemie, ETH Zürich, Switzerland, in the research group of Prof. **Roland Riek**, 2008-2011

Laboratory of Chemical Physics, National Institute of Diabetes, Digestive & Kidney Diseases (NIDDK) of the National Institutes of Health (NIH), Bethesda, Maryland, USA, in the research group of Dr. **Ad Bax**, 2005-2008

Research Fellow

Institut für Physikalische Chemie, ETH Zürich, Switzerland, in the research group of Prof. **Konstantin Pervushin**, 2001-2005

Institute of Molecular Biology and Biophysics, ETH Zürich, Switzerland, in the research group of Prof. **Kurt Wüthrich**, 2000-2001

Teaching

Lectures

The Nuclear Overhauser Effect in NMR Structure and Dynamics Analysis, ETH Zürich, 2015; 2016

Second in charge (lectures, exams, script revision), physical chemistry for biologists and pharmacists, ETH Zürich, 2010-2016

Laboratory Supervising

Supervisor of two Ph.D. theses, ETH Zürich, own funding from March and September 2013 on; bachelor thesis, ETH Zürich, 2012; semester thesis, ETH Zürich, 2009

Practical Courses

Head, NMR Praktikum (part physical chemistry), ETH Zürich, 2010

Praktikum Allgemeine Chemie (part physical chemistry), ETH Zürich, 2009-2010

Exercise Assistant

Head of exercise assistants, physical chemistry for biologists and pharmacists, ETH Zürich, 2011-2013

Magnetic resonance (physical chemistry IV), ETH Zürich, 2011-2012

Physical chemistry for biologists and pharmacists, ETH Zürich, 2009-2010, 2012

Advanced techniques in solution state NMR of biomolecules, ETH Zürich, 2005

Physical chemistry (kinetics, thermodynamics) for biologists, chemists and pharmacists, ETH Zürich, 2001-2005, 2013

Project Grants

Project funding by the **Swiss National Science Foundation**, **Supplementary Grant** 140214/2, "*NMR methodology for description of motional networks in proteins*", 6 months, 28’523 Swiss Fr. (ca. 30'000 US$) one Ph.D. salary, 2015

Project funding by **ETH Research Grant** ETH-04 13-1, "*Towards a comprehensive structural and motional description of WW domain folding and glycosylation using eNOE NMR*", 3 years, 151'520 Swiss Fr. (ca. 160'000 US$) including one Ph.D. salary, 2013

Project funding by the **Swiss National Science Foundation**, **Grant** 140214, "*NMR methodology for description of motional networks in proteins*", 3 years, 220'016 Swiss Fr. (ca. 250'000 US$) including one Ph.D. salary, 2012

Awards and Fellowships

Habilitation and Venia Legendi from ETH Zürich, 2014

Visiting Fellow Award by the National Institutes of Health, U.S.A., 2007

Visiting Fellow Award by the National Institutes of Health, U.S.A., 2006

Competitive Fellowship by the Swiss National Science Foundation, 2005

Publications

* equal contributions

** corresponding author

55. Celestine Chi, Dean Strotz, Roland Riek, Beat Vögeli**, *NOE-derived methyl distances from a 360 kDa proteasome complex*, submitted.
54. Liliya Vugmeyster, Parker Nichols, C. James McKnight, Beat Vögeli, *Effect of deuteration of non-exchangeable protons on slow correlated motions in proteins*, submitted.
53. Per Jemth, Eva Andersson, Beat Vögeli, Greta Hultqvist, Jakob Dogan, Peter Güntert, Roland Riek, Celestine Chi, *Evolution of structure and conformational dynamics in intrinsically disordered proteins over 600 million years*, submitted.
52. Gustav Sundel, Beat Vögeli, Ylva Ivarsson, Celestine Chi, *The sign of NMR chemical shift difference as a determinant of the origin of binding selectivity: Elucidation of the position-dependence of phosphorylation in ligands binding to scribble PDZ1*, 2017, **Biochemistry**, DOI: 10.1021/acs.biochem.7b00965.
51. Robert Bryn Fenwick, Beat Vögeli**, *Detection of correlated protein backbone and side-chain angle fluctuations*, 2017, **ChemBioChem**, 18, 2016-2021.

50. Parker Nichols, Alexandra Born, Morkos A. Henen, Dean Strotz, Julien Orts, Simon Olsson, Peter Güntert, Celestine Chi, Beat Vögeli**, *The exact NOE: Recent advances*, 2017, **Molecules**, 22, 1176.

49. Dean Strotz, Julien Orts**, Celestine Chi, Roland Riek, Beat Vögeli**, *eNORA2 exact NOE analysis program*, 2017, **J Chem Theory Comput**, 13, 4336-4346.

48. Beat Vögeli**, *Cross-correlated relaxation rates between protein backbone H-X dipolar interactions*, 2017, **J Biomol NMR**, 67, 211-232.

47. Robert Bryn Fenwick**, Charles D. Schwieters, Beat Vögeli**, *Direct investigation of slow correlated dynamics in proteins via dipolar interactions*, 2016, **J Am Chem Soc**, 138, 8412-8421.

46. Simon Olsson, Dean Strotz, Beat Vögeli, Roland Riek, Andrea Cavalli, *The dynamic basis for signal propagation in human Pin1-WW*, 2016, **Structure**, 24, 1464-1475.

45. Beat Vögeli, Stefan Bibow, Celestine Chi, *Enzyme selectivity fine-tuned through dynamic control of a loop*, 2016, **Angew Chem Int Ed Engl**, 55,1-6.

Selected as Very Important Paper.

44. Beat Vögeli**, Simon Olsson, Peter Güntert, Roland Riek, *The exact NOE as an alternative in ensemble structure determination*, 2016, **Biophys J**, 110, 113-126.

43. Beat Vögeli**, Simon Olsson, Roland Riek, Peter Güntert, *Compiled data set of exact NOE distance limits, residual dipolar couplings and scalar couplings for the protein GB3*, 2015, **Data in Brief**, 5, 99-106.

42. Dean Strotz, Julien Orts, Martina Minges, Beat Vögeli**, *The experimental accuracy of the uni-directional exact NOE*, 2015, **J Magn Reson**, 259, 32-46.

41. Beat Vögeli**, Simon Olsson, Roland Riek, Peter Güntert, *Complementarity and congruence between exact NOEs and traditional NMR probes for spatial decoding of protein dynamics*, 2015, **J Struct Biol**, 191, 306-317.

40. Celestine Chi, Beat Vögeli, Stefan Bibow, Dean Strotz, Julien Orts, Peter Güntert, Roland Riek, *A structural ensemble for the enzyme cyclophilin reveals an orchestrated mode of action at atomic resolution*, 2015, **Angew Chem Int Ed Engl**, 54, 11657-11661.

39. Celestine Chi, Dean Strotz, Roland Riek**, Beat Vögeli**, *Extending the eNOE data set of large proteins by evaluation of NOEs with unresolved diagonals*, 2015, **J Biomol NMR**, 62, 63-69.

38. Marielle Aulikki Wälti, Julien Orts, Beat Vögeli, Silvia Campioni, Roland Riek, *Solution NMR studies of recombinant Aβ(1-42): From the presence of a micellar entity to residual β-sheet structure in the soluble species*, 2015, **ChemBioChem**, 16, 659-669.

37. Cédric Eichmann, Julien Orts, Christos Tzitzilonis, Beat Vögeli, Jean Smrt, Justin Lorieau, Roland Riek, *Intermolecular detergent–membrane protein NOEs*

for the characterization of dynamics of membrane protein-detergent complexes, 2014, **J Phys Chem B**, 118, 14288-14301.

36. Simon Olsson, Beat Vögeli, Andrea Cavalli, Wouter Boomsma, Jesper Ferkinghoff-Borg, Kresten Lindorff-Larsen, Thomas Hamelryck, *Probabilistic determination of native state ensembles of proteins*, 2014, **J Chem Theory Comput**, 10, 3484-3491.

35. Nikolaos G. Sgourakis, Kannan Natarajan, Jinfa Ying, Beat Vögeli, Lisa F. Boyd, David H. Margulies, and Ad Bax*, The structure of mouse cytomegalovirus m04 protein obtained from sparse NMR data reveals a conserved fold of the m02-m06 viral immune modulator family*, 2014, **Structure**, 22, 1263-1273.

34. Beat Vögeli**, Julien Orts, Dean Strotz, Celestine Chi, Martina Minges, Marielle Aulikki Wälti, Peter Güntert, Roland Riek***, Towards a true protein movie: A perspective on the potential impact of the ensemble–based structure determination using exact NOEs*, 2014, **J Magn Reson**, 241, 53-59.

33. Beat Vögeli**, *The nuclear Overhauer effect from a quantitative perspective*, 2014, **Prog Nucl Magn Reson Spectrosc**, 78, 1-46.

32. Julien Orts, Beat Vögeli, Roland Riek, Peter Güntert, *Stereospecific assignments in proteins using exact NOEs*, 2013, **J Biomol NMR**, 57, 211-218.

31. Beat Vögeli**, *Full relaxation matrix analysis of apparent cross-correlated relaxation rates in four-spin systems*, 2013, **J Magn Reson**, 226, 52-63.

30. Beat Vögeli**, Julien Orts, Dean Strotz, Peter Güntert, Roland Riek, *Discrete three-dimensional representation of macromolecular motion from eNOE-based ensemble calculation*, 2012, **Chimia**, 66, 787-790.

29. Beat Vögeli, Peter Güntert, Roland Riek, *Multiple-state ensemble structure determination from eNOE spectroscopy*, 2013, **Mol Phys**, 111, 437-454.

28. Beat Vögeli, Sina Kazemi, Peter Güntert, Roland Riek, *Spatial elucidation of motions in proteins by ensemble-based structure calculation using exact NOEs*, 2012, **Nat Struct Mol Biol**, 19, 1053-1057.

    Recommended by the Faculty of 1000 (F1000).

27. Julien Orts, Beat Vögeli, Roland Riek, *Relaxation matrix analysis of spin diffusion for the NMR structure calculation with eNOEs*, 2012, **J Chem Theory Comput**, 8, 3483-3492.

26. Beat Vögeli**, *How uniform is the peptide plane geometry? A high-accuracy NMR study of dipolar C^{α}-C'/H^{N}-N cross-correlated relaxation*, 2011, **J Biomol NMR**, 50, 315-329.

25. Dominik Leitz, Beat Vögeli, Jason Greenwald, Roland Riek, *Temperature dependence of $^{1}H^{N}$ – $^{1}H^{N}$ distances in ubiquitin as studied by exact measurements of NOEs*, 2011, **J Phys Chem B**, 115, 7648-7660.

24. Beat Vögeli**, *Comprehensive description of NMR cross-correlated relaxation under anisotropic molecular tumbling and correlated local dynamics on all timescales*, 2010, **J Chem Phys**, 133, 014501-113.

Selected for the issue cover.

Selected for the **Virt J Biol Phys Res**, 2010, 20:1.

23. Beat Vögeli, Michael Friedmann, Dominik Leitz, Alexander Sobol, Roland Riek, *Quantitative determination of NOE rates in perdeuterated and protonated proteins: Practical and theoretical aspects*, 2010, **J Magn Reson**, 204, 290-302.

22. Beat Vögeli**, Roland Riek, *Side chain-backbone projections in aromatic and ASX residues from NMR cross-correlated relaxation*, 2010, **J Biomol NMR**, 46, 135-147.

21. Beat Vögeli, Takuya Segawa, Dominik Leitz, Alexander Sobol, Alexandra Choutko, Daniel Trzesniak, Wilfred Van Gunsteren, Roland Riek, *Exact distances and internal dynamics of perdeuterated ubiquitin from NOE buildups*, 2009, **J Am Chem Soc**, 131, 17215-17225.

20. Beat Vögeli**, Lishan Yao, *Correlated dynamics between protein HN and HC bonds observed by NMR cross relaxation*, 2009, **J Am Chem Soc**, 131, 3668-3678.

19. Lishan Yao, Beat Vögeli, Jinfay Ying, Ad Bax, *NMR determination of amide N-H equilibrium bond length from concerted dipolar coupling measurements*, 2008, **J Am Chem Soc**, 130, 16518-20.

18. Beat Vögeli, Lishan Yao, Ad Bax, *Protein backbone motion viewed by intraresidue and sequential H^N-H^α residual dipolar couplings*, 2008, **J Biomol NMR**, 41, 17-28.

17. Lishan Yao, Beat Vögeli, Dennis Torchia, Ad Bax, *Simultaneous NMR study of protein structure and dynamics using conservative mutagenesis*, 2008, **J Phys Chem**, 121, 6045-6056.

Recommended by the Faculty of 1000 (F1000).

16. Konstantin Pervushin, Katherina Vamvaca*, Beat Vögeli*, Donald Hilvert, *Structure and dynamics of an enzymatically active molten globule*, 2007, **Nat Struct Mol Biol**, 14, 1202-1206.

Recommended by the Faculty of 1000 (F1000).

15. Beat Vögeli, Jinfa Ying, Alexander Grishaev, Ad Bax, *Limits on variations in protein backbone dynamics from precise measurements of scalar couplings*, 2007, **J Am Chem Soc**, 129, 9377-9385.

14. Kaifeng Hu, Beat Vögeli, G. Marius Clore, *Spin-state selective carbon-detected HNCO with TROSY optimization in all dimensions and double echo-antiecho sensitivity enhancement in both indirect dimensions*, 2007, **J Am Chem Soc**, 129, 5484-5491.

13. Kaifeng Hu*, Beat Vögeli*, G. Marius Clore, *^{13}C-detected HN(CA)C and HMCMC experiments using a single methyl-reprotonated sample for unambiguous methyl resonance assignment*, 2006, **J Biomol NMR**, 36, 259-266.

12. Kaifeng Hu*, Beat Vögeli*, G. Marius Clore, *Interference between transverse cross-correlated relaxation and longitudinal relaxation affects apparent J-*

coupling and transverse cross-correlated relaxation, 2006, **Chem Phys Lett**, 423, 123-125.

11. Donghan Lee, Beat Vögeli, Konstantin Pervushin, *Detection of C',C$^{\alpha}$ correlations in proteins using a new time- and sensitivity-optimal experiment*, 2005, **J Biomol NMR**, 31, 273-278.

10. Beat Vögeli, Konstantin Pervushin (Supervisor), *Towards structure and dynamics of large and dynamically disordered biomacromolecules: New methods in solution NMR spectroscopy*, 2005, **Ph.D. Thesis ETH Zürich**, Diss. ETH No. 15993, http://e-collection.ethbib.ethz.ch/show?type=diss&nr=15993.

9. Kaifeng Hu, Beat Vögeli, Konstantin Pervushin, *Side-chain H and C resonance assignment in protonated / partially deuterated proteins using an improved 3D ^{13}C-detected HCC-TOCSY*, 2005, **J Magn Reson**, 174, 200-208.

8. Beat Vögeli, Helena Kovacs, Konstantin Pervushin, *Simultaneous ^{1}H- or ^{2}H-, ^{15}N- and multiple-band-selective ^{13}C-decoupling during acquisition in ^{13}C-detected experiments with proteins and oligonucleotides*, 2005, **J Biomol NMR**, 31, 1-9.

7. Konstantin Pervushin, Beat Vögeli, Tim Heinz, Philippe Hünenberger, *Measuring ^{1}H-^{1}H and ^{1}H-^{13}C RDCs in methyl groups: Example of pulse sequences with numerically optimized coherence transfer schemes*, 2005, **J Magn Reson**, 172, 36-47.

6. Katherina Vamvaca, Beat Vögeli, Peter Kast, Konstantin Pervushin, Donald Hilvert, *An enzymatic molten globule: Efficient coupling of folding and catalysis*, 2004, **Proc Natl Acad Sci USA**, 101, 12860-12864.

Selected for Editors' Choice: Highlights of the Recent Literature, Biochemistry: *One size fits many*, 2004, **Science**, 305, 5691-5691.

5. Beat Vögeli, Helena Kovacs, Konstantin Pervushin, *Measurements of side-chain ^{13}C-^{13}C residual dipolar couplings in uniformly deuterated proteins*, 2004, **J Am Chem Soc**, 126, 2414-2420.

4. Konstantin Pervushin, Beat Vögeli, *Observation of individual transitions in magnetically equivalent spin systems*, 2003, **J Am Chem Soc**, 125, 9566-9567.

3. Beat Vögeli, Konstantin Pervushin, TROSY *Experiment for refinement of backbone ψ and ϕ by simultaneous measurements of cross-correlated relaxation rates and $^{3,4}J_{H_{\alpha}HN}$ coupling constants*, 2002, **J Biomol NMR**, 24, 291-300.

2. Konstantin Pervushin, Beat Vögeli, Alexander Eletsky, *Longitudinal ^{1}H relaxation optimization in TROSY NMR spectroscopy*, 2002, **J Am Chem Soc**, 124, 12898-12902.

1. Beat Vögeli, Roland Riek (Supervisor), Kurt Wüthrich (Supervisor), *NMR solution structure of the fragments of the human prion protein hPrP(121-226) and hPrP(130-230)*, 2001, **Diploma Thesis**, ETH Zürich.

Service

Grant review for Swiss National Science Foundation

Peer review for Nature Communications

Peer review for Angewandte Chemie (Int. Ed.)

Peer review for Journal of the American Chemical Society

Peer review for ChemBioChem

Peer review for Journal of Physical Chemistry

Peer review for Physical Chemistry Chemical Physics

Peer review for ChemPhysChem

Peer review for Journal of Chemical Physics

Peer review for Biophysical Journal

Peer review for Biophysics

Peer review for Pharmaceutical Research

Peer review for Journal of Chemical Theory and Computation

Peer review for Journal of Biomolecular NMR

Peer review for Journal of Magnetic Resonance

Peer review for Journal of Chemical Information and Modeling

Peer review for Computational and Structural Biotechnology Journal

Collaborations

Group of Dr. C.N. Chi, Uppsala Biomedical Center, Uppsala University, Sweden (current, Proteasome, Cyclophilin A, Pin 1, evolution of interactions)

Group of Dr. R. Gassmann**,** Institute for Research and Innovation in Health, Institute for Molecular and Cell Biology (IMCB), Porto, Portugal (current, Dynein motor complex)

Group of Prof. F. Allain**,** Institute of Molecular Biology and Biophysics, ETH Zürich, Switzerland (current, RNA-protein interaction)

Dr. R. Bryn Fenwick**,** group of Prof. Peter Wright, the Scripps Research Institute, La Jolla, California, USA (current, MD simulation of NMR parameters)

Group of Prof. Peter Güntert, Goethe-Universität**,** Frankfurt, Germany (current, protein ensemble calculations)

Group of Prof. Wilfred Van Gunsteren, Laboratory of Physical Chemistry, ETH Zürich, Switzerland (NOEs in MD simulations)

Group of Dr. David Margulies, Laboratory of Immunology, Molecular Biology Section National Institutes of Health, Bethesda, Maryland, USA (Glycoprotein of cytomegalovirus)

Group of Dr. C. Marius Clore, Laboratory of Chemical Physics, National Institute of Diabetes, Digestive & Kidney Diseases (NIDDK) of the National Institutes of Health (NIH), Bethesda, Maryland, USA (NMR techniques)

Group of Prof. Donald Hilvert, Laboratory of Organic Chemistry, ETH Zürich, Switzerland (Chorismate mutase)

Talks

"Functional protein conformation networks probed by NMR nanorulers", College of Liberal Arts and Sciences, University of Colorado Denver, Denver, CO, USA, October 6, 2017

"Functional protein conformation networks probed by NMR nanorulers", 9th International Conference on Structural Biology, Zürich, Switzerland, September 19, 2017

"Protein communication interception by NMR nanorulers", Structural Biology and Biochemistry Program, University of Colorado Denver, Aurora, CO, USA, March 22, 2017

"Protein conformation and communication networks – new perspectives from NMR", Department of Biochemistry and Greehey Children's Cancer Research Institute, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA, July 25, 2016

"Protein conformation networks probed by dipolar interactions", Bax Symposium, National Institutes of Health, Bethesda, MD, USA, June 13, 2016

"Functional protein conformation networks probed by eNOEs", 57th ENC Experimental Nuclear Magnetic Resonance Conference, Wyndham Grand Hotel, Pittsburgh, PA, USA, April 12, 2016

"Protein conformation and communication networks – new perspectives from NMR", Department of Biochemistry and Molecular Genetics, University of Colorado, Denver, Aurora, CO, USA, February 29, 2016

"Functional conformation networks from eNOE analysis", XXI Swiss NMR Symposium, EPFL Lausanne, Switzerland, February 4, 2016

"Conformation networks from exact NOE analysis", EUROMAR 2015, Prague, Czech Republic, 2015

"Magnetische Momente in der Dynamikanalyse von Biomolekülen", Antrittsvorlesung, ETH Zürich, Switzerland, October 28, 2014

"New NMR perspectives for the elucidation of protein dynamics", VIB Structural Biology Research Center, Brussels, Belgium, September 2, 2014

"Novel visualization of protein dynamics by eNOEs", EUROMAR 2014, Zürich, Switzerland, July 3, 2014

"New NMR perspectives for the elucidation of protein dynamics", Biochemistry and Cell Biology, Stony Brook University, Stony Brook, NY, USA, February 18, 2014

"New NMR perspectives for the elucidation of protein dynamics", Structural and Computational Biology, The Scripps Research Institute, San Diego, CA, USA, October 22, 2013

"New NMR perspectives for the elucidation of protein dynamics", Department of Chemistry & Biochemistry, University of California, San Diego, CA, USA, October 21, 2013

"New NMR perspectives for the elucidation of protein dynamics", Biochemistry & Molecular Biology, University of Texas Medical Branch, Galveston, TX, USA, October 17, 2013

"New NMR perspectives for the elucidation of protein dynamics", Green Center for Systems Biology, University of Texas Southwestern Medical Center, Dallas, TX, USA, October 15, 2013

"New NMR perspectives for the elucidation of protein dynamics", Campus Chemical Instrument Center (CCIC), The Ohio State University, Columbus, OH, USA, October 11, 2013

54th ENC Experimental Nuclear Magnetic Resonance Conference, Asilomar Conference Center, Pacific Grove, CA, USA, 2013

Department of Molecular Pharmacology, Physiology & Biotechnology (MPPB), Brown University, Providence, RI, USA, 2012

Indo-Swiss Symposium on Recent Trends in NMR of Biomolecules and Advanced Materials, National Chemical Laboratory, Pune, India, 2012

Colloquium of the Institut für Physikalische Chemie, ETH Zürich, Switzerland, 2012

Institute of Molecular Biology and Biophysics, ETH Zürich, Switzerland, 2010

Helmholtz Centre for Infection Research, Braunschweig, Germany, 2010

18th Swiss NMR Symposium, Geneva, Switzerland, 2009

Schweizerische NMR Benutzertagung, Basel, Switzerland, 2009

Physikalisch-Chemisches Institut, Universität Zürich, Switzerland, 2008

Institut für Physikalische Chemie, ETH Zürich, Switzerland, 2007

Group representative for evaluation committee, ETH Zürich, Switzerland, 2004

Colloquium of the Institut für Physikalische Chemie, ETH Zürich, Switzerland, 2004

Lecture Summer school Otocec, Slovenia, 2003

EENC European Experimental Nuclear Magnetic Resonance Conference, Prague, Czech Republic, 2002