

Curriculum vitae

Prof. Dr. Jan Lipfert

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Phone: +49-89-2180 2005
Email: Jan.Lipfert@lmu.de
Date of birth: October 8, 1977
Place of birth: Frankfurt am Main, Germany
Citizenship: German

Education

- 1/2008 **Ph.D. in Physics**, *Stanford University, CA, USA*
Specialization in theoretical and experimental biophysics; Thesis title: “*Small-Angle X-Ray Scattering of RNA, Proteins, and Membrane Protein-Detergent Complexes*”
Adviser: Sebastian Doniach; Co-advisers: Daniel Herschlag and Vijay S. Pande
- 5/2002 **Master of Science**, *University of Illinois at Urbana-Champaign, IL, USA*
Graduate coursework in mathematical, biological and condensed matter physics
- 6/2001 **M. Phil.** (“Filosofie Magister”), *Uppsala Universitet, Sweden*
Major: physics; Minor: mathematics; Thesis in computational quantum chemistry: “*Radiation induced damage in serine phosphate - a model for strand breakage in DNA*”
Advisers: Leif A. Erikson, Janos Hajdu
- 7/2000 **Undergraduate in Economics** (“Vordiplom”), *Ruprecht-Karls-Universität Heidelberg, Germany*
- 6/2000 **Undergraduate in Physics** (“Vordiplom”), *Ruprecht-Karls-Universität Heidelberg, Germany*
- 6/1997 **High School Diploma** (“Abitur”), *Friedrichsgymnasium Kassel, Germany*

Employment

- since 9/2013 **Professor** (W2, tenure track) *Department of Physics, Ludwig-Maximilian-University Munich*
- 10/2007-7/2013 **Post doc** in the lab of Nynke Dekker, *Delft University of Technology, The Netherlands*
Independent funding since 2/2010 through a 250 k€ VENI grant
- Pioneered novel magnetic tweezers to directly measure single-molecule torque and twist
 - Applied magnetic and optical tweezers to investigate DNA and RNA mechanical properties, protein-DNA and drug-DNA interactions, and topoisomerase-mediated supercoil removal
 - Utilized PDMS-based microfluidic chip technology for fluid handling
- 9/2002-10/2007 **Research Assistant** in the lab of Sebastian Doniach, *Stanford University, CA, USA*
- Combined small-angle X-ray scattering and molecular modeling to investigate the solution structure of functional RNAs, peptides, proteins, and membrane protein-detergent complexes
 - Mastered RNA wet lab chemistry and electrostatic modeling
 - Developed large scale simulations of conformations and free energies in amyloidogenic peptides

Internships and National Service

- 1/2006 – 3/2006 **Research Assistant**, *Institut Pasteur, Paris, France*
RNA electrostatics calculations; modeling of RNA thermodynamics and conformational changes
- 6/2003 – 8/2003 **Research Assistant**, *Institut Pasteur, Paris, France*
Simulation of protein dynamics using stochastic differential equations
- 6/2002 – 8/2002 **Internship** as management consultant, *Siemens Management Consulting, Munich, Germany*
- 7/1999 – 8/1999 **Internship** as financial analyst, *Wintershall U.K. Ltd, London, U.K.*
- 6/1998 – 7/1998 **Internship** as assistant for quality control, *Alstom Energy Systems - SHG, Kassel, Germany*
- 7/1997 – 6/1998 **National service** as emergency medical technician, *Arbeiter-Samariter-Bund, Kassel, Germany*

Honors and Awards

10/2009	VENI postdoctoral fellowship of the Dutch Organization for Scientific Research (NWO) (Three year grant with a total budget of 250,000 €; Start date 2/2010)
7/2007	Margaret C. Etter Student Lecturer Award, American Crystallographic Association
6/2006	Student travel award for the SAS 2006 meeting, Kyoto, Japan
2001 – 2004	Fellowship of the German National Merit Foundation (“ Studienstiftung des deutschen Volkes ”) (Fellowship awarded to the top 0.25% of German students)
2001 – 2002	Fulbright Fellowship for the academic year 2001/2002
2000 – 2001	Erasmus Fellowship for the academic year 2000/2001
1999 – 2001	Fellowship of the “ Stiftung der deutschen Wirtschaft ” (SDW)
1/1994	First place German National Latin Competition (“Bundeswettbewerb Fremdsprachen”)
1992 – 1996	Men’s crew state champion in 1992-96; 2nd and 6th place in nationals in 1994 and 1996

Teaching

2007-2013	Supervisor for several students during their Bachelor and Master theses at the TU Delft: Ruaridh Forbes (summer student), Toivo Hensgens (Bachelor), Johannes Keegstra (Master), Renier Daudey (co-supervisor, Master), Aafke van den Berg and Gerwin Koolstra (KNAW research fellowship students), Tessa Jager (Master), Peter Jan Laverman (Master), Iris Koster (Bachelor), Maylon Rojer (Master), Sven Klijnhout (Bachelor), and Xiaomin Hao (Master)
2009-2011	Instructor: Designed and taught (in Dutch) a series of journal clubs on physical methods in the biological sciences as part of the TU Delft B.Sc. “honors track” program
Spring 2011	Supervisor/instructor: Mentored high school teachers in training at the TU Delft in developing a “Bionanoscience” teaching module for high school science classes (in Dutch)
Summer 2009	Instructor (joint with B. Menze): Designed and taught (in German) a three week summer course on bioinformatics for gifted high school seniors from five countries as part of the Deutsche SchülerAkademie (German Student Academy) program
2008-2009	Instructor for the section on polymer statistics for “ <i>Biophysics</i> ” at TU Delft
2004-2007	Supervisor for several undergraduate students in thesis research projects at Stanford University; Served as judge for high school science fairs in the bay area
Spring 2004	Teaching Assistant for “ <i>Computational Physics</i> ” at Stanford University
Winter 2003	Teaching Assistant for “ <i>Mathematical Methods of Physics</i> ” at Stanford University
Fall 2002	Teaching Assistant for “ <i>Mechanics and Heat</i> ” at Stanford University

Memberships and Professional Service

- **Member** of the Biophysical Society since 2003; **Member** of the German Physical Society (DPG) since 1999
- **Chair** of the Biophysical Society Molecular Biophysics Subgroup, 2012/2013
- **Student representative** on the **Graduate Studies Committee**, Department of Physics, Stanford University, 2003-2007
- **Referee** for *Analytical Chemistry*, *Biochemistry*, *Biophysical J.*, *EMBO J.*, *J. Appl. Cryst.*, *Mol. Biol. Cell*, *Nanoscale*, *Nature*, *Nucleic Acids Research*, *Phys. Rev. Lett.*, *Phys. Rev. E*, *PLOS ONE*, and *RNA*
- **Reviewer** for The Wellcome Trust, the Stanford Synchrotron Radiation Laboratory *Proposal Review Panel*, and the selection committee of the Flemish Agency for Innovation by Science and Technology (IWT)

Languages

German (native), English (native-like; 5/C2), Dutch (fluent; 3/C1), French (fluent; 3/C1), Swedish (good knowledge; 2/B1), Spanish (basic knowledge; 1/A2), Latin (*Grades refer to the ILR/CEFR scales*)

Other Activities

Soccer, crossfit, running (10 K and marathon), biking, hiking, traveling, and politics

Selected Publications (Total of 35 peer-reviewed publications; Total citations: 1169; H-index: 20)

15. Jan Lipfert, Gary M. Skinner, Johannes Keegstra, Toivo Hensgens, Tessa Jager, Serge Donkers, Fang-Chieh Chou, Rhiju Das, and Nynke H. Dekker
“Double-Stranded RNA under Force and Torque”, *submitted*
14. Jan Lipfert, Sebastian Doniach, Rhiju Das, and Daniel Herschlag
“Understanding Nucleic Acid-Ion Interactions”
Annual Review of Biochemistry, *in press*
13. David Dulin, Jan Lipfert, Charl Moolman, and Nynke Dekker
“Genome Processing Studied at the Single-Molecule Level”
Nature Reviews Genetics 14:9-22 (2013)
12. Xander Janssen[†], Jan Lipfert[†], Tessa Jager, Renier Daudey, and Nynke H. Dekker
“Electromagnetic Torque Tweezers: A Versatile Approach for Measurement of Single-Molecule Twist and Torque”,
Nano Letters 12:3634-9 (2012) ([†]Authors contributed equally)
11. Jan Lipfert[†], Matthew Wiggin[†], Jacob W.J. Kerssemakers, Francesco Pedaci, and Nynke H. Dekker
“Freely-Orbiting Magnetic Tweezers to Directly Monitor Changes in the Twist of Nucleic Acids”
Nature Communications 2:439 (2011) ([†]Authors contributed equally)
10. Jan Lipfert, Jacob W.J. Kerssemakers, Tessa Jager, and Nynke H. Dekker
“Magnetic Torque Tweezers: Measuring Torsional Stiffness of DNA and RecA-DNA filaments”
Nature Methods 12:977-80 (2010)
9. Jan Lipfert[†], Adelene Y.L. Sim[†], Daniel Herschlag, and Sebastian Doniach
“Dissecting Electrostatic Screening, Specific Ion Binding, and Ligand Binding in an Energetic Model for Glycine Riboswitch Folding”
RNA 16:708-719 (2010) ([†]Authors contributed equally)
8. Jan Lipfert, Xiaomin Hao, and Nynke H. Dekker
“Quantitative Modeling and Optimization of Magnetic Tweezers”
Biophys. J. 96:5040-9 (2009)
7. Jan Lipfert[†], Jonathan Ouellet[†], David G. Norman, Sebastian Doniach, and David M. J. Lilley
“The Structure of the Complete VS Ribozyme in Solution by Small-Angle X-Ray Scattering”
Structure 16:1357-67 (2008) ([†]Authors contributed equally)
6. Benjamin J. Spink, Sivaraj Sivaramakrishnan, Jan Lipfert, Sebastian Doniach, and James A. Spudich
“Long Single alpha-Helical Tail Domains Bridge the Gap between Structure and Function of Myosin VI”
Nature Struct. Mol. Biol. 15:591-597 (2008)
5. Jan Lipfert, Linda Columbus, Vincent B. Chu, Scott A. Lesley, and Sebastian Doniach
“Size and Shape of Detergent Micelles by Small-Angle X-ray Scattering”
J. Phys. Chem. B 111:12427-38 (2007)
4. Jan Lipfert and Sebastian Doniach
“Small-Angle X-Ray Scattering from RNA, Proteins, and Protein Complexes”
Ann. Rev. Biophys. Biomol. Struct. 36:307-27 (2007)
3. Jan Lipfert, Rhiju Das, Vincent B. Chu, Madhuri Kudaravalli, Nathan Boyd, Daniel Herschlag, and Sebastian Doniach
“Structural Transitions and Thermodynamics of a Glycine-Dependent Riboswitch from *Vibrio cholerae*”
J. Mol. Biol. 365:1393-1406 (2007)
2. Bojan Zagrovic, Jan Lipfert, Erik J. Sorin, Ian S. Millett, Wilfred F. van Gunsteren, Sebastian Doniach, and Vijay S. Pande
“Unusual Compactness of a Polyproline type II Structure”
Proc. Nat. Acad. Sci. 102:11698-11703 (2005)
1. Jan Lipfert, Joel Franklin, Fang Wu, and Sebastian Doniach
“Protein Misfolding and Amyloid Formation for the Peptide GNNQQNY from Yeast Prion Protein Sup35: Simulation by Reaction Path Annealing”
J. Mol. Biol. 349:648-658 (2005)

Talks and Presentations Overview

Total of 15 talks at international conferences, 14 talks and national conferences and colloquia, and 19 poster presentation as presenting author.

Selected Talks and Poster Presentations

21. CeNS Workshop 2013, Venice, Italy, September 2013 (Talk)
20. International Summer School *Nicholas Cabrera*, Madrid, Spain, July 2013 (2 Talks)
19. Colloquium at the Institute for Computational Physics, University of Stuttgart, Germany, May 2013 (Talk)
18. Biophysical Society Meeting, Philadelphia, PA, February 2013 (Talk)
17. Single-Molecule Biophysics Conference, Aspen, CO, January 2013 (Poster)
16. "Forces in Biomolecular Systems" Symposium, Ringberg Castle, Germany, July 2011 (Talk)
15. German Physical Society (DPG) meeting, Dresden, Germany, March 2011 (Talk)
14. Seminar at the Peter Grünberg Institute, Research Center Jülich, Germany, February 2011 (Talk)
13. Biophysical Society Meeting, Baltimore, MD, March 2011 (Talk)
12. Zing Nucleic Acids Conference, Puerto Morelos, Mexico, November 2010 (Talk)
11. Gordon Research Conference on *Single Molecule Approaches to Biology*, Lucca, Italy, June 2010 (Talk)
10. Small-Angle Scattering 2009 Conference, Oxford, UK, September 2009 (Talk)
9. Structural Biology Seminar, Institut Pasteur, Paris, France, February 2009 (Talk)
8. Biophysical Society Meeting, Boston, MA, February 2009 (Talk)
7. RNA Society meeting, Berlin, Germany, August 2008 (Poster)
6. Gordon Research Conference on *Single Molecule Approaches to Biology*, New London, NH, August 2008 (Poster)
5. TOPO2008 meeting, Norwich, UK, July 2008 (Poster)
4. Biophysical Society Meeting, Long Beach, CA, February 2008 (Talk)
3. American Crystallographic Association meeting, Salt Lake City, UT, July 2007 (Talk)
2. Physics Colloquium, Reed College, Portland, OR, April 2007 (Talk)
1. Small-Angle Scattering 2006 conference, Kyoto, Japan, July 2006 (Talk)

Munich, September 2013