

# CURRICULUM VITAE

RICHARD A. NEHER

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## ADDRESS

Biozentrum  
University of Basel  
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## PERSONAL DATA

Date of birth: 30th of August, 1979  
Place of birth: Göttingen, Germany  
Nationality: German

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## POSITIONS HELD

since 2017	Associate Professor, Biozentrum, University of Basel
2010-2017	Independent Max Planck Research Group Leader
2007-2010	Post-Doctoral Fellow at the Kavli Institute for Theoretical Physics, University of California, Santa Barbara, USA
2004-2007	PhD student at the University of Munich, Germany

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## EDUCATION

2007/05	PhD in physics. Grade: <b>Summa cum laude</b> University of Munich Thesis advisor: Prof. Ulrich Gerland Thesis title: Dynamics aspects of DNA
2006/07	Les Houches Summer School of Theoretical Physics on Complex Systems
2003/11	Diploma in physics. Grade: <b>With distinction</b> University of Munich Thesis advisor: Prof. Herbert Wagner Thesis title: Stochastic Geometry and Percolation
2000–2003	Graduate studies in physics at the University of Munich
07/2000	Prediploma in physics. Grade: <b>Very good</b> University of Göttingen
1998–2000	Undergraduate studies in physics at the University of Göttingen

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## FELLOWSHIPS & AWARDS

2016/05	OpenSciencePrize (Phase I, with Trevor Bedford)
2012/12	ARCHES award of the German Secretary of Science and Education
2011/03	ERC Starting Grant
2009/08	Harvey L. Karp Discovery Award
2007-2010	Post-Doctoral Fellow at the Kavli Institute for Theoretical Physics
2005-2007	Scholar of the Elite-Network of Bavaria

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## PROFESSIONAL ACTIVITIES

since 2015/09	Associate editor for Virus Evolution
since 2014/08	Reviewing Editor at eLife
summer 2014	Co-organizer of the <i>Drug resistance evolution</i> program a two month meeting at the interface of evolutionary biology, public health, and physics at KITP, UC Santa Barbara
2011-2015	Associate Editor, BMC Evolutionary Biology  Reviewer for many journals including PNAS, eLife, PRL, PRE, JSTAT, Genetics, MBE, PLoS Genetics, Trends in Ecology & Evolution  Reviewer for grant agencies including ERC, ANR, SNF, HFSP, GIF, NWO.

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## OUTREACH ACTIVITIES

2014/04	Tübinger Fenster für Forschung (lecture to the general public)
2014/01	XLAB science festival 2014 (lecture to approx. 450 high-school students).
2011/03	KITP science teacher conference
2009/08	Friends of KITP (lecture to the general public)

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PUBLICATIONS

See Google Scholar for up-to-date citation statistics.

<http://scholar.google.de/citations?user=dfvXOrMAAAAJ>

**42. In-vivo mutation rates and fitness landscape of HIV-1.**

F. Zanini, V. Puller, J. Brodin, J. Albert, R.A. Neher, *Virus Evolution*, in press (2017)

**41. Error rates, PCR recombination, and sampling depth in HIV-1 Whole Genome Deep Sequencing.**

F. Zanini, J. Brodin, J. Albert and R.A. Neher, *Virus research*, 10.1016/j.virusres.2016.12.009. (2016)

**40. HIV Cell-to-Cell Spread Results in Earlier Onset of Viral Gene Expression by Multiple Infections per Cell**

M. Boullé, T. G. Müller, S. Dähling, Y. Ganga, L. Jackson, D. Mahamed, L. Oom, G. Lustig, R. A. Neher, A. Sigal. *PLoS Pathogens*, 10.1371/journal.ppat.1005964 (2016)

**39. Establishment and stability of the latent HIV-1 DNA reservoir.**

J. Brodin, F. Zanini, L. Thebo, C. Lanz, G. Bratt, R.A. Neher, J. Albert, *eLife*, 10.7554/eLife.18889 (2016)

**38. Revisiting adult neurogenesis and the role of erythropoietin for neuronal and oligodendroglial differentiation in the hippocampus.**

Hassouna et al., *Molecular Psychiatry*. (2016)

**37. Prediction, dynamics, and visualization of antigenic phenotypes of seasonal influenza viruses.**

R.A. Neher, T. Bedford, R.S. Daniels, C.A. Russell, B.I. Shraiman, *PNAS*, 113, E1701-E1709. (2016)

**36. Population genomics of inpatient HIV-1 evolution**

F. Zanini, J. Brodin, L. Thebo, C. Lanz, G. Bratt, J. Albert, R.A. Neher, *eLIFE*, 11282. (2016)

**35. nextflu: real-time tracking of seasonal influenza viruses in humans.**

R.A. Neher, T. Bedford, *Bioinformatics*, 10.1093/bioinformatics/btv381. (2015)

**34. Challenges with Using Primer IDs to Improve Accuracy of Next Generation Sequencing.**

J. Brodin, C. Hedskog, A. Heddini, E. Benard, R.A. Neher, M. Mild, J. Albert. *PLoS ONE* 10: e0119123 (2015)

**33. Prediction evolution from the shape of genealogical trees.**

R.A. Neher<sup>†</sup>, C.A. Russell, B.I. Shraiman, *eLife*, 03568 (2014)

**32. Genetic diversity in the interference selection limit.**

B. Good, A.M. Walczak, R.A. Neher, M.M. Desai, *PLoS Genetics*, *PLoS Genet* 10(3), e1004222 (2014).

- 31. Characterization of Genetic Diversity in the Nematode *Pristionchus Pacificus* from Population-Scale Resequencing Data.**  
C. Rödelberger, R.A. Neher, A.M. Weller, G. Eberhardt, H. Witte, W.E. Mayer, C. Dieterich, and R.J. Sommer. *Genetics*. doi:10.1534/genetics.113.159855 (2014)
- 30. Quantifying the range of a lipid phosphate signal in vivo.**  
A. Mukherjee, R.A. Neher, A. D. Renault. *J. Cell Sci.*, 126, 5453-5464 (2013)
- 29. Coalescence and genetic diversity in sexual populations under selection.**  
R.A. Neher<sup>†</sup>, T.A. Kessinger, B.I. Shraiman. *PNAS*, 110, 15836-15841 (2013)
- 28. Inferring HIV escape rates from multi-locus genotype data.**  
T.A. Kessinger, A.S. Perelson and R.A. Neher<sup>†</sup>. *Front. Immunol.*, 4:252 (2013)
- 27. Quantifying selection against synonymous mutations in HIV-1 env evolution.**  
F. Zanini, R.A. Neher<sup>†</sup>. *Journal of Virology*, 87, 11843-11850 (2013)
- 26. Genetic draft, selective interference, and population genetics of rapid adaptation.**  
R.A. Neher<sup>†</sup>, *Annual Reviews of Ecology, Evolution, and Systematics*, vol 44, 195-215 (2013)
- 25. The emergence of clones in sexual populations.**  
R.A. Neher, M. Vucelja, M. Mezard, B.I. Shraiman, *JSTAT*, P01008, (2013)
- 24. Mathematical modeling of escape of HIV from cytotoxic T lymphocyte responses.**  
V.V. Ganusov\*, R.A. Neher\*, A.S. Perelson, *JSTAT*, P01008 (2013)
- 23. Genealogies of rapidly adapting populations.**  
R.A. Neher<sup>†</sup> and Oskar Hallatschek. *PNAS*, vol. 110 pp. 437-442 (2013)
- 22. FFPopSim: An efficient forward simulation package for the evolution of large populations.**  
Fabio Zanini and R.A. Neher<sup>†</sup>. *Bioinformatics*, vol. 28 pp. 3332-3333 (2012)
- 21. Dynamic Mutation Selection Balance as an Evolutionary Attractor.**  
S. Goyal, D.J. Balick, E.R. Jerison, R.A. Neher, B.I. Shraiman, and M.M. Desai, *Genetics*, 191:1309-1319 (2012)
- 20. Fluctuations of fitness distributions and the rate of Muller's ratchet.**  
R.A. Neher<sup>†</sup>, B.I. Shraiman, *Genetics*, 191:1283-1293 (2012)
- 19. Estimation of selection coefficients from deep population diversity data.**  
P.W. Messer, R.A. Neher<sup>†</sup>, *Genetics*, 191:593-605 (2012)
- 18. Target search on a dynamic DNA molecule.**  
T. Schötz, R.A. Neher, and U. Gerland. *Phys. Rev. E.*, Vol. 84, p. 051911 (2011)
- 17. Statistical Genetics and Evolution of Quantitative Traits.**  
R.A. Neher, B.I. Shraiman, *Rev. Mod. Phys*, Vol 83(4), pp. 1283 (2011)

16. **Genetic Draft and Quasi-Neutrality in Large Facultatively Sexual Populations.**  
R.A. Neher, B.I. Shraiman, *Genetics*, 188, 975-996 (2011)
15. **Correlated Evolution of Nearby Residues in Drosophilid Proteins.**  
B. Callahan, R.A. Neher, D. Bachtrog, P. Andolfatto, B.I. Shraiman, *PLoS Genet.* 7(2) e1001315 (2011)
14. **Recombination rate and selection strength in HIV intra-patient evolution .**  
R.A. Neher<sup>†</sup> and T. Leitner. *PLoS Comput Biol* 6 (1) pp. e1000660 (2010)
13. **Rate of Adaptation in Large Sexual Populations.**  
R.A. Neher, B. I. Shraiman and D. S. Fisher. *Genetics*, 184 pp. 467-481 (2010)
12. **Competition between recombination and epistasis can cause a transition from allele to genotype selection**  
R.A. Neher and B.I. Shraiman. *PNAS*, Vol. 106, pp. 6866-6871 (2009)
11. **Blind source separation for the analysis of fluorescence microscopy images**  
R.A. Neher, M. Mitkovski, E. Neher, F. Kirchhoff, F. Theis and A. Zeug. *Biophys. J.*, 96, pp. 3791-3800 (2009)
10. **Blind Decomposition of Spectral Imaging Microscopy: A Study on Artificial and Real Test Data**  
F. Theis, R. Neher, and A. Zeug. in *ICA '09: Proc. 8th Int. Conference on Independent Component Analysis and Signal Separation.*, pp. 548-556, (2009)
9. **Topological estimation of percolation thresholds**  
R.A. Neher<sup>†</sup>, K. Mecke, H. Wagner. *JSTAT*, P01011, (2008)
8. **Optimal stiffness for conformational transitions in macromolecules**  
R.A. Neher, W. Moebius, E. Frey and U. Gerland. *Phys. Rev. Lett.*, Vol. 99, p. 178101, (2007)
7. **Force-Induced DNA slippage**  
F. Kühner, J. Morfill, R.A. Neher K. Blank and H. Gaub. *Biophys. J.*, 92:2491-2497 (2007)
6. **Kinetic Accessibility of Buried DNA Sites in Nucleosomes**  
W. Möbius, R.A. Neher and U. Gerland. *Phys. Rev. Lett.*, Vol. 97, p. 208102, (2006)
5. **Intermediate phase in DNA melting**  
R.A. Neher<sup>†</sup> and U. Gerland. *Phys. Rev. E.*, Vol. 73, p. R030902, (2006)
4. **DNA as a viscoelastic nanoelement**  
R.A. Neher and U. Gerland. *Biophys. J.*, Vol. 89, p. 3446-3855, (2005)
3. **Dynamics of Force-Induced DNA Slippage**  
R.A. Neher and U. Gerland. *Phys. Rev. Lett.*, Vol. 93, p. 198102, (2004)
2. **Applying Spectral Fingerprinting to the Analysis of FRET Images**  
R.A. Neher and E. Neher, *Micros. Res. Tech.*, Vol. 63, p.185-195, (2004)

**1. Optimizing imaging parameters for the separation of multiple labels in a fluorescence image**

R.A. Neher and E. Neher, J. of Microscopy, Vol. 213(1), p.46-62, (2004)

† denotes corresponding author, \* denotes co-first author.

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PATENTS

**Method and device for conducting the spectral differentiating, imaging measurement of fluorescent light.** US Patent 7304733, German Patent 10222359.

E. Neher and R.A. Neher.

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THESES

**PhD thesis: Dynamic aspects of DNA – DNA-slippage and nucleosome dynamics**

University of Munich, 2007. Thesis advisor: Prof. Ulrich Gerland

**Diploma thesis: Stochastic Geometry and Percolation**

University of Munich, 2003. Thesis advisor: Prof. Herbert Wagner

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INVITED CONFERENCE CONTRIBUTIONS

- 2016/07 “Statistical-physics methods in biology and computer science”, Paris
- 2016/06 Keynote at Mathematical and Computational, Evolutionary Biology Conference, Montpellier
- 2015/07 “Forecasting Evolution”. Instituto Gulbenkian, Lisbon
- 2015/07 “Forecasting Evolution”. Instituto Gulbenkian, Lisbon
- 2015/06 “Probability and Biological Evolution”. CIRM, Luminy
- 2015/05 “Next generation sequencing of viruses”. Institute Pasteur, Paris
- 2014/06 Heraeus-Seminar on “Mechanisms, Strategies, and Evolution of Microbial Systems”, Bad Honnef, Germany
- 2014/05 Molecular Frontiers in Ecology and Evolution, Tübingen, Germany
- 2014/02 Physics of Evolution, Regulation and Signaling, Munich, Germany
- 2013/08 European Society for Evolutionary Biology, Lisbon, Portugal
- 2012/12 KITP program on “Quantitative Immunology”, Santa Barbara, CA, USA
- 2012/05 Selection in Population Genetics, Radcliffe Institute, Harvard University, MA, USA
- 2012/02 Cologne Spring Meeting (Satellite meeting on viral evolution)
- 2011/12 Population Genetics, ENS, Paris, France
- 2011/09 Mind the Gap 2011, Cologne, Germany
- 2011/03 Kavli Future Conference: Evolution of Novelty, Aspen, CO, USA
- 2011/03 KITP program on “Viral and Microbial Evolution”, Santa Barbara, CA, USA
- 2010/03 American Physical Society Annual Meeting: Symposium on evolutionary dynamics, Portland, OR, USA
- 2010/01 Aspen Center for Physics: Populations, Evolution, and Physics, Aspen, CO, USA
- 2009/06 DIMACS Workshop: Identifying genetic signatures for the evolution of complex phenotypes, Rutgers, USA

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INVITED TALKS & SEMINARS (SELECTION)

- 2016/05 Cambridge University
- 2016/02 MIT, Boston, Biophysics Seminar Series
- 2016/01 KRITH, Durban, South Africa, Biophysics Seminar Series
- 2015/11 CIDID Seminar, Fred Hutchinson Cancer Research Center, Seattle
- 2015/02 Pacific Center for Emerging Infectious Diseases. University of Hawai’i

2014/11 CeNS Colloquium, LMU Munich, Germany  
2014/04 BioQuant Seminar, Heidelberg, Germany  
2013/12 Virological Colloquium, Medical School Tübingen, Germany  
2013/05 Seminar at the Institute for Molecular Virology, University Ulm, Germany  
2012/06 Microbiological Colloquium, Medical School Tübingen, Germany  
2012/04 Seminar, Biophysics Seminar series, Princeton University, NJ, USA  
2012/01 Transregio Seminar, University Duisburg-Essen, Germany  
2011/11 Seminar, Institute for Evolution and Ecology, University Münster, Germany  
2011/04 Colloquium, Max-Planck Institute for Dynamics and Self-Organization, Göttingen, Germany  
2010/07 T6 Seminar, Los Alamos National Lab, Los Alamos, NM, USA  
2010/04 Biophysics/Population genetics Seminar, Stanford University, Palo Alto, CA, USA  
2009/07 SFB 680 Colloquium, Institute for Genetics, University of Cologne, Germany  
2009/05 Biophysics Seminar, Princeton University, USA  
2008/07 Soft matter and Biophysics seminar, LMU Munich, Germany  
2007/01 Biophysics seminar, ENS Paris, France