

Alexander Schlaich

Curriculum Vitae

Postdoctoral research associate
Laboratoire Interdisciplinaire de Physique
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Vocational Experience

Research

- 2017–2019 **Postdoctoral researcher**, *Laboratoire Interdisciplinaire de Physique*, Grenoble, France.
Multiscale modeling of adsorption, phase transitions and transport in porous media within the ANR project TAMTAM via molecular simulation and systematic upscaling using rigorous statistical mechanics approaches.
- 2012–2017 **Ph.D. student**, *Freie Universität Berlin*, Germany.
Thesis: Water effects on the interaction and friction between polar surfaces — Investigation of hydration, dielectric, electrostatic and frictional interactions between polar surfaces accross nano-confined water using theory and molecular simulation.
- Sep. 2012 **Fellow of the HPC-Europa2 programme**, *Università degli Studi di Roma "La Sapienza"*, Rome, Italy.
Research stay with Sofia Kantorovich / group of Francesco Sciortino
- 2011–2012 **Research associate**, *Institute for Computational Physics, University of Stuttgart*, Stuttgart, Germany.
Development of a Poisson–Boltzmann solver for regions with dielectric mismatch and charge regulating surfaces, implementation of a Poisson–Nernst–Planck solver. Involvement into the institutes teaching duties and contributions to the in-house molecular dynamics package ESPResSo.

Teaching

- 2012–2016 **Mentoring**, two M.Sc. and three B.Sc. students in physics.
- 2012–2016 **Computational Physics**, *Lecturer: Roland Netz*, Freie Universität Berlin.
- 2011–2012 **Introduction to Computational Methods**, *Lecturer: Axel Arnold*, Universität Stuttgart.
- 2010–2012 **Simulation methods in physics**, *Lecturer: Christian Holm*, Universität Stuttgart.
- 2008–2010 **Physics Lab Course**, Universität Stuttgart.

Other

- 2006–2012 **System Administrator**, *Analytisches Institut Bostel*, Stuttgart.
Administration and supervision of the IT infrastructure of the laboratory concerned with chemical, microbiological and molecular biological foodstuffs analysis, consisting of about 40 workstations, 4 servers and 2 branch offices.
- 2010–2012 Head of the German Red Cross community in Stuttgart-Feuerbach with about 120 active members. Platoon leader in the civil protection responsible for the emergency patient treatment space.

- 2005–2012 **Ambulance Officer**, *DRK Rettungsdienst Stuttgart*.
Temporary/voluntary employment in the emergency medical services and ambulance service.
- 2002–2013 Active member of the German Red Cross, among others development of student emergency services at high schools and responsible for internal qualification and education.

Education

- 2017 **Ph.D. thesis**, *Freie Universität Berlin*, Germany, Title: Water effects on the interaction and friction between polar surfaces.
Supervisor: Professor Dr. Roland Netz
- 2011 **Diploma thesis**, *University of Stuttgart*, Germany, Title: An iterative Poisson Boltzmann solver for regions with dielectric mismatch.
Supervisor: Professor Dr. Christian Holm
- 2005–2011 **Studies of Physics (Diploma degree)**, *University of Stuttgart*, Germany.

Publications

Publications in peer-reviewed journals

- 2019 A. Schlaich and B. Coasne. Dispersion truncation affects the phase behavior of bulk and confined fluids: Coexistence, adsorption, and criticality. *J. Chem. Phys.*, 150(15):154104, April 2019.
- 2018 A. Schlaich, A. P. dos Santos, and R. R. Netz. Simulations of Nanoseparated Charged Surfaces Reveal Charge-Induced Water Reorientation and Nonadditivity of Hydration and Mean-Field Electrostatic Repulsion. *Langmuir*, December 2018.
- Q. D. Pham, A. Wolde-Kidan, A. Gupta, A. Schlaich, E. Schneck, R. R. Netz, and E. Sparr. Effects of Urea and TMAO on Lipid Self-Assembly under Osmotic Stress Conditions. *J. Phys. Chem. B*, 122(25):6471–6482, June 2018.
- P. Loche, C. Ayaz, A. Schlaich, D. J. Bonhuis, and R. R. Netz. Breakdown of Linear Dielectric Theory for the Interaction between Hydrated Ions and Graphene. *J. Phys. Chem. Lett.*, 9(22):6463–6468, November 2018.
- 2017 A. Schlaich, J. Kappler, and R. R. Netz. Hydration Friction in Nanoconfinement: From Bulk via Interfacial to Dry Friction. *Nano Lett.*, 17(10):5969–5976, October 2017.
- B. Kowalik, A. Schlaich, M. Kanduč, E. Schneck, and R. R. Netz. Hydration Repulsion Difference between Ordered and Disordered Membranes Due to Cancellation of Membrane–Membrane and Water-Mediated Interactions. *J. Phys. Chem. Lett.*, pages 2869–2874, June 2017.
- M. Kanduč, A. Schlaich, A. H. de Vries, J. Jouhet, E. Maréchal, B. Demé, R. R. Netz, and E. Schneck. Tight cohesion between glycolipid membranes results from balanced water–headgroup interactions. *Nat. Commun.*, 8:14899, April 2017.
- 2016 A. Schlaich, E. W. Knapp, and R. R. Netz. Water Dielectric Effects in Planar Confinement. *Phys. Rev. Lett.*, 117(4):048001, July 2016.
- M. Kanduč, A. Schlaich, E. Schneck, and R. R. Netz. Water-Mediated Interactions between Hydrophilic and Hydrophobic Surfaces. *Langmuir*, 32(35):8767–8782, September 2016.

- 2015 A. Schlaich, B. Kowalik, M. Kanduč, E. Schneck, and R. R. Netz. Physical mechanisms of the interaction between lipid membranes in the aqueous environment. *Physica A*, 418:105–125, January 2015.
- 2014 M. Kanduč, A. Schlaich, E. Schneck, and R. R. Netz. Hydration repulsion between membranes and polar surfaces: Simulation approaches versus continuum theories. *Adv. Colloid Interface Sci.*, 208:142–152, June 2014.

Book-chapters

- 2019 M. Kanduc, A. Schlaich, B. Kowalik, A. Wolde-Kidan, R. R. Netz, and E. Schneck. Simulation Approaches to Short-Range Interactions Between Lipid Membranes. In *Biomembrane Simulations: Computational Studies of Biological Membranes*. CRC Press, Portland, USA, (in press) edition, 2019.
- 2015 A. Schlaich, B. Kowalik, M. Kanduč, E. Schneck, and R. R. Netz. Simulation Techniques for Solvation-Induced Surface-Interactions at Prescribed Water Chemical Potential. In G. Sutmann, J. Grotendorst, G. Gompper, and D. Marx, editors, *Computational Trends in Solvation and Transport in Liquids*, volume 28 of *IAS Series*, pages 155–185. Forschungszentrum Jülich GmbH, Jülich, March 2015.
- 2012 Kanduč, Matej, A. Schlaich, E. Schneck, and R. R. Netz. Interactions between biological membranes: Theoretical concepts. In Lydéric Bocquet, David Quéré, Thomas A. Witten, and Leticia F. Cugliandolo, editors, *Soft Interfaces*, number 98 in Lecture Notes of the Les Houches Summer School. Oxford University Press, Oxford, July 2012.

Scientific communication

Invited international conference talks

- Sep. 2017 **The transition from hydrodynamic via interfacial to dry friction for sheared surfaces in water**, A. Schlaich, J. Kappler, and R. R. Netz, BBSRC Workshop on nanofluidics in biological systems, Durham, Great Britain.

Oral presentation at international conferences

- Mai 2019 **Coupling of Adsorption and Transport in Hierarchical Porous Materials**, A. Schlaich and B. Coasne, Interpore 2019: Fluids in Nanoporous Media, Valencia, Spain.
- Oct. 2018 **Modeling Adsorption and Transport in Multiscale Porous Media**, A. Schlaich and B. Coasne, Liquids@Interfaces, Bordeaux, France.
- Mar. 2018 **Counterions in aqueous planar nano-confinement: Atomistic simulations and continuum modeling**, A. Schlaich and R. R. Netz, Annual Meeting of the German Physical Society, Berlin, Germany.
- Mar. 2018 **From hydrodynamic via interfacial to dry friction for sheared surfaces in water**, A. Schlaich, J. Kappler, and R. R. Netz, Annual Meeting of the German Physical Society, Berlin, Germany.
- Jul. 2016 **Water dielectric effects in planar confinement**, A. Schlaich and R. R. Netz, Protein Electrostatics 2016, Berlin, Germany.

- Jun. 2016 **From wet to dry friction**, [A. Schlaich](#), *J. Kappler*, and *R. R. Netz*, SOMATAI conference, Crete, Greece.
- Mar. 2016 **The dielectric response of aqueous water slabs in nanoconfinement**, [A. Schlaich](#) and *R. R. Netz*, Annual Meeting of the German Physical Society, Regensburg, Germany.
- Mar. 2015 **Hydration Interaction of Charged Polar Surfaces**, [A. Schlaich](#) and *R. R. Netz*, Minischool on Biophysics of Protein Interactions, ICTP SAIFR Sao Paolo, Brazil.
- Oct. 2014 **Hydration Interaction of Polar Surfaces**, [A. Schlaich](#) and *R. R. Netz*, Exploring Solvation Science, 572. WE Haereus Seminar, Bad Honnef, Germany.
- Mar. 2012 **A Poisson-Boltzmann solution of the two-colloids problem**, [A. Schlaich](#), *S. Kesselheim*, *M. Sega*, and *C. Holm*, Annual Meeting of the German Physical Society, Berlin, Germany.

[Invited seminar presentations and Colloquia](#)

- May 2019 **Coupling of Adsorption and Transport in Hierarchical Porous Materials**, [A. Schlaich](#) and *B. Coasne*, Joint Institute for Computational Physics and SFB 1313 Colloquium. Stuttgart, Germany
- Oct. 2018 **The transition from hydrodynamic via interfacial to dry friction for sheared surfaces in water**, [A. Schlaich](#) and *R. R. Netz*, Institut de Chimie Séparative de Marcoule, France.
- Jun. 2018 **Modeling Adsorption and Transport in Multiscale Porous Media**, [A. Schlaich](#), Freie Universität Berlin, Germany.
- Nov. 2015 **Interaction of [Charged] [Polar] [Soft] Surfaces**, [A. Schlaich](#), Humboldt Universität Berlin, Germany.