Biographical Sketch: Markus Deserno

Markus Deserno, Professor
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(a) Professional Preparation

University of Erlangen/Nürnberg (Germany)	Physics	Diploma, 1996
University of Mainz & MPI for Polymer Research	Physics	Dr. rer. nat., 2000
University of California, Los Angeles	Physics	PostDoc 2000–2003

(b) Appointments

2003–2007	Scientific Project Leader, MPI for Polymer Research, Mainz, Germany
Sep. 2007–Jun. 2011	Associate Professor of Physics, Carnegie Mellon University, Pittsburgh
since July 2011	tenured Associate Professor of Physics, Carnegie Mellon University, Pittsburgh
since September 2013	Associate Department Head
since July 2016	Full Professor of Physics, Carnegie Mellon University, Pittsburgh

Member of: American Physical Society (APS); American Chemical Society (ACS), Biophysical Society (BPS), Deutsche Physikalische Gesellschaft (DPG).

(c) Selected publications

Research ID: P-1699-2014**; Orcid ID:** 0000-0001-5692-1595**.**

Recent work

- Z.A. McDargh, P. Vázquez-Montejo, J. Guven, and M. Deserno, "Constriction by Dynamin: elasticity vs. adhesion", Biophys. J. **111**, 2470–2480 (2016). URL: http://dx.doi.org/10.1016/j.bpj.2016.10.019.
- X. Wang and M. Deserno, "Determining the Lipid Tilt Modulus by Simulating Membrane Buckles", J. Chem. Phys. B. **120**, 6061–6073 (2016). URL: http://dx.doi.org/ 10.1021/acs.jpcb.6b02016.
- M. Deserno, "Fluid lipid membranes: From differential geometry to curvature stresses", Chem. Phys. Lipids **185**, 11–45 (2015). URL: http://dx.doi.org/10.1016/j.chemphyslip.2014.05.001.
- C. Yolcu, R.C. Haussman, and M. Deserno, "The effective field theory approach towards membrane-mediated interactions between particles", Adv. Colloid Interface Sci. **208**, 89–109 (2014). URL: http://dx.doi.org/10.1016/j.cis.2014.02.017.
- T. Bereau, Z.-J. Wang, and M. Deserno, "More than the Sum of its Parts: Coarse-Grained Peptide-Lipid Interactions from a Simple Cross-Parametrization", J. Chem. Phys. **140**, 115101 (2014). URL: http://dx.doi.org/10.1063/1.4867465.
- M. Hu, P Diggins IV, and M. Deserno, "Determining the bending modulus of a lipid membrane by simulating buckling", J. Chem. Phys. **138**, 214110 (2013). URL: http://dx.doi.org/10.1063/1.4808077.
- C. Globisch, V. Krishnamani, M. Deserno, and C. Peter, "Optimization of an Elastic Network Augmented Coarse Grained Model to Study CCMV Capsid Deformation", PLOS ONE, **8**(4): e60582 (2013).
- URL: http://dx.doi.org/10.1371/journal.pone.0060582.
- M. Hu, F. Stanzione, A.K. Sum, R. Faller, and M. Deserno, "Design Principles for Nanoparticles Enveloped by a Polymer-Tethered Lipid Membrane", ACS Nano **9**, 9942–9954 (2015). URL: http://dx.doi.org/10.1021/acsnano.5b03439.
- P. Diggins, Z.A. McDargh, and M. Deserno, "Curvature softening and negative compressibility of gel-phase lipid membranes", J. Am. Chem. Soc. **137**, 12752–12755 (2015). URL: http://dx.doi.org/10.1021/jacs.5b06800.

Some older work that received some attention

- M. Deserno and C. Holm, "How to mesh up Ewald sums. I. A theoretical and numerical comparison of various particle mesh routines", J. Chem. Phys. **109**, 7678–7693 (1998). URL: http://dx.doi.org/10.1063/1.477414.
- M. Deserno and C. Holm, "How to mesh up Ewald sums. II. An accurate error estimate for the particle–particle–particle-mesh algorithm", J. Chem. Phys. **109**, 7694–7701 (1998). URL: http://dx.doi.org/10.1063/1.477415.
- B.J. Reynwar, G. Illya, V.A. Harmandaris, M.M. Müller, K. Kremer, and M. Deserno, "Aggregation and vesiculation of membrane proteins by curvature-mediated interactions", Nature **447**, 461–464 (2007). URL: http://dx.doi.org/10.1038/nature05840.
- M. Deserno, C. Holm, and S. May, "Fraction of condensed counterions around a charged rod: Comparison of Poisson− Boltzmann theory and computer simulations", Macromolecules **33**, 199–206 (2000). URL: http://dx.doi.org/ 10.1021/ma990897o.
- I.R. Cooke, K. Kremer, and M. Deserno, "Tunable generic model for fluid bilayer membranes", Phys. Rev. E **72**, 011506 (2005). URL: http://dx.doi.org/ 10.1103/PhysRevE.72.011506.
- T. Murtola, A. Bunker, I. Vattulainen, M. Deserno, and M. Karttunen, "Multiscale modeling of emergent materials: biological and soft matter", Phys. Chem. Chem. Phys. **11**, 1869–1892 (2009). URL: http://dx.doi.org/ 10.1039/B818051B.
- I.R. Cooke and M. Deserno, "Solvent-free model for self-assembling fluid bilayer membranes: stabilization of the fluid phase based on broad attractive tail potentials", J. Chem. Phys. **123**, 224710 (2005). URL: http://dx.doi.org/10.1063/1.2135785.
- M. Deserno, "Elastic deformation of a fluid membrane upon colloid binding", Phys. Rev. E **69**, 031903 (2004). URL: https://doi.org/10.1103/PhysRevE.69.031903.
- T. Bereau and M. Deserno, "Generic coarse-grained model for protein folding and aggregation", J. Chem. Phys. **130**, 235106 (2009). URL: http://dx.doi.org/10.1063/1.3152842.
- Z.-J. Wang and M. Deserno, "A systematically coarse-grained solvent-free model for quantitative phospholipid bilayer simulations", J. Phys. Chem. B **114**, 11207–11220 (2010). URL: http://dx.doi.org/10.1021/jp102543j.

(d) Ph.D. students

Martin M. Müller (2007); Tristan Bereau (2011); Cem Yolcu (2012); Mingyang Hu (2013); Patrick Diggins (2016); Robert Haussman (2016).

(e) Postdoctoral Research Scholars

Ira R. Cooke, Gregoria Illya, Vagelis A. Harmandaris, Benedict J. Reynwar, Zunjing Wang, Xiaofei Li, Venkatramanan Krishnamani, Pablo Vázquez-Montejo, Martina Pannuzzo.

(f) Research interests

I am a Theoretical and Computational Physicist who is interested in the intersection of Soft Matter and Biological Physics. I specifically focus on problems involving lipid membranes and proteins at the mesoscale (tens to hundreds of nanometers), using a relatively wide set of tools—ranging from continuum elasticity, differential geometry, statistical physics, and field theory, up to molecular dynamics and multiscale modelling. For instance, I have worked on membrane mediated interactions, viral budding, lipid bilayer curvature elasticity, lipid tilt, viral capsid stability, the thermodynamics of peptide insertion into bilayers, and the development of a variety of coarse-grained models for studying such phenomena.

(Pittsburgh, February 2017)