

# ***Curriculum Vitae***

## **Anton Arkhipov**

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### **EDUCATION**

Ph.D. in Physics, University of Illinois at Urbana-Champaign, Urbana, IL, 2008

M.S. in Physics, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia, 2004

B.S. in Physics, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia, 2002

### **PROFESSIONAL EXPERIENCE**

August 2009 – present: Postdoctoral fellow, D. E. Shaw Research, New York, NY (Dr. David E. Shaw, advisor).

January 2009 – August 2009: Postdoctoral associate, Theoretical and Computational Biophysics Group, University of Illinois at Urbana-Champaign (Dr. Klaus Schulten, advisor).

August 2004 – December 2008: Graduate student, Theoretical and Computational Biophysics Group, Beckman Institute and Department of Physics, University of Illinois at Urbana-Champaign (Dr. Klaus Schulten, advisor).

Fall 2000 – Summer 2004: Research Assistant, Institute of Spectroscopy, Russian Academy of Science, Troitsk, Moscow Region, Russia (Dr. Yu. Lozovik, advisor).

## **RESEARCH INTERESTS**

Structural basis of cell signaling, receptor tyrosine kinases, structure and dynamics of viruses, computational and theoretical biophysics, coarse-grained models.

## **HONORS AND AWARDS**

Jordan S. Asketh Fellowship (2008), Department of Physics, University of Illinois at Urbana-Champaign.

L. S. Edelheit Fellowship (2007-2008), Department of Physics, University of Illinois at Urbana-Champaign.

Dynasty Foundation Scholarship (2002-2004).

## **REVIEWER**

PNAS

Biophysical Journal

Journal of Physical Chemistry

Langmuir

## **PUBLICATIONS**

\* - denotes equal contribution

32. Wouter H. Roos, Melissa M. Gibbons, Anton Arkhipov, Charlotte Uetrecht, Norman Watts, Paul Wingfield, Alasdair C. Steven, Albert J.R. Heck, Klaus Schulten, William S. Klug, and Gijs J.L. Wuite. Squeezing protein shells: how continuum elastic models, molecular dynamics simulations and experiments coalesce at the nanoscale. *Biophysical Journal*, 99:1175-1181, 2010.

31. Ying Yin\*, Anton Arkhipov\*, and Klaus Schulten. Multi-scale simulations of membrane sculpting by N-BAR domains. In Philip Biggin and Mark Sansom, editors, *Molecular Simulations and Biomembranes: From Biophysics to Function*, chapter 6, pp. 146-176. Royal Society of Chemistry, 2010.

30. Anton Arkhipov\*, Ying Yin\*, and Klaus Schulten. Membrane-bending mechanism of amphiphysin N-BAR domains. *Biophysical Journal*, 97:2727-2735, 2009.

29. Anton Arkhipov, Wouter H. Roos, Gijs J. L. Wuite, and Klaus Schulten. Elucidating the mechanism behind irreversible deformation of viral capsids. *Biophysical Journal*, 97:2061-2069, 2009.

28. Ying Yin\*, Anton Arkhipov\*, and Klaus Schulten. Simulations of membrane tubulation by lattices of amphiphysin N-BAR domains. *Structure*, 17:882-892, 2009.

27. Anton Arkhipov and Klaus Schulten. Limits for reduction of effective focal volume in multiple-beam light microscopy. *Optics Express*, 17:2861-2870, 2009.

26. Jen Hsin, Anton Arkhipov, Ying Yin, John Stone, and Klaus Schulten. Using VMD – and introductory tutorial. *Current Protocols – Bioinformatics*, 5:Unit 5.7, 2008.
25. Peter L. Freddolino\*, Anton Arkhipov\*, Amy Y. Shih, Ying Yin, Zhongzhou Chen, and Klaus Schulten. Application of residue-based and shape-based coarse graining to biomolecular simulations. In Gregory A. Voth, editor, *Coarse-Graining of Condensed Phase and Biomolecular Systems*, chapter 20, pp. 299-315. Chapman and Hall/CRC Press, Taylor and Francis Group, 2008.
24. Amy Y. Shih, Peter L. Freddolino, Anton Arkhipov, Stephen G. Sligar, and Klaus Schulten. Molecular modeling of the structural properties and formation of high-density lipoprotein particles. In Scott Feller, editor, *Current Topics in Membranes: Computational Modeling of Membrane Bilayers*, chapter 11, pp. 313-342. Elsevier, 2008.
23. Anton Arkhipov\*, Ying Yin\*, and Klaus Schulten. Four-scale description of membrane sculpting by BAR domains. *Biophysical Journal*, 95:2806-2821, 2008.
22. Anton Arkhipov, Jana Hüve, Martin Kahms, Reiner Peters, and Klaus Schulten. Continuous fluorescence microphotolysis and correlation spectroscopy using 4Pi microscopy. *Biophysical Journal*, 93:4006-4017, 2007.
21. Amy Y. Shih, Anton Arkhipov, Peter L. Freddolino, Stephen G. Sligar, and Klaus Schulten. Assembly of lipids and proteins into lipoprotein particles. *Journal of Physical Chemistry B*, 111:11095-11104, 2007.

20. Amy Y. Shih, Peter L. Freddolino, Anton Arkhipov, and Klaus Schulten. Assembly of lipoprotein particles revealed by coarse-grained molecular dynamics simulations. *Journal of Structural Biology*, 157:579-592, 2007.
19. Anton Arkhipov, Peter L. Freddolino, and Klaus Schulten. Stability and dynamics of virus capsids described by coarse-grained modeling. *Structure*, 14:1767-1777, 2006.
18. Anton Arkhipov\*, Peter L. Freddolino\*, Katsumi Imada, Keiichi Namba, and Klaus Schulten. Coarse-grained molecular dynamics simulations of a rotating bacterial flagellum. *Biophysical Journal*, 91:4589-4597, 2006.
17. Jordi Cohen, Anton Arkhipov, Rosemary Braun, and Klaus Schulten. Imaging the migration pathways for O<sub>2</sub>, CO, NO, and Xe inside myoglobin. *Biophysical Journal*, 91:1844-1857, 2006.
16. Deyu Lu, Aleksei Aksimentiev, Amy Y. Shih, Eduardo Cruz-Chu, Peter L. Freddolino, Anton Arkhipov, and Klaus Schulten. The role of molecular modeling in bionanotechnology. *Physical Biology*, 3:S40-S53, 2006.
15. Peter L. Freddolino\*, Anton Arkhipov\*, Steven B. Larson, Alexander McPherson, and Klaus Schulten. Molecular dynamics simulations of the complete satellite tobacco mosaic virus. *Structure*, 14:437-449, 2006.
14. Amy Y. Shih, Anton Arkhipov, Peter L. Freddolino, and Klaus Schulten. Coarse grained protein-lipid model with application to lipoprotein particles. *Journal of Physical Chemistry B*, 110:3674-3684, 2006.
13. A. S. Arkhipov, G. E. Astrakharchik, A. V. Belikov, and Y. E. Lozovik. Ground-state properties of a one-dimensional system of dipoles. *JETP Letters*, 82:39-43, 2005.

12. A. S. Arkhipov, Yu. E. Lozovik, V. I. Man'ko, and V. A. Sharapov. Center-of-mass tomography and probability representation of quantum states for tunneling. *Theoretical and Mathematical Physics* 142:311-323, 2005.
11. A. S. Arkhipov and V. I. Manko. Quantum transitions in the center-of-mass tomographic probability representation. *Physical Review A* 71:012101, 2005.
10. A. S. Arkhipov, E. A. Burovski, and I. Ya. Polishchuk. A self-consistent modeling of the leakage current through thin oxides. *Proc. SPIE Int. Soc. Opt. Eng.* 5401:620-628, 2004.
9. A. S. Arkhipov and V. I. Man'ko. Relativistic Systems and Their Evolution in Quantum Tomography. *Journal of Russian Laser Research* 25:468-476, 2004.
8. A. S. Arkhipov, Yu. E. Lozovik, and V.I. Man'ko. Center of mass tomography for reconstructing quantum states of multipartite systems. *Physics Letters A* 328:419-431, 2004.
7. Yu. E. Lozovik, V. A. Sharapov, and A. S. Arkhipov. Simulation of tunneling in the quantum tomography approach. *Physical Review A* 69:022116, 2004.
6. A. S. Arkhipov and Yu. E. Lozovik. Quantum tomography as a new approach to simulating quantum processes. *JETP* 98:231-239, 2004.
5. A. S. Arkhipov and Yu. E. Lozovik. New method of quantum dynamics simulation based on the quantum tomography. *Physics Letters A* 319:217-224, 2003.

4. A. S. Arkhipov, Yu. E. Lozovik, and V. I. Man'ko. Tomography for several particles with one random variable. *Journal of Russian Laser Research* 24:237-255, 2003.
3. Yu. E. Lozovik, A.V. Filinov, and A. S. Arkhipov. Tunneling of interacting particles through the potential barriers: computer simulation by quantum molecular dynamics method. *Mathematical Modeling* 15:18-36, 2003 (in Russian).
2. Yu. E. Lozovik, A.V. Filinov, and A. S. Arkhipov. Tunneling of interacting identical particles. In *Progress in Nonequilibrium Greens functions*, volume 2, ed. by M. Bonitz (World Scientific, Singapore), 2003.
1. Yu. E. Lozovik, A.V. Filinov, and A. S. Arkhipov. Simulation of wave packet tunneling of interacting identical particles. *Physical Review E* 67:026707, 2003.

## **CONFERENCE PRESENTATIONS AND TALKS**

### TALKS

Advances in Large-scale, Long-time Biomolecular Modeling with NAMD. TeraGrid 2009, June 2009, Arlington, VA.

4Pi Microscopy for Fluorescence Microphotolysis and Correlation Spectroscopy. Biophysical Society Annual Meeting, February 2008, Long Beach, CA.

Visualizing How Viruses Infect Cells. Beckman Foundation Board Meeting 2007. April 2007, Beckman Institute, Urbana, IL.

Stability and Dynamics of Virus Capsids Described by Coarse-Grained Modeling. Biophysical Society Annual Meeting, March 2007, Baltimore, MD.

Center of mass tomography and probability representation of quantum states for tunneling. International conference "Classical and Quantum Integrable Systems". January 2004, Dubna, Russia.

A self-consistent modeling of the leakage current through thin oxides. International conference "*Micro and Nanoelectronics 2003*". October 2003, Zvenigorod, Russia.

#### POSTER PRESENTATIONS

Conformational Diversity of the Epidermal Growth Factor Receptor and Models of its Dimer States. Anton Arkhipov, Yibing Shan, Nicholas F. Endres, Michael P. Eastwood, John Kuriyan, and David E. Shaw. FASEB Summer Research Conference "Protein Kinases and Protein Phosphorylation", July 2011, Snowmass Village, CO.

Coarse-grained Simulations and AFM Nanoindentation Experiments on a Hepatitis B Virus Capsid. Anton Arkhipov, Wouter H. Roos, Gijs J. L. Wuite, Klaus Schulten. Biophysical Society Annual Meeting, March 2009, Boston, MA.

Multiscale Simulations of Membrane Tubulation by BAR Domains. Ying Yin, Anton Arkhipov, Klaus Schulten. Biophysical Society Annual Meeting, February 2008, Long Beach, CA.

Simulation of Protein Translocation in a Growing Flagellum. Zhongzhou Chen, Peter L. Freddolino, Anton Arkhipov, Klaus Schulten. Biophysical Society Annual Meeting, February 2008, Long Beach, CA.

Assembly of Lipoproteins Revealed by Coarse-Grained Molecular Dynamics Simulations. Amy Shih, Peter L. Freddolino, Anton Arkhipov, Klaus Schulten. Biophysical Society Annual Meeting, March 2007, Baltimore, MD.

Coarse-Grained Molecular Dynamics Simulations of Rotation-Induced Structural Transitions in Bacterial Flagellum. Peter L. Freddolino, Anton Arkhipov, Klaus Schulten. Biophysical Society Annual Meeting, March 2007, Baltimore, MD.

Simulation of Protein Translocation in a Growing Flagellum. Zhongzhou Chen, Peter L. Freddolino, Anton Arkhipov, Klaus Schulten. Biophysical Society Annual Meeting, March 2007, Baltimore, MD.

Oxygen Pathways in Myoglobin. Anton Arkhipov, Jordi Cohen, Rosemary Braun, Klaus Schulten. Biophysical Society Annual Meeting, February 2006, Salt Lake City, UT.

Molecular Dynamics Simulations of the Complete Satellite Tobacco Mosaic Virus. Peter L. Freddolino, Anton Arkhipov, Steven B. Larson, Alexander McPherson, Klaus Schulten. Biophysical Society Annual Meeting, February 2006, Salt Lake City, UT.

A Coarse-Grained Protein-Lipid Model with Application to High-Density Lipoprotein Particles. Amy Y. Shih, Anton Arkhipov, Peter L. Freddolino, and Klaus Schulten. Biophysical Society Annual Meeting, February 2006, Salt Lake City, UT.

## **TEACHING**

2005-2009: Co-author of the tutorial “Shape-Based Coarse Graining” and the Myoglobin Case Study for Computational Biophysics Workshops and Graduate course “Biological Physics.” Theoretical and Computational Biophysics Group, Beckman Institute and Department of Physics, University of Illinois at Urbana-Champaign.  
<http://www.ks.uiuc.edu/Training/>

Spring 2005: Instructor. Computational Biophysics Workshop (Lake Tahoe, CA).  
<http://www.ks.uiuc.edu/Training/>

Fall 2004: Teaching Assistant. Undergraduate course “Optics”, Department of Physics, University of Illinois at Urbana-Champaign.