

Jeffrey R Comer

PERSONAL	<i>Address:</i> 1110 W Green Street Urbana, Illinois 61801	<i>Email:</i> jcomer2@illinois.edu <i>Phone:</i> 217.244.1774	
EDUCATION	PhD Physics University of Illinois, Urbana, Illinois, USA Thesis: <i>Nanopore Technology for DNA Sequencing</i> Thesis advisor: Aleksei Aksimentiev		2005 – 2010
	BS Physics University of Akron, Akron, Ohio, USA Honors: <i>summa cum laude</i> Minors: Computer Science and Mathematics		2001 – 2005
RESEARCH AREA	Theoretical and Computational Biophysics Research Interests: method development for modeling biotechnology over broad spatial and temporal scales, hybrid inorganic/biological systems at the nanoscale, DNA transport, DNA–protein assemblies, DNA sequence recognition, biomimetics		
RESEARCH EXPERIENCE	University of Illinois , Urbana, Illinois, USA <i>Research Assistant</i> , Department of Physics (Advisor: Aleksei Aksimentiev) <i>Postdoctoral Researcher</i> , Department of Physics (Advisor: Aleksei Aksimentiev)	2006 – 2010 2010 – present	
	<ul style="list-style-type: none">Worked with experimentalists to model nanopore force spectroscopy of hairpin DNA and DNA–protein assemblies in all-atom molecular dynamics.Computed 3D PMF maps from umbrella sampling in all-atom MD. Implemented atomic resolution Brownian dynamics model using these PMF maps in C++/OpenMP. Analyzed source of sequence-dependent ion current in nanopores containing DNA using this model.Demonstrated sequence-dependent rates of DNA transport through nanopores.Designed and implemented multiscale model of transport of molecules through nanochannels.		
	University of Akron , Akron, Ohio, USA <i>Research Assistant</i> , Department of Physics (Advisor: Rex Ramsier)		2002 – 2005
	<ul style="list-style-type: none">Studied the binding of organophosphates to metal oxides surfaces by FTIR.Analyzed and theoretically modeled scanning probe oxidation of metal oxide and nitride surfaces.		
TECHNICAL SKILLS	<ul style="list-style-type: none">Expert in molecular dynamics package NAMD (5 years)Expert in visualization and analysis package VMD (5 years)Programming: C++, Java, Matlab, Tcl/Tk, Bash, PerlParallel programming: C++ with OpenMP and MPIGraphics and Documents: Adobe Creative Suite, Blender, L^AT_EX, MS Word		
OTHER SKILLS	<ul style="list-style-type: none">Fluency in Spanish; proficiency in Italian, FrenchCoauthored a number of successful proposals for funding and computer time from agencies such as National Institutes of Health, National Science Foundation, and Department of Energy		
JOURNAL ARTICLES	<ol style="list-style-type: none">17. Venkatesan B, Polans J, Comer J, Sridhar S, Wendell D, Aksimentiev A, Bashir R (2011) Lipid bilayer coated Al₂O₃ nanopore sensors: Towards a hybrid biological solid-state nanopore. <i>Biomed Microdevices</i> doi: 10.1007/s10544-011-9537-3.16. Carr R, Comer J, Ginsberg MD, Aksimentiev A (2011) Modeling pressure-driven transport of proteins through a nanochannel. <i>IEEE Tran Nanotechnol</i> 10(1):75–82.15. Mirsaidov U, Comer J, Dimitrov V, Aksimentiev A, Timp G (2010) Slowing the translocation of double-stranded DNA using a nanopore smaller than the double helix. <i>Nanotechnology</i> 21:395501.		

14. Timp W, Mirsaidov U, Wang D, **Comer J**, Aksimentiev A, Timp G (2010) Nanopore sequencing: Electrical measurements of the code of life. *IEEE Tran Nanotechnol* 9(3):281–294.
13. Dorvel B, Sigalov G, Zhao Q, **Comer J**, Dimitrov V, Mirsaidov U, Aksimentiev A, Timp G (2009) Analyzing the forces binding a restriction endonuclease to DNA using a synthetic nanopore. *Nucl Acids Res* 37:4170–4179.
12. Aksimentiev A, Brunner R, Cruz-Chu ER, **Comer J**, Schulten K (2009) Modeling transport through synthetic nanopores. *IEEE Nanotechnology Magazine* 3:20–28.
11. **Comer J**, Dimitrov V, Zhao Q, Timp G, Aksimentiev A (2009) Microscopic mechanics of hairpin DNA translocation through synthetic nanopores. *Biophys J* 96(2):593–608.
10. Sigalov G, **Comer J**, Timp G, Aksimentiev A (2008) Detection of DNA sequence using an alternating electric field in a nanopore capacitor. *Nano Lett* 8:56–63.
9. Zhao Q, **Comer J**, Dimitrov V, Aksimentiev A, Timp G (2008) Stretching and unzipping nucleic acid hairpins using a synthetic nanopore. *Nucl Acids Res* 36(5):1532–1541.
8. Farkas N, **Comer J**, Zhang G, Evans E, Ramsier R, Dagata J (2005) SPM oxidation and parallel writing on zirconium nitride thin films. *J Vac Sci Technol A* 23:846.
7. Farkas N, **Comer J**, Zhang G, Evans E, Ramsier R, Dagata J (2005) High-voltage SPM oxidation of ZrN: materials for multiscale applications. *Nanotechnology* 16:262–266.
6. Farkas N, **Comer J**, Zhang G, Evans E, Ramsier R, Wight S, Dagata J (2004) Parallel writing on zirconium nitride thin films by local oxidation nanolithography. *Appl Phys Lett* 85:5691.

BOOK CHAPTERS

5. **Comer J**, Wells DB, Aksimentiev A (2011) Modeling nanopores for sequencing DNA. In *Protocols in DNA nanotechnology*. Humana Press. ISBN 978-1-61779-141-3.
4. **Comer J**, Aksimentiev A (2011) Nanopore force spectroscopy: Insights from molecular dynamics simulations. In *Nanopores: Sensing and Fundamental Biological Interactions*. Springer Science and Business Media, LLC. ISBN 978-1-4419-8251-3.
3. Timp G, Mirsaidov U, Timp W, Shim J, Wang D, Dimitrov V, Scrimgeour J, Lin C, **Comer J**, Ho HY, Zou X, Aksimentiev A, Schulten K (2011) 3rd generation DNA sequencing with a nanopore. In *Nanopores: Sensing and Fundamental Biological Interactions*. Springer Science and Business Media, LLC. ISBN 978-1-4419-8251-3.
2. Aksimentiev A, Brunner R, Cohen J, **Comer J**, Cruz-Chu E, Hardy D, Rajan A, Shih A, Sigalov G, Yin Y, Schulten K (2008) Computer modeling in biotechnology: a partner in development. In *Nanostructure Design: Methods and Protocols*, pages 181–234. Humana Press. doi: 10.1007/978-1-59745-480-3_11. ISBN 978-1-934115-35-0.
1. Shepard M, **Comer J**, Young T, McNatt J, Espe M, Ramsier R, Robinson T, Nelson L (2004) Organophosphate adsorption on metal oxide surfaces. In *Silanes and Other Coupling Agents*, Vol. 3, pages 225–240. VSP: Leiden. ISBN 978-90-67-64404-4.

OTHER PUBLICATIONS

- **Comer J**, Aksimentiev A (2007). Bionanotechnology tutorial. URL: <http://www.ks.uiuc.edu/Training/Tutorials/nanobio/tutorial-html/index.html>.
- Timp W, Timp G, Mirsaidov U, Aksimentiev A, **Comer J** (2009) Polynucleotide sequencing by solid-state nanopassages. *Provisional patent application* 61/287,974.

PRESENTATIONS

- “Mechanics of DNA in Synthetic Nanopores,” *Invited Talk, Winterhalter Group*, Bremen, Germany, Sep. 2008.
- “Fractional kinetics in atomic force microscope assisted oxidation of zirconium nitride,” *Materials Research Society 2004 Fall Meeting*, Boston, Massachusetts, Nov. 2004.