

# Joshua N. Horn

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## Interests

- Biophysical mechanism of membrane-targeting antimicrobial lipopeptides and peptides
- Multiscale molecular dynamics simulations of biomolecules
- Structure and dynamics of membranes and membrane proteins
- Bioinformatics and computational methods for biological research and data analysis
- Effective and practical science education practices for post-secondary education

## Education

- *University of Rochester*, Rochester, New York, 2008 - Present  
M.S. in Biophysics, 2010  
Ph.D. expected, July 2013
- *Rochester Institute of Technology*, Rochester, New York, 2004-2008  
B.S. in Bioinformatics, 2008

## Research Experience

- Doctoral Research, Department of Biochemistry and Biophysics, University of Rochester  
June 2008 - Present  
Adviser: Dr. Alan Grossfield
- Part-time Bioinformatics Research, UCB-Group Pharmaceutical  
Spring 2008
- Summer Scholars Research Experience for Undergraduates, University of Rochester  
Summer 2007  
Adviser: Dr. David Mathews

## Publications

1. Horn, J. N., Kao, T-C, and Grossfield, A., *Coarse-grained Molecular Dynamics Provides Insight into the Interactions of Lipids and Cholesterol with Rhodopsin*, in *G Protein-Coupled Receptor Modeling and Simulation*, ed. Marta Filizola, Springer, 2013. (*accepted*)
2. Horn, J. N., Sengillo, J. D., Lin, D., Romo, T. D., and Grossfield, A., *Characterization of a potent antimicrobial lipopeptide via coarse-grained molecular dynamics*, *Biochimica et Biophysica Acta (BBA) – Biomembranes*, Volume 1818, Issue 2, February 2012, 212-218.

## Teaching Experience and Training

- *Adjunct Faculty (Chemical Principles I Laboratory)*  
Rochester Institute of Technology (Fall Quarter, 2012)
- *Rochester Scholars Educator*  
Developed and taught “Bytes and Biology,” a week-long pre-college course in summer of 2012
- *Guest Lecturer (Biochemistry: Conformation and Dynamics course)*  
Rochester Institute of Technology (April 23, 24 and October 12, 2012)
- *Student in “Graduate Experience in Science Education”*  
Training and development course offered by the University of Rochester
- *Teaching Assistant: Advanced Biochemistry*  
University of Rochester  
Fall semester, 2009 and 2011

## Awards and Honors

- William Neuman Award in Biophysics, 2012
- Student Seminar Award in Biophysics, 2010 and 2011
- Best Presentation of Session 2, RIT Graduate Research and Creativity Symposium, 2012
- Best Poster, University of Rochester's Center for Integrated Research Computing Session, 2012
- NIH T32 Training Grant Award (2T32GM068411-06), 2010-2011

## Service and Outreach

- Referee for a special issue of Chemistry and Physics of Lipids, due out 2013.
- **Statistics in Molecular Dynamics Simulations.** Presentation to AP Statistics classes at Athena High School, Greece, NY. (Jan 19, Feb 10, and Dec 19, 2012)
- **Computers and Biology: A Look at Computation in Biological Research.** Presentation to AP Biology and AP Computer Science classes at Greensburg Salem High School, Greensburg, PA. (March 8, 2010 and March 23, 2012)

## Presentations and Presented Posters

- **Molecular Dynamics Simulation: Exploring Antimicrobial Lipopeptides at the Atomic Level.** Rochester Academy of Science, St. John Fisher College. (Nov 10, 2012)
- **Using Molecular Dynamics Simulation to Probe Protein and Peptide Dynamics.** Annual Graduate Research and Creativity Symposium, Rochester Institute of Technology. (July 17, 2012)
- **Elucidating Antimicrobial Lipopeptide Action via Combined Coarse-grained and All-atom Molecular Dynamics.** Poster at Biophysical Society Meeting, San Diego, CA. (2012)
- **Characterizing GPCR-Lipid Interactions Using Multiscale Molecular Dynamics.** Biochemistry and Molecular Biology (BMB) Program Retreat, University of Rochester. (Jan 12, 2012)
- **Characterization of Potent Antimicrobial Lipopeptide via All-Atom and Coarse-Grained Molecular Dynamics.** Poster at Biophysical Society Meeting, Baltimore, MD. (2011)
- **Binding of Antimicrobial Lipopeptides To Lipid Bilayers Characterized By Microsecond Molecular Dynamics Simulations.** Poster presented by A. Grossfield at Biophysical Society Meeting, San Francisco, CA. (2010)

## Invited Talks

- **Molecular Dynamics Simulation: Exploring Antimicrobial Lipopeptides at the Atomic Level.** Chemistry Program Seminar, Rochester Institute of Technology. (Sept 19, 2012)
- **Characterizing Antimicrobial Lipopeptides with Coarse-grained Molecular Dynamics Simulation.** NIH sponsored T32 Retreat in Cellular, Biochemical and Molecular Sciences, University of Rochester. (March 28, 2012)
- **Molecular Dynamics Simulations and Antimicrobial Lipopeptides.** Science Colloquium, Houghton College. (Sept 20, 2011)

## Poster Abstracts

1. Joshua N. Horn, Jesse D. Sengillo, Alan Grossfield. *Elucidating Antimicrobial Lipopeptide Action via Combined Coarse-Grained and All-Atom Molecular Dynamics*. Biophysical Journal, Volume 102, Issue 3, Supplement 1, 31 January 2012, Page 92a.
2. Dejun Lin, Joshua N. Horn, Alan Grossfield. *Estimating the Free Energy to Bind a Potent Antimicrobial Lipopeptide to a Model Membrane Bilayer*. Biophysical Journal, Volume 102, Issue 3, Supplement 1, 31 January 2012, Page 92a.
3. Tod D. Romo, Joshua N. Horn, Denise V. Greathouse, Alan Grossfield. *Characterization of Membrane Interactions with Lactoferricin Peptides by Both All-Atom and Coarse-Grained Molecular Dynamics Simulations, Solid-State NMR, and Fluorescence Spectroscopy*. Biophysical Journal, Volume 102, Issue 3, Supplement 1, 31 January 2012, Page 77a.
4. Joshua N. Horn, Jesse Sengillo, Alan Grossfield. *Characterization of Potent Antimicrobial Lipopeptide via All-Atom and Coarse-Grained Molecular Dynamics*. Biophysical Journal, Volume 100, Issue 3, Supplement 1, 2 February 2011, Page 497a.
5. Joshua N. Horn, Tod D. Romo, Michael C. Pitman, Alan Grossfield. *Binding of Antimicrobial Lipopeptides To Lipid Bilayers Characterized By Microsecond Molecular Dynamics Simulations*. Biophysical Journal, Volume 98, Issue 3, Supplement 1, January 2010, Page 81a.