

## REBECCA FAYE ALFORD

CARNEGIE MELLON UNIVERSITY, SMC 2858, 5000 FORBES AVE, PITTSBURGH, PA 15289

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### EDUCATION

Carnegie Mellon University <i>B.S. Chemistry, Concentration: Computational Chemistry</i>	Pittsburgh, PA May 2016
The Johns Hopkins University <i>Visiting Undergraduate - Chemical &amp; Biomolecular Engineering</i>	Baltimore, MD May 2013–Present

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### RESEARCH EXPERIENCE

NIH Undergraduate Research Fellow, The Johns Hopkins University <i>Advisor: Dr. Jeffrey J. Gray</i> Topic: Computational modeling of membrane proteins	2013–Present
Software Engineering Intern, Spatial4j <i>Advisor: David Smiley</i> Topic: Modeling of geodesic shapes in object-oriented Spatial4j	Spring 2014
High School Research Assistant, New York University <i>Advisors: Dr. Richard Bonneau</i> Topic: Prediction of deleterious protein variants using structure prediction	2011–2013
High School Research Assistant, Stony Brook University <i>Advisor: Dr. Maurice Kernan</i> Topic: Characterization of TRPM ion channel function in <i>Drosophila</i>	2009–2010

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### PUBLICATIONS

3. Bough EH, Simmons-Elder R, Muller C, **Alford RF**, Volovsky N, Lash A, Bonneau R (2015) "Structural modeling improves classification and interpretation of deleterious protein variation," *Under Review*
  2. **Alford RF\***, Koehler Leman J\*, Weitzner BD, Duran AM, Tilley DC, Elazar A, Gray JJ (2015) "An integrated framework for computational modeling and design of membrane proteins," *PLoS Comput. Biol.* In press. (\* equal contribution authors)
  1. Pope WH, Bowman CA, Russell DA, Jacobs-Sera D, Asai DJ, Cresawn SG, Jacobs WR, Hendrix RW, Lawrence JG, Hartfull GF, **SEA-PHAGES**, PHIRE (2015) "Whole genome comparison of a large collection of mycobacteriophages reveals a continuum of phage genetic diversity variation" *eLife*, 4, 1-65. \*Full author listing in manuscript. Contribution – Isolated and characterized a novel phage computationally and experimentally
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### TEACHING EXPERIENCE

Co-Instructor, Rosetta REU Boot Camp: <i>An intense crash course to developing in Rosetta</i>	UNC, Spring 2015
Co-Instructor, Rosetta Boot Camp: <i>An intense crash course to developing in Rosetta</i>	UNC, Spring 2014
Co-Developer and Co-Instructor, ThinkTech: <i>A computational thinking course for middle school girls</i>	CMU, Fall 2014–Present

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### SCIENTIFIC LEADERSHIP

Assistant Organizer, Rosetta REU Program First virtual REU community. Assisted with admissions and adjusted boot camp materials for the undergraduate level	2015
High school research mentor Mentor to six high school student researchers interested in computational structural biology and bioinformatics	2011–Present
Organizer, Rosetta @ Grace Hopper Attended Grace Hopper for first time as Rosetta Organization. Created career fair materials, poster, and served as contact point for conference logistics	Fall 2014

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## SCIENTIFIC TALKS

3. Alford RF, Baugh EH, Gray JJ (2014) “Real-time visualization of Rosetta membrane simulations using the PyMOL viewer” *Rosetta Developer’s Meeting*, Seattle, WA.
2. Alford RF, Koehler Leman J, Weitzner BD, Gray JJ (2014) “RosettaMP - An object-oriented framework for modeling and design of membrane proteins in Rosetta” *Rosetta Developer’s Meeting*, San Francisco, CA
1. Alford RF (2013) “The Dream Machine” *TEDxCMU*, Pittsburgh, PA.

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## SCIENTIFIC POSTERS

8. Alford RF, Fleming P, Fleming KG, Gray JJ (2015) “Toward an all-atom energy function for scoring in membrane environments of diverse lipid composition” *Rosetta Conference*, Leavenworth, WA.
7. Alford RF, Koehler Leman J, Gray JJ (2015) “Validation of an intrinsic lipid bilayer model in the RosettaMP framework” *Gordon Research Conference – Membrane Protein Folding*, Waltham, MA.
6. Alford RF, Koehler Leman J, Weitzner BD, Gray JJ (2014) “An integrated framework advancing membrane protein modeling and design” *Carnegie Mellon Meeting of the Minds Symposium*, Pittsburgh, PA.
5. Alford RF, Koehler Leman J, Weitzner BD, Gray JJ (2014) “A new object-oriented framework for modeling and design of membrane proteins in Rosetta” *Grace Hopper Conference for Women in Computing*, Phoenix, AZ.
4. Alford RF, Koehler Leman J, Weitzner BD, Gray JJ (2014) “A new object-oriented framework for modeling and design of membrane proteins in Rosetta” *Rosetta Conference*, Leavenworth, WA.
3. Alford RF, Koehler Leman J, Weitzner BD, Gray JJ (2014) “A new object-oriented framework for modeling and design of membrane proteins in Rosetta” *Carnegie Mellon Meeting of the Minds Symposium*, Pittsburgh, PA.
2. Alford RF, Koehler Leman J, Gray JJ (2013) “Redesigning the framework for membrane protein modeling in Rosetta” *Rosetta Conference*, Leavenworth, WA.
1. Alford RF, Simmons-Elder R, Poultney C, Halvorsen L, Bonneau R (2012) “A machine-learning based approach to predicting functional effects of mutations in membrane proteins” *Rosetta Conference*, Leavenworth, WA.

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## ACTIVITIES AND OUTREACH

Instructor and Volunteer, CMU Creative Technology Nights Weekly 2hr workshops for middle school girls designed to increase STEM exposure	2013–Present
Science Fair Judge, Plainview Old Bethpage Middle School Evaluated projects for annual 6th grade science fair	2014, 2015
Committee Member, Carnegie Mellon Women in Computer Science	2014–Present
Writer and Science Policy Director, The Triple Helix Undergraduate Journal	2013–2015
Team Captain, VisionWalk Organized teams in Long Island, NY and Pittsburgh, PA for annual walk to raise awareness for retinal disease	2012, 2013