REBECCA FAYE ALFORD

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
B.S. Chemistry, Concentration: Computational Chemistry — *May 2016*

The Johns Hopkins University — Baltimore, MD
Visiting Undergraduate - Chemical & Biomolecular Engineering — *May 2013–Present*

RESEARCH EXPERIENCE

NIH Undergraduate Research Fellow, The Johns Hopkins University — 2013–Present
Advisor: Dr. Jeffrey J. Gray
Topic: Computational modeling of membrane proteins

Software Engineering Intern, Spatial4j — Spring 2014
Advisor: David Smiley
Topic: Modeling of geodesic shapes in object-oriented Spatial4j

High School Research Assistant, New York University — 2011–2013
Advisors: Dr. Richard Bonneau
Topic: Prediction of deleterious protein variants using structure prediction

High School Research Assistant, Stony Brook University — 2009–2010
Advisor: Dr. Maurice Kernan
Topic: Characterization of TRPM ion channel function in Drosophila

PUBLICATIONS

3. Baugh 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*

SELECTED HONORS AND AWARDS

NIH Undergraduate Research Fellowship	2013–Present
Dean's List High Honors	Fall 2014, Spring 2014, Spring 2015
Mellon College of Science – Ruth Welch Walker Scholarship	2013–Present
Grace Hopper Celebration of Women in Computing - Scholar	2014
Selected Student Speaker - TEDxCMU	2013
Best in Biochemistry - Intel International Science and Engineering Fair	2012
National Semifinalist - Intel Science Talent Search	2012
NASA Max Carpenter Award for Promise in Science and Engineering	2010

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.

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-orieented 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-orieented 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-orieented 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.

TEACHING EXPERIENCE

Co-Instructor, Rosetta REU Boot Camp — Spring 2015
A course on developing in Rosetta for undergraduate students — Chapel Hill, NC

Co-Instructor, Rosetta Boot Camp — Spring 2014
A course on developing in Rosetta for graduate students and postdocs — Chapel Hill, NC

Co-Developer and Co-Instructor, ThinkTech — Fall 2014–Present
A computational thinking course for middle school girls — Pittsburgh, PA

SCIENTIFIC LEADERSHIP

Assitant Organizer, Rosetta REU Program — 2015
First REU supported by a virtual community. Assited with admissions and adjusted boot camp materials for the undergraduate level

High school research mentor — 2011–Present
Mentor to six high school research students interested in computational structural biology and bioinformatics

Organizer, Rosetta @ Grace Hopper — Fall 2014
Attended Grace Hopper for first time as Rosetta Organization. Created career fair materials, poster, and served as contact point for conference logisitcs

ACTIVITIES AND OUTREACH

Instructor and Volunteer, CMU Creative Technology Nights 2013–Present
Weekly 2hr workshops for middle school girls designed to increase STEM exposure

Science Fair Judge, Plainview Old Bethpage Middle School 2014, 2015
Evaluated projects for annual 6th grade science fair

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 2012, 2013
Organized teams in Long Island, NY and Pittsburgh, PA for annual walk to raise awareness for retinal disease