Brian Koepnick

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Education

University of Washington, Seattle, WA — **Present**
Ph.D. in Biochemistry, with David Baker (in progress)

Wake Forest University, Winston-Salem, NC — **May 2012**
Bachelor of Science – Biochemistry and Computer Science

North Carolina School of Science and Math, Durham, NC — **June 2008**

Research Experience

Graduate Student, University of Washington (David Baker, Ph.D.) — **2012 – present**
Development of protein design tools for citizen scientist Foldit players
Analysis and characterization of *de novo* designed proteins by Foldit players

Lab Assistant, Wake Forest University (Rebecca Alexander, Ph.D.) — **2011 – 2012**
MD simulations of correlated motions in methionyl-tRNA synthetase
Protein engineering and *in vitro* kinetics studies with radiolabeled ^{35}S-methionine

Research Intern, NC Central University (Darlene Taylor, Ph.D.) — **2007 – 2008**
Synthesis of small organic compounds (polyphenylene dimers)
Characterization of organic compounds by LC/MS, IR, NMR spectroscopy
Theoretical HOMO-LUMO band gap calculations

Publications

Brian Koepnick, Jeff Flatten, Tamir Husain, Alex Ford, Daniel Adriano Silva, Matt Bick, Aaron Bauer, Foldit players, Zoran Popović, Firas Khatib, Seth Cooper, David Baker. De novo design of stable proteins by citizen scientists. [*In preparation*]

Lorna Dsilva, Shubhi Mittal, **Brian Koepnick**, Jeff Flatten, Seth Cooper, Scott Horowitz. Creating custom Foldit puzzles for teaching biochemistry. [*Submitted*]

Scott Horowitz*, **Brian Koepnick***, Raoul Martin*, Agnes Tymieniecki, Amanda A Winburn, Seth Cooper, Jeff Flatten, David S Rogawski, Nicole M Koropatkin, Tsinatkeab T Hailu, Neha Jain, Philipp Koldewey, Logan S Ahlstrom, Matthew R Chapman, Andrew P Sikkema, Meredith A Skiba, Finn P Maloney, Felix R M Beinlich, Foldit Players, University of Michigan students, Zoran Popovic, David Baker, Firas Khatib, and James C A Bardwell. Determining crystal structures through crowdsourcing and coursework. *Nature Communications* **2016**, 7, 12549.

Brian D. Koepnick, Jeremy S. Lipscomb, Darlene K. Taylor. Effect of substitution on the optical properties and HOMO-LUMO gap of oligomeric polyphenylenes. *J. Phys. Chem. A* **2010**, *114*, 13228-13233.

*shared first authorship

Presentations

"Foldit players design proteins" Talk at RosettaCon Meeting, August 9, 2018

Foldit demonstration with Mars, Inc. and ThermoFisher Scientific, Lindau Nobel Laureate Meeting, June 25-29, 2018

"Foldit: Solve Puzzles for Science!" Suds & Science Public Talk, ASBMB Annual Meeting 2014

"Foldit players design proteins" Poster at RosettaCon Meeting, annually 2013-17

"Allosteric mechanisms in methionyl-tRNA synthetase" Poster at Symposium on RNA Biology, RNA Society of North Carolina, October 21-22, 2011

Awards & Fellowships

NSF Graduate Research Fellowship **2014 – 2019**
Five-year fellowship with three years of funding for graduate research

Hurd Fellowship, University of Washington **2012 – 2013**
One year of funding for graduate research

Reynolds Scholarship, Wake Forest University **2008 – 2012**
Four-year "full-ride" academic merit scholarship

Outreach

Foldit booths and demonstrations:

- Life Sciences Research Weekend/Curiosity Days at Pacific Science Center, Seattle, WA, annually 2013-18
- Shoreline Community College STEM Fair, annually 2015-17
- Bennett Elementary School Science Fair, annually 2014-16
- SciTech Northwest Expo, November 9, 2016
- Jane Addams Middle School STEAM Fair, June 14, 2016
- Hazel Wolf K-8 School Science Fair, April 21, 2016
- Spiritridge School Science Fair, April 20, 2016
- Bellevue STEM Career Conference, May 28, 2014

Online communications:

- Foldit blog: http://fold.it/portal/blog
- Live, scheduled Foldit "science chats": http://fold.it/portal/chats

Teaching

Teaching Assistant, Biochemistry 440, Fall 2013 & Winter 2014
Planning and supervision of weekly quiz/review section, grading exams, office hours

Skills

***In silico*:**
macOS, Linux, Windows
C/C++, Python, R, Bash, HTML
Rosetta, PyRosetta, PHENIX, HKL2000, Coot, Chimera

***In vitro*:**
Cloning in *E. coli*, PCR, Gibson assembly, site-directed mutagenesis, ligation
Protein expression and purification
SDS-PAGE, FPLC (metal affinity, size exclusion, ion exchange), circular dichroism
X-ray crystallography (data processing, molecular replacement, model building and refinement)

***In otio*:**
Ukulele, sourdough, crosswords

References

David Baker (Ph.D. advisor)
Professor
University of Washington, Department of Biochemistry
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(206) 543-1295

Seth Cooper (collaborator)
Assistant Professor
Northeastern University, College of Computer and Information Science
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Scott Horowitz (collaborator)
Assistant Professor
University of Denver, Department of Chemistry and Biochemistry
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