

# KRYSTLE J. MCLAUGHLIN

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## EDUCATION

2006-2011      **PhD, Biophysics**, University of Rochester, Rochester NY

2006            **BA, Physics**, Colgate University, Hamilton, NY

## PROFESSIONAL EXPERIENCE

2017-present    **Assistant Professor**  
Department of Chemistry, Vassar College, Poughkeepsie NY

2014-present    **Professor of Practice**  
Department of Biological Sciences, Lehigh University, Bethlehem PA

2011-2014      **Seeding Postdoctoral Innovators in Research and Education (SPIRE)**  
**Postdoctoral Scholar**  
Chemistry Department, University of North Carolina at Chapel Hill, Chapel Hill NC

## PUBLICATIONS

### Refereed Journal Articles

\*denotes equal contribution

**McLaughlin K.J.** “Understanding Structure: A Computer Based Macromolecular Biochemistry Laboratory.” *J Chem Ed* **2017** (Web Published) **DOI:** 10.1021/acs.jchemed.6b00464

Agrawal A., **McLaughlin K.J.**, Jenkins J.L., Kielkopf C.L. “A Structure-Guided U2AF<sup>65</sup> Variant Improves Recognition and Splicing of a Defective pre-mRNA.” *Proc Natl Acad Sci U S A.* **2014**, *111*(49):17420-5

**McLaughlin K.J.**, Nash R.P., Redinbo M.R. “Unique Helicase Determinants in the essential conjugative factor TraI from Salmonella typhimurium plasmid pCU1.” *J Bacteriol.* **2014**, *196*(17):3082-90

**McLaughlin K.J.**, Jenkins J.L., Kielkopf C.L. “Large Favorable Enthalpy Changes Drive Specific RNA Recognition by RNA Recognition Motif Proteins.” *Biochemistry* **2011**, *50*(9):1429-31

**McLaughlin K.J.**<sup>\*</sup>, Strain-Damerell<sup>\*</sup>, C.M., Xie, K., Brekasis, D., Soares, A.S., Paget, M.S. and Kielkopf, C.L. “Structural Basis for NADH/NAD<sup>+</sup> Redox Sensing by a Rex-Family Repressor.” *Molecular Cell* **2010**, *38*(4):563-75

Buboltz JT, Bwalya C<sup>#</sup>, **Williams K<sup>#</sup>**, Schutzer M<sup>#</sup>. “High-resolution mapping of phase behavior in a ternary lipid mixture: do lipid-raft phase boundaries depend on the sample preparation procedure?” *Langmuir* **2007**, *23*: 1968-71

### **In Preparation**

<sup>#</sup>denotes undergraduate author

Rice A.M., Warren J.A.<sup>#</sup>, Chan E. <sup>#</sup>, Botello J. <sup>#</sup>, Wang C.Y. <sup>#</sup>, McQuillan M.A., Anderson K.R., **McLaughlin K.J.**, and Miwa J.M. “Selection on lynx1 associated with vocal learning and sensitive period length in birds.” *Submitted to Proceedings of the Royal Society B—under review*

### **Invited Articles**

**McLaughlin K.J.** “Education Corner: Lysozyme, Models and the PDB: Helping Students Explore Structure.” *RCSB PDB Newsletter*, Issue 70, July 2016.

**Williams K.** "Commentary: Putting a new face on physics." *Symmetry* 2008, *5(1)*, 3.

### **RESEARCH EXPERIENCE**

2011-2014 **University of North Carolina at Chapel Hill**, Chapel Hill NC

Postdoctoral Research Associate, Department of Chemistry.

Advisor: Dr. Matthew R. Redinbo

Research focus: Structural and Biochemical Characterization of Conjugative Plasmid Transfer Proteins from *Salmonella typhimurium* and *Staphylococcus aureus*.

2007-2011 **University of Rochester**, Rochester NY

Graduate Research Assistant, Department of Biochemistry and Biophysics.

Advisor: Dr. Clara L. Kiekopf

Thesis title: Structural & Thermodynamic Analysis of Protein-Nucleic Acid Interactions

2005 **Colgate University**, Hamilton NY

Undergraduate Research Assistant, Department of Physics.

Advisor: Dr. Jeffery T. Buboltz

Research Focus: Mapping phase behavior of ternary lipid mixtures using FRET

### **HONORS AND AWARDS**

2015 NeXXt Scholars Program Mentoring Fellow, New York Academy of Sciences

2013 Postdoctoral Leadership Award, University of North Carolina at Chapel Hill

2012 George V. Metzger Award: most outstanding biophysics PhD thesis, University of Rochester

2011 Biophysics Student Seminar Award, University of Rochester

2010 Margaret C. Etter Student Lecturer Award, American Crystallographic Association

2009 William F. Neuman Award, most outstanding biophysics student, University of Rochester

2006 Physics and Astronomy Department Founders Award, Colgate University

2006 Society of Physics Students National Leadership Award, Society of Physics Students

## GRANTS AND FELLOWSHIPS

### Research Grants

- 2016 **Summer Mountaintop Experience Research Grant**, Lehigh University  
Co-PI: Dr. Julie Miwa; Project Title: Exploring the Genetics of Behavioral Adaptation,  
\$31,500 to support 4 undergraduate researchers and 1 graduate student during the summer.
- 2015 **Internal Research Grant**, Department of Biological Sciences, Lehigh University  
\$12,000 awarded towards research supplies.

### Fellowships

- 2011- **Seeding Postdoctoral Innovators in Research and Education (SPIRE) Postdoctoral**  
2014 **Fellowship (NIGMS K12-GM000678)**, University of North Carolina at Chapel Hill  
Three-year NIH funded postdoctoral fellowship support for postdoctoral research,  
pedagogical training and professional development.
- 2010 **Elon Huntington Hooker Graduate Fellowship**, University of Rochester  
\$18,000 stipend awarded to three outstanding students per year engaged in chemistry research  
based on scientific merit and promise.

## SELECTED PRESENTATIONS

### Conference Activity

*20 submitted presentations since 2005, including 6 talks and 12 posters at local, regional, national and international meetings.*

“Cooperative Approaches in Introducing Undergraduates to Protein Crystallography.” (Podium)  
American Crystallographic Association (ACA) Meeting. New Orleans, LA. May 2017

“The BioSFilm Festival: A Collaborative Multimedia Learning Assignment” (Podium)  
Symposium on Teaching and Learning. Lehigh University. April 2017

“Towards Structural Characterization of Novel Bacteriophage Proteins.” (Podium) First African  
Light Source Conference and Workshop. Grenoble, France. 2015

“Unique Helicase Determinants in the essential conjugative factor TraI from *Salmonella typhimurium* plasmid pCU1.” (Poster) American Crystallographic Association Meeting.  
Albuquerque, NM. 2014

“Structural and Biochemical Analysis of the TraI DNA Helicase.” (Poster) IRACDA,  
Philadelphia, PA. 2012.

“Mechanism of NADH/NAD<sup>+</sup> Sensing by the Redox Sensing Repressor, Rex.” (Podium)  
American Crystallographic Association (ACA) Meeting. Chicago, IL. July 2010

“Turning Up the Heat: Unusually Large Enthalpy Drives RNA Recognition by RNA Recognition

Motif (RRM)-Containing Proteins.” (Poster) Bi-annual Cold Spring Harbor Laboratory RNA Processing Meeting. Cold Spring Harbor, NY. 2009

“Thermodynamic Characteristics of pre-mRNA Splice Site Recognition.” (Poster) Biophysical Society Meeting. Boston, MA. 2008

### **Invited and Departmental Talks**

“Active learning in the undergraduate classroom: what, why, and how?” Biological Sciences Seminar Series, Lehigh University. Bethlehem PA. 2015

“Structural and Biochemical Analysis of Protein-Nucleic Acid Interactions.” North Carolina A&T State University. Greensboro NC, 2012

“Structural and Biophysical Basis for Protein-Nucleic Acid Recognition during Gene Regulation.” Colgate University. Hamilton NY, 2010

### **TEACHING EXPERIENCE**

#### **Vassar College**

Protein Chemistry (Fall 2017)

General Chemistry (Lab) (Fall 2017)

Biochemistry (Spring 2018)

Biochemistry (Lab) (Spring 2018)

#### **Lehigh University**

Biology Core I: Cell and Molecular (Spring 2015 & 2016, Summer 2016)

Biology Core II: Genetics (Fall 2014, 2015 & 2016)

Biochemistry Lab (Fall 2014, 2015 & 2016)

Advanced Genetics Lab (Spring 2015 & 2016)

#### **University of North Carolina at Pembroke**

Principles of Biology (Spring 2013)

#### **University of Rochester**

Advanced Biochemistry (as Teaching Assistant) (Fall 2007)

### **PEDAGOGICAL AND PROFESSIONAL DEVELOPMENT**

#### **Workshops Organized/Facilitated**

##### Lehigh University

“Inclusive Teaching.” Faculty workshop. (2015)

“Strategies for Active Learning in the Classroom.” Graduate Student workshop (2014 & 2015)

##### University of North Carolina at Pembroke

“Preparing for Independent Research.” Undergraduate Student Workshop (2013)

- “Making the Most of Conferences.” Undergraduate Student Workshop (2013)  
“Keys to a Successful Summer Internship.” Undergraduate Student Workshop (2013)

### **Pedagogical Training**

- National Center for Case Study Teaching in Science Summer Workshop (2016)  
Association for Biology Laboratory Education (ABLE) Workshop and Meeting (2015)  
HHMI Biosystems Dynamics Summer Institute Mentoring Workshop (2015)  
Inclusive Teaching Workshop, Lehigh University (2015)  
Diversity, Inclusion and Engagement Workshop- Cornell Interactive Theatre Ensemble (2014)  
POGIL (Process Oriented Guided Inquiry Learning) Workshop, SPIRE UNC Chapel Hill (2013)  
NeXXt Scholars Program Mentor Training, New York Academy of Sciences (2013)  
Lesson Planning Workshop, SPIRE UNC Chapel Hill (2013)  
Diversity Training- UNC Chapel Hill Office of Diversity and Multicultural Affairs (2012)  
Effective Teaching: A Workshop (Drs. Felder and Brent), UNC Chapel Hill (2012)  
Teaching with Technology Workshop, SPIRE UNC Chapel Hill (2012)  
Becoming an Effective Mentor, UNC Chapel Hill (2012)  
SPIRE Seminar on College Teaching (10 weeks)(2012)

### **SERVICE TO PROFESSION**

#### **Offices Held**

- 2017- Member, Communication Committee, American Crystallographic Association  
2015- Chair, Society of Physics Students Awards Committee 1  
2015- Secretary, BioMacromolecules SIG- American Crystallographic Association  
2015- Member, Steering Committee for the African Synchrotron Light Source  
2013- American Crystallographic Association Delegate- American Institute of Physics Liaison Committee on Under-Represented Minorities (LCURM)

#### **Conference Sessions Organized/Chaired**

- American Crystallographic Association Annual Meeting:  
Diversity and Inclusion Session- 2015, 2016 & 2017  
Society of Physics Students Undergraduate Reception- 2014, 2015, 2017

### **DEPARTMENTAL/UNIVERSITY SERVICE**

- 2017- Secretary, Chemistry Department, Vassar College  
2015- Department of Biological Sciences Undergraduate Committee, Lehigh University  
2015- Faculty Athletics Council, Lehigh University

### **COMMUNITY INVOLVEMENT/OUTREACH**

- 2016- Director, PA DNA Day. Organized an outreach program that allows young scientists to go to high schools to talk about genetics with students

2013 Volunteer, North Carolina Science Festival- Visited Southern Middle School in rural Roxboro NC and met with four 7<sup>th</sup> grade science classes

### **EXTRACURRICULAR UNIVERSITY SERVICE.**

Faculty Advisor, Lehigh University African Caribbean Cultural Club (2014-)  
Panelist, SophoMORE Connections Science Research Panel, Colgate University (2014 & 2015)  
Chair, UNC Chapel Hill Minority Postdoc Alliance (2012- 2014)  
Chair, UNC Chapel Hill Chemistry Department Postdoctoral Association (2012- 2014)  
Summit on Women In Science Planning Committee, UNC Chapel Hill (2013)  
SPIRE Distinguished Scholar Seminar for Undergraduates Committee, UNC Chapel Hill (2012)  
Panelist, “Diversity in the Sciences at Colgate”, Colgate University (2012)  
Panelist, “Encouraging and Keeping Minorities in the Sciences”, Colgate University (2007)

### **LABORATORY TECHNIQUES AND SKILLS**

Extensive knowledge of protein crystallization techniques and software (Including crystallization robots: Crystal Phoenix & Mosquito® Crystal)  
Protein expression and purification (*E. coli* expression systems, ÄTKA FPLC systems)  
PCR: Gene cloning, subcloning, mutagenesis  
Isothermal titration calorimetry (Microcal VP-ITC and Auto-iTC200)  
Fluorescence spectroscopy: DNA/RNA binding assays, ATPase assays  
Gel electrophoresis: SDS-PAGE, electrophoretic mobility shift assays  
Surface plasmon resonance (Reichert SR7000, Biacore T100, Biacore X)  
RNA and DNA preparation  
Bacterial conjugation assays

### **PROFESSIONAL MEMBERSHIPS**

American Crystallographic Association  
American Chemical Society  
American Association for the Advancement of Science  
Biophysical Society