

CHRYSTAL STARBIRD, Ph.D.

Yale University
Department of Pharmacology
840 West Campus Drive, Rm 367
West Haven, CT 06515

chrystal.starbird@yale.edu
Office (203) 737-6736
Cell (203) 214-2363

Education

Vanderbilt University, PhD , Chemical and Physical Biology	August 2011 – August 2017
University of North Carolina at Chapel Hill, B.S. Biology	August 2006 – August 2008
Central Carolina Community College, A.S. Science	August 2005- May 2006

Publications

Birmingham, W.A., **Starbird, C.A.**, Panosian, T.D., Nannemann, D.P., Iverson, T.M., Bachmann, B.O. Bioretrosynthetic evolution of a didanosine biosynthetic pathway. *Nature Chemical Biology* **10** (2014): 392-399

Starbird, C.A., Maklashina, E., Cecchini, G., Iverson, T.M. Flavoenzymes: covalent versus noncovalent. *Encyclopedia of Life Sciences* (2015): 1-11

Immormino, R.M., **Starbird, C.A.**, Silversmith, R.E., Bourret, R.B. Probing mechanistic similarities between response regulator signaling proteins and haloacid dehalogenase phosphatases. *Biochemistry* **22** (2015): 3514-3527

Maklashina, E., Rajagukguk, S., **Starbird, C.A.**, McDonald, H., Koganitsky, A., Eisenbach, M.S., Iverson, T.M., Cecchini, G. Binding of the covalent flavin assembly factor to the flavoprotein subunit of Complex II. *Journal of Biological Chemistry* **291** (2016): 2904-2916

Starbird, C.A., Maklashina, E., Sharma, P., Qualls-Histed, S., Cecchini, G., Iverson, T.M. Structural and biochemical analyses reveal insights into covalent flavinylation of the *Escherichia coli* Complex II homolog quinol:fumarate reductase. *Journal of Biological Chemistry* **292** (2017): 12921-12933

Starbird C.A., Tomasiak, T., Singh, P.K., Yankovskaya, V., Maklashina, E., Eisenbach, M., Cecchini, G., Iverson, T.M. New crystal forms of the integral membrane *Escherichia coli* quinol:fumarate reductase suggest that ligands control domain movement. *Journal of Structural Biology* **202** (2018): 100-104

Starbird, C.A., Perry, N.A., Chen, Q., Berndt, S., Yamakawa, I., Loukachevitch, L.V., Limbrick, E.M., Bachmann, B.O., Iverson, T.M., McCulloch, K.M. The structure of the bifunctional everninomicin biosynthetic enzyme EvdMO1 suggests independent activity of the fused methyltransferase-oxidase domains. *Biochemistry* **57** (2018): 6827-6837

Starbird, C.A., Bagchi, A., Stayrook, S., Schmitz, K.R., Van Bergen En Henegouwen, P.M., Ferguson, K.M. Structural insights into activation and inhibition of oncogenic EGFRvIII. Manuscript in preparation

Conference Presentations

New England Cryo-EM Meeting, "Structural Basis of TAM Receptor Activation", New Haven, CT, September 2019

Platform presentation, "Mechanisms of Assembly and Covalent Flavinylation in Complex II", 60th annual meeting of the Biophysical Society, Los Angeles, CA, February 2016

Invited Speaker, "Going Retro: How structure can guide bioretrosynthetic pathway development", Mid-Atlantic IMSD/Prep Research Symposium, Chapel Hill in May 2014

Presented "Borrowing from a Cousin: Modulating Autophosphorylation Kinetics in Chemotaxis Protein Y" at the Postbaccalaureate Research Education Program Symposium at the University of North Carolina at Chapel Hill in May 2011

"Probing the mechanistic basis for active site similarities between response regulator signaling proteins and HAD phosphatases" Annual Biomedical Research Conference for Minority Students, November 2010, Charlotte, NC

Awards & Fellowships

2019 NIH F32 Individual National Research Service Award (NRSA), 1F32GM131460

NIH Diversity Supplement, Vanderbilt University, July 2016

University Nomination for the Lindau Award, Vanderbilt University, October 2014

Award for best talk, Vanderbilt Chemical and Physical Biology Retreat, May 2014

National Science Foundation Graduate Research Fellowship, Vanderbilt University, May 2013-May 2016

Molecular Biophysics Training Grant, Vanderbilt University, May 2012-May 2013

Center for Structural Biology Stipend Award, Vanderbilt University, August 2011-August 2016

Award for Best Overall Research Talk, PREP Symposium, UNC Chapel Hill, May 2011

Integrated Biomedical Research Training Program Scholar, UNC Chapel Hill, May 2007-May 2008

Award for Academic Excellence, with a perfect GPA, Central Carolina Community College, May 2006

National Society of Collegiate Scholars, inducted freshman year, May 2001

Research Experience

Postdoctoral Fellow, with Dr. Kathryn Ferguson

Department of Pharmacology, Yale University

Leading a project to investigate TAM receptor activation mechanism

Training graduate students and staff in protein expression and purification methods

Contributing to a collaborative research project on antibody design

Graduate Research Assistant, with Dr. Tina Iverson

Department of Pharmacology, Vanderbilt University Medical Center, Present

Sustained NSF funded research on the role of assembly factors in covalent flavinylation of Complex II

Submitted several structures to RCSB of phosphopentomutase variants engineered to accept non-natural substrates

Engaged in research collaboration with several groups both in and outside of Vanderbilt

Predocctoral Research Scholar, with Drs. Robert Bourret & Ruth Silvermith

Department of Microbiology & Immunology University of North Carolina at Chapel Hill

Postbaccalaureate Research Education Program, 2010-2011

Investigated the role of engineered mutations in *E. coli* chemotaxis protein CheY on phosphorylation kinetics

Measured kinetics using spectrofluorimeter probing of reactions with small molecule phosphodonors

Submitted several structures to RCSB of mutants in which kinetics were most drastically altered

Associate Biochemist, Dr. Scott Cook (supervisor)

Research and Development Pfizer, Inc., Sanford, NC , 2009-2010

Assisted in the design and development of protocols for antigen purification in the development of vaccines

Worked within a team to set up and carry out differential studies to assign drug product specifications

Conducted studies on products from outside vendors used in production and discovered defects leading to a worldwide recall of the vendor product

Research Technician, with Dr. Scott Randell

Cystic Fibrosis Center, University of North Carolina at Chapel Hill, 2008-2009

Clean dissection of lung tissue to harvest human airway epithelial cells

Practiced sterile tissue culture technique in the upkeep of numerous cultures

Maintenance of tissue culture facility, including updating records, monitoring supplies, and distribution

Undergraduate Research and Research Assistant, with Dr. Brian Strahl

Department of Biochemistry & Biophysics, University of North Carolina at Chapel Hill, 2007-2008

Purification of yeast histone proteins using HPLC

Developed protocols to reconstitute recombinant yeast nucleosomes

Designed new experiments to characterize the role of histone variants in nucleosome stability

Research Assistant, with Dr. Bernard Weissman

Lineberger Comprehensive Cancer Research Center, University of North Carolina at Chapel Hill, 2006-2007

Assisted with lab manager tasks such as inventory, ordering supplies, and data entry

Maintained the lab for experimental procedures

Cell Culture of Human Cancer Cell lines

Lab Assistant, with Drs. James Oliver and Todd Steck

Department of Biological Sciences, University of North Carolina at Charlotte, 2001-2003

Utilized work study program to gain working experience in various microbiology and environmental labs

Maintained the lab for experimental procedures

Purified water samples and analyzed for pH and specific conductance

Teaching Experience

Lecturer, Worked with a team to develop and teach Genetics and Developmental Biology Course for the Department of Molecular, Cellular and Developmental Biology, Yale University, Spring 2020

GRE Instructor, Designed a GRE Course for undergraduate students at Vanderbilt and nearby Institutions, Vanderbilt University, Fall of 2013-2015

Chemistry Tutor, Vanderbilt University, Fall 2015

Tutor, Biology and English, Central Carolina Community College, 2006

References

Dr. Kathryn Ferguson, Associate Professor
Department of Pharmacology
Yale Cancer Biology Institute
ABC 371B, 840 West Campus Drive
P.O. Box 27400
West Haven, CT 06516
Phone: 203-737-6544
kathryn.ferguson@yale.edu

Dr. Walter Chazin, Professor
Chancellor's Chair in Medicine
Director of the Center for Structural Biology
Departments of Biochemistry and Chemistry
5142 BIOSCI/Medical Research Building III
Nashville, TN 37232-8725
Phone: 615-936-2210
walter.j.chazin@vanderbilt.edu

Dr. Tina Iverson, Professor
*Departments of Pharmacology and
Biochemistry* 460 Robinson Research Building
2200 Pierce Avenue
Nashville TN, 37232-6600
Phone 615-322-7817
tina.iverson@vanderbilt.edu

Dr. Robert Bourret, Professor
Department of Microbiology and Immunology
6108 Marisco Hall
CB #7290
125 Mason Farm Rd
Chapel Hill, NC 27599
Phone: 919-966-2679
bourret@med.unc.edu