

Dillon B. Nye

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410 Calvin Ave. • Baltimore, MD 21218

Updated: September 15th, 2018

EDUCATION

Johns Hopkins University

PhD, Chemical Biology

Dissertation: Heme coordination and hemoglobin structure

Baltimore, MD

Expected December 2018

Reed College

BA, Biochemistry and Molecular Biology

Portland, OR

2013

RESEARCH EXPERIENCE

Johns Hopkins University

Graduate Researcher; Advisor: Juliette Lecomte

Biophysical investigation of cyanobacterial and algal hemoglobin enzymes

Baltimore, MD

2013 - Present

- Used NMR spectroscopy to study structure and dynamics of several hemoglobins and variants.
- Explored the role of electrostatic interactions between protein and cofactor in hemoglobin function.
- Identified and characterized novel globin conformations with relevance to the superfamily.
- Connected protein dynamics to the evolution of hemoglobins from catalysts to oxygen managers.

Reed College

Undergraduate Researcher; Advisor: Arthur Glasfeld

Structure solution of a virulence-related metalloregulatory protein

Portland, OR

2012 - 2013

- Characterized a transcription factor from the opportunistic pathogen *Streptococcus mutans*.
- Solved the X-ray structure from data collected at the ALS to 3.1 Å resolution.
- Assessed binding affinity for cognate DNA sequence in presence and absence of metals.

SKILLS and TECHNIQUES

- Solution NMR spectroscopy of biomolecules with specialty in paramagnetic systems
- Protein structure determination in the solid (X-ray) or solution (NMR) state
- Proficient with Python, specifically NumPy and BioPython packages; some experience with R
- Recombinant protein preparation and purification using AKTA systems with Unicorn software
- Common biophysical and biochemical techniques, e.g., circular dichroism, fluorescence anisotropy, protein stability measurements, enzyme activity assays, UPLC-MS
- Some experience with *E. coli* plasmid libraries, high-throughput screens, and deep sequencing

LEADERSHIP and OUTREACH

Johns Hopkins University

Head RA, Biophysical NMR Facility

Baltimore, MD

2016 - 2018

- Trained and supervised 3 – 5 other graduate researchers in maintenance of spectrometers, including difficult procedures such as liquid helium transfers.
- Interfaced with Bruker and Airgas to ensure optimal instrument performance.

Mentor, Women in Science and Engineering (W.I.S.E.)

2018

- Assisted a high school student 4 hours per week for 1 semester with a preliminary research project.
- Guided student through the design of a “consensus” hemoglobin using 1,563 sequences derived from metagenomic data.

Mentor, Biophysics Research for Baltimore Teens (B.R.B.T.)

2016 – 2017

- Developed a close relationship with a public high school student over the course of a research project lasting 6 hours a week for 2 semesters and 40 hours/week for 1 summer.
- Student has gone on to study chemistry at the University of Maryland.

CONFERENCE PRESENTATIONS

Nye, D. B., Preimesberger, M. P., Majumdar, A., and Lecomte, J. T. J. A histidine-lysine axial ligand switch in a hemoglobin. Poster presentation and flash talk delivered at the Biophysical Society annual meeting, San Francisco, CA, February, 2018. *Travel grant awardee*.

Nye, D. B., Preimesberger, M. P., Majumdar, A., and Lecomte, J. T. J. A role for the heme propionates in a monomeric hemoglobin. Poster presentation delivered at the Gibbs Conference on Biothermodynamics, Carbondale, IL, October, 2016.

Nye, D. B., Martinez, J., Preimesberger, M. P., Majumdar, A., and Lecomte, J. T. J. A role for the heme propionates in hemoglobins: Dictating the nature of the iron distal ligand. Poster presentation delivered at the Protein Society symposium, Baltimore, MD, July, 2016.

Nye, D. B., Preimesberger, M. P., Kougentakis, C., Rice, S. L., and Lecomte, J. T. J. Heme coordination versatility in a truncated hemoglobin. Poster presentation delivered at the Biophysical Society annual meeting, Baltimore, MD, February, 2015.

PUBLICATIONS

Nye, D. B. and Lecomte, J. T. J. (2018) Replacement of the distal histidine reveals a non-canonical heme binding site in a 2-on-2 hemoglobin. *Biochemistry*, *Just Accepted*.

Johnson, E. A., Russo, M. M., **Nye, D. B.**, Schlessman, J. L., and Lecomte, J. T. J. (2018) Lysine as a heme iron ligand: A property common to three truncated hemoglobins from *Chlamydomonas reinhardtii*. *Biochim. Biophys. Acta* 1862, 2660 – 2673.

Nye, D.B., Preimesberger, M. R., Majumdar, A., and Lecomte, J. T. J. (2018) Histidine-lysine axial ligand switching in a hemoglobin: a role for the heme propionates. *Biochemistry* 57, 631 – 644.

Preimesberger, M. R., Johnson, E. A., **Nye, D. B.**, and Lecomte, J. T. J. (2017) Covalent attachment of the heme to *Synechococcus* hemoglobin alters its reactivity towards nitric oxide. *J. Inorg. Biochem.* 177, 171 – 182.

Spatafora, G., Corbett, J., Cornacchione, L., Daly, W., Galon-Donlo, D., Wysota, M., Tivan, P., Collins, J., **Nye, D. B.**, Levitz, T., Breyer, W. A., and Glasfeld, A. (2015) Interactions of the metalloregulatory protein SloR from *Streptococcus mutans* with its metal ion effectors and DNA binding site. *J. Bacteriol.* 197, 3601 – 3615.

Johnson, E. A., Rice, S. L., Preimesberger, M. R., **Nye, D. B.**, Gilevicius, L., Wenke, B. B., Brown, J. M., Witman, G. B., and Lecomte, J. T. J. (2014) Characterization of THB1, a *Chlamydomonas reinhardtii* truncated hemoglobin: linkage to nitrogen metabolism and identification of lysine as a distal heme ligand. *Biochemistry* 53, 4573 – 4589.