

## Dillon B. Nye

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### 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.
- Described hemoglobin iron ligand switching phenomena as a pH response.
- 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

2011 - 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 for analysis and modeling of biophysical data
- Recombinant protein preparation and purification, with or without cofactors
- Common biophysical techniques, e.g., circular dichroism, fluorescence anisotropy, protein stability measurements, enzyme activity assays
- 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. *Under Review*.

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.