Andrew C. Mutter

1080 Warburton Ave Apt 1F Yonkers, NY 10701

845-893-6127 amutter00@gmail.com

Education:

Ph.D., Biochemistry, City University of New York, September 2007-August 2014

B.S., (Cum Laude) Biochemistry, the City College of New York, February 2007

Awards:

Fellow, Crest CENSES 2008-2014

Experience:

Postdoctoral Fellow: Harvard University, Dept. of Physics September 2014-February 2016

- Established biochemistry laboratory for exploring integration of photosynthesis apparatus onto graphene substrates
- Recombinant expression and purification of ferredoxin NADP(H) reductases (FNR) from four organisms
- Construction of GFP fusion proteins of FNRs
- Carried out cysteine point mutations on FNRs to use maleimide crosslinking chemistry to attach pyrene moieties for interfacing with graphene
- Optimization of pyrene attachment to FNRs
- Optimization of UV-Vis solution assay for surface attachment activity
- Develop strategies and custom cuvettes for cyclic voltammetry experiments of large graphene electrodes
- Developed procedures for ion exchange purification of PSII from *T. elongatus* BP-1

Graduate Research Assistant: The City College of New York, Dept. of Chemistry 2007-2014

- Thesis project: the construction and analysis of a light activated charge separation *de novo* protein utilizing zinc phthalocyanine monosulfonate (ZnPcS), heme, and quinones
- Designed four-helix bundle proteins for multiple cofactor binding
- Optimized expression and purification of four-helix bundle proteins
- Developed UV-Vis and fluorescence assay for ZnPcS binding
- Developed techniques to make bio-compatible thin film protein-encapsulated Sol-gels

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- Developed low-volume cuvette tools for potentiometric assays of proteins
- Streamlined quinone adduct formation to cysteine containing proteins
- Worked on design principles for model light-activated triades
- Trained MARC-RISE student Ismail Ahmed

Planning Committee Member: NSF National Informal Science Education, NanoDays 2011

- Organized graduate students in science demonstrations for high school students
- Developed super-hydrophobicity presentation with plants and insects with Bernard Everson

Steering Committee Member: New York Academy of Science, Soft Materials Solar Energy Meeting, 2009

- Speaker selection for industry and academia sections, January 2010 meeting

Laboratory Rotations:

Laboratory of Dr. Brian Gibney, Brooklyn College, Dept. of Chemistry:

- Optimized expression of C-type to B-type cytochromes
- Performed binding and potentiometric studies on C-type to B-type cytochromes

Laboratory of Dr. Hiroshi Matsui, Hunter College, Dept. of Chemistry:

- Optimized expression and purification of modified collagen construct for SEM study
- Manuscript editing for Kaur, P., *et al.* 2010 *Angewandte Chemie*

Laboratory Technician: The City College of New York, Koder Lab 2005-2007

- Express and purify *de novo* proteins in *E.coli*
- Synthesis and purify Ruthenium phthalocyanine
- Curate database on flavin containing proteins with crystal structures for bioinformatics analysis
- Coordinate purchasing of laboratory supplies

Laboratory Technician: Lamont Doherty Earth Observatory, Peter Schlosser Lab, Dept. of Geochemistry, 2004-2005

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- Water sample preparation for Helium/Tritium mass spectrometric measurements using two vacuum extraction apparatus
- NOAA Vessel Ron Brown, World Ocean Circulation Experiment, A16S January 11 - February 24, 2005
    - Collection and extraction of samples for He/T analysis

Publications:

Raju G., **Mutter A.** C., Everson B. H., Cerda J. F., and Koder R. L., 'Extended Scope Synthesis of an Artificial Safranin Cofactor' *Tetrahedron Letters*, *55*(15), 2487-2491.

Mutter,A. C., Norman J. A., Tiedemann M. T., Singh S., Sha S., Morsi S., Ahmed I., Stillman M. J., and Koder R. L. (2014) 'Rational Design of a Zinc Phthalocyanine Binding Protein.' *J. Structural Biology. 185(2), 178-185*

Brisendine, J. M.*, **Mutter, A. C.***, Cerda, J. F., and Koder, R. L. (2013) A 3D Printed Cell for Rapid, Low Volume Spectroelectrochemistry, *Analytical Biochemistry* 439(1), 1-3. *Co-first authors.

Punnoose, A., McConnell, L. A., Liu, W., **Mutter, A. C.**, and Koder, R. L. (2012) Fundamental Limits on Wavelength, Efficiency and Yield of the Charge Separation Triad, *Plos One,* 7(6).

Zhang, L., Anderson, J. L. R., Ahmed, I., Norman, J. A., Negron, C., **Mutter, A. C.**, Dutton, P. L., and Koder, R. L. (2011) Manipulating Cofactor Binding Thermodynamics in an Artificial Oxygen Transport Protein, *Biochemistry,* 50(47), 10254-10261.

Kaur, P., Maeda, Y., **Mutter, A. C.**, Matsunaga, T., Xu, Y., and Matsui, H. (2010) Three-Dimensional Directed Self-Assembly of Peptide Nanowires into Micrometer-Sized Crystalline Cubes with Nanoparticle Joints, *Angewandte Chemie-International Edition* 49(45), 8375-8378.

In Preparation:

Mutter, A. C.*, Brisendine, J. M.*, and Koder, R. L., 'Potentiometric studies on *de novo* proteins encapsulated in sol-gel thin films'

French C., Everson B. H., **Mutter, A. C.**, Zhang, L., Koder, R. L., 'Modulating Internal Electric Fields by supercharging Exterior Hydrophilic Residues in a de novo Protein'

Mutter A. C., Morsi S., Norman J. A., and Koder R. L. 'Manipulating heme binding thermodynamics through long range interactions'

Oral Presentations:

Speaker Eastern Regional Photosynthesis Conference, 'Rational Design of a Zinc Phthalocyanine Binding Protein' Woods Hole Ma. April 2013

Speaker Eastern Regional Photosynthesis Conference, 'Design and Optimization of a Charge Separation Protein Dyad for use in a Metamaterial Solar Cell' Woods Hole Ma., April 2011

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Invited Speaker, New York Academy of Science, Soft Materials: The Future of Solar Technologies, 'Protein Design, Synthetic Biology and Hybrid Metamaterials' January 2010

Print Presentation:

Mutter, A. C., Koder, R. L., Singh, S., and Norman, J. A., Koder R. L. 'Rational Design of a Zinc Phthalocyanine Binding Protein', Biophysical Society meeting Philadelphia, Pa February 2013.

Everson, B. H., French, C. A., **Mutter, A. C.**, Nanda, V., and Koder, R. L. 'Hemoprotein Design using Minimal Sequence Information', Biophysical Society meeting Philadelphia, Pa. February 2013.

French C., Everson B. H., **Mutter, A. C.**, Zhang, L., Koder, R. L., 'Modulating Internal Electric Fields by supercharging Exterior Hydrophilic Residues in a de novo Protein' ERPC April 2013

Everson B. H., French, C., **Mutter, A. C.**, Nanda, V., Koder, R. L. 'Hemoprotein Design Using Minimal Sequence Information' ERPC April 2013

McConnell, L. A., Punnoose, A., **Mutter, A. C.**, and Koder, R. L. 'Fundamental limits on wavelength, efficiency and yield of a charge separation triad' ERPC April 2012

Bernard E. H., **Mutter A. C.**, Koder R. L. 'A Patterning Method for the Design of Cofactor-Binding Proteins' ERPC April 2012

Mutter A. C., Koder R. L. 'Design and Optimization of a Protein Charge Separation Dyad for use in a Metamaterial Solar Cell' ERPC April 2012

Brisendine J. M., **Mutter A. C.**, Koder R. L., 'Bio-compatible Sol-gel Thin Films for Solar Cell applications' ERPC Woods Hole Ma., April 2012

Mutter A. C., Koder R. L. 'Design and Optimization of a Protein Charge Separation Dyad for use in a Metamaterial Solar Cell' 3rd Annual Canadian Bioinorganic Chemistry Conference, Georgia Bay, Canada, June 2011

Mutter A. C., Koder R. L. 'Design and Optimization of a Protein Charge Separation Dyad for use in a Metamaterial Solar Cell' ERPC Woods Hole Ma., April 2010

Mutter A. C., Koder R. L. 'Design of *de novo* Protein for Phthalocyanine Binding' Gordon Research Coference Graduate Resreach Seminar Mount Holyoke College South Hadley, Ma June 2008

Mutter, A. C., Koder, R.L., 'Light Activated *de novo* Proteins Using Phthalocyanines' ACS Mid Atlantic Regional Meeting Queens, NY, May 2008

Rybak, L. A., **Mutter, A. C.**, Song, Y., Gunner, M., and Koder, R. L. 'A statistical analysis of flavoprotein structure: Reduction potential relationships', Biophysical Society meeting Baltimore, Md. March 2007.

References:

Dr. Ronald L. Koder Dept. Physics, City College of New York, (Thesis Advisor)
160 Convent Ave Marshak Rm 419 New York, NY 10031 USA
(Office) 212-650-5583 (Email) koder@sci.ccny.cuny.edu

Dr. Masahiro Morii Dept. Physics, Harvard University, (Dept. Chair)

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17 Oxford Street Cambridge, MA 02138

(Office) 617-495-3279 (Email) morii@physics.harvard.edu