

Nicholas Attila Kovacs

STRUCTURAL BIOINFORMATICIST & DATA SCIENTIST

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Education

Ph.D. Bioinformatics

GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, Georgia

Aug 2013 - Dec 2018 (expected)

B.S. Biochemistry and Molecular Biology/Biotechnology

MICHIGAN STATE UNIVERSITY

East Lansing, Michigan

Aug 2008 - May 2012

Scientific Skills

| | |
|----------------------------------|---|
| Programming | Python, Perl, Bash, SQL, Javascript, MATLAB |
| Structural Bioinformatics | PyMOL, PyRosetta, VMD |
| Computational Genomics | de Novo Genome Assembly, SAMtools, BCftools, GATK, Kent Source Tree, JBrowse |
| Operating Systems | Ubuntu, RHEL, Windows, Amazon Web Services |
| Molecular Biology | Molecular Cloning, One-Hybrid and Two-Hybrid Screening, GUS Staining |
| Biochemistry | SDS-PAGE, Western Blot, Enzyme Kinetics, Protein Crystallization, FRET |
| Bioanalytical Chemistry | Circular Dichroism, NMR, TLC, IR, Fluorescence Spectroscopy |
| Lab Organisms | <i>E. coli</i> , <i>S. cerevisiae</i> , <i>A. thaliana</i> , <i>Nannochloropsis sp.</i> , <i>A. tumefaciens</i> |

Publications

- (6) Gómez Ramos, L. M., Degtyareva, N. N., **Kovacs, N. A.**, Holguin, S. Y., Jiang, L., Petrov, A. S., Biesiada M., Hu, M. Y., Purzycka, K. J., Arya, D. P., Williams, L. D. "Eukaryotic Ribosomal Expansion Segments as Antimicrobial Targets", *Biochemistry* 56, pgs 5288-5299 (2017)
- (5) **Kovacs, N.A.**, Petrov, A.S., Lanier, K.A., and Williams, L.D. "Frozen in Time: The History of Proteins", *Mol. Biol. Evol.* 34, pgs 1252-1260 (2017)
- (4) Gómez Ramos, L.M., Smeekens, J.M., **Kovacs, N.A.**, Bowman, J.C., Wartell, R.M., Wu, R., and Williams, L.D. "Yeast rRNA Expansion Segments: Folding and Function", *J. Mol. Biol.* 428, pgs 4048-4059 (2016)
- (3) Petrov, A.S., Gulen, B., Norris, A.M., **Kovacs, N.A.**, Bernier, C.R., Lanier, K.A., Fox, G.E., Harvey, S.C., Wartell, R.M., Hud, N.V., and Williams, L.D. "History of the Ribosome and the Origin of Translation", *Proc. Natl. Acad. Sci. U.S.A.* 112, pgs 15396-15401 (2015)
- (2) Petrov, A.S., Bernier, C.R., Hsiao, C., Norris, A.M., **Kovacs, N.A.**, Waterbury, C.C., Stepanov, V.G., Harvey, S.C., Fox, G.E., Wartell, R.M., Hud, N.V., and Williams, L.D. "Evolution of the Ribosome at Atomic Resolution", *Proc. Natl. Acad. Sci. U.S.A.* 111, pgs 10251-10256 (2014)
- (1) Sharma, M., Predeus, A.V., **Kovacs, N.A.**, and Feig, M. "Differential Recognition Specificities of Eukaryotic MutS α and MutS β ", *Biophys. J.* 106, pgs 2483-2492 (2014)

Research Experience

Adviser: Dr. Loren Williams

GRADUATE RESEARCH ASSISTANT

Georgia Institute of Technology

Aug 2013 - Current

PhD Thesis: *The History of Proteins Revealed by Data Mining the Ribosome*

- **Hypothesis:** The ribosome is a molecular fossil; its structure can be mined to unravel the evolution of life
- **Tools:** Python, PyMOL, Adobe Illustrator, Perl, MATLAB, JavaScript
- **Funding:** NASA Astrobiology Institute
- **Support:** Data analysis for experimental labmates

Adviser: Dr. Chiaolong Hsiao

EAST ASIA AND PACIFIC SUMMER INSTITUTES FELLOW

National Taiwan University

Jun 2017 - Aug 2017

- **Project:** The Evolution of Proteins in Eukaryotes: Data Mining the Ribosome Structure
- **Tools:** Python, PyMOL
- **Funding:** National Science Foundation - East Asia and Pacific Summer Institutes

Adviser: Dr. Michael Feig

UNDERGRADUATE RESEARCH ASSOCIATE

Michigan State University

Dec 2012 - May 2012

- **Project:** Molecular simulations of Mismatch Repair Enzymes MutS α and MutS β

Adviser: Dr. Peter Westhoff

MOLECULAR BIOLOGY EXCHANGE STUDENT

- **Project:** DNA-protein interaction of cis-regulatory elements in *Flaveria sp.*

Heinrich-Heine Universität

May 2011 - Jul 2011

Adviser: Dr. Yair Shachar-Hill

UNDERGRADUATE RESEARCH ASSOCIATE

- **Project:** Metabolic flux analysis of carbon through *Nanochloropsis sp.*
- **Project:** Aquaporin signalling in *Arabidopsis thaliana* gametogenesis

Michigan State University

Jun 2010 - Mar 2011

Adviser: Dr. Cristoph Benning

UNDERGRADUATE RESEARCH ASSOCIATE

- **Project:** Protein-protein interactions in ER to chloroplast lipid trafficking

Michigan State University

Feb 2010 - May 2010

Awards and Scholarships

NSF East Asia and Pacific Institutes

EAPSI FELLOW

- **Project:** The Evolution of Proteins in Eukaryotes: Data Mining the Ribosome Structure
- **Adviser:** Dr. Chiaolong Hsiao
- **PI:** Nicholas Attila Kovacs
- Awarded \$5,400 stipend, \$1,667 living allowance, and roundtrip airfare to Taipei, Taiwan

National Taipei University

Mar 2017 - Mar 2018

Petit Undergraduate Research Scholars Program

GRADUATE MENTOR

- Research mentor for undergraduate student
- Awarded \$2,500 for materials and conference travel

Georgia Institute of Technology

Jan 2017 - Dec 2017

BASF Chemistry Symposium

3RD PLACE

- Oral presentation of PhD thesis research to Chemistry Department and science panel from BASF
- Awarded \$300

Georgia Institute of Technology

Apr 2017

Presentations

The Evolution of Proteins: Data Mining the Ribosome Structure

EARTH AND LIFE SCIENCE INSTITUTE 6TH INTERNATIONAL SYMPOSIUM • POSTER

Tokyo, Japan

Jan 2018

The History of Proteins

ASTROBIOLOGY GRADUATE STUDENT CONFERENCE • ORAL

Charlottesville, VA

Jun 2017

Eukaryotic Ribosomal Protein Evolution

BASF CHEMISTRY SYMPOSIUM • ORAL

Atlanta, GA

Apr 2017

Frozen in Time: The History of Proteins

SEARCH FOR LIFE: FROM EARLY EARTH TO EXOPLANETS • ORAL

Quy Nhon, Vietnam

Dec 2016

Frozen in Time: The History of Proteins

GEORGIA TECH CHEMISTRY RETREAT • ORAL

Atlanta, GA

Oct 2016

The History of Protein Folding

ASTROBIOLOGY GRADUATE STUDENT CONFERENCE • ORAL

Madison, WI

Jul 2015

The History of Protein Folding

ASTROBIOLOGY GRADUATE STUDENT CONFERENCE • POSTER

Troy, NY

Jul 2014

Teaching Experience

CHEM 6572 - Macromolecular Structure

GRADUATE TEACHING ASSISTANT – DR. LOREN WILLIAMS

Georgia Institute of Technology

2 Semesters

CHEM 4582 - Biochemistry Laboratory II

GRADUATE TEACHING ASSISTANT – DR. MARY PEEK

Georgia Institute of Technology

6 semesters

CHEM 3511 - Survey of Biochemistry

GRADUATE TEACHING ASSISTANT – DR. PAMELA PERALTA-YAHYA

Georgia Institute of Technology

1 semester