

# Nicholas Attila Kovacs

STRUCTURAL BIOINFORMATICIST

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## Education

### Ph.D. Bioinformatics

Georgia Institute of Technology, School of Chemistry and Biochemistry

Atlanta, Georgia

Aug 2013 - Dec 2018 (expected)

### B.S. Biochemistry and Molecular Biology/Biotechnology

Michigan State University, College of Natural Science

East Lansing, Michigan

Aug 2008 - May 2012

## Scientific Skills

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

## Publications

- 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)
- 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)
- 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)
- 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)
- 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)
- Sharma, M., Predeus, A.V., **Kovacs, N.A.**, and Feig, M. "Differential Recognition Specificities of Eukaryotic MutS $\alpha$  and MutS $\beta$ ", *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, 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 $\alpha$  and MutS $\beta$

### Adviser: Dr. Peter Westhoff

Molecular Biology Exchange Student

Heinrich-Heine Universität

May 2011 - Jul 2011

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

**Adviser: Dr. Yai Shachar-Hill**

Undergraduate Research Associate

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

## Teaching Experience

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**Adviser: Dr. Loren Williams**

Graduate Teaching Assistant

- **Course:** CHEM 6572 - Macromolecular Structure (half time)

Georgia Institute of Technology

Fall 2016

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II (half time)

Georgia Institute of Technology

Fall 2016

**Adviser: Dr. Pamela Peralta-Yahya**

Graduate Teaching Assistant

- **Course:** CHEM 3511 - Survey of Biochemistry

Georgia Institute of Technology

Summer 2016

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II

Georgia Institute of Technology

Spring 2016

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II

Georgia Institute of Technology

Fall 2015

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II

Georgia Institute of Technology

Summer 2015

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II

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- **Course:** CHEM 6572 - Macromolecular Structure

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- **Course:** CHEM 4582 - Biochemistry Laboratory II

Georgia Institute of Technology

Spring 2014

**Adviser: Dr. Mary Peek**

Graduate Teaching Assistant

- **Course:** CHEM 4582 - Biochemistry Laboratory II

Georgia Institute of Technology

Fall 2013

## Presentations

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**The History of Proteins**

Astrobiology Graduate Student Conference

Charlottesville, VA

Jun 2017

**Eukaryotic Ribosomal Protein Evolution**

BASF Chemistry Symposium

Atlanta, GA

Apr 2017

**Frozen in Time: The History of Proteins**

Search for Life: From Early Earth to Exoplanets

Quy Nhon, Vietnam

Dec 2016

**Frozen in Time: The History of Proteins**

Georgia Tech Chemistry Retreat

Atlanta, GA

Oct 2016

**The History of Protein Folding**

Astrobiology Graduate Student Conference

Madison, WI

Jul 2015

**The History of Protein Folding (poster)**

Astrobiology Graduate Student Conference

Troy, NY

Jul 2014

# Awards and Scholarships

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## 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 (myself)
- 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*

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

*Georgia Institute of Technology*

*Apr 2017*