

# Nicholas Attila Kovacs

BIOINFORMATICIST & DATA SCIENTIST

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## Expertise

- Former wet-lab biochemist turned structural bioinformaticist
  - Preferred language is python
  - Proficient in SQL, Perl, R, MATLAB, and JavaScript
  - Guided PhD dissertation from theoretical concepts to Network Science and Machine Learning focused projects
- An adept communicator that thrives in multidisciplinary environments
  - Two 1<sup>st</sup> author publications. 3<sup>rd</sup> in preparation. Coauthored 6 publications with computational and experimental scientists.
  - 5 oral and 2 poster presentations at international and domestic scientific conferences
  - Instructed 8 senior undergraduates per semester for 6 semesters as a teaching assistant for the biophysical chemistry lab course

## Education

**Ph.D. Bioinformatics** GPA: 3.5

GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

Aug 2013 - Fall 2018 (expected)

**B.S. Biochemistry and Molecular Biology/Biotechnology** GPA: 3.3

MICHIGAN STATE UNIVERSITY

East Lansing, MI

Aug 2008 - May 2012

## Experience

**Graduate Research Assistant**

GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

Aug 2013 - Current

**Dissertation:** *Data Mining the Atomic Structure of the Ribosome to Unravel the History of Protein Folding*

- **Summary:** Analyzed atomic structures of ribosomes comprised of over 400,000 atoms, using structural bioinformatics and machine learning.
- **Results:** Two 1<sup>st</sup> author research articles published. 3<sup>rd</sup> in preparation.
- **Collaboration:** Coauthored 2 experimental and 4 computational research articles.
- **Communication:** Independently wrote and awarded NSF grant to support summer research in Taiwan. Oral and poster presentations at 7 domestic and international scientific conferences.
- **Mentoring:** Awarded conference and travel funding for mentoring undergraduate student.

**Atomic Interaction Network Analysis of the Ribosome**

COURSE PROJECT FOR CS 7280 - NETWORK SCIENCE

Atlanta, GA

Fall 2017

- Collaborated with a team member to apply course concepts and algorithms to 3 interaction networks of the ribosome, each composed of more than 100,000 non-covalent interactions (edges) between approx. 50,000 amino acid residues (nodes).
- **Results:** Predicted RNA and protein folding domains within the ribosome by applying community detection algorithms.

**Analysis and Interpretation of NGS Data from CDC**

COURSE PROJECT FOR BIOL 8803B - PROGRAMMING FOR BIOINFORMATICS AND BIOL 7210 - COMPUTATIONAL GENOMICS

Atlanta, GA

Fall 2014 and Spring 2015

- Worked in multidisciplinary teams of biologists and computer scientists to analyze NGS reads provided by the CDC.
- Analyzed 97 genomic single-end and paired-end reads of *Neisseria meningitidis*, *Haemophilus influenza*, and *Haemophilus haemolyticus* generated from GAII or Illumina HiSeq/MiSeq instruments.
- **Results:** Developed a typing-tool that identifies the organism and its serotype/serogroup from fasta file inputs and constructed a genome browser of 53 annotated genomes.

**Graduate Teaching Assistant**

GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

9 Semesters

- **Biophysical Chemistry Lab(CHEM 4582)** - 6 semesters - Instructed ~8 undergraduate students on experimental and computational protocols.
- **Macromolecular Structure(CHEM 6572)** - 2 semesters - Directed ~25 graduate students on the use of computational modelling programs.
- **Survey of Biochemistry(CHEM 3511)** - 1 semester - Guided ~40 undergraduate students to solve homework problems in weekly recitation.

## Skills

### Programming

Python, Perl, Bash, SQL, R, Javascript, MATLAB, HTML, CSS

### Python Packages

Numpy, Pandas, Scipy, SK-Learn, Matplotlib, Seaborn, Plotly, NetworkX, igraph, Biopython, Jupyter

### Machine Learning

Linear Regression, Logistic Regression, SVM, Decision Trees, Random Forest, KNN, K-Means, PCA, Community Detection

### Structural Bioinformatics

PyMOL, Maestro, PyRosetta, VMD, NAMD, AutoDock, MODELLER

### Computational Genomics

de Novo Genome Assembly, SAMtools, BCFtools, VCFtools, bwa, GATK, JBrowse

### OS and Software

Ubuntu, RHEL, Windows, OSX, Amazon Web Services, Microsoft Office, Adobe Illustrator, Git, Cytoscape