ALEXANDER G. LUCACI

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EDUCATION

Temple University *2018-Present*
Ph.D. Candidate in Bioinformatics
Department of Biology
Institute for Genomics and Evolutionary Medicine (iGEM)
Acme Computational Molecular Evolution Group (ACME)
Dissertation mentored by Dr. Sergei Pond:
"The influence of multi-nucleotide instantaneous mutations on evolutionary dynamics."

New York University *2016 - 2018*
Masters of Science in Biology
Department of Biology

SUNY Stony Brook University *2011*
Bachelors of Science in Biochemistry
Department of Biochemistry and Cell Biology

EXPERIENCE

Temple University Spring 2022
Graduate Research Assistant

· Conducting research in molecular evolution evaluating the effect of multinucleotide mutational events on the inference of parameters of gene adaptation.
· This work involves the use and development of statistical models and computational software. Our current implementation is available as an extension in the Hypothesis testing in Phylogenies (HyPhy) suite of analyses.

Maxim Group Fall 2021 - Present
Intern - Biotechnology Equity Research

· Initiate coverage on companies with investment recommendations based on fundamental analysis.
· Modeling companies under coverage using financial valuation methods and report on company earnings.

Temple University Fall 2021
Graduate Teaching Assistant - Genomics in Medicine

· Directed over one hundred and fifty students in a cross-listed (Graduate and Undergraduate) course.
· Responsible for holding office hours and communicating with students.
· Provide guidance on assignments, help with interpreting primary research articles and offered guidance on classroom projects.

Temple University Spring 2021
Graduate Research Assistant

· Conducting research in molecular evolution evaluating the effect of multinucleotide mutational events on the inference of parameters of gene adaptation.
· This work involves the use and development of statistical models and computational software. Our current implementation is available as an extension in the Hypothesis testing in Phylogenies (HyPhy) suite of analyses.

Temple University Fall 2020
Graduate Teaching Assistant *Genomics in Medicine*

- Directed over one hundred and sixty students in a cross-listed (Graduate and Undergraduate) course in a virtual format.
- Responsible for holding office hours and communicating with students.
- Provide guidance on assignments, help with interpreting primary research articles and offered guidance on classroom projects.

Bioinformatics Studio at Temple University Spring 2018 - Present
Co-Founder

- The Bioinformatics Studio is an inclusive and hands-on environment for learning, training, sharing, and most importantly doing bioinformatics at Temple University.
- A student run organization that provides guided hands-on training at every level of research and computational expertise in an open studio format.

Temple University Spring 2020
Graduate Research Assistant

- Conducting research in molecular evolution evaluating the effect of multinucleotide mutational events on the inference of parameters of gene adaptation. This work involves the use and development of statistical models and computational software. Our current implementation is available as an extension in the Hypothesis testing in Phylogenies (HyPhy) suite of analyses.

Temple University Fall 2019
Graduate Teaching Assistant - Genomics in Medicine

- Directed over one hundred students in a cross-listed (Graduate and Undergraduate) course.
- Responsible for holding office hours and communicating with students. Additionally, provided guidance on assignments, helped with interpreting primary research articles and offered guidance on classroom projects.

Temple University Spring 2019
Graduate Teaching Assistant - Introduction to Organismal Biology

- Directed forty students over two sections of the Introduction to Organismal Biology Laboratory course.
- Instructed students on laboratory exercises, provided feedback, and demonstrated proper techniques.

Temple University Fall 2018
Graduate Teaching Assistant - General Biology

- Directed forty students over two sections of the "General Biology I" Laboratory course
- Instructed students on laboratory exercises, provided feedback, and demonstrated proper techniques.

ROTH Capital Partners Spring 2018
Intern - Healthcare Investment Banking

- Participated in the process for the Initial Public Offering (IPO) of a NASDAQ listed company.
- Responsible for current healthcare IPO market data, preparing pitch decks for senior managers and materials for mergers and acquisition (M&A) deals.

New York University Spring 2018
Adjunct Professor - Fundamentals of Bioinformatics

- Directed twenty students in a weekly recitation section.

· Reviewed theory and topics discussed in lecture and provided guidance and hands-on support in the use of bioinformatics software and analysis.

New York University Fall 2017
Adjunct Professor - Molecules of Life

· Directed forty students over two sections in a weekly laboratory course.
· Reviewed theory and topics discussed in lecture and provided guidance and hands-on support in the use of standard laboratory techniques.

New York University Spring 2017
Adjunct Professor - Principles of Biology Laboratory

· Directed forty students over two sections in a weekly laboratory course.
· Reviewed theory and topics discussed in lecture and provided guidance and hands-on support in the use of standard laboratory techniques.

Albert Einstein College of Medicine 2012 - 2017
Lab Manager - Dominick P. Purpura Department of Neuroscience

ORGANIZATIONS

Member: The National COVID Cohort Collaborative (N3C)

Member: American Physiological Society (APS)

Member: Vertebrate Genomes Project (VGP)

Member: Vertebrate Genomes Project - Genome Assembly Group

Member: Models of Infectious Disease Agent Study (MIDAS)

Member: CDC-MIDAS COVID-19 working group

Co-Founder: The Bioinformatics Studio at Temple University

Member: Society for Molecular Biology and Evolution

Member: Biology Graduate Student Society at Temple University

Member: New York Academy of Sciences

RELEVANT COURSES

Core Courses
Genomics
Computational Genomics
Molecular Phylogenetics
Population Genetics
Design and Analysis of Algorithms

Other Courses
Infectious Disease Dynamics
Biomarkers and Biotargets
Evolutionary Analytics
Applied Statistics and Data Science
Data Structures

PUBLICATIONS

1. **Lucaci, Alexander G**, Michael J Notaras, Sergei L Kosakovsky Pond, and Dilek Colak. The Evolution of BDNF Is Defined by Strict Purifying Selection and Prodomain Spatial Coevolution, but What Does It Mean for Human Brain Disease? BioRxiv, January 1, 2022, 2022.01.21.477254. https://doi.org/10.1101/2022.01.21.477254.

2. **Lucaci, Alexander G**, Jordan D Zehr, Stephen D Shank, Dave Bouvier, Han Mei, Anton Nekrutenko, Darren P Martin, and Sergei L Kosakovsky Pond. RASCL: Rapid Assessment Of SARS-CoV-2 Clades Through Molecular Sequence Analysis. BioRxiv, January 1, 2022, 2022.01.15.476448. https://doi.org/10.1101/2022.01.15.476448.

3. Viana, Raquel, Sikhulile Moyo, Daniel G. Amoako, Houriiyah Tegally, Cathrine Scheepers, Christian L. Althaus, Ugochukwu J. Anyaneji, et al. Rapid Epidemic Expansion of the SARS-CoV-2 Omicron Variant in Southern Africa. Nature, January 7, 2022. https://doi.org/10.1038/s41586-022-04411-y.

4. Martin, Darren P, Spyros Lytras, **Alexander G Lucaci**, Wolfgang Maier, Bjrn Grning, Stephen D Shank, Steven Weaver, et al. Selection Analysis Identifies Unusual Clustered Mutational Changes in Omicron Lineage BA.1 That Likely Impact Spike Function. BioRxiv, January 1, 2022, 2022.01.14.476382. https://doi.org/10.1101/2022.01.14.476382.

5. **Lucaci, Alexander G.**, Sadie R. Wisotsky, Stephen D. Shank, Steven Weaver, and Sergei L. Kosakovsky Pond. Extra Base Hits: Widespread Empirical Support for Instantaneous Multiple-Nucleotide Changes. PLOS ONE 16, no. 3 (March 12, 2021): e0248337. https://doi.org/10.1371/journal.pone.0248337.

6. Martin, Darren P., Steven Weaver, Houriiyah Tegally, James Emmanuel San, Stephen D. Shank, Eduan Wilkinson, **Alexander G. Lucaci**, et al. The Emergence and Ongoing Convergent Evolution of the SARS-CoV-2 N501Y Lineages. Cell 184, no. 20 (September 30, 2021): 5189-5200.e7. https://doi.org/10.1016/j.cell.2021.09.003.

7. Yao, Cong, Kimberly G. Vanderpool, Matthew Delfiner, Vanessa Eddy, **Alexander G. Lucaci**, Carolina Soto-Riveros, Thomas Yasumura, John E. Rash, and Alberto E. Pereda. Electrical Synaptic Transmission in Developing Zebrafish: Properties and Molecular Composition of Gap Junctions at a Central Auditory Synapse. Journal of Neurophysiology 112, no. 9 (November 1, 2014): 210213. https://doi.org/10.1152/jn.00397.2014.

WORKSHOPS

• 2020 American Society of Tropical Medicine and Hygiene (ASTMH)

Modeling for Disease Outbreaks

• 2020 Marine Biological Laboratory (MBL) - Workshop on Molecular Evolution

* Cancelled due to COVID-19 *

• 2019 Temple University (College of Science and Technology)

Summer workshop on Scientific Computing and Statistical Reasoning

AWARDS

2020 Society for Molecular Biology and Evolution (SMBE).

Young Investigators Travel Award [1,500 USD]

REVIEWER FOR ACADEMIC JOURNALS

Genomics (https://www.journals.elsevier.com/genomics)

PRESENTATIONS

• 2021 EMBO Workshop: The Evolution of Animal Genomes

• 2021 6th Annual MidAtlantic Bioinformatics Conference – Emerging Approaches to Omics Questions Data Science for the 21st Century

• 2021 Dynamics and Evolution of Human Viruses – Presentation "RASCL: RAPID ASSESSMENT OF SARS-COV-2 CLADES THROUGH MOLECULAR SEQUENCE ANALYSIS"

• 2020 CSHL Biological Data Science
Abstract: "Evaluating the impact of multiple simultaneous mutations on evolutionary rate inference."

• 2020 9th Human Genetics in NYC Conference
Abstract Accepted: Conference Cancelled due to COVID-19

• 2020 Society for Molecular Biology and Evolution (SMBE)
Abstract Accepted: Conference Cancelled due to COVID-19

• 2020 Biology Graduate Student Organization Symposium - Binghamton University
Abstract: "Evaluating the impact of multiple simultaneous mutations on evolutionary rate inference."

• 2019 Temple University Biology Graduate Student Society Annual Retreat
Abstract: "Evaluating the impact of multiple simultaneous mutations on evolutionary rate inference."

• 2019 Mid-Atlantic Bioinformatics Conference (MABC)
Abstract: "Evaluating the impact of multiple simultaneous mutations on evolutionary rate inference."

• 2019 Evolution in Philadelphia Conference (EPiC)
Abstract: "Evaluating the impact of multiple simultaneous mutations on evolutionary rate inference."

CONFERENCES

• 2021 9th Human Genetics in NYC Conference

• 2021 Society for Molecular Biology and Evolution (SMBE)

• 2020 Mid-Atlantic Bioinformatics Conference (MABC)

• 2020 COVID-19 Dynamics and Evolution - Virtual Conference Series

• 2020 ETH Zurich Department of Biosystems Science and Engineering (D-BSSE) eSymposium 10.13.2020 "What do SARS-CoV-2 genomes tell us about their evolution and spread?"

• 2020 Institute for Translational Medicine and Therapeutics (ITMAT) 15th Annual International Symposium

• 2020 Biodiversity Genomics Conference

• 2020 24th International Conference on Research in Computational Molecular Biology (RECOMB)

• 2020 The Allied Genetics Conference (TAGC) - Online

• 2019 The State of Pre-College Education 12 years after "The Gathering Storm"

• 2019 Artificial Intelligence for Improvements of Biomarkers Imaging and TMA Multiplexing Analysis

• 2019 Epigenetics in Cancer Scientific Symposium at The Wistar Institute

• 2019 8th Human Genetics in NYC Conference

• 2019 BIO International Convention

• 2019 Mount Sinai: Fifth Annual New York Area Population Genomics Workshop

• 2018 7th Annual Human Genetics in NYC Conference

• 2018 BIO International Convention

• 2017 NYC EDC SBIR Impact: Bio and Health Tech NYC

• 2017 NYU Tandon: Future Labs AI Summit

• 2017 10th Annual NYU Developmental Genetics Symposium - Tissue Homeostasis and Regeneration