

# DANIEL LAZAREV

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## EDUCATION

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Massachusetts Institute of Technology

PhD, Mathematics  
2021 – present

Renaissance School of Medicine  
at Stony Brook University

MD  
2018 – 2020 (On leave for PhD)

Yeshiva University

BA (Hons.), Mathematics, Physics, Pre-medicine  
2012 – 2016

## WORK AND VOLUNTEER EXPERIENCE

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Broad Institute of MIT and Harvard

*Associate Computational Biologist*

Cambridge, MA  
March 2020 – September 2021

• Worked in the Neale lab in the Stanley Center for Psychiatric Research at the Broad Institute of MIT and Harvard and in the Analytic and Translational Genetics Unit at Massachusetts General Hospital.

• Built a Maximum Entropy model of multilayer gene-phenotype networks using data from the UK Biobank that allows the prediction of latent phenotypes mediating complex diseases, such as schizophrenia. Will continue contributing to this work as a graduate student.

Yeshiva University, Physics Department

*Adjunct Instructor*

New York, NY  
August 2016 – May 2018

Courses taught: Introduction to Physics I Lab, Introduction to Physics II Lab, General Physics II Lab, General Physics III Lab, General Physics I Problem Seminar, General Physics II Problem Seminar.

TABC High School

*Physics Teacher*

Teaneck, NJ  
January 2018 – June 2018

Taught two classes of eleventh grade physics.

YRSRH Middle and High School

*Science Teacher*

New York, NY  
September 2016 – June 2018

Courses taught: Science (sixth and seventh grades), Algebra I: Regents Prep (eighth and ninth grades), Chemistry: Regents Prep (eleventh grade), AP Physics (twelfth grade), SAT Math Review (twelfth grade).

Yeshiva University

New York, NY

• *Student Course Assistant*: General Physics (Honors)

September 2015 – May 2016

• *Honors Program Advisor*:

November 2015 – May 2016

Advised lowerclassmen in the Honors Program regarding coursework, and helped them devise a four-year course of study

• *Peer and Private Tutor*: Calculus, Physics, Chemistry and Writing

January 2014 – May 2016

• *Member of Student Government*:

August 2013 – May 2016

Sophomore Class President (2013 – 2014), Junior Class President (2014 – 2015), Senior Justice of the Student Court (2015 – 2016)

• *Student Ambassador*:

September 2013 – May 2016

Gave tours, participated in panel discussions, and represented the Mathematics Department, the Physics Department, and the Honors Program

• *Mentorship Program Volunteer*:

January 2013 – January 2016

Helped run science modules for elementary school students in underrepresented schools and for young patients in children's hospitals as a member of several initiatives, including Project START, CollegeEDge, the YU Literacy Program, and Project TEACH

## RESEARCH EXPERIENCE

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### Mathematical and Computational Biology

Adviser: Dr. Benjamin Neale

March 2020 – present

Broad Institute; MGH; Harvard Medical School

Developing a method that uses the Maximum Entropy Principle together with data from the UK Biobank and network topological constraints to build multilayer gene-phenotype interaction networks that allow the prediction of latent traits mediating complex diseases.

### Mathematical Physics and Fluid Dynamics

Adviser: Dr. James Glimm

December 2018 – December 2020  
Stony Brook University, Applied Mathematics & Statistics Department

Co-adviser: Dr. Gui-Qiang Chen

University of Oxford, Mathematical Institute

The Euler and Navier-Stokes equations model fluid flow and turbulence, but admit multiple solutions, even when solved numerically. We proved that the maximum entropy production principle is a necessary admissibility condition for the physically relevant solution to those equations.

### Nonlinear Dynamics

Adviser: Dr. Marian Gidea

August 2017 – December 2019

Yeshiva University, Mathematics Department

Analyzed the motion of a charged particle in the magnetic field created by a circular wire, perturbed by a constant, external magnetic field as a model for the motion of charged particles in accelerators and other magnetic instruments.

### Atomic Force Microscopy

Adviser: Dr. Fredy Zypman

September 2015 – June 2017

Yeshiva University, Physics Department

Built a mathematical model to find the size and charge of a ring sample *in vacuo* and in electrolytic environments given data typically provided by an atomic force microscope.

### Network Science

Adviser: Dr. Marian Gidea

November 2014 – April 2015

Yeshiva University, Mathematics Department

Investigated small-world networks, with application to the spread of cancer-promoting behaviors on college campuses.

## PUBLICATIONS

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3. J. Glimm, D. Lazarev, and G.-Q. Chen, Maximum entropy production as a necessary admissibility condition for the fluid Navier-Stokes and Euler equations, *SN Applied Sciences* **2**, 2160 (2020).
2. D. Lazarev and F. R. Zypman, Charge and size of a ring in an electrolyte with atomic force microscopy, *Journal of Electrostatics* **87**, 243 (2017).
1. D. Lazarev and F.R. Zypman, Determination of size and charge of rings by atomic force microscopy, *Journal of Electrostatics* **83**, 69 (2016).

## AWARDS AND ACHIEVEMENTS

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- **Jay and Jeanie Schottenstein Honors Program:** Additional Honors Program course requirements; Honors Thesis; full scholarship for undergraduate studies at Yeshiva U.
- **Professor Arnold & Bertha Lowan Memorial Award for Excellence in Physics Research:** Awarded April 2016 with a cash award of \$1200.
- **Dr. Ron and Cheryl Nagel Award for Excellence in Pre-Medical Studies:** Awarded May 2016.
- **The Lawrence P. Fischer Memorial Award** for “the best Hebrew paper on some aspect of Jewish History.” Awarded May 2016 with a prize of \$1500.
- **Imrei Shefer Writing Contest:** First place in a Yeshiva U. writing contest with a prize of \$1500. Awarded January 2016.
- **Dean’s List:** 2012 – 2016.