

# Mykhaylo Mykolaiovich Malakhov

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## THE BASICS

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**Permanent address:**  
21105 Rolling Hills Rd  
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**Citizenship:** United States  
**Date of birth:** June 27, 1998

## RESEARCH INTERESTS

I love all areas of mathematics! My current research focuses on mathematical ecology, where I study differential equation and periodic matrix models of infectious diseases (both human and animal), climate change, and animal behavior.

## EDUCATION

### Andrews University

B. S. in Mathematics (expected May 2020)

- Minor in Computing
- Honors Thesis: *Managing White-nose Syndrome in Bats: A Spatially Dynamic Modeling Approach*
- Goldwater Scholar
- J. N. Andrews Honors Scholar
- 4.00 GPA

### Budapest Semesters in Mathematics

I will be studying abroad through the BSM program for the Fall 2019 semester.

## RESEARCH EXPERIENCE

### UCLA IPAM RIPS (Summer 2019)

I am participating in the Research in Industrial Projects for Students (RIPS) program at the Institute for Pure and Applied Mathematics (IPAM) at the University of California, Los Angeles (UCLA).

### Williams College SMALL REU (Summer 2018)

Advisors:

- Julie C. Blackwood, Department of Mathematics and Statistics, Williams College
- Katriona Shea, Department of Biology, The Pennsylvania State University

I was part of the mathematical ecology group, where I worked on two projects. In one project we investigated how seasonal bat dispersal could affect the success of white-nose syndrome control strategies by posing and numerically analyzing the first spatially-explicit ODE model of white-nose syndrome. The second project focused on the perspective of ecosystem federalism as applied to infectious disease management; we explored the allocation of regulatory authority between different levels of government in a two-patch *SIRS*-type model.

## Andrews University Seabird Ecology Team REU (Summer 2017)

Advisors:

- Shandelle M. Henson, Department of Mathematics, Department of Biology, Andrews University
- J. M. Cushing, Interdisciplinary Program in Applied Mathematics, Department of Mathematics, University of Arizona

We analyzed a 3-dimensional, nonlinear periodic matrix model of seabird behavior and population dynamics using both numerical and analytic techniques. I proved the existence of backward bifurcations due to egg cannibalism.

### PUBLICATIONS

Junyan Duan, Mykhaylo M. Malakhov, Jordan Pellett, Ishan Phadke, Katriona Shea, Julie C. Blackwood, David Kling, Suzanne Lenhart, Jim Sanchirico, and Mike Neubert. *Transboundary Disease Management Under Alternative Objectives*, in preparation.

Junyan Duan, Mykhaylo M. Malakhov, Jordan Pellett, Ishan Phadke, Jackson Barber, and Julie C. Blackwood. *Managing White-nose Syndrome in the Presence of Spatial Dynamics*, in preparation.

Mykhaylo M. Malakhov, Benjamin MacDonald, J. M. Cushing, and Shandelle M. Henson. *Life History Strategies and Backward Bifurcations in a Structured Seabird Population Model*, in preparation.

### CONFERENCE PRESENTATIONS

*Managing White-nose Syndrome in Bats: A Spatially Dynamic Modeling Approach*. 2019 Honors Thesis Symposium, Andrews University. (April 2019)

*Modeling the impact of bat dispersal on white-nose syndrome control strategies*. Mathematics Section, Michigan Academy of Science, Arts, and Letters, Alma College. (March 2019)

*Federalism in Epidemic Modeling: Multi-objective Management of Interconnected Populations*. AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, Joint Mathematics Meetings, Baltimore, MD. Jointly with Ishan Phadke. (January 2019)

*Cannibalism and synchrony in a periodic matrix seabird population model*. Mathematics Section, Michigan Academy of Science, Arts, and Letters, Central Michigan University. (March 2018)

*Backward Bifurcations in a Periodic Matrix Model of Seabird Population Dynamics*. MAA General Contributed Paper Session on Modeling and Applications, Joint Mathematics Meetings, San Diego, CA. (January 2018)

### OTHER ORAL PRESENTATIONS

*SMALL Projects for a Big World: Spatial Models of Infectious Disease*, eigen\*Talk (undergraduate math/physics colloquium), Andrews University. (November 2018)

*Differential Geometry: History, Theory, and Applications*, eigen\*Talk (undergraduate math/physics colloquium), Andrews University. Jointly with other Differential Geometry students. (April 2018)

*Effects of Sea Surface Temperature on Seabird Behavior in the Pacific Northwest*, eigen\*Talk (undergraduate math/physics colloquium), Andrews University. (September 2017)

*Uncertainty in Mathematics: A Historical Analysis of the Validity and Rigor of Mathematical Statements*, eigen\*Talk (undergraduate math/physics colloquium), Andrews University. Jointly with Robert C. Moore and Lukasz Krzywon. (April 2017)

POSTER  
PRESENTATIONS

*Managing White-nose Syndrome in Bats: A Spatially Dynamic Modeling Approach*, 2019 Honors Scholars and Undergraduate Research Poster Symposium, Andrews University. (March 2019)

*Efficacy of Control in a Spatially Dynamic Model of White-nose Syndrome*, Summer Science Poster Session, Williams College. Jointly with Ishan Phadke. (August 2018)

*A Periodic Matrix Model of Seabird Behavior and Population Dynamics*, 2018 Honors Scholars and Undergraduate Research Poster Symposium, Andrews University. (March 2018)

TEACHING  
EXPERIENCE

**Department of Mathematics, Andrews University**

Planned and taught L<sup>A</sup>T<sub>E</sub>X short course with Devin Garcia (Spring 2019)

Reader for MATH 355 Foundations of Advanced Mathematics (Spring 2018, Spring 2019)

Tutor, Mathematics Center (Spring 2017 – Spring 2019)

Teaching Assistant for MATH 192 Calculus II (Spring 2017)

Private Math Tutor (Fall 2016 – Spring 2019)

HONORS AND  
AWARDS

**National and International Awards**

Member, Nu Sigma Chapter of Sigma Tau Delta: The International English Honor Society (inducted 2019)

Member, Chapter 249 of The Honor Society of Phi Kappa Phi (inducted 2019)

Barry M. Goldwater Scholarship (2018)

Member, Michigan Gamma Chapter of Pi Mu Epsilon: The National Mathematics Honor Society (inducted 2018)

Associate Member, Andrews-Whirlpool Chapter of Sigma Xi: The Scientific Research Honor Society (inducted 2017)

**Andrews University Awards**

Dean's List (every semester)

J. N. Andrews Honors Scholar (admitted into the program 2016)

Full Tuition ACT/SAT Scholarship (awarded 2016 for four years)

**Andrews University Department of Mathematics Awards**

Award for Excellence in Probability Theory with Statistical Applications (2019)

Award for Excellence in Complex Analysis (2019)

Award for Excellence in Applied Mathematics (2019)

Award for Excellence in Abstract Algebra (2019)

Award for Excellence in Geometry (2019)

Harold T. Jones Scholarship (2018) for highest overall excellence in mathematics

Louis Ulloth Scholarship (2018) for most significant leadership contributions

Award for Excellence in Differential Equations (2018)

	Award for Excellence in Mathematical Modeling in Biology (2018)
	Award for Excellence in Calculus III (2018)
	Putnam Team Member (2017 and 2018)
	Award for Excellence in Foundations of Advanced Mathematics (2017)
	Award for Excellence in Calculus II (2017)
	Award for Excellence in Calculus I (2017)
SERVICE AND OUTREACH	<p>President, Michigan Gamma Chapter, Pi Mu Epsilon (2018–present) I organize <math>\pi</math> Day festivities, game nights, and other fun activities. After one year of service I was reelected for a second term.</p> <p>Vice President, AU Chapter, Engineers Without Borders (2018–2019) I oversaw all club administration and functions, as well as the initial phases of a \$60,000+ solar energy project in Madagascar. The summer of 2018 I traveled to Madagascar to conduct the assessment phase of our project.</p> <p>Mathematics President, eigen*: the AU math/physics club (2017–2018) I planned math-related colloquia and events and invited guest speakers. I also organized the first-ever Putnam Competition team and preparation course at AU.</p> <p>Treasurer, AU Chapter, Engineers Without Borders (2017–2018) I oversaw all club and project finances, grant applications, and fundraising. During my time as Treasurer we raised almost \$20,000.</p> <p>Founding Student Leader, codeShack: Google igniteCS @ AU (2016–2017) I helped start a computer science education program at the local elementary school and wrote a successful application for Google igniteCS funding.</p>
RELEVANT SKILLS	<p>Languages: English (native), Russian (native), Spanish (intermediate)</p> <p>Programming and Software: MATLAB, L<sup>A</sup>T<sub>E</sub>X, Scientific WorkPlace, Linux, Java (including Android app development), C++, Python, git, Processing (language)</p>