

## David McMorris

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CONTACT INFORMATION	Department of Mathematics Luter Hall 340 Christopher Newport University One Avenue of the Arts Newport News, VA 23606	david.mcmorris@cnu.edu <a href="https://davidmcmorris.github.io/">https://davidmcmorris.github.io/</a>
RESEARCH INTERESTS	Mathematical biology and scientific computing, applications of control theory to plant life history and ecology.	
EDUCATION	<b>University of Nebraska-Lincoln</b>	
	Ph.D. in Mathematics Advisor: Glenn Ledder Dissertation: <i>Optimal Allocation of Two Resources in Annual Plants</i>	August 2020
	M.S. in Mathematics	May 2016
	<b>Hope College</b>	
	B.S. in Mathematics <i>Magna Cum Laude</i> Advisor: Brian Yurk	May 2014
APPOINTMENTS	<b>Adjunct</b> , Christopher Newport University <b>Graduate Teaching Assistant</b> , UNL	August 2021 - present 2014 - 2020
TEACHING EXPERIENCE	<b>Instructor of Record</b>	
	<b>Christopher Newport University</b>	
	Math 115: Contemporary Mathematics	Fall 2023, Spring 2024
	Math 130: Precalculus	Spring 2022, 2023, Fall 2023, 2024
	Math 125: Elementary Statistics	Fall 2022, 2023, 2024, Spring 2024, 2025
	Math 135: Calculus for Business and Social Sciences	Fall 2021, Spring 2022
	<b>University of Nebraska-Lincoln</b>	
	Math 302: Math Modeling A course for pre-service elementary teachers.	Spring 2017, 2019, 2020
	Math 104: Applied Calculus (~ 110 students)	Fall 2019
	Math 106: Calculus I Part of the WHT Scholars Learning Community for first-generation students	Fall 2018
	Math 203: Contemporary Mathematics	Spring 2018
	Math 301: Geometry Matters A course for pre-service elementary teachers.	Summer 2017
	Math 103: College Algebra & Trigonometry Part of the WHT Scholars Learning Community for first-generation students	Fall 2016, 2017
	Math 101: College Algebra	Fall 2015, Spring 2016, Summer 2016

## Teaching Assistant

### University of Nebraska-Lincoln

Math 107: Calculus II Recitation

Spring 2015

Math 106: Calculus I Recitation

Fall 2014, Summer 2015

## Qualifying Exam Workshops

### University of Nebraska-Lincoln

Organized workshops for first-year graduate students preparing for qualifying exams

PDE and Applied Math Workshop

May 2018

ODE and Applied Math Workshop

May 2017

## Grader

### University of Nebraska-Lincoln

Math 489/889: Stochastic Processes

Fall 2018

Math 831: Partial Differential Equations

Fall 2017

Math 842: Methods in Applied Mathematics

Fall 2016

Math 104: Applied Calculus

Spring 2015

## PUBLICATIONS AND PREPRINTS

1. D. McMorris and G. Ledder, *Resource Allocation in Annual Plants*. (submitted)  
bioRxiv 2021.04.19.440512.
2. D. McMorris, P. Pearson, and B. Yurk, *A modified wavelet method for identifying transient features in time signals with applications to bean beetle maturation*.  
Involve, a Journal of Mathematics, **10(1)** (2016), 21-42.

## PRESENTATIONS

† DENOTES INVITED TALK

- Optimal Allocation of Two Resources in Annual Plants*  
(50 min)  
UNL, Dissertation Defense July 2020
- † *Plant Life History and Optimal Control*  
(20 min)  
Nebraska Wesleyan University Math Club November 2019
- † *Investigating Plant Growth Through Mathematical Biology*  
(50 min)  
Nebraska Wesleyan University STEM Seminar March 2019
- † *Using Optimal Control Theory to Model Resource Allocation in Annual Plants*  
(50 min)  
Creighton University Department of Mathematics Colloquium November 2018
- An Optimal Control Approach to Resource Allocation in Annual Plants*  
(50 min)  
UNL MathBio Seminar October 2018
- An Application of Optimal Control to Resource Allocation in Annual Plants*  
(20 min)  
Midwest Mathematical Biology Conference, UW - La Crosse May 2018
- † *Optimal Control Theory and Math Biology*  
(10 min)  
Nebraska Wesleyan University Math Club October 2017

- † *Modified Wavelet Methods for Identifying Transitions in Bean Beetle Maturation*  
(Poster)  
     Hope College Celebration of Undergraduate Research April 2014  
     † Michigan Mathematics Prize Competition Awards Day March 2014
- † *Identifying Transitions in Bean Beetle Maturation Using Modified Wavelet Methods*  
(15 min)  
     † Hope College Mathematics Department Colloquium October 2013  
     Midstates Consortium for Math and Science Undergraduate Research  
     Symposium, University of Chicago October 2013

# RESEARCH EXPERIENCE

- University of Nebraska-Lincoln** 2016 - 2020  
 Dissertation Research; Advisor: Glenn Ledder  
 Optimal control theoretical approach to resource allocation in annual plants  
     – Developed a two-resource model for resource allocation in annual plants.  
     – Used optimal control theory to determine the growth trajectory that maximizes fruit production over the course of a growing season.  
     – Implemented numerical methods to simulate the model in MATLAB.
- University of Nebraska-Lincoln** Summer 2018  
 Graduate Research Assistant; Advisor: Adam Larios  
 Regularity of solutions to fractional Benjamin-Bona-Mahony equation  
     – Used numerical techniques to investigate the effects of incorporating a fractional differential operator on the smoothness of solutions to the BBM equation.
- Hope College** 2013-2014  
 Undergraduate Research Assistant; Advisor: Brian Yurk  
 Studied effects of climate change on growth of embryonic *Callosobruchus maculatus*  
     – Developed and implemented laboratory protocol for exposing embryos to varying environmental conditions and collecting data via digital microscopy.  
     – Employed a modified wavelet image processing algorithm with R and Java to examine effects of climate variation on the timing of key transition points in embryonic development.

# HONORS AND AWARDS

- Parents' Recognition Award**, UNL 2017  
     Nominated by parents for making a difference in the lives of their students.
- Outstanding Qualifying Exam**, UNL 2015
- Othmer Fellowship**, UNL 2014  
     Merit-based three-year fellowship awarded to incoming graduate students.
- Albert E. Lampen Mathematics Prize**, Hope College 2014  
     Awarded annually to two graduating seniors in mathematics.
- Member of Phi Beta Kappa** inducted 2014
- Member Pi Mu Epsilon**, Michigan Delta chapter inducted 2014
- John H. Kleinheksel Mathematics Award**, Hope College 2012  
     Awarded annually to select sophomore-level mathematics majors.
- Presidential Scholarship**, Hope College 2010  
     Merit-based scholarship at Hope College

SERVICE

- MCM/ICM**, Consortium for Mathematics and Its Applications Since 2021  
The Mathematical Contest in Modeling and Interdisciplinary Contest in Modeling are international modeling contests each spring which challenge students to engage with open-ended problems and write detailed reports of their work. I have been a first-round judge for either the ICM or MCM since 2021, and have served on a panel of final judges to identify Finalist and Outstanding papers for the ICM since 2023.
- Referee**, Letters in Biomathematics Since 2021
- New Student Enrollment**, UNL Summer 2019, 2020  
Worked with academic advisors and incoming freshmen to determine their math placement based on their backgrounds and major requirements.
- Nebraska Conference for Undergraduate Women in Mathematics**,  
Department of Mathematics, UNL January 2019, 2020  
NCUWM is an annual conference open to undergraduate women mathematicians. I volunteered to assemble informational packets and register conference attendees.
- Dean Search**, College of Arts and Sciences, UNL January 2019  
Served on a panel of 10 students who met with and evaluated each candidate.
- Math Day**, Department of Mathematics, UNL November 2014 - 2019  
Proctored/coordinated throughout a day of high school mathematics competitions for approximately 1400 students across Nebraska.