ETHAN HOBBS CURRICULUM VITAE

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RESEARCH INTERESTS
Complex Systems; Physics of Living Systems; Dynamic Networks; Collective/Emergent Behavior; Soft Matter; Active Matter, Behavioral Ecology

EDUCATION

University of Colorado - Boulder Boulder, CO
PhD in Computer Science Expected May 2023
Certificate in Quantitative Biology

Carthage College Kenosha, WI
B.A. in Physics and Mathematics May 2018
Minors in Spanish and Theater
Cumulative GPA: 3.87/4.00
Relevant Coursework - Physics: Mechanics; Optics; Computational Data Reduction; Mathematical Physics
Relevant Coursework - Mathematics: Multivariate Calculus; Linear Algebra; Differential Equations; Abstract Algebra; Combinatorics*; Real Analysis; Theory of Statistics

ONGOING RESEARCH EXPERIENCE

Fire Ant Aggregation Dynamics
CU-Boulder May 2019
Research Advisor: Dr. Franck Vernerey, CU-Boulder, Mechanical Engineering
Exploration of the material properties of Fire Ant aggregations through experiments and simulations to further build active soft matter theory.

2-Dimensional Facilitated Transport
CU-Boulder Aug 2019
Research Advisor: Dr. Franck Vernerey, CU-Boulder, Mechanical Engineering
Creating a theoretical model and simulations for 2-dimensional facilitated diffusion of a particle with attached polymer chains.

PREVIOUS RESEARCH EXPERIENCE

Reducing Pollinator Decline
CU-Boulder Mar 2019–May 2019
Research Advisor: Dr. Colin Campbell, University of Edinburgh, Chemistry
A review on the causes of pollinator loss to explore radical possibilities for the reduction in the rate of decline. A team science project conducted with students Philip Benson (CU-Boulder Biochemistry) and Sierra Jech (CU-Boulder Evolutionary Biology

Patterns in Barn Swallow Nest Site Settlement
CU-Boulder Jan 2019–Mar 2019
Research Advisor: Dr. Rebecca Safran, CU-Boulder, Evolutionary Biology
A data based study on the spacial patterns of Barn Swallow settlement over several years at a single site location. Investigated factors like line of sight, familiarity of the site, and amount of light on the nest

The Role of Collective Behavior in the Glass Transition
Carthage College Oct 2017–May 2018
Research Advisor: Dr. Jean Quashnock, Carthage College
A study of several glass transition models and their similarities to the Repulsive Vicsek Model to isolate the importance of collective motion in the glass transition.

The Optimal Path through a Crowd
Carthage College Sep 2017–Apr 2018
Research Advisors: Dr. Orit Peleg, University of Colorado-Boulder and Dr. Haley Yaple, Carthage College
Investigating the best path through a crowd at varying levels of noise by examining the forces which act upon the particle over the path.

Understanding Collective Motion: Jamming and Crowd Dynamics
Harvard University - TRiCAM REU Program Jun 2017–Aug 2017
Research Sponsor: Professor L. Mahadevan, Harvard University
Research Advisors: Dr. Christoph Weber, Dr. Orit Peleg, Alex Heyde, Harvard University
Participated in a team of four undergraduate researchers that investigated collective motion behavior in crowd scenarios. Created simulations and visualizing software for the Vicsek Model, the Repulsive Vicsek Model, and a Crowd Scenario. Under crowd dynamics, investigated optimal paths for crowd infiltration using controlled agents.

One-Dimensional Ising Model Analysis
Carthage College Jun 2016–Sep 2016
Research Advisor: Dr. Haley Yaple, Carthage College
Created a stochastic simulation to verify the continuous one-dimensional Ising model for ferromagnetism.

PRESENTATIONS

"The Role of Collective Behavior in the Glass Transition"
Senior Physic Thesis Symposium, Carthage College, May 2018.

"The Optimal Path Through a Crowd"
Joint Mathematics Meeting, San Diego, Jan 2018. Poster Presentation

"The Optimal Path Through a Crowd"
Pi Mu Epsilon Regional Undergraduate Mathematics Conference, St. Norbert College, Nov 2017.

"Collective Motion: Jamming and Crowd Dynamics"
Harvard Summer Undergraduate Research Symposium, Harvard University, Aug 2017.

"The Ising Model"
Pi Mu Epsilon Regional Undergraduate Mathematics Conference, St. Norbert College, Oct 2016.

ACADEMIC HONORS & AWARDS

Sigma Pi Sigma Honors Society Apr 2018
Membership awarded for distinction in the physics major and excellence in presentation of scientific ideas

John Hay Presidential Scholarship 2014– 2018
Awarded for academic excellence, provides 75% tuition coverage

Pi Mu Epsilon Honors Society Apr 2017
Membership awarded for distinction in the mathematics major

Marie and John Sladek Scholarship 2016
Awarded for excellence in both the arts and natural sciences

Wisconsin Math Modeling Challenge Oct 2016
Team member in the 24-hour math modeling competition, winning 2nd place for written summary of solution and finalist for presentation

PROFESSIONAL MEMBERSHIPS

Mathematical Association of America (MAA)
American Mathematical Society (AMS)
Society of Industrial and Applied Mathematics (SIAM)
Society of Physics Students (SPS)

TECHNICAL SKILLS

Python - Extensive experience in data visualization and simulation techniques as well as library maintenance
MATLAB - Extensive experience in simulation techniques for research projects
C++ - Experience with large modifying simulations
LaTeX - Experience creating documents for both research articles and classroom reports
Git - Experience managing large simulations and website development

NON-TECHNICAL SKILLS

Languages:
English (Fluent)
Spanish (Proficient)

Music:

Pit Orchestra - *Into the Woods* (Bassoonist)	Feb 2018–May 2018
Pit Orchestra - *The Mystery of Edwin Drood* (Bassoonist)	Feb 2017–May 2017
Carthage Wind Orchestra (1st Chair Bassoonist)	Sep 2014–Jun 2018
Carthage Philharmonic Orchestra (1st Chair Bassoonist)	Sep 2014–Jun 2018
AMATI Small Ensemble (1st Chair Bassoonist)	Aug 2015–Jun 2018