

# John D. Cobb

PHD STUDENT AT UNIVERSITY OF WISCONSIN-MADISON

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CITIZENSHIP: USA

## Education

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### University of Wisconsin-Madison

PHD MATHEMATICS

Madison, WI

Aug. 2019 - Present

### Honors College of Charleston

B.S. MATHEMATICS | B.A. CHEMISTRY | MINOR DATA SCIENCE

Charleston, S.C.

Aug. 2015 - May 2019

- Major GPA of 4.0, cumulative GPA of 3.97.
- Awarded over 5 departmental scholarships over the first three years.
- Goldwater Scholar in 2017 for research in modeling the morphology of semiconducting polymers.

## Honors & Awards

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2019	<b>Recipient</b> , Ewa Wojcicka Mathematics Award	Collegewide
2019	<b>Recipient</b> , ACS Outstanding Student in Computational Chemistry	Regional
2019	<b>Fellow</b> , NDSEG Fellowship	National
2019	<b>Alternate Candidate</b> , Fulbright	National
2019	<b>Outstanding Poster</b> , MAA-JMM Undergraduate Poster Session	National
2018	<b>Honorable Mention</b> , COMAP Mathematical Modeling Competition	International
2018	<b>Recipient</b> , Scott Ward Award for Excellence in Mathematical Studies	SC, U.S.A.
2018	<b>Recipient</b> , Brewer Scholarship (Chemistry)	SC, U.S.A.
2018	<b>Recipient</b> , Horatio Hughes Scholarship in Mathematics	SC, U.S.A.
2018	<b>Recipient</b> , Gadsden Scholarship (Mathematics)	SC, U.S.A.
2017	<b>Recipient</b> , Howard Hughes Medical Institute Mentoring Grant	National
2017	<b>Scholar</b> , Goldwater Scholarship	National
2017	<b>Top 10%</b> , Virginia Tech Regional Math Competition	Regional
2017	<b>Recipient</b> , ATD Scholarship in Mathematics	SC, U.S.A.
2015	<b>Recipient</b> , Palmetto Fellows	SC, U.S.A.
2015	<b>AP Scholar with Distinction</b> , College Board	National

## Publications

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Cobb, John. Kasman, Alex. Sharpman, Monique. Serna, Albert. *Direct and Inverse Scattering of Quaternion-Valued KdV Solitons*. In Preparation.

Anderson, Paul and John Cobb. *Evolutionary Strategies to Solve the Rankability Problem*. In Preparation.

Boucher, David. Sharp, Devin. Taylor, Sarah. Cobb, John. Smirnova, Anna. *Aggregate Dispersions to Enhance the Intrachain Order in Surfactant-Stabilized Aqueous Colloids of Poly(3-hexylthiophene)*. Journal of Molecular Liquids. **77** (2018), 996-1004.

## Presentations

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“Breather Soliton Interactions for the Quaternionic KdV Equation.” JMM Contributed Paper Session. Baltimore, MD. January 2019. Presenter.

“Quaternion-valued Solutions to the Korteweg-deVries Equation.” JMM Quaternion Special Session. Baltimore, MD. January 2019. Presenter.

“Quaternionic 2-Soliton Interaction and Phase Shifts” JMM Undergraduate Poster Session. Baltimore, MD. January 2019. Poster Presenter.

“Quaternion-Valued Solutions to the KdV Equation” CofC Mathematics Colloquium. Charleston, SC. November 2018. Presenter.

“Rankability.” Tresata. Charlotte, SC. August 2017. Invited Presenter.

“Investigating Rankability Using Distributed Graph Analytic Frameworks.” CofC Celebration of Scholars. Charleston, SC. August 2017. Poster Presenter.

“Singular Value Decomposition and Digital Image Processing.” College of Charleston Data Science Club. Charleston, SC. November 2016. Presenter.

“Affine Transformations and Fractal Images.” College of Charleston Data Science Club. Charleston, SC. October 2016. Presenter.

“Investigating the stability of P3HT solutions using light scattering and zeta-potential measurements.” Colloid Chemistry, ACS Southeast Regional Meeting. Columbia, SC. October 2016. Poster Presenter.

“Concentration Dependence of the Self-Assembly of Poly(3-hexylthiophene).” CofC Celebration of Scholars. Charleston, SC. August 2016. Poster Presenter.

“Solvent-Induced Assembly of P3HT: Controlling Organic Photovoltaic Film Morphology.” College of Charleston Department of Chemistry and Biochemistry: Weekly Colloquium. Charleston, SC. June 2016. Presenter.

“Growth of P3HT-PCBM Nanostructures at Solvent-Solvent Interfaces.” CofC Celebration of Scholars. Charleston, SC. August 2017. Poster Presenter.

## Research Experience

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### College of Charleston Department of Mathematics

*Charleston, SC*

#### STUDENT RESEARCHER

*Mar. 2018 - May 2019*

- Conduct research of noncommutative soliton solutions to the nonabelian n-KdV hierarchy and KP hierarchy focusing on quaternion-valued solutions to the KdV equation.
- Work during Summer 2018 led to a publication in progress and several presentations, including one at the Joint Mathematics Meetings (JMM) in January.

### Institute on Graph Analytics and Research in Data Science

*Charleston, SC*

#### STUDENT RESEARCHER

*Dec. 2016 - May 2019*

- Work with a team dedicated to pursuing fundamental problems in data science.
- Currently designing algorithms to calculate suspected indicators of how “rankable” a dataset is by virtue of its spectral properties.
- Creating scalable approximative solutions that work across distributed systems.
- Invited by Dr. Tim Chartier of Davidson College to present at Tresata, a big data predictive analytics company based in Charlotte.

## College of Charleston Chemistry & Biochemistry Department

Charleston, SC

STUDENT RESEARCHER & MENTOR

Sep. 2015 - Aug. 2017

- Conduct research that focuses on: solubility parameter theory, polymer assembly in the liquid phase, morphology of polymer films, synthesis of polymer-nanoparticle composites using *in-situ* methods for the design of organic optoelectronics.
- Participant in HHMI Grant supporting my work as a mentor.

## Tresata

Charlotte, NC

SUMMER DATA ANALYST RESEARCHER

Jul. 2017-Aug. 2017

- Invited by Chief Analyst Dr. Tim Chartier to represent IGARDS and design efficiently stored graph theory algorithms for the rankability project.
- Involved rewriting prospective rankability measures to fit the memory partitioning schemes of computer clusters, with the ultimate goal of speeding up the computation of large ranking problems.

## Teaching & Tutoring

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### College of Charleston School of Science and Math

Charleston, SC

TEACHING ASSISTANT

Aug. 2017 - Present

- Hold sessions during class to help students in "MATH 229: Vector Calculus with Chemical Applications".
- Help grade assignments for students in the introductory proof class.

### College of Charleston

Charleston, SC

PERSONAL TUTOR

Aug. 2016 - Present

- Meet with struggling students referred to me by previous professors.
- Develop lesson plans to clearly reteach concepts.

### Trident Literacy Association

Charleston, SC

VOLUNTEER TUTOR

Oct. 2015 - Oct. 2016

- Trident literacy is a nonprofit organization that seeks to reverse the cycle of generational poverty and illiteracy.
- Helped weekly to prepare nontraditional students for their GED.
- Primarily taught topics from arithmetic, algebra, and precalculus.

## Extracurricular & Leadership

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### College of Charleston Higdon Leadership Cohort

Charleston, S.C.

STUDENT LEADER

Sep. 2018 - May 2019

- 50 Applicants are selected through an application and group interview process.
- Engage in networking and participate in discussion and activities including local businesses, government figures, and service organizations.

### College of Charleston School of Sciences and Mathematics

Charleston, S.C.

STUDENT AMBASSADOR

Sep. 2018 - May 2019

- Select group of 9 students who have demonstrated outstanding academic achievement and exemplary student leadership.
- Represent the School of Sciences and Mathematics at College of Charleston to incoming students and other interest groups.

### College of Charleston Chess Club

Charleston, S.C.

PRESIDENT

Aug. 2017 - May 2019

- Organizing local tournaments and promoting chess in the CofC community.
- Support individuals or teams who wish to compete in local, state, national, or international competitions.

## **Phi Kappa Phi Honor Society**

*Charleston, SC*

STUDENT VICE-PRESIDENT & WEBMASTER

*Apr. 2017 - May 2019*

- Meet with board to coordinate volunteer opportunities and promote education throughout the College of Charleston campus.
- Help organize events on campus for Phi Kappa Phi members.
- Manage the College of Charleston Chapter Phi Kappa Phi Website.

## **The Cancer Chase**

*Fort Mill, SC*

CO-FOUNDER & BOARD MEMBER

*Feb. 2015 - Oct. 2017*

- Help direct the founding of The Cancer Chase, whose first project began an annual 5k run benefiting Carolinas HealthCare System's Levine Cancer Institute.
- Rally support from local businesses to raise over \$15,000 annually.

## **Alpha Chi Sigma Chemistry Honors Fraternity**

*Charleston, S.C.*

STUDENT MEMBER

*Apr. 2016 - Apr. 2017*

- Volunteer to clean up Charleston beaches and participate in local charity events.
- Promote chemistry in community by helping throw chemistry "magic shows" at local high schools and setting up chemistry/math help sessions after school.

## **AMS Spring Southeastern Sectional Meeting**

*Charleston, S.C.*

VOLUNTEER

*Mar. 2017*

- Signed in attendees to the 3-day AMS Spring southeastern sectional meeting.
- Attended many of the events, particularly those pertaining to rankability.

## **CofC Math Meet**

*Charleston, SC*

VOLUNTEER

*Feb. 2016, Feb. 2017, Feb. 2018*

- Math Meet is held annually at College of Charleston to motivate interested high schoolers.
- Volunteer to oversee various parts of the planned activities including judging timed sprints and signing students in.