Benjamin Eller

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PERSONAL/CONTACT INFORMATION

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PUBLICATIONS

- "Clar's rule reveals the topological origin of edge states in π-conjugated systems" **B. Eller**, J. Fortner, Y. Wang, *J. Phys. Chem. Lett.* (2025, in press).
- "Scaling law of quantum confinement in single-walled carbon nanotubes" **B. Eller**, C. W. Clark, Y. Wang, *J. Chem. Phys.* **162** 144303 (2025). arXiv:2410.21672
- "Can armchair nanotubes host organic color centers?" **B. Eller**, J. Fortner, J. Kłos, Y. Wang and C. W. Clark, *J. Phys.: Condens. Matter* **34** 464004 (2022)
- "Thermal stability of a quantum rotation sensor" E. Arabahmadi, D. Schumayer, M. Edwards, **B. Eller**, and D. A. W. Hutchinson, *Phys. Rev. A* **104**, 033323 (2021)
- "Producing flow in racetrack atom circuits by stirring" **B. Eller**, O. Oladehin, D. Fogarty, C. Heller, C. W. Clark, and M. Edwards, *Phys. Rev. A* **102**, 063324 (2020)
- "Superfluid transport dynamics in a capacitive atomtronic circuit" A. Li, S. Eckel, **B. Eller**, K. E. Warren, C. W. Clark, and M. Edwards, *Phys. Rev. A* **94**, 023626 (2016)

PRESENTATIONS

- Physics Colloquium, Dept. of Biochemistry, Chemistry, and Physics, Georgia Southern University, September 2025
- Poster presentation, Conference on Excited State Processes, organized by Los Alamos National Laboratory, June 2025
- Contributed plenary symposium talk at the NT'24 conference on low-dimensional materials, June 2024
- Contributed 10-min talks at APS (American Physical Society) March Meetings 2022, 2019, 2018 and 2017
- Contributed 10-min talk at APS DAMOP, June 2018

PROFESSIONAL EXPERIENCE

Faculty Assistant (current) Sep 2025-
University of Maryland, Dept. of Chemistry & Biochemistry
Supervisor: Prof. YuHuang Wang

Postdoctoral Research Assistant June 2025-Sep 2025

University of Maryland, Dept. of Chemistry & Biochemistry
Supervisor: Prof. YuHuang Wang

EDUCATION

Ph.D. Chemical Physics 2019-2025
University of Maryland
Thesis title: Structural and excitonic properties of quantum defect-tailored ultrashort carbon nanotubes from density functional theory. Advised by Charles W. Clark & YuHuang Wang.

M.S. Applied Physical Sciences 2017-2019
Georgia Southern University
Thesis topic: Modeling the production of quantized circulation in atomtronic circuits at zero and non-zero temperature. Advised by Mark Edwards.

B.S. Physics 2013-2017
Georgia Southern University
Undergraduate research: Bose-Einstein condensates and atomtronics. Advised by Mark Edwards.

RESEARCH EXPERIENCE

- Attended the carbon nanotube sorting camp at NIST in June 2025 to observe methods of sorting carbon nanotubes.
- Gained hands-on experience calculating exciton states in low-dimensional materials using *BerkeleyGW* software at the BESC 2024 workshop.
- Studied optical and electronic properties of theoretical models of chemically functionalized carbon nanotubes using density functional theory methods from Fall 2019 to the present
- Performed theoretical research on Bose-Einstein condensates and their potential for use as atomtronic devices using numerical solutions of the Gross-Pitaevskii equation from Fall 2015 through Spring 2019

TEACHING EXPERIENCE

- TA for PHYS 276 at the University of Maryland, electronics lab for physics majors, Fall 2024 and Spring 2025
- TA for PHYS 121 at the University of Maryland, introductory physics course, Spring 2024
- Taught an upper-division undergraduate quantum mechanics lecture as a substitute while working towards my M.S. in applied physical sciences
- Performed physics tutoring and TA duties during my M.S. studies from Fall 2017 through Spring 2019
- Performed physics tutoring and TA duties during my B.S. studies from Fall 2015 through Spring 2017

ACTIVITIES & OUTREACH

- Served on a development team for the Institute for Robust Quantum Simulation to develop quantum activity kits for educational outreach on quantum mechanics and qubits
- Organized speakers for the Joint Quantum Institute's Friday Quantum Seminar series in the Fall of 2023 and Spring of 2024
- Volunteered for Cyber Defense Camp on the University of Maryland campus, Summer 2023
- Organized the Kamp Kwal-i-fire qualifying exam preparation series for Physics and Chemical Physics PhD students at the University of Maryland, Summer 2020
- Served as president of the Georgia Southern chapter of Society of Physics Students from Fall 2017 through Spring 2018
- Involved in numerous science outreach activities at local schools and STEM events starting in Fall 2015