

Lottie Murray

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EDUCATION

University of Delaware (UD), Newark, DE 19716

Ph.D. in Materials Science and Engineering (July 2021 - Present)

Research Focus: Exploration of material platforms for single photon quantum emitters via strain engineering and Molecular Beam Epitaxy

≈ Advisor: Dr. Matthew Doty

≈ GPA: 3.83

Washington & Jefferson College (W&J), Washington, PA 15301

B.A. in Physics, Minor in Mathematics (May 2019)

≈ Advisor: Dr. Michael McCracken

≈ GPA: 3.72

RESEARCH EXPERIENCE

≈ *Wafer-scale growth of site-determined wavelength-tunable quantum emitters in atomically-thin (2D) semiconductors*, Dr. Matthew Doty (July 2021 - Present)

We study the optoelectronic properties and degradation pathways of 2D materials created via Molecular Beam Epitaxy and exfoliation. Additionally, strain engineering aims to allow 2D semiconductors to be used as a platform for site deterministic single photon quantum emitters in quantum computing.

≈ *Integrating Wifi into The CosmicWatch Desktop Muon Detector*, Dr. Michael McCracken (September 2018 - May 2019)

We modified a CosmicWatch Desktop Muon Detector by adding an ESP8266 wifi module to the micro-controller and altering the CosmicWatch Arduino program. This would allow for multiple detectors to transmit data to one collective dataset.

≈ *Identification of semi-muonic Λ decays using machine learning*, Dr. Michael McCracken (May 2017 - May 2018)

We investigated the muonic decay of the Λ baryon using a Monte Carlo simulation and kinematics. We used neural networks to analyze detector data and categorize the type of decay and therefore the frequency of each decay.

PUBLICATIONS

[Google Scholar](#)

1. **L. Murray**, H. Carneiro da Silva, C. Celani, E. Herrmann, K. Booksh, X. Wang, M. Doty. Optimizing Analysis for Strain Engineering of 2D Materials, (2025) (*In Preparation*)
2. **L. Murray**, E. Herrmann, I. Evangelista, A. Janotti, X. Wang, M. Doty. Quantifying the Relationship Between Strain and Bandgap in Thin Ga₂Se₂, (2025) (*In Preparation*)
3. E. Herrmann, **L. Murray**, M. Doty, X. Wang. Designer Strain Distributions in Two-Dimensional Materials, (2024) (*In Preparation*)
4. **L. Murray**, M. Whalen, A. Ishraq, C. Maurtua, J. Q. Xiao, C. Chakraborty, M. Doty. Understanding and Mitigating the Degradation of Optical Emission from Exfoliated Ga₂Se₂ (2024) (*In Preparation*)
5. M. Yu, **L. Murray**, M. Doty, S. Law. Epitaxial growth of atomically thin Ga₂Se₂ films on c-plane sapphire substrates. *J. Vac. Sci. & Technol. A*, 41 (3): 032704 (2023). <https://doi.org/10.1116/6.0002446>

PRESENTATIONS

Contributed Oral Presentations

1. **L. Murray**, M. Doty *Understanding the Degradation and Effects of Strain on Thin Ga₂Se₂*; Eastern Analytical Symposium (EAS), Princeton, NJ (November 2024)

2. H. Carneiro da Silva, **L. Murray**, R. Radpour, J. Smith, C. Celani, M. Doty, K. Booksh *Deconvolution of Non-linear Surfaces Using Gaussian Mixture Models: Applications to Hyperspectral Images*; Eastern Analytical Symposium (EAS), Princeton, NJ (November 2024)
3. **L. Murray**, M. Doty *Understanding the Degradation and Effects of Strain on Thin Ga₂Se₂*; SciX, Rayleigh, NC (October 2024)
4. X. Wang, **L. Murray**, E. Herrmann, I. Evangelista, A. Janotti, M. Doty *Designer strain distributions in a two-dimensional semiconductor*; SPIE Optics + Photonics, San Diego, CA (August 2024)
5. X. Wang, E. Herrmann, **L. Murray**, I. Evangelista, S.R. Sitaram, K. Ma, Z. Huang, J. Jahadun-Nobi, A. Madu, A. Janotti, M. Doty *Reversible nanoscale strain in suspended two-dimensional materials*; SPIE Optics + Photonics, San Diego, CA (August 2024)
6. **L. Murray**, M. Doty *Understanding the Degradation of Thin Ga₂Se₂*; Electronic Materials Conference (EMC), University of Maryland, College Park, MD (June 2024)
7. **L. Murray**, M. Yu, E. Herrmann, X. Wang, S. Law, M. Doty *Optical Characterization of 2D Ga₂Se₂ via Molecular Beam Epitaxy and Exfoliation*; APS Mid-Atlantic Section, University of Delaware, Newark, DE (November 2023)

Poster Presentations

1. **L. Murray**, M. Yu, E. Herrmann, X. Wang, S. Law, M. Doty *Optical Characterization of 2D Ga₂Se₂ via Molecular Beam Epitaxy and Exfoliation*
Eastern Analytical Symposium, Princeton, NJ (November 2023)
2. **L. Murray**, S. Burrier, M. McCracken *Identification of semi-muonic Λ decays using machine learning*
APS April Conference, Columbus, OH (April 2018)

HONORS AND AWARDS

- ≈ MSEG Outstanding Graduate Student Service Award (April 2023)
- ≈ Outstanding Presentation Award for Annual MSEG Student Symposium (October 2023)
- ≈ Physics Honors Society, $\Sigma\Pi\Sigma$ (2017)
- ≈ National Honors Society, $\Lambda\Lambda\Delta$ (2016)
- ≈ Math Honors Society, ΠIME (2019)
- ≈ Washington Fellow, W&J Honors College (2015)

WORK EXPERIENCE

- ≈ Systems Engineer I June 2019 - May 2021
Perspecta Manager: Gregory Lui
Applied orbital mechanics, Perl, Systems Tool Kit (STK), and Cameo Enterprise Architecture to work on program and internal research and development projects. Security clearance was obtained for this position.
- ≈ Peer-Assisted Learning Tutor September 2017 - May 2019
Washington and Jefferson College Supervisor: Doree Baumgart
Assist students in introductory physics and math classes with completing assignments, preparing for exams, and completing lab work.
- ≈ Undergraduate Research Assistant May 2017 - May 2018
Washington and Jefferson College Supervisor: Michael McCracken
Wrote a Monte Carlo simulation using conservation of momentum and energy to investigate the frequency of the semi-muonic λ baryon.

PROFESSIONAL INVOLVEMENT

- ≈ ASM Brandywine Valley 2023 - Present
 - Secretary (May 2024 - Present)

Responsible for meeting minutes, meeting organization, managing membership lists, and all associated responsibilities listed for student representative.

- Student Representative (May 2023 - May 2024)

Attend monthly meetings to organize events throughout the year including technical talks, facility tours, and networking events. Additionally mediate a connection between the ASM Chapter and the Material Science and Engineering Department at UD.

≈ EmPOWER Mentoring

2022 - Present

- Lead Mentor (June 2023 - Present)

Responsible for arranging topic-specific department wide events focused on: department and college level networking, managing graduate school stressors and challenges, highlighting available on-campus resources, and more. Furthermore, peer mentor/mentee matching for incoming first year graduate students.

- Mentor (August 2022 - Present)

Aid first year graduate students as they transition into graduate school by providing information on advisor and research group selection, program requirements, work life balance, the surrounding area, etc.

≈ Materials Research Society

2021 - Present

- Student Advisor (August 2023 - August 2024)

Mentor new executive board during transition and duration of the year.

- President (August 2022 - August 2023)

Organized department and college wide events for both undergraduate and graduate students focusing on networking and professional development including; Third Year Student Symposium, Career Day, Technical Workshops, Panel Discussions, etc.

- First Year Representative (September 2021 - August 2022)

Assist in organizing MRS events, such as the MSEG Annual Student Symposium and social and networking opportunities.

≈ Outreach

- Washington & Jefferson College Outreach Event (October 2022)

Organized a Material Science and Quantum Science outreach event at W&J aimed at informing undergraduate students about graduate school options in physics, chemistry, materials science, and quantum science. A collaborative quantum science 3-2 Program is being established between W&J and UD as a result of this event.

- Magnetic Levitator Outreach Event (March 2017)

Instructed local high school students on introductory physics, soldering technique, and construction of a small magnet levitator for hands on laboratory experience.

≈ American Chemical Society Middle Atlantic Regional Meeting Panelist

June 2021

Participated on panel discussion "Making Career Decisions during the Pandemic" in the session Empowering Chemists with Disabilities.

≈ Society of Physics Students

2017-2019

- President (May 2018 - May 2019)

Responsible for organizing annual SPS trip to national labs for physics and non-physics students; organizing regular meetings and outreach and volunteer events; and assisting departmental events such as guest lectures and social events for current and incoming physics students.

- Vice President (May 2017 - May 2018)

Assisted in organizing a trip to Chicago to tour Argonne and Fermi National Labs for both physics and non-physics majors.

≈ Conference for Undergraduate Women in Physics (January 2017)

- Attended workshops on mental health and combatting imposter syndrome, workshops on becoming a successful ally to other women and minorities, and sessions on the unconscious discrimination and gender bias and how to introduce discussions about them.