

## Corey Arms

Email : [corey.finnley.arms@gmail.com](mailto:corey.finnley.arms@gmail.com)

I am a **physics and math** student at the University of Florida who strongly wishes to go to graduate school. I admire the interdisciplinary nature of **biological physics**, drawing me to obtain a **PhD** in the subject. I am most drawn to studies intersecting physics and math with **microbiology**.

### EDUCATION

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#### University of Florida

Gainesville, FL

*B.S. in Physics and B.S. in Math; GPA: 3.8/4.0*

*August 2024 – Present*

- **Selected Coursework:** Statistical Mechanics, Modern Physics, Biological Physics, Quantum Mechanics II, Theoretical Physics, Differential Equations, Linear Algebra, Abstract Algebra

#### Valencia Community College

Orlando, FL

*Dual-enrollment; GPA: 3.95/4.0*

*August 2021 – December 2023*

- **Selected Coursework:** Intro to Engineering Technology, C Programming, Statistical Methods

### RESEARCH EXPERIENCE

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#### Biological Physics Undergraduate Researcher

Gainesville, FL

*University of Florida - Advisor: [Dr. Emrah Şimşek](#)*

*October 2025 - Present*

**zcsc:** October 2025-Present

- Executed large-scale bacterial growth experiments across 12 strains, including mono and pairwise communities
- Collected and normalized optical density data using spectrophotometers and microplate readers.
- Passaged and maintained an eight-strain bacterial community over multiple generations; archived time-point samples for PCR sequencing to characterize evolving community composition.
- Safely conducted experiments on BSL-2 organisms (including *Pseudomonas aeruginosa*) using biosafety cabinets and established sterile technique.
- Trained graduate and undergraduate peers in experimental protocols, data handling practices, and lab safety procedures.
- Analyzed large experimental datasets using signal-to-noise metrics and statistical methods.
- Applied machine learning dimensionality reduction techniques (principal component analysis (PCA), and linear discriminant analysis (LDA) to high-dimensional experimental datasets.

#### Robotics Programmer – Opentrons Flex Robot: May 2025 – Present

- Program and automate liquid-handling workflows using the Opentrons Flex robotic platform.
- Develop Python protocols for high-throughput bacterial growth experiments and sample preparation.
- Design automated workflows to improve experimental reproducibility and reduce manual pipetting error.
- Integrate robotic protocols with spectrophotometer and microplate reader workflows for data collection.
- Troubleshoot hardware, calibration, and protocol issues to ensure reliable operation during experiments.

#### Undergraduate Molecular Biophysics Researcher

New York City, NY

*Columbia University - Advisor: [Dr. John Hunt](#)*

*May 2026 - August 2026*

- Analyzed large Cryogenic Electron Microscopy (CryoEM) datasets while remaining well organized
- Applied CryoSPARC, PyMol, and ChimeraX to follow a single particle reconstruction pipeline, using advanced classification techniques.
- Interpreted ribosome structure to determine if an order to disorder transition in the peptidyl transferase center of the ribosome found in an *E. coli* dataset can be seen in other organisms.
- Presented my findings at a conference, poster session, and group meetings.

## HIGHLIGHTED COURSES

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### Undergraduate Biological Physics Specialization Course

University of Florida - Instructor: [Dr. Gabriel Birzu](#)

Gainesville, FL

January 2025 - May 2025

- Learned biological system fundamentals to apply to mathematical models (Lotka-Volterra model, Luria-Delbrück model, Brownian motion, and the Monod growth equation)
- Utilized programming to solve models of bacterial growth
- Solved nonlinear dynamical systems both analytically and numerically.
- Analyzed dynamical systems using linear stability analysis, Poincaré sections, and perturbation theory.

## POSTERS

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- **Inferring Microbial Community Composition from Absorbance Spectra:** Corey Arms, J. R. Taragjini, E. Şimşek. Physics End-of-Year Poster Session, University of Florida, April 2026.
- **Determining whether order to disorder transitions in the PTC of the ribosome are universal throughout life:** Corey Arms, J. Hunt. Columbia University Pathways Programs, Columbia University, July 2026.
- **Determining whether order to disorder transitions in the PTC of the ribosome are universal throughout life:** Corey Arms, J. Hunt. RNA World Day, Columbia University, July 2026.

## ORAL PRESENTATIONS

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- **Determining whether order to disorder transitions in the PTC of the ribosome are universal throughout life:** Corey Arms, J. Hunt. The Leadership Alliance National Symposium, July 2026.

## CONFERENCES ATTENDED

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- **Summer 2026 meeting of the New York Structural Biology Discussion Group:** Invited to attend New York specific structural biology large group meeting to learn more about the field of structural biology.
- **The Leadership Alliance National Symposium:** Invited to present an oral presentation about my 9 week SR-EIP project about structural biophysics

## HONORS & FELLOWSHIPS

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| • <b>Univeristy Scholars Program - AI Scholar</b>                                               | University of Florida                |
| • <i>Awarded \$1,750 stipend to support research work with <a href="#">Dr. Emrah Şimşek</a></i> | <i>August 2026 - May 2027</i>        |
| • <b>Leadership Alliance Summer Research Early Identification Program (SR-EIP)</b>              | Columbia University                  |
| • <i>Awarded \$5,000 stipend to support research work with <a href="#">Dr. John Hunt</a></i>    | <i>May 2026 - August 2026</i>        |
| • <b>Continuing Education Scholarship 2x</b>                                                    | Orlando Youth Alliance               |
| • <i>Awarded \$5,000 for high academic potential</i>                                            | <i>August 2026 &amp; August 2027</i> |

## SKILLS

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- **Programming Languages:** Python (scikit-learn, NumPy, Matplotlib, SciPy), C, CSS, HTML, Linux,  $\text{\LaTeX}$
- **Softwares:** CryoSPARC, PyMol, ChrimeraX
- **Lab Skills:** Bacterial cell passaging, spectrophotometer, microplate readers, biosafety cabinet, culture inoculation, pairwise community creation
- **Machine Learning:** Principal component analysis (PCA), Linear Discriminant Analysis (LDA)

## EXTRACURRICULAR

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- **Society of Physics Students (SPS) President (May 2026 - Present):** In the process of making SPS more connected by creating a bimonthly newsletter highlighting the wonders of the physics department. Creating an undergraduate talk series to help others develop professional speaking skills. Updating the physics undergraduate lounge to foster undergraduates connections.
- **Society of Physics Students (SPS) Social Chair (May 2025 - May 2026):** I bring the community together at UF's physics department by organizing social events for undergraduates, graduate students, and professors alike to foster a welcoming environment. I host Cookie Coffee Time weekly before our department-wide colloquium, plan meet-the-professor talks, and host social gatherings for the department which fills our conference room to its capacity.
- **SPS Website (June 2026 - Current):** Developed and maintained a website for UF's Society of Physics students from scratch using HTML and CSS with over 500 views since it has been made. The website goes over details about the club, upcoming events, and a photo gallery.

- **Personal Blog Page (December 2024 - Current)**: Developed and maintained a blog page from scratch using HTML and CSS. The blog page has had over 2690 views since I first created it to document my journey in physics.

## PERSONAL PROJECTS

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- **Created an optical density sensor (April 2026)**: Built an optical density sensor using breadboards and primarily operational amplifiers to compute Beer-Lamberts law. The sensor was tested using diluted strains of *E. coli* where the OD600 was measured by the voltage output as a function of resistance through a photo resistor.
- **SIMIODE Challenge Using Differential Equations Modeling (November 2025)**: Led a team of three undergraduates in developing a dynamical systems model of interacting large language models. We derived analytical solutions and implemented numerical analysis in Python, earning a meritorious award (4/5).