the Collage

College of Liberal Arts & Sciences
Kutztown University

Dec. 2024

Josiah McCarty | Physics

Student Highlight

Josiah McCarty is a Physics major at Kutztown University. He is part of a project working with computers to simulate ultracold atomic particle interactions. The project so far has taught him about using technology to study physics, ultimately introducing him to the field he'll study in graduate school. Josiah is fascinated by the way physics uses mathematics to explain the natural world. Now, as a senior at KU, he is taking part in a project that explains the world at the atomic level.

Josiah focuses on physics engineering, and he is part of an ongoing project with Dr. Kunal Das, professor of Physics. The project, "Macroscopic Quantum Entanglement of Collective Spin of Ultracold Atoms and Rings," utilizes computer simulations to mathematically show and analyze how particles interact with each other while entangled. Josiah's work is focused on ultracold atoms of two species. More specifically, the species of atoms are each given a different initial angular momentum state. Josiah's simulations also model quantum teleportation that occurs between particles. This teleportation occurs only at atomic or subatomic levels. During the teleportation, traits of atoms, like momentum, can be transferred. Josiah's research is focused on showing how this occurs through simulations.

"My favorite part of physics is the fact that all of these different kinds of physical systems can be described by mathematics."

His research is guiding him toward graduate school, and it has helped him decide what he wants to focus on when he gets there. "I would probably pursue quantum information," said Josiah.

Josiah has learned a lot of valuable lessons and skills already from his time working on the project. It has taught him that research sometimes can't be done alone and that it's ok to ask for help. Josiah explained, "It's hard to ask questions, especially when you think you're very close to solving something and you think if I just give it another day, I won't actually have to ask but...I had to swallow my pride a little bit and ask questions sooner." It was a hard thing to overcome, but once he came to terms with the fact that he couldn't do everything by himself, it became much easier to move forward and get the work done.

"It's given me an idea of what research is like. It's taught me how to pursue research," Josiah said. There have been many roadblocks to get around in the project, but he says it has been fulfilling to be able to solve problems and find ways around issues.

Josiah is very glad that he took the opportunity to work with Dr. Das. However, Josiah wishes he had started research earlier so he could learn more about the topic. So, he wants to leave all students with this piece of advice: "Pursue research earlier rather than later. Don't wait for it to happen to you."

Congratulations, December Graduates!

The College of Liberal Arts and Sciences Dean's office is proud to congratulate the fall 2024 graduates. After having met many challenges, you have made it to the end with success. We hope you are proud of your accomplishments here at KU and we cannot wait to see what the future holds for all of you.

Congratulations class of fall 2024!

Dr. Lisa Frye | CS&IT
Faculty Highlight

Professor and department chair of Computer Science and Information Technology at Kutztown University, Dr. Lisa Frye strives to increase diversity in the field. People of color and women are often underrepresented in jobs in the computer science field, and she is advocating to lower this gender and race gap by supporting students from all backgrounds.

"[The Outstanding Faculty Award] means I'm doing my job and it means I'm making some type of impact, which is what all good teachers want to do because it's all about teaching. It's all about the students."

Dr. Frye loves KU because of the opportunities the university provides, much like the ones she received when she attended KU as an education major. She took a few computer science courses and loved the subject so much that she added it as her second major. Dr. Frye thinks KU is an amazing university because it does so much for those who are first-generation or come from a lower-income family. "The Golden Bear students are lucky because they found a really great school that has a lot of people that care," says Dr. Frye.

Early in Dr. Frye's career, she conducted research in computer science, networking, security and programming. In more recent years, she has shifted her focus to working towards getting underrepresented populations into computer science. She was part of a grant from the National Science Foundation, "Computer Science for All," working with high schools to make computer science more interesting and attainable for students of every background.

Dr. Frye has seen how the gender gap in the field has affected women. "There are no role models...that's one thing that I can be for students," Dr. Frye explains. "They don't see people like them being successful in the field, so it's hard."

Women are still pushed into traditionally female roles even when they enter the computer science field. "When you walk into a meeting or leadership, it's like, 'Who wants to be the secretary?' And who do they point to? The female in the room," Dr. Frye explains. She has seen this situation over and over again in the jobs she tries to prepare students for, and it keeps pushing her to help women be more confident in the field. She thinks they should be aiming for leadership roles and should be taking every opportunity to prove themselves in their work.

The other groups that need help getting into the field are minoritized students and students who come from lower-income school districts. "For underrepresented students...those school districts don't have the money to get cool toys, like robots, for computer science. So, they're not teaching computer science as much," Dr. Frye says. "And that makes a difference because a lot of those lower-income students and those lower-income school districts are our students." She worries that while technology continues to grow and evolve, schools are not improving their technology education programs to help students learn important skills for their future in fields such as computer science.

As Dr. Frye points out, "People don't know what computer science is." She sees several students every year come into computer science with a completely different idea of what it is going to be. Some students think computer science is all game development, which is a different major. She is more than happy to help them find the right area for them. But that's part of the problem: "Students should be taught what computer science is before they arrive at KU," Dr. Frye says.

Dr. Frye mentors younger faculty and students about the gender and race gaps in the computer science field. As she works toward getting grant funding for lower-income schools, she is also doing her part on campus to help every one of her students succeed. Dr. Frye's end goal in her career is to create a field that is diverse and equal for all, one student at a time. "I'm teaching because I want to make a difference."

Extra Excerpts!

Dr. Frye: "[Students] can do what they want to do if they put their mind to it. I have a poster here, '10 things that require 0 talent.' Things like work ethic, effort, attitude, energy are on that list."

Josiah: "In my free time I read and I play piano."

Josiah: "I am a member of SPS, the Society of Physics Students and I certainly don't I don't regret joining that."

Dr. Frye: "Talk to your professors. We're human beings, not these people that you can't talk to that don't have other lives. We're very interesting individuals."

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The December 2024 edition of *The Collage* was designed, edited, and written by Emma Osborne '27, Professional Writing major, under the supervision of the CLAS Dean's Office.