Student highlight

We all come to college to find direction in life. Sometimes the most exciting adventures aren't planned, but we all seem to find our way in the end.

Take for instance, geology senior Will Reichard-Flynn. He transferred to KU after studying theater at NYU for one year. Coming to Kutztown, he considered the English or professional writing major, but changed it to geology at the last second.

"I don't even know why," he commented. "I ended up going here and doing geology and really loving it."

Reichard-Flynn had the opportunity to visit a dinosaur quarry in Utah during summer break 2017. "There were people sitting there under a tent just brushing away at dinosaur bones in the ground. It's exactly how you think it's going to be."

He enjoyed the experience so much that he returned several times to the various dinosaur sites in Utah. He and his fellow students eventually came across the Mill Canyon Dinosaur Tracksite, where there were massive amounts of microbial induced sedimentary structures, or MISS. MISS are colonies of bacteria which form microbial mats that are infused into rocks and other sedimentary structures. They decided to measure the different patterns within the mats, to see if there were any variations. Reichard-Flynn claims, "If you are able to identify [the bacterial mats], then you can identify the times and places during which there was life."

Most of the previous research of MISS

Will Reichard-Flynn | Geology

focuses on microbialites, bacteria infused rocks, in marine settings. However, the MISS found in lake or continental settings are much different from those of marine-based microbialites.

of America's annual conference in Indianapolis in November, 2018. Reichard-Flynn comments, "I got to present a poster…talked to anyone who walked by and got their feedback… I had a chance to see my own work from a different perspective and got other people's opinions on how to improve and that was really amazing."

Reichard-Flynn's research demonstrated a possible alternative method of identifying MISS by genus.

However, Reichard-Flynn's journey didn't stop there. His experience with measuring MISS and analyzing the data introduced him to Python. Python is a high-level programming language that allows Reichard-Flynn to analyze statistics, create models, and represent his data. "I learned Python… and loved it. That persuaded me to go into a computer science heavy field."

> Bacteria "is almost an alien life form… a superior world within our world."

Reichard-Flynn had more of an interest in the bacteria than the dinosaur bones. He claims that bacteria "is almost an alien life form… a superior world within our world that we can't see but [which] affects everything in ways that we don't even notice." If there is life on other planets, it will most likely be identified by living bacteria in MISS. They are a force that will stand the test of time; existing before humanity and probably existing long after.

He decided to further his research of MISS by taking an independent study in the fall 2018 semester. He studied what other scientists had to say about MISS and eventually wrote a paper about the vertical variation of MISS morphology in a continental setting. He also presented his research at the Geological Society

Reichard-Flynn plans to enhance his skills in Python and go to Lehigh University to study seismology. "Fieldwork is something that's so cool and so fun, but it's probably not my life's destiny." He likes to balance field and analytical work, but prefers using the computer language to visualize and interpret data.

"Ideally, [I would like to] work with an engineering firm… and use seismic waves to image the subsurface and use it in constructive ways with projects… That sounds really satisfying."

Reichard-Flynn did not intend on studying geology, let alone going to graduate school to pursue seismology. His experience at KU guided him toward that decision, and he ultimately found his direction in life.

Faculty highlight

Dr. Schwesinger | Computer Science

We've all heard the story of robots taking over the world. However, artificial intelligence in movies and books is far more advanced than in real life. Can robots talk and have complete thoughts? Or are they solely controlled by a computer program?

According to Dr. Schwesinger of the Computer Science Department, "Things that are easy for humans are hard to do in AI, or with a computer. And things that are easy for a computer to do are hard for us to do." Robots are simply computers with designated tasks. As the field of AI progresses, computer scientists try to make AI agents, or robots, as similar to humans as possible.

One instance of this is a subfield of AI called natural language processing. Siri, Amazon Alexa, and Cortana are a few examples of computers trying to speak and interact with humans. However, the human language is complex, and many words have ambiguous or multiple meanings, sometimes making it difficult for the computer to interpret what the speaker actually means.

"How do you represent knowledge?" Schwesinger asks. "How do you model common sense?" These are the questions that computer scientists and AI specialists have to ask when creating a robot. Schwesinger is currently working on knowledge representation—how to teach a robot where things are and what to do if it encounters an obstacle. "How does [the robot] know if stuff moves?" Knowledge representation and language processing is all done through algorithms and programming: in other words, math.

make an agent of their choice complete a task or respond to the environment. His main teaching goal is to show his students how to use the tools needed to make such agents. Schwesinger lets his students choose what they want to create or research because they produce better results. "Here's how you do it, but you also need to be motivated to do things that are of interest to you."

> "Math is super important for doing interesting things... like [making] a robot drive down the hallways."

In his classes, Schwesinger shows his students how math can be interesting and what they can create when they apply themselves. "Math is super important for doing interesting things…If you're just taking a pure math class, you don't get an appreciation for the utility of it. Once you're able to do a thing, like make a robot drive down the hallways without bumping into walls, that's kind of interesting because you're using math to make that happen."

Math is especially important for CSC 548: Artificial Intelligence II, a course Schwesinger is teaching for the first time this semester. In this class, students will

Not only is the idea of creating robots impressive, but the market for computer science and AI related fields is continuously growing. "Software… is eating the world. Anything you do anymore is using software in some fashion," says Schwesinger.

AI is used to solve problems. Once one problem is fixed, another will rise. "AI is a moving target; it's [something] you can't currently do." There will always be a need for AI and students who can solve problems. Dr. Schwesinger is here to help prepare students to fill that need.

Dean's Corner
Dr. David Beougher

While reading the articles for this edition of *The Collage*, my mind raced from dinosaurs to robots to the explanatory nature of math to the possibilities of artificial intelligence. I was reminded of one of Dr. Seuss's classic works, *Oh the Places You'll Go*. The text begins, "You have brains in your head. You have feet in your shoes. You can steer yourself any direction you choose. You're on your own. And you know what you know. And YOU are the guy who'll decide where to go." While you are never alone on your journey at Kutztown, each of us has a unique path to discover. The book is about the future and opportunity. I encourage you to read it, as well as the stories of opportunity and discovery presented in this edition of *The Collage*.