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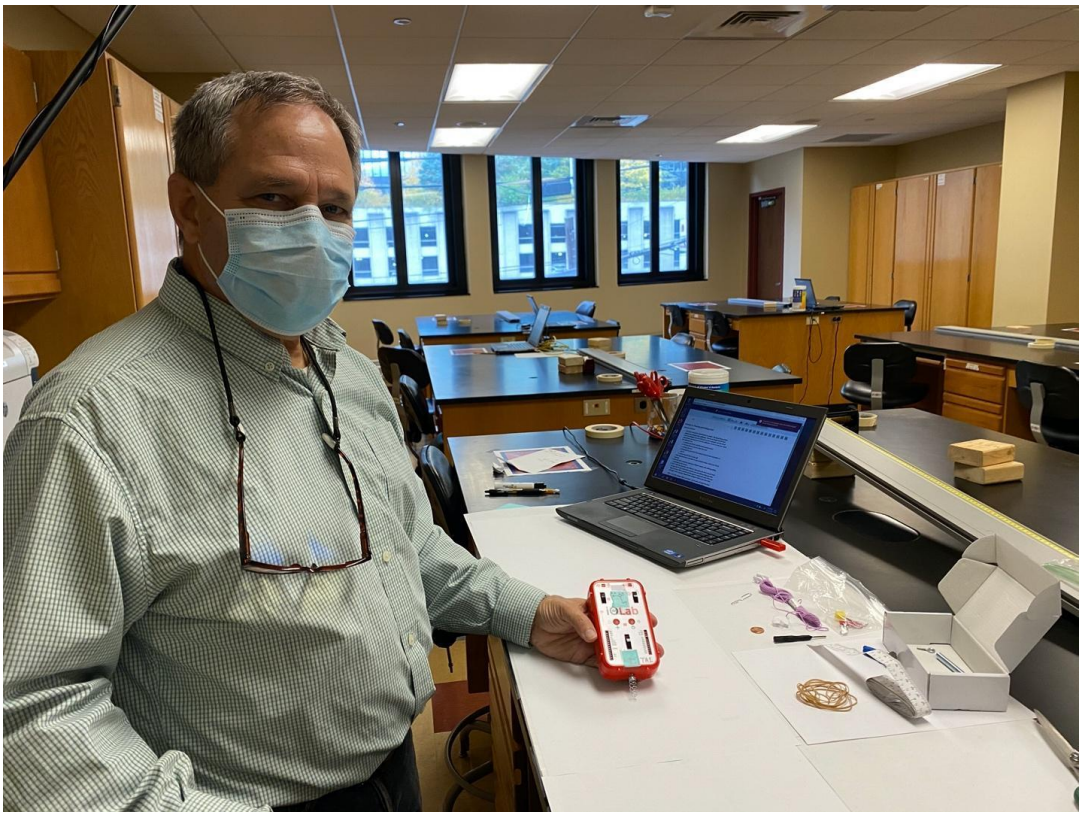
Staff Article

The coronavirus has affected all of us differently at Duquesne University whether socially or academically, but an important thing that came from this pandemic was the perseverance we have all developed. All Duquesne research labs shut down as soon as the lockdown started. Labs did not reopen until the summer. Despite how the members of the labs were affected, they adapted and grew from these challenges. Now students and faculty are prepared in case they are met with the same challenges again.

Doctor Jensen-Seaman's lab looks at how changes in genes cause changes in phenotypes in dormant species. His lab also explores the question of why some species are more susceptible to HIV. Doctor Jensen-Seaman's lab is in the biology department where COVID caused a 90% shutdown on March 13th. The 90% shutdown meant that all lab work halted except for the computational work that could be done at home. When the shutdown hit, there were 3 PhD students and 5 undergraduates, including a senior working on their thesis. The shutdown posed an issue during the summer as well, because students are usually full time in the lab. In the summer, undergraduate juniors are usually working towards their senior honors thesis. Gradually, lab work has become closer to normal, but there are still limited researchers, which reduces the social benefits of lab experience. Several new challenges arose as the lab work slowed down, prompting faculty and students to adapt. Luckily, some research could continue at home, especially computational biology techniques. Due to the shutdown, researchers have learned to read more background and have a better understanding of their research instead of just focusing on the experiments themselves. Doctor Jensen-Seaman found that he had more time to apply for grants, collaborate with others, catch up on the analysis of data, and closely observe what he has overlooked in the lab. He learned not to procrastinate, stating "do work while you can." The challenges he faced can be described in his quote: "there's always challenges; you just have to find ways to adapt." His lab is now prepared for another shutdown, which is a positive outcome from the need to adapt. Students and faculty now understand how to continue their research at home if it is not safe to come into the lab.

The impact of COVID on teaching in the labs can be seen in the adaptations that Doctor Huster has made. Doctor Huster teaches the introduction to physics lab for undergraduates. Coronavirus brought many challenges to the lab, including the need for a change in the curriculum. This necessity stemmed from the need for experiments that could be performed with the new IO labs. Interactive Online Lab Systems, IO labs, allow for remote and in person participation in activities. They include built-in sensors that calculate force, acceleration, temperature, sound, pressure, magnetic field, rotation, displacement, velocity, and voltages. They allow for the input and output of different digital analogs. This technology has also been adapted for life science-based physics and calculus-based physics. The technology has enabled more flexible laboratory attendance. Students were required to attend one of the first two weeks of lab, and a sign-up sheet was posted for the rest of the weeks. The attendance system has allowed for the depopulation of the lab. The system was first come first serve for those who signed up to be in-person that week. The IO labs have even allowed a fully remote student in Brazil to fully participate in the labs. Due to the challenges of COVID-19, a permanent technological improvement has been made in the physics labs.



Dr. Huster with the IO lab and one of the experiments students were performing on the new technology.

When it came to graduate students, Bethann Wilson was able to sum up the challenges faced during COVID-19. She is in a lab with Dr. Stolz, and together they are researching the protein Arx from MLHE-1. This protein is an arsenite oxidase, meaning it is an established, ancient enzyme within the dimethyl sulfoxide reductase (DMSOR) family. Arx is capable of oxidizing arsenite from the very toxic and soluble arsenite to less toxic and less soluble arsenate. This research has implications for bioremediation of groundwater contaminated with arsenic. The goal of this research is to purify the protein, Arx, while studying its kinetics and rate of reaction. Wilson and Stolz are also evaluating the evolutionary history of Arx's subunits. Due to Covid-19, there is a limit on the lab occupancy and everyone must wear face masks and social distance. Originally, the hours that lab staff were allowed in the building were limited, but they have been increased since. A google calendar system is in place to sign up to use machines, such as the autoclave and centrifuge. A positive outcome is the ease of communication between departments. This stems from the change from in-person meetings to zoom meetings. Although Bethann was unable to do research in the summer, she has been able to catch up on her work now. Since she is in the beginning of her PhD program, her degree has not been badly affected. Because biology labs are naturally sterile environments, not much has changed in ways of cleaning. The actual experiments and the communication to her lab partners have stayed consistent throughout Covid. With the new fear of shutting down again, she has incorporated more bioinformatic techniques into her research in case wet lab techniques are stalled again. Whether it was making models of the protein with I-Tasser and Swiss Model or learning programs like R, Blast, and Mega, Bethann has managed to stay productive at home. The R, Blast, and Mega programs are all used for statistical analysis and uncovering trends within data. The labs' abilities to adapt have been summed up in her words: "I am confident that we have the capacity to overcome this challenging period. I have seen both the students I teach, and my fellow graduate students learn, adapt, and thrive over the course of this year, and we will continue to do so."

The perseverance of researchers at Duquesne has been prominent throughout the pandemic. It is so impressive to see how well they have adapted to these trying times. We can all learn from their ability to face these newfound challenges so quickly.

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