

## New Tech students dive into mouse brains

### SCIENCE PROJECT

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When **students** in Bernadette Barragan's neuroresearch science class at George H.W. Bush **New Tech** Odessa put on their virtual reality gear, they put themselves smack in the middle of **mouse brains** and they share in research being conducted by scientists at the University of South Florida. Professor George Spirou and Dakota Johnson, PhD and postdoctoral scholar, worked with eight of Barragan's **students**.

The idea to develop citizen scientists in Odessa came about through Ector County ISD Chief Innovation Officer Jason Osborne.

"... Jason initially had this idea of using virtual reality in education and the ... bookend notion to that was this notion of the citizen scientist," Spirou said. "That resonated with what we were thinking, which is if you engage people at a young age, **students**, and this is high school but maybe even earlier in the doing of real science. ... That would be a way to get away from the kind of dull textbook presentations that turn people off and get them right **into** actually the big questions and a sense of the excitement, etc."

"That was really Jason's concept initially and then the virtual reality was something that we were talking about with him. We were wondering, OK is this a way through VR that the **students** get access to actual research images and work on research topics and how would that go that was the set up?" Spirou said.

After some initial technical difficulties, Spirou said the **students** did well as citizen scientists.

Jackson said he had a similar experience through the GEAR UP program in high school making products like shampoo in a chemistry lab.

GEAR UP is designed to increase the number of low-income **students** who are prepared to enter and succeed in postsecondary education, the U.S. Department of Education website said.

"I've taken those experiences and I was working from that perspective and I very quickly realized for them it wasn't about the

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**New Tech senior Octavio Garcia, 17, demonstrates their research within a program called SyGlass** using a Steam VR headset following an interview about the school's neuroscience program Tuesday afternoon at **New Tech** Odessa.

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### Tech

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individual details and whether or not they were familiar with them, it was all about the process of science. So it was as inspirational to watch them as it was for me to go through that process when I was like 15 or 16 to learn to just learn to flex my intellectual muscles, if you will," Jackson said.

He added that the **students** were more knowledgeable at the tail end of it than when they started.

Spirou said working with high school **students** is something they want to try again.

"... What we found was once they got **into** VR ... that made all the difference. We were comparing the virtual reality experience to the initial

be a psychiatrist.

"I personally have always been really fascinated with the brain," Aguirre said. "Seeing the biological standpoint of how the brain works and the complexities makes me open my mind to more understanding why some people may be some way ..."

Octavio Garcia, 17, a senior at **New Tech**, said he wants to become a nurse after high school.

"... I feel like this class will help me tremendously, just to understand key terminology, to think like a scientist would, especially since we're working professors from Florida," Garcia said.

From a district perspective, Osborne noted that **students** have become an extension of a university by providing valuable scientific data analysis through their virtual reality (VR) platform, SyGlass.

PowerPoint pictures and the virtual reality experience really made it all come alive in 3D and 4D because these are dynamic movies over time. They were able to appreciate what's happening in the third, fourth, fifth month of gestation in a human because they're watching the equivalent in a **mouse** that we had imaged. ...." Spirou added.

Jackson said the questions he got from **students** prompted him to do some research himself.

"All in all, I thought it was a really beautiful example of learning classic neurobiology in a context that's using very modern technology; very engaging; and the **students** really seem to enjoy it, specifically because of that VR component," Jackson said.

Spirou said it helped them refine what they were looking at because the **students** looked at the material with fresh eyes.

Jackson added that it was refreshing to speak to an audience that was unaccustomed to using scientific jargon.

This meant that he and Spirou introduced these concepts from a very fundamental level.

"It didn't take long for these **students**, because of their tenacity and curiosity, to very quickly get to the point where we were talking about cutting edge when it comes to neurobiology topics. It took a few months to get to that point, but certainly they went through a tremendous evolution to get there," Jackson said.

Barragan said some of the **students** also liked the data aspect of the project and created data spreadsheets.

Abigail Murrillo, a 17-year-old senior at NTO, said she would like to study nursing in college.

Murillo said the experience has given her an in-depth look at what a neuroscientist is.

"I'm now more knowledgeable of that, along with my school work since this whole topic of neuroscience makes you think critically and explore the subject I think just the way of thinking, it has helped me," Murillo said.

She saw neuroscience and the science field as something that was out of reach. "But now, being involved in this internship it kind of seems like a possibility of something that I could be particularly interested in. I really enjoy the process of research how being curious and trying to figure out a solution, or an answer to a specific thing ...." Murillo said.

Garcia said for him it's a nice change of pace, because in a regular environment it involves just a computer screen and paper.

"But with our internship it was using something that we really never used before, which was VR and what made it more special" because it made it easier to understand certain concepts that you wouldn't normally get in a textbook," Garcia said.

"That's what really was special to me about being in this internship," he added.

Angela Aguirre, 18, a senior at NTO, wants to

"We realize that when **students** engage in authentic and hands-on experiences, they become more vested in their learning journey. The Innovation department continually seeks out these partnerships in order to engage more **students** in real world problem solving as well as provide teachers with personalized professional development," Osborne said in an email.

"Imagine if a high school student was able to assist neuroscientists in understanding how the brain is wired. ECISD high school **students** have this opportunity and have become citizen scientist. The citizen science approach has opened doors for opportunity in ECISD. **Students** from pre-k through seniors contribute to many branches of science from paleontology to neuroscience. ECISD has partnerships with 24 universities and growing. The district is in the process of creating a partnership with the Marine Biological Laboratory located in Woods Hole, Mass. We are hoping that through this partnership **students** will have a chance to assist in marine biological research with scientists located around the world.

"We are extremely grateful for our partnership with the University of South Florida. Our **New Tech** Odessa **students** were analyzing neuroscience data in a very futuristic method. Through virtual reality **students** learned how to manipulate brain data in real time with professors from the university. Both Dr Spirou and Dr. Jackson met with **students** on a weekly basis and taught them college graduate level techniques in neuroscience research. There is potential for this teaching and learning method to be more broadly utilized going forward and provide more choices for **students**," he wrote.

Barragan said **students** also are working with West Virginia University, Mount Holyoke and Appalachian State through a software called CATMAID.

"... We're also bringing Dr. Greg Gage back from Backyard **Brains**," Barragan said. "He's going to be coming to meet everybody, which is exciting because we didn't get to do that last year. He's going to be here in person and we're going to be exploring with the Backyard **Brains**, lab equipment and then at the end of the year. They'll have an opportunity to do kind of a capstone project for this class."



**New Tech senior Angela Aguirre, 17**, answers a question during an interview about the school's neuroscience program Tuesday afternoon at **New Tech** Odessa.

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