



The University of Georgia



CICEP

INNOVATION AND ECONOMIC PROSPERITY UNIVERSITIES  
AWARDS PROGRAM

CASE  
STUDY  
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## Tech Venture Could Revolutionize STEM Education in K12 Schools

In 2008, Dr. Tom Robertson, an associate professor of physiology and pharmacology in the UGA College of Veterinary Medicine began noticing that his students were having a hard time applying critical thinking skills to real-life problems. He determined that the deficiency was rooted in K–12 education.

Critical thinking skills are required for success in a global economy driven by technology and innovation. Currently the U.S. is ranked 48th in science, technology, engineering and math (STEM) education by the World Economic Forum. Only 21 percent of U.S. high school seniors are proficient in science, according to the U.S. Department of Education. Only 16 percent are proficient in mathematics and interested in pursuing STEM careers. About half of U.S. public high school students who fail to graduate say they dropped out of school because their classes were neither interesting nor, they believed, relevant.

With an interdisciplinary team of UGA researchers, Robertson applied for and received a grant from the National Institutes of Health (NIH) to develop a new approach to teaching science. The team used 3D video gaming technologies to teach key biological concepts in the context of real-world problems.



*Athens Academy science teacher Anna Scott helps one of her students navigate the IS3D software in class.*

For example, in a program called the Osmosis Interactive Case students try to save the life of a calf named Clark, which is having a seizure. The virtual environment allows the students to see inside the calf's brain to learn about osmosis, collect data and form a hypothesis to explain Clark's seizures. Students test this hypothesis by choosing a treatment and analyzing its effects on the brain. They can see, in real time, if their choice of treatment is going well or not.

The approach emphasizes critical thinking and problem-solving skills while making science more exciting and engaging for students.

By evaluating the technology in high schools, Robertson and his team found that it significantly increased student learning. The NIH, impressed by the initial results, encouraged the UGA team to start a new venture and apply for NIH small business grants. Interactive Science in 3 D (IS3D) was founded in 2010.

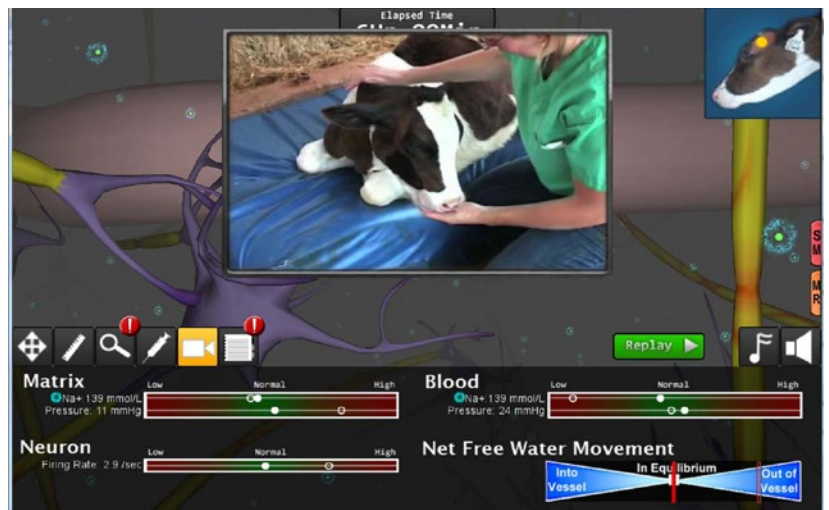
Through partnerships with more than a dozen school districts, IS3D has developed animation and games, applications, e-books and interactive case studies that help students develop and hone the problem-solving skills required for successful careers in STEM fields.

IS3D's latest patent-pending innovation provides teachers with an innovative assessment tool. the ability to assess how students are progressing through each of IS3D's educational programs. IS3D's online skills and assessments-based learning environment (SABLE) provides a medium for teachers to interact with students and to observe in real time how they are progressing through complex scientific programs. The proactive approach to monitoring students' critical thinking skills provides teachers the flexibility to identify and work with individual students who struggle with particular subjects. Student performance at each step is sent to SABLE so that teachers can track progress of the entire classroom.

The UGA College of Education evaluated the classroom impact of IS3D products through a three-year study of 1,500 students. Researchers concluded that the effects on student learning were "staggering," showing significant gains in student knowledge and critical thinking skills. Teacher feedback relayed that students demonstrated excitement to learn. Teachers surveyed unanimously expressed their belief that the case studies should become regular instruction for all students.

Pam Perry, chair of the science department at Mill Creek High School in Gwinnett County, Ga., said, "My students engage more deeply with these interactive cases than they do with any other activities I've used in the past. They all felt that they had a richer understanding of the concepts after completing the interactive cases."

IS3D is currently working with the UGA College of Education to develop products for elementary school children that will lead to better health and lifestyle choices by investigating the effects of diabetes and obesity on the body.



*Screenshot of Clarke the calf used in IS3D's Osmosis Interactive Case.*

IS3D contributes to local economic development through employment of 11 full-time and four hourly employees, including two UGA students. To date, IS3D has secured \$3.9 million from federal and state grants, and has subcontracted \$326,000 in sponsored research funding to UGA. In 2013, IS3D received the inaugural "Startup of the Year Award" from Four Athens, a technology incubator in Athens, Ga. IS3D was recently named one of the Top 40 Innovation Technology Companies by the Technology Association of Georgia and is a finalist for the 2014 *Atlanta Magazine* Groundbreaker of the Year Award.

To better facilitate working directly with teachers and students, IS3D relocated to space owned by the Clarke County School District. In exchange, IS3D provides free use of its products in Clarke County classrooms and offers training opportunities for students interested in business and software development.

IS3D will release its first suite of products in partnership with an international distributor of science education materials in spring 2015, extending its reach and impact.

UGA expertise, support and services guided IS3D through its venture. The UGA Technology Commercialization Office facilitated negotiations to license the intellectual property to IS3D. UGA VentureLab assisted IS3D in its application for funding from the Georgia Research Alliance (GRA), a nonprofit organization that works closely with the state’s research universities and the Georgia Department of Economic Development to spur technology-based economic development and innovation through technology transfer and start-up opportunities. IS3D won \$50,000 in GRA seed funding for proof-of-concept work, which allowed IS3D to improve its technologies, commission a market research report and compete for Small Business Innovation Research (SBIR) grants. Since the receipt of GRA funding in 2010, which is only available to university-affiliated companies, IS3D has secured over \$3.7 million in SBIR funding.

The UGA Small Business Development Center (SBDC) provided training, education and consulting to the business. Robertson completed the Kauffman Foundation FastTrac TechVenture Program, a six-week course offered by the SBDC, designed to give technology-related entrepreneurs the skills to launch a successful company. The Georgia BioBusiness Center, UGA’s business incubator, provided physical infrastructure and space to facilitate the company’s formation over two years.

*Interactive Science in 3D (IS3D)—Knowledge Incubation and Acceleration Programs*

Description	2010	2011	2012	2013	2014	Total
Number of full time equivalent employees		2	5	11	11	<b>11 FTE employees</b>
Dollar amount of funding received from GRA Ventures Program	\$50K		\$100K			<b>\$150,000</b>
Dollar amount of funding received from federal sources (SBIR)		\$539K	\$500K	\$1.95M	\$750K	<b>\$3,739,000</b>
Dollar amount of funding received from federal, state, or foundation sources; state or local matching programs; or other non-private sources	\$50K	\$539K	\$600K	\$1.95M	\$750K	<b>\$3,889,000</b>

*Georgia BioBusiness Center (GBBC)—Incubation and Acceleration Program Success*

Description	2008	2009	2010	2011	2012	2013	2014	Total
Total number of UGA startup companies	107		117	120	122	127	132	<b>132 UGA startup companies</b>
Total number of full time equivalent employees by UGA startup companies	537		664				824	<b>824 FTE employees</b>

*Georgia BioBusiness Center (GBBC)—Ability to Attract External Investment*

<b>GRA Ventures Program</b>							
Description	2008	2009	2010	2011	2012	2013	Total
Number of GBBC companies receiving an award	10	9	7	11	9	8	<b>54</b>
Number of awards	11	12	10	18	10	8	<b>69</b>
Dollar amount of funding received	\$497,201	\$573,000	\$307,875	\$689,000	\$332,300	\$294,400	<b>\$2,693,776</b>
<b>Federal Small Business and Innovation (SBIR) and Small Technology Transfer (STTR)</b>							
Number of Awards	3	6	4	4	8	10	<b>35</b>
Dollar amount of funding received	\$426,392	\$1,069,704	\$826,548	\$935,859	\$2,173,330	\$3,249,161	<b>\$8,680,994</b>