McMURRY UNIVERSITY

Year	Student	Advisor	Topic	Description	After Graduation
2010	Tylar Murray	Dr. Timothy Renfro	PEM Fuel Cell Testing Platform	https://mail.mcm.edu/academic/depts/physics/projects/Fuel_Cell_Poster.png	Ph.D. in Electrical Engineering from University of South Florida, https://www.linkedin.com/in/tylar-murray-10251225/
2011	Jared Land	Dr. Tikhon Bykov	Electromagnetic Accelerator	https://mail.mcm.edu/academic/depts/physics/projects/Project%20PosterJaredLand.pdf	https://www.linkedin.com/in/jared-land-179a5295/
2012	Shayna Hoag	Dr. Tierney Brosius			M.S. in Biotechnology from Worcester State University (2018)
2013	Miranda Nguyen	Dr. Gary Wilson	Influence of Growth Medium and Crystal Production on Spore Volume for *Bacillus cereus* and *Bacillus thuringiensis*	In this investigation, Bacillus thuringiensis (Bt) and Bacillus cereus (Bc) spores were grown on nutritionally rich and poor media to study how nutrition influences spore volume. Spores used were wild-type and genetically-engineered strains of Bt and Bc, to see whether (1) extremes in quality of the medium (soil extract vs. nutrient agar) and (2) presence of the toxic crystal gene influence the size of spores produced. The study was conducted by analyzing micrographs of spore preparations using ImageJ software to determine the volumes of spores. This study proved that growth medium influenced spore volume and thus spore quality. It also demonstrated that adding the crystal gene to Bc negatively influences the spore, while removing the crystal gene from Bt positively influences the spore.	Enrolled in Nursing School at Baylor UMC
	Heath Koop	Dr. Timothy Renfro	Induction Smelting Furnace	The project was to build an induction smelting furnace for melting and casting metal parts. Even though the final product could not melt an iron nail, it could heat it to several hundred degrees Celsius using a very low input voltage.	https://www.linkedin.com/in/heath-koop-0035a398/

	Nicole McGunegle	Dr. Gary Wilson	Influence of Entomocidal Protein Genes on Heat Resistance of *Bacillus thuringiensis* and *Bacillus cereus* Spores	In this investigation, wild-type spores and genetically modified acrystalliferous and crystalliferous Bacillus thuringiensis and Bacillus cereus strains were exposed to heat at 80 °C for 20 min. To determine heat resistance. The surviving spores from the initial heat exposure were exposed to the same heating conditions a second time to test for the possibility of altered heat resistance. The results suggest the wild-type spore coat structure of B. cereus is unaffected by additional synthesis of entomocidal crystal protein during sporulation, and that the wild-type spore coat structure of *B. thuringiensis* is made more heat resistant by the loss of crystal protein synthesis. The observed results suggest that a homogeneous B. cereus spore population possesses mature, well-crosslinked spore coats, and a heterogeneous B. thuringiensis spore population includes early and mature spores, likely responsible for the varied heat resistance observed, as well as the previously reported auto-activated germination response.	Completed B.S.N. at UT El Paso
2014	Brittany McGuire	Dr. Joel G. Brant	Survey of Pocket Gophers in the Big Country	Brittany surveyed the nine counties of the Big Country for evidence of pocket gopher activity. She then mapped that activity to determine the apparent soil preference for pocket gophers. Brittany determined that pocket gophers prefer Paducah Loam, a soil type not found in Taylor County (explaining why pocket gophers also do not occur in Taylor County).	Aspiring Singer
	Kara Black	Dr. Anna Saghatelyan	Testing Central Texas Plants for Antibacterial and Insecticidal Activity	Kara Black collected five species selected from the local flora, isolated crude extracts, performed thin layer chromatography to find the active compounds, tested the extracts against different bacterial cultures, and found some with antibacterial properties. Some of her extracts were tested against different cancer cell lines, and two species were active against some cultures. She presented a talk on this project at an intercollegiate conference, a poster at the Chemical Society Conference, and an oral presentation at the Texas Undergraduate Research Conference from 2014 to 2015.	Doctor of Osteopathic Medicine from UNTHSC (2019)
2015	Kent Grimes	Dr. Tikhon Bykov	The Hydroelectric Generator	https://mail.mcm.edu/academic/depts/physics/projects/research_project_program_Kent_Grimes.pdf	M.E. in Civil Engineering from Texas Tech University, https://www.linkedin.com/in/kent-grimes-620070145/
	Taylor Freehauf	Dr. Tikhon Bykov	Dual Axis Solar Tracking System	https://mail.mcm.edu/academic/depts/physics/projects/research_project_program_Taylor_Freehauf.pdf	M.E. in Mechanical Engineering from Texas A&M University, https://www.linkedin.com/in/taylor-freehauf-28116811b/

2016	Kirk Hodel	Dr. Tikhon Bykov	Feasibility of Wind Energy Production on a Small Scale	https://mail.mcm.edu/academic/depts/physics/projects/research_project_program_Kirk_Hodel.pdf	US Navy
	Ryan Pittman	Dr. Wayne Keith	Musical Tesla Coil	https://mail.mcm.edu/academic/depts/physics/projects/research_project_program_Ryan_Pittman.pdf	Graduate Student pursuing Ph.D. in Physics at Baylor University
2017	Kelsey McKiernan	Dr. Malaney O'Connell	Evaluating collagen-dependent metastatic breast cancer: development of novel diagnostic/prognostic strategies	She successfully demonstrated that overexpression of collagen X in MDA-MB-231 breast cancer cell lines enhanced the invasive capability of the cells using transwell assays.	Studying for the MCAT and applying for medical school in the Fall of 2020
	Heather Jimenez	Dr. Malaney O'Connell	Evaluating the effects of COL10A1 on the Epithelial to Mesenchymal Transition	Using MDA-Vec (GFP only) and MDA-COL (GFP/COL10A1) overexpressing cell lines, she evaluated the effects of COL10A1 overexpression on the EMT process. Using PrimerBlast (NCBI), primers capable of amplifying Vimentin, Twist 1 and 2, Snail 1 and 2, and Zeb 1 and 2 were designed and optimized. RNA was isolated from MDA-Vec and MDA-COL cell lines, and cDNA was synthesized from each sample. RT-PCR analysis was used to evaluate the expression of each EMT-associated gene.	Research Assistant at Xencor (biotech company) in Monrovia, CA
2018	Jacob Hubbard	Dr. Malaney O'Connell	CRISPR/Cas9 Mediated Knockout of Collagen X in MDA-MB-231 Cells	Jake used the CRISPR-Cas9 system to knockout COL10A1 in MDA-MB-231 cells. He is evaluating the effects of COL10A1 knockout in tumor formation, tumor growth, and tumor metastasis in vitro. These studies will help to delineate the role COL10A1 plays in enhancing metastasis.	Applied to Medical Schools
	Michael McEachern	Dr. Malaney O'Connell	Inhibition of Collagen X via Small Molecule Inhibitors	Michael's study aimed to inhibit collagen X protein function by small molecule inhibitors and then evaluate the resulting changes in the invasive capability of the cells. It is expected that the results of this study may lead to the successful development of a treatment strategy capable of mediating collagen X-enhanced expression	Switched to Physics, then Math, and did not graduate?
	Alexandria Mendoza	Dr. Tikhon Bykov	Galaxies, Droplets, and Collisions	https://mail.mcm.edu/~bykov.tikhon/projects/research_project_program_AlexandriaMendoza.pdf	Graduate Student pursuing Ph.D. in Physics at Baylor University
	David Winski	Dr. Tikhon Bykov	Collecting Kinetic Energy from Everyday Movement	https://mail.mcm.edu/~bykov.tikhon/projects/research_project_program_DavidWinski.pdf	Graduate Student pursuing Ph.D. in Physics at the University of Maine

2019	Daniel Nunez	Dr. Malaney O'Connell	Three-Dimensional Cell Culture Assay for Evaluating Differences in Cell Lines	Daniel successfully designed and optimized a "collagen sandwich" technique to evaluate the effects of COL10A1 in breast cancer cell lines. He has also successfully optimized immunofluorescent protocols to visualize 3D cultures.	Pursuing a master's in public health at the University of Texas Health Science Center, San Antonio
	Desmond Turner	Dr. Tikhon Bykov	Use of Neodymium Magnets in Football Helmets to Help Reduce Chances of a Concussion	https://mail.mcm.edu/~bykov.tikhon/projects/research_proposal_program_DesmondTurner.pdf	Quality Control Inspector at Broadwind Towers And Heavy Industries
2020	Joseph Watson	Dr. Wayne Keith	Compound Bow Efficiency	https://mail.mcm.edu/~bykov.tikhon/projects/research_proposal_program_Joseph_Watson.pdf	Internship with Goddard Space Center
2021	Austin Bridwell	Dr. Wayne Keith	Plastic Grinder	https://mail.mcm.edu/~bykov.tikhon/projects/research_project_program_AustinBridwell.pdf	Mechanical engineer with Rentech Inc. in Abilene, Texas
2022	Kaylee Berdoll	Dr. Timothy Renfro	Regulating crow populations in pecan orchards with experimentally determined effective audio files projected from a drone.	https://mail.mcm.edu/~bykov.tikhon/2023/honors%20research_project_program_Kaylee_Berdoll.pdf	MS in Mechanical Engineering at Texas A&M University in College Station

	Taryn Fambrough	Dr. Wayne Keith	Building a Dobsonian Telescope.	https://mail.mcm.edu/~bykov.tikhon/2023/research_project_program_Taryn_Fambrough.pdf	Systems Engineer Associate at Lockheed Martin in Fort Worth
2023	Chloe Gatch	Dr. Wayne Keith	Automated Car Prototype	https://mail.mcm.edu/~bykov.tikhon/2023/research_project_program_Chloe_Gatch.pdf	Medical Scribe, Applying to Medical School
	Isaiah Narvaez (now Alvarez)	Dr. Wayne Keith	Plastic strip cutter	https://mail.mcm.edu/~bykov.tikhon/2023/research_project_program_Isaiah_Alvarez.pdf	Looking for work