

Project Summary

Our team is excited for this Escape Room project which directly aligns with SCSU's mission of "preparing students for life, work, and citizenship in the 21st century". Drs. Jacobson, Petitto, and Bruender share similar philosophies, which directly align with the University's mission, as to how we as educators play an integral role in student development and learning. We each advocate and design lectures to where learning is the students' responsibility— they will hopefully decide to use the information presented in class to increase their personal understanding and then integrate these concepts into their daily lives. However, for students to be able to learn, we understand the major responsibilities of our job as educators are to provide the course information in a clear and consistent manner, show them how to use the information, and have supporting materials available. . We also share the belief that the most important aspect of teaching is a welcoming classroom environment where the students can make the decision to learn for themselves using the provided tools. . The students have major responsibilities as well, which we openly communicate to them. They must also trust themselves that they can do the work and trust the course is set-up to help them succeed with the types of instruction, activities, homework, and the time and effort they put into the course itself. . Learning is a two-way street, if we both show up and do our "jobs" then students are successful.

We also believe that proficiency of any subject cannot be accomplished by memorization alone. Learning is a combination of critical thinking, problem solving, and communication, but also one's ability to see how and where these concepts are interconnected and to apply them. We view chemistry like a pointillism painting, up close we only see a disordered array of colored dots, but if we take a few steps back an image appears with vast and intricate details. Unfortunately, students too often get caught and overwhelmed by all the individual points of color (i.e. terminology, definitions, equations, mathematics, just doing the questions to earn points!) and our job is to challenge and encourage them to discover the structure and connectivity that allow them to see the whole picture. This is where we see the value in an activity like the Escape Room. This activity provides the structure for students to demonstrate their conceptual and practical knowledge in chemistry/biochemistry. The Escape Room also allows the students to apply their current knowledge to a larger chemical problem in a structured, lower stress environment than an exam or lab practicum. In this setting, students can begin to see the link between what they are learning and a larger chemical context/problem, which will begin to foster confidence as they progress toward graduation, and make a critical connection to the value of lifelong learning which will enrich their lives long after leaving SCSU.

We also firmly believe that the creation of exceptional curriculum and extraordinary student experiences require a team approach. Modern curriculum must combine content, creativity, assessment, and technology to create an experience that is compelling to the student and has the capability to enhance the learning process. For that reason, this is a team proposal. Dr Jacobson is a scientist, theologian, artist, and musician with a demonstrated history of leadership in the private sector and academic community. Dr. Bruender is a rock-star young scientist and though a junior faculty member has nearly twenty scientific publications. His energy and profound commitment to engaging students inspire us all. Dr. Petitto is a recognized leader in science education and champion for underserved communities. Mr. Jorgensen combines his vast knowledge of emerging technology with a passion to implement those tools to support learning communities.

While we use similar classroom approaches and share elements of our teaching philosophies, the unique strengths of each member of our team combine to empower the excellence we expect to attain.

Dr. Jacobson brings a track record of innovative approaches to science education spanning pre-kindergarten to Master's level research as exemplified by the Science Express Program where he brought together scientists, science educators, and science education professionals to develop and implement a critically acclaimed science outreach program that supported hands-on science education for over 100,000 pK-12 students. Dr. Jacobson also led a team composed of SCSU, Ridgewater and Anoka Ramsey faculty to create

Applied Structural Genomics, an undergraduate research experience that could be implemented at both the university and community college level.

Dr Jacobson combines the creativity that created the first Escape Room for CHEM 480 in the fall of 2018, with the leadership awareness that the next step represented in this proposal is a substantial multi-faceted effort that would be impossible for any one of us alone. This combination of innovation and leadership, coupled to the value of the idea, inspired Drs. Petitto and Bruender to accept his invitation to collaborate to expand this concept beyond CHEM 480.

Dr. Petitto has an exemplary, established record of using evidenced based pedagogical practices to support and enhance student learning in all her courses. Teaching and Pedagogy are major focuses where she spent the most time developing, designing, and implementing initiatives, activities, and language for the most inclusive, active learning classroom environments since starting at SCSU ten years ago. Her teaching merits received the highest accolade with the MN State Board of Teaching “**Outstanding Teacher of the Year**” award in 2018. In addition, Dr. Petitto’s scholarly activities have centered on pedagogy as well. She disseminated a paper on innovative teaching, is a Co-PI on the recently fully funded STEM Course Transformation for Equity and Inclusion grant, and was Co-Pi or Senior Personal on six additional grants involving STEM education or instrumentation for student and faculty scholarship. Furthermore, as part of her sabbatical, she completed a five year evaluation of the collaborative learning techniques (Learning Assistants, small group work activities) to assess the learning of the students and determine the continuation of the implementation and adaptation of collaborative learning techniques. She also has presented two workshops during SCSU Convocations on active learning and learning assistants, been a guest lecturer in CHEM 460 STEM Pedagogy, and was a student and completed the STEM Education, Theory, and Practice for Learning Assistants, a MN State-wide on-line semester course in S18. She also initiated a faculty summer 2018 book club, where we read “Make it Stick, the Science of Successful Learning,” where she gained the confidence to revise General Chemistry I for this past fall. She has numerous professional meetings including the 64th Annual Meeting of the Midwest Association of Chemistry Teachers in Liberal Arts Colleges (MACTLAC) and the Transforming your Course using Active Learning and Learning Assistants.

Dr. Bruender is an exceptional young scientist and recognized expert in the structural biology and biochemistry of antibiotics and natural products with chemotherapeutic properties. He also has a deep interest in science education. Dr. Bruender has been very active in implementing evidenced-based pedagogical practices in his courses since his arrival in August of 2016. In that time, he has participated in 3 courses focused on pedagogical best practices and effective implementation of learning assistants both at the SCSU and MN State level and is part of a team that was awarded a MN State Collaborative grant to extend the LA model across MN State campuses. Because of his commitment to facilitated student learning, Dr. Bruender has been awarded and utilized learning assistants in five of the six semesters he has been at SCSU.

Our final member, Greg Jorgensen, was involved in the early stages of the first Escape Room when we reached out to him for technical advice. Earlier this year, we reached out to him again to explore ways we could improve the user interface. Greg’s experience with the spectrum of technology tools available to support teaching and learning which could be used for this endeavor were immediately apparent in that meeting as was his passion for the possibilities Escape Rooms represented. In many ways, that meeting and Greg’s vision of how we could better implement the Escape Room user interface was the genesis of this proposal. His expertise is an essential component of this collaboration.