"After a certain level of technical skill is achieved, science and art tend to coalesce in esthetics, plasticity, and form. The greatest scientists are always artists as well." —Albert Einstein

**Description of Intended Work**

This grant will be used to integrate STEM (Science, Technology, Engineering, Mathematics) content into the Art Education and Art Department curricula by exemplifying the concept of STEAM. STEAM adds the “A” or the Arts to the science-based movement which marries the sciences to the arts thereby validating the importance of the Arts to not only education, but to the world-at-large. Moreover, the STEAM movement recognizes the importance of the arts and arts-related skills such as creativity, problem solving, innovative collaboration, visual communication, and imaginative brainstorming to all content areas, especially to the sciences.

The movement to incorporate Art into the STEM curricula began at art schools such as *The Rhode Island School of Design* and with art groups such as *Americans for the Arts*, but has recently grown to enjoy national recognition. The importance of adding the Arts to the STEM content was integral to the 113th Congress House Resolution 51 which resolved to recognize the importance of Art and Design in STEM fields. The 2013 resolution supported: 1) The designation of STEM-to-STEAM month, 2) Encouraged the inclusion of Art and Design into the STEM fields during the reauthorization of the Elementary and Secondary Act, and 3) Supported the Department of Education, NSF, and the Secretary of Commerce to develop a STEM to STEAM Council in order to facilitate a comprehensive approach to the incorporation of Art and Design into the Federal STEM programs.

Since the STEAM movement has attained national recognition, it behooves the Art Education Program to inform Art Education, Elementary Education, and General Education majors as to the significance of nationally recognized curricular movements. Subsequently, I propose to use this grant to accomplish 3 goals: 1) Integrate STEM content into three Art Education courses: Art 380, 381, and 398; 2) Design STEM-based curricular lessons to be shared on Western Gallery’s website that complement the university outdoor sculpture collection, in particular the newly installed: *Lunar Drift*; and 3) Develop a STEAM minor for the Art Department with a strand for Art 398 to allow non majors to use the course for credit in the new STEAM Minor.

◆ **STEM Content Integrated with ART 380, 381, and 398:**

**Art 380: Art Educating the Child:** 1) Develop a studio lesson that is STEM related to be taught in Art 380 during Fall 2014, 2) Develop resource list for relevant artists whose work is STEM related and suitable for elementary aged students, and 3) Research appropriate STEM readings for Elementary Education majors.

**Art 381: Theories in Art Education:** 1) Develop resource list of artists whose work is STEM related that is suitable for middle school and secondary students, 2) Research readings on STEAM related topics to be used for K-12 Art curricula, 3) Develop a lesson plan format to model the development of STEAM related unit plans for K-12 students.

**Art 398: Integrated Arts in the Elementary Classroom:** 1) Develop resource list of relevant artists, musicians, actors and dancers whose work is STEM related and suitable for
elementary aged students, 2) Research samples of STEAM curricula in the four arts to be used as exemplars, 3) Develop STEAM related course activities, 4) Determine relevant readings and develop guided discussion questions for STEAM content appropriate for Elementary Education majors, and 5) Develop a lesson plan component for unit development.

♦ Development of Art lessons that support WWU Outdoor Sculptures and Public Art Collection that feature STEM connections:

In 2007, I developed curricular lessons available for public school teachers to be used with the outdoor sculpture collection and with two (at the time) current exhibits. Shared on the Western Gallery website under tabs labeled: Outdoor Sculpture/Educational Resources and Projects/K-12 Resources, the six lessons present curricular units that teach about the outdoor sculpture collection and recent exhibits in the gallery. For this grant, I will develop a STEAM unit that focuses on the WWU Public Art Collection works that relate to STEM content, in particular the recently installed Lunar Drift. During Spring 2014, I also purchased resources such as books, videos, art prints, and curricular models to be used in the development of STEAM curricula for WWU courses and the public school system.

♦ Development of the STEAM minor and course content in Art 381 to function as course offering in new STEAM minor:

The third component of this grant is to facilitate the development of a STEAM minor for the Art Department. Program requirements, new courses, impact on resources, and personnel are components integral to the responsibilities that I will undertake to develop the STEAM Minor. Additionally, I will redesign Art 381 by developing a non major strand so that the course could be used in the new STEAM minor as an elective and/or core course.

Project's Importance and Outcome

This project is important for four reasons: First, art educators and educators in general should be apprised of current legislation and stay abreast of all national movements that affect educational curricula. Modeling the importance of researching and studying current pedagogical thought is valuable for future professional development and supports the goal of The College of Fine and Performing Arts to encourage “a dynamic, lifelong relationship with the arts.”

Secondly, it has always been my personal conviction that theory without practice, especially in education, is not as meaningful without the development of ways to implement the concepts. Subsequently, a significant portion of this grant will identify the means for infusing STEAM concepts into the university curricula and subsequently, the future curricula that will be used by Art Education and Education majors in their classrooms. Moreover, STEAM concepts support educational learning theories such as Gardner's Multiple Intelligences that are integral to current philosophical thought in Education, thereby demonstrating the interrelationships of theoretical precepts.

Third, developing and identifying curricula that integrates STEM concepts with the visual Arts would not only provide resources for WWU Art Education, Education and General education majors, it would also provide STEAM curricula that can be used by the public school system. Sharing instructional ideas and resources for teachers in the community on Western Gallery’s website enhances the relationship between the Art Education area and local school districts: a significant goal of the Art Education area and the Art Department's goal of promoting “lifelong learners and leaders in the community.”

Lastly, the development of an Art Department STEAM minor enhances the interdisciplinary nature of the department and college. The potential for collaboration throughout the university is increased as is the relevance and contemporaneous nature of the science and arts-based content.