



NSF DGE 0538652

SCULPTING SUCCESSFUL STEM FELLOWS

STRATEGIES FOR TRANSITIONING FROM A RESEARCHER TO AN EDUCATOR AND RESEARCHER

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PROJECT OVERVIEW

The Culturally -Relevant Engineering Applications in Mathematics (CREAM) model promises energized student learning and increased success of students in mathematics classes along the engineering pipeline.

“Culturally Relevant Mathematics engineering applications, drawing from proven curricular materials, linked to mandated mathematics learning outcomes and relevant cultural interests.

“Diverse Implementation Model implemented in widely distributed secondary schools with Hispanic, Native, and African American cultures and academic diversity.

“Mentored Learning Graduate fellows, as content experts and role models, mentor youth in learning and understanding culturally relevant engineering applications.

“Resource Leveraging Partnering with schools, cultural experts, statewide extension, MESA, and engineering education research center to access resources and support sustainability.

PROJECT GOALS

The CREAM Project has three primary goals.

“To greatly increase learning of mathematics and valuing of engineering careers among traditional and underrepresented student populations.

“To create in mathematics and engineering graduate students the desire to pursue careers as university educators who also engage in outreach and serve as mentors to diverse pre-college students.

“To establish long term relationships among geographically separated K12 teachers and university faculty to support effective teaching of mathematics and promotion of engineering careers at the K and university levels.

STEM FELLOWS

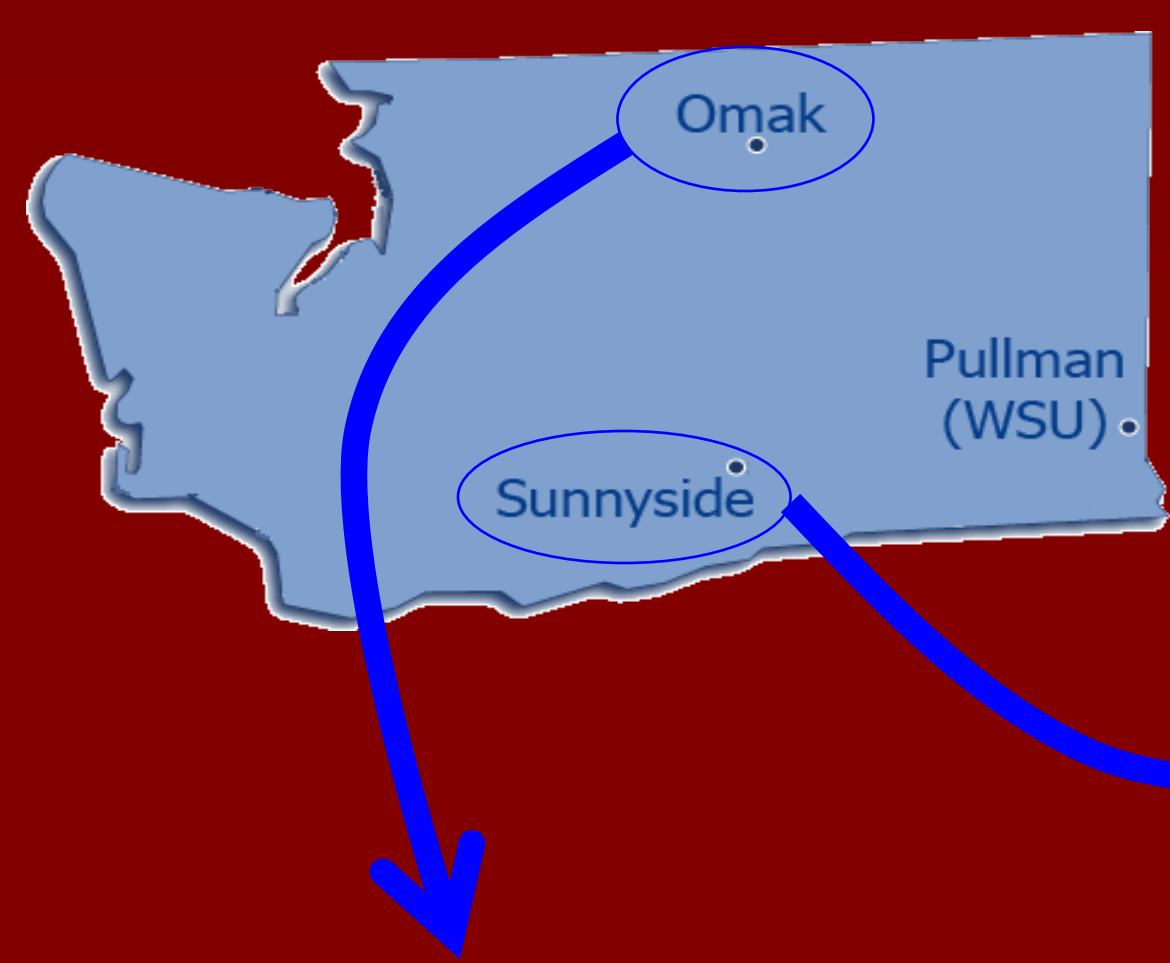


Figure 1: Demographic of education level based on city. WSU located in Pullman while two partner schools located in Omak and Sunnyside.

<p>Nathan Hamlin - Omak Team Leader</p> <p>2nd Year Fellow</p> <p>PhD Candidate in Mathematics studying public key cryptography.</p> <p>Amber Smith PhD Candidate in Mathematics modeling c.i. for projected individual performance under multiple sleep structures.</p> <p>Erik Wemlinger PhD Candidate in Electrical Engineering studying cold plasma at atmospheric pressure to process light biooil for the improved generation of syngas</p>	<p>Courtney Bonuccelli - Sunnyside Team Leader</p> <p>2nd Year Fellow</p> <p>PhD Candidate in Chemical Engineering studying advanced heat /mass transfer associated with liquid cooling.</p> <p>Greg Vogel PhD student in Applied Mathematics studying mathematical modeling of patients in chronic HIV stages.</p> <p>Kevin Chang PhD student in Computer Engineering studying the optimization of routing paths in computer electronic chips.</p>
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Figure 2: 2009-2010 CREAM TEAM. Top Row (left to right): Denny Davis (PI), Teri Alvarez-Ziegler (Science Teacher), Erik Wemlinger (STEM Fellow), Amber Smith (STEM Fellow), Kevin Chang (STEM Fellow), Rennie McCormick (Math Teacher), Nathan Hamlin (STEM Fellow), Greg Vogel (STEM Fellow), Jon Soule (Science Teacher). Bottom Row (left to right): Melodyecha (Math Teacher), Courtney Bonuccelli (STEM Fellow), Jo Olson (STEM Faculty). Not Pictured: Guy Westhoff (STEM Faculty), Sandy Cooper (STEM Faculty), Jennife Beller (STEM Faculty), Cale Otten (Math Teacher).

SUMMER TRAINING

JUNE: Workshop with Fellows and Faculty

“Fellows present research in non-technical terms

“Training sessions on Cultural awareness

- What defines culture & acknowledge our own culture.
- Expectations of working within a K-12 setting/classroom.
- Blending within the school culture.

“STEM Lesson Explorations and Implementation

- Bucket of Functions activity DEMO

“Instructional Design Model

- Instructional template designed and modified by CREAM team.

- Designed all STEM focused lessons within template format for implementation within K-12 mathematics and science classrooms.

SUMMER TRAINING

JULY: Workshop with Fellows and K -12 Educators

“Brainstorming sessions by school teams .

- Explored overlap opportunities between curriculum and STEM Fellow research and related project ideas.
- Focused time for design and development of STEM lessons within school teams.

“Recognizing community and school culture

- Researched unique school and community demographics in teams.
- Shared findings of demographics to group.

“Team Building Activities

- Ropes course

CREAM PROJECT ACTIVITIES

“ Fall Semester Course on Intersections of Culture and Mathematics.

- Readings and discussions focused on equitable teaching practices.
- Research projects focused on statistical data and trends related to women and underrepresented populations in STEM fields.

“ Spring Semester Course on Research and Publication Methods.

- Readings supporting understanding of qualitative and quantitative research practices in education.
- Mentoring of Fellows with faculty for publishing education research.
- Fellow reflections on project implantation, impact on K-12 students, modifications to research projects.

“STEM Lesson Implementation

- STEM Fellows implement research based projects
- Engineering Design Project: Rocket Design and Flight

IMPACTS ON STEM FELLOWS

“ Reflections on implementation success, improvements, and alternative strategies for delivery of their research based projects to better highlight the key concepts or ideas.

“ Fellows changing understanding of their research and extension opportunities.

“ Alternative funding opportunities for engineering education materials.

REFERENCES

1. City Education Demographic. www.profiles.nationalrelocation.com. Accessed July 20,2009.