SENCER at TWU

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Texas Woman's University

- Largest public institution of higher education primarily for women in the country
- Student population is about 15,700
- 90% women
- 25% hispanic
- Many of these students are first family member in college

Chemistry and Biochemistry

- The Department of Chemistry and Biochemistry offers the ACS certified BS in Chemistry and in Biochemistry and the MS degree in Chemistry
- Offer courses in chemistry (CHEM), physics (PHYS) and science (SCI)
- All students at TWU must take 6 to 8 credits of “science” as a core requirement
- Part of our new core focuses on teamwork and social responsibility

Translating Science into Common Language:

SENCER and the Dual Poster Concept

Cynthia Maguire

TWU Dual Poster Project – Early Steps

- Non science majors created a handbook
- Recruited students with existing science posters
- Finished two poster pairs and surveyed undergraduate student responses to them

Convincing Students
…and Faculty

- Must understand benefits to creating a dual poster
  - Potential funding
  - Skills for future teaching
  - Assurance of understanding
  - Working with other disciplines
  - Recruitment of new students
- Explain that dual poster isn't "dumbing down" their science

Title Revision

- List all words that may not be understood by your audience, followed by more common synonyms or a brief explanation
- What is the purpose of your work? What impact could it have on the general public?
- Create a new poster title considering your above answers.
- Share your title with someone unfamiliar with your work. What is their response? Do they have a basic idea what your poster is about?
- Are there any final changes you can make to your title?

Abstract Revision

- Rewrite abstract without jargon.
- Does your abstract still sound overly technical? Can the average person understand what you are studying? Rewrite your abstract again with these questions in mind.
- Ask someone who is unfamiliar with your work to look at your abstract. Do they understand what you studied? Do they know why it is relevant to them? Rewrite your abstract a final time.

Poster Body

- Allow students to test their wings
- Keep look of original poster by retaining most charts and pictures
- Explain all technical items
- Summarize methods and expand results

Conclusion

- Try to rewrite conclusion using the skills gained from the previous exercises. Focus on the impact of your work and steps that you would like your audience to take now that they understand it. Examples of steps could include: social or legislative actions, funding additional research or lifestyle changes
- Share your conclusion with someone who is unfamiliar with your work. Do they understand what action you want them to take? Is there anything you can change? Write your final version.

A Spectroscopic and Calorimetric Investigation of the Human Telomere DNA Sequence

Brenna A. Tucker[1], Sam G. Gabriel[1], C. Antonacci[2], and Richard D. Sheardy[1]
[1]Texas Woman's University, Denton, TX 76204
[2]Seton Hall University, South Orange, NJ 07079

Introduction

Methods

Results and Discussion

Conclusions:

Future Studies:

References

Acknowledgements

Unusual DNA Structures and their Potential Role in New Cancer Therapies

Brenna A. Tucker[1], Sahmla Gabriel[1], Cosimo Antonocci[2], and Richard D. Sheardy[1]
[1]Texas Woman's University, Denton Texas, 76204
[2]Seton Hall, South Orange New Jersey, 07079

Introduction

Specific Aim 1

Specific Aim 2

Specific Aim 3

Methods

Conclusions

References

Acknowledgements

Science, Society and Sustainability

A new undergraduate certificate

Important Requirements for an Undergraduate Certificate

- Requires 15 to 18 credits of upper division courses (3000 and 4000 level)
- Must be an integrated and organized sequence of study
- Students are responsible for all prerequisites
- A project or practicum is suggested but not required
- A Certificate is issued

Certificate Program Objectives

- Define scientific, sociological and economic sustainability.
- Evaluate a variety of sustainability issues, along with their risks and benefits.
- Predict impacts of modern lifestyles on earth's material and energy resources.
- Relate knowledge of scientific, sociopolitical and economic aspects of sustainability to a civic issue within the community.
- Synthesize sustainable solutions to complex civic issues.
- Communicate civic issues and sustainable solutions to the general public and policymakers.

Science, Society and Sustainability Certificate Program

Foundation

Community Conversation in Sustainability

Building Blocks

Natural Sciences And Mathematics

Arts, Humanities and Social Sciences

Government and Business

Synthesis

Building Sustainable Communities

Community Sustainability Project

Courses for the Certificate

- Foundation Course: A multidisciplinary, team taught course discussing all aspects of sustainability from scientific, sociological and economic points of view (3 credits in a 3000 level course)

Courses for the Certificate

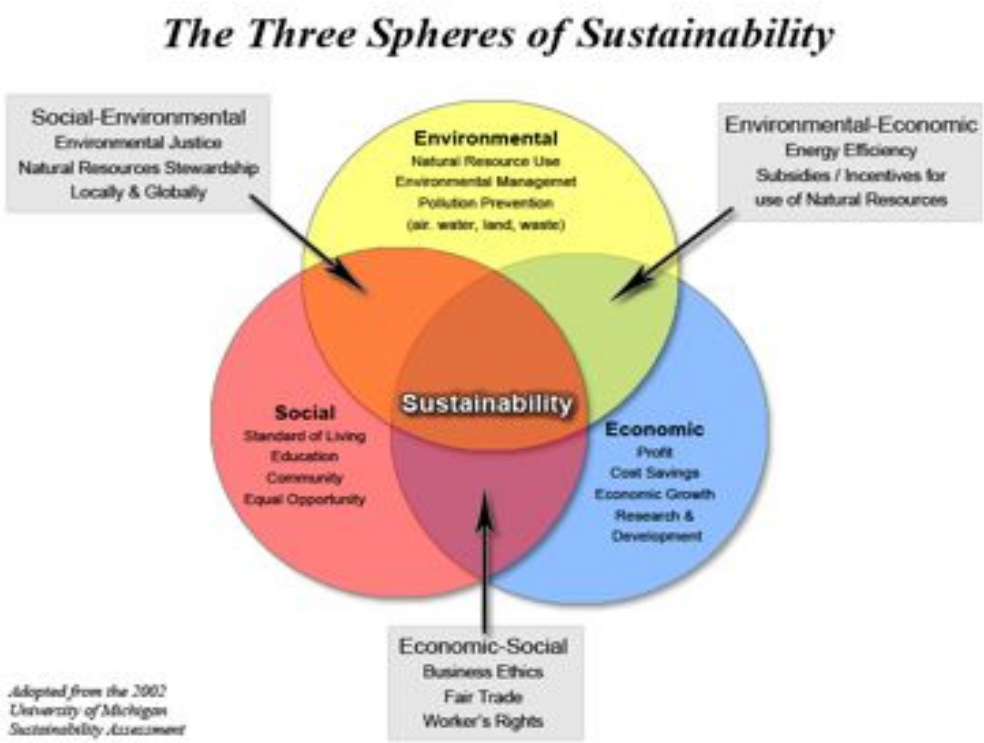
- Building Block Courses: Students are required to take at least one 3000 or 4000 level course (3 credits each)in the three areas of focus (Natural Sciences and Mathematics, Arts, Humanities and Social Sciences, Government and Business) from a list provided by appropriate departments within Arts and Sciences. This total is a minimum of 9 credit hours.

Building Block Courses

- SCI 3033: Water in a Changing Environment
- SCI 3133: Climate Change: A Human Perspective
- BIOL 4293: Scientific Communication
- BIOL 4582: Science in the Secondary Classroom
- PSY 4183: Global Perspectives in Psychology
- PHIL 3073: Bioethics
- SOCI 3083: Population Dynamics
- SOCI 3283: Principles of Geography
- HIST 4233: Global Issues and Trends
- BUS 3201: Business Principles of Community Service
- DNCE 3383: Dance, Gender and Culture
- MU 3713: Music and World Cultures

Courses for the Certificate

- Synthesis Course: This is a capstone seminar course in which students use the sum of their knowledge of sustainability to complete a civic engagement project. (3 credits, 4000 level course)



The Road to Green Chemistry at TWU

Incorporating civic engagement in undergraduate research

Organic Chemistry at TWU

- Traditional two semester course for chemistry, biochemistry and biology majors
- In the last three years, we have grown from 5 to 7 sections of 16 students in organic chemistry laboratory!
- We offer a state of the art laboratory space with 8 student hoods each with a rotary evaporator
- In the past five years, the department has brought in over a million dollars of teaching and research grade equipment and instrumentation

Organic Chemistry Lab

The Catalyst to Green Chemistry at TWU

The 15th Annual Green Chemistry and Engineering Conference (2010)

Presented poster about science education and civic engagement

Learned a lot about green chemistry in the undergraduate curriculum

Realized that teaching and using green chemistry in organic lab is a form of civic engagement

Next Steps

- Sarah Sutherland (a TA for organic lab) was awarded an NSF Travel Fellowship to the meeting the next year.
  - Sarah found many references to green chemistry experiments for organic lab
- David Caltrider (also a TA) was also awarded an NSF Travel Fellowship to the meeting last year (2013).
  - David continued to research for new experiments as we slowly started doing more green experiments
  - He presented a poster at this year's green chemistry meeting and will present his story at the national meeting of the ACS next week

Green Chemistry Experiments

- Hydrobromination of alkenes
  - Used HBr/H_2O_2 instead of Br_2
- The Benzopinacol Rearrangement
  - Reaction catalyzed by sunlight
- The Diels-Alder cycloaddition
  - Carried out reaction in water instead of hexane

The Benzopinacol Reaction

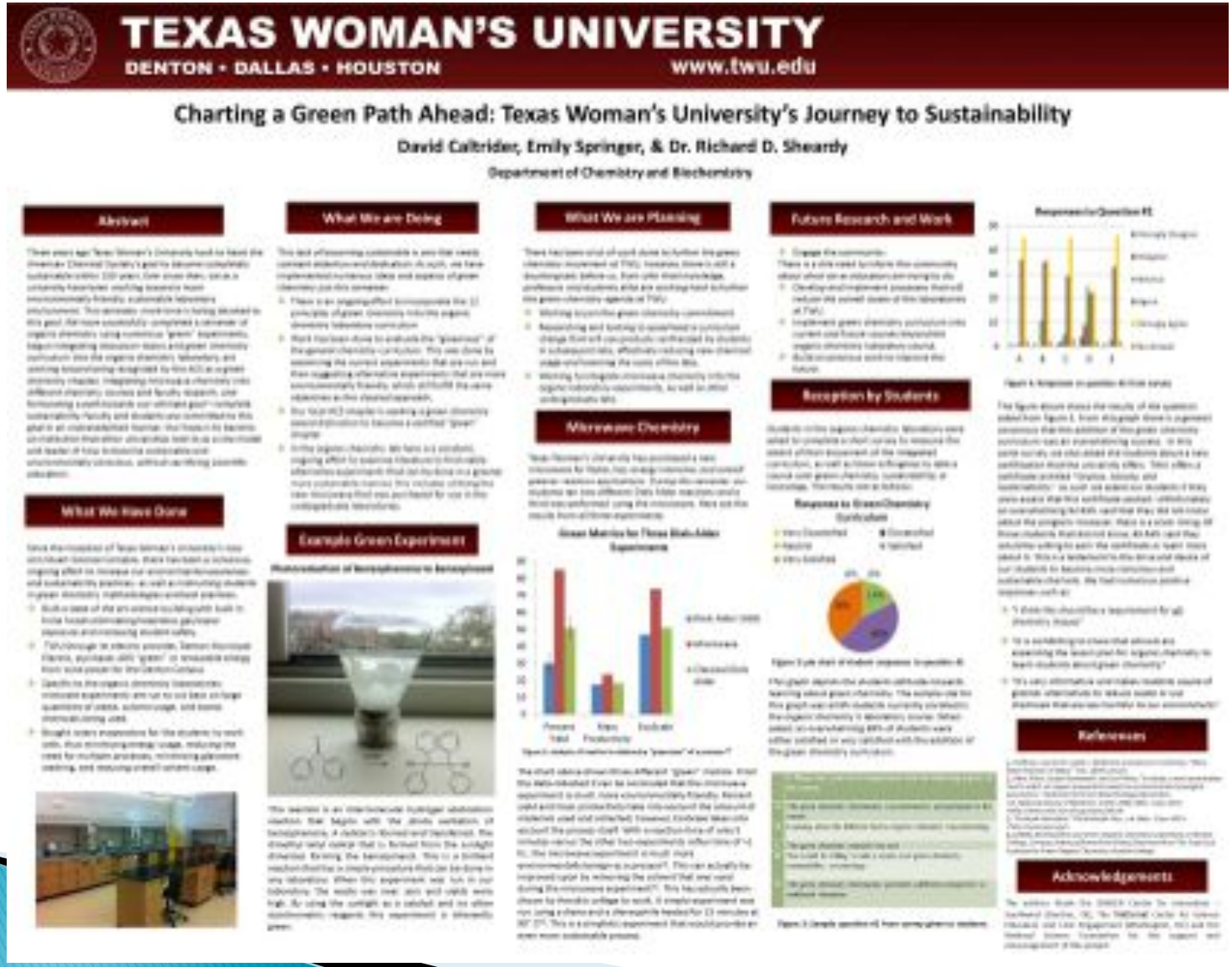
Coming Soon

Microwave technology

- Can carry out reactions in minutes rather than hours
- Can often carry out solventless reactions

- David was present for demonstration
- Proceeded on his own to try different reactions which he had found in the literature
- Recommended some possibilities for the organic lab

David's Poster



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Charting a Green Path Ahead: Texas Woman's University's Journey to Sustainability

David Caltrider, Emily Springer, & Dr. Richard D. Sheardy

Department of Chemistry and Biochemistry

Abstract

What We Are Doing

What We Are Planning

Future Research and Work

Reception by Students

What We Have Done

Example Green Experiment

Microwave Chemistry

References

Acknowledgements

Summary and Conclusions

- This project is an example of how a single student can get involved in a research project and have a very positive outcome for other students and for the community
- David learned a lot of organic chemistry. (He graduated with his BA in Business and is now in his first year at UT Medical Branch in Galveston).
- The organic lab students appreciated the green chemistry aspect of the course
- We are making progress toward of goal of greener chemistry experiments at all levels of undergraduate laboratory experience because of his efforts

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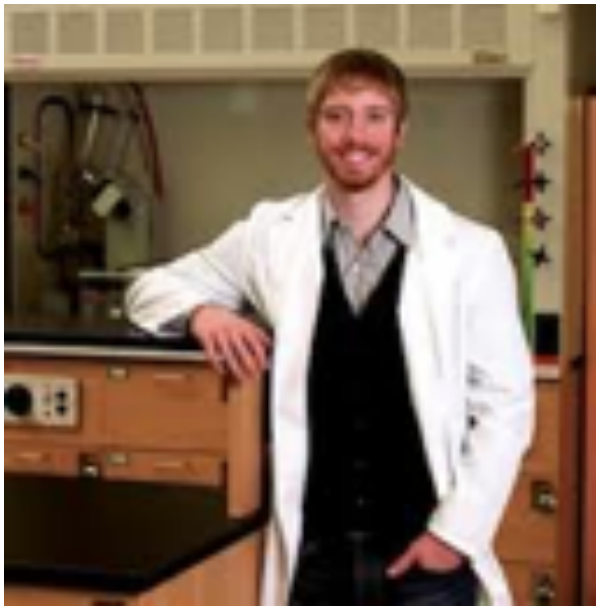
And, last but not least:

Sarah Sutherland



David Caltrider