



2014 SIS and CARS Vignettes Table of Contents

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PROJECT VIGNETTE

Name(s):

Andrew S. Bartlett

Grant title:

Developing a Mobile App for Cardiovascular and Pulmonary Management

Type of grant: CARS SIS

How many students did you engage in this project? Two

The purpose of my project was to...

The use of technology to easily access information may have a positive impact on student learning. The primary goal of this project was to develop a method for physical therapy students and therapists to easily obtain information pertaining to cardiovascular and pulmonary examination and treatment techniques. A secondary goals was to develop of a collaborative faculty/student research project with another academic institution (Winston Salem State University) to determine its' impact on student learning. I felt this project was significant because currently an App does not exists for cardiovascular and pulmonary examination and treatment techniques. Providing students and therapists with an option to obtain easily accessible and evidenced based information may improve student learning and patient outcomes. Additionally, it will engage students from two physical therapy schools to work on a research project together.

To accomplish this, I (we)...

We planned to develop a cardiopulmonary App that can be used on ipads and mobile devices such as iphones and android phones.

Thus far, I (we) have...

We have developed the App for iphones, ipads and android phones and are currently adding content pertaining to examination and treatment techniques. The App also includes videos and best level of evidence. The two students involved with this project have assisted with research and videoing. The grant has allowed me not only to involve students but also allowed me to collaborate with another faculty member from another college (Winston Salem State University). From this collaboration we have developed two research projects involving students from both colleges.

With the following interesting results...

The App is not ready to be fully integrated into our labs or in the field but I have been able to post the content including the videos onto Moodle. Students have reported the videos and content to be very helpful in preparing them for labs. A pilot study on the effectiveness in using an App on student learning will start this January and a larger scale study in the fall of 2015.

In the future, I (we) hope to build on this project by...

Adding case studies and information that will facilitate clinical reasoning skills. We hope the App will allow students and therapist to choose the best examination and treatment techniques for a patient based on the patients signs/symptoms.

PROJECT VIGNETTE

Name(s):

Beverly J. Brown

Grant title:

Using Horticultural Therapy to Improve the Quality of Life for Veterans and Their Families

Type of grant: CARS SIS

How many students did you engage in this project? 0

The purpose of my project was to...

. . . provide much needed support to the under-served population of Veterans and their families. Without effective support, without a connection to their community, these veterans are often left homeless and in need. This project was designed to provide support in a variety of ways ranging from planting crops, harvesting crops, to sharing communal meals while gathering data about the efficacy of this horticultural therapy approach.

To accomplish this, I (we)...

. . . forged collaborative relationships between Nazareth College, EquiCenter, Cornell Cooperative Extension Center, and several Veterans service organizations. At EquiCenter we established a series of raised bed gardens and a larger garden with deer fencing to allow ample space for gardening. Veterans and their families helped to plant the raised beds, harvest and take crops home, and to plant garlic for harvest next summer. These activities were designed to allow relaxed conversation between staff, Veterans, and their families, if present.

Thus far, I (we) have...

. . . begun to develop a network of interested Veterans, their families, and the organizations listed above. This network allows for exchange of information on resources and opportunities for Veterans and their families.

. . . created gardening opportunities that reduce stress, encourage teamwork, and help to develop food stability.

With the following interesting results...

. . . food was shared weekly with Veterans.

. . . one Vietnam Veteran brought vegetables from his home garden to share with others.

. . . participants in the gardening activities responses can best be summed up by this inquiry from a Veteran at the end of planting -- "When can we come back again?"

In the future, I (we) hope to build on this project by...

. . . including 20 additional Veterans who will be participating in a new riding program at EquiCenter.

. . . beginning garden programming in April and completing an entire growing season of projects now that there is plenty of garden space.

. . . working with Dr. Susan Taylor Brown to obtain additional funding for horticultural therapy programming.

PROJECT VIGNETTE

Name(s):

Paula Brown & Laura Riddle

Grant title:

Promoting teaching and research using conversation and language analysis tools

Type of grant: CARS SIS

How many students did you engage in this project? 32

The purpose of my project was to...

create a community of scholars who can engage in language analysis activities, thus advancing student learning and research productivity. Our immediate goals were to promote our knowledge and use of three specific language tools in order to foster faculty and student use of the programs for academic learning, clinical use, and research activity. The three programs were: The Child Language Data Exchange System (CHILDES), the Language Environment Analysis system (LENA), and Systematic Analysis of Language Transcripts (SALT). Our goal was to study these systems leading to our own competencies with their use and the development of instructional materials for student and faculty use. These materials will be used to conduct learning activities including independent workshops on language analysis.

To accomplish this, I (we)...

focused our attention on the CHILDES system with its three integrated tools: the CHAT transcription and coding format, the CLAN analysis program, and an extensive database of language samples. "Conquering" this system ended up being far more onerous than we anticipated and therefore became the primary focus of our summer work.

Thus far, I (we) have...

learned the components of the CHILDES system and begun creating descriptive and instructional materials related to their use. We are in the process of creating a procedural guide in a user friendly format for students and faculty. We have also developed instructional activities in two courses for utilizing SALT and LENA and we have begun creating a community of faculty and student scholars who are interested in research through a series of Friday afternoon research meetings.

With the following interesting results...

We have had 12 students attending the research meetings and ideas have been generated for research. The meetings have offered students the opportunity to engage in collaborative discussions of research ideas and they have discovered that research is more manageable than they had previously thought. Some interesting ideas for research have been generated. The group of students doing the

LENA project are waiting for the language sample they are analyzing to be completed and are very excited to use the tool. In addition, one faculty member in the department is interested in joining the students in this opportunity. We discovered that the CHAT transcription system plus CLAN analysis system has some transcription advantages over the SALT system and therefore, we are looking forward to more expanded use of this program.

In the future, I (we) hope to build on this project by...

holding workshops and developing materials that will inspire faculty to include more assignments requiring language analysis in their courses; prepare students to perform more language analyses in clinical situations; and inspire more students to conduct language-related research.

PROJECT VIGNETTE

Name(s):

Leanne Charlesworth & Jed Metzger

Grant title:

Project Homelessness Connect- 2014

Type of grant: CARS SIS

How many students did you engage in this project? Approximately 100-125

The purpose of my project was to...

- 1) Engage approximately 100 to 125 undergraduate and graduate students in service for the 2014 Project Homeless Connect event.
- 2) Improve the Intake survey for use at the 2014 event so that the survey meets the needs of multiple community partners who serve the homeless.
- 3) Implement the quality improvement strategies recommended from the 2013 Project Homelessness Connect event (to increase flow, decrease wait time, make guests more comfortable at the front door).
- 4) Undergraduate students complete an intake survey form on 95% of guests (expected to be between 800-1,000 individuals).
- 5) Undergraduate students to analyze and present the data to community providers (undergraduate engaged scholarship).
- 6) Graduate students to act as individual hosts to guests (expected to be between 800-1,000 individuals).

To accomplish this, I (we)...

(1) worked with the multiple community partners over the summer to ensure that consensus was obtained from all service providers with regard to the intake survey instrument and other event assessment strategies. (2) provided training to volunteers (including Nazareth students), worked with students to run toiletry and clothing drives, organized materials for distribution prior to the event. (3) provided transportation and/or parking money as needed for Nazareth College students and faculty (the event is held at the Blue Cross Arena in downtown, Rochester). (4) provided all Nazareth College students with a tee-shirt to wear at the event. This builds pride and recognition for the student participants and the College, and helps guests at the event quickly find volunteers. (5) successfully held the event on October 21. Nazareth undergraduate and graduate students played a critical role in the success of the event.

Thus far, I (we) have...

With the following interesting results...

The event was successfully held on October 21, 2014. Well-over 500 guests (individuals experiencing homelessness or individuals at-risk of homelessness) were served. Students employed social work skills to engage guests and facilitate a positive experience for all. Students will present their findings from the diverse data sources (entrance interview, counts kept by service providers, exit questionnaire) gathered to community power sources, in November 2014. Students will also have opportunity to present their work at CARS. Faculty will present at the 2014 Council of Social Work Education annual conference on October 25 in Tampa, Florida.

In the future, I (we) hope to build on this project by...

Continuing this community-university partnership into the future & expanding community & student impact.

PROJECT VIGNETTE

Name(s):

Rui Cheng

Grant title:

Academic Writing for International Graduate Students: Challenges and Possible Solutions

Type of grant: CARS SIS

How many students did you engage in this project?6

The purpose of my project was to...

The purpose for this project was to explore the challenges and frustrations non-native speaking graduate students have in their writing in their academic fields and expectations and attitude professors hold toward their writing with the aim to seek the possible solutions that may help both students and faculty. The findings of the study may be significant in the sense that educators and instructors may understand better where the difficulties and frustrations come from and find ways to help students overcome the difficulties in a more efficient way.

To accomplish this, I (we)...

I distributed a survey to elicit information on students' demographic backgrounds, past writing experiences in both their native language and English, and their experiences with academic writing in English, etc. Since explicit teaching in academic writing is almost non-existent for students in the master level courses, students generally learn to write their academic papers through legitimate peripheral participation activities in their chosen discipline through attending related writing workshops, getting help from the writing center, interacting with more advanced peers, incorporating teachers' feedback on their papers etc. The participants of the study are followed for a semester on a weekly basis. The data collected from them included a weekly log on their literacy activities including what sources they found to help them write papers, who they talked to, and what they wrote in their paper, what texts they cited etc., a weekly interview on their progress, activities, problems in their writing and literacy activities. The interview also covered the topics such as how they treated the source texts to avoid plagiarism, etc. I interviewed some faculty members on their perceptions on the students' performance, why the students were struggling, and how they helped students in the writing of academic papers, etc.

Thus far, I (we) have...

I have finished data collection. Due to the extensiveness of data collection, I included 6 students in this study, but mainly focused on 4. For these 4 students, I collected all the logs over the semester, conducted weekly interviews and gathered all the written assignments they've completed (both drafts and final versions with teacher feedback). I also interviewed 2 faculty members who worked closely with these students. The data analysis has been partially performed. The logs were reorganized in a big table to clearly indicate the literacy activities each student was engaged in. Around 50% of interviews were transcribed which was closely related with 2 studies that I am currently focusing on.

Constant comparison was used to identify the themes of interview data. All the written academic papers were carefully read and tied to students' log and their interviews. I've submitted two conferences proposals to TESOL (Teaching English to Speakers of Other Languages) and AAAL (American Association to Applied Linguistics) respectively.

With the following interesting results...

For most non-native speaking students, grammar is not the main source of problems or frustration in writing academic papers in English. Many students had some training in English grammar and many learned to use resources such as writing center or American peers to help with editing. One of the may issues of not being able to writing successful papers in their chosen discipline (in this case, teaching English as a second/foreign language) is students' unfamiliarity with the writing topics and conventions. In the TESOL program, non-native students had hard time writing lesson plans and theory-practice papers if they don't have knowledge about the US classrooms. Therefore, the program provided some opportunities for students to enter the local classrooms and conduct experiential learning. The results of this type of arrangement allowed students to understand academic writing expectations, learn course content, utilize and assess learning in real life situations. The study revealed that language deficiency should not prevent L2 students from participating in experiential learning. Instead, they should be encouraged to become more involved as the experiential learning provided opportunities for them to learn the hidden knowledge that is needed in their disciplinary writing, but not explicitly taught in the classroom. Educators should consider incorporating experiential learning into their curriculum.

In the future, I (we) hope to build on this project by...

exploring other aspects of academic literacy. The current projects mainly focused on the role of experiential learning on non-native students' learning of academic literacy. I am also interested in investigating the role of feedback, peer collaboration, faculty attitude, etc. on non-native students writing disciplinary academic papers. The manuscripts are being developed based on the data analysis.

PROJECT VIGNETTE

Name(s):

Bonnie Choi and Beverly Smoker

Grant title:

Piano Instruction Videos for Piano Pedagogy Courses

Type of grant: CARS X SIS

How many students did you engage in this project? The project engaged Nazareth Community Music Program students, students from the Rochester community and their Nazareth faculty teachers. College music students will be engaged in their piano pedagogy courses.

The purpose of my project was to...

create a variety of piano instruction videos needed for the observation component of piano pedagogy courses offered in our new Master of Music in Performance and Pedagogy degree and for our undergraduate piano performance degree pedagogy courses delivered in both online and traditional in-class formats.

To accomplish this, I (we)...

piano faculty selected students meeting the specifications requested for our teaching videos, obtained student and parental video release permission, video-recorded the lessons in a weekly basis, and presented them to Nic Marinancio for editing.

Thus far, I (we) have...

We have created 32 lesson/sequence videos. All of these videos ranges from 20 min. to one hour.

Suzuki Instruction: taught by Roberta Honadle

1. one interview
<https://cloud.ensemblevideo.com/Watch/n8G9Ewy7>
2. two lessons
<https://cloud.ensemblevideo.com/Watch/Yn37Zrg4>
<https://cloud.ensemblevideo.com/Watch/Lb62MwQs>

Teaching from Day One (home studio): taught by Bonnie Choi

1. one four-lesson video sequence
<https://cloud.ensemblevideo.com/Watch/Cs9z2SNc>
<https://cloud.ensemblevideo.com/Watch/k2HSr5c8>

<https://cloud.ensemblevideo.com/Watch/o8FSr7q6>

<https://cloud.ensemblevideo.com/Watch/Rn7e5NTc>

Late-Intermediate Student: taught by Gary Fisher

1. one three-lesson video sequences (will be online next week)

Elementary Student (home studio): taught by Jen Ryckaert

1. one four-lesson video sequences (will be online next week)

Advanced Student: taught by Gary Fisher

1. one three-lesson video sequences (will be online next week)

Student with Disabilities (home studio): taught by Jen Ryckaert

1. one five-lesson video sequences (will be online next week)

Beginning Adult: taught by Gary Fisher

2. one three-lesson video sequence

<https://cloud.ensemblevideo.com/Watch/d3FZi8k5>

Teaching from Day One (home studio): taught by Brian Preston (still in progress)

1. one six-lesson video sequences

Brian did not have a beginning student during the summer, he is currently completing his video lessons sequence

Supplemental Group Class: taught by Josh Massicot

1. one two-lesson video sequences with movement activities

<https://cloud.ensemblevideo.com/Watch/Np5n6MEc>

<https://cloud.ensemblevideo.com/Watch/r5G6ZbQx>

2. one two-lesson video sequences with improvisation activities

<https://cloud.ensemblevideo.com/Watch/i7Y4Cqs3>

<https://cloud.ensemblevideo.com/Watch/g9JAi7d4>

With the following interesting results...

The wealth of pedagogical material contained in the teaching video sequences provides us with a wealth of material that showcase and inspire effective teaching practices for piano instruction.

Students can observe teacher's instruction technique, student's response and the weekly outcome as presented by the video sequences.

In the future, I (we) hope to build on this project by...

refining the video teaching guides, addressing levels of learning exemplified in the videos. We would like to extract target teaching demos from these videos (ie. rhythm, arm weight, hand position, etc.) and publicize our teaching video resources to piano teachers on a local, state and national level. We expect the process of compiling these pedagogical videos will give us material for a pedagogical presentation at our New York State Music Teachers Association State Conference.

PROJECT VIGNETTE

Name(s):

Isabel Cordova (Hadassah Rivera, Taylor Cook, Matt Maloney, Erin Maloney)

Grant title:

Building an Archive: Documenting the History of Rochester Latinos

Type of grant: CARS SIS

How many students did you engage in this project? 4

The purpose of my project was to...

Establish a local Latino historical archive

To accomplish this, I (we)...

We established a partnership with RMSC library archives and the local history department within the Central Library of Rochester and Monroe County.

Thus far, I (we) have...

We created a finding aid and organized a collection documenting previous efforts to establish a Latino archive at the RMSC, completed interviews with those involved and also uploaded 40 interviews of Rochester Latinos along with their respective written summaries in preparation to launch an online collection "Latino Voices" within the Rochester Voices (Central Library) database.

With the following interesting results...

We expect Latino Voices to go live by January.

In the future, I (we) hope to build on this project by...

After talking to Emily Carpenter and our community partners we decided to establish an internship in order to continue growing and maintaining this project. We plan on adding interviews and documents to our collections as well as establishing a webpage where historical information on area Latinos can be centralized and accessed (primarily via links and contact info). I also intend on soliciting the collaboration of other area colleges and schools who have or would like to add to the oral histories of the collection.

PROJECT VIGNETTE

Name(s):

Zbigniew Granat

Grant title:

“Flamenco Blues” and “All Sketches”: The Forgotten Story of the Reversal of Titles on Miles Davis’s Album Kind of Blue

Type of grant: CARS SIS

How many students did you engage in this project?

I have used material from my paper in a graduate class on jazz music I teach at Nazareth. Ten students in the class have been exposed to my research and experienced my interpretation of the relevant primary sources.

The purpose of my project was to...

prepare for publication a scholarly article devoted to the reversal of two song titles on the original release of the best-selling jazz album of all times: Miles Davis’s Kind of Blue (Columbia, 1959). The two songs in question are “All Blues” and “Flamenco Sketches,” both of which appeared on side B of the original album. Most listeners would not doubt that the fourth track on Kind of Blue, which is in 6/8 meter, is called “All Blues,” or that the last track on the album, the slow and pensive piece based on five scales, is titled “Flamenco Sketches.” And yet the liner notes written by the pianist Bill Evans for the original release of the album claimed the opposite to be true. “Flamenco Sketches,” wrote Evans, “is a 6/8 12-measure blues form”; and “All Blues” “is a series of five scales, each to be played as long as the soloist wishes.” This inconsistency resulted in a complex reception history of the most influential album in the entire history of recorded jazz, which is the main subject of my article.

To accomplish this, I (we)...

traveled to the New York Public Library for the Performing Arts – Music Division in NYC in order to conduct my research in the archives of Columbia Records. I have also purchased several books and recordings that were crucial to my research. I have devoted much of my summer to the writing of the article.

Thus far, I (we) have...

written an extensive draft of my paper in which I was able to reconstruct the now lost narrative (which I call the “Bill Evans perspective”) and contrast it with the traditional story that originated with Miles Davis’s invention of the original titles for both tunes (which I call the “Miles Davis perspective”). I have also sketched a critique of recent attempts, by writers such as Ashley Kahn and Robert Palmer, to suppress the existing evidence in order to promote a cleaner version of the album’s history.

With the following interesting results...

I intend to conduct stylistic analyses of the two compositions in question to demonstrate that the song called “All Blues” reveals much more flamenco influence than the piece commonly known as “Flamenco Sketches.” I plan to complete the article this fall and submit it to a musicological journal in the spring 2015.

In the future, I (we) hope to build on this project by...

offering lectures and conference presentations on my topic. Since the topic is of interest to a more general audience, I would like to pursue the option of publishing a shortened version of the article in mainstream publication (e.g. jazz magazine). In the future, I may also contact Columbia/Legacy and propose to write new album notes for subsequent releases of Miles Davis’s Kind of Blue. All these activities will bring publicity to the college and the Department of Music. The students will greatly benefit from my work as my scholarship always finds its way into the classroom and inspires others to research and write about things they love. Ultimately, I might consider a book publication on the subject.

PROJECT VIGNETTE

Name(s):

Richard Hartmann

Grant title:

Systematic Study of the Conversion of Acetic Acid to its Alkyl Esters catalyzed by Tin II Halides

Type of grant: CARS SIS

How many students did you engage in this project?7

The purpose of my project was to...

Investigate reaction kinetics and study the effects of catalyst modifications on the reaction used to synthesize biodiesel.

To accomplish this, I (we)...

In the summer of 2014 7 students worked on three projects aimed at improving the efficiency of biodiesel synthesis by evaluating kinetics and formulating new catalysts.

Thus far, I (we) have...

The first group employed ^1H NMR to study the mechanism of methylation of acetic acid catalyzed by tin II Bromide. A second group worked to improve the recoverability of the tin catalyst by building a resin bound phosphine system to anchor the tin catalyst. The third group worked to prepare the solution phase analog of the resin bound system for comparison of catalytic efficiency. All three groups made extensive progress in: synthesis, purification, and characterization of their desired products.

With the following interesting results...

We have managed to synthesize both resin bound and free analogues of a bisphosphine amine and bind a tin halide to them.

In the future, I (we) hope to build on this project by...

Reproducing the synthetic work, binding the tin compounds, assessing catalytic efficiency, and building a resin bound phosphine with a larger bite angle.

PROJECT VIGNETTE

Name(s):

Jennifer S.A. Leigh

Grant title:

PRME: An edited textbook of innovative pedagogy resources for Business Educators

Type of grant: **CARS** **SIS**

How many students did you engage in this project?0

The purpose of my project was to...

1. Meet with my co-editor in March 2014 to develop scope of responsibilities.

Action: Two day meeting in Springfield, MA.

2. Follow up meeting with co-editor in June to discuss literature review and marketing approach for Academy of Management Conference in Philadelphia, PA from 4-9 August 2014.

Action: Completed a flyer.

3. Finalize call for chapters.

Action: Accomplished after several iterations.

4. Conduct an in depth literature review of current PRME specific related articles, chapters, and texts to identify areas for development, emerging themes, potential authors, and editorial chapter materials.

Action: Completed and utilized in my PDW discussant role for a sustainability forum and will be useful for the book.

5. Identify communication outlets and promote the call for chapters.

Action: Promoted at several conferences including the Cross-Sector Social Interaction Symposium (Boston-May 2014), Organizational Behavior Teaching Conference (Nashville-June 2014), Research in Management Education Unconference (Copenhagen-2014), Academy of Management (Philadelphia-August 2014), and British Academy of Management (September 2014). Promoted on numerous academic list servs, Facebook, and twitter feeds.

6. Provide early feedback and coaching to call for chapter inquiries.

Action: This is an ongoing process and I've spoken with dozens of individuals in person and via email.

7. Solicit 12 high quality contributions for the edited book.

Action: 8 strong chapters so far with another month on the proposal.

8. Prepare for chapter review process by identifying potential reviewers starting spring 2015.

Action: Basic guidelines have been formulated.

To accomplish this, I (we)...

We have formally signed our contract with Greenleaf publishing and also see table above.

Thus far, I (we) have...

See table above.

With the following interesting results...

See table above.

In the future, I (we) hope to build on this project by...

Offering a Professional Development Workshop at Academy of Management bringing together these authors to share their innovations with a broader community.

PROJECT VIGNETTE

Name(s):

Lisa Glebatis Perks

Grant title:

Media Marathoning: Immersions in Morality

Type of grant: CARS SIS

How many students did you engage in this project?

I engaged one current student and one recent (2014) graduate. The current student assisted with gathering research and taking notes on sources. The graduate worked on the bibliography.

The purpose of my project was to...

revise the book manuscript for Media Marathoning: Immersions in Morality in preparation for publication.

To accomplish this, I (we)...

hired two students--one to help me research sources for the book revision and one to help format the bibliography. I also used the money to defray the cost of June day care while I worked on the revisions.

Thus far, I (we) have...

spent hundreds of hours reading new sources, integrating the sources into the manuscript, revising other aspects of the content, collecting images for the book, securing permissions for various quotes and images, and filling out my book marketing paperwork. I submitted all of the materials to my publisher, Lexington Books, on August 4th. The SIS was instrumental in helping me complete this vast body of work.

With the following interesting results...

The book is now going to the copy editor. It should be in print around November of this year.

In the future, I (we) hope to build on this project by...

This project is complete, but I was inspired to pursue several other projects through the course of this research. One spin-off project is a study of media spoiler temporality in the digital age. I have already begun research for that project and will be conducting an independent study on the topic with senior Noelle McElrath-Hart, the student who helped me with Media Marathoning revisions, and junior Julia Keiper.

PROJECT VIGNETTE

Name(s):

Stephen Tajc

Grant title:

Structural analysis of small molecule receptors for cations in aqueous solution

Type of grant: CARS SIS

How many students did you engage in this project? 6

The purpose of my project was to...

This research project explores the ability of pyridine-2,6-dicarboxylic acid (dipicolinic acid or DPA), a small organic molecule produced by environmentally friendly soil bacteria, as a diverse metal scavenger with the unique potential to biodegrade. The process of hydraulic fracturing has many consequences and environmental concerns. Among the greatest of concerns are the alarming levels of metal cations contained in the wastewater that include calcium, magnesium, strontium, and barium. We intent to use DPA to remove the metals from contaminated water and have bacteria use the small molecule: metal complex as a source of nutrient.

To accomplish this, I (we)...

We use spectroscopic techniques to measure binding constants of DPA and DPA derivatives to specific metal cations that are commonly found in hydraulic fracturing contaminated flowback wastewater. In addition we analyzed the ability of DPA to remove cations from water using atomic absorbance spectroscopy to quantify the metals.

Thus far, I (we) have...

We have successfully measured the binding capabilities individually of DPA to calcium, magnesium, strontium, and barium. The binding constants correlated beautifully to the ability of DPA to sequester these same metals from the hydraulic fracturing flowback water.

With the following interesting results...

The current levels of calcium found in the flowback wastewater are 400,000 times greater than the levels accepted by the Environmental Protection Agency. We were excited to report that 95% of calcium could be removed from the contaminated wastewater using our technique. This puts the level of calcium in the acceptable ranges to be treated by the wastewater treatment plants.

In the future, I (we) hope to build on this project by...

Although we have been able to have bacteria eat DPA and metals individually on agar plates, we have struggled in finding the proper procedure for the same method using the purified metal reduced

water. This portion of the project has now become our main focus for the upcoming fall semester and will most likely continue through the spring.

PROJECT VIGNETTE

Name(s):
Stephanie Zamule

Grant title:
Remediation of Persistent Environmental Pollutants Using Plant and Bacterial Systems

Type of grant: CARS SIS

The purpose of my project was to...

The purpose of this project was to provide support for students to work with me on an ongoing research project. Funds from this grant helped support seven undergraduate students who conducted the research full-time for four weeks in summer A through the Biology Department's new course, BIO 452 Biology Research. During the research course, each student worked on one specific aspect of my ongoing project which seeks to assess the abilities of various plant and bacterial systems to degrade pollutants in the environment that may otherwise persist for long periods of time, contributing to adverse health effects in humans and animals. Previous findings from a short-term pilot study indicated that certain bacteria species, namely those of the *Pseudomonas* genus, are able to break down imidacloprid and thiamethoxam, two pesticides that are known to persist in the environment and that have been linked to the disappearance of honey bee colonies. We sought to expand upon these findings in the ways described below. Additionally, as preliminary findings suggest that the common bean plant can successfully degrade a number of pollutants, we sought to assess the ability of this plant to break down imidacloprid in the ways described below.

To accomplish this, I (we)...

To evaluate the ability of various *Pseudomonas* species and the common bean plant to take up imidacloprid and thiamethoxam from the environment, we had planned to grow the bacteria or plant in the presence of a range of environmentally-relevant concentrations of each pollutant. We had planned to sample the growth media over a period of two weeks and analyze the samples by high performance liquid chromatography (HPLC) to quantify resulting changes in the amount of the pollutant remaining in the media. Additionally, we had planned to culture the *Pseudomonas* species on solid media with imidacloprid as the sole carbon and/or nitrogen source, in order to determine whether or not these species can use imidacloprid exclusively for their nutritional needs.

Thus far, I (we) have...

Thus far we evaluated the abilities of two bacteria species, *Pseudomonas putida* and *Pseudomonas aeruginosa*, to degrade one environmentally-relevant concentration of thiamethoxam over a 24-day period and five environmentally-relevant concentrations of imidacloprid over a 12-day period. We also tested the ability of *Pseudomonas putida*, *Pseudomonas aeruginosa*, and a third species, *Pseudomonas fluorescens*, to utilize imidacloprid as a sole nitrogen or carbon source by conducting growth studies. Finally, we analyzed the ability of the common bean plant to degrade two environmental-relevant concentrations of imidacloprid over a 10-day period.

With the following interesting results...

We observed striking 98% and 49% decreases in thiamethoxam levels over a 24-day period in the presence of *Pseudomonas putida* and *Pseudomonas aeruginosa*, respectively, as compared to control cultures containing no bacteria. With respect to imidacloprid degradation, small decreases (in the 5-10%) were observed in the presence of both organisms over a 4-day period for the smaller environmentally-relevant concentrations, although degradation of the larger environmentally-relevant concentrations appeared to be limited. Technical issues with some of the instrumentation prevented us from running this study for the 2-week time period as originally planned, thus we are currently repeating this work. The results from our growth studies showed that none of the organisms were able to utilize imidacloprid as their sole carbon source, however all three species were able to grow (albeit slowly) with imidacloprid serving as their sole nitrogen source. Results from the studies assessing the ability of the common bean plant to degrade imidacloprid were inconclusive due to a number of issues with the methodology. We have revised our methods for subsequent work on this part of the project.

In the future, I (we) hope to build on this project by...

This project is being continued by student researchers during the academic year. We are currently re-running some of the bacteria-imidacloprid studies over a longer time period. We are also repeating the common bean-imidacloprid studies using our refined methodology. Future goals include determining the fate of these pollutants once inside organisms. This will allow us to evaluate whether the organisms are simply storing the pollutants or are actively metabolizing them to less toxic products. Additionally, we plan to assess the ability of the candidate plants and bacteria to remediate complex mixtures of pollutants, induce enzymes involved in remediation to increase metabolic potential, and test the organisms' remediative ability in soil and, ultimately, in the field. Student researchers plan to present the findings from their summer research experience at a number of venues including the Upstate NY Undergraduate Research Conference, Rochester Academy of Science Annual Fall Paper Session and CARS.