

## Preview of Award 0966206 - Annual Project Report

### Cover

Federal Agency and Organization Element to Which Report is Submitted: 4900

Federal Grant or Other Identifying Number Assigned by Agency: 0966206

Project Title: Scholarships-Creating Opportunities for Applying Mathematics

PD/PI Name: Yu-Ju Kuo, Principal Investigator  
Frederick A Adkins, Co-Principal Investigator

Submitting Official (if other than PD/PI): Yu-Ju Kuo  
Principal Investigator

Submission Date: 04/26/2013

Recipient Organization: Indiana University of Pennsylvania

Project/Grant Period: 05/01/2010 - 04/30/2014

Reporting Period: 05/01/2012 - 04/30/2013

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions) Yu-Ju Kuo

### Accomplishments

#### \* What are the major goals of the project?

- Establish a supportive mentoring program between M.S. in Applied Mathematics students and undergraduates through cohort activities
- Increase recruitment of students attending the M.S program in Applied Mathematics at IUP through efforts focused on the Pennsylvania State System of Higher Education and regional colleges
- Expand recruitment of STEM undergraduates from regional community colleges
- Increase retention of undergraduate students majoring in mathematical areas at IUP
- Increase numbers of science undergraduate students with a mathematics minor and who take advanced applied mathematics courses at IUP, enhancing their preparation for the workforce and further studies

#### \* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?

- Major Activities:
- Community Building, Career Counseling, and Academic Support
  - Support & Mentoring of Students by Faculty and other professionals
  - Provide conference travel support
- Specific Objectives:
- More students seeking math related degree or minor
  - Engage more students in practical training like internships or research
  - High retention for cohort
- Significant Results:
1. Increase the number of mathematics minors. (from 6 in 2009-2010 to 34 in 2012-2013).
  2. Increase the number of cohort students participating in internships or research activities (from 3 in Summer 2011 to 8 in Summer 2012.)
  3. High retention within the scholarship cohort. All undergraduates met renewal requirements between Jan. 2012 and April 2013, except two no longer had financial need and one decided to leave IUP. All graduate students met renewal requirements except one decided to become a part time student.
  4. Several undergraduate students attended national conferences to present their research results and a few of them have received award or recognitions for their work. Rebecca Beadling, an undergraduate, won 2012 Chung Soo Yoo Award for Outstanding Graduate-Level Research for her presentation in Diffraction and

Crystallography at the annual Pittsburgh Diffraction Conference, held at the Stanford Linear Accelerator National Laboratory in Menlo Park, California. SaraJane Parsons's work was featured on the front page of the June 2012 SIAM News.

**Key outcomes or Other achievements:**

From the Spring 2012 semester evaluation, 28 out of 30 program students responded:

- 100% indicated participation in the group increases their ability to network with students and faculty;
- 86% indicated the monthly meetings improved their commitment to continue their academic programs;
- 82% indicated the monthly meetings improve their motivation to work hard and succeed in classes;
- 96% indicated participation in S-COAM increases their awareness of different career options.

From the Fall 2012 semester evaluation, 25 out of 29 program students responded:

- 96% indicated participation in the group increase their feelings of connection with other mathematics and science students and their ability to network with other students.
- 92% indicate participation in the group increase their ability to network with more faculty.
- 84% indicated the monthly meetings improved their commitment to continue their academic programs

**\* What opportunities for training and professional development has the project provided?**

We offer the following training and professional development opportunities:

1. Workshops: All workshops are announced to the entire IUP community through email and through the daily campus bulletin.
  - Spring 2012: Matlab, WinEdt/LaTeX/Matlab publishing, Application to Graduate Schools
  - Fall 2012: R (Statistical Software), LINGO (Operations Research/Optimization Software),
  - Spring 2013: Sage (Mathematical Software), Finding Employment and Career Preparation
2. Invited Speakers: Three speakers gave presentations on their cutting edge research in different areas of applied mathematics and statistics and shared their work experience with students. Alumni also provided a panel discussion on careers and graduate school. Presentations are advertised and open to the entire IUP community.
  - Spring 2012: Dr. Sarah Lukens, University of Pittsburgh, gave a presentation on March 21. Dr. Irene Fonseca, President-Elect of Society for Industrial and Applied Mathematics gave three presentations on April 20, 2012 and met with several students for lunch.
  - Fall 2012:
    - i. Dr. Sara Del Valle, Scientist/Project Leader, Los Alamos National Laboratory, gave three presentations on September 26, 2012, and met with several students for lunch.
    - ii. S-COAM Alumni Career and Graduate School Panel : **Dane Alabran** (B.S. in Computer Science and Mathematics and M.S. in Applied Mathematics) is a report analyst in Information Services Department in Indiana Regional Medical Center. **Jennifer Casanova** (B.S. in Chemistry and Natural Science with minor in Dance and Mathematics) is pursuing a Master of Science in Public Health degree in the Department of Environmental Sciences and Engineering at the Gillings School of Global Public Health at University of North Carolina at Chapel Hill. **SaraJane Parsons** (B.S. in Mathematics with minor in Economics and Business Administration) is in the Economics Ph.D. Program at Michigan State University in East Lansing, Michigan.
  - Spring 2013: Dr. Adam Rosenberg gave three presentations on April 25, 2013 and met with students for lunch.

First Student Presentation Day, 2:00–5:00 p.m., Thursday, May 3, 2012: There were a total of 14 presentations given by 12 undergraduate and 13 graduate presenters. Among them, there are 10 SCOAM students.

A graduate school panel was held during MAA Allegheny Mountain Section Spring Meeting. The presenters were from West Virginia University, Carnegie Mellon University, Duquesne University, and IUP.

**\* How have the results been disseminated to communities of interest?**

During Jan. 2012 and April 2013, co-PIs have attended several conferences to give oral presentations to share their experience in writing and running a S-STEM program. In addition, the annual report and evaluation result are posted on the program website for people who are interested in running a similar program. Co-PIs attended the NSF S-STEM Projects Meeting in October 2012.

1. PASSHEMA 2013, "From assessment to a mathematics focus NSF S-STEM program"
2. JMM 2013, "Mentoring Mathematics and Science Majors in Applying Mathematics"
3. JMM 2013, "From assessment to a mathematics focus NSF S-STEM program"
4. MAA Allegheny Mountain Section Meeting 2013, "Mentoring and Networking Mathematics and Science Majors in Applying Mathematics"

**\* What do you plan to do during the next reporting period to accomplish the goals?**

- Continue to recruit and retain STEM students, particularly community college transfers
- Invite speakers
- Run cohort monthly meetings
- Offer training workshops and professional development activities

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## Products

### Journals

### Books

### Book Chapters

### Thesis/Dissertations

### Conference Papers and Presentations

Yu-Ju Kuo and Rick Adkins (2013). *From assessment to a mathematics focus NSF S-STEM program*. The Pennsylvania State System of Higher Education Mathematics Association. Clarion, PA.

Status = OTHER; Acknowledgement of Federal Support = Yes

Yu-Ju Kuo and Rick Adkins (2013). *From Assessment to a mathematics focus NSF S-STEM program*. Joint Mathematics Meetings. San Diego.

Status = OTHER; Acknowledgement of Federal Support = Yes

Rick Adkins and Yu-Ju Kuo (2013). *Mentoring Mathematics and Science Majors in Applying Mathematics*. Joint Mathematics Meetings. San Diego, CA.

Status = OTHER; Acknowledgement of Federal Support = Yes

Yu-Ju Kuo and Rick Adkins (2012). *Mentoring and Networking Mathematics and Science Majors in Applying Mathematics*. MAA Allegheny Mountain Section Meeting 2012. Morgantown, WV.

Status = OTHER; Acknowledgement of Federal Support = Yes

### Other Publications

### Technologies or Techniques

Nothing to report.

### Patents

Nothing to report.

### Inventions

Nothing to report.

### Licenses

Nothing to report.

### Websites

Title: Scholarship for Creating Opportunities for Applying Mathematics

URL: <http://www.iup.edu/page.aspx?id=94513>

Description: This website provides information about the scholarship including application forms, deadline, and event schedules. The annual report and survey results are also posted.

Other Products  
Nothing to report.

Participants

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Frederick A Adkins	Co PD/PI	2
Joe Shyrock	Technician	0
Alisa DeStefano	Other	0
Mike Husenits	Other	0
Alarcon Francisco	Other	0
Kimberly Burch	Other	0
John Lattanzio	Other	0
Dan Radelet	Other	0
Christoph Maier	Other	0
Mark Anthony	Other	0
Nathan Ritchey	Other	0
Frank DeStefano	Other	0
Edward Donley	Other	0
John Chrispell	Other	0
Deanne Snavelly	Other	0
Gary Stoudt	Other	0
Greg Wisloski	Other	0
Yu-Ju Kuo	PD/PI	2

What other organizations have been involved as partners?

Name	Location
INFORMS	Hanover, MD
Mentoret.Net	California

Name	Location
Sigma Xi Chapter for Indiana Univ. of Pennsylvania	Indiana, PA
Society For Industrial and Applied Mathematics	Philadelphia, PA

**Have other collaborators or contacts been involved? Y**

## Impacts

### What is the impact on the development of the principal discipline(s) of the project?

In May 2012, the Mathematics Department had the largest group of graduates in the department over the last 20 years. Even though many factors contribute to this result, the S-COAM program has clearly increased the number of students in various mathematics courses, including filling sections of Introduction to Ordinary Differential Equations. Comparing 2009-2010 with 2011-2012, mathematics majors increased by 17%. Comparing 2009-2010 with 2012-2013 the number of mathematics minors has increased over 5 times.

More students are now graduating from the M.S. in Applied Mathematics program. Even though the number of newly admitted and matriculated students seems to remain steady since Fall 2009, the number of new international students has declined, resulting in an unusually high proportion of domestic students over the last two years compared to other mathematics programs.

In Spring 2012, S-COAM organized the first *Student Presentation Day* for the Mathematics Department. This forum showcased student projects and research work from across the department with 25 students giving 14 presentations. Participation in colloquia has increased, reflecting additional student attendance as well as integration of colloquia content into course activities by more faculty.

### What is the impact on other disciplines?

- S-COAM sponsored the IUP Undergraduate Scholar Forum and the Women in Mathematics, Science, and Technology Program by providing "Best Computational Science Poster Award" for each event, this provides recognition of model student research on computational science across the sciences.
- Scholarship recipients' participation in research, internship, conferences:
  - Spring 2012: One undergraduate gave an oral presentation and a poster presentation at the JMM in Boston. Three graduate students completed their internships. Two undergraduate students completed their student teaching.
  - Summer 2012: Two undergraduate students participated in REU programs in Chemistry and Computer Science. Two graduate students completed their internships. One graduate student attended the Joint Statistics Meetings.
  - Fall 2012: Three undergraduate students attended national conferences to present their research results (two in Geoscience and one in Chemistry). Rebecca Beadling, an undergraduate, won 2012 Chung Soo Yoo Award for Outstanding Graduate-Level Research for her presentation in Diffraction and Crystallography at the annual Pittsburgh Diffraction Conference, held at the Stanford Linear Accelerator National Laboratory in Menlo Park, California.
  - Several graduate students and undergraduate students received financial support to attend regional, state-wide, or national conferences in between January 2012 and December 2012.
- Co-PIs determine math course requirements for each student after carefully reviewing each individual's academic schedule and mathematical background. As the participants are from a variety of science disciplines, this impacts the scientific preparation of each recipient by enhancing their mathematical skills as they are required to take additional mathematics courses and participate in at least one workshop/colloquium per month.
- Participants' professional preparation was also enhanced by monthly meetings, in which the cohort activities include: orientation name games, mock interviews, resume critiques, practice and critique of oral presentations, and 3-minute self-introduction. All scholars gave group presentations based on mathematics modeling readings from COMAP Mathematics Modeling Competitions.
- The program also offered workshops which were open to members of other disciplines. Dr. Adkins offered a Matlab workshop. Dr. Kuo and SaraJane Parsons, a S-COAM scholar, ran a WinEdt/LaTeX/Matlab publishing workshop. Dr. Stocker and Dr. Chrispell offered R and LINGO/LINDO workshops, respectively. Four S-COAM scholars shared their experience on applying graduate schools.

### What is the impact on the development of human resources?

#### Outcome for Undergraduates

- All undergraduate recipients met the GPA requirement ( $>3.0$ ) and mathematics courses requirements for Spring 2012 and Fall 2012 renewal.
- One, eight, and one undergraduate students in the cohort graduated in Dec. 2011, May 2012, and Dec. 2012, respectively. Four are currently pursuing graduate degrees in Economics, Physics, and Applied Mathematics.

**Outcome for Graduate Students in the M.S. in Applied Mathematics program**

- All graduate recipients except two in Spring 2012 met the GPA requirement ( $>3.2$ ) for Fall 2012 renewal.
- All graduate recipients in Fall 2012 met the GPA requirement for Spring 2013 renewal.
- Five and two graduated in May and December, 2012. All are currently employed in STEM fields.

**Workshops created for the scholarship cohort were open to the university community.**

- For the R workshop: there were 13 faculty members and 17 students (5 not in the S-COAM program).
- For WinEdt/LaTeX/Matlab: there were 18 students (1 not in the S-COAM program).
- For LINGO/LINDO workshop: there were 3 faculty members and 15 students (1 not in the S-COAM).
- For Sage workshop, there were 2 faculty members and 19 students (1 not in the S-COAM).
- There were at least 64 students attending the Career and Graduate School Panel in Fall 2012.

**What is the impact on physical resources that form infrastructure?**

Nothing to report.

**What is the impact on institutional resources that form infrastructure?**

MentorNet service was extended for three years.

Original license for Matlab Toolboxes was extended for two years.

**What is the impact on information resources that form infrastructure?**

SIAM Journal on Applied Mathematics and SIAM Review was subscribed for three years, including electronic access and printed journal copies.

**What is the impact on technology transfer?**

Nothing to report.

**What is the impact on society beyond science and technology?**

- **Students will improve their communication and networking skills through participation in the monthly activities with mentors and peers.**
  - Monthly cohort meetings include activities like: orientation name games, mock interviews, resume critiques, 3-minute self-introduction, and practice and discussion of oral presentations. The cohort also shares two office spaces, Stright Hall 205 and 219.
  - A scholarship banquet was held on May 4, 2012. A total of 29 scholarship recipients from Mathematics Department and S-COAM and their invited guests came together to celebrate their accomplishments. A total of 86 participants, including scholarship recipients, their invited guests, and faculty members attended the event.
  - MentorNet is an e-mentoring program matching students with professionals in science and engineering for one-on-one guided relationships. Every student selects his/her own mentor through MentorNet based on his/her own career/demographic preferences. With the additional support from the IUP College Technology fund, all students in the college can use this service.
- **Students will explore workforce and career options.**
  - Megan Agosti (Physics), Dane Alabran (M.S. in Applied Mathematics), Albert Harrison (M.S. in Applied Mathematics), SaraJane Parsons (Mathematics) spoke to interested students about the process to apply for graduate schools in Spring 2012.
  - Invited speakers, Dr. Irene Fonseca and Dr. Sara Del Valle had either career related presentation or open forum to answer questions from students regarding their career.
  - Three alumni from the S-COAM program shared their experience with students in Fall 2012.

**Changes**

**Changes in approach and reason for change**

We started including sophomores in cohort in order to improve the overall retention.

**Actual or Anticipated problems or delays and actions or plans to resolve them**

Nothing to report.

**Changes that have a significant impact on expenditures**

Two graduate students completed their degrees ahead of schedule and one found employment, these students were not replaced in the cohort resulting in unspent scholarship funds.

**Significant changes in use or care of human subjects**

Nothing to report.

**Significant changes in use or care of vertebrate animals**

Nothing to report.

**Significant changes in use or care of biohazards**

Nothing to report.

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**Special Requirements**

**Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.**

Reports on student involved and their progress have been submitted to the S-STEM Scholarship Reporting Site.

