REU Site: Sensor Science and Engineering

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Preview of Award 0848014 - Final Project Report

Accomplishments

* What are the major goals of the project?

This reporting period covers a one year no-cost extension to the REU site project. Four REU 2011 fellows, two of them women students, continued their REU projects during the academic year.

* What was accomplished under these goals (you must provide information for at least one of the 4
**Major Activities:**
Four REU fellows, two of them women students, continued their research from the summer of 2011. The research topics were:

- Peroxide based explosive detection using a lateral field excited (LFE) sensor
- Saxitoxin detection using an LFE sensor
- AlN thin film deposition and characterization for LFE thin film resonator (TFR) sensors
- Passive harmonic wireless tags for juvenile amphibian tracking using harmonic direction finding radar

**Specific Objectives:**
An optimized design for the passive harmonic wireless tag was invented, which improved the range of the harmonic direction finding radar unit developed during the summer of 2012 (see first year report for NSF grant 1156611 REU Site: Sensor Science and Engineering).

**Significant Results:**

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

Four REU fellows, two of them women students, continued their research from the summer of 2011, providing them with additional exposure to research methods and improving their laboratory skills.

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

Two conference papers were presented and published on the passive harmonic wireless tag design and optimization research carried out by the REU fellow Evan Kus. One journal paper was submitted to Sensors and Actuators B on peroxide based explosive detection using a lateral field excited bulk acoustic wave sensor.

**Products**

**Books**

**Conference Papers and Presentations**


**Inventions**
Nothing to report.

**Journals**
Licenses
Nothing to report.

Other Products
Nothing to report.

Other Publications

Patents
Nothing to report.

Technologies or Techniques
Nothing to report.

Thesis/Dissertations

Websites
NSF REU Site: Sensor Science and Engineering
http://web.eece.maine.edu/research/URP/

This web site contains information on the REU Site at UMaine Electrical and Computer Engineering, including application details, past projects and participants.

Participants/Organizations

Research Experience for Undergraduates (REU) funding
Form of REU funding support: REU site award

How many REU applications were received during this reporting period? 0
How many REU applicants were selected and agreed to participate during this reporting period? 4

REU Comments: Three REU fellows from the summer of 2011 continued their projects during the academic year.

What individuals have worked on the project?

<table>
<thead>
<tr>
<th>Name</th>
<th>Most Senior Project Role</th>
<th>Nearest Person Month Worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vetelino, John</td>
<td>PD/PI</td>
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<tr>
<td>Emanetoglu, Nuri</td>
<td>Co PD/PI</td>
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<tr>
<td>Fitzgerald, Michael</td>
<td>Research Experience for Undergraduates (REU)</td>
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<tr>
<td></td>
<td>Participant</td>
<td></td>
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<tr>
<td>Name</td>
<td>Role</td>
<td>Year of schooling completed</td>
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<td>----------------</td>
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<tr>
<td>John F Vetelino</td>
<td>PI</td>
<td>Junior</td>
</tr>
<tr>
<td>Nuri Emametoglu</td>
<td>Co-PI</td>
<td></td>
</tr>
<tr>
<td>Michael Fitzgerald</td>
<td>REU participant</td>
<td></td>
</tr>
</tbody>
</table>
Evan Kus
Email: Evan_Kus@umit.maine.edu
Most Senior Project Role: Research Experience for Undergraduates (REU) Participant
Nearest Person Month Worked: 1

Contribution to the Project: Mr. Kus continued his research on wireless tags for juvenile amphibian tracking during the academic year.

Funding Support: REU Grant

International Collaboration: No
International Travel: No
Year of schooling completed: Junior
Home Institution: University of Maine
Government fiscal year(s) was this REU participant supported: 2012, 2011

Heather Muzzy
Email: heather.muzzy@umit.maine.edu
Most Senior Project Role: Research Experience for Undergraduates (REU) Participant
Nearest Person Month Worked: 1

Contribution to the Project: Ms. Muzzy continued her research on a saxitoxin sensor based on LFE BAW devices.

Funding Support: REU grant.

International Collaboration: No
International Travel: No
Year of schooling completed: Junior
Home Institution: University of Maine
Government fiscal year(s) was this REU participant supported: 2011

Sara Nadeau
Email: Sara_Nadeau@umit.maine.edu
Most Senior Project Role: Research Experience for Undergraduates (REU) Participant
Nearest Person Month Worked: 1

Contribution to the Project: Ms. Nadeau continued her research on LFE sensors during the academic year.

Funding Support: REU grant

International Collaboration: No
International Travel: No
Year of schooling completed: Junior
Home Institution: University of Maine
Government fiscal year(s) was this REU participant supported: 2011

What other organizations have been involved as partners?
Nothing to report.

What other collaborators or contacts have been involved?
Impacts

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

The passive harmonic wireless tag design was refined and optimized. Two conference papers were published in this work. New configurations for lateral field excited (LFE) sensors and AlN thin films for thin film resonator (TFR) sensors were investigated.

What is the impact on other disciplines?

Researchers in Wildlife and Ecology utilized the passive harmonic wireless tags for tracking frogs. The LFE and AlN TFR projects involved physics, materials science and chemistry.

What is the impact on the development of human resources?

Four REU fellows, two of them women students, continued their research from the summer of 2011, providing them with additional exposure to research methods and improving their laboratory skills.

What is the impact on physical resources that form infrastructure?
Nothing to report.

What is the impact on institutional resources that form infrastructure?
Nothing to report.

What is the impact on information resources that form infrastructure?
Nothing to report.

What is the impact on technology transfer?
Nothing to report.

What is the impact on society beyond science and technology?
Nothing to report.

Changes/Problems

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them
Nothing to report.

Changes that have a significant impact on expenditures
Nothing to report.

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.