Biodiesel Learning Laboratory to Facilitate Campus Sustainability Initiatives across SUNY Grant Application

Kyongsei Sohn
The College at Brockport, ksohn@brockport.edu

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Biodiesel Learning Laboratory to Facilitate Campus Sustainability Initiatives across SUNY

[APPLICATION FOR SUNY SUSTAINABILITY FUND]

Project Director
Kyongsei Sohn, Ph.D., The College at Brockport, SUNY

Co-Principal Investigators
John Gardner, Ph.D., The College at Brockport, SUNY
Mustafa Canbolat, Ph.D., The College at Brockport, SUNY
Skyelar Habberfield, Student, The College at Brockport, SUNY
Zachariah Piron, Student, The College at Brockport, SUNY
Alexander Theuman, Student, The College at Brockport, SUNY

Project Participants
Anthony Lenzi, Student, The College at Brockport, SUNY
Kelly Holder, Student, The College at Brockport, SUNY
Andrew Bailey, Student, The College at Brockport, SUNY
Ken Johnston, Student, The College at Brockport, SUNY
Stephen Godleski, Ph.D., The College at Brockport, SUNY
Thomas Trabold, Ph.D., RIT Golisano Institute for Sustainability

Collaborators
David Fister, MS., RIT Senior Staff Engineer
Jamie Adams, SUNY at Oswego
Daniel Bruton, Graduate Student, RIT
David Frank, Graduate Student, RIT
SUNY Small Grants: Sustainability Fund

Background for Project
One of the challenges associated with the current campus food system is the high levels of food waste containing used cooking oil. For example, at The College at Brockport, an amount close to 900 gallons of used canola and soy bean oil is produced for disposal per month when the College is in session. The disposal of the used cooking oil presents a significant environmental concern requiring a used oil recycling company to haul away the waste from the campus because the Brockport campus does not have an operating biodiesel production facility. This is an environmental concern across SUNY campuses. We propose a three-part approach to develop and expand a SUNY system that will address this issue and include students who are interested in campus sustainability programs. Our results can be extended both onto other SUNY campuses as well as into the local Brockport community. Our approach is to:

1) Design and establish a biodiesel production facility at Brockport through the work of student research assistants.
2) Develop manuals and the production specification details for future operations and expansion throughout SUNY campuses (as the production process requires a period of trials and errors before it can become stable and consistent, further develop technical guidelines for error-prone production processes).
3) Develop a plan to apply and assist the production design and process for other interested SUNY campuses to establish their own biodiesel facility setup and production.

1. Title of project
Biodiesel Learning Laboratory to Facilitate Campus Sustainability Initiatives across SUNY

2. Duration of project
The program is intended to be an ongoing project that continues to engage students in sustainability for campus development and scholarship. The pilot project construction will take place over the spring, 2014 semester with the potential for a larger scale operation in following years to lend the Eagle Diesel’s expertise on biodiesel production to other SUNY campuses. For this request the timeframe is March 1 – Nov. 1, 2014.

3. Amount of funds requested
We are requesting $7,500 (only 30% of total costs; 70% are contributed) in funding to subsidize the material and supplies costs of establishing Eagle Diesel, our first project. The knowledge and production experience gained will result in the establishment of
4. Project Summary:

This project will create a sustainable used cooking oil recycle system. Other SUNY campuses which do not house biodiesel facilities can benefit from the knowledge and experience Brockport develops from this program. Production manuals, schematic designs and specifications for the materials will be produced and made available to other SUNY campuses.

Success will be defined as production of approximately a 45 gallon batch production (per week) of biodiesel derived from 50 gallons of used cooking oil at Brockport. This will result in instant measurable energy savings. For example, a 45 gallon batch per week for 12 weeks per semester will produce 540 gallons per semester or 1,080 gallons per year of biodiesel for the Brockport campus to use in powering diesel lawn mowers and tractors, saving the campus the cost of purchasing regular diesel fuel. The biodiesel also burns cleaner and produces less carbons because it is carbon neutral fuel.

Since the biodiesel is derived from used cooking oil, as long as fried food consumption is present on campus, there will be used cooking oil for disposal. Reusing used cooking oil without hauling it away across a long distance will result in an environmentally positive impact. Biodiesel produced from used cooking oil represents one small step towards an additional renewable energy.

The local community will also have an opportunity for used cooking oil collection for biodiesel production and to support sustainability. Once the Brockport campus program is established we will share our experience with local communities to create awareness and education.

5. Project Participants

Three Co-PIs - each of the three are Brockport faculty members:
Kyongsei Sohn, Ph.D. (Project Director and Principal Investigator)
Assistant Professor
School of Business Administration and Economics
The College at Brockport, SUNY
350 New Campus Dr.
Brockport, NY 14420
Phone: (585) 395-2054
Fax: (585) 395-2542
Email: ksohn@brockport.edu
John T Gardner, Ph.D. (Co-Principal Investigator)
Professor
School of Business Administration and Economics
The College at Brockport, SUNY
Email: jgardner@brockport.edu

Mustafa Canbolat, Ph.D. (Co-Principal Investigator)
Assistant Professor
School of Business Administration and Economics
The College at Brockport, SUNY
Email: mcanbola@brockport.edu

Student Participants (7):
Skyelar Habberfield, Student, The College at Brockport, SUNY
Zachariah Piron, Student, The College at Brockport, SUNY
Alexander Theuman, Student, The College at Brockport, SUNY
Anthony Lenzi, Student, The College at Brockport, SUNY
Kelly Holder, Student, The College at Brockport, SUNY
Andrew Bailey, Student, The College at Brockport, SUNY
Ken Johnston, Student, The College at Brockport, SUNY

Collaborators (6):
Stephen Godleski, Ph.D., Professor and Chair, Department of Chemistry, The College at Brockport, SUNY
Thomas Trabold, Ph.D., RIT Golisano Institute for Sustainability
David Fister, MS., RIT Senior Staff Engineer
Jamie Adams, SUNY at Oswego
Daniel Bruton, Graduate Student, RIT
David Frank, Graduate Student, RIT

7. Lead campus
The College at Brockport, State University of New York.

8. Nature of Our Project
Having received a small internal grant for seed money, the School of Business Administration and Economics initiated a biodiesel business learning lab in the Fall of 2013. The initial set of seven students are preparing a business plan while the two science students are testing the chemistry as they scale up small test runs using the used cooking oil from the campus food service operations. The students presented their
preliminary findings to the relevant stakeholders on campus recently. The project will need additional start-up funding to succeed. The students have visited all of the nearby campus biodiesel operations and contacted many campuses concerning their status with regard to biodiesel production.

The team and the researchers were searching specifically for SUNY biodiesel models to follow. None were found. While there are other SUNY institutions that have biodiesel production facilities (it was reported that SUNY Morrisville has a machine, but they have not been using it), the Brockport researchers found it very difficult to acquire reliable and reproducible data/process manuals for the biodiesel production process. This reinforces one of the goals of the team to produce a manual for other SUNY campuses to follow as they consider biodiesel production using a student engagement/learning lab approach.

The team found two non-SUNY campuses that have active biodiesel production initiatives in progress in the Rochester area. At Nazareth College the operation is not a student run activity, but the process is up and running. A visit and debrief of the parties involved was very instructive. Rochester Institute of Technology (RIT) has a program running, but it is a research-focused project involving faculty and students. Neither model follows the student engagement/learning lab approach. Both programs are interested in helping Brockport succeed in our initiative. In particular, the RIT team is very receptive to sharing technical expertise as we approach initial production.

While the project is housed in the Business School at Brockport, the Chemistry Department and the Environmental Science Department are both active participants. The science students are crucial to the ability of the program to measure and test the production process as well as to build safety protocols into the program.

Facilities and Planning has offered a garage behind their main buildings as a location for the lab. The garage has been cleared out and cleaned up as a prelude to renovating the space and installing the equipment. The facility has space enough for an additional learning lab to be initiated at a later date.

To date there have been six faculty acting as advisors, seven students have committed ten hours per week for the semester, and many administrators in Facilities and Planning have met repeatedly in the process of launching this initiative. BASC, the operators of the food service on campus, has committed to donating their used cooking oil without charge as well as changing their contract with the oil collection company in order to make the process of transferring the oil efficiently. Two outside parties, a retired health and safety administrator and a biodiesel industry veteran have also been informally consulting with the students.

Timeline: the students anticipate beginning production at the end of the spring semester, 2014. The garage will be insulated and utilities restored early in the spring
semester or an alternative site will be identified. Larger scale bench testing of the process should also conclude early in the spring. Full production should commence with the beginning of the fall semester, 2014. Late in the fall 2014 the full manual of operation and program description should be available for additional SUNY Campuses to upload. In spring of 2015 the students will execute a marketing plan for informing and encouraging additional campuses to adopt or modify the model developed at Brockport.

Detailed Plan:

1. The sustainability theory employed by SSTEP’s (the Student Sustainability Task Engagement Program) first project, Eagle Diesel, is focused on all three pillars of sustainable development.
   a. Economically, biofuel will be produced at a substantially lower cost than that of purchased petro-diesel. The program will be sustained by its cost savings while providing substantial returns on its investment.
   b. Socially, students are encouraged in personal development and networking. This is accomplished through cross disciplinary collaboration that utilizes their skills in unique setting that provide opportunities that are different from conventional classrooms. The program also helps open an important perspective in learning experience for the students providing a keener understanding regarding sustainability initiatives.
   c. Environmentally, the program is one small step closer to carbon neutrality, and a major step toward weaning off of fossil fuels in a transition to renewable energy sources. Not only will biodiesel reduce Green House Gas (GHG) emissions by 80%, the program will also continue to encourage greater environmentally sustainable projects.

2. The project is essentially an incubating think tank that is being studied and practiced to determine whether or not this student-run business model is a feasible campus sustainability project of entrepreneurship. If successful, the model will be developed and documented. It will be available for free access, allowing SUNY schools to mirror the program and adopt the biodiesel project as its initiative.

3. The program can become a stepping stone to sustainable education development, both in student curriculum and hands on engagement opportunities. The initial biodiesel project will educate students on renewable fuel and its associated potential benefits. The production labs will serve as a campus and community wide educational center that can conduct research while compiling the lessons on the biodiesel industry and production process. Several schools, such as Nazareth College, offer training programs for farmers and community members, and the materials and models produced by our project would be perfectly suitable for educational purposes.

4. Brockport is just the beginning for SSTEP and the biodiesel project. This is an opportunity that can be adopted by faculty and administrators of other colleges in the SUNY system and by students with an interest in sustainability issues.
5. Student involvement is paramount to the differentiation of SSTEP and is the foundation of the model and the reason for its success. Students are encouraged to build a team with faculty advisement, and the team then makes all major decisions with minor inputs from faculty. Students are required to plan and develop a biodiesel laboratory by conducting all research and making all connections needed. From this comprehensive effort, students experience hands on learning geared towards sustainability and entrepreneurship, and are exposed to a breadth of cross disciplinary studying.

6. The RIT biodiesel production team (Trabold, Fister, Bruton, and Frank) has been providing essential technical support to the Brockport project.

7. This funding will provide for the establishment of SSTEP and the first biodiesel project run by students. Receiving this investment will ensure the potential for a much larger movement that will ignite within the SUNY system, and in each proceeding adoption of the program we will see new opportunities for grant funding for every institution to join. At Brockport, we have the ability to seek investment from the school, community members, as well as outside professionals.

8. This project may lead to a larger project.

This project will provide a solid foundation for future efforts at Brockport and on other SUNY campuses. This operation can engage students in active learning while improving campus sustainability. In the future it should be possible for the local community and the SUNY campus to collaborate to set up a facility to utilize used cooking oil to produce biodiesel. Our project will create a set of operations procedures, safety procedures, profit projections, program structure guidelines that can then be replicated on other campuses.

Additionally, other student engagement/learning lab sustainability projects could use this structure as a model to develop other sustainability projects focused on reuse of other waste products.

9. Subject matters taught by three principal investigators, each of whom are faculty members in the School of Business Administration and Economics at The College at Brockport follow.
<table>
<thead>
<tr>
<th>Investigators</th>
<th>Institutions</th>
<th>Subject matters taught</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>University of Maryland, Baltimore, School of Pharmacy</td>
<td>Brown bag session for faculty members, nurses and Ph.D. students: externalities (spillover effects of individual behaviors) and its societal benefits/costs</td>
</tr>
<tr>
<td></td>
<td>The George Washington University, Department of Economics</td>
<td>Intermediate Microeconomics, Principles of Macroeconomics, Money and Banking</td>
</tr>
<tr>
<td></td>
<td>Cleveland State University Nance School of Business Administration</td>
<td>Principles of Marketing, Business Government and Society</td>
</tr>
<tr>
<td></td>
<td>The Ohio State University Fisher School of Business</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>Mustafa Canbolat</td>
<td>SUNY, The College at Brockport, School of Business Administration and Economics</td>
<td>Project Management, Production and Operations Management, Decision Analysis, Introduction to Statistics</td>
</tr>
<tr>
<td></td>
<td>Brock University</td>
<td>Quantitative Business Modeling</td>
</tr>
<tr>
<td></td>
<td>McMaster University</td>
<td>Supply Chain Management, Managerial Decision Making</td>
</tr>
</tbody>
</table>
10. List of publications by principal investigators

**Kyongsei Sohn, PI**

- Viral Marketing – More than a Buzzword, *Journal of Applied Business and Economics*, volume 14(1), Spring 2013, with J. Gardner and J. Weaver
- Thiazolidinediones and Cardiovascular Events in High-Risk Patients with Type-2 Diabetes Mellitus: A comparison with other oral antidiabetic agents, *Pharmacy and Therapeutics*, September 2009, Vol.34 Number 9, with F. Shaya, Z. Lv, and M. Weir

**Grants**


**Project Participated**

- NIH funded research, “Effects of education on Type 2 diabetes patients.” University of Maryland and Bon Secours Hospital, Urban Medical Institute, Baltimore, Principle Investigators: R. Winston and E. Saunders.

**John T. Gardner, Co-PI**


**Mustafa Canbolat, Co-PI**


Grants


United University Professions Individual Development Grant (2010)

11. Budget, with expenditures broken down by salaries for students, supplies, travel and equipment (no requested salary allocation for faculty or staff). The form budget is Exhibit A to this request for proposals.
Budget form - Exhibit A

<table>
<thead>
<tr>
<th>Requested Materials &amp; Supplies</th>
<th>Cost</th>
<th>Campus Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production equipment (Drum Heater)</td>
<td>1500</td>
<td>Each of the three Co-PIs will be contributing a minimum of 3% of their time in the academic year to this project. Based on their academic year salaries this will be:</td>
</tr>
<tr>
<td>Hand-Pump for Chemicals</td>
<td>250</td>
<td>Kyongsei Sohn, PhD, PI, = $</td>
</tr>
<tr>
<td>Supply of Chemicals for Production (for Maximum production level)</td>
<td>750</td>
<td>John Gardner, PhD, Co-PI = $</td>
</tr>
<tr>
<td>Partial Payment for Processor, NWR Independence Model</td>
<td>3850</td>
<td>Mustafa Canbolat, PhD, Co-PI = $</td>
</tr>
<tr>
<td>Waste removal</td>
<td>250</td>
<td>Contributed fringe benefits at 58.75% = $4,753</td>
</tr>
<tr>
<td>Marketing Materials (Video &amp; Logo)</td>
<td>250</td>
<td>Personnel Matching Funds = $12,844</td>
</tr>
<tr>
<td>Lab/Testing equipment</td>
<td>250</td>
<td>Additionally, two of the Co-PIs (Drs. Sohn and Gardner) have competitive internal grants related to this project totaling $5,000 (see attached letters).</td>
</tr>
<tr>
<td>Safety equipment (shower station, eye wash, spill mats, fire extinguisher, etc)</td>
<td>400</td>
<td>$17,844</td>
</tr>
<tr>
<td>Total</td>
<td>$7,500</td>
<td></td>
</tr>
</tbody>
</table>

Total Requested SUNY Sustainability Fund = $7,500
Total Contributed funds of $17,844

Total Project costs = $25,344.
Requesting $7,500 (30% of total costs) from Sustainability Fund
Matching contributed funds of $17,844 (70% of total costs) from Brockport.
Appendix: The College at Brockport two internal grant awards information:

April 12, 2013

Kyongse Sohn
Accounting, Economics, Finance and
MIS, School of Business Administration and Economics

Dear Kyongse:

Congratulations! The Pre-Tenure Award Committee has decided to fund your project, *Assurance of Learning through Engagement in Business Lab Experience*, in the amount of $2,000.

**Award Information**

One half of the award is available immediately and can be used for the same wide range of defined scholarly/creative activities as are funded through Faculty Scholars account. This includes registration and travel to academic conferences for presenting and/or attendance, research purposes including travel, hiring of student assistants, etc., purchasing software, documents/data, lab or studio supplies, publication costs, artistic performance and display costs. The remaining half will be awarded upon completion of the requirements listed below and the submission of an external grant through the Grants Development Office.

**When funds Expire**

Please note that funds will expire if unused by April 5, 2015.

**Requirements**

Complete the following (if you have not done so previously) to meet the grant requirements:

1. Meet with Colleen Donaldson, Grants Development Director. Colleen can be reached at cdonalds@brockport.edu or at extension 5118.
2. Register with the online COS database to receive ongoing emails on relevant grant opportunities (www.cos.com).
3. Contact program officers of targeted public and/or private grant sponsors.
4. Attend the annual college’s grants writing workshop for faculty/staff on campus.
5. Discuss with Colleen the feasibility of having assistance from the Grants Resource Center (copy of previously successful proposals from that funder, etc. can be obtained from them).
6. Comply with campus requirements for external grant submissions (through the Grants Development Office).

350 New Campus Drive • Brockport, New York 14420 • 585-395-2523 • Fax: 585-395-2006 • www.brockport.edu
7. If your project involves conducting research with human subjects, you will need Institutional Review Board (IRB) approval prior to receiving the award.

8. A one page (250 words) final results summary report, including activities, professional presentations, and/or journal/manuscript submissions and publications, must be submitted to the Grants Development Office within twelve months of receiving the award.

To access your funds:

Payments for The Pre-Tenure grants are now being made by the College’s Research Foundation Office. **If you wish to use the Research Foundation’s Visa Card for services or purchase(s), please call Debbie Fisher at the Research Foundation at extension 5153.** (Award fund balances will be verified before allowing any charges.) **You can no longer use your department credit card for your purchase(s) when using funds from The Pre-Tenure Grant.**

If you wish to use your personal credit card, or have a check sent directly to the service provider or vendor, please complete the attached Purchase Requisition and send it with your supporting documentation and a copy of this letter to, Kim Remley in the Grants Development Office, 605 Allen Administration Building. Your paperwork will be forwarded to Debbie Fisher in the Research Foundation Office once all supporting documentation has been received.

If you have any questions, feel free to contact Kim Remley at kremley@brockport.edu or at extension 2523.

Sincerely,

James Spiller
Assistant Provost for Research and Scholarship
Dean of the Graduate School
April 12, 2013

John Gardner
Business Administration, School of
Administration and Economics

Dear John:

Congratulations! The Provost’s Post Tenure Award Committee has decided to fund your project, *Assurance of Learning through Engagement in Business Lab Experiences*, in the amount of $3000.

To access your funds:

Payments for The Provost’s Post Tenure awards are now being made by the College’s Research Foundation Office. *If you wish to use the Research Foundation’s Visa Card for services or purchase(s), please call Debbie Fisher at the Research Foundation at extension 5153.* (Award fund balances will be verified before allowing any charges.) You can no longer use your department credit card for your purchase(s) when using funds from The Provost’s Post Tenure Award.

If you wish to use your personal credit card, or have a check sent directly to the service provider or vendor, please complete the attached Purchase Requisition and send it with your supporting documentation and a copy of this letter to, Kim Remley in the Grants Development Office, 605 Allen Administration Building. Your paperwork will be forwarded to Debbie Fisher in the Research Foundation Office once all supporting documentation has been received.

Award Requirements:

1) If your project involves conducting research with human subjects, you will need Institutional Review Board (IRB) approval prior to receiving the award.
2) A one page (250 words) final results summary report, including activities, professional presentations, and/or journal/manuscript submissions and publications, must be submitted to the Grants Development Office within twelve months of receiving the award.
If you have any questions, feel free to contact Kim Remley at kremley@brockport.edu or at extension 2523.

Your funds are available immediately and for up to two years.

Sincerely,

James Spiller
Assistant Provost for Research and Scholarship
Dean of the Graduate School