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MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See <http://www.mtsu.edu/sga/cleanenergy.shtml> for funding guidelines. Save completed form and email to cee@mtsu.edu or mail to MTSU Box 57.

1. General Information	
Name of Person Submitting Request <i>Melissa Shelby</i>	
Department/Office <i>Biology / SEA / Native American Student Association</i>	Phone # (Office)
MTSU Box #	Phone # (Cell) <i>615-801-5970</i>
E-mail <i>mshelby@mtmail.mtsu.edu</i>	Submittal Date <i>10/7/16</i>

2. Project Categories (Select One)	
Select the category that best describes the project.	
<input type="checkbox"/> Energy Conservation/Efficiency	<input checked="" type="checkbox"/> Sustainable Design
<input checked="" type="checkbox"/> Alternative Fuels	<input checked="" type="checkbox"/> Other <i>Research</i>
<input checked="" type="checkbox"/> Renewable Energy	

3. Project Information	
a. Please provide a brief descriptive title for the project. b. The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission. c. List the source of project cost estimates. d. Provide a brief explanation in response to question regarding previous funding.	
3a. Project Title	<i>BioTech Applications for Biofuels Industry</i>
3b. Project Cost Estimate	<i>\$ 4820.00 USD</i>
3c. Source of Estimate	<i>See Attached</i>
3d. If previous funding from this source was awarded, explain how this request differs?	<i>See Attached</i>

4. Project Description (continued)

4c. Location of Project (Building, etc.)

see Attached

4d. Participants and Roles

4e. Student participation and/or student benefit

4f. Future Operating and/or Maintenance Requirements

4g. Additional Comments or Information Pertinent to the Proposed Project

MTSU Clean Energy Initiative Project Funding Request

1. General Information

Melissa Shelby

Biology Department/ Students for Environmental Action/ Native American Student Association

Phone (Cell) 615.801.5970

Email mds2e@mtmail.mtsu.edu

10/07/2016

2. Project Categories : Research Initiative; Alternative Fuels

All of the following categories also apply: Renewable Energy; Sustainable Design; Other Research

3. Project Information

- a. Title: Biotech applications for Biofuels Industry
- b. Estimated Cost: \$4820.00 USD
- c. Source for Estimate: Biotech and Scientific Research company supply catalogs (consumables, chemicals, macro molecules, enzymes, nutrients, supplies); Kenaf seed supply companies; comparative research models; professional knowledge and extensive experience in the field
- d. No previous funding exists

4. Scope: Project Description

- a. Work to be accomplished: Kenaf seed supplies a 70% oil content with 90% of that oil being the top three carbon chain lengths optimal for biodiesel production (previous research; publication pending). Callus is a biotechnology technique which allows for massive stem cell generation; stem cells can be induced for targeted production. Kenaf (Malvaceae; *Hibiscus cannabinus*) readily calluses under optimized conditions (previous research; publication pending; see youtube "kenafcallushoedown" for demonstration). This work will explore kenaf callus for induction of oil generation and additionally will use biotechnology applications of micropropagation for optimizing seed oil production. This approach is completely novel and has not been previously investigated; however, models for single-cell algal harvesting of bio-oils have been demonstrated and the principals of biotechnology have a significant potential in the biofuels industry. Of significance is that this model is not a water consumptive process as with algal models.
- b. Benefit Statement: A sustainable and scalable biodiesel production is of direct interest to the energy sectors as well as fuel sectors. Biodiesel fuel supports both transportation and energy generator industrial sectors. MTSU owns diesel engine machinery that may benefit from this research investigation, as will the greater public. Results will be offered for publication in MTSU journals.
- c. Location: The biotech portion of this research will be conducted both on campus in the Biology and Chemistry department labs and also off campus at Salomon's House, LLC., located in Murfreesboro. The analytical instrumentation and quantifications will be conducted at MTSU Chemistry Labs.
- d. Participants: Melissa Shelby will be conducting the research and evaluation; Dr. Matthew Wright, MTSU Chemistry Post Doctorate, and Salomon's House CEO, will be supervising consultant, management, and analyzing data; Statistics faculty will be assessing analytical parameters. Portions of the research may enlist certain Chemistry faculty expertise as the experimental design is adjusted for optimization. Melissa Shelby will make the results available to the MTSU population.

- e. Student participation and benefit: As Melissa Shelby is a current student of the Masters of Professional Science program, and Matthew Wright is an alumni and current Post Doctorate at the university; this research allows MTSU students to expand their discipline to applications in "Real World" issues. This research initiative soars in professional development while strengthening the skills learned in the coursework, catapulting the scientist into competitive career options upon graduation.
- f. Future Operating and Maintenance: Upon completion of this preliminary study, no further maintenance is expected.
- g. Additional Comments: Melissa Shelby's experience includes previous work in biodiesel fuel initiatives and presentation of her research internationally. She has received scholarship and worked in tandem for the Clean Energy and Engineering Conference in D.C. multiple years. She has developed callusing techniques specific to kenaf that transformed laboratories here at the university as well as other institutions, even winning competitions in the Life Sciences categories. Additionally, she has successfully produced more than fifty projects for public, institutional, community, and private interests. This scientist's passion is utilizing her knowledge and energy to create sustainable lifestyles and transform our community expectations. It is an innate characteristic deeply formed from her Native American cultural identity and how she feels her most successful service to be. Melissa is a candidate for graduation with the MSc degree and will soon be leaving the campus community in the student capacity; it is greatly desired to leave one last contribution before conferment of the degree.

5. Project Performance Information

- a. Estimated Annual Energy savings: While this preliminary investigation may not generate initial savings, the findings may positively impact both institution and student budgets for fuel costs in the future.
- b. Annual COST savings: Refer to 5a.
- c. Annual Operating Savings: Refer to 5a.
- d. Matching or Supplementary Funding: While this Clean Energy Initiative Project Funding Request encompasses the full budget for the Biotech approach to Biofuel proposal; additional funding for presentation and professional sharing of results, consultations, and other lateral expands are potentials for funding through several funding and granting programs housed at the University. For instance, the Entrepreneur Investment programs and others available through the Business department and Marketing department as well as research funding through the Basic and Applied Science departments. At this point in time, no other funding has been sought, but possibilities are noted.

⊕ as many Tribal nations depend on diesel fuels and oils for heat, this preliminary research has a tremendous potential for enhancing the lives of many Native Students' families and relations.