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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 Scott Handy	
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E-mail shandy@mtsu.edu	Submittal Date. 9/11/2024

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 type="checkbox"/>	Alternative Fuels	<input type="checkbox"/>	Other
<input type="checkbox"/>	Renewable Energy	<input type="checkbox"/>	

3. Project Information

<p>a. Please provide a brief descriptive title for the project.</p> <p>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.</p> <p>c. List the source of project cost estimates.</p> <p>d. Provide a brief explanation in response to question regarding previous funding.</p>
3a. Project Title Waste Reduction in the Discovery of New Fluorophores via miniaturization and in situ screening
3b. Project Cost Estimate \$1994 (plates \$564, test tubes \$300, vials \$80, chemicals \$600, pipet tips \$450)
3c. Source of Estimate current catalog prices (Fisher Scientific, Ambeed, USA Scientific, and Discount Vials)
3d. If previous funding from this source was awarded, explain how this request differs? This is a different project area from the one funded last year (allylations). That project delivered the preliminary results for two

grant applications as well as one paper that will be submitted this fall and two presentations at a regional meeting this fall. The goal is for this grant to support generating preliminary data for additional external grant applications.

4. Project Description

(Completed in as much detail as possible.)

- a. The scope of the work to be accomplished is a detailed description of project activities.
- b. The benefit statement describes the advantages of the project as relates to the selected project category.
- c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
- d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
- e. Provide specific information on anticipated student involvement or benefit.
- f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
- g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

4a. Scope: Work to be accomplished

The focus of this project is the more efficient discovery of new fluorescent probes for a range of applications (biological analysis, environmental analysis, pH determination, etc.). Fluorescent compounds are used a great deal in analytical applications due to their high sensitivity and their non-destructive characteristics. The process of developing these compounds has traditionally been one of the synthesis and characterization of a number of individual compounds in a sequential manner, followed by the eventual use of the best compound. In this project, we intend to prepare very small amounts of arrays of potentially useful compounds and directly explore them for a given application (acidity will be our first application) without isolation. Once the best compound has been identified, it will be prepared on larger scale and the results observed in the array step confirmed. This will serve to both reduce the amount of waste generated as well as reduce the amount of time required to find optimal fluorescent probes for analytical applications.

4b. Scope: Benefit Statement

As mentioned in the Scope section, the benefits of this method will be the generation of less waste by preparing very small amounts of material and directly testing them for a given application rather than the tradition method of isolating and characterizing each compound separately. Time will also be saved, since multiple different compounds can be prepared at the same time using a multi-well plate instead of having to set up many separate reactions in individual reactors. Another potential benefit is that the same set of compounds could be explored at the same time for multiple different applications, again saving time, material, and effort. All of this translates into reduced waste generation (that must then be safely disposed of) as well as reduced energy consumption (since all of the reactions and analysis will occur in the same run, instead of multiple different runs).

4. Project Description (continued)

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

SCI 3021

4d. Participants and Roles

Scott Handy – PI and director of the project. I will do some of the experimental work, train the undergraduates (and hopefully one graduate student) in the experimental methods and in how to process and interpret the data

Issac Puckett – undergraduate researcher. He will conduct the bulk of the experiments and gain further independence in his ability to conduct research

Braden Huff – new graduate student. He is just starting in the master's program, but the goal is for him to start on aspects of this project and gather additional research data.

Two other undergraduate researchers – Morgan Rudesill and Olivia Vickers will also likely contribute to further expansion of this project idea.

4e. Student participation and/or student benefit

As mentioned above, my goal is to have up to four students involved in aspects of this project. For two of them, this will be their introduction to research and a way to broaden their educational experience. For the other two, it will enable them to continue their research experience and to develop skills in working with and training others in research. For all of them, this project should expand their practical knowledge in Chemistry and help them to determine what type and to what level they wish to continue on in this discipline.

4f. Future Operating and/or Maintenance Requirements

The goal is for this proposal to result in the preliminary data for a successful NIH and/or NSF proposal that will provide future funding for this work.

4g. Additional Comments or Information Pertinent to the Proposed Project**5. Project Performance Information**

Provide information if applicable.

- a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc.
- b. Provide information on estimated annual energy cost savings in monetary terms.
- c. Provide information on any annual operating or other cost savings in monetary terms. Be specific.
- d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.

5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.) Not Applicable

5b. Annual Energy COST Savings (\$) Not applicable

5c. Annual Operating or Other Cost Savings. Specify. (\$) While difficult to accurately quantify, by reducing waste volumes, savings of at least \$1600 per year in disposal fees is anticipated.

5d. Matching or Supplementary Funding (Identify and Explain) Not applicable