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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: <u>Ngee Sing Chong</u>	
Department/Office: <u>Chemistry</u>	Phone # (Office): <u>615-898-5487</u>
MTSU Box # : <u>PO Box 68</u>	Phone # (Cell)): <u>615-556-5509</u>
E-mail: nchong@mtsu.edu	Submittal Date: <u>October 5, 2017</u>

2. Project Categories (Select One)	
Select the category that best describes the project.	
<input type="checkbox"/> Energy Conservation/Efficiency	<input type="checkbox"/> Sustainable Design
<input type="checkbox"/> Alternative Fuels	<input checked="" type="checkbox"/> Other (Upgrade of donated instruments from Tennessee Health Department Laboratory)
<input type="checkbox"/> Renewable Energy	

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: <u>Upgrade of Laboratory Instruments (GC and ICP-OES) Donated to MTSU by Tennessee Health Department Laboratory</u>
3b. Project Cost Estimate <u>Hydride generation system for ICP-OES (\$7400) and GC detector/pneumatics upgrade (\$5423) for a total project request of \$ 12,823.</u>
3c. Source of Estimate http://www.perkinelmer.com/product/hydride-icp-generation-system-mp2-6-n8122470?searchTerm=&pushBackUrl= https://www.chem.agilent.com/store/en_US/Cat-SubCat2ECS_46161/3800-Varian-GC
3d. If previous funding from this source was awarded, explain how this request differs? <u>My last Clean Energy project funding was for the purchase of</u>

a hydrogen generator in 2014 in the category of Energy Efficiency. I am now requesting funds to upgrade the chromatograph and spectrometer donated.

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

Both the Varian 3800 GC detector and the Perkin Elmer hydride generation system for the PE Optima ICP-OES will be purchased via sole source procurement method since these parts will have to fit onto the donated equipment. The installation and calibration of the hydride generation and GC detector modules will require about 8 days of work to be completed before March 31, 2018. The work will be performed with the assistance of a regional technical service engineer and calibration will be done by Dr. Chong and his graduate research students.

4b. Scope: Benefit Statement

GC and ICP-OES are widely used in analytical laboratories and are among the most important techniques covered in all textbooks for Instrumental Analysis. Therefore, the availability of a functioning GC and an ICP-OES instruments are critical in allowing faculty to provide proper training for MTSU students who will use this kind of instruments in laboratories for research and quality control applications. This will improve the quality of laboratory instruction by providing hands-on experience for students in CHEM 6640 and CHEM 3880/4880 courses and laboratory experiments for FSCH 4231, CHEM 4231, and CHEM 6231. Furthermore, the ICP-OES instrument will be used for CHEM 6640 and CHEM 3880/4880 research courses for students working on their M.S. theses or undergraduate research.

4. Project Description (continued)
4c. Location of Project (Building, etc.): <u>Science Building, Room 3101 and Room 3070</u>
4d. Participants and Roles <u>Project Leader-Ngee Sing Chong (Implementing the project and ensuring student access to the upgraded instruments)</u> <u>Chemistry Chair-Greg Van Patten (Approval of purchase and space allocation for donated instruments)</u> <u>Instrument Support Specialist-Jessie Weatherly (Continuing the maintenance and repair of instruments after initial setup)</u>
4e. Student participation and/or student benefit <u>This project will provide experiential learning opportunities for chemistry majors with interest in chemical instrumentation to get involved with the installation and upgrade of the gas chromatograph and inductively coupled plasma-optical emission spectrometer. This skills are greatly helpful for students desiring employment in industrial chemistry laboratories. Once the instrument is set up, students enrolling in CHEM 4230, FSCH 4230, and CHEM 6230 will benefit from having hands-on skill with operating these instruments that not currently available in the Department of Chemistry</u>
4f. Future Operating and/or Maintenance Requirements <u>Once the instruments are set up, the operating costs of argon and helium gases and chemical standards will be covered by the Department of Chemistry. For instrument maintenance, Mr. Jessie Weatherly will provide his instrument maintenance service as he has been doing with all the other departmental instruments.</u>

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

The installation and upgrade of GC and ICP-OES will be one way that MTSU can save money needed for expensive instrumentation used in laboratory courses. A new ICP-OES instrument typically costs about \$60,000-\$100,000. A sample quote of Perkin Elmer Optima ICP-OES in 2009 showing the price of \$94,409.50 is attached. The cost of the donated GC is estimated at \$50,000 when purchased as a new item. Even though MTSU has not been able to fund the purchase of an ICP-OES spectrometer via MTSU Technology Access Fees (TAF) support, MTSU will have the opportunity to install and upgrade this ICP-OES to benefit students in Chemistry and Forensic Science programs at both undergraduate and graduate levels.

This project on the upgrade of the equipment donated by Tennessee Health Department is implicitly related to "Energy Conservation" because even if MTSU has the money to purchase both GC and ICP-OES as new instruments, the energy associated with the process of manufacturing will have to be considered in the life cycle assessment of net energy expenditure of new instruments over a recycled or refurbished instrument. I have been assured by the Director of Tennessee Health Department Laboratory that the instruments are in good operating conditions and still have original factory performance specifications.

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. (\$)

Not applicable.

5d. Matching or Supplementary Funding (Identify and Explain)

Upon the completion of the installation and upgrade of donated equipment totaling close to \$140,000 when purchased as new items, the Department of Chemistry will use its operating budget to cover the consumable expenditures of argon, helium, and chemical standards totaling about \$8000 per year. It is anticipated that some students will use these instruments for research supported by URECA and this may account for additional \$2000 of matching funds from URECA. The project cost is based on the weblinks provided in Section 3c and the itemized costs are attached with this application.

ITEM DETAILS	QUANTITY	LIST PRICE	YOUR PRICE	TOTAL
391482100 Manual, installation qualification and operational qualification, for series 3800 Varian gas chromatography systems	1	\$511.00		\$511.00
Add to My Catalog Remove from Cart	<i>In Stock - Item available to ship</i>			
CP740766 PDHID Pulse Discharge module, used with 3800 Varian gas chromatography systems	1	\$2,663.00		\$2,663.00
Add to My Catalog Remove from Cart	<i>In Stock - Item available to ship</i>			
PALMRV3800450 Mounting kit, used with 3800 Varian gas chromatography systems	1	\$1,741.00		\$1,741.00
Add to My Catalog Remove from Cart	<i>In Stock - Item available to ship</i>			
392611025 Preparative air needle, 1/pk, used with 3800 Varian gas chromatography systems	1	\$508.00		\$508.00
Add to My Catalog Remove from Cart	<i>In Stock - Item available to ship</i>			

Do you have a promotional code?

APPLY >

SUBTOTAL OF 4 ITEM(S)

\$5,423.00
USD

Hydride ICP Generation System MP2 6



Not over image to zoom in

Hydride ICP Generation System, including MP2 6 channel precision micro pump and gas-liquid separator.

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Part Number	List Price	Your Price	Quantity
N8122470	7400.00 USD	Login to view your price	1

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7
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Dr Ngee-Sing Chong Fax: 203.944.4914
 Middle Tennessee State University Website: <http://perkinelmer.com>

N0770796	1OPTIMA 7300DV CONCENTRIC	90,800.00	90,800.
N0770631	1INSTALLATION SOLUTIONS FOR OPTIMA 5X00/7	720.00	720.
N0772036	1CHILLER-6106PE LOW NOISE 60HZ	3,550.00	3,550.
N0770452	1CONTROLLER-ICP WINLAB32 W/MON^	5,200.00	5,200.
09421085	1PRINTER LASER BROTHER HL-5340D 120V	463.00	463.
09421130	1CABLE-USB2 480MBPS A/B PLUG 10 FT^	30.00	30.
N2020006	1S10 Autosampler for ICP	8,400.00	8,400.
N0205010	1TRAINING-OPTIMA ICP	1,810.00	1,810.

Sub Total	110,973
Discount	16,563.
Total	94,409.

This quotation reflects Educational discounts only. These prices are good for budgetary planning purposes. Other promotions may be in place at the time of purchase which could be of greater advantage to your pricing.

This is a preliminary quotation and is issued for budgetary purposes only. Prices and terms may differ from those appearing on this form. Any orders resulting from this preliminary quotation are subject to acceptance by PerkinElmer in Shelton, CT, USA.