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Application Summary

Competition Details

Competition Title:	MSFT Applications for 2020-2021
Category:	Internal Funding
Award Cycle:	2020-2021
Submission Deadline:	4/10/2020 3:00 PM

Application Information

Submitted By:	Clare Steele
Appplication ID:	293
Application Title:	ESRM Virtual Machines & Water Quality Instrumentation Refresh
Date Submitted:	3/2/2020 2:40 PM

Personal Details

Applicant First Name:	Clare
Applicant Last Name:	Steele
Applicant Department:	ESRM
Email Address:	clare.steele@csuci.edu
Phone Number:	(805) 437-1686
Who is the Staff Support for Project/Activity?:	Emily Gaston
Staff Support email:	Emily.gaston@csuci.edu

Application Details

Proposal Title

ESRM Virtual Machines & Water Quality Instrumentation Refresh

Brief Project Description

The Environmental Science and Resource Management (ESRM) Program prepares students with technical expertise in the newest environmental monitoring technologies available in order to prepare them for professions in environmental science and monitoring locally and nationally. The ESRM program has a track record of success in training students in remote sensing technologies (e.g. imaging and mapping using remotely operated aerial vehicles) and in the processing of large data sets in technical software to produce detailed maps and three dimensional models of local landscapes. ESRM needs a great deal more capacity for computer-based data processing in the majority of our required classes. To accomplish this goal we aim to transition ESRM to Virtual Machines (VM), run on Chromebooks, equipped with the processing power of a high powered computer, and with the required specific software needed for ESRM courses (i.e. ArcPro, Pix4D, LP360, R, SPSS).

ESRM struggles to provide access to needed software and processing capability, outside of our GIS (Geographic Information Systems) computer lab, located in Sierra Hall. In lieu of requesting another static computer lab for the ESRM program, we see access to virtual machines as a way to provide maximum flexibility and portability for all our courses. A portable laptop (Chromebook) cart equipped with virtual machines will have the capacity to provide each student (in a lab class of 24) with the required software on the VM, instead of relying on each student to use their personal laptops. This will reduce equity gaps created by disparity in access to laptops and tablets and improve instruction by having a uniform platform across the classroom. This capacity will be invaluable in a great many of our courses that include embedded research, data processing and statistical analysis elements (e.g. ESRM 313 Conservation Biology, ESRM 371 Coastal Monitoring With Remotely Piloted Systems). In addition, our newly approved GWAR course, ESRM 303 Data Visualization and Climate Communication, needs access to these virtual machines. The course combines intensive writing with the creation and integration of data visualization into technical writing.

The remainder of the MSFT funding request concerns the updating of the ESRM water quality instrumentation. We currently have a suite of water quality probes that are used by ESRM 300 Coastal Contaminants and Ecotoxicology and ESRM 499 Capstone. We are currently limited to two very old laptops as data loggers for our water quality instruments. Water quality instrumentation requires a hardwire or physical connection to a computer and software on a local hard drive, thus Chromebooks will not suffice for this application. For a complete lab set, for use by a 25 student lab section, the water quality instrumentation refresh will require six Dell Latitude Laptops and 1 new multiparameter sonde.

The courses expected to benefit the most from these needed improvements include:

- ESRM 210 - Physical Oceanography (50 Students anticipated annual enrollment)
- ESRM 300 - Coastal Contaminants and Ecotoxicology (50)
- ESRM 303 - Data Visualization and Climate Communication (50)
- ESRM 313 - Conservation Biology (Cross-listed as BIOL 313) (150)
- ESRM 328 - Introduction to Geographic Information Systems (100)
- ESRM 351 - Field Methods: Monitoring and Assessment (50)
- ESRM 370 - Fundamentals Of Remotely Piloted Systems (50)
- ESRM 371 - Coastal Monitoring With Remotely Piloted Systems (25)
- ESRM 400 - Analytics Studio (25)
- ESRM 462 - Coastal and Marine Resource Management (50)
- ESRM 428 - Intermediate Geographic Information Systems (50)

Amount of MSFT Funding Requested

58,590

Project/Activity Budget Detail

The budget for ESRM's MSFT funding request includes a laptop cart with Chromebooks and the Amazon Web Services credits for hosting the Virtual Machines. The main benefits of using VMs to remotely process large data sets generated by remote sensing technologies include the processing, stitching and modeling of images into three dimensional landscape models. These data processing activities can take 8-16 hours of processing time on local desktop computers, thus tying up computers for long stretches of time outside of classes. Amazon Web Services can remotely process these data, thus freeing up local desktop computers in the GIS lab for other classes. In addition, virtual machines can be accessed by students outside of the GIS lab, thus enabling students to carry these skills and activities to other courses and applications, including independent study and Capstone.

The remaining budget request is for training students in the measurement of water quality and learning the calibration and maintenance of water quality probes. One multi-parameter water quality probe is requested to supplement our current suite of instruments. Local software on laptop hard drives is needed for these instruments. Six Dell Latitude Laptops will suffice for one laboratory section.

Will you receive funds from any other source(s)?
No

Other Funding Sources

Has this project or activity previously received MSFT funding?
Yes

Acknowledgment

Fiscal Management
Project applicant/sponsor's unit or department may be responsible for incurred over and above what is funded through the MSFT. If support is requested for costs beyond initial award, or for use on activities or materials not included in approved proposals, the project sponsor must seek approval from the MSFT committee. The project applicant/sponsor will be responsible for managing purchases, transfers of funds, and all transactions related to approved projects

Please review MSFT webpage for information about the fund and its objectives before submitting your application.

2020-2021

Project or Acitivity Title	**Total Requested $$**	Please layout in detail when various components of your plan will be complete in order to achieve key milestones. This information will be use to forecast the spending of MSFT within the fiscal year. PS: all purchases/services need to be received and billed to CI before June 30th to account for the current fiscal year.
ESRM Virtual Machines & Water Quality Instrumentation	**$58,600**	

MSFT Planning Budget Calendar 2020-2021

Items or services requested to be funded	July 2020 -Period 1	August 2020-Period 2	September 2020 -Period 3	October 2020 -Period 4	November 2020 -Period 5	December 2020 -Period 6	January 2021 -Period 7	February 2021 -Period 8	March 2021 -Period 9	April 2021 -Period 10	May 2021 -Period 11	June 2021-Period 12	Grand Total
Laptop Cart	$ 900.00												$ 900.00
Chrome Books x18		$ 3,500.00											$ 3,500.00
Dell Latitude x6		$ 6,690.00											$ 6,690.00
Amazon Web Services		$ 25,000.00											$ 25,000.00
eLumin technical support fee		$ 2,500.00											$ 2,500.00
YSI Exo multiparameter Sonde			$ 15,000.00										$ 15,000.00
maintenance for YSI sondes											$ 5,000.00		
Total	$ 900.00	$ 37,690.00	$ 15,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ -	$ 58,590.00

2020-2021

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ESRM Virtual Machines & Water Quality Instrumentation

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formulas will calculate totals

MSFT Planning Budget Calendar 2020-2021

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insert your items or service here													$ -
insert your items or service here													$ -
* you can add lines to your budget by inserting lines here													$ -
Total	$ 900.00	$ 37,690.00	$ 15,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ -	$ 58,590.00

MSFT SUMMARY REPORT for Environmental Science and Resource Management FY 19-20

Please provide a summary of your submission and explain how MSFT funding has helped improve resources and experiences for students at CI. Feel free to add 2-3 photos.

ESRM's MSFT request for FY 2019-2020 was primarily to obtain technical and field equipment to train students in the latest sampling techniques. The main benefits to the students in FY 2019-2020 has been the usage of the pilot Virtual Machines, drones, and survey grade GPS for ESRM 371 Coastal Monitoring with Remotely Piloted Systems.

The second benefit has been the soil samplers, seine nets, and camera traps for ESRM 351 Field Methods. These tools are utilized in the classroom to learn different field based methods including California Rapid Assessment Method (CRAM) in wetlands, wildlife monitoring, and soil quality.

Students in ESRM 499 Capstone have utilized the skills they have developed on this field equipment to implement a variety of projects in the local region.
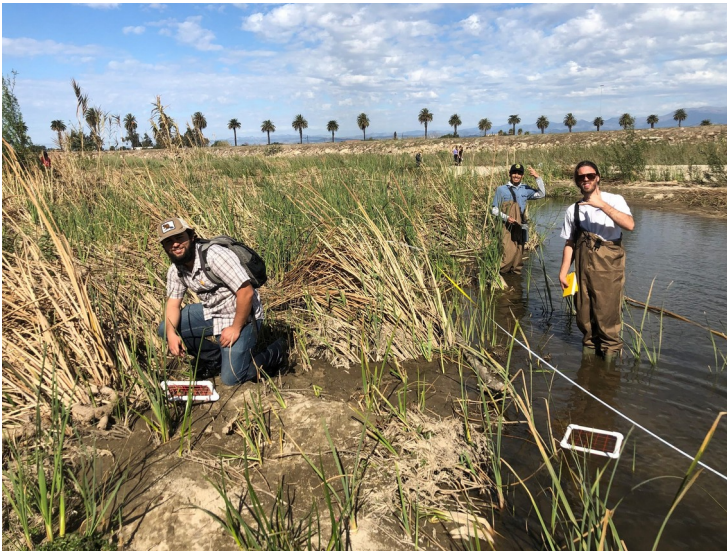
Provide a summary of the status of your budget. Were you within budget? Was the entire allocation spent by end of FY? Overspent? An extension requested due to scope/materials change?

Satellite phone	$930.00	2	$1,860.00
HoboRX 3000 Advanced Portable Weather Station (Onset)	$3,000.00	1	$4,159.06
eLumin AWS Fee	$2,500.00	1	$2,500.00

Data Visualization Spectacles	$2,300.00	3	$6,900.00
Drone camera	$400.00	2	$800.00
Large Pole	$69.00	2	$138.00
I-button software	$167.00	1	$167.00
I-buttons (50-100)	$500.00	1	$500.00
Soil Samplers	$202.50	1	$202.50
Environmental Soil Sampling kit	$2,154.00	1	$2,154.00
Seine Nets	$837.32	1	$837.32
WQ micro sensors	$375.85	1	$375.85
WQ probes and solutions	$1,000.00	1	$1,000.00
Matrice 600 UAV	$6,000.00	1	$6,000.00
Field dissecting microscopes	$300.00	4	$1,200.00
Ohaus portable scale	$235.00	4	$940.00
HOBO 100 water level deluxe data	$1,137.00	1	$1,137.00
survey GPS	$500.00	1	$500.00
Reconyx SC950 C Camera traps	$1,200.00	5	$6,000.00
			$37,370.73

The items highlighted in gray have been purchased. We are still in the process of completing purchases for some of the remaining items.

We requested and were granted a modification of the original MSFT proposal for F2019-S2020 because ESRM was able to purchase some requested equipment items through other avenues of funding over the previous year. Justification for the approved items was as follows:

- Amazon Web Services: Dr. Kiki Patsch received an award from the chancellor's office of 20,000 amazon web service credits . After meeting with IT, it was suggested that we use MSFT funding to pay for the support consultant, eLumin (found by IT), which will cost $2,500 dollars (discounted from $5k). This company will assist Dr. Patsch and IT develop virtual machines necessary for Spring 2020's pilot classroom in ESRM 371 Coastal Monitoring with remotely piloted systems. This money will go towards technical support during the semester and is extremely recommended by IT as they do not have the capacity to support us yet would like to learn from eLumin from this process.
- Survey grade GPS: The level of accuracy a survey grade GPS provides high quality precision and accuracy down to the inch. Currently ESRM only has 2 units available for students to use in various classes including ESRM 200, 351, 371,462, 328, 428,

491, and 499. This field equipment can be utilized in improving the accuracy and precision of student maps in Geographic information systems 328 and 428 as well as ESRM 351 (intro to drones) and 371 (coastal monitoring with remotely piloted systems) by integrating the survey grade GPS for ground control points. Lastly, the survey grade GPS can be used in our lower division ESRM class (ESRM 200) by navigating to nest sites at Ormond beach snowy plover restoration site.

- Data Visualization Spectacles: These are used to quantify engagement duration, visual focus, and effectiveness of visual hierarchy in scientific writing containing a mixture of figures data visualizations, and text. In ESRM's new GWAR class students will use these spectacles to quantitatively and objectively assess, revise, and increase the impact of their written and visual deliverables from several ESRM classes.

- Drone Camera and Long Pole: The DJI osmo pocket is a small camera that is stabilized for optimum photography. The camera combined with a long pole will act as a drone without the additional needs of a certified pilot and flying in the air. The camera and pole can be mounted to a backpack and traversed across difficult landscapes to collect imagery to make detailed 3D images and maps. For example, students will be able to walk SRI beaches and map the cliffs or intertidal zone without using a drone (which are prohibited on the island and in all national parks).

- ibuttons: ibuttons measure temperature and relative humidity of different environments. The buttons are easy to program and every student in the appropriate class will be able to program and deploy ibuttons out in the field to collect long-term environmental data.

- HOBO water level: The HOBO water level will be utilized in multiple ESRM classes, including but not limited to ESRM 200, 300, 351, to measure the water levels in estuaries or during breaching events at beaches. Each student will have the opportunity to measure the water levels at specific field sites and use the data and make graphics.

Additional statements or final comments you would like to provide to the MSFT committee:

Funding provided by MSFT for FY 2019-2020 greatly expanded our capacity to provide upper-division students with the tools and training that will equip them to work in careers in the field of Environmental Science and Resource Management. The integration of these new tools and skills into our ESRM program will have additive benefits as future students will be introduced to this newly acquired equipment at multiple stages throughout our curriculum.