

2014 Budget Form – President’s Performance Fund

New Mexico State University
New Initiatives Supporting Vision 2020 Goals and Objectives
For Allocation of President’s Performance Fund – Fiscal Year 2013-2014

Date of Request:	Tuesday, September 24, 2013	
Submitted By:	Kenneth “KC” Carroll, PhD, April Ulery, PhD	Phone: 6-5929, 6-2219
College or Unit:	Agricultural, Consumer and Environmental Sciences	
Department:	Plant and Environmental Sciences	
Project Name: (Short description):	Computer Simulations	
<input checked="" type="checkbox"/>	Recurring for:	Amount Recurring Funding Requested per year:
	<input type="checkbox"/> One Year	Year 1: \$ 15,000
	<input type="checkbox"/> Two Years	Year 2: \$ 15,000
	<input checked="" type="checkbox"/> Three Years	Year 3: \$ 15,000
<input type="checkbox"/>	Non-Recurring	Amount Non-Recurring Funding Requested: \$
Description of request		
<p>Students in the hard sciences require more than methods practice in lab activities; they must gain an understanding of the <i>application of the scientific process</i> through lab work. For example, students should learn when they <i>don't have enough data</i>, how to design an experiment, when a lab accident <i>warrants a complete redo of the experiment</i>, or how to recognize when <i>bias, assumptions, or misleading confirmations</i> impact results. These <i>higher-level</i> science concepts cannot be learned solely by reading about them, or simply hearing about them, but through an opportunity to apply these ideas through a series of interactive lab exercises. Large classes, time constraints, and funding typically limit student access to science labs that provide experiential learning that is needed to <i>motivate and develop</i> new scientists.</p> <p>Interactive, <i>discovery-based</i> computer simulations and virtual labs provide an excellent, low-risk opportunity for learners to engage in lab processes and activities. Students can conduct experiments, collect data, draw conclusions, and even abort a session. In an online lab, it is possible to allow students to do things <i>the wrong way</i>, and then correct their actions. An online lab can be paused for thoughtful reflection. We propose development of 3 specific online virtual labs, through which students can engage in labs required for soil chemistry, environmental chemistry, and water science. The specific lab activities include sorption and cation exchange capacity, porosity and hydraulic conductivity. However, in addition to learning the specific procedures involved in each lab, the online activities will also prompt exploration and practice in key scientific and mathematical concepts, such as unit conversion, significant digits, assessing risks, evaluating bias, and assessing quantity and quality of data. These labs are not designed to replace traditional lab instruction, but to supplement instruction on <i>challenging concepts</i>. To prepare for class, students can continue their lab experience while at home. More importantly, they can reflect, discuss, review, and even fail at their lab experience as part of the process to see <i>why natural processes and scientific approaches work the way they do</i>.</p> <p>Dr. Ulery has worked with faculty in the College’s Media Productions over the past 2 years developing similar modules on working in multiple dimensions, reading logarithmic scales, and interpreting graphs (which can be previewed at scienceofsoil.com). Media Productions has also completed a series of online digital labs with other content at virtuallabs.nmsu.edu. As a mentor to Dr. Carroll, she has shared with him the potential to use both hands-on labs and supplemental digital learning materials. They have identified key lab processes and learning content that could be used across several disciplines. This type of online learning tool works particularly well with students at highest risk: those students for whom English is a second language, students with specific learning needs, and those students deficient in pre-requisite math and science understanding. To significantly enhance <i>graduation rates</i>, these students must be reached in new ways.</p> <p>Development of these modules will help faculty secure additional funding from programs like USDA’s Hispanic Serving Institution program, which supports <i>underrepresented student learning, retention, and diversity</i>. External funding will be acquired to continue and advance labs for all other scientific disciplines.</p>		



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Request Justification

Support Vision 2020 Goals *(select as many Vision 2020 goals as apply below).*

<input checked="" type="checkbox"/>	1. Graduation – Teaching, Learning & Programs - <i>Provide effective academic programs, stellar teaching and learning, and enhanced student engagement to advance highly capable graduates</i>
<input checked="" type="checkbox"/>	2. Diversity – <i>Be a model of student, faculty and staff diversity at all levels</i>
<input type="checkbox"/>	3. Internationalization - <i>Effectively prepare students for a global society</i>
<input type="checkbox"/>	4. Research & Creative Activity -- <i>Be the catalyst for promoting discovery, encouraging innovation, sparking economic advancement, and inspiring creative achievement</i>
<input type="checkbox"/>	5. Economic Development -- <i>Be a driving force for economic progress in New Mexico</i>
<input type="checkbox"/>	6. Resource Stewardship -- <i>Increase philanthropy and alternative revenue to support teaching, research and service</i>
<input type="checkbox"/>	7. Community - Service, Extension & Outreach -- <i>Be a model for community engagement at all levels through innovative and exceptional outreach activity</i>
<input type="checkbox"/>	Specific objectives: (Complete attached Performance Data Matrix)

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Approvals (please print and sign)			
Submitted by	Kenneth Carroll		9/25/13
	April Ulery		9/25/13
	Print	Signature	Date
Director/ Department Approval	Richard Pratt		9/26/13
		Print	Signature
	Print	Signature	Date
College Dean/ Division VP Approval			
	Print	Signature	Date

Internal Use Only			
University Budget Committee:	Tier Assignment:	<input type="checkbox"/> Tier I	<input type="checkbox"/> Tier II
		<input type="checkbox"/> Tier III	
	Ranking No.: _____	Date: _____	
Comments:	<hr/> <hr/> <hr/>		
President’s Academic Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Comments:	<hr/> <hr/> <hr/>		

2014 Budget Form – President’s Performance Fund, supplement

New Mexico State University
 New Initiatives Supporting Vision 2020 Goals and Objectives
 Performance Data Matrix
 Fiscal Year 2013 - 2014

The Vision 2020 Strategic Plan provides goals, objectives and key performance indicators for the University. Using the goal(s) you have check marked on the request form, please indicate which of the stated objectives this request is projected to positively impact, how the request is tied to the selected objective and propose a performance measure(s). Then indicate the target performance improvement goals over an annual timeline not to exceed three (3) years. Add rows as needed. All Presidents’ Performance Fund awards are subject to annual review of comparative performance as a condition of continuing award. The required conditions of continuing funding will be identified at the time of award from the President’s Performance Fund.

Goal Number	Vision 2020 Objective	Explain how request is tied to this objective	Performance Measure	FY2013-2014 Target	FY2014-2015 Target	FY 2015-2016 Target
1. Graduation – Teaching, Learning & Programs	<p>1. Provide a learning environment and course offerings supportive of timely degree completion.</p> <p>2. Provide strong academic programs through continuous innovation and evaluation.</p>	<p>Students must gain a first hand understanding of the application of the scientific process in the lab, not only by completing labs, but also by gaining knowledge only available by making mistakes, lab accident, or how to recognize when bias and assumptions impact their results.</p> <p>Students need reinforcement and applicability in key supporting concepts, which are areas of confusion that inhibit student learning, success, and retention.</p>	<p>Pre/post lab assessment will measure student skill and concept application, which will also be assessed in regular class and follow on labs and classes.</p> <p>Labs will be modified or tailored to student needs as determined from post lab student evaluations.</p> <p>Pre/post lab student survey will support assessment of student learning, confidence, and interest in science and their degree programs.</p>	In each of the 3 years, and for each of the 3 modules: students with access to the modules will show >10% increased proficiency in their skill and performance and be able to express their understanding of the scientific processes with >10% more confidence, as determined by performance assessment methods. Students will demonstrate measurable improvement in core science courses, and student retention will increase.		

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Goal Number	Vision 2020 Objective	Explain how request is tied to this objective	Performance Measure	FY2013-2014 Target	FY2014-2015 Target	FY 2015-2016 Target
2. Diversity	1. Provide an academic environment supportive of a diverse student, faculty, and staff population 2. Shape student diversity at all academic stages through recruitment, retention efforts, and support services 4. Reflect a commitment to New Mexico and border region diversity through programs and curriculum	Supplemental, non-time limited, interactive, and application-based learning labs are novel methods for reaching and advancing students of different cultures, languages, and learning styles or needs. Labs will target science class problem areas for international and Hispanic students and students with various learning styles or needs. Online nature of content supports students with English as a second language and students that need more time to learn. It also supports the potential application throughout the region. Inclusion and support of different types of students supports continued student diversity and retention of students that reflect diversity.	Pre/post lab assessment will measure student success for various types of students. Student surveys and lab assessment will examine learning improvement across different cultures, languages, learning styles or needs. Student surveys and lab assessment will examine student interest in interest in science and their degree programs across different cultures, languages, learning styles or needs.	In each of the 3 years, and for each of the 3 modules: students with access to the modules will show >10% increased learning for international, Hispanic, and non-native English speaking students. A >10% increase in retention and graduation will be observed for international, Hispanic, and non-native English speaking students. A measureable increase will be observed in student diversity over the 3 year period.		