PROPOSAL TO LOYOLA UNIVERSITY NEW ORLEANS
UNIVERSITY COMMITTEE ON INTERNAL GRANTS
Faculty Development Grant Proposal

Name: James L. Wee College/Department: H & NS, Biol Sci
Rank: Professor Chair/Professorship: Provost Distinguished Profess.

Date Submitted: Nov. 15, 2013
Start Date: January 15, 2014 Completion Date: December 30, 2014

Title of Project: “Development and Testing of the “Audubon Park Lagoon Nanosafari” Menu Line in the “GO to Lake Thoreau” iPad Application for Supporting LoyNO Common Curriculum Courses”.

Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Supplies (itemize below)</td>
<td>$722</td>
</tr>
<tr>
<td>2. Printing &amp; Copying</td>
<td>$0</td>
</tr>
<tr>
<td>3. Journal Page Charge</td>
<td>$0</td>
</tr>
<tr>
<td>4. Travel (itemize below)</td>
<td>$0</td>
</tr>
<tr>
<td>5. Per Diem (itemize below)</td>
<td>$0</td>
</tr>
<tr>
<td>6. Other Costs (itemize below)</td>
<td>$2,790</td>
</tr>
</tbody>
</table>

REQUESTED TOTAL: $3,512

Budget Justification: (Please do not attach other budget pages)

Requested Budget Items. (based on quotes or catalogue prices, including tax & shipping).
Supplies: field fixative ($75, 500 mL glacial acetic acid; $55, 100 mL, 32% EM grade paraformaldehyde); 2 plankton nets - $275, 10 µm net, $242, 35 µm net; $75 1 L, 30% H₂O₂.
Other: $1000, Slugworth Application Development Company, to add “Audubon Park Nanosafari” to GO to Lake Thoreau iPad application. $290, Cellular Service iPad Contract for one year. $1200 Stipend to Ms. Courtney Slugher ($10/hr, 20 hrs/wk, May 15 – June 30). $300, Scanning Electron Microscopy (SEM) for two sessions, ca. 2.5 hrs/session.

$4815 in Matching Funds provided by the PI from his Provost Distinguished Professorship. $3500, stipend to Dr. Lisa Underwood to work in a one-on-one capacity with Ms. Slugher one day/wk, January–June 2014 in support of her activities; $765, iPad purchase; $300, additional SEM costs; $250, estimated miscellaneous supplies.

Total Cost of Project (requested and matching funds): $8327.

Per Cent of Total Costs Requested From Faculty Development Grant: 42%
What other sources of funding (internal and external) have you identified for this project?

Dr. Aimée Thomas is an extraordinary faculty member in the Biological Sciences Department in the first year of an NSF grant supporting the beta version of her “GO to Lake Thoreau” iPad application. She will provide expertise in developing the “Audubon Park Nanosafari” for inclusion as a menu line in the beta version of her “GO to Lake Thoreau” iPad application. Further, she will support pilot testing the educational effectiveness of the “Audubon Park Nanosafari”, pending first-year renewal of grant support in 2014 through the NSF Advancing Informal STEM Learning funding. Further, Dr. Bob Thomas occupies the Loyola University Chair in Environmental Communications and is excited about this project. He also has offered to work with the PI to solicit additional local extramural grant support once the initial preliminary work has been completed.

If you have received any prior Loyola University grant funding within the past three years, please list the years and amounts. For each award, specify whether a final report was submitted. If any documents are outstanding, please explain why and specify whether a formal extension was granted. “Development and Testing of an Algal Culture Medium Based Upon Water Chemistry of the Lake Pontchartrain Basin Estuary”. Awarded January, 2010. Final report submitted, August 2012. $3280.

Does your research involve human subjects? _____ Yes _____ No.
I have submitted the Employee Conflict of Interest Disclosure Form. _____ YES
I have read and understand the University’s reimbursement policy. _____ YES

Narrative Description (use no more than one additional page and please write for a general academic audience):

The lack of fundamental scientific literacy among the general public in the US has been an ongoing political and social issue for decades. Although most Americans have a basic appreciation of microorganisms (bacteria, viruses, algae, protozoa, protists) as pathogens, we do not recognize their biodiversity or pivotal roles in our planet’s natural ecological systems (e.g. production and degradation of biofuels and fossil fuels, ameliorating global climate change). The fundamental premise of this proposal is that human beings are visually oriented and rarely make the connection between microbes and their roles in our planet’s natural systems simply because we cannot see them. Thus, the overall goal is to develop an iPad software application and demonstrate “proof of concept”, that when visual images of microbes in a natural setting are connected to key concepts (e.g. specific aspects of microbial biodiversity and roles in the Earth’s ecosystems) a significant increase in conceptual understanding will occur. Due to its proximity to campus the Audubon Park Lagoon (APL) already is sampled routinely in a variety of common curriculum, introductory and elective biology courses (e.g. Investigating Nature, Biology of Organisms, Ecology, Aquatic Microbiology) and is ideal for addressing these issues. The focus of this proposal is to use state-of-the-art technology to lay the groundwork to address these issues with common curriculum students. To this end we will obtain images and information of the APL’s microbial flora from biweekly sampling during January – June 2014 to develop a menu line in Dr. Aimée Thomas’ “GO to Lake Thoreau” iPad application that will target LoyNO common curriculum students. The long-term goal is to obtain funding that will allow us to expand the concept by targeting students in introductory biology and elective biology courses (Biology of Organisms, Microbiology, Ecology, Aquatic Microbiology) by linking them to a web site we will call “Wee Critters”.

Application development will occur in combination with standard, microbial scientific tools to communicate awareness, understanding and appreciation of microbial roles and biodiversity in
the Earth’s natural systems. The application will be accessed by students on an iPad using the “GO to Lake Thoreau” application while field sampling or visiting up to three predetermined, marked sites on the APL. Images and descriptive information (e.g. sample site, sampling method, low & high magnification light microscope images, scanning electron microscope images, information nuggets, links to more detailed information) tailored for specific student-group needs will connect the student visually to key microscopic organisms previously sampled from the APL. Information on how the microbe’s biology is pertinent to the student’s life will be associated with these images. Eventually, we anticipate that information access will be tiered, that is organized in increasing levels of complexity with entry driven by the interest and need of the users, the three student user groups identified above.

The focus will be to bring aquatic microorganisms to life while meeting specific educational objectives and increasing appreciation of microbial natural history. Digital images of the sample sites and collecting methods, color micrographs of selected microbial species and Scanning Electron Microscope images (SEM) where warranted will attract the attention of the user. Pond water samples are well known to be intriguing because the organisms are so visually different from the day-to-day experience of most people. It is exactly this experience that drew many aquatic microbiologists to their chosen fields and, similarly, should attract those lacking experience with aquatic microbes. **Upon arriving at the APL sample site we will exploit this novel experience to take the uninitiated user on a “nanosafari”, a nature walk via microscope images previously captured, uploaded and then accessed via their iPad.** This experience will physically and simultaneously link the students at the sample sites to these images as well as targeted conceptual information, increasing knowledge and understanding of microbes.

**Feasibility.** A team of individuals with complementary expertise already has been assembled and begun the introductory phases of the project. Dr. James Wee will head the project and have primary responsibility for identifying the educational goals for the user groups, writing the information nuggets and identifying information links. Dr. Lisa Underwood is retired from the U.S. Army Corps of Engineers (USACE) where she directed work monitoring aquatic microbes on USACE projects and has been working as a volunteer in Dr. Wee’s laboratory for over year. Ms Courtney Slugher is a LoyNO biology major and work-study student working in Dr. Wee’s laboratory. Ms. Slugher already has begun some introductory aspects of the training under the supervision of Drs. Underwood and Wee, (e.g. sampling, microscopy, imaging) in anticipation that the project may be funded and will take responsibility for the bi-weekly sampling, as well as microorganism identification and image capture. Ms. Slugher will pursue a biology honors thesis with this work and expects to submit a Louisiana S.U.R.E. application early in 2014 for stipend support in July-August 2014. Dr. Wee has had success with a previous student in obtaining S.U.R.E. funding. After sampling is finished in June 2014 work will begin to include the images and information in the “Audubon Park Lagoon Nanosafari” menu line of the “GO to Lake Thoreau” application and conceptualizing the “Wee Critters” web pages. Dr. Aimée Thomas will work with Wee, Underwood and Slugher to design an assessment of the “Audubon Park Nanosafari” menu line pending renewal of her NSF grant. Further, Drs. Wee and Underwood will be pursuing extramural funding avenues to move the work past the initial stages. Dr. Wee has committed more than half the funds for this project from his FY 2013/2014 distinguished professorship account; the remainder already were committed to other projects and are unavailable to this support this project. The project’s success depends upon this funding and, notably, a number of synergistic aspects have come together unusually well to significantly enhance the long-term success for this project.