

**Applicant Name:** Julia B. Ponder

**Date:** 3 March 2009

**Project Title:** Contemporary Issues in Ecosystem Health: Developing an Undergraduate Course

**Department:** Veterinary Population Medicine/The Raptor Center

**College:** Veterinary Medicine

**Dept. Head's Name:** Thomas Molitor,

**E-mail:** [molit001@umn.edu](mailto:molit001@umn.edu)

**Dean's Name:** Trevor Ames, DVM

**E-mail:** [amesx001@umn.edu](mailto:amesx001@umn.edu)

**How did you hear about this funding opportunity:** E-mail announcement

**Amount of funding requested:** \$7439

**[Include a brief statement of what you will use the funds for without going into budget details]**

This proposal is for the development of a transdisciplinary undergraduate course in Ecosystem Health. Funds will be used for course development and creation of teaching tools, including providing support for a graduate student to assist in the process.

## **Project's Nature and Importance**

Recent decades have seen a dramatic increase in the number of health issues that are directly or indirectly tied to human impacted environmental change. There is an expanding awareness of the interdependence of wildlife, domestic animals, humans and the environment as society confronts challenges at this intersection including the acceleration of species' extinctions, food and water shortages, increasing levels of environmental contaminants, the emergence of new diseases and increases in vector-borne diseases. Recent examples of health challenges at this intersection in Minnesota alone include the emergence of West Nile Virus and Lymes disease, the declines of moose populations, the increased incidence of flooding and drought events and the high incidence of amphibian limb abnormalities. Along with the occurrence of these events has come the realization of the finite nature of physical resources, the interrelatedness and fragility of ecosystems and the ability of humans to adversely impact both, to the detriment of all life on the planet. At this point, there is a need to take a whole systems approach to these health issues, understanding the impacts of human population growth and societal concerns and placing them in an ecological context. The emerging field of Ecosystem Health is focused on training the next generation to meet these health challenges at the intersection of animals, humans and the environment.

Disease and health are traditionally the realm of human and veterinary health professionals. However, these emerging challenges cannot be solved through a traditional medical approach. The interconnectedness of these issues with human activity and environmental change, demands that a broad range of expertise be recruited. Many disciplines need to be involved: ecology, conservation biology, natural resource management, wildlife and fisheries, law, policy and economics all need to be included to develop an integrated analysis of these complex problems. .

Addressing these challenges requires novel approaches to the training of professionals. Traditional single discipline approaches often result in a biased view towards potential solutions, failing to consider situations as complex, integrated systems. Although a relatively new field, there are an increasing number of opportunities for students to explore Ecosystem Health at the graduate level. The University of Minnesota is uniquely positioned to advance this concept. As one of the most comprehensive Universities in the world, UMN has all the necessary expertise under one administrative 'roof'. An Ecosystem Health initiative is already underway and a graduate program in Ecosystem Health Initiative is in development.

A missing component at the University of Minnesota is the opportunity to introduce undergraduate students to the Ecosystem Health concept. An Ecosystem Health course could partner across campus to bring a broad perspective to this new field including partnerships with Veterinary Medicine, Conservation Biology, Public Health, CFANS (including natural resources, entomology, fisheries, wildlife and applied economics), Ecology, Evolution, and Behavioral Biology, the Medical School, Institute on the Environment and the Humphrey Institute. In addition, it could draw upon regional expertise in this field including state agencies, non-profits and corporations. Beginning at the undergraduate level, students need to be taught to approach Ecosystem Health in a whole systems manner and develop problem solving skills. An undergraduate course that lays the groundwork for future studies is a critical component to

creating a strong academic program for the development of future professionals.

### **Innovative Contribution to Interdisciplinary Work**

We are proposing to develop a semester long, 2 credit hour, undergraduate course to introduce students from a wide range of disciplines (biology, ecology, veterinary medicine, food sciences, public health, agriculture, social sciences, law) to the concept of Ecosystem Health. Our goal will be to broaden students' perspectives and introduce them to the multifactorial issues impacting health on a global level. In order to integrate the many disciplines required for addressing Ecosystem Health issues, we will use a teaching model that incorporates interdisciplinary instruction and small group problem solving exercises, as well as on-line technology to augment learning. We will utilize web-based tools to provide background information and self-assessment, guest lecturers to bring diverse perspectives, field trips to experience challenges first-hand, and real-world case scenarios to develop problem solving skills through small group work. Through this process, students will be exposed to both the challenges and the possibilities presented by utilizing a multi-disciplinary approach, as well as the importance of problem-solving abilities, communication skills and partnership networks. In addition to the many discipline-related partnerships throughout the University, we will work also with the Center for Teaching and Learning to develop cutting edge approaches to teaching this course.

Components of this undergraduate course would address issues such as the impact of environmental change on health; trends in vector-borne diseases; environmental contaminants, ecosystem services and health, food security and environmental change, economic implications of environmental change on health; impact of disease on wildlife populations; emergence and re-emergence of zoonotic diseases; biodiversity and health; global trade implications on health; and the role of societal and cultural influences on human behavior as related to these health issues. Didactic lectures and group activities will be focused around case studies such as lead toxicity in wildlife and humans; re-emergence of bovine tuberculosis in humans, livestock and wildlife; the dynamics of avian influenza globally as it affects people, poultry, and wild birds; the growing challenge of malaria worldwide; and the challenges in maintaining health among humans, domestic livestock, and wildlife as demand for food, fiber, and fuel continues to grow in response to an ever-increasing human population. By using real-world examples of complex problems and capitalizing on the tremendous expertise in these issues at the University of Minnesota, we will engage students in an interactive course that exposes them to the importance of the growing field of Ecosystem Health.

### **Work Plan Timeline**

Summer 2009

- Hire graduate student
- Assemble steering committee and initiate bi-weekly meetings
- Develop course design; engage advisors on use of planned teaching methodologies

Fall 2009

- Assemble background materials
- Create web site/web vista
- Develop
  - In-course materials

- Assessment tools
- Invite speakers
- Announce course for spring semester registration

Spring 2010

- Course offered

## **Biographies - Collaborators**

### **Julia Ponder, DVM**

Julia Ponder is a 1984 graduate of the Texas A&M College of Veterinary Medicine. She is currently the Executive Director of The Raptor Center, at the University of Minnesota's College of Veterinary Medicine and a candidate for the MPH degree. Dr. Ponder has 17 years of private practice experience prior to joining The Raptor Center as staff veterinarian in 2000. She has presented extensively on raptor medicine and surgery; her current focus area is the wildlife health component of the Ecosystem Health convergence and on building a training program for Ecosystem Health at the University of Minnesota.

### **Katey Pelican, DVM, PhD**

Katey Pelican is head of the Ecosystem Health Initiative at the University of Minnesota, focused on improving health at the intersection of animals, humans and the environment. She is also Assistant Professor of Ecosystem Health in the College of Veterinary Medicine and a Resident Fellow in the Institute on the Environment.

Dr. Pelican maintains an active research program in wildlife conservation, physiology and health. Her research interests include:

- Building sustainable food systems
- Disease transmission between wildlife and livestock
- How changes in wildlife physiology impact population fitness and disease susceptibility.

Dr. Pelican got her DVM from the University of Minnesota in 1997. She completed her PhD in Wildlife Physiology with the Smithsonian's National Zoo and the University of Maryland in 2002 and continued at the Smithsonian until fall of 2007. Highlights at the Smithsonian include building a new Department of Environmental Change and Species Survival and heading the Smithsonian Amphibian Working Group. She continues to head the Vertebrate Monitoring Working Group for the Smithsonian's Global Earth Observatories, a network of 30 long-term monitoring sites.

### **Patrick T. Redig, DVM, PhD**

Patrick T. Redig, D.V.M., Ph.D., is co-founder and director of The Raptor Center and a professor in the University of Minnesota College of Veterinary Medicine, where he teaches courses in avian physiology, medicine, and surgery.

Dr. Redig is also known for his work with the restoration of endangered birds of prey, particularly the bald eagle and the peregrine falcon, which was removed from the endangered species list in 1999. In 1993, he was appointed to the California Condor Recovery Team, and was named veterinary coordinator in 1994.

He has written extensively on the subjects of avian medicine and surgery and raptor conservation and reintroduction, publishing 125 book chapters and articles in professional journals and conducting countless presentations at veterinary medical conferences.

Dr. Redig's goal is to effect raptor, avian, and habitat conservation through the medium of veterinary medicine. He received his D.V.M. (Doctor of Veterinary Medicine) from the University of Minnesota College of Veterinary Medicine in 1974 and his Ph.D. in 1980.

**Michelle Willette, DVM, MPH candidate**

Dr. Willette is staff veterinarian at The Raptor Center, College of Veterinary Medicine, University of Minnesota and adjunct instructor at Argosy University. She has extensive experience in zoological medicine and is the co-founder of the Association of Reptilian and Amphibian Veterinarians. Most recently Dr. Willette was awarded a One World One Health Leadership grant and conducted a workshop on wildlife disease surveillance. She is currently enrolled in a Master of Public Health program at The University of Minnesota and is interested in the wildlife health component of Ecosystem Health.

Consortium on Law and Values in Health, Environment the Life Sciences  
**Budget for Faculty Proposals**

**Project Title: Contemporary Issues in Ecosystem Health: Developing an Undergraduate Course**

**Instructions:** add rows for multiple personnel.

Category	Description & justification	Requested funding	Matching/other funding	
		Amount	Amount	Source
<b>Personnel: Graduate Student</b> <i>Explain what hourly wage &amp; fringe are based on-- departmental, community or other rate? Salary numbers are based on departmental hourly and fringe rates for the Veterinary Public Health program</i>	Salary = 240 hrs x \$15 hrly wage	\$3,600		
	Fringe rate .18	\$648		
	What work will this person do? <i>Background research for course development; work with faculty to develop course design, curriculum and assessment tools; produce and organize teaching resources/tools for in class use such as case study modules and web vista site; work with invited speakers to assure integration of topics and transdisciplinary approach.</i>			
	<b>Subtotal</b>	<b>\$4,248</b>		
<b>Personnel: Faculty</b> <i>Explain what hourly wage &amp; fringe are based on-- departmental, community or other rate? Salary numbers are based on departmental hourly and fringe</i>	Salary = 40 hours (2% effort)	\$1,950		
	Fringe rate 32.3	\$630		
	What work will this person do? <i>Lead faculty to work with graduate student and provide oversight for course development and curriculum design</i>			
	<b>Subtotal</b>	<b>\$2,580</b>		
<b>Personnel: Administrative support</b> <i>Explain what hourly wage &amp; fringe are based on-- departmental, community or other rate? Salary numbers are based on departmental hourly and fringe</i>	Salary = 15 hrs x \$20 hrly wage	\$300		
	Fringe rate .37	\$111		
	What work will this person do? <i>Provide administrative support for faculty and graduate student</i>			
	<b>Subtotal</b>	<b>\$411</b>		
Speaker Honoraria	<u>1</u> speakers x \$ <u>200</u> honorarium	200		
Supplies & Services	List items and explain use.			

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**Budget for Faculty Proposals**

<p><b>Equipment</b>  <i>Equipment costs are allowable only if the justification clearly shows that the equipment is necessary for the project. Include explanation of what will happen to equipment at completion of project.</i></p>	<p>Identify and explain use.</p>			
<p><b>Travel</b>  <i>Travel costs must include a description of the purpose of the travel, start and stop dates of travel, transportation costs, housing costs, and allowable per diem (use University rates found at <a href="http://travel/umn.edu">http://travel/umn.edu</a>).</i></p>	<p>Explain.</p>			
	<p><b>Subtotal research supplies, equipment, travel, other</b></p>			
<p><b>TOTAL BUDGET</b></p>		<p align="right">200</p>		
		<p align="right">\$7,439</p>		

UNIVERSITY OF MINNESOTA

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*Twin Cities Campus*

*Veterinary Population Medicine  
College of Veterinary Medicine*

*225 Veterinary Medical Center  
1365 Gortner Avenue  
St. Paul, MN 55108  
Office: 612-625-7755*


March 9, 2009

Dr. Julia Ponder  
Executive Director  
The Raptor Center  
College of Veterinary Medicine  
University of Minnesota  
St Paul, MN

Dear Dr. Ponder:

I am writing to express my enthusiastic support for your proposed undergraduate course in Ecosystems Health. The Veterinary Population Medicine Department in the College of Veterinary Medicine is committed to developing programs in Ecosystem Health and emerging infectious disease as central to the mission of the CVM. We bring to the table extensive expertise in disease diagnostics, epidemiology, molecular virology, microbiology and wildlife health as well as strong partnerships with other programs at the University of Minnesota such as the School of Public Health Infectious Disease Corridor, conservation biology, wildlife and fisheries, natural resources, food animal science and economics. This course, with its focus on the integration of whole systems and problem-based learning, would be an excellent introduction to the concept of Ecosystem Health for undergraduate students. I strongly support the creation of this course and am happy to provide whatever effort is needed from the VPM Department.

Sincerely,



Tom Molitor, PhD  
Distinguished Teacher  
Professor and Chair