May 19, 2014

John Yoder, Chair  
Faculty Executive Committee  
College of Agricultural and Environmental Sciences

RE: Proposal for a new Global Disease Biology undergraduate major and minor

The Undergraduate Council reviewed and discussed the Proposal to establish a new undergraduate major and minor, Global Disease Biology, during its May 1, 2014 meeting. Upon review and discussion, the Council voted to approve the proposal with the following provisions:

A. The name be changed to “Disease Biology” omitting “Global”
B. Math requirements be changed from 016A, 016B, 016C to 017A, 017B, 017C
C. Interested parties, including Deans of CBS and CAES, clarify how this major will be distinguished from related CBS majors; and how such distinctions will be made clear to prospective students

By copy of this memo to Interim vice Provost Carolyn de la Pena, the Davis Division provides notification that the Division has completed its review, thus transferring responsibility to the Vice Provost’s Office to coordinate review by the Council of Deans and Vice Chancellors.

Respectfully,

Matthew Traxler, Chair  
Davis Division Academic Senate Undergraduate Council

Enclosure: Proposal for a new Global Disease Biology undergraduate major and minor

cc: Bruno Nachtergaele, Chair, Davis Division Academic Senate  
     Gina Anderson, Executive Director, Davis Division Academic Senate  
     Carolyn de la Pena, Interim vice Provost – Undergraduate Education  
     Helene Dillard, Dean, College of Agricultural and Environmental Sciences  
     James Hildreth, Dean, College of Biological Sciences  
     Steven Theg, Chair, Faculty Executive Committee, College of Biological Sciences
9 December 2013

Dr. Bruno Nachtergaele, Chair
Davis Division of the Academic Senate

Dear Dr. Nachtergaele,

Attached is a proposal for a new undergraduate major and minor, Global Disease Biology, for review by the UC Davis Academic Senate. This new major is a collaboration between the Department of Plant Pathology in the College of Agricultural and Environmental Sciences, the School of Veterinary Medicine, and the School of Medicine. While we see this as a collaboration between the three colleges, the official administrative and advising home for the major will be the Department of Plant Pathology in CA&ES. Therefore, this is technically a single department/single college major.

The major has been reviewed and approved by the CA&ES Executive Committee, the subcommittee on Undergraduate Majors and Courses, and Dean Mary Delany (see attached memos). The major also has the support of Dean Michael Lairmore, School of Veterinary Medicine and Executive Associate Dean Fred Meyers, School of Medicine (support letters included with the main proposal). We have also included support letters from the chairs of our departmental partners in the professional schools: Dori Borjesson, Pathology, Microbiology and Immunology and Satya Dandekar, Medical Microbiology and Immunology.

Based on our discussions with Gina Anderson this past summer, we decided to submit the major proposal at the same time as submitting new classes associated with the major via ICMS. There will be 7 new classes submitted: 3 lecture classes and 4 seminar classes. Therefore, we are submitting them using the PLP designator to allow us to load the classes into ICMS. If the major is approved we will then request that all of the new classes be converted to a GDB designator. This information is in the remarks section of the ICMS forms for each class. Hopefully, this will make it simpler for the various committees to connect the major to these new classes as each moves through the process. We also realize that the final approval for the new GDB degree title will eventually come after Systemwide review.

In a number of ways, we have modeled the Global Disease Biology major and several of our new classes along the lines of the successful Animal Biology major. This includes a research component and the seminar classes associated with the research project (GDB 187, 189, 189D). As with the Animal Biology major, our new major will also have a number of restricted electives that allow students to personalize their major with the help of an advisor.

We believe this major will be unique in the UC system as well as across the United States. I’m looking forward to working with the various Academic Senate committees as the major moves through the system. Please let me know if you have any questions or need additional information at any step of the way. I would also be happy to make a presentation to any Academic Senate committee that thinks it would be helpful (e.g., Undergraduate Council). Thank you for your consideration.

Sincerely,

Dr. David Rizzo
Professor and Chair of Plant Pathology
December 4, 2013

DAVID RIZZO
Plant Pathology

RE: Global Disease Biology major

Dear Professor Rizzo,

The College of Agricultural and Environmental Sciences (CA&ES) is fully supportive of the new Global Disease Biology major you have proposed. This type of interdisciplinary education with built-in interactions and intellectual support from multiple colleges and professional programs is an important direction for our campus to embrace. Your collaborative efforts in the formation of the major have been exemplary. The letters of support you have provided with your proposal are impressive. I very much appreciated the thoughtful development of curriculum for the new major, your proposal of new courses combined with use of existing courses to support this unique, new direction in undergraduate education on the campus. As we face the challenges of pathogen spread associated with climate change and the global movement of humans, plants and animals, the broad focus on disease biology and training of a generation of new scientists in this arena are contemporary and appropriate. We look forward to the offering this major and we are enthusiastic about hosting this major in CA&ES.

Sincerely,

Mary E. Delany
Interim Dean

DU/laf
November 19, 2013

Diane Ullman, Associate Dean
College of Agricultural and Environmental Sciences

RE: Proposed major in Global Disease Biology

Dear Diane,

At its November 8, 2013 meeting, the CA&ES Executive Committee voted unanimously to support the proposed major in Global Disease Biology. This is an exciting proposal for a new major that studies pathogen in both plants and animals: an investigative approach that is increasingly providing insights into pathogen biology. As one of the few places in the world with the resources allowing such a major, UC Davis students will get a novel academic experience that will serve them well in their future career paths. The subcommittee on Undergraduate Majors and Courses independently reviewed the proposal and is also fully supportive of the proposed major. David Rizzo has made the appropriate contacts and conversations with colleagues in other campus majors and programs that might be impacted by this major, and there appears to be no significant concerns about this new major.

The CA&ES Executive Committee is whole heartedly supportive of this new major and looks forward to its approval and implementation.

Sincerely,

John Yoder
Chair CA&ES Executive Committee

/ln

Attachment

cc: Ken Shackel, chair UMAC
    Tracy Grissom, co-director, UAP, CA&ES Dean’s Office
    David Rizzo, professor, Plant Pathology
To: Chris Calvert  
Chair, College Executive Committee  
RE: Proposal for a major in Global Disease Biology

Dear Chris,

The Undergraduate Majors and Courses Standing Committee reviewed a proposal to establish a new major (Global Disease Biology), and met with Dave Rizzo and Tom Gordon to clarify issues related to the roll out of the major. This is a very ambitious major, and the committee in charge has put a lot of thought and effort into its development, for which they are to be congratulated. The success of this very broad major may require attention at the Deans office if, in the executive committee’s opinion, faculty involvement from departments other than Plant Pathology and the medical schools should be encouraged.

Sincerely,

Ken Shackel, Chair  
Undergraduate Majors & Courses Standing Committee

cc: UMAC  
Dave Rizzo
Proposal Committee Members

College of Agricultural and Environmental Sciences

Department of Plant Pathology
Gitta Coaker, Associate Professor
Doug Cook, Professor
Lynn Epstein, Professor
Tom Gordon, Professor and Chair
Johan Leveau, Associate Professor
Neil McRoberts, Assistant Professor
Dave Rizzo, Professor
Ioannis Stergiopoulos, Assistant Professor

School of Veterinary Medicine

Department of Pathology, Microbiology and Immunology
Pat Conrad, Professor
Sophia Papageorgiou, Postdoctoral Associate

Department of Medicine and Epidemiology
Janet Foley, Professor
Woutrina Miller, Associate Professor

School of Medicine

Department of Medical Microbiology and Immunology
Satya Dandekar, Professor and Chair
Jose Torres, Professor

Department of Internal Medicine
Michael Wilkes, Professor, Director of Global Health
Introduction

We propose a new major and minor at UC Davis, *Global Disease Biology*, that will be a collaboration between the Department of Plant Pathology in the College of Agricultural and Environmental Sciences, the School of Veterinary Medicine, and the School of Medicine. We believe this educational collaboration at the undergraduate level will be unique in the United States. Only nine universities in the country have schools of medicine and veterinary medicine, and a plant pathology department co-located on the same campus. No other university with all three disciplines is found in the western United States.

Pathogens cross disciplinary and taxonomic boundaries, yet traditionally disease research and education have occurred in many separate disciplines including veterinary and human medicine, plant pathology, and ecological and evolutionary sciences. However, there has been much recent interest in linking our understanding of plant, animal, and human diseases through research (e.g., Borer et al. 2011, Fletcher et al. 2009, Morris et al. 2009, Rabinowitz et al. 2013, Scholthof 2007, Smith et al. 2005), education (e.g., Brewer et al. 2008, Conrad et al. 2009), and policy (e.g., Choffnes et al. 2012, Scholthof 2003, Wilkinson et al. 2011). The *Global Disease Biology* major aims to bridge disciplinary and taxonomic gaps using an integrated approach to advance student understanding of the concept(s) of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. Students motivated by interests in health will integrate concepts from multiple disciplines to learn how to collectively solve global disease and health problems using innovative approaches. Throughout a series of core courses, animal, human and plant health problems, along with tools available to solve these problems, will be introduced to provide students with real scenarios in which they can apply and advance their creative and critical thinking skills.

Core Competencies/Learning Outcomes

Prior to developing the curriculum, our committee agreed on a number of competencies and learning outcomes for the major. As we developed the competencies, we relied on faculty expertise and experience as well as outside teaching reports (e.g., American Association for the Advancement of Science 2011, Association of American Medical Colleges 2009). The competencies were divided into three broad areas reflecting what the committee felt should be the overall content of the major. Competency 1 addresses key worldwide issues in disease biology and the underlying determinants. Competency 2 is more specific to the biology of diseases and pathogens. Finally, Competency 3 reflects our intent to incorporate broader research and communication skills into the overall curriculum. The full list of Core Competencies/Learning Outcomes for the *Global Disease Biology* major can be found in Appendix A. Using our list of core competencies and learning outcomes, we then worked backwards to develop the overall major curriculum as recommended by a number of recent papers on undergraduate teaching in biology (e.g., Wood 2009, Mervis 2013). We also used this approach during the development of the new core courses described below.

Curriculum Description

The *Global Disease Biology* major will provide students with broad preparatory scientific course work, disease biology core classes, flexibility in upper division electives, and a strong research experience. Preparatory lower and upper division classes (e.g., biology, chemistry, math, genetics, evolution, etc.) are common across many UC Davis biological sciences majors; this should allow for students to easily transfer into the major. *Global Disease Biology*-specific aspects of the curriculum are discussed below. See Appendix B for the full list of courses to be associated with the major. In addition, Appendix C presents an example of a potential 4-year schedule for a student in the major and Appendix F shows the curriculum as formatted for the catalog.
Core courses

The Global Disease Biology core classes are intended to be transdisciplinary and focus on concepts that cut across human, animal, and plant diseases. Oral communication and scientific literacy skills will be developed, and students will work alone and in small groups on assignments that complement the key course concepts. Appendix D provides detailed descriptions of core courses that are already approved; Appendix E provides detailed descriptions of the core courses that have been submitted for approval. A brief description of the classes is provided here.

There will be two lower division core classes taken during a student’s first or second year. Both classes are required regardless if the student is a freshman, transferring from another UCD major, or is a transfer from another school. GDB 90, Introduction to Global Disease Biology, will introduce students to the major, research and internship opportunities on campus, and potential career paths in human, animal and plant health. Based on our seven year experience with the CAES Career Discovery Group (CDG) program (http://ucanr.edu/sites/sas/Career_Discovery_Groups/), it is apparent that most first year students do not have a good sense of the wide range of career paths and opportunities that are available to them after graduation. Using the CDG program as a model, students will meet disease professionals representative of a wide range of fields including practitioners, researchers, and policy makers (see section on careers below). GDB 90 will also introduce students to the “nature of science” (Schussler et al. 2013) including the definition of science, how scientists communicate research results, and how science is funded. Finally, we see this course as an opportunity to create a cohort of Global Disease Biology students early in their UC Davis experience. The other lower division core class, SAS 13: Disease and Society, will provide students with an introduction to key disease concepts they will encounter in other courses throughout the major program. SAS 13 also introduces a societal context that is critical for solving global health problems.

Four upper division core courses will add breadth and depth to the concepts introduced in SAS 13. As demonstrations of the concepts, all core courses will be designed to include examples and case studies from each of the main host groups. PMI 129Y: One Health: Human, Animal and Environment Interfaces will serve as a portal to the other upper division core classes and introduce students to ideas from biology, sociology, and engineering to develop solutions to global health problems. Disease Ecology (VME 158), Epidemiology (GDB 101), and Disease Policy and Intervention (GDB 102) will examine disease from a number of perspectives to illustrate the merits of a unified approach to promoting health at individual, local, regional and global scales.

Pathogen courses

While the core courses will take a very broad approach to understanding disease, more specific pathogen/disease courses will also be required (in addition to Introductory Microbiology, MIC 101) (Appendix B). These classes will provide depth on specific pathogen groups (e.g., bacteria, viruses, fungi, macroparasites) or diseases of specific hosts (e.g., plants, animals). We have identified seven courses (PLP 120, PMI 127, PMI 128, MIC 162, ENT 153, ENT 156, GDB 103 [new]) taught by faculty in the participating departments or in CAES that will serve as a pathogen core. Students will be required to take a minimum of two pathogen courses, although they can certainly take more as restricted electives.

Restricted Electives

There will be no tracks within the major. Students will have the opportunity to choose from a wide array of electives allowing them to focus in an area of interest. They will work with faculty and staff advisors to develop a personalized plan of study. Appendix B lists examples of courses that could be used to complete the elective requirements. Depending on student interests, many other courses not listed in the appendix could also serve as electives. With the exception of upper division service courses (e.g., BIS 101, MIC 101), we recognize that some courses outside of CAES may be considered impacted
and therefore registration may be difficult for students in the major. This is why we have restricted required core courses to those taught by participating faculty, and/or taught in CAES, while proposing most courses taught in CBS and L&S as electives.

Research requirement

All students will be required to complete a research project over 1 or 2 quarters during their senior year. This model has been successfully implemented by the Animal Biology (ABI) major. Prior to conducting research, students will take a Global Disease Biology seminar (GDB 187) in which students will decide on a research project, find a research mentor, and write a research proposal under the guidance of the faculty instructor. The research project provides an opportunity for students to apply the concepts introduced in the core classes by asking important questions, developing research skills, interacting with faculty or other scientists, and writing a detailed paper. The project may be laboratory or field-based research or a detailed review paper exploring a critical issue in global disease or health. Projects may be off campus with a non-UC Davis mentor, but students must also have an on-campus faculty member as a co-mentor. Students and faculty mentors will be provided with a detailed set of guidelines to help with completion of the project.

Overlap with other majors

The Global Disease Biology major will offer a different perspective on disease than a typical Public Health major. Currently UC Berkeley and UC Irvine offer a major in Public Health, while UCLA, UC San Diego, and UC Santa Cruz offer a major in Human Biology. On the UC Davis campus, there are a number of majors (e.g., Neurobiology, Physiology and Behavior, Microbiology, Animal Biology, Environmental Toxicology, Nutrition) that include health or disease concepts in some of their required classes or electives, but diseases are not an overall emphasis of these majors. In addition, to the broader taxonomic emphasis (humans, animals, plants), Global Disease Biology will offer a more unifying ecological and quantitative perspective on disease. Students can draw from the many UC Davis undergraduate courses currently offered on disease and health in a way that compliments the core courses required for the Global Disease Biology major.

Global Disease Biology minor program

We believe there will also be student interest in a Global Disease Biology minor from students majoring in other biology-based areas (see above). The minor would consist of SAS 13, the upper division core classes (PMI 129Y, VME 158, GDB 101, GDB 102) and at least one pathogen/disease course for a total of 20-22 units.

Student opinions

We conducted two undergraduate student focus groups in May 2013 as well as having a number of ad hoc discussions with other students. We recruited students for the focus groups via classes we have taught (PMI 129Y, PLP 148, SAS 30, Davis Honors Challenge discussion sections) and from undergraduate lab assistants. These students represented a variety of majors including Animal Science, Anthropology, Biochemistry, Biology, Biotechnology, Environmental Policy, Human Development, International Relations, NPB, Nutrition, and Psychology; all class years were represented as well.

Students were very enthusiastic about the major. The title of the major, Global Disease Biology, was preferred over a number of alternatives (e.g., Disease Biology, Global Health Biology). The concept of creating a Global Disease Biology cohort through the introductory class (GDB 090) was seen as a strong positive. The focus groups also considered a rigorous series of core classes to be a plus especially for those students considering applying to professional or graduate school; students had no problems with the proposed number of required upper-division core classes. While some students (primarily first
year students) suggested the inclusion of tracks within the major, the majority supported the flexibility of a large number of electives. The students gave excellent feedback on how to incorporate transfer students into the major. Students strongly supported a research experience as part of the major. Finally, the potential for a Global Disease Biology minor was originally brought up by the students.

**Administrative Structure**

The Department of Plant Pathology will serve as the administrative and advising home for the major. The School of Veterinary Medicine and School of Medicine cannot officially be the home of undergraduate majors. However, the major is strongly supported by the administration of each of the participating groups (see attached support letters, Appendices G-K). From an educational perspective, our goal is to make this a truly collaborative major. To this end we will establish a Committee-in-Charge that will be composed of the chairs (or faculty appointed by the chairs) of the primary participating departments (Plant Pathology; Medical Microbiology and Immunology; Pathology, Microbiology and Immunology) and the Master Advisor for the major. By including the chairs of participating departments, this committee will ensure that the core courses are offered and contribute to the interdisciplinary academic leadership of the major. The current membership of the Committee-in-Charge is listed in Appendix F (p. 20).

**Advising Structure**

The Department of Plant Pathology will serve as the advising home for the major, although faculty from the School of Veterinary Medicine and the School of Medicine will also participate. An overall advising committee for the major will consist of the master advisor, faculty advisors, and the staff advisor. The proposed advising structure for the major includes the following:

a. Master Advisor based in Plant Pathology
b. Additional faculty advisors from Plant Pathology (number will vary depending on number of students in the major)
c. Staff Advisor based in Plant Pathology
d. Peer Advisor (an upper division student)
e. Research mentor nominated by the student during GDB 187 and approved by the advising committee.

All students will be assigned a faculty advisor immediately after joining the major. This advisor along with the staff advisor will help students with their overall program including choosing classes (especially restricted electives). In the junior or senior year, students will also choose a research mentor that closely aligns with their interests. Therefore, each student will have direct contact with a minimum of two faculty members as advisors in their final year in the major.

**Assessment of the major**

We will work with the Office of Academic Assessment (http://oaa.ucdavis.edu/index.html) to develop an assessment plan for the major including direct and indirect evidence of learning. As noted above, one key to the major are core classes at both the upper and lower division levels. In their first quarter students will take GDB 90. This course will include reflective writing that will give us a starting point for student understanding of the field. In the upper division core classes, we will also track student progress especially through team projects in PMI 129Y (fall quarter) and GDB 102 (spring quarter). The research project (GDB 189) will serve as capstone assignment for the major as a student nears the end of her/his program, which will demonstrate a mastery of program learning outcomes. Especially in the early years of the major we will use program-based focus groups and surveys of both students and faculty to get feedback on student progress and the success of the major.
Implementation

Three of the core courses (SAS 13, VME 158, PMI 129Y) have been approved, while the remainder of the core courses (GDB 90, 101, 102, 187, 189, 189D) have been submitted for approval. SAS 13 has been offered since 2010 and had ~200 students enrolled the last time it was taught in W 2013. VME 158 has been taught in alternate years since 2007 and will move to an every year offering. PMI 129Y was approved in March 2013 and taught for the first time in spring quarter to 20 students. Although PMI 129Y and VME 158 were originally designed from an animal/human disease perspective, these courses will be modified to include plant diseases. Most of the pathogen/disease classes (PLP 120, PMI 127, PMI 128, MIC 162, ENT 153, ENT 156) are long established courses that are offered each year. The final pathogen course, GDB 103, has been submitted for approval. Instructors from each of the established courses have given their approval for inclusion in the major. Department chairs have committed to continuing to offer these classes in the future (Appendix G-K). In Appendix L, we have also included a plan in case of very high student interest soon after the establishment of the major.

We have discussed the major and shared this proposal with Susan Keen, Associate Dean for Undergraduate Programs, College of Biological Sciences and Michele Igo, Department of Microbiology and Molecular Genetics. To date, no objections have been raised from CBS concerning the major.

Careers, internships, and international study opportunities:

During the planning phase of this major, we have consulted with staff at the UC Davis Internship and Career Center (Marcie Kirk-Holland, Janice Morand). The ICC is very interested in collaborating with us in several areas including career education and research internships. In conjunction with ICC staff, we see a number of potential careers associated with this major including:

- Health Care including, but not limited to, veterinary medicine, human medicine, nursing, dentistry, optometry, pharmacy.
- Public Health: health education, health policy, health management, occupational safety and health, environmental health sciences, health communication, global health, health preparedness, epidemiology.
- Agriculture including industry, government policy (APHIS, USDA, CDFA), pest management, and graduate work in plant pathology.
- Research in pharmaceutical/biotechnology industry, government, non-profit, and university laboratories.
- Laboratory work in food/beverage industry, regulatory agencies (FDA, EPA), forensics laboratories, hospitals/clinics (Clinical Lab Scientists).
- Teaching (K – 12, colleges and universities, general public e.g., museums).
- Science writing/technical writing.
- Consulting (health care, environmental, agriculture).

The ICC is also helping us explore international educational opportunities that are specific to Global Disease Biology. The UC Davis Education Abroad Center (EAC) has several programs that include internships. The best match for Global Disease Biology is the Latino/a Health Internship Program in Oaxaca, Mexico (http://studyabroad.ucdavis.edu/programs/quarterabroad/mexico.html). This program includes coursework on transnational health, field work (malaria brigades), and clinical rotations in hospitals and clinics. In Mexico, the EAC and ICC have a partner, Child Family Health International (http://www.cfhi.org/web/index.php#), that coordinates most on-site logistics, including clinical rotations. Child Family Health International also has a number of additional programs not associated with the EAC program that could also provide internship experiences for students. We are also working with leaders from Ecohealth Alliance (http://www.ecohealthalliance.org/) to develop international internships and research opportunities in disease ecology on a variety of zoonotic diseases.
**References:**


Appendices

Page
9  Appendix A. Core Competencies/Learning Outcomes for Global Disease Biology.
11  Appendix B. Proposed curriculum for Global Disease Biology.
13  Appendix C. Example 4 year schedule for a Global Disease Biology major.
14  Appendix D. Descriptions and recent course outlines for core classes that are currently offered.
17  Appendix E. Course outlines for proposed core classes.
20  Appendix F. Major formatted for catalog.
23  Appendix G. Letter of support from Tom Gordon, Chair, Department of Plant Pathology, College of Agricultural and Environmental Sciences.
24  Appendix H. Letter of support from Michael Lairmore, Dean, School of Veterinary Medicine.
25  Appendix I. Letter of support from Dori Borjesson, Chair, Department of Pathology, Microbiology and Immunology, School of Veterinary Medicine.
26  Appendix J. Letter of support from Fred Meyers, Executive Associate Dean, School of Medicine.
27  Appendix K. Letter of support from Satya Dandekar, Chair, Department of Medical Microbiology and Immunology, School of Medicine.
28  Appendix L. Course enrollments and implementation of the Global Disease Biology major.
Appendix A. Core Competencies/Learning Outcomes for Global Disease Biology

**Competency 1: Global Disease Issues in Animals, Humans, and Plants**
Demonstrate an understanding of historical, cultural, and scientific antecedents to past, present, and emerging global health problems.

**Competency specific skill set**
Demonstrate the ability to:
1) Describe the biological principles, scope and complexity of disease in people, animals, and plants in a global health context;
2) Understand the effects of global change on health and how both local and global factors affect disease transmission within and between countries;
3) Identify and understand the origins and determinants of health (human, animal and plant) as related to disease;
4) Compare and contrast health and non-health consequences of diseases and exposures, including economic impacts and social pressures, across global regions;
5) Recognize major challenges and opportunities to improve global health.

**Competency 2: Disease Knowledge**
Demonstrate relevant, practical knowledge of established and evolving transdisciplinary, epidemiological, socio-behavioral, management, and economic sciences, as well as the application of this knowledge, to the improvement of global health.

**Competency specific skill set**
Demonstrate the ability to:
1) Characterize the etiology, evolution, and ecology of infectious disease agents of people, animals, and plants that are of global health importance;
2) Describe the main transmission routes for infectious diseases, including human-human, animal-human, plant-plant, human-plant, vector-borne, water-borne, and air-borne cycles;
3) Explain epidemiologic principles used to characterize problems that involve human, animal, plant, and environment components;
4) Use the principles that underlie biological complexity, genetic diversity, and interactions of systems from individuals to ecosystems to understand human, animal and plant health.
5) Understand common cultural and socio-economic determinants and impacts of illness, including poverty, residential geography, cultural practices, education, nutrition, and resource security;
6) Describe interventions used to prevent disease and improve human, animal and plant health at the individual, community, and population levels.

**Competency 3: Scientific Research and Methods**
Demonstrate the ability to understand and apply principles of research and evaluation methods.

**Competency specific skill set**
Demonstrate the ability to:
1) Describe the benefits and challenges of a multi-disciplinary, integrative approach when implementing a prospective investigation into health concerns at the human-animal-plant-environment interface;
2) Effectively communicate, both orally and in writing, scientific data and findings to the scientific community, public audiences, media, and policy makers.

3) Demonstrate scientific quantitative skills, such as the ability to evaluate experimental design, read graphs, and use information from scientific papers.

4) Demonstrate the ability to build a transdisciplinary team and apply principles of participatory research and ethical practice;

5) Develop a plan to translate research findings and new discoveries into global health policies, community programs, interventions and public education in a manner that is sustainable and culturally relevant.
Appendix B. Proposed curriculum for Global Disease Biology.

B.S. Major Requirements:

PREPARATORY SUBJECT MATTER (54-58 UNITS)

- Introduction to Global Disease Biology: GDB 90 (1) NEW
- Disease and Society: SAS 13 (3)
- General Chemistry: CHE 2A (5), 2B (5), 2C (5)
- Organic Chemistry: CHE 118A (4), 118B (4)* or CHE 8A (2), 8B (4)*
- General Physics: 7A (4), 7B (4)*
- Calculus: MAT 17A (4), 17B (4) or MAT 16A (3), 16B (3)

*Additional quarters of Organic Chemistry and Physics may be required for some Medical or Veterinary Schools. Consult with advisors for more details.

DEPTH SUBJECT MATTER (43-48 UNITS)

Upper Division Biology

- Genes and Gene expression: BIS 101 (4)
- Biomolecules and Metabolism: BIS 105 (3)
- Introduction to Evolution: EVE 100 (4)
- Introductory Microbiology: MIC 101 (5) Lab

Statistics (1 course)

- Elementary Statistics: STA 13 (4)
- Applied Statistics for Biological Sciences: STA 100 (4)
- Applied Statistics in Agricultural Science: PLS 120 (4)

Disease Biology Core

- One Health: Human, Animal & Environment Interfaces: PMI 129Y (3)
- Disease Ecology: VME 158 (3)
- Epidemiology: GDB 101 (4) NEW
- Disease Policy and Intervention: GDB 102 (4) NEW

Pathogen/Disease courses (Choose 2 courses)

- Introduction to Plant Pathology: PLP 120 (4) Lab
- Medical bacteria and fungi: PMI 127 (5) Lab
- General Virology: MIC 162 (4) or Biology of Animal Viruses: PMI 128 (3)
- Medical Entomology: ENT 153 (3)
- Biology of Parasitism: ENT 156 (3); Biology of Parasitism Lab: ENT 156L (1) Lab
- The Microbiome of People, Animals, and Plants: GDB 103 (4) NEW

Disease Biology Practicum

- Global disease Biology seminar: GDB 187 (2) NEW
- Senior Research Project: GDB 189 (2) (may be taken for more than one quarter) NEW
- Senior Research Discussion: GDB 189D (1) NEW (recommended)
Restricted electives 25 units (with approval of adviser)

Allows student to focus in an area of interest. Below are examples of courses that could be used to complete the elective requirements. Depending on student interests many other courses not listed below could fill electives. The courses are grouped into broad areas only as examples; there would be no requirement to take a certain number of classes from each group. The importance of prerequisites in selecting electives will be taken into consideration during student advising.

Examples of Disease/microbe courses:
- Plant-virus-vector interactions: PLP 123 (3) (alternate years)
- Introductory Mycology: PLP/PLB 148 (4) Lab
- Fungal Biotechnology and Biochemistry: PLP 130 (3)
- Fungal Ecology: PLP 150 (3)
- Infectious diseases of humans: IDI 141 (1)
- Ecological parasitology: MMI 115 (3)
- Parasitology for wildlife biologists: MMI 116 (3)
- Medical mycology: MMI 130 (3)
- Introductory Nematology: NEM 110 (2)
- General Entomology: ENT 100 (4)
- General Entomology Lab: ENT 100L (2) Lab
- Food Microbiology: FST 104 (3)
- Food Microbiology Lab: FST 104L (4)
- Microbiology and safety of fresh fruits and vegetables: PLS 174 (3)
- Principles of environmental toxicology: ETX 101 (4)
- Cell Signaling in Health and Disease: NPB 107 (3)
- Application of evolution in medicine, human behavior, and agriculture: SAS 110 (4)

Examples of Host courses:
- Human immunology: MMI 188 (3)
- Fundamentals of immunology: PMI 126 (3)
- Botany and Physiology of Cultivated Plants: PLS 2 (4) Lab
- Plant Physiology: PLB 111 (3)
- Elementary Human Physiology: NPB 10 (3)
- Systemic Physiology: NPB 101 (5)
- Comparative Vertebrate Organology: NPB 123 (4) Lab
- Introduction to Ecology: EVE 101 (4)
- General Ecology: ESP 100 (4)
- Cell Biology: BIS 104 (3)

Examples of social/policy courses:
- Global poverty: Critical thinking and taking action: SAS 121 (4)
- Feeding the Planet: Influences on the Global Food Supply: SAS 2 (3)
- Introduction to Geographic Information Systems: ABT 15 (4)
- Health and Medicine in a Global Context: ANT 129 (4)
- Perspectives in community health: SPH 101 (3)
- Environmental History of Disease and Public Health: HST 109B (4)
- Agricultural Biotechnology and Policy: PLP 140
Appendix C. Example 4 year schedule for a Global Disease Biology major.

### Year 1
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<td>PMI 129Y</td>
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Key:
- RE – restricted elective
- GE – general education class
Appendix D. Descriptions and recent course outlines for core classes that are currently offered.

SAS 013: Disease and Society (3 units)
Lecture—3 hours. Limited enrollment. Introduction to the concept of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. GE credit: SciEng or SocSci

Course Outline
What is disease?
1 Introduction to class
2 Taxonomy and definition of disease
3 Etymology of disease names

Infectious diseases
4 Introduction to infectious disease
5 Malaria: a vector-borne disease
6 Fungal diseases of humans

Genetic diseases
7 Introduction to single-gene disorders
8 Phenylketonuria and Huntington’s disease

Nonhuman diseases
9 Diseases of plants and animals
10 Diseases of fungi, bacteria and viruses

Scales of Disease
11 Temporal scales: tuberculosis through the ages
12 Spatial scales: cholera, from human gut to global spread
13 Common and rare diseases

Disease Ethics
14 Guinea pigs versus the placebo effect
15 Typhoid Mary and the history of quarantine
16 Disease mongering

Disease Treatment and Prevention
17 Disease concepts and medical care through the ages
18 Sanitation and vaccination

Evolution of Disease
19 Why infectious diseases exist
20 Benefits of genetic disease

Societal and Personal Impacts of Disease
21 How disease has shaped human history: cities and trade
22 Stigma of disease
23 Disease in films, song, and art

Emerging Diseases
24 Disease in a changing world: lessons from the Black Plague
25 The next global influenza pandemic?
26 Antimicrobial resistance
PMI 129Y: One Health: Human, Animal & Environment Interfaces (3 units)
Lecture—1 hours, Discussion (online)—2 hours. Introduction to fundamentals, challenges, and opportunities in One Health using local and global health case studies. Animal, human, and environmental health problems, along with tools and transdisciplinary approaches, will be introduced to foster innovative thinking that addresses complex issues. This is a hybrid course with both classroom meetings and online discussions. GE credit: SciEng or SocSci, Oral Skills, Scientific Literacy

Course outline
One: Shifting the Paradigm
1. Course Introduction, Animal-Human-Environment: The One Health Triad
2. Discussion: AdobeConnect Orientation; HALI Project in Tanzania
3. The Biggest Patient in the World (marine diseases)
4. Discussion: Sentinels of One Health

Two: Expanding the One Health Discipline
5. Environmental Policy and One Health
6. Discussion: Two Feet, One Health
7. Engineering and One Health
8. One Health & Policy: Government agencies, NGOs, Stakeholders, Partnerships, Leadership
9. Discussion: Meeting One Health Needs in Underserved Communities

Three: Air, Water, Land: Interdisciplinary Problem Solving in One Health
10. Climate Change and Global Health
11. Plant diseases and One Health
12. Discussion: Sudden Oak Death
14. Disease Ecology of Tick-borne Pathogens in an Isolated Mongolian Ecosystem
15. Discussion: Zoonotic Diseases at One Health Interfaces
17. Discussion: One Health---Unifying the Disciplines

Four: Final Project
18. Oral Projects

PMI 158: Infectious Disease in Ecology and Conservation (3 units)
Lecture—3 hours. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientists' role in developing disease control policies.

Note: Course currently includes human and plant examples (see below). Specific disease topics are changed yearly based on current events.

Course outline
1. Introduction, overview of disease ecology, medicine and disease, anthropogenic influences on ecology and disease, surveillance, and conservation and management of species
2. Disease evolution
3. Epidemiological models: Micro and macro parasites
4. Host populations and disease ecology
5. Disease control: vaccination, culling, and fertility control
6. Disease and host communities: dilution and rescue effects, apparent competition
7. How infectious disease causes extinction
8. Spatial disease ecology and habitat fragmentation and connectivity
9. Effects of disease on host behavior, reproductive success and survival
10. Zoonotic diseases (tularemia, cowpox, etc.)
11. Transmissible tumors
12. Amphibian decline and disease
13. Hemorrhagic fevers
15. Ecology and vector-borne diseases II: Mosquito-borne diseases
17. Tuberculosis
18. Ecology of influenza and the newest avian influenza pandemic
19. Marine mammal distemper
20. Rabies
21. Animal translocation
22. Coral and aquatic disease
23. AIDS
24. White Nose Syndrome
Appendix E. Course outlines for proposed core classes.

**GDB 090. Introduction to Global Disease Biology (1 unit) DRAFT**
Seminar—1 hour. Introduction to the Global Disease Biology major, research and internship opportunities, potential career paths in human, animal and plant health. Communication and ethics in science will be emphasized. P/NP grading.

**Key topics**
- Introduction to the Global Disease Biology major
- Research and internship opportunities at UC Davis and beyond
- Meet the professionals: potential career paths in human, animal and plant health
- What is science? This will include the nature of science, how is science communicated among scientists, and how is science funded.
- Communication and team building
- Values and ethics in disease biology

**GDB 101: Epidemiology, 4 units DRAFT**
Lecture—2 hours, Laboratory—3 hours. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary, human and plant disease, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance.

**Key topics:**
- Epidemiologic concepts
- Causation
  - cause/effect
  - Koch's postulates
- Disease transmission: communities and disease emergence
- Herd immunity:
  - \( R_0 \), vaccination
  - herd immunity
  - social determinants of disease
- Measurement in Epidemiology, frequency measures: prevalence/incidence/attributes
- Measurement in Epidemiology, association measures: risk, rates, ratios
- Diagnostic test evaluation
- Accuracy/Bias/ Interpretation:
  - accuracy/precision
  - inference/bias
  - validity/generalizability
- Surveillance, questionnaires/surveys, risk assessment
- Study design
  - outbreak, cross-sectional, cohort, clinical trial
- Ethics in epidemiology
- Communicating results in epidemiology
- The lab will use an epidemiology 'game' will focus on epidemiologic concepts and principles with the goal of 'modeling' disease transmission. The game will be staged in lab, teams will work on it and
develop it during the quarter. The final two weeks of the quarter the teams will exchange 'games' and work through the other groups 'game.' The groups will score the games and then the last week or for the final, the groups will present their 'games' to the entire class.

**GBD 102: Infectious Disease Policy and Intervention (4 units)** DRAFT
Lecture—2 hours, Discussion—1 hour, Project—1 hour. This course will examine the occurrence, prevention and treatment of disease across a range of scales (individuals to populations) and methods (chemical application to policy). It aims to explore the similarities and differences in management of diseases affecting humans, animals and plants. Discussion sections will use case studies to illustrate the merits of a unified approach to promoting health at local, regional and global scales.

**Key topics:**
- Key concepts and approaches to disease intervention in plants, animals, humans
- The scales of disease intervention: individual to populations, communities and ecosystems; local to international
- Policy and disease control
  - Major policy groups (CDC, WHO, APHIS, WTO, FDA, FAO, IOM, etc.)
  - NGOs
  - Policy approaches (e.g. quarantines)
- Ethical and legal considerations
- Globalization
- Communication
- Antimicrobials
  - Antibiotics
  - Fungicides
  - Other antimicrobials (e.g., alternatives to antibiotics in human disease)
  - Evolution of resistance in antibiotics and fungicides
- Biological control
- Disease resistance
- Eradication and culling
- Other non-chemical treatment of disease
- Disease prevention
  - Vaccines
  - Sanitation
- Biotechnology and disease
- Environmental issues and disease
- Non-infectious disease
- Social aspects of disease prevention
- Infectious disease in the developed vs. developing world (poverty and disease)
- Food-borne illness and farming practice
- Bioterrorism


**GDB 187. Global Disease Biology Seminar (2 units) DRAFT**
Seminar—1 hour; discussion—1 hour. Prerequisite: junior standing, courses GDB 090, SAS 013. Seminar leading to development of the Major Proposal for the Global Disease Biology major.

**Key topics**
- The Global Disease Biology major proposal.
- Selecting a faculty research sponsor/mentor.
- Writing a research proposal- literature review, developing hypothesis, planning experiments
- How research is conducted, applying the scientific method.
- Communication in science- how to prepare a scientific talk.

**GDB 189. Global Disease Biology Senior Research (2) DRAFT**
Independent study—6 hours. Prerequisite: junior standing, courses GDB 092, SAS 013 and GDB 187; course 189D concurrently the first time course 189 is taken. May be repeated one time for credit. (P/NP grading)

Research project for Global Disease Biology major. The research project may be experimental, a library research project, or some other creative activity under a faculty mentor that will serve as a capstone experience for the Global Disease Biology major. The project may be completed over two quarters. Research generally would be conducted in the first quarter with the second quarter used to finish analyzing data and writing. Research may be conducted under a non-UC Davis mentor with approval from the master advisor. In this case, a UC Davis faculty member must serve as instructor of record. Internships would not officially count as a research project, but may serve as a starting point to finding a mentor or project.

A GDB student or team may conduct a laboratory or field research project. The project may be independent or within the mentor’s program. With mentor guidance the student may collaborate with a graduate student or post doc. Students will develop a protocol, set up the experiment, collect, analyze and interpret the data, and write a research paper in the format of a scientific journal article. The paper should put the significance of the research into the greater context of science and societal interests. GDB students may also select an important disease-related issue, conduct library and interview based research, evaluate the data in relation to economics, society, human, animal, or plant health, and makes relevant conclusions. The written paper presents the nature of the problem, stakeholder interests, and weights solutions. The mentor guides all aspects of the work.

**GDB 189D. Senior Research Discussion (1) DRAFT**
Discussion—1 hour. Prerequisite: junior standing, courses GDB 092, SAS 013 and GDB 187; course GDB 189 required concurrently. (P/NP grading only.)—I, II, III. (I, II, III.)

The course is design to prevent or solve problems during the students’ required Global Disease Biology research activity (GDB 189). This will include weekly meetings with a faculty advisor or graduate assistant that are independent from the GDB 189 research mentor. The class will be a combination of individual meetings and group discussions with other students conducting research projects that quarter. This will allow GDB advisors to keep track of research projects and correct potential problems at an early stage. Group meetings will allow students to share their research experiences and problem solving with other students.
Appendix F. Major formatted for catalog

Global Disease Biology
(College of Agriculture and Environmental Sciences)
Global Disease Biology is an interdisciplinary major.

Program Office. 152 Hutchison Hall
(530) 752-2244.

Master Advisor TBA, Ph.D.

Committee in Charge
Patricia A. Conrad, D.V.M, Ph.D., Professor (Pathology, Microbiology and Immunology)
Douglas R. Cook, Ph.D., Professor (Plant Pathology)
Satya Dandekar, Ph.D., Professor (Medical Microbiology and Immunology)
Janet Foley, D.V.M, Ph.D., Professor (Medicine and Epidemiology)
Thomas Gordon, Ph.D., Professor (Plant Pathology)
Woutrina Miller, D.V.M, Ph.D., Associate Professor (Medicine and Epidemiology)
David M. Rizzo, Ph.D., Professor (Plant Pathology)
Jose V. Torres, Ph.D., Professor (Medical Microbiology and Immunology)
Michael S. Wilkes, M.D., M.P.H., Ph.D., Professor (Internal Medicine)

Faculty
Faculty includes members of the Departments of Plant Pathology, on page 465; School of Veterinary Medicine, on page 523; School of Medicine on page 390

The Major Program
The major serves those interested in infectious diseases and global health. This major prepares graduates to understand the transdisciplinary nature of disease and systems-based aspects of sustainability and provides them with the knowledge, leadership skills and experiences required to excel in health-related professions.

The Program. The Global Disease Biology major consists of courses in the biological sciences that build an understanding of biology from the molecular to the ecological and evolutionary levels of organization. Disease biology core classes are intended to be transdisciplinary and focus on concepts that cut across human, animal, and plant diseases. Students plan their chosen emphasis of study as part of a required discussion course and in consultation with their
adviser. This program includes a senior research project, which each student designs to bridge the disciplines of the major.

**Internships and Career Alternatives.** The program and interests of each student in solving societal problems guides students to a range of internship and career choices. On and off-campus internship opportunities are available in research laboratories, in field situations, with governmental agencies, with private industry, and in international programs. A degree in Global Disease Biology prepares students for careers in research, teaching, governmental regulation, health or agriculture as each relates to disease and health. Careers in medicine, veterinary medicine, and plant pathology are open to Global Disease Biology majors, however, other preparation may be required. Students in the major gain research experience and may choose to continue their training at the graduate or professional level in a variety of biological disciplines.

**B.S. Major Requirements:**

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<td>Veterinary Medicine 158</td>
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<td>Global Disease Biology 101, 102</td>
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<td>Two courses from Plant Pathology 120; Pathology, Microbiology &amp; Immunology 127, 128; Microbiology 162; Entomology 153,156/156L; Global Disease Biology 103</td>
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21
Focused specialty upper division courses as outlined in the student’s major proposal (from course 187) with approval of an adviser.

**Total Units for the Degree.** ........................................... **123-132**

**Recommended**
Biological Sciences 101D .............................................. 1
Global Disease Biology 189D ....................................... 1

**Minor Program Requirements:**
A minor in Global Disease Biology may complement student’s major program. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

Science and Society 13 ......................................................... 3
Pathology, Microbiology & Immunology 129Y ................. 3
Veterinary Medicine 158 ................................................. 3
Global Disease Biology 101, 102 ....................................... 8
One course from Plant Pathology 120; Pathology,
Microbiology & Immunology 127, 128; Microbiology 162;
Entomology 153,156/156L; Global Disease Biology 103. . . . 3-5
**Total Units** ................................................................. **20-22**

**Minor Program advisor: TBA**

**Advising Center** for the minor, is located in 152 Hutchison Hall (530)754-7277
4 September 2013

Dr. David Rizzo, Professor
Department of Plant Pathology, CAES
University of California, Davis

Dear Dave:

By this letter I confirm the unanimous and enthusiastic support of faculty members in the Department of Plant Pathology for the proposed new undergraduate major and minor in Global Disease Biology at UC Davis. We welcome the opportunity to serve as the administrative home for this innovative new program. We are committed to development of the new courses that will be needed to support the major and we will ensure that all required courses are offered as often as needed to meet student demand. Our faculty members are prepared to serve as instructors, advisors, members of the committee in-charge and as mentors to students in the program.

The curriculum outlined for the major in Global Disease Biology is designed to inspire an appreciation of disease as a phenomenon of profound biological importance that impacts human welfare both directly as a cause of death and morbidity, and indirectly through detrimental effects on domesticated plants, animals and native ecosystems. Integral to this effort is bringing together faculty members with expertise in diverse pathosystems. We feel that this will not only help us to create a unique and timely instructional program but will also serve to open new avenues of communication between the faculties of the College of Agricultural and Environmental Sciences, the School Medicine and the School of Veterinary Medicine. This in turn is likely to foster collaborations that will deepen our understanding of cross-kingdom commonalities in phenomena at cellular, organismal and population levels that lead to the diseased state.

No university is better positioned than UC Davis to bring the vision embodied in this proposal to fulfillment. I join my departmental colleagues in offering my strong support for a new major in Global Disease Biology.

Sincerely,

Thomas R. Gordon
Professor and Chair
Department of Plant Pathology
July 29, 2013

Dear Madam or Sir,

I am writing to offer my support for the proposed Global Disease Biology major and minor. I support the aim of the major and minor to bridge disciplinary and taxonomic gaps using an integrated approach to advance student understanding of the concepts of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. I am also a strong supporter of cross-college/school collaborations in undergraduate curriculum delivery and the partnership among the School of Veterinary Medicine, the School of Medicine, and the Department of Plant Pathology in the College of Agricultural and Environmental Sciences is appealing.

I have discussed the proposal with key faculty members and the lead department chair and they have agreed that there are faculty members willing to serve on the committee that will plan and direct the major. Currently the SVM offers the following courses: PMI 126, 127, 128, 129Y and VME 158. These courses will be part of the core of the major and the SVM plans to continue these courses and encourage enrollment by students in the Global Disease Biology major. I have also been assured by the participating faculty members and department chair that there would be faculty willing to serve as research mentors for the students in the major as needed. Finally, I have confirmed that there are interested SVM faculty members who are willing to participate in other courses as instructors or guest lecturers.

I am optimistic this major and minor will be approved and am pleased to provide my strong support. If you have any questions, please contact me.

Sincerely,

Michael D. Lairmore, Dean
School of Veterinary Medicine

cc: Pat Conrad, Professor, SVM
    David Rizzo, Professor, CAES
July 31st, 2013

Dr. David Rizzo  
Professor  
Department of Plant Pathology  
University of California, Davis  

RE: Proposal for Global Disease Biology Major  

Dear Dr. Rizzo:

I am writing to express my support for active participation by the School of Veterinary Medicine (SVM) and, specifically, the department of Pathology, Microbiology and Immunology in the Global Disease Biology Major. Our department houses many faculty with interests in “One Health”, host-pathogen interaction and the interface of disease, wildlife and the environment. We are therefore willing to serve as the “home” of the major within the SVM. Dr. Pat Conrad has agreed to serve on the Committee-in-Charge that will advise and plan the direction of the major.

Faculty in our department are committed to continuing to offer our well-established courses in biology of animal viruses (PMI 128), immunology (PMI 126), medical microbiology (PMI 127) and the fundamentals of one health (PMI 129). In addition, our faculty are willing to serve in both the research and teaching missions of this major as research mentors and contributing lecturers, respectively.

Students motivated by interests in health and its relationship to environmental change will find our far-reaching programs in Wildlife Health, pathogenesis of disease and animal models of disease fascinating outlets for their research interests. We already emphasize an integrative approach to pathobiology and rely heavily on collaborative research teams to integrate concepts from multiple disciplines to collectively solve global health problems and develop critical thinking skills. As such, this proposed new major in Global Disease Biology is a timely and perfect interdisciplinary fit for our current strengths. We very much look forward to working with you and our counterparts in the School of Medicine to make this a very successful major.

Sincerely,

Dori Borjesson DVM, PhD, Dipl. AVCP  
Professor and Chair, Vet Med: Pathology, Microbiology, Immunology  
Chair Comparative Pathology Graduate Group  
School of Veterinary Medicine  
4325 VetMed 3A  
University of California  
Davis, CA 95616  
(530) 754-5202 work
Dr. David Rizzo  
Professor, Department of Plant Pathology  
University of California, Davis  

RE: Proposal for Global Disease Biology Major  

Dear Dr. Rizzo:

I am pleased to provide a strong letter of support for the Global Disease Biology major. This proposal is a timely reminder that global health, i.e. health factors that cross artificial boundaries and can include both international health issues as well as similar issues in the USA, is both a passion for faculty in the School of Medicine as well as our students, pre-doctoral and post doctoral, MD and PhD. We have advanced global health interests in infectious diseases, cancer, and neurodevelopmental diseases, as well as inter collegiate collaborations including with the School of Veterinary Medicine and the School of Engineering. We have medical students and graduate medical education residents as well established programs in the School of Medicine.

Dr. Satya Dandekar will be the lead faculty in the School of Medicine, organizing our courses and working with other schools to provide an integrated and supportive environment for the students. I expect that this major will attract students not only with global health as a career pathway but also pre-health students including medicine, nursing, social work, pharmacy, and public health.

Thank you for organizing this effort.

Sincerely,

Frederick J. Meyers, MD, MACP  
Executive Associate Dean  
Professor of Internal Medicine  
University of California, Davis, School of Medicine
August 2, 2013

Dr. David Rizzo
Professor
Department of Plant Pathology, CAES
University of California, Davis

Dear Dr. Rizzo,

I am writing this letter to express our strong support for the proposed new undergraduate major and minor in Global Disease Biology at UC Davis and our commitment of active participation. Faculty in the Department of Medical Microbiology and Immunology at the UC Davis School of Medicine have strong commitment to teaching and research in global infectious disease epidemics. We are willing to serve as the home department in the School of Medicine for the Global Disease Biology major and minor. Dr. Jose Torres and I are willing to serve on the Committee-in-Charge to contribute to the interdisciplinary academic leadership of the Global Disease Biology Major.

Faculty in the Department of Medical Microbiology and Immunology, UC Davis School of Medicine are actively engaged in the teaching of global epidemics of infectious diseases, host-pathogen interactions and immune response to pathogens in the undergraduate and graduate courses. They are responsible for undergraduate courses including, MMI 130: Medical Mycology, IDI 141: Major epidemics of human infectious diseases and MMI 188: Human immune system. In addition, faculty provide research training and mentorship to undergraduate students (MMI 192: Internship in medical microbiology, MMI 198: Group study in medical microbiology and MMI 199: Research in medical microbiology and MMI 194: Senior honors project in medical microbiology and Immunology). Teaching of these courses and the graduate level courses from the department involve collaborations with faculty from the SOVM, CBS and CAES. Faculty in the department will contribute to the teaching mission of the Global Disease Biology major by providing lectures in the courses for the major and by providing research training to the students.

In summary, we are very enthusiastic about the proposed Global Disease Biology major as it provides an outstanding opportunity to develop collaborations among faculty from the SOM, CAES and SOVM and CBS for teaching of health sciences at the interface of several disciplines. This interdisciplinary major builds on the existing strengths at UC Davis to offer instruction in the most current concepts in global disease biology. We look forward to working with you for the success of the Global Disease Biology major.

Sincerely,

Satya Dandekar, Ph.D.
Professor and Chair
Dept. of Medical Microbiology and Immunology, School of Medicine
Appendix L. Course enrollments and implementation of the Global Disease Biology major.

We were asked by the CAES Undergraduate Majors and Courses Committee to develop an implementation plan in case of very high student interest soon after the establishment of the major. Overall, we do not see any major issues as far as the offering of courses and the ability of students to meet the course requirements of the major. Department chairs and deans have committed to offering the classes (see appendices G-K). There are a number of options available to address strong student interest including offering classes in additional quarters, offering additional sections, or increasing the pool of classes that can be used to fulfill requirements. The table presents current enrollment caps and the most recent enrollments of GDB core classes that are already offered. See appendix B for the full requirements of the major. Below we also address specific options for the two main “cores” in the major: the Global Disease Biology core and the Pathogen core.

<table>
<thead>
<tr>
<th>#</th>
<th>Course name</th>
<th>Current Max Enrollment Cap</th>
<th>Last Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDB core classes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAS 13</td>
<td>Disease and Society</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>PMI 129Y</td>
<td>One Health: Human, Animal &amp; Environment Interfaces</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>VME 158</td>
<td>Disease Ecology</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Pathogen core classes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMI 127</td>
<td>Medical bacteria and fungi</td>
<td>80</td>
<td>72</td>
</tr>
<tr>
<td>PMI 128</td>
<td>Biology of Animal Viruses</td>
<td>90</td>
<td>58</td>
</tr>
<tr>
<td>MIC 162</td>
<td>General Virology</td>
<td>132</td>
<td>98</td>
</tr>
<tr>
<td>ENT 153</td>
<td>Medical Entomology</td>
<td>60</td>
<td>56</td>
</tr>
<tr>
<td>ENT 156</td>
<td>Biology of Parasitism</td>
<td>124</td>
<td>91</td>
</tr>
<tr>
<td>PLP 120</td>
<td>Introduction to Plant Pathology</td>
<td>38*</td>
<td>35</td>
</tr>
</tbody>
</table>

*Offered twice a year with max enrollment of 38.

Global Disease Biology core

This core consists of 2 lower division classes (GDB 90, SAS 13) and four upper division classes (PMI 129Y, VME 158, GDB 101, GDB 102). The three GDB classes will be new and can be offered in ways to accept all students as needed (e.g., high enrollment cap, multiple discussion sections, taught in multiple quarters). SAS 13 is a general education class that currently fills each year. The course is taught out of the Plant Pathology Department and our plan is to offer this course in additional quarters and/or raise the enrollment cap as needed to accommodate demand. VME 158 is a lecture only class. The enrollment cap is currently set at 40, but the instructor has agreed to raise the enrollment cap. PMI 129Y was offered for the first time in Spring 2013 with only a few weeks notice for students to enroll. This class was designed for at least 100 students and can easily accommodate higher enrollments. We see no problems implementing this core.
**Pathogen core**

Students will be required to take a minimum of two pathogen courses. Currently, we list seven potential courses that students may take to complete this requirement. Six of the courses have been offered for many years, while the final course, GDB 103, has been submitted for approval. Based on the above table, we do not see a problem for students to complete this requirement. Several classes are currently close to their current enrollment cap, but we do not see this as a problem. Unlike the GDB core discussed above, student numbers would be spread out over seven different courses. PLP 120 and MIC 162 are taught by faculty in the Department of Plant Pathology and lend themselves well to additional enrollment or sections. If we find that students are having difficulty getting into the above classes, there are other courses that could meet the pathogen core requirement including: PLP 123, PLP 130, PLP 148, PLP 150, PLS 174, NEM 110, ETX 101.

**Other required courses**

Both lower (e.g., BIS 2 series, CHE 2 series, etc.) and upper division science courses (e.g., BIS 101, 105, MIC 101, etc.) will be required as part of the major. At least in the short term, it seems reasonable to expect that the majority of the students enrolling in the Global Disease Biology major would otherwise be in a major that requires many of the same courses. Because of this, we anticipate that the impact on most of these large enrollment service courses will be minimal. The same logic could also apply to enrollments in the pathogen core.
Hi Gina,

The School of Medicine, Faculty Executive Committee reviewed and discussed the New Major Proposal - Global Disease Biology at their meeting on January 8, 2014. Overall, the committee is in agreement with the said proposal.

Best regards,

BERNADETTE ABUCAYAN
Faculty Senate Analyst
bernadette.abucayan@ucdmc.ucdavis.edu
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Gina Anderson

From: ChairoftheFaculty <ChairofFac@vetmed.ucdavis.edu>
Sent: Tuesday, January 28, 2014 9:42 AM
To: Gina Anderson
Cc: Academic Senate Chair; peter.wolinsky@ucdmc.ucdavis.edu
Subject: RE: New major proposal - Global Disease Biology

Dear Gina,

The SVM EC has reviewed the materials regarding the proposed undergraduate “Global Disease Biology” major and expressed their support of this new plan. Thank you for providing the School with the opportunity to provide feedback on this important initiative. Please let me know if you need any additional information.

Best,

Andrea Fascetti, Chair
SVM Executive Committee

From: Gina Anderson [mailto:gina.anderson@ucdavis.edu]
Sent: Wednesday, December 18, 2013 5:55 PM
To: Fascetti, Andrea J; peter.wolinsky@ucdmc.ucdavis.edu
Cc: Blakewell, Katie; Bernadette Abucayan; Academic Senate Chair
Subject: FW: New major proposal - Global Disease Biology

Dear Chairs Fascetti and Wolinsky,

The Academic Senate received a proposal for a new undergraduate major to be housed in the College of Agricultural and Environmental Sciences. However, the proposal outlines partnerships with specific departments in the Schools of Medicine and Veterinary Medicine. The proposal contains letters of support from the Department Chair from each department. However, the proposal does not contain support from the faculty.

We would appreciate it if your Faculty Executive Committee could review the proposal and respond to me in writing concerning whether or not it is supportive of the proposal. We hope to avoid a lengthy delay of the proposal if possible. We would appreciate receiving the FEC response by January 31, 2014. If you need more time, please let me know ASAP the date by which the FEC will be able to respond.

Best wishes,

Gina

Gina Anderson
Executive Director
Academic Senate Office
402 Mrak Hall
E-mail: gina.anderson@ucdavis.edu
Phone: 530-752-3917
Web: http://academicsenate.ucdavis.edu

From: Nakamoto, Brenda
Sent: Monday, December 09, 2013 2:16:45 PM (UTC-08:00) Pacific Time (US & Canada)
Dear Bruno and Gina,

I am forwarding to you a proposal for a new Global Disease Biology undergraduate major from professor Dave Rizzo and the CA&ES Executive Committee.

Brenda

Brenda Nakamoto
Administrative Assistant
College of Agricultural and Environmental Sciences Dean's Office
University of California
Davis, CA 95616
(530) 752-1606 office, (530) 752-9049 fax