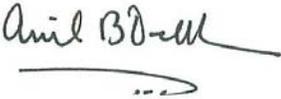


TO: Professor Jose Wudka, Chair of the UCR Division of the Academic Senate

FROM: Anil B. Deolalikar, Dean 

RE: Proposal to establish a Master's
of Science in Global Health (MS-GH) degree program at UCR

DATE: May 27, 2014

Attached is a proposal to establish a professional Master's of Science in Global Health (MS-GH) degree program at UCR. The School of Public Policy (SPP) is submitting this proposal for consideration to the UCR Division of the Academic Senate.

Thank you once again for considering this request. Please do not hesitate to come back to me with any questions.

**A PROPOSAL TO ESTABLISH A PROGRAM OF GRADUATE STUDIES IN
GLOBAL HEALTH FOR THE MASTER OF SCIENCE DEGREE (MS-GH) AT
THE UNIVERSITY OF CALIFORNIA, RIVERSIDE**

School of Public Policy

May 2014

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SECTION 1. INTRODUCTION

The University of California Global Health Institute (UCGHI), launched in 2009, advances the mission of the 10-campus University of California system to improve the lives of people in California and around the world. By stimulating education, research, and partnerships, UCGHI leverages the diverse intellectual resources across the University to train the next generation of global health leaders and accelerate the discovery and implementation of transformative global health solutions. The Institute's three Centers of Expertise (COE)—Migration and Health, Women's Health and Empowerment, and One Health—involve scores of faculty across the UC system. The UCGHI is committed to supporting the development of global health education programs that provide students with real-world experiences and skills to equip them for leadership roles in global health.

With this commitment to education, UCGHI has supported the development of graduate-level programs in global health. With the support of UCGHI, UC Riverside has now developed and proposes a Master of Science in Global Health (MS-GH) degree program that we anticipate will commence in fall quarter 2015. This global health degree will focus specifically on integrating science and policy with the aim of protecting global health by preventing the outbreak of diseases, especially those transmitted by water, food, and vectors. Rigorous training in research methodology will be a hallmark of the program.

1.1 Aims and objectives

The proposed MS-GH program meets a worldwide need for well-trained professionals to lead global health efforts, including global health policy, health care delivery, non-governmental organizations (NGOs) and research and development, and to serve populations in limited-resource settings in the U.S. and abroad. The MS-GH program will include training in the fundamental building blocks of public health, including quantitative and qualitative data collection methods, biostatistics, and environmentally-transmitted diseases. It will provide broad training to achieve competence in core principles of global health through courses in emerging issues in global health, social, cultural and environmental determinants of health; economics and policy issues in global health; health and environmental risk assessment, water- and vector-borne diseases; and health equity and social justice. Students will be exposed to research methodologies such as mixed methods (application of both qualitative and quantitative methods to understand a health phenomenon) and spatial analysis technology (e.g., GIS mapping). Particular emphasis will be placed on working in interdisciplinary teams composed of a diverse group of scholars to address problems of significant challenge to the health of people around the globe. Thus, training will be broadly interdisciplinary, drawing on faculty in life and health sciences, agricultural and environmental sciences, and social and behavioral sciences. Faculty members will be drawn from across the UCR campus, and in some cases from other UC campuses whose faculty will be invited to participate through distance learning, guest lectures, thesis mentoring, or fieldwork supervision. Our ultimate goal will be to engage faculty from all ten campuses in the training of MS students. The majority of instruction will be performed by UCR faculty.

Global health issues are essentially public health issues but at a larger scale and affected by the socio-economic issues either in single developing countries or widespread regions. We accept that these issues can affect global trade and policy and so affect those in the countries other than the focus country or region.

1.2 Historical development of the field and program strength in the field

Global health has emerged as a critical discipline to improve the health of populations in both industrialized and developing nations. As such, it has taken center stage in transnational public health efforts and funding, and has galvanized academic institutions, their faculty and students, as well as numerous private and public organizations to collaborate towards improved health for all. Many reasons can be cited for the growing popularity and importance of global health, including:

Globalization: Globalization is transforming the world order in trade, commerce, and information flows, promoting regional economic integration and determining patterns of disease in countries across the world. As labor-intensive manufacturing and service industries move increasingly to developing countries, and individuals and their families migrate to pursue work and a better standard of living, the concept of a global workforce with specific healthcare needs is compelling.

The Millennium Development Goals (MDG): Developed in 2000 under the United Nations Development Program (<http://www.beta.undp.org/undp/en/home/mdgoverview.html>), these goals are endorsed by 189 nations as a path to alleviate extreme poverty and multiple deprivations worldwide (e.g., eradicate extreme poverty, achieve universal primary education, combat HIV/AIDS, malaria and other diseases). Although the MDG were to be achieved by 2015, the reality is that achievement of the goals will be an ongoing process. The goals should continue to serve as a foundation for global health efforts and will require a long-term, collaborative commitment of well-trained global health professionals.

Health Equity and Social Justice: Concern for the inequitable distribution of food, potable water, and health care resources has stimulated interest in global health among faculty and students in academic institutions and public health practitioners across the globe. To this extent, we will offer our students training in Health Equity and Social Justice that will be critical to framing and implementing effective global health policies.

Emerging and re-emerging infectious diseases: Water is essential for human health and well-being. Yet, if improperly managed, it poses significant risks to human health. The most significant health risk from drinking water is from fecal contamination (WHO, 2006), often due to untreated or inadequately treated water supplies. Nearly a billion people worldwide, mostly children in the developing world, suffer from diseases caused by pathogenic microorganisms in water. Rotavirus, the most common cause of severe diarrheal disease in infants and young children globally, results in an estimated 527,000 deaths annually (85% occur in Africa and Asia) (WHO, 2009; 2012a). *Cryptosporidium* and *Giardia* are also common fecal pathogens in children in Africa associated with significant morbidity and mortality, and prevalence from 2-31% (Molbak et al., 1994; Ali et al., 2005; Tumwine et al., 2005).

Unmanaged standing water bodies provide sites that allow mosquito proliferation, and the transmission of human diseases such as malaria, dengue, yellow fever, filariasis, and Chikungunya Fever. These diseases are a major contributor to the global burden of disease and mortality. For example, the annual costs of malaria alone are estimated at \$12 billion annually in Africa. The economic impact of these diseases on developing countries is considerable and is one factor that impedes their emergence from poverty.

Environment and Climate Change: Regional and global environmental hazards to human health include climate change and its direct and indirect impacts. These include extreme weather events, ozone depletion, ecosystem and biodiversity loss, impacts on hydrological systems, the growing scarcity of freshwater, land degradation, urbanization, food security challenges due to strains on agricultural production, and migration due to climate induced changes in the

environment. Global warming is a global health problem and has the potential to promote the spread of vector-borne disease. The WHO asserts that an “appreciation of this scale and type of influence on human health requires a new perspective which focuses on ecosystems and on the recognition that the foundations of long-term good health in populations rely in great part on the continued stability and functioning of the biosphere's life-supporting systems.”

Agriculture: Agricultural practices require water management and so are prone to an increase in human pathogens (for example enteric pathogens or an increase in mosquitoes which vector pathogens) if water management is poor or even not present. In developing countries this can serve as a reservoir for disease. The effect of climate change on the distribution of agriculture is expected to lead to changes in land usage, which may well bring increased mismanagement of water supplies. For this reason the impact of agriculture on immediate human health issues is a large and emerging component of global health studies.

Our approach to research and education is trans-disciplinary, bringing together researchers from the health sciences, social sciences, agricultural and environmental sciences, and engineering to understand the social-biological-cultural determinants of health. The goal is not to simply juxtapose different perspectives, but instead to bring them into rapprochement through a process of creative, cross-disciplinary engagement focused on a shared object of scrutiny. UCR's Global Health students will be trained to assess and respond to global health problems arising from the human-water-vector-plant interface and to design, implement, and evaluate practical, cost-effective, and sustainable solutions that focus on the foundations of health in collaboration with local partners. The ultimate goal is to develop integrated policy interventions that holistically address the various causes of poor human health.

Program Strength

The strength of the proposed program lies in its ability to draw on the expertise and resources of faculty across the campus.

UCR has numerous faculty across the campus who have the expertise and interest to contribute to this program. A large number of faculty in CNAS conduct research on vector-pathogen systems at the molecular, genetic, and ecological levels, with work applicable to human health, and the protection of crop plants. Entomologists, botanists, biologists, nematologists, geneticists, and plant biologists and pathologists from UCR, along with other UC scientists as well as with state and federal government researchers conduct research on pests introduced into California that present risks to public health, urban environmental quality, natural resources, managed and unmanaged ecosystems, and economically important plants. Faculty across campus conduct water science and policy research on water supply and management problems, including the impacts of water scarcity and water quality on human health, agriculture and the environment in California and around the world. Social scientists on campus investigate cultural and environmental settings in which water presents hazards to human health and how residents understand and adapt to these circumstances. The newly-established School of Medicine will be a key resource for the proposed program. The campus also has several undergraduate instructional programs from which MS students can be recruited: majors in Anthropology; Biochemistry; Biology; Cell, Molecular and Developmental Biology; Economics; Entomology; Environmental Engineering; Environmental Sciences; Global Studies; Microbiology; Neuroscience; Political Science; Psychology; and Public Policy.

1.3 Timetable of development of the program, including enrollment projections

The MS-GH degree will be launched immediately upon approval of this proposal. Assuming the proposal is approved during AY 2013-14, the Program will begin recruiting students in Fall 2014, with the first class, targeted at 20 students, enrolling in Fall 2015. Within five years,

we anticipate enrolling 60 students per class, resulting in a total of 120 MS-GH students in residence.

Relation to Campus Priorities and Enrollment Plan

Increasing the number of graduate students in professional degree programs is a very high priority for the UCR campus, as the campus has one of the lowest ratios of graduate/professional students to undergraduates in the UC system. UCR's 2020 Strategic Plan clearly outlines this goal (of increasing the number of graduate students) as one of the campus' top goals.

1.4 Relationship of the proposed program to existing programs and to the campus academic plan

UC Riverside does not have graduate-level programs in public health or global health. Students with interests in health-related fields pursue graduate degrees in a number of different graduate programs, including Economics, Psychology, Environmental Toxicology, Microbiology, Biomedical Sciences, and Anthropology, to name a few. The addition of a program in Global Health would provide a single program in which students with different backgrounds could come together to receive an education in an interdisciplinary setting, with an emphasis on the *global* aspects of health.

1.5 Interrelationship of the program with other University of California institutions

1.5.1 UCLA Fielding School of Public Health (FSPH)

The UCLA Fielding School of Public Health is comprised of five departments: Biostatistics, Community Health Sciences, Environmental Health Sciences, Epidemiology, and Health Services. Programs leading to the MPH and DrPH degrees emphasize solving public health problems by applying professional disciplinary approaches and methods in professional environments such as local, state, or national public health agencies and health care organizations. Three of the programs (Community Health Sciences, Environmental Health Sciences, and Epidemiology), and a certificate in Global and Immigrant Health have elements in common with some of those in the proposed program.

The MS GH program offers in all courses an explicit emphasis on the global nature of the issues covered, more extensive leadership training, and greater attention to issues of cultural differences, health equity, and social justice that transcend national boundaries.

1.5.2 UC Berkeley School of Public Health

The UC Berkeley School of Public Health offers a two-year and an eleven-month Master's of Public Health degree, as well as a six-semester, on-line, part-time program. Students applying to the eleven-month program must hold a Ph.D. or doctoral level clinical degree. Students in the two-year program must complete a 3-month internship. Students must either pass a comprehensive final examination or complete a master's thesis. Students in the two-year program may obtain the degree with an area of concentration in: Environmental Health Sciences, Epidemiology/Biostatistics, Health & Social Behavior, Health Policy & Management, Infectious Disease, and Maternal & Child Health and Public Health Nutrition. Students in the eleven-month program may concentrate in Environmental Health Sciences, Epidemiology, Health Policy & Management, and Maternal and Child Health. Neither of these degree programs has an explicit global health focus.

UC Berkeley also offers a Master of Science in Global Health & Environment that is oriented towards students in environmental sciences. This is an interdisciplinary, campus-wide program based in the School of Public Health. The objective of the program is to help people in developing countries achieve a sustainable level of well being and to stabilize populations, while protecting the local, community, and global environments. The program requires two years of study (plus one summer) in several departments across the campus, including environmental health sciences, biostatistics, epidemiology, development theory and policy, and risk analysis.

1.5.3 University of California, San Francisco

UCSF is the only UC campus to offer a master's degree in global health (the first in the nation to do so). This program has been closely aligned with the UCGHI since its inception in 2009. Beginning in academic year 2010-11, faculty affiliated with the UCGHI COEs have served as guest lecturers, course instructors, fieldwork mentors, and advisors for UCSF masters students. Two UCSF courses were redesigned to integrate curricula from One Health, Migration and Health, and Women's Health and Empowerment; new syllabi were created with new readings, case studies and lectures. In addition, several COE faculty became members of the UCSF Graduate Group in Global Health. This relationship continued in the 2011-12 and 2012-13 academic year, with the addition of a new Women's Health and Empowerment course elective that was also offered through videoconference to the COE-affiliated UCLA Law School and to UC Davis.

The proposed MS GH is distinct from the UCSF MS in that the UCSF program is a one-year, non-thesis program that does not offer a specialization. Going forward, the UCR and UCSF programs plan to collaborate in several ways: 1) faculty may serve as guest lecturers, 2) they may collaborate on curriculum, course design and competencies, and 3) serve as mentors and on thesis committees. It is expected that some students will apply to both the UCSF and the UCR MS degrees. Each campus may refer applicants to each other depending on the best fit for the student.

It should be noted that fundraising efforts conducted by the UCGHI have yielded, and will continue to generate, student scholarship funds.

1.6 Program Governance

The MS-GH program will be housed in the new School of Public Policy, which was approved by the UC Regents in September 2008 and launched by the campus in 2012. UCR has already appointed a Founding Dean for the new School effective February 1, 2013.

1.7 Plan for evaluation of the program

Graduate programs at UC Riverside are formally evaluated in year three initially and then every seven years thereafter. This includes both an external review by a panel of nationally-recognized scholars and an internal review by a subcommittee of the UCR Graduate Council. Since the School of Public Policy is a new graduate school, none of its programs has been evaluated yet. The proposed MS-GH degree will be evaluated as part of the normal 7-year review process for graduate degrees.

In addition, the School of Public Policy will develop a learning outcomes and assessment plan to evaluate student learning on a continuous basis.

SECTION 2. PROGRAM

2.1 Preparation for admission

All applicants must have completed a bachelor's degree (BA/BS), or the equivalent, from an accredited institution, with a minimum of 3.0 (B) Grade Point Average (GPA). Successful completion of at least one college-level course in each of the following areas with a grade of B or better is preferred: mathematics (e.g., calculus, statistics), general biology, health-related science (e.g., anatomy, microbiology, nutrition, physiology), or another biology course.

Admission requirements and process:

- 1) Three letters of recommendation, including at least two from faculty who are in applicant's major area and are in a position to assess the applicant's academic ability and potential to succeed in our program.
- 2) Official transcripts from all institutions attended after secondary school. GRE test scores taken within the last five years.
- 3) GRE scores within last five years.
- 4) International applicants whose first language is not English and who have not earned an advanced degree at an institution where English is the exclusive language of instruction must submit TOEFL or IELTS exam scores taken within two years of the time they intend to enroll at UCR.

2.2 Foreign language

Although there will not be a specific language requirement for all students, basic proficiency in a second language is highly encouraged among applicants. In some cases, demonstrated proficiency in a specific language will be required in order for students to conduct thesis research and be placed at a particular field site location.

2.3 Program of study

All students will receive training in the fundamental building blocks of public health (quantitative and qualitative data collection methods) and broad training to achieve competence in core principles of global health.

In addition, students will be trained in an integrated approach to examining infectious diseases that are not attributable to a single cause, but are instead the result of a confluence of factors related to water, vectors, plants, and, in some cases, human practices that work concurrently and synergistically to adversely affect human health. This approach to research and education is trans-disciplinary, and requires bringing researchers from the health sciences, social sciences, agricultural and environmental sciences, and engineering to work together to understand the social-biological-cultural determinants of health. The goal is not to simply juxtapose different perspectives, but instead to bring them into rapprochement through a process of creative, cross-disciplinary engagement focused on a shared object of scrutiny. Students will learn to assess and respond to global health problems arising from the human-water-vector-plant interface and to design, implement, and evaluate practical, cost-effective, and sustainable solutions that focus on the foundations of health in collaboration with local partners. The ultimate goal is to develop integrated policy interventions that holistically address the multiple causes of poor human health.

The curriculum will include courses in:

- Leading issues and challenges in global health
- Ethics, professionalism, and normative bases of global health
- Quantitative methods
- Qualitative social science methods
- Health systems in developed and developing countries
- Environmental and vector transmission of infectious disease
- Agricultural practices
- Health and ecological risk assessment
- Human behavior in the context of global health
- Global health seminar

2.3.1 Plan(s): Master's I and II

The MS-GH will offer both a Plan I and Plan II option. Plan I will require a thesis and Plan II will require a comprehensive examination.

2.3.2 Unit Requirements

All candidates for the degree are required to complete all of the general requirements specified in the Graduate Studies section of the catalog.

The core curriculum will consist of 31 units. Students will complete an additional two elective courses (worth 8 units), for a total of 39 units. Plan I students will receive additional 2 units of credit for Directed Thesis Research for each quarter that they are enrolled and conducting research. It is expected that Plan I students will spend two quarters on Directed Thesis Research.

2.3.4 Required and Recommended Courses

A description of the required and recommended courses is listed above and for core courses under Section 2.11 - Sample Program below.

2.3.5 Licensing or certification

There will be no specialized licensing or certification required for the degree in global health.

2.4 Field examinations

No field examinations will be required.

2.5 Qualifying examinations

There will be no required qualifying examinations.

2.6 Thesis and/or Dissertation

Students electing Plan I will need to establish a thesis committee and present a proposal for a thesis during the summer after the first year. They will then proceed to conduct their fieldwork or research, and spend at least two quarters of their second year working on their thesis.

2.7 Comprehensive examination

Students electing the Plan II option will take a comprehensive written examination that covers fundamental topics in global health sciences, as well as topics relevant to the student's chosen specialization. The written examination, 3-4 hours in duration, will be prepared and evaluated by a committee consisting of all course directors who participated in the student's training. The committee will be appointed by the respective Faculty Program Director. The examination will be taken during the latter part of the final quarter of program (usually the summer quarter), after all coursework has been completed. Students must wait at least eight weeks before retaking a failed examination. If the student fails the exam a second time, the student be dismissed from the program.

2.8 Special requirements over and above minimum requirements

There are no special requirements for this degree program.

2.9 Relationship of master's and doctoral programs

Because our students participate in rigorous learning environments (both didactic and experiential), they will be well prepared to succeed in doctoral programs in related global health disciplines. Even though the MS-GH is designed as a terminal degree in Global Health, students will be well prepared to enter competitive PhD programs, such as the UCSD-SDSU Joint Doctoral Program in Public Health with specialization in Global Health. The profile of the successful applicant to such PhD programs includes not only a basic global health skill set (e.g., application of research methods in a global health environment) but also global health leadership skills (including participatory leadership, meaningful engagement of key stakeholders).

2.10 Special preparation for careers in teaching

The program is not specifically designed to prepare students for future careers in teaching, although some graduates may opt to pursue such careers.

2.11 Sample Program

Sample Program for MS in Global Health		
Sample Coursework for the MS Program in Global Health		
First Year		
<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Leading issues and challenges in global health (4 units)	Qualitative social science methods (4 units)	Health systems in developing and developed countries (4 units)
Quantitative methods (4 units)	Environmental and vector transmission of infectious disease (4 units) OR Agricultural or community	Ethics, professionalism, and normative bases of global health (4 units)

	practices (e.g., plant biology; human behavior in the context of global health) (4 units)	
Risk Assessment (4 units)	Elective 1 (4 units)	Elective 2 (4 units)
Global Health Seminar (1 unit)	Global Health Seminar (1 unit)	Global Health Seminar (1 unit)
<u>Summer</u> : Thesis design/proposal development (Plan I students) or Comprehensive examination (Plan II students)		
Second Year		
<i>Fall</i>	<i>Winter</i>	
Directed thesis research (2 units)	Directed thesis research (2 units)	

2.12 Normative time from matriculation to degree

For students in the Plan I option, normative time to degree will be six quarters (approximately 18 months). For students in Plan II, time to degree will be four quarters or 12 months. After the program has been operational for a couple of years, we will try to develop a program plan and fee structure to accommodate part-time students.

2.13 Professional Fees

Students in this program will pay a professional fee of \$1,984 per quarter in addition to other fees.

SECTION 3. PROJECTED NEED

3.1 Student Demand

Demand for the MS-GH program has been mounting over the last five years as global health issues such as HIV, global warming, and migration have gained wide-spread media attention and captivated undergraduate and professional students. Evidence of this interest has been observed in the increasing number of undergraduate students who are involved with local global health campus organizations or who participate in global health brigades. The recent UCSD Global Health Interest Night for Undergraduates generated an exceptional response from undergraduates and medical students with interest in global health service. There is also mounting evidence that a continuous stream of leaders in global health will be needed to mount effective responses to global health challenges (Murdoch-Eaton, 2011).

We anticipate that 15-20 students will be enrolled in the MS-GH program in its first year of operation. The program will draw from a large and growing pool of undergraduate students with interest in a graduate degree in global health, professional students who wish to take a gap year in their clinical education (i.e., medical students who have completed their third year of training), and mid-career professionals who wish to incorporate global health into their future work. Since the MS-GH will offer both a one-year and two-year option, there is flexibility to meet the career goals of many types of prospective students. Graduates of the program will be prepared to enter into the workforce of global health or, for students interested in advanced degrees, would be prepared to successfully compete for admission to a PhD program and various health-related professional degrees.

An on-line survey of students enrolled in a global health-related course at UCSD in Fall 2010 found that undergraduates majoring in biochemistry, human biology, international studies, psychology, physiology and neuroscience, and sociology were interested in the UCGHI MS program. More than three-quarters of the respondents favored doing a thesis for the MS degree (the Plan I option).

The Global Health track of the UCSD/SDSU joint Ph.D. program in Public Health regularly receives >40 applicants per year, some of whom are more appropriate for a master's degree. Medical students in the PRIME Health Equity program at UCSD and UCD who are already receiving specialized courses in health equity (UCSD) and rural health (UCD) and who are required to complete a fifth year of medical school to complete a master's degree will be attracted to the multi-campus MS program.

Since 2010, faculty from the One Health Center of Expertise at UC Davis and UC Riverside offer a highly subscribed two-credit, multi-campus course on One Health. Both students and faculty in the course represent the unique trans-disciplinary focus of the One Health approach to global health. Videoconferencing technology is utilized in the biweekly two-hour sessions to link medical students and residents at the UC Davis Medical Center in Sacramento with graduate students at each of the main campuses in Davis and Riverside.

The UC Davis graduate students enrolled in the course came from International and Community Nutrition; International Agricultural Development; the Center for Health & the Environment; and the School of Veterinary Medicine. At UC Riverside, the graduate students are drawn from the Departments of Economics; Entomology; Environmental Sciences; Cell, Molecular and Developmental Biology; Psychology; and Sociology.

It is anticipated that there are numerous undergraduate majors at UC Riverside that will act as gateways for the MS-GH Program. These include global studies, public policy, biochemistry, biology, psychology, bioengineering, environmental engineering, environmental sciences, and anthropology.

The two most well-established master's degree programs in Global Health, UCSF (started in 2008) and Duke University (started in 2009) have both experienced growth each year.

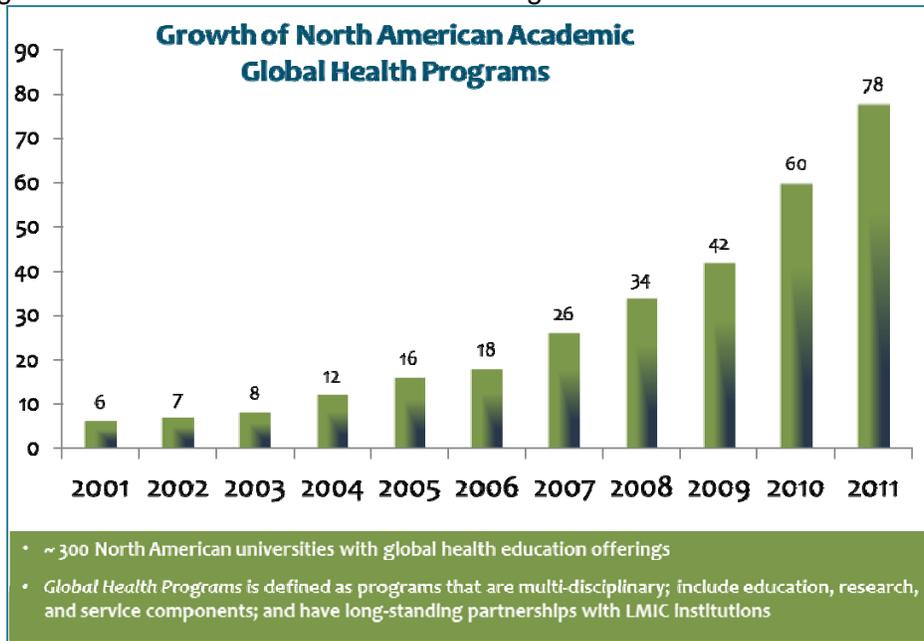
University of California, San Francisco MS in Global Health Sciences					
Academic Year	# Applications	# Admitted	# Enrolled	% Applicants Accepted	% Accepted Enrolled
2012-2013	181	60	38	33%	63%
2011-2012	186	50	38	27%	76%
2010-2011	74	47	30	64%	64%
2009-2010	35	28	18	80%	64%

Duke University MS in Global Health					
Academic Year	# Applications	# Admitted	# Enrolled	% Applicants Accepted	% Accepted Enrolled
2012-2013	96	65	24*	68%	37%*
2011-2012	79	53	29	67%	55%
2010-2011	71	44	21	62%	48%
2009-2010	36	27	17	75%	63%

**Projected as of July 2012*

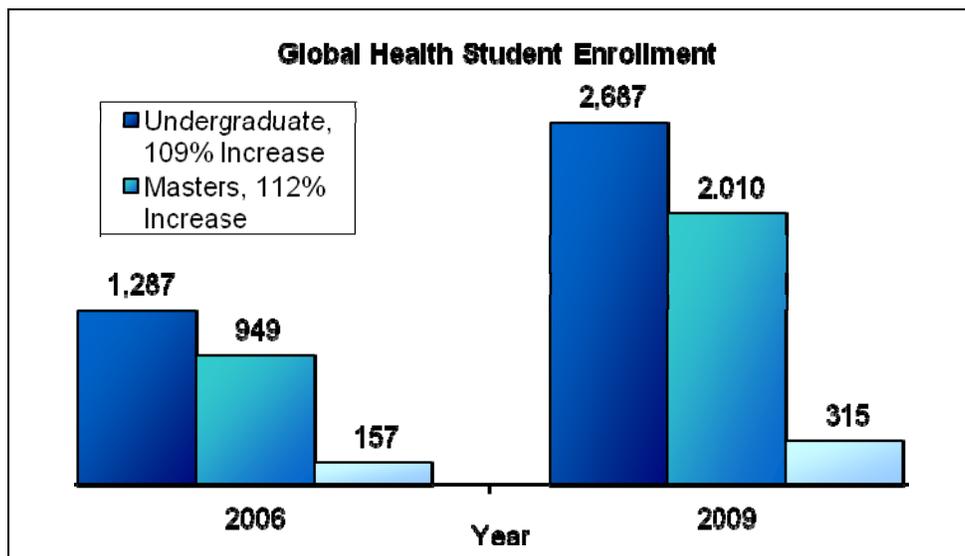
A review of selected Public Health master's degrees with a global health or international health emphasis (Emory, University of Washington, and Johns Hopkins), all show robust application rates and stable or increased enrollments from 2009 to 2012. In the aggregate, these three programs had combined applications numbering 1,391 for a total enrollment of 256 global health students (18% of applications).

According to recent web-based research conducted by the CUGH, there is tremendous growth in the number of global health academic programs nationally. Over the last five-years, dedicated training programs in Global Health in North America grew from 26 in 2007 to 78 in 2011.



Survey of North American Universities, Consortium of Universities for Global Health

A 2010 survey conducted by the Consortium of Universities for Global Health showed that undergraduate and graduate student enrollment in global health-related programs grew by over 100% between 2006 and 2009.



3.2 Opportunities for placement of graduates

“A central objective of workforce development is to produce sufficient numbers of skilled workers with technical competencies whose background, language and social attributes make them accessible and able to reach diverse clients and populations. More schools of public health are needed” (2) (WHO, The World Health Report 2006)

The global health workforce is in dire need of both clinical and non-clinical experts in global health. MS-GH graduates will enter a growing job market; according to the Association of Schools of Public Health (ASPH), 250,000 more public health workers will be needed in the U.S. by 2020. In order to achieve this goal, increasing the number of global health graduates is imperative (1, 2). In an increasingly globalized world, health needs are expanded and further complicated by their international nature (communicable diseases, environmental hazards, natural disasters) (1). Global health therefore is public health at the global level and professionals trained to become experts in global health are in very high demand (3). Students with clinical degrees could fill gaps in health service providers with global health training. MS GH graduates would be ready to serve in the breadth of global health workforce capacities that will be needed, including applied research, health program management and an array of public health support workers. Employment opportunities for graduates would include government, multi-lateral and international agencies, non-governmental organizations (NGOs), research and academic institutions among other growth-oriented job sectors (3).

Academic placements

Numerous US-based research universities now have, or plan to have, active international health programs. Partnerships are established by these universities with developing country institutions to help build capacity and to collaborate to solve globally important health problems. The newly formed Consortium of Universities for Global Health has over 100 U.S. and international members that comprise growing departments and major institutional commitments in global health. Graduates may pursue funding from the US Government, international agencies, foundations and the private sector to support their future research careers. This unprecedented magnitude of funding for global health will also result in an increased demand for expertise and practical experience.

Research and policy positions within global and domestic non-profit and government agencies and organizations

Positions for specialist researchers and advisors in global health are available in the US National Institutes of Health (NIH); the Fogarty International Center of the NIH; the US Centers for Disease Control and Prevention (CDC); the US Department of Defense; the World Health Organization; Peace Corps; the World Bank; the International Monetary Fund; the Bill and Melinda Gates Foundation; the Global Fund to Fight AIDS, TB, and Malaria; UNAIDS; GAVI (Global Alliance for Vaccines and Immunization); and multiple pharmaceutical companies, to name a few. There is a growing demand for evidence backed policy advice and informed decision-making at the country level. Development agencies are increasingly looking at "diagonal" approaches (i.e., use explicit health intervention priorities such as HIV prevention to drive needed improvements into health systems) that expand on the effectiveness of "vertical" disease-oriented programs and incorporate "horizontal" capacity building and health systems strengthening.

Healthcare practitioner positions within community or regional organizations (non-profit and for-profit), both domestically and internationally

Those with concurrent professional degrees and the MS will be well placed for these positions. There is a proliferation of volunteer and non-volunteer organizations that offer clinical training and capacity building in low- and middle-income countries. Trained physicians, nurses, midwives and community health workers are needed to help stabilize and reverse the workforce crisis in poor countries.

Engagement of related global health disciplines

Increasingly, the "market" for global health graduate education incorporates individuals with unique talents and special skills (e.g., filmmaking; journalism; geography; engineering; environment) that can be aptly and wisely applied to the global health enterprise. Students are looking more toward entrepreneurial and innovative development solutions and are more skeptical of top-down aid. They are more wary of "needs assessment" and more favorably inclined to "asset building" at the community level. The new generation of global health practitioners embraces a more pragmatic and holistic approach to poverty relief and health promotion, and they gravitate naturally toward team building, partnerships and cross disciplinary interaction. The MS-GH and the emphasis in UCGHI toward multidisciplinary epitomize and will galvanize this new energy and commitment.

Recent UCSF MS placement information

A total of 89 graduates have completed the UCSF MS program in Global Health Sciences – 54 from 2008 to 2011 and 35 in the most recent class of 2012. Of the 54 graduates in the first three years of the program, 28 (52%) are employed in the global/public health sectors by completing residency programs, teaching and/or conducting research in academia, working at NGOs, and in other public and non-profit areas. Twenty-one (39%) are currently enrolled in an advanced academic or professional degree program (i.e., PhD, DPH, MD, MBA); five students (9%) are currently looking for employment or taking time off from work. Eighteen of the 54 graduates (33%) entered the MS program with an advanced degree.

3.3 Importance to the discipline

Modern transportation has allowed the spread of emerging infections with, literally, jet speed. The recent H1N1 influenza pandemic provides a perfect example of how a disease that originated in one region can rapidly spread to others, causing disruption in the economy, commerce and travel. Global climate change has the potential to increase the geographic distribution of many vector-borne diseases. The emergence of these conditions and migration of populations has underscored the need for a workforce specialized in global health to lead new global health initiatives that meaningfully engage local and national decision makers and communities in creating solutions to existing and emerging global health problems.

These and the reasons discussed throughout this proposal create an opportunity to develop a program of rigorous academic studies in global health sciences. As premier universities, UC is uniquely positioned to develop a training program that will create a new discipline in global health that bridges the gap between public health and medicine.

According to the Global Forum for Health Research, (<http://www.globalforumhealth.org/Site/000Home.php>), the public and private sectors spend more than US \$70 billion annually on health research and development. An estimated 10% of this is used for research on 90% of the world's health problems. Basic sciences have much to contribute to the understanding of the pathogenesis of microbial infections and in drug and vaccine development; however, global health practitioners are needed to translate this research to global communities. Specialization in global health leadership, research and diplomacy is an essential step to closing this gap. Epidemiology and biostatistics, as well as clinical research and clinical trial methods, are of the utmost importance in the new field of global health sciences. Health economics and policy are central to the causes, effects, and potential solutions in global health. The next generation of researchers, clinicians, and policy leaders in global health need to be well-trained in how to draw upon and integrate skills, perspectives, and expertise provided by all these disciplines.

3.4 Ways in which the program will meet the needs of society

The program will serve two critical needs: 1) it will prepare specialized researchers and leaders with a base of knowledge and skills directed towards improving health in populations in industrialized and developing countries, and, 2) it will direct resources towards the pursuit of scholarly work in global health by its graduates.

The program graduates will be prepared to help solve some of the pressing health problems faced by nations and minimize the impact of emerging epidemics, thereby contributing to economic and political stability throughout the world. The humanitarian value of all work undertaken by the MS GH program participants will be emphasized.

These individuals can expect to attain leadership positions in academia and may go on to provide leadership in agencies such as the NIH, CDC, WHO, and World Bank. Armed with experiences and technical abilities unlike that found in more limited research training programs, graduates will be uniquely prepared to solve large, transnational global health problems.

3.5 Relationship of the program to research and professional interests of faculty

Individual faculty members conduct research on specific aspects of global health. These include faculty in the biological, social, physical, medical, and engineering sciences. Bringing this expertise together in a graduate program in Global Health will strengthen interactions among these faculty members, likely leading to increased inter- and trans-disciplinary research.

3.6 Program differentiation

The proposed master's degree differs from the extant UCSF MS in Global Health Sciences in several significant ways. The UCSF Plan II Capstone requirement includes a longitudinal project that begins in the fall, requires fieldwork abroad or in the U.S in the spring quarter, and culminates in a written and oral presentation in the summer. The UCR program offers a Plan I thesis option (18-24 months), as well as a Plan II comprehensive exam option (12 months without a fieldwork component). The UCR master's degree has an emphasis on the interactions between global health problems arising from the human-water-vector-plant interface with corresponding courses and thesis topics, whereas the UCSF program is generalized (with the exception of the Capstone project, which is student initiated). The program will appeal to new graduates who lack specialized expertise in global health and who wish to spend additional time—up to two years—conducting field research and writing a thesis. It also will appeal to those who have only one year available to complete a master's degree and who may not be able—for financial, professional, or personal reasons—to complete a fieldwork project.

SECTION 4. FACULTY

Participating faculty will include student academic advisors, student mentors, course directors, and course facilitators. Below is a description of their roles and responsibilities:

Graduate Advisor

All students will be advised initially by the Graduate Advisor, who will meet with the student to assess initial skills and learning needs, review program requirements, assist with assigning a

mentor for Plan I students and preparing Plan II students for the comprehensive examinations, provide feedback on academic progress, and assist with career planning.

Faculty Advisor

Each student who is participating in the Plan I, thesis option, will choose or be assigned a faculty advisor who will assist with the design and execution of the research project.

The following faculty members have been identified as Affiliated Faculty of the program. These faculty will teach in the program and serve as faculty academic advisors and faculty mentors.

Peter Atkinson (Entomology)
Julia Bailey-Serres (Botany & Plant Sciences)
Tim Close (Botany & Plant Sciences)
Carl Cranor (Philosophy)
Sean Cutler (Botany & Plant Sciences)
Anil B. Deolalikar (Economic and Public Policy)
David Eastmond (Cell Biology & Neuroscience)
Kevin Esterling (Political Science)
Elizabeth Davis (Psychology)
Robin DiMatteo (Psychology)
John M. Fischer (Philosophy)
Howard Friedman (Psychology)
Mary Gauvain (Psychology)
T. S. Harvey (Anthropology)
David Lo (Biomedical Sciences)
Mindy Marks (Economics)
Juliet McMullin (Anthropology)
Misaki Natsuaki (Psychology)
Robin Nelson (Anthropology)
G Richard Olds (School of Medicine)
Chandra Reynolds (Psychology)
Phil Roberts (Nematology)
Sharon Walker (Chemical & Environmental Engineering)
Linda Walling (Botany & Plant Sciences)
Bill Walton (Entomology)
Marylynn Yates (Environmental Sciences)
Tuppert Yates (Psychology)

Affiliated Adjunct Faculty

Nathaniel Jones (CFAO, CHASS)
Paul Lyons (Associate Dean, SOM)
Michael Nduati (Associate Dean, SOM)

SECTION 5. COURSES

The MS-GH curriculum will consist of required core courses for all students in both Plan I and Plan II, and an ongoing Leadership and Communications seminar. Below is a description of each course and the designated instructor.

Course	Instructor(s)	Brief Description
GBHL2xx: Leading issues and challenges in global health	TBD	This course will describe the foundations of global health practice and provide the essential background for the other core courses. Students will study both macro and disease-specific major global health challenges, strategies for responding to them, key institutions, and international legal frameworks. A recurring theme will emphasize the evolving structural landscape of multi-sectoral global health institutions ranging from governments, bilateral and multilateral organizations, NGOs, civil society, and the private sector. Throughout the course students will be informed of the debates and ethical issues that underlie global health activities.
GBHL2xx: Health systems in developing and developed countries	TBD	This course introduces students to key challenges faced in strengthening of health systems in developing and developed countries. The course will cover a diverse set of topics including an overview of organization of health systems, models of purchasing and providing health care, innovations in financing health care, and issues in service delivery such as quality of care and human resource challenges. Students will learn frameworks and methods employed in the evaluation of health systems. Readings primarily from health policy, economics and other social science journals. Consent of instructor required.
GBHL2xx: Quantitative methods	Kevin Esterling, Mindy Marks	This course will provide students with the ability to understand and evaluate health interventions and priorities through quantitative research methods and to employ these methods in their own research. The course covers material about the way in which data are collected (experiments versus observational studies), analyzed, and interpreted. It examines the sources of information including data originating from surveys, experiments, think tanks, policy analysis, and secondary sources, and how the source of the data can affect the type of analysis to which it is subjected. Statistical methods to be discussed will include estimation and testing for two sample comparative studies, simple and multiple linear regression and correlation, analysis of variance, categorical data techniques, and more. The focus will be on application of the techniques and interpretation of the results. The importance of checking the adequacy of assumptions for each technique is also emphasized. The course will explore the strengths and limitations of each of these methods as well as some of the debates pertaining to the use of each. It will also examine the bases for choosing one method over another.
GBHL2xx: Ethics, professionalism, and normative bases of global health (4 units)	Carl Cranor	This course will present an overview of practical and theoretical approaches to bioethics from a range of perspectives, including the humanities, law, philosophy, medicine and science. Students will apply various resources, terminology and frameworks to case studies which will prepare them for their own research. The course will include IRB and responsible conduct of research.
GBHL2xx: Qualitative social science methods	Juliet McMullin, T.S. Harvey	This course will introduce students to qualitative methods widely used in the social sciences and to their use in global health. Among the methods to be investigated are the case study; ethnography, including participant observation; interviews, including structured and semi-structured interviews and focus groups; and discourse and image analysis. Strengths and limitations of each method will be discussed, as will the epistemological bases for choosing among alternative methods.
GBHL2xx: Risk Assessment	David Eastmond	An introduction to the basic principles and methods by which health risks associated with exposure to chemical and physical agents are determined. Topics include hazard identification, dose response and exposure assessments, as well as risk characterization and management.
GBHL2xx: Environmental and Vector Transmission of Infectious Diseases	Marylynn Yates, Peter Atkinson	Introduction to important water-, food-, zoonotic- and vector-borne diseases
GBHL2xx:	Mary	Introduction to the range of social and behavioral issues that affect the occurrence,

Course	Instructor(s)	Brief Description
Human Behavior in the Context of Global Health	Gauvain, Robin DiMatteo, Howard Friedman	severity, and response to global health issues due to environmental or resource-related conditions
GBHL291: Global Health Seminar	Faculty	Presentation and discussion of current topics and literature in global health
GBHL299: Thesis Design & Proposal Development	Faculty Advisor	

The following existing courses at UCR will also count as elective courses in the program:

ANTH 261. Anthropology of the Body (4) Seminar, 3 hours; written work, 3 hours.

Prerequisite(s): graduate standing or consent of instructor. Examines cultural anthropology's treatment of the body as both a subject and object of social processes through recent and classic texts. Aims to ground theoretical inquiry in ethnographic and historical materials through the examination of bodies across time and space.

ANTH 262. Seminar in Medical Anthropology (4) Seminar, 3 hours; outside research, 3 hours.

Prerequisite(s): graduate standing or consent of instructor. Surveys major topics in medical anthropology. Examines the theoretical and methodological underpinnings of medical anthropology, including the cultural construction of health and disease, the nature of the therapeutic process, and how social structures contribute to inequality and suffering.

BMSC 223E. Inflammation, Autoimmunity, and Pathogen Defense (3) Lecture, 23 hours per quarter; discussion, 8 hours per quarter; laboratory, 8 hours per quarter. Prerequisite(s): consent of course coordinator. Integrative view of the human immune system and inflammation in health and disease.

BMSC 223F. Cardiovascular Physiology (4) Lecture, 30.5 hours per quarter; discussion, 11.5 hours per quarter; laboratory, 5 hours per quarter. Prerequisite(s): consent of course coordinator. Integrative view of the human cardiovascular system in health and disease.

CEE 232. Green Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 120 or consent of instructor. A study of the design, commercialization, and use of feasible and economical processes and products that minimize risks to human health and the environment. Topics include environmental issues, risk assessment, and regulations; flow of chemical and manufacturing unit processes and flow-sheet analysis for pollution prevention; product life-cycle assessment; and industrial ecology.

CEE 241. Water Quality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENVE 142 or consent of instructor. Topics include assessment of surface water and groundwater quality for beneficial uses, fate and transport of waterborne pollutants, and water quality modeling in natural and engineered systems.

ECON 268. Economics of Biotechnology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing in Economics or in one of the biological sciences or consent of instructor. Covers the economic causes and consequences of revolutions in biotechnology. Topics may include the agricultural revolution, the Columbian exchange, and biotechnological advances in mechanization, brewing, and plant and animal breeding. Focuses on the implications of adopting genetically modified crops such as *Bacillus thuringiensis* corn and herbicide-resistant crops.

ENTM 210. Molecular Biology of Human Disease Vectors (3) W Lecture, 2 hours; seminar, 1 hour. Prerequisite(s): consent of instructor. Covers the molecular aspects of vectors transmitting most dangerous human diseases. Involves lectures and student presentations about current issues in molecular biology and genomics of vector insects and pathogens they transmit.

ENTM 255. Seminar in Medical and Veterinary Entomology (2) F Seminar, 2 hours. Prerequisite(s): ENTM 126 or consent of instructor. Rigorous review and analysis of advanced topics in medical and veterinary entomology and related disciplines.

ENTM 276. Research Seminar in Medical, Urban, and Veterinary Entomology (1) F, S Seminar, 1 hour. Prerequisite(s): consent of instructor. Seminar and critical discussion emphasizing current research and advances in medical, urban, and veterinary entomology.

ENSC 207. Surface Water Quality Modeling (4) W, Odd Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introduction to the principles of surface water quality modeling. Explores mathematical representations of surface water systems. Reviews theory and develops analytical and numerical solutions to describe hydrodynamics and mixing in surface waters, surface water quality, eutrophication, and the cycling and fate of contaminants in lake and river ecosystems.

SOC 235. Methods and Materials of Demography (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to the methods and materials of demography.

SWSC 208. Ecotoxicology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, CHEM 112A, CHEM 112B; or consent of instructor. Introduction to the impact of chemicals upon ecological systems. Examination of the fate and effects of environmental chemicals in various hierarchies of biological organization to learn how to carry out precise and accurate assessments of ecological risk.

PSYC 262. Developmental Biopsychology (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers basic processes of brain development and plasticity from conception to adulthood. Emphasis is on relationships between biological and psychological phenomena such as sensation, perception, and learning.

Professional Development Training: The curriculum for the MS-GH degree program includes professional development training. In particular, two sessions of GBHL 291 (Global Health Seminar) each quarter will be dedicated to professional development. The subjects will include but not limited to: research ethics, scientific and technical writing, academic careers, employment opportunities beyond academia, and professional networking. In addition, each student will be encouraged to have a one-on-one networking meeting with visiting colloquia at least once every quarter.

SECTION 6. RESOURCE REQUIREMENTS

FTE Faculty: The university administration has already set aside 12 faculty FTE for the School of Public Policy. Of these, roughly one-half will be used in the form of joint or split appointments with other departments on campus. Most of these are envisaged to be 50% faculty appointments shared with departments such as Political Science, Economics, and Environmental Sciences. (Joint appointments are very common in public policy schools nationwide.) The remaining FTE will be full-time in the School. Obviously, the MS-GH program will not have exclusive use of these faculty FTE, since the School of Public Policy plans to offer a doctoral program and concurrent degree programs with other units on campus (including the School of Medicine) at a later time.

Faculty recruitment will begin in AY 2013-14 and will be phased in over time, so that the 12 faculty FTE will be fully deployed by 2016-17. (Two open-rank faculty searches are already underway; one of these positions is joint with the Graduate School of Education and the other with the College of Humanities, Arts and Social Sciences.)

The MS-GH program will not adversely affect course offerings available to graduate students in other departments on campus for three reasons. First, because the campus has already sequestered 12 faculty FTEs for the School of Public Policy, other departments will be appropriately compensated for courses that their faculty will teach in the School of Public Policy in the form of additional faculty lines (e.g., a department losing half of a faculty FTE to the School of Public Policy will receive an additional 0.5 FTE from central administration). Second, many of the graduate course offerings of contributing departments, such as Entomology, Economics, Environmental Sciences, Political Science, and Sociology, will count as electives toward the MS-GH degree. Thus, graduate courses in other departments will be more fully utilized as a result of the MS-GH program. Third, new MS-GH courses offered by faculty in other units (who partially shift their FTE to the School of Public Policy) will actually increase the selection of courses available to graduate students in other departments. Many faculty members and graduate students in the primary contributing departments have research and teaching interests in global health and public policy.

A founding dean has already been appointed for the School of Public Policy as of February 1, 2013. This is an important indication of the commitment of the UCR campus leadership to the School of Public Policy and the MS-GH degree program.

Other Operating Costs: The program will require administrative support and student services support. Students in MS-GH degree programs need to be aggressively recruited, and expect considerable support during their two-year program, especially in the area of job placement. The program director would provide support in the first year for advertising the program and recruiting students and faculty. Over time, the program director would continue with these duties assisted by a student services assistant who could also serve as a writing tutor. These positions could be filled in the following increments:

Year 1: Program director at 50%.

Year 2 onwards: Program director at 100%, add student services assistant.

An operating budget for the first six years is shown below.

Operating budget of MS-GH program, 2014-15 to 2019-20						
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Program director	\$31,000	\$62,000	\$62,000	\$62,000	\$62,000	\$62,000
Student services assistant		\$42,000	\$42,000	\$42,000	\$42,000	\$42,000
Faculty incentives for course design	\$48,000					
Course buy-out funds for teaching courses		\$128,000	\$144,000	\$96,000	\$64,000	\$40,000
Student recruitment costs (publicity, advertising, information workshops, etc.)	\$25,000	\$25,000	\$25,000	\$20,000	\$20,000	\$15,000
Global health seminar series	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Faculty equipment, computers, furniture	\$25,000	\$15,000	\$15,000	\$15,000	\$10,000	\$10,000
Total	\$144,000	\$287,000	\$303,000	\$250,000	\$213,000	\$184,000

Notes: In the first years of the program, most teaching will be done by faculty from other units on a course buy-out basis. As the School of Public Policy begins recruiting faculty, the need for course buy-out will diminish. The costs of SPP faculty, as well as of the SPP Dean, are not included here, as they are part of the central campus' long-term campus strategic plan.

Library Acquisitions: UCR library staff were consulted while drafting the proposal to establish the School of Public Policy. No major library acquisitions will be needed for the MS-GH program, as most journals (printed and electronic) and books in the area of public policy are already available in the UCR and the UC library system.

Space and other capital facilities: This program will require the following space to begin operation:

- administrative office space, with furniture, computers, etc.
- office for the program director
- office space for student services assistant
- group work space for student projects

As enrollment grows and faculty FTEs are hired, additional office space will be needed. Classrooms will be scheduled through the Registrar's office in general campus classroom space.

Limited office space has already been secured by the School of Public Policy on loan from the College of Humanities, Arts and Social Sciences (CHASS) in the Interdisciplinary Building. More space will be made available, as needed, in the same building by CHASS. In the longer run, the School of Public Policy will need a new building. The campus' Long Range Development Plan calls for a new building housing both the School of Public Policy and the Graduate School of Education to be constructed on the West Campus. Raising funds for a new building will be a high priority of the School of Public Policy's development efforts.

The above costs will be funded in part from the income from professional fees, as described in Section 8 below, as well as from UCR campus resources. As noted earlier, the School of Public Policy is an important element of UCR's 2020 strategic plan to grow professional student enrollment on campus.

SECTION 7. GRADUATE STUDENT SUPPORT

Students enrolled in the MS-GH program will pay a professional fee of \$1,984 per quarter in addition to quarterly resident or non-resident graduate student fees and tuition.¹ For 2013-14 (fall through summer), projected costs are \$XXX for residents and \$-YYY for non-residents. UC practice is to set aside one-third of the fees for financial aid; the remainder of the professional fee at UCR is usually returned to the program.

There will, however, be a need for increased graduate student support – over and beyond the one-third of the fees set aside for student for financial aid – at least until the MS-GH degree program at UCR becomes more established. Therefore, one of the top priorities of the MS-GH program will be to raise funds for MS-GH student scholarships from external donors. Such scholarships will be essential in recruiting strong students to the program.

SECTION 8. CHANGES IN SENATE REGULATIONS

No changes in Senate Regulations are required for the MS in Global Health.

¹ This professional fee is similar to that being proposed for UCR's Master's of Public Policy (MPP) program, which will be the other degree program to be offered by the School of Public Policy.

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3. Explore health careers Global Health
http://explorehealthcareers.org/en/Career/51/Global_Health

Additional resources for reference:

4. World Health Organization. New financing tool to help reverse global health workforce shortage; 2009
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APPENDIX A: GLOBAL HEALTH PROGRAM BYE-LAWS

Article 1: Purpose

The primary purpose of this program is to administer graduate instruction and research leading to the Master of Science in Global Health (MS-GH) in accordance with the rules of the Graduate Council of the Academic Senate of the University of California, Riverside. The program director will report to the Dean of the School of Public Policy and will be housed in the same School. This program will serve to facilitate interdisciplinary interaction, collaboration, research and teaching.

Article II: Membership

Membership in this program consists of core and affiliated faculty members. Membership is open to faculty members who conduct research and teach in the field of global health.

Core faculty consists of faculty who normally teach in the core curriculum at least once every three years. In addition to teaching in the core curriculum, core faculty advise and mentor students, have full voting rights and are available for committee work. The executive committee for the program is drawn from the core faculty. Core faculty will meet once or twice a quarter, or as deemed appropriate by the executive committee and the Dean, to review the program and assess future direction.

Affiliated faculty will normally provide at least one course on the list of electives every three years. Affiliates may also serve on committees as appropriate.

Anyone desiring to become a member of the program may submit an application to the Dean, listing her/his qualifications and stating the reason for wishing to become a member. These applicants will be evaluated in terms of their current research interests and teaching commitments and their potential contribution to the Program's course offerings. The application will be acted upon by the executive committee.

Membership in the program will be reviewed annually by the executive committee. The executive committee will appoint new Core and Affiliated members and remove Core and Affiliated members. Affiliated or Core members who do not participate in administration, teaching and advising will be subject to removal.

Article III: Program Director and Committees

The Program Director will be appointed by the Dean with the advice of the executive committee for a term of three years, renewable. The director will report to the Dean. Financial oversight will be provided by the office of the Dean and the Division of Graduate Studies.

The Director will meet with the Dean once per quarter. He/she will convene meetings of the faculty and of the executive committee, will appoint committees (other than the executive

committee, e.g., curriculum, hiring, merit and promotion) with the advice of the executive committee. The Director will oversee program staff.

The executive committee will include representatives of the School of Public Policy as well as some faculty members from other colleges and schools at UCR. The executive committee will be composed of a minimum of five members (including the Program Director) and a maximum of six members (including the Director). The Director will have full voting rights in the executive committee. This group will set academic policy, make recommendations on curriculum, and advise the Director on the constitution of committees (e.g., hiring, merit and promotion, admissions) to be made up of Core and Affiliated members.

Executive committee members will be initially drawn from the Core faculty members and appointed by the Dean.

There will be graduate student representation on all committees except those dealing with personnel issues.

Article IV: Committee meetings

Meetings achieving a quorum (50% of the committee membership) will be empowered to take any action appropriate to that committee. Decisions will be made on the basis of a majority of the committee membership, with proxy votes accepted by consensus of the meeting attendees.

The executive committee will meet once every teaching quarter, with additional meetings if and when necessary. Additional meetings may be called by the Director in consideration of requests of faculty, staff or students. Meetings shall be conducted according to an agenda, which will include a director's report, unfinished business and new business. Minutes will be kept and provided to executive committee members at the beginning of the next meeting and by request to any Core or Affiliated faculty or to the Dean.

Article V: Amendments

Changes in these by-laws shall be proposed by the executive committee and approved by a majority of the Core faculty. The change must be discussed with the Dean and provided in writing to the Core faculty at least one week prior to the date of voting.

APPENDIX B: CORE FACULTY RESEARCH PROFILES

Peter Atkinson

Entomology

Peter Atkinson is a Professor of Entomology. His research focuses on the development of genetic strategies for the control of pest insect species. One important aspect of this is the use of gene vectors that efficiently introduce genes into these species. His most recent publications include Cruz, J., Sieglaff, D. H., Arensburger, P., Atkinson, P. W., Raikhel, A. S. Nuclear receptors in the mosquito *Aedes aegypti*: annotation, hormonal regulation and expression profiling. *FEBS J.* (in press); Lawson, D., P. Arensburger, P. Atkinson, N. J. Besansky, R. V. Bruggner, R. Butler, K. S. Campbell, G. K. Christophides, S. Christley, E. Dialynas, M. Hammond, M., C. A. Hill, N. Konopinski, N. F. Lobo, R. M. MacCallum, G. Madey, K. Megy, J. Meyer, S. Redmond, D. W. Severson, E. O. Stinson, P. Topalis, E. Birney, W. M. Gelbart, F. C. Kafatos, C. Louis, F. H. Collins. (2009). VectorBase: a data resource for invertebrate vector genomics. *Nucl. Acids Res.* 37 (database issue): pD583-587. Salvemini M., M. Robertson, B. Aronson, P. Atkinson, L. C. Polito, G. Saccone. (2009). *Ceratitis capitata* transformer-2 gene is required to establish and maintain the autoregulation of *Cctra*, the master gene for female sex determination. *Int. J. Dev. Biol.* 53: p109-120. Atkinson, P. W. Proposed uses of transposons in insect and medical biotechnology (2008). *Adv. Exp. Med. Biol.* 627: 60-70. Ray, D. A., C. Feschotte, H. J. Pagan, J. D. Smith, E. J. Pritham, P. Arensburger, P. W. Atkinson, and N. L. Craig (2008). Multiple waves of recent DNA transposon activity in the bat, *Myotis lucifugus* (2008). *Genome Res.* 18: 717-728. Tribolium Genome Sequencing Consortium (2008). The genome of the model beetle and pest, *Tribolium castaneum*. *Nature* 452;:949-955.

Julia Bailey-Serres

GENETICS

Julia Baily-Serres is a Professor of Genetics and the Director, Center for Plant Cell Biology Her areas of research and expertise are Gene Regulation; Translational Control; Abiotic Stress Signaling/Response; Low Oxygen Sensing; Flooding/Submergence and Genomic Technologies. Her current publications include the following: Selective mRNA sequestration by OLIGOURIDYLATE-BINDING PROTEIN 1 contributes to translational control during hypoxia in *Arabidopsis*. Sorenson R, Bailey-Serres J, *Proc Natl Acad Sci U S A.* 2014 Feb 11; 111(6): 2373-8, Profiling of Translatomes of in Vivo-Grown Pollen Tubes Reveals Genes with Roles in Micropylar Guidance during Pollination in *Arabidopsis*. Lin SY, Chen PW, Chuang MH, Juntawong P, Bailey-Serres J, Jauh GY *Plant Cell.* 2014 Feb ; 26(2): 602-18

Tim Close

GENETICS

Tim Close is a Professor of Genetics and a Geneticist. His research focuses on Crop Plant Genomics and Bioinformatics; High Density Genetic Linkage Maps and Marker Assisted Selection; Barley, Citrus, Cowpea, Rice, Wheat; Abiotic and Biotic Stress Regulated Genes and Proteins; Application of Transcriptome Analyses to Biomarker Development for Citrus. His most current publications include Lucas MR, Diop N-N, Wanamaker S, Ehlers JD,

Roberts PA, Close TJ. 2011. Cowpea-soybean synteny clarified through an improved genetic map. *The Plant Genome* 4: 218-225. Close TJ, Bhat PR, Lonardi S, Wu Y, Rostoks N, Ramsay L, Druka A, Stein N, Svensson JT, Wanamaker S, Bozdogan S, Roose ML, Moscou MJ, Chao S, Varshney RK, Szucs P, Sato, K, Hayes PM, Matthews DE, Kleinhofs A, Muehlbauer GJ, DeYoung J, Marshall DF, Madheshetty K, Fenton RD, Condamine P, Graner A, Waugh R. 2009. Development and implementation of high-throughput SNP genotyping in barley. *BMC Genomics* 10:582. Muchero W, Diop NN, Bhat PR, Fenton RD, Wanamaker S, Pottorff M, Hearne S, Cisse N, Fatokun C, Ehlers JD, Roberts PA, Close TJ. 2009. A consensus genetic map of cowpea [*Vigna unguiculata* (L) Walp.] and synteny based on EST-derived SNPs. *Proc. Natl. Acad. Sci. (USA)* 106: 19159-18164.

Carl Cranor

Philosophy

Professor Cranor is a Distinguished Professor of Philosophy. His generic research interests are in legal and moral philosophy. More specifically in recent years he has focused on philosophic issues concerning risks, science and the law, writing on the regulation of carcinogens and developmental toxicants, the use of scientific evidence in legal decisions, the idea of acceptable risks, protection of susceptible populations, and how society might approach the regulation of new technologies and toxicants. He is the author of *Legally Poisoned: How the Law Puts Us at Risk from Toxicants* (Harvard, 2011), *Regulating Toxic Substances: A Philosophy of Science and the Law* (1993) and *Toxic Torts: Science, Law and the Possibility of Justice* (2006), as well as co-authoring a report for the Office of Technology Assessment, *Identifying and Regulating Carcinogens* (1987), and a study by an Institute of Medicine Committee, *Valuing Health: Cost Effectiveness Analysis for Regulation* (2006). This research has been supported by grants from the National Science Foundation and the University of California Toxic Substances Research and Teaching Program. At the undergraduate level he has taught courses on ethics, political philosophy, law and society, legal philosophy, environmental ethics, Rawls, justice and utilitarianism and a rare course in the history of philosophy. At the graduate level seminars have included justice, Rawls, Rawls and utilitarianism, philosophy of the tort law, legal philosophy, and the idea of acceptable risks. He has served on science advisory panels (California's Proposition 65, Electric and Magnetic Fields, Nanotechnology, and Biomonitoring Panels) as well as on Institute of Medicine and National Academy of Sciences Committees.

Sean Cutler

BOTANY AND PLANT SCIENCES

Sean Cutler is an Associate Professor of Plant Cell Biology and Chemistry. He is also an NSF ChemGen IGERT Program Associate Director. His research is focused on two interrelated research interests— the use of chemical genetics to identify new factors that regulate Arabidopsis cell expansion and the analysis and exploitation of natural variation using small molecules. His publications include, Lozano-Juste J, Cutler SR “Plant genome engineering in full bloom.” *Trends Plant Sci.* 2014 Mar 24; Okamoto M, Peterson FC, Defries A, Park SY, Endo A, Nambara E, Volkman BF, Cutler SR, “Activation of dimeric ABA receptors elicits guard cell closure, ABA-regulated gene expression, and drought tolerance.” *Proc Natl Acad Sci U S A.* 2013 Jul 16; 110(29): 12132-7, Forde BG, Cutler SR, Zaman N, Krysan PJ

“Glutamate signalling via a MEKK1 kinase-dependent pathway induces changes in Arabidopsis root architecture” *Plant J.* 2013 Jul ; 75(1): 1-10

Anil B. Deolalikar

Economics

Anil Deolalikar is a Professor of Economics and Founding Dean of the School of Public Policy. His research focuses primarily on poverty and human development in developing countries; economics of child health and nutrition; social-sector policy reform in developing countries; and economics of education. His recent publications include Deolalikar and Nandi, “Does a Legal Ban on Sex-Selective Abortions Improve Child Sex Ratios? Evidence from a Policy Change in India,” *Journal of Development Economics*, 2013; *Handbook on Food: Demand, Supply, Sustainability and Security* (co-edited with Gaiha and Jha), Edward Elgar Publishing Ltd., forthcoming; “Hunger and Malnutrition: Alternative Perspectives,” in Bjorn Lomborg, ed., *Global Crises, Global Solutions*, Cambridge University Press, 2013; “Human Development in India: The Contradictions of Progressive Policy,” *East Asia Forum Quarterly*, Vol. 4, No. 1, January-March 2012; “Financing Health Improvements in India” (with Jamison, Jha, and Laxminarayan), *Health Affairs* 27(4), June 2008; “Tobacco Initiation, Cessation and Change: Evidence from Vietnam” (with Laxminarayan), *Health Economics* 13(12), 2004; “Health Insurance and Treatment-Seeking Behaviour: Evidence from a Low-Income Country” (with Jowett and Martinsson), *Health Economics* 13, 2004: 845-857; and “Economies of Scale and Scope in Vietnamese Hospitals” (with Weaver), *Social Science and Medicine* 59, 2004: 199-208.

David Eastmond

CELL BIOLOGY AND NEUROSCIENCE

David Eastmond is a Professor and Chair of the Department of Cell Biology & Neuroscience and Research Toxicologist. His research focuses on the mechanisms involved in the toxicity and carcinogenesis of environmental and agricultural chemicals. His studies involve a variety of chemical, biochemical and molecular approaches using isolated enzymes, cells in culture and animal model systems. His most current publications include Zhang L, Steinmaus C, Eastmond DA, Xin XK, Smith MT (2009) Formaldehyde exposure and leukemia: A new meta-analysis and potential mechanisms, *Mutation Research – Reviews* 681:150-168., Guyton KZ, Kyle AD, Aubrecht J, Cogliano VJ. Eastmond DA, Jackson M, Keshava N, Sandy MS, Sonawane B, Zhang L, Waters MD, Smith MT (2009) Improving Prediction of Chemical Carcinogenicity by Considering Multiple Mechanisms and Applying Toxicogenomic Approaches, *Mutation Research – Reviews* 681:230-240.

Kevin Esterling

Political Science

Kevin Esterling’s research interest focuses on deliberative democracy in American national politics. His current work identifies the conditions that lead citizens to engage constructively in public discourse. He is the author of *The Political Economy of Expertise: Information and Efficiency in American National Politics* (University of Michigan Press, 2004). Recent publications include: “Connecting to Constituents: The Delusion of Representation Practices among Congressional Websites” (with David Lazer and Michael Neblo), *Political Research*

Quarterly, forthcoming; "The Multiple Institutional Logics of Innovation" (with David Lazer, Michael Neblo, Curtis Ziniel, and Ines Mergel), *International Public Management Journal*, forthcoming; Representative Communication: Website Interactivity & 'Distributional Path Dependence' in the U.S. Congress" (with David Lazer and Michael Neblo), *Political Communication*, forthcoming; "Estimating Treatment Effects in the Presence of Selection on Unobservables: The Generalized Endogenous Treatment Model" (with David Lazer and Michael Neblo), *Political Analysis* 19 (Spring): 205-226, 2011.

Elizabeth Davis

PSYCHOLOGY

Elizabeth Davis is an Assistant Professor of Psychology. Her research focuses on understanding how emotion regulation relates to adaptive outcomes (e.g., learning) and maladaptive outcomes (e.g., anxiety) in childhood. Her work also focuses on identifying mechanisms responsible for effective emotion regulation (e.g., attentional focus) to explain why certain emotion regulation strategies attenuate negative emotion and distress. Her most recent publications include Davis, E. L., & Levine, L. J. (2012). Emotion regulation strategies that promote learning: Reappraisal enhances children's memory for educational information. *Child Development*, DOI: 10.1111/j.1467-8624.2012.01836.x; Davis, E. L., & Buss, K. A. (2012). Moderators of the relation between shyness and behavior with peers: Cortisol Dysregulation and Maternal Emotion Socialization. *Social Development*, DOI: 10.1111/j.1467-9507.2011.00654.x.; Davis, E. L., Greenberger, E., Charles, S. T., & Chen, C. S. (2012). Emotion experience and regulation in China and the United States: How do culture and gender shape emotion responding? *International Journal of Psychology*, DOI: 10.1080/00207594.2011.626043.

Robin DiMatteo

PSYCHOLOGY

Robin DiMatteo is a Distinguished Professor of Psychology. She has spent her entire career at UC Riverside and is a recipient of the Distinguished Teaching Award. Since she was a graduate student under the mentorship of Dr. Robert Rosenthal, Robin has studied the micro-social environment of health care delivery. Her work on dyadic interactions in health care has focused on physicians, patients, and nurses. She is interested in interpersonal behavior including both providers' and patients' verbal and nonverbal communication, and she examines whether training programs for providers and patients can help close the communication gap. Robin also studies the measurement and prediction of patient adherence, focusing on patient knowledge, beliefs, attitudes, behavioral constraints, depression, social support, illness severity, and provider-patient communication as they affect patients' willingness and ability to follow a variety of preventive and treatment recommendations. Her current work involves the study of income and ethnic group disparities in provider-patient communication and in the promotion and maintenance of patient adherence to treatment. She is especially interested in the health care interaction process for patients from vulnerable populations. Her publications include DiMatteo, M.R., Haskard, K.B., & Williams, S.L. (2007). Health beliefs, disease severity, and patient adherence: A meta-analysis. *Medical Care*, 45, 521-528. Haskard, K.B., DiMatteo, M.R., & Heritage, J. (in press). Affective and instrumental communication in primary care

interactions: Predicting the satisfaction of nurses and patients. *Health Communication*. Williams, S.L., Haskard, K.B., & DiMatteo, M.R. (in press). The therapeutic effects of the physician-older patient relationship: Effective communication with socially and economically vulnerable older patients. *Clinical Interventions in Aging*.

John Fischer
PHILOSOPHY

John Fischer is a Distinguished Professor of Philosophy. His main research interests lie in free will, moral responsibility, and both metaphysical and ethical issues pertaining to life and death. He is the author of *The Metaphysics of Free Will: An Essay on Control*; with Mark Ravizza, *Responsibility and Control: A Theory of Moral Responsibility*; and *My Way: Essays on Moral Responsibility*. His recent work includes a contribution to *Four Views on Free Will* (in Blackwell's Great Debates in Philosophy series) and three collections of essays all published by Oxford University Press: *My Way: Essays on Moral Responsibility*; *Our Stories: Essays on Life, Death, and Free Will*; and *Deep Control: Essays on Free Will and Value*. His undergraduate teaching includes an introductory ethics course, philosophy of law, theories of distributive justice, and philosophy of religion. He has also taught various courses on death and the meaning of life. His graduate teaching has primarily focused on free will, moral responsibility, and the metaphysics of death (and the meaning of life). Fischer is currently (as of July 1, 2012) serving as President of the American Philosophical Association, Pacific Division and also Project Leader for The Immortality Project, a major grant supported by the John Templeton Foundation.

Howard Friedman
PSYCHOLOGY

Howard S. Friedman is Distinguished Professor of Psychology at the University of California, Riverside. His scientific work on health and longevity has drawn wide attention in the scientific community and has been featured in popular media worldwide. For three decades, Dr. Friedman has studied personality predictors of longevity, developing a scientific understanding of the "disease-prone personality" and the "self-healing personality."

His newest book is: [*The Longevity Project: Surprising Discoveries for Health and Long Life from the Landmark Eight-Decade Study*](#). NY: Hudson Street Press. Based on the most extensive study of longevity ever conducted, [*The Longevity Project*](#) shows what really impacts our health and lifespan — including friends, family, personality patterns, and work.

In 2008, the Association for Psychological Science (APS) awarded him the [James McKeen Cattell Fellow award](#), citing his research and ideas that are "changing how we think about the nature of health." Dr. Friedman is also the recipient of the career award for "Outstanding Contributions to Health Psychology" from the American Psychological Association (Div. 38). Professor Friedman is an elected Fellow of the American Association for the Advancement of Science (AAAS); the American Psychological Association (APA); and the Society of Behavioral Medicine.

Dr. Friedman is the Editor of the [Journal of Nonverbal Behavior](#). His research on nonverbal expressiveness and personal charisma has been widely applied in health promotion, leadership training, medical education, and viral marketing.

His books include: [The Oxford Handbook of Health Psychology](#) (Oxford, 2011); *Foundations of Health Psychology* (Oxford 2006; named an "Outstanding Academic Title" by Choice); *The Self-Healing Personality: Why Some People Achieve Health and Others Succumb to Illness* (Henry Holt 1991; iUniverse 2000; reprinted in French and German); *Personality and Disease* (Wiley, 1990; also available in Japanese edition); *Health Psychology* (Prentice Hall, 2002); and *Hostility, Coping, and Health* (American Psychological Association, 1992). He was Editor-in-chief of the *Encyclopedia of Mental Health* (Academic Press, 1998; named a "Best Reference Source of 1998" from Library Journal).

Professor Friedman is also known for his textbooks: *Personality: Classic Theories and Modern Research 5e* (Allyn & Bacon, 2012) and *The Personality Reader* (Allyn and Bacon, 2008). He has received UCR's [Distinguished Teaching Award](#), as well as the Outstanding Teacher award from the Western Psychological Association (WPA). In 2012, he was awarded the Elizabeth Hurlock Beckman Award Trust prize "for inspiring students to make a difference in the community." See <http://newsroom.ucr.edu/2829>.

Mary Gauvain PSYCHOLOGY

Mary Gauvain is a Professor of Psychology. Her research focuses on how social and cultural processes contribute to children's acquisition, organization, and use of cognitive skills. A fundamental question about human cognition that underlies her research is: How do children grow up to be competent members of the community in which they live? Recent publications include: Gauvain, M., & Perez, S. M. (2008). Mother-child planning and child compliance. *Child Development, 79*, 761-775; Gauvain, M., & Perez, S. M. (2007). The socialization of cognition. In J. Grusec & P. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 588-613). New York: Guilford; Pan, Y., Gauvain, M., Liu, Z., & Cheng, L. (2006). American and Chinese parental involvement in young children's mathematics learning. *Cognitive Development, 21*, 17-35; Gauvain, M., & Perez, S. M. (2005). Parent-child participation in planning children's activities outside of school in European American and Latino families. *Child Development, 76*, 371-383.

T. S. Harvey ANTHROPOLOGY

T.S Harvey is an Assistant Professor of Anthropology. Broadly, Professor Harvey's work is grounded in medical and linguistic anthropology as well as global public health with geographical areas of specialization in Guatemala, Mexico, and the United States. Topically, his focus on language use in health care spans from micro analyses of cross-cultural doctor-patient interactions, to macro analyses of risk communication in public health campaigns, through the theoretical and methodological development of new approaches like "the ethnography of polyphony" that seek to open the disciplinary dialogues of anthropology up to the heterogeneous voices and perspectives of its subjects, on to applied research and physician education in the areas of cultural and communicative competence in health care, and into international collaborations on crisis management, risk communication, and

disaster relief efforts. Dr. Harvey is also a member of "One Health: Water, Animals, Food and Society," a UC Riverside and UC Davis Center of Expertise (COE) within the University of California Global Institute (UCGI). His most recent publications include Harvey, T.S. (forthcoming) *Wellness Beyond Words : Maya Compositions of Speech and Silence in Medical Care*. University of New Mexico Press. Harvey, T.S. *Cyanobacteria Blooms: Maya Peoples between the Politics of Risk and the Threat of Disaster*. *Medical Anthropology: Cross-Cultural Studies in Health and Illness*. 2012 Harvey, T.S. (2011) *Maya Mobile Medicine: The 'Other' Public Health*. *Medical Anthropology Quarterly*. 25:1. 2011 Sepehri, Diana S. and T.S. Harvey. *Osteopathic Summer Preceptorship in Guatemala: Hands-On Cultural Competency*. In *California DO: The Journal of the Osteopathic Physicians & Surgeons of California*. Fall 2009

David Lo

Biomedical Sciences

David Lo is a Distinguished Professor of Biomedical Sciences. He joined UCR in 2006 from prior positions at the La Jolla Institute for Allergy and Immunology, the biotech company Digital Gene Technologies, and the Scripps Research Institute. In addition to his faculty position in the UCR medical school's Division of Biomedical Sciences, Professor Lo is affiliated with the UCR Center for Disease Vector Research and the UC Global Health Institute. He is a Fellow of the American Association for the Advancement of Sciences (2007) and a 2005 recipient of a "Grand Challenges in Global Health" award, Bill and Melinda Gates Foundation and the Foundation for the National Institutes of Health. His current publications include Wang, J., Gusti, V., Saraswati, A., and Lo, D. D., *Convergent and divergent development among M cell lineages in mouse mucosal epithelium*. *J. Immunol.* 187:5277-85, 2011. (PMID: 21984701). Lopez de Victoria, A., Gorham, R.D., Bellows, M.L., Ling, J., Lo, D.D., Floudas, C.A., and Morikis, D., *A new generation of potent complement inhibitors of the Compstatin family*. *Chemical Biology and Drug Design*, 77:431-40, 2011. (PMID: 21352502). Eckelhoefer, H.A., Rajapaksa, T.E., Wang, J., Stover-Hamer, M., Appleby, N.C., Ling, J., Lo, D.D., *Claudin-4: Functional studies beyond the tight junction*. *Methods Mol. Biol.* 762: 115-128, 2011. (PMID: 21717353). Ploix, C.C., Noor, S., Crane, J., Masek, K., Carter, W., Lo, D.D., Wilson, E.H., and Carson, M.J., *CNS-derived CCL21 is both sufficient to drive homeostatic T cell proliferation and necessary for efficient T cell migration into the CNS parenchyma following Toxoplasma gondii infection*. *Brain, Behavior, and Immunity* 25:883-96, 2011. (PMCID: PMC3032828).

Mindy Marks

Economics

Mindy Marks is an Associate Professor of Economics. Her research focuses on labor economics, health economics and applied microeconomics. Recent publications include: [Occupational Licensing and Minorities: A Reply to Klein, Powell, and Vorotnikov](#) *Econ Journal Watch*, (with [Marc Law](#)), 2012; [Do Course Evaluations Truly Reflect Student Learning? Evidence from an Objectively Graded Post-Test](#) *Economics of Education Review*, 31(5):709-719 (with [David Fairris](#) and [Trinidad Beleche](#)), 2011; [Motherhood and Female Labor Supply in the Developing World: Evidence from Infertility Shocks](#) *Journal of Human Resources*, 46(4):800-826 (with [Jorge Agüero](#)), 2011; [Minimum Wages, Employer-Provided Health Insurance and the Nondiscrimination Law](#)

Industrial Relations, 50(2):241-262, 2011; [The Falling Time Cost of College: Evidence from Half a Century of Time Use Data](#) *The Review of Economics and Statistics*, 93(2):468-478 (with [Philip Babcock](#)), 2009; [Effects of Occupational Licensing Laws on Minorities: Evidence from the Progressive Era](#) in *The Journal of Law and Economics*, 52(2):351-366 (with [Marc Law](#)), 2008; [Motherhood and Female Labor Force Participation: Evidence from Infertility Shocks](#) in *American Economic Review*, 98(2):500-504 (with [Jorge Agüero](#)).

Juliet McMullin

Anthropology

Juliet McMullin is an Associate professor of Anthropology. She specializes in Cultural and Medical Anthropology. She is the author of *The Healthy Ancestor: Embodied Inequality and the Revitalization of Native Hawaiian Health*, and co-editor of the School of Advanced Research volume *Confronting Cancer: Metaphors, Advocacy, and Anthropology*. She has had an enduring interest in the production of health knowledge and inequalities, and a passion for translating that interest to her work with local communities and students. She is an active member of the UC Global Health Initiative, a board member for the Society for Medical Anthropology, and co-organizer for the Center for Ideas and Society Medical Narratives workgroup. Her current research examines the field of graphic medicine, the social and material role of graphic novels in narrative medicine and health inequalities. Recent articles include: McMullin J., Bone, M., Pang, K., Pang, V., McEligot, AJ. [Native Hawaiian Voices: Enhancing the Role of Cultural Values in Community Based Participatory Research](#). *California Journal of Health Promotion*. 2010; 8(SI):52-62; McMullin JM, [The Call to Life: Revitalizing a Healthy Hawaiian Identity](#). *Social Science and Medicine*. 2005; 61:809-820; and Chavez LR, McMullin JM, Mishra SI, Hubbell FA. [Beliefs Matter: Cultural Beliefs and the Use of Cervical Cancer Screening Tests](#). *American Anthropologist* 2001; 103:1-16.

Misaki Natsuaki

PSYCHOLOGY

Misaki Natsuaki is an Assistant Professor of Psychology, Her research focuses on the roles of puberty, biological and environmental origins of vulnerability to psychopathology, and family environment. Her most recent publications include Natsuaki, M. N., Leve, L. D., Harold, G. T., Neiderhiser, J. M., Shaw, D. S., Ganiban, J. M., Scaramella, L. V., & Reiss, D. (in press). Transactions between child social wariness and observed structured parenting: Evidence form a prospective adoption study. *Child Development*. Natsuaki, M. N., Leve, L. D., Neiderhiser, J. M., Shaw, D. S., Scaramella, L. V., Ge, X., & Reiss, D. (in press). Intergenerational transmission of risk for social inhibition: The interplay between parental responsiveness and genetic influences. *Development and Psychopathology*. Natsuaki, M. N., Leve, L.D., & Mendle, J. (2011). Going through the rites of passage too early: Timing and transition of menarche, childhood sexual abuse, and anxiety (Special section on pubertal development), *Journal of Youth and Adolescence*, 40, 1357-1370.

G. Richard Olds

MEDICINE

Dr. G. Richard Olds is the Vice Chancellor of Health Affairs and the Founding Dean of the School of Medicine. Dr. Olds is a graduate of Case Western Reserve University School of

Medicine and trained in internal medicine at the Massachusetts General Hospital in Boston. He was an infectious disease fellow and one of the nation's first Geographic Medicine fellows at University Hospitals of Cleveland, where he also served as medical chief resident and a faculty member. In 1986, Olds went to Brown University where he rose to full professor of medicine, pediatrics, molecular, cell and developmental biology and headed that institute's International Health Institute. In 1993, he became professor and chairman of medicine at the MetroHealth Campus of Case Western Reserve University and in 2000, was appointed as professor and chair of medicine at the Medical College of Wisconsin. In 2010, he became vice chancellor of health affairs and founding dean of the School of Medicine at the University of California, Riverside.

Olds is a tropical disease specialist who has served on the WHO expert committee on schistosomiasis, the WHO working group in the health of school aged children, and the board of a Gates Foundation Initiative to de-worm children in sub-Saharan Africa. Olds is author of more than 100 peer-reviewed articles, book chapters and reviews, primarily focused on international health issues.

Known as an educational innovator, Olds has taught undergraduates at Brown and medical students during all four years of training at Case Western Reserve University, Brown and Medical College of Wisconsin. He has won an outstanding teaching award at each institution and he was elected by his peers to the Society of Teaching Scholars at the Medical College of Wisconsin. Olds advised more than 100 students a year at the Medical College of Wisconsin and received the MCW Student Assembly's "Standing Ovation" Award for these activities.

Olds came to UCR to develop a School of Medicine — the first public medical school in California in more than four decades — which was intended to address the severe doctor shortage in Inland Southern California. In addition, the medical school is developing pipeline programs to bring more diversity into the medical profession, transforming the orientation of medical education to emphasize cultural competency, prevention and outcomes, and serving as a catalyst to improve the health of an area of California that fares poorly in several health indicators.

Chandra Reynolds

PSYCHOLOGY

Chandra Reynolds is a Professor of Psychology. Her primary research focuses on how and why individuals differ from one another in health and cognition across development. Her most recent publications include, Reynolds, C.A., Gatz, M., Pedersen, N.L., & Prince, J.A. (2011). An assessment of CETP sequence variation in relation to cognitive decline and dementia risk. *International Journal of Molecular Epidemiology and Genetics*, 2, 122–129. Sharp, E.S., Reynolds, C.A., Pedersen, N.L., & Gatz, M. (2010). Cognitive engagement and cognitive aging: is openness protective? *Psychology & Aging*, 25, 60-73. Kern, M.L., Reynolds, C.A., & Friedman, H.S. (2010). Predictors of Physical Activity Patterns Across Adulthood: A Growth Curve Analysis. *Personality and Social Psychology Bulletin*, 36, 1058-1072. Reynolds C.A., Gatz, M., Prince, J.A., Berg, S., & Pedersen, N.L. (2010). Serum lipid levels and cognitive change in late life. *Journal of the American Geriatrics Society*, 58, 501-509. Reynolds, C.A., Hong, M-G., Eriksson, U., Blennow, K., Wiklund, F., Johansson, B., Malmberg, B., Berg, S., Alexeyenko, A., Grönberg, H., Gatz, M., Pedersen, N.L., & Prince,

J.A. (2010). Analysis of lipid pathway genes indicates association of sequence variation near SREBF1/TOM1L2/ATPAF2/ with dementia risk. *Human Molecular Genetics*, 19, 2068-2078.

Phil Roberts

NEMATOLOGY

Phil Roberts is the Chair of the Nematology Department as well as a Professor of Nematology. His research focuses on the integrated management of plant parasitic nematodes. Current work includes studies of resistance gene inheritance, development of gene markers, genome mapping, and gene transfer. He has provided leadership to a number of committees for the Society of Nematologists, serves on the Editorial Board for the journal *Nematology*, and has been a long-time member of the Cotton Disease Council of the National Cotton Council. His publications include, DeVay, J.E., A.P. Guitierrez, G.S. Pullman, R.J. Wakeman, R.H. Garber, D.P. Jeffers, S.N. Smith, P.B. Goodell and P.A. Roberts. 1997. Inoculum densities of *Fusarium oxysporum* f. sp. *vasinfectum* and *Meloidogyne incognita* in relation to the development of Fusarium wilt and the phenology of cotton plants (*Gossypium hirsutum*). *Phytopathology* 87:341-346. Keen, N.T. and P.A. Roberts. 1998.

Plant parasitic nematodes: digesting a page from the microbe book. *Proc. Natl. Acad. Sci. USA* 95:4789-4790. Ogallo, J.L., P.B. Goodell, J. Eckert and P.A. Roberts. 1999.

Management of root-knot nematodes with resistant cotton cv. NemX. *Crop Science* 39:418-421. Veremis, J.C., A.W. van Heusden and P.A. Roberts. 1999.

Mapping a novel heat-stable resistance to *Meloidogyne* in *Lycopersicon peruvianum*. *Theor. Appl. Genet.* 98:274-280. Ehlers, J. D., W.C. Matthews, A. E. Hall, and P.A. Roberts. 2000.

Inheritance of a broad-based form of root-knot nematode resistance in cowpea. *Crop Science*. 40:611-618. Ehlers, J. D., A. E. Hall, P. N. Patel, P.A. Roberts, and W.C.

Matthews. 2000. Registration of 'California Blackeye 27' cowpea. *Crop Science* 40:854-855.

Sharon Walker

CHEMICAL & ENVIRONMENTAL ENGINEERING

Sharon Walker is an Associate Professor of Chemical and Environmental Engineering. Her research interest lies at the intersection of physical, chemical, and biological processes in natural and engineered aquatic systems. The overall goal of her work is to optimize effective water treatment and distribution, wastewater reclamation, and to understand mechanisms controlling microbial transport in aquatic environments. Recent and forthcoming articles include: Bolster, C.H., Haznedaroglu, B., and Walker, S. L. "Diversity in cell properties and transport behavior among 12 environmental *Escherichia coli* isolates" *Journal of Environmental Quality* (in press); Tazehkand, S.S., Torkzaban, S., Walker, S.L., and Bradford, S.A. 2008 "Cell preparation methods influence *E.coli* D21g surface chemistry and transport in saturated porous media" *Journal of Environmental Quality* (in press); Torkzaban, S., S. S. Tazehkand, S. L. Walker, and S. A. Bradford 2008, Transport and fate of bacteria in porous media: Coupled effects of chemical conditions and pore space geometry, *Water Resour. Res.*, 44, W04403, doi:10.1029/2007WR006541; Torkzaban, S., Bradford, S.A., and Walker, S.L., 2008, "Colloid transport in unsaturated porous media: The role of water content and ionic strength on particle straining" *Journal of Contaminant Hydrology* 96:113-

127; Haznedaroglu, B., Bolster, C.H., and Walker, S. L. , 2008, "The role of starvation on bacterial adhesion and transport in saturated porous media" *Water Research* 42:1547-1554.

Linda Walling

BIOLOGY

Linda Walling is a Professor of Genetics and a Geneticist. Her research interest are Plant/pest Interactions; Defense Mechanisms; Aminopeptidases and Transferases That Modify the N-terminus of Proteins; Plant gene expression during development and in response to biotic stress. Her recent works include, "Suppression of terpenoid synthesis in plants by a virus promotes its mutualism with vectors." Luan JB, Yao DM, Zhang T, Walling LL, Yang M, Wang YJ, Liu SS *Ecol Lett.* 2013 Mar ; 16(3): 390-8, "Microarray analysis of tomato's early and late wound response reveals new regulatory targets for Leucine aminopeptidase A." Scranton MA, Fowler JH, Girke T, Walling LL *PLoS One.* 2013; 8(10): e77889, "Plant leucine aminopeptidases moonlight as molecular chaperones to alleviate stress-induced damage." Scranton MA, Yee A, Park SY, Walling LL *J Biol Chem.* 2012 May 25; 287(22): 18408-17

Bill Walton

Entymology

Bill Walton is a Professor of Entymology and Department Vice Chair. His research is in IPM of vector and pest arthropods particularly mosquitoes. Biogeography of freshwater flora and fauna. Trophic interactions of freshwater food webs. His publications include Walton, W.E. 2012. Design and management of free water surface constructed wetlands to minimize mosquito production. Special Issue on "Wetlands and Human Health". *Wetlands Ecology and Management.* 20(3):173-195. Wirth, M. C., W. E. Walton, and B. A. Federici. 2012. Inheritance, stability, and dominance of Cry resistance in *Culex quinquefasciatus* (Diptera: Culicidae) selected with the three Cry toxins of *Bacillus thuringiensis* subsp. israelensis. *Journal of Medical Entomology* 49: 886-894. Walton, W. E., D. A. Popko, A. R. Van Dam, A. Merrill, J. Lythgoe, and B. Hess. 2012. Width of planting beds for emergent vegetation influences mosquito production from a constructed wetland in California (USA). *Ecological Engineering* 42: 150-159.

Marylynn Yates

ENVIRONMENTAL SCIENCES

Marylynn Yates is a Professor of Environmental Microbiology and Dean of the College of Natural and Agricultural Sciences. Her research areas include water and wastewater microbiology, developing and improving methods to detect microorganisms in environmental samples (e.g., water, wastewater, biosolids, and soil) using traditional cultural methods as well as molecular methods; developing methods to assess the vulnerability of ground water to fecal contamination using bacteriophages; examining the factors that control the persistence of pathogenic microorganisms in the environment; assessing the potential for microbial contamination of ground water using both laboratory soil columns and field tracer studies; assessing the efficacy of water, wastewater, and biosolids treatment processes to inactivate pathogenic microorganisms; and assessing the potential for the use of mathematical models to predict the survival and transport of microorganisms in soil-water

systems. Her publications include Yeh, H.Y., Yates, M.V., Mulchandani, A., Chen, W. 2008. Visualizing the dynamics of viral replication in living cells via TAT-peptide delivery of nuclease-resistant molecular beacons. *Proceedings of the National Academy of Sciences*. 105(45):17522-17525. Cantera, J.L., W. Chen, and M.V. Yates. 2010. A simple, rapid and sensitive flow cytometry method to detect infective poliovirus based on fluorescence resonance energy transfer (FRET) technology. *Appl. Environ. Microbiol.* 76:584-588. Yeh, H.Y., M.V. Yates, A. Mulchandani, and W. Chen. 2010. Molecular beacon-quantum dot-Au nanoparticle hybrid nanoprobe for visualizing virus replication in living cells. *Chem. Commun.* 46 (22): 3914-3916.

Tuppett Yates
PSYCHOLOGY

Tuppett Yates is an Associate Professor of Psychology. Her work is conducting translational research within the integrative paradigm of developmental psychopathology. Adopting this perspective, her work emphasizes the mutually informative connections between studies of normative and atypical development, and between developmental research and clinical practice. To this end, in the Adversity & Adaptation Lab, she examines how adversity broadly, and child maltreatment in particular, influences developmental pathways toward psychopathology and competence. Employing diverse methods (e.g., behavioral observation, clinical interview, survey) with children and adolescents, my research centers on identifying the specific effects of childhood adversity across multiple levels of adaptation and influence (e.g., community, family, individual, physiological), as well as the developmental processes that underlie the emergence and patterning of these effects over time. She is especially interested in social and regulatory developmental processes, including attachment and representations of self, others, and relationships, and behavioral and emotional regulation. Her current published works include Yates, T. M., & Wekerle, C. (Eds.). (in press). Special section: The long-term consequences of childhood emotional maltreatment on development: (Mal)adaptation in adolescence and young adulthood: *Child Abuse & Neglect*. Yates, T. M., Carlson, E. A., & Egeland, B. (2008). A prospective study of child maltreatment and self-injurious behavior. *Developmental and Psychopathology*, 20. 651-671. Yates, T. M., Tracy, A. J., Luthar, S. S. (2008). Nonsuicidal self-injury among "privileged" youth: Longitudinal and cross-sectional approaches to developmental process. *Journal of Consulting and Clinical Psychology*, 76. 52-62.