

Meet the New Faculty

Alan Hubbard, Ph.D. '98 Assistant Professor of Biostatistics



"New" faculty member **Alan Hubbard** isn't exactly unfamiliar with the School. Although he was recently appointed assistant professor of biostatistics, he has been teaching classes here for almost ten years, as an instructor, then as a lecturer, then as adjunct assistant professor of biostatistics. He has also worked on many studies at the School, from examining data on schistosomiasis in China to evaluating information on indoor air pollution in Guatemala. He's even the third generation in his family to earn a degree at UC Berkeley, and his father has a bachelor's degree in public health from the School. But while the campus may not be novel for him, Hubbard loves the fact that as a biostatistician at the School, he is constantly working on new projects. "I can be studying exotic diseases in foreign places one day, and doing lab science the next. I get to survey a broad spectrum of science—and that's what I like the most."


Much of Hubbard's research centers on causal inference, looking at new ways of exploring data and defining questions of interest. This is particularly important in observational epidemiological studies, where there is no control over the distribution of the risk factor of interest in the sample population. Hubbard seeks ways of determining whether or not one risk factor plays a causal role in an outcome. For example, he is working with data from an ongoing study, led by professor of epidemiology **Ira Tager** and pediatrician **Yvonne Cheng**, which looks at birth complications and an infant's atypical birth position: face-down as opposed to face-up. The researchers want to determine if having physicians alter the infant's position to face-up would reduce or prevent the need for

Cesarean sections. However, C-sections often have multiple risk factors. Hubbard is working with the data to statistically determine how many C-sections could be prevented by re-weighting the distribution of other risk factors in the study population.

Hubbard also conducts significant research in computational biology—looking for patterns in data sets where researchers collected thousands of variables on every person. Many of these studies gather data using microarrays, collections of microscopic DNA spots used to examine the expression of thousands of genes at the same time. Rather than aim to prove or disprove a particular hypothesis, researchers sometimes examine this data to see what patterns or differences between groups emerge. This creates a welcome challenge for biostatisticians, who must explore the data aggressively but at the same time adjust for that aggressive exploration. "If you've ever stared at a stucco ceiling, you can see pictures if you look long enough," says Hubbard. "People are great at finding patterns, but we need to determine whether or not those patterns are real."

Hubbard has used these methods of exploring data for a number of studies at the School. He worked with professor of toxicology **Martyn Smith** to study data on people in China who were exposed to benzene in the workplace. Smith's group collected extensive genetic data on exposed people and on a control group, and is now examining which genes are differentially expressed. The statistical techniques help sift through data on more than 30,000 genes to determine which are effected by benzene exposure with a high level of accuracy. Understanding gene expression can help demonstrate how benzene causes certain diseases such as cancer, but it also may enable researchers to locate biomarkers, which could help predict risk for disease development.

Working on different kinds of data analysis for so many disparate studies is part of what

Hubbard appreciates about UC Berkeley. "This is the most collaborative place I've ever been," he says. This, he adds, may be the product of his role as biostatistician. Hubbard quips, "I'm sort of the academic equivalent of a plumber." He also has a great appreciation for the biostatistics students here. "Our students tend to be a very interesting lot, and we have many brilliant students here now," he says. "Most of them have pretty varied backgrounds. That's not true for all schools." 

Education

Ph.D. Biostatistics, UC Berkeley, 1998
M.S. Geology/Paleontology, Virginia Polytechnic University, 1990
B.A., Geology, UC Santa Barbara, 1985

Selected Experience

Assistant Professor of Biostatistics, School of Public Health, UC Berkeley, 2006–present
Adjunct Assistant Professor of Biostatistics, School of Public Health, UC Berkeley, 1998–2006
Research Statistician, Environmental Health Sciences, School of Public Health, UC Berkeley, 1999–present
Research Statistician, California State Office of AIDS, 1999–2001
Research Statistician, Reproductive Epidemiological Section, California Health Department, 1994–1999

Selected Publications

Van der Laan, M.J. and Hubbard, A.E. (2006.) Quantile-function based null distribution in resampling based multiple testing. *Statistical Applications in Genetics and Molecular Biology*. 5 (1).
Rachowicz, L., Hubbard, A.E., Beissinger, S.R. (2006.) Estimating and comparing offshore distributions of marbled murrelets among different regions. *Ecological Modelling*. 196: 329-344.
Hubbard, A.E., Van der Laan, M.J. (2005.) Population intervention models in causal inference. *U.C. Berkeley Division of Biostatistics Working Paper Series*. Working Paper 191.
Hubbard, A.E., Liang, S., Maszle, D., Qiu, D., Gu, X., Spear, R.C. (2002.) Estimating the distribution of worm burden and egg excretion of *Schistosoma japonica* by risk group in Sichuan province, China. *Parasitology* 125: 221-231.

Michael Jerrett, Ph.D.
Associate Professor, Environmental Health Sciences



Michael Jerrett integrates the fields of geography and public health in his work, bringing together individual characteristics affecting health—lifestyle,

occupation or genetics, for example—with geographic data to reveal the spatial aspects of health and disease.

Jerrett grew up in Ottawa, Canada, and completed his graduate work at the University of Toronto. He came to the United States in 2003, when the University of Southern California recruited him as an associate professor of preventive medicine. Last year, he was invited to apply for his current position as associate professor of environmental health sciences at the School of Public Health.

“I was attracted to Berkeley by the campus’s outstanding reputation,” says Jerrett, “and the chance to be a faculty member at one of the world’s greatest research institutions.”

Jerrett continues to collaborate with many of his Canadian and southern California colleagues. In one of several studies he is currently working on, he is examining the relationship between obesity and factors in the built environment—including proximity to grocery stores, fast-food chains or parks—in 11,000 children in 16 communities in southern California.

To date, most research on the subject has been cross-sectional in nature, says Jerrett. “Our study adds the question of longitudinal progression toward obesity,” he says. It follows what he calls the children’s “obesogenic trajectory” as they go through adolescence.

He’s also collaborating on a prospective cohort study investigating the association between air pollution and asthma incidence in children—a subject he’s explored with his Canadian colleagues as well—and he’s studying the progression of atherosclerosis in the same cohort of children. In addition, he was a coauthor on the first study to link carotid artery thickness in adults to air pollution, published in *Environmental Health Perspectives* in 2005. This work links to his other studies showing large effects from air pollution on circulatory mortality.

“The longitudinal design of these studies is important to show that exposure may be causally linked to disease,” Jerrett explains.

Canada’s universal single-payer health care system offers excellent opportunities to assemble large data sets on patient characteristics, and Jerrett’s research continues to take advantage of this. He’s currently examining the effects of air pollution on mortality and the risk of Parkinson’s disease. The manganese in MMT, an anti-knock agent added to gasoline in Canada since the 1970s, produces symptoms similar to those of Parkinson’s disease. “This has implications not just for Canada but for the U.S. and beyond—anywhere MMT is available or could be widely used.”

In a separate study examining the relationship between air pollution exposure and mortality in small geographic areas, Jerrett and colleagues have had striking findings: Data from Ontario and Hamilton showed that living within 50 meters of a major road or 100 meters of a freeway essentially nudges a person’s life expectancy down by two-and-a-half years. “That gives society and policymakers something to ponder about the health effects of traffic,” he says.

On top of a busy research schedule, Jerrett plans to lead the environmental health doctoral seminar in the Spring 2007 semester and hopes to offer a Geographic Information Systems (GIS) course at the School

of Public Health. He also has ambitious plans to establish a GIS Health Exposure Analysis Lab on the Berkeley campus. He hopes the lab will improve research opportunities not just for public health students, but for students across campus. And within years, Jerrett says, he hopes the lab will be the “premier GIS lab in the country, if not the world.”

Education

Ph.D., Geography, University of Toronto, 1996

M.A., Political Science/Environmental Studies, University of Toronto, 1988

B.S., Environmental Science, Trent University, 1986

Selected Experience

Associate Professor, Environmental Health Sciences, School of Public Health, UC Berkeley, 2006–present

Associate Professor, University of Southern California, 2003–present

Codirector, Exposure Assessment and GIS Facility Core, Southern California Center for Environmental Health Science, 2003–present

Adjunct Associate Professor, McMaster University, 2005–present

Associate Professor with tenure, McMaster University, 1998–2005

Adjunct Associate Professor, Graduate Program in Population Health, Ontario Veterinary College, 2002–present

Teaching Postdoctoral Fellow, Tri-Council Eco-Research Environmental Health Program and Department of Geography McMaster University, 1995–1997

Selected Honors

Dangermond Endowed Speaker, Environmental Research Systems Institute and University of California, Santa Barbara, 2004

Special Graduate Faculty Member, Department of Population Health, University of Guelph, 2002

Certificate of Excellence in Undergraduate Teaching, granted by the Undergraduate Student Union of McMaster University, 1997