2009 NUTRITIONAL SCIENCES

GEORGINA HARTZELL

Georgina Hartzell looks like any Berkeley grad with a fresh diploma in hand—jeans, t-shirt, scarf, flats. But there's a brightness in her eye, having received acceptance letters from three medical schools, and when she opens her mouth, it is clear that Hartzell made up her mind long ago that she wasn't going to be just any doctor.

Hartzell received her bachelor's degree in Nutritional Sciences in May of 2009. Her passion for nutrition and medicine started early. As a teen, Hartzell volunteered at Marin General Hospital and got her first taste of the challenges of caring for underserved populations. While at Berkeley she had a job with

Kaiser Permanente's Division of Research, exploring why and how women survive breast cancer, as her mother has. By the time she was interviewing for medical school, she'd worked on health issues for young and old, and used her fluent Spanish to translate between American doctors and Honduran villagers.

As a result of these experiences, Hartzell believes there is much more to practicing medicine than prescribing drugs. She notices the lack of playgrounds in neighborhoods with more than an average share of overweight children. She sees the confusion in the eyes of emergency room patients receiving life-changing diagnoses via telephone translation services. She worries about the marginalization of patients who live in polluted neighborhoods. "For a long time it's been all about 'OK you're sick, take this and get better.' But where a person lives, what they eat, and who cares for them also influences their health. I'm interested in seeing a patient as a whole," Hartzell says.

Some of Hartzell's ideas about doctoring evolved during her five years of research work for Kaiser. In the breast cancer study, she helped collect data on over 2,000 survivors, and conducted nutrition and health status interviews. Sifting through medical records to abstract information for data points and check boxes, she struggled with the anonymity of patient ID numbers versus the human suffering written on the pages. "I like to put a face on data, to work with real people, but I understand the bigger, more important, things science can do to prevent and treat cancer."

Many interviewees asked Hartzell about the overall research results. She told them about the suite of papers linking alcohol and breast cancer recurrence, and those finding more cancer in women who have children after they're 30. She also shared findings that the weight gain produced by some anti-cancer drugs can actually be protective against recurrence—findings published in an August 2008 paper she co-authored in *Cancer Causes and Control*.

Hartzell entered an entirely different realm of research when she began working on type 2 diabetes, once referred to as adult onset diabetes. Though historically limited to older, more affluent patients, the disease is now on the rise among young children. Often these kids come from African American and Hispanic communities. While working on an Oakland research project with at-risk nine-year-olds, Hartzell says she was disconcerted to see "the jump of the disease across intersections of race, age, and income."

The Oakland project, run by UC Berkeley Professor of Nutritional Sciences and Toxicology **Sharon Fleming**, focused on nine- to twelve-year-old overweight kids. With the help of Berkeley students like Hartzell, the project provided cooking lessons, self-esteem building exercises, sports, and games at a local YMCA. The goal was to change lifestyles and eating habits before the children developed diabetes. "Until then, I wasn't really aware of the connection between type 2 diabetes and poverty. If you go to some of these neighborhoods, it's all fast food, and maybe a 7-Eleven, so how are they going to get healthy foods?" asks Hartzell.

Hartzell has also traveled to Honduras with Global Medical Brigades—a university-level version of Doctors Without Borders. Her brigade included two doctors and about 20 Berkeley students. Partnered with a local doctor and pharmacist, they traveled from village to village, setting up in schools and clinics and providing advice and supplies.

The Brigades recruited Hartzell because she spoke Spanish—a skill she had carefully cultivated to one day better serve California's current population. While communicating medical woes between doctor and patient in Honduras, Hartzell got a unique taste of what it's really like to practice medicine. She also came home with the knowledge that the Americans she'll be seeing in her future waiting room won't be so different from the Hondurans she cared for: they all have the same aches and pains and family troubles. "Whether you're in the nicest clinic in Beverly Hills or you're in a rural traveling clinic in Honduras with no plumbing, you need to help the patient feel comfortable with the whole process," she says.

Hartzell at a Global Medical Brigades clinic in rural Honduras delivering the "charla," a talk about hand washing, water purification, and ways to prevent diseases.

PHOTO CREDIT: Nicole Evans, Global Medical Brigades

Once she finishes medical school, Hartzell dreams of launching a community clinic for type 2 diabetes in a Spanish-speaking corner of a California city. She imagines a place that not only provides critical medical care, but also nutrition and physical activity classes, and a garden full of vegetables. "Maybe I can help change the field of medicine," she says. "If you really want to make a difference, you have to have a tough skin, you have to put yourself out there."

Written by: Ariel Rubissow-Okamoto | Photo by: James Block

2008 MOLECULAR TOXICOLOGY

LUDMILLA ARISTILDE

"Level-headed" is the way Ludmilla Aristilde describes her father, someone she thinks she takes after. He was the one to resolve family conflicts, to choose being a teacher over a lawyer, to build a school, and to tell Aristilde and her three brothers that education was the way to become something. He also gave his young daughter this advice: "Don't let your friends choose you, choose them." And "Don't worry about what everyone else is doing."

Every year, more than 1 million wildebeest migrate in a clockwise path through the savannahs of Kenya's Masai Mara and Tanzania's Serengeti following rain. Accompanied by more than half a million gazelles and 200,000 zebras, this incessant journey constitutes the largest mammalian migration in the world.

Perhaps this man gave Aristilde the tools she needed to leave her home in Haiti at the age of 14, enroll in a tough Brooklyn high school, and then work her way through four academic degrees capped by a doctorate in molecular toxicology from UC Berkeley. Certainly the long journey through the sexism and racism of academic science required an unusually level head. Certainly her mother's strong will, or that of the Russian Olympian who is her namesake, may have played a part. But most of her success surely comes from her own drive and smarts. She's an environmental engineer who is serious and articulate enough to change business as usual on the planet, and who embodies America's multi-racial future.

Aristilde grew up on the outskirts of Port-au-Prince, witnessing scenes of devastation that long preceded the recent earthquake. During her childhood, people continued to chop down the tropical trees that once covered the mountainsides surrounding the town—a scene that Aristilde painted as a child. "The changes in the environment had an impact on me as an artist," she recalls. It is to this deforestation, as well as to tree planting trips organized by her school in Haiti, that she attributes her first spark of interest in the environment. A cholera outbreak started her thinking about the connection between water and health that has permeated her work ever since. Though an extraordinary Jamaican teacher at her school in Brooklyn made her fall in love with chemistry a few years later, Aristilde kept building her art portfolio. By the time she graduated from Cornell University in 2003, she had degrees in both fine arts and earth sciences.

The transition from an urban all-black high school to the privileged halls of Cornell demanded adjustments. At times, students seemed reluctant to work with her because she looked different. A kindly professor called on her more often to make her aptitude more evident to her peers. Several professors served as mentors and provided encouragement. The university's Christian fellowship offered some refuge.

Aristilde found her professional path on an honors research trip to India. Heading up her own project, she sampled groundwater for contaminants in 14 villages and linked findings to local health problems. But it wasn't the science that presented the most challenges, it was the oddity of her work in a culture where most women married and settled into domestic life very young. "At that time I thought the experience was tough because of my race, but in retrospect, I believe it was because I was a woman in science, so young and yet in charge. I was only 20, and it was a minefield to navigate," she reflects. Aristilde grew from the experience. "All the pieces came together for me in India, my interest in environmental health and a sense of professional independence."

Leaving the cocoon of Cornell also helped focus Aristilde's ambitions. To better prepare for work on environmental health issues, she studied environmental chemistry and toxicology at Berkeley. Soon she was examining, on a molecular level, how pharmaceuticals interact with plants and soil. Drugs often aren't fully metabolized, and the remainder enters the sewage system. But wastewater treatment facilities aren't designed to remove such molecules, so they are discharged into the environment. Agricultural effluent can be an even greater source of pharmaceutical waste, as cows, chickens, and farmed fish get dosed with antibiotics to prevent infections from spreading in overcrowded conditions.

Aristilde's research suggests that the antibiotic Cipro can inhibit photosynthesis in an aquatic ecosystem. In a study with spinach, she found that Cipro impedes the process by which the chloroplasts in these plants turn light energy into chemical energy. Although low levels of the antibiotic over two weeks had minimal or "sub-lethal" effects, a stronger dose over a whole month resulted in plants with fewer leaves and shorter roots that soon died.

"Antibiotics are here to stay, but we need to do a better job of assessing the potential impacts of their release into the environment," she says. "My research goal is to use knowledge of a pharmaceutical's chemistry to predict whether that pharmaceutical will persist, degrade, or be bad for the environment."

Aristilde works on contaminants that trigger reverberations throughout the ecosystem. Pursuing a 2008-2009 Fulbright scholarship in France, she probed how clay particles may sequester tetracycline antibiotics and diminish their harmful effects on soil microbes. Over the past year, as a postdoctoral researcher at Princeton University, she has begun an investigation into stresses on marine phytoplankton. These tiny plantlike organisms provide up to 70 percent of our oxygen, but their survival is now threatened by an ocean chemistry altered by climate change.

"You can see the chemistry and environmental health threads in my work," she says, some of which has been published in journals such as *Environmental Science and Technology* and *Environmental Toxicology and Chemistry*. Aristilde is in the midst of preparing more papers for publication, and the Discovery Channel reported on her Cipro and spinach findings this past spring. "I want to do policy-changing environmental research," she says.

But that's not all Aristilde wants. Having inherited her parents' passion for teaching, she aims to be a professor at a major research university, where she wants to educate young minds about global environmental health issues, as well as be an example for students of every background. "It's just as important for non-minorities to be exposed to a minority professor as it is for minorities," she says.

Written by: Ariel Rubissow-Okamoto | Photo by: Bethany Bandera