These young researchers are changing your world

By Lauren Coartney

Climate change, heart disease, childhood obesity, barriers to education – these challenges define our world and shape our future.

The bad news is there are no simple solutions. An approach holds promise, then quickly becomes irrelevant. Researchers tackling complex global problems must be prepared to start over – and over and over – to rethink not only the solution, but even the problem.

Yet, they persist. Brilliant young researchers pursue the elusive cure for heart disease and the strategy to minimize global warming’s devastation. Some of them live and work right here in San Diego as faculty members of San Diego State University.

As leaders in their fields, they could go almost anywhere, but they choose SDSU, not only for its research excellence, but also for the opportunity to teach bright, diverse students and involve them in their vanguard work.

Over the last 10 years, enterprising researchers from every discipline have come to SDSU to get their hands dirty looking for answers to the dynamic problems facing society today.

With impressive credentials and millions of dollars in funded research activity, they are transforming SDSU into one of the top urban research universities.

Take a long, hard look at these seven faces – these are the people who may change how we deal with the pressing health, safety and environmental issues that define our times.

Roberta Gottlieb

“It would be the first time we could demonstrate a cause-effect relationship between the presence of gum disease and the risk for heart disease.”

Since the advent of immunizations and antibiotics, few people in the Western world die from infectious disease – no do they? Maybe the bacteria, rather than going away, found more insidious means of utilization.

“We’re only now beginning to recognize how bacteria contribute in such more subtle ways to chronic disease,” said Roberta Gottlieb.

A biology professor, Gottlieb came to SDSU last year to head the BioScience Center, which explores the connections between infection, inflammation and heart disease. With four grants from the National Institutes of Health, she is currently focused on two separate areas of research – finding ways to salvage heart muscle following heart attack and documenting a link between gum disease and heart disease.

Recent research on the latter topic indicates that inflammation is the body’s response to bacterial infection. Even local inflammation can cause arteries to harden.

“We’re moving toward this idea that’s it’s not necessarily specific pathogens going directly into the blood vessels and hardening them. The inflammatory response to multiple low-level infections is sufficient to create an environment leading to diabetes, obesity and heart disease.”

Sheldon Zhang

“We interview people in the under-world and the forgotten corners of the community. What we learn can help governments make better policy decisions regarding this segment of society.”

Wanted: Innovative entrepreneur with international experience and expert knowledge of interactive technology.

Not the words of a recruiter looking for a capable employee, the above describes the needs of law enforcement officials who find themselves always two steps behind Chinese organized crime.

Known for pulling off elaborate transnational human smuggling operations and financial crimes, such as credit card fraud and money launderings, these crafty perpetrators have long subverted justice.

Government agencies have traditionally focused on uncovering a large, well-organized criminal entity, said SDSU Sociology professor Sheldon Zhang. “It makes sense, intuitively, but we interview the criminals and find that most Chinese organized crime is done by enterprising agents.”

One of a handful of people specializing in transnational organized crime, Zhang does potentially dangerous work interviewing criminals and observing their tactics. His research helps officials undermine criminal schemes that bilk innocent people of millions of dollars.

Michelle Dean

“Personal infection is especially important in a knowledge-based economy; it is critical to understand how psychologically based knowledge, skills and abilities relate to on-the-job success.”

You’re at 30,000 feet in a line of planes waiting to land on a runway that’s also used for takeoffs. Do you know who your air traffic controllers are? More importantly, does the Federal Aviation Administration (FAA) know who they are? A mistake by one air traffic controller can kill hundreds. But colleges don’t offer this field of study, and the air space available for “practice” is hard to come by.

Management Professor Michelle Dean is helping the FAA hire smarter. The agency is faced with replacing about one-sixth of the aging air traffic control workforce as controllers hired after the 1981 strike begin to exceed the mandatory age limit.

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Dean’s focus on matching the life experiences of applicants with those of demonstrably successful
"The problem is bigger than individuals; it’s environmental."

Frank Harris III

“What’s happening to discourage boys and men from taking education seriously? The unintended effect of the way we socialize boys is that they’ve academics as a feminine endeavor.”

For more than 10 years, Marshall has been collecting data about the decisions made by children, parents and schools about diet and activity. He works directly with young people to find out whether vending machines and Nintendo or parental example leads to healthier disease and achievement for boys and academic achievement for girls.

Simon Marshall

"The problem is bigger than individuals; it’s environmental. We need policy intervention into the collective conscious, to help educators, counselors and parents."

In a vicious cycle that often leads to heart disease and diabetes, overweight adults beget obese children. Research blaming TV and Twinkies has grabbed the media and the national attention.

Edward Beighley

"As the climate changes, rainfall will affect the flooding cycle and the corresponding biogeochemical processes in large flood plains.”

Karen Emmorey

"The goal is to use sign language to ask questions about the nature of language."

Karen Emmorey seconds that argument. Her ongoing study of sign language identifies which elements of human language are universal, and which are particular to spoken or signed languages.

Edward Beighley is a civil engineering professor whose hydrological modeling of the Amazon and Congo basins could restore the predictability of flood cycles and provide critical information on floodplain characteristics. His technique to model global flooding is anchored in a GIS-based, real-time monitoring and reporting system.

For centuries – from the Nile to New Orleans – people have thrived around flood plains, where water cycles are perennially predictable. Abrupt changes in these cycles can wipe out entire communities and result in massive loss of life. With the onset of climate change, altered rainfall patterns have begun to wreak havoc on flooding cycles.

Emmorey hopes her research leads to greater endorsement of sign language in the medical community.


Frank Harris III looks for deeper roots.

Karen Emmorey also recommended sign language as simply elaborate mimicry.

"I’m trying to better understand how big flood plains behave.”

Karen Emmorey suggests that if you don’t get early exposure, because research suggests that if you don’t get early language, whether it’s speech or sign, there are later problems with understanding language and cognition.”