

DIVERSIFYING DENTISTRY

Dual-degree programs in a range of fascinating fields lead to illuminating research and nontraditional career paths.

The close association of Penn Dental Medicine with Penn's other professional and graduate schools affords the unique opportunity for students to combine their dental degree with a graduate degree in another major field of study. With the announcement this past November of a new dual-degree program in law, there are now more options than ever — a total of six innovative, inter-professional, dual-degree programs. While preparing to become dentists, qualifying students can simultaneously earn a master's degree in Bioengineering with the School of Engineering & Applied Science, in Business Administration with Wharton, in Education with the Graduate School of Education, in Bioethics or Public Health with the Perelman School of Medicine, or a Juris Doctor degree with the School of Law. Currently, 20 dental students are taking advantage of dual-degree opportunities (see box, page 12). Their experiences are leading to in-depth research and independent study opportunities that can change the way they think and shape their plans for the future. Here are three such stories from students who have taken on the challenges, and the unique benefits, of a dual degree.

EVEN BEFORE SHE ARRIVED at Penn Dental Medicine as a first-year student, Lauren Katzel (D'12), a Ukiah, Calif., native and graduate of University of California at Santa Barbara, knew that she wanted to focus on the public health aspect of dentistry. "I always pictured myself working with underserved communities," she says. "Not everyone has access to good dental care, and I wanted to help change that."

In her first year at Penn Dental Medicine, she seized the opportunities available, volunteering at a clinic in South Philadelphia with a primarily Spanish-speaking population, a position she would maintain for all four years. During the summer, she participated in Bridging the Gaps, an interdisciplinary summer internship program focusing on community health. In 2008, when she heard about a new dual-degree program being offered in conjunction with Penn's Master of Public Health program (MPH) in the Perelman School of Medicine, it sounded perfect, and she became the first Penn Dental Medicine student to graduate with both dental and public health degrees.

A WELL-ROUNDED COMBINATION: The MPH curriculum allowed Lauren to combine her primary passions. "I was able to learn not just the clinical aspects of dentistry, but also to go deeper into public health areas like epidemiology and biostatistics," she says. "I received an unusually well-rounded dental education as a result."

Though the content of the dual-degree program was just what Lauren was looking for, the workload was not without its challenges. "Tackling two graduate programs at one time was tricky, especially in terms of time management," she says. She credits Dr. Joan Gluch, Director of Community Oral Health and Associate Dean for Academic Policies, and Dr. Robert Collins (D'71), Clinical Professor of Community Oral Health, with helping her plan and schedule so that her transition was a success, and with providing support throughout her four years.

A VALUABLE RESEARCH OPPORTUNITY: As her senior year approached and she began to plan for the capstone project required for the MPH program, Lauren stumbled upon another seemingly perfect fit: a research opportunity with Rosie Frasso, PhD, CHP, Director of Education for the MPH program. Dr. Frasso was collaborating with principal investigator Jennifer Culhane, PhD, at the Children's Hospital of Philadelphia on the Philadelphia Collaborative Preterm Prevention Project (PCPPP), a large-scale study of women at high-risk for preterm birth, and invited Lauren to join the team. "I was thrilled to be given an opportunity to analyze data from a large-scale, community-based, randomized controlled trial," an ideal subject for her capstone project, Lauren remembers.

A PERFECT FIT:

Lauren Katzel, D'12

Dual-degree program in Public Health



The CCPPP, a collaboration among 12 major hospitals in Philadelphia, recruited and followed more than 1,000 women for two years. All of the subjects had a history of preterm birth, defined as less than 35 weeks of gestation. The research team was examining systemic inflammation as a cause of preterm birth, and had determined that the risk factors for systemic inflammation were stress, depression, being over- or underweight, smoking, and infection, such as periodontal disease.

More than half of the subjects had been given a periodontal exam as part of the study. How many of them had periodontal disease, and what other risk factors were present? Lauren's job was to sift through the records of 765 women to find the answers. As she methodically examined the data, a profile began to take shape: 56% of the high-risk women she studied had periodontal disease. Those identified with periodontal disease, compared with those not identified with periodontal disease, were more likely to be African American, older, of lower income, overweight or underweight, and were heavier smokers.

Lauren's results informed the growing body of research findings addressing the relationship between oral health and preterm birth, and for the first time established the prevalence of periodontal disease for a large sample of women at extremely high risk for preterm delivery. (Miguel Padilla Hernandez, D'13, a dental student currently earning a dual degree in dental medicine and public health, will continue to work on the PCPPP using the same data set and collaborating with Dr. Culhane's team on his own capstone project, which he hopes will shed further light on the issue.)

PRESENTING HER FINDINGS: Lauren presented her capstone project — the final requirement of her MPH — to fellow students and faculty in December 2012. With Dr. Frasso and other team members, this recent alumna is now completing a paper titled "Periodontal Disease Prevalence and Risk Factors in Women with a History of Early Preterm Birth," which she hopes will be published later this year. She believes her findings may be applied in the future to identify high-risk women and intervene in their prenatal care, thereby lowering preterm birth rates.

Lauren could not be more satisfied with her choice of degree or with the research experience that came with it. "Research is such a big part of dentistry, and understanding public health is such a big part of research," she says. "Knowing how to apply evidence-based reasoning will help me throughout my dental career."

STRUCTURE MEETS FUNCTIONALITY:

Haim Tawil, D'14

Dual-degree program in Bioengineering



UNDERSTANDING HOW THINGS WORK has always been a priority for Haim Tawil (D'14), who grew up in Long Branch, N.J., and studied Biomedical Engineering at Rutgers University as an undergraduate. "I'm fascinated by how structure meets functionality," says the Penn Dental Medicine junior. Originally considering medicine, he took an engineering class at Rutgers taught by a materials scientist who discussed the elements of tooth structure, and realized the two fields — dentistry and engineering — could be merged. He also liked the pioneering spirit associated with dental discoveries: "A lot of things in medicine were originally tested in dentistry. Dentistry is like the Wild West of biomaterials," he says.

As a freshman at Penn Dental Medicine, he heard Dr. Uri Hangorsky, Associate Dean for Academic Affairs, describe the dual-degree program in Bioengineering available to dental students in conjunction with Penn's School of Engineering and Applied Science. The program was slated to become available to students starting with the class of 2015, but Haim expressed so much enthusiasm that Dr. Hangorsky made the program available a year earlier. Once he worked out his schedule (the Bioengineering degree requires ten courses, two of which — biochemistry and anatomy — also count toward his dental degree), Haim found he loved the learning experience of combining classes in both subjects: "Engineering is all about problem solving," he says. "It's a great way to balance the clinical aspect of dentistry." Through his studies, he has discovered a range of interesting ways that engineering can be applied to dentistry, including instrumentation, imaging, tissue engineering, and material science.

HANDS-ON, INDEPENDENT RESEARCH: Haim had a chance to put some of his newfound learning to the test after his first year, when he was chosen by Dr. Francis Mante, Associate Professor, Division of Restorative Dentistry and Director of Biomaterials, to pursue an independent research project over the summer. (Although there is no research project required for the Master's in Bioengineering, the project earned him an independent research credit.) He collaborated with Dr. Mante in a study on surface changes in titanium implants, titled "Use of Electrochemical Spark Anodization on Titanium Surfaces to Increase Chondrocyte Adhesion and Proliferation."

Haim believes his research could have critical implications for many joint replacement surgeries, including the temporomandibular joint. Currently, titanium is used for medical implantation throughout the body. Although it has long been used for bony implants, it has not been successful in implants involving cartilage cells, such as joint replacements. Discovering a surface modification technique for titanium that would allow a single titanium implant to be compatible with both bone and cartilage cells would greatly improve the structural performance of any rehabilitated joint, says Haim. Using a process called electrochemical anodization, Haim and Dr. Mante experimented with altering the metal by creating pores on its surface, then testing its biocompatibility with bone and cartilage cells.



IN PURSUIT OF ETHICAL THINKING:

Rayna Strong, D'13

Dual-degree program in Bioethics

CONTINUING TO EXPLORE: Haim's experience in the laboratory ultimately shaped the curriculum of his dual-degree program: when the project was complete, he found that he wanted to explore related topics further, and ended up selecting engineering classes in biomaterials and environmental degradation, which in turn, have shaped his outlook on what he'd like to do in the future. While the research project was an illuminating experience for Haim, research is only one aspect of the career he envisions for himself after finishing dental school. He plans to do it all — work as a dentist, collaborate with a dental supply or other dental-related industry, and maybe even teach a biomaterials course or two in a program similar to the one he is enrolled in now. By pursuing multiple roles within dentistry and engineering, he will continue his exploration of structure, functionality, and balance.

AS A LITTLE GIRL, Rayna Strong (D'13) loved going to the dentist. "It was always a positive experience," she remembers. "I always felt good about myself when I went there. I decided early that I would be a dentist and help make other people feel good about themselves."

It was not until she attended Wheaton College in Illinois, however, that she knew what kind of dentist she wanted to be. Wheaton, a Christian liberal arts school, stressed critical, ethical, and theological analysis of just about every subject, and as a pre-dental major, Rayna understood that this way of looking at the world would figure heavily into her future practice of dentistry. In particular, she wanted to serve underserved populations, bringing dental care to those who need it most.

INSPIRED BY A MENTOR: Her convictions, and her desire to attend Penn Dental Medicine, were cemented by an internship at Oregon Health Sciences University in her hometown of Portland, where she worked closely with Dr. David Rosenstein, the founder of one of Portland's first community dental clinics, who encouraged her to look at Penn Dental Medicine's program. Dr. Rosenstein spoke enthusiastically about School and all that it had to offer: "He basically told me that Penn was where I wanted to be," she remembers.

Rayna was accepted, and, in her freshman year, learned about a dual-degree option in Bioethics, offered in conjunction with the Perelman School of Medicine, that required just five additional courses and would support and nurture her holistic view of dentistry. Focusing on the ethical examination of topics like health care rationing and cultural competency, "it allowed me to continue to think critically, and to analyze things on moral and ethical grounds, while pursuing the clinical study of dentistry," she says.

PROFESSIONAL ETHICS: Preparing to graduate this spring, Rayna is completing the final project required for the Master's in Bioethics: a paper with the working title "Reprioritizing Social Justice in Dentistry and Dental Education." In her paper, she examines the definition of professionalism as it is taught in dental schools across the country.

"What does it mean to be a professional?" she asks. "As professionals in health care, do we all have an obligation to reduce disparities and serve the underserved? We know that everyone needs dental care. What keeps us from acting on that knowledge more often?" She questions the traditional values of dental education, believing that dental schools are often run more like businesses, with more focus on the market environment than on service. She feels that of all the health care professions, dentistry is one of the more conservative and resistant to change.

Change is what she seeks: "I hope that my paper will encourage dentists, and dental schools, to look critically at themselves, and to look beyond the status quo," she says, adding that she would like to see her fellow dentists continually striving for true excellence in all aspects of practice. In addition to researching the opinions of industry leaders, her paper will include the results of interviews with student and faculty members at Penn Dental Medicine.

PUTTING IDEAS TO WORK: Rayna, who received a scholarship for dental school from the National Health Service Corps, will have a chance to put her words into action. To repay her scholarship, she will work for the next four years in an underserved area in rural Mississippi where the need is great. There, she will continue to promote the concepts that have shaped her education and her outlook: social justice, ethical thinking, and excellence. **PDJ**

—Juliana Delany

TAKING ON THE CHALLENGE

These 20 Penn Dental Medicine students are currently enrolled in dual-degree programs:

MASTER OF SCIENCE IN BIOENGINEERING

Mehren Merchant, D'14
Neel Patel, D'14
Haim Tawil, D'14
Seung Hyung Kim, D'15
Jonathan Vo, D'15

MASTER OF BIOETHICS

Jemima Louis, D'13
Matt Ryskalczyk, D'13
Rayna Strong, D'13
Sean Dekow, D'15
William Konicki, D'15

MASTER OF PUBLIC HEALTH

Miguel Padilla, D'13
Miriam Abkari, D'14
Milda Chmieliauskaite, D'14
Matthew Oishi, D'15
Eunice Chay, D'15

MASTER OF SCIENCE IN HIGHER EDUCATION

Laura Gart, D'14
Chirag Pahreet, D'14
Teemar Carey, D'15
David Greco, D'15
Matthew Paradisgarten, D'15