



STUDENT PROFILE:
SUMIN LEE, GD '13, DScD '15
NISHAT SHAHABUDDIN, D'17

Advancing the Application of Research

Two students — each with a passion for using research to make a difference in the lives of patients — are the first to take advantage of two innovative, research-focused degree programs that are helping them shape distinctive, multifaceted careers.

Sumin Lee, GD '13, DScD '15: **Doctor of Science in Dentistry (DScD)**

Dr. Lee, a 2013 graduate of the endodontics postdoctoral program, is the first graduate of Penn Dental Medicine's DScD program, which prepares students to enter the field of academic dentistry for careers in research and teaching. She defended her thesis, "The Role of NLRP3 Inflammasome in Pathogenesis of Pulpal Disease," and was awarded her DScD degree in August.

The School's DScD program, established in the 2011-2012 academic year, is open to both students pursuing their postdoctoral clinical specialty training at Penn Dental Medicine and those who have completed it elsewhere. The DScD combines the research and clinical strengths of the School, drawing faculty mentors from both the clinical and basic science departments, and offering students the chance to collaborate on research projects across disciplines here at Penn Dental Medicine as well as at Penn's Schools of Engineering and Applied Sciences, Medicine, Nursing, and Veterinary Medicine.

A native of South Korea, Dr. Lee became interested in dentistry in high school, intrigued by the idea of running her own practice and building close relationships with patients. "I

liked the idea of a career that blended art and science," she remembers. She earned her DDS and completed a three-year clinical residency training and master's program in conservative dentistry combined with operative dentistry and endodontics at South Korea's Chosun University before coming to Penn Dental Medicine.

During a visit to Penn while vacationing in the States, she was deeply impressed by the work of Dr. Syngcuk Kim, Louis I. Grossman Professor of Endodontics and a pioneer in the fields of dental pulp physiology and microcirculation. Ready for "something new and different, where I would have more influence in the lives of my patients," she made a big decision: she would move to Philadelphia to earn a certificate in endodontics at the School of Dental Medicine.

Soon after enrolling, Dr. Lee learned about the DScD degree. "I knew it would help me bring my research ideas from practice to the bench, and solve problems that would help patients live better lives," she says.

After being accepted to the program in 2012, she was introduced by Dr. Kim to Dr. Anh Le, Chair and Norman Vine Endowed Professor of Oral Rehabilitation in the Department of Oral and Maxillofacial Surgery and selected Dr. Le as her DScD mentor. Working closely with Dr. Le on research involving oral and craniofacial

tissue regeneration using orofacial mesenchymal stem cells, Dr. Lee was also able to pursue her own research interests, which deal with pulp tissue regeneration as an alternative to root canal treatment.

"A widely accepted current procedure in endodontics is to remove infected pulp tissue and fill the space with synthetic material, rather than to treat and preserve the living tissue," she explains. "If we can save the pulp tissue, we can ultimately save natural teeth." To this end, Dr. Lee isolated and characterized stem cells from both healthy and inflamed pulp to identify their role in pulpal disease and their potential use in tissue regeneration.

Presently, she is continuing to do research in Dr. Le's lab and looks forward to a career in academia as a researcher and teacher. (She loves being in the classroom, and in 2012 received an award for her outstanding contribution in teaching continuing education courses within the Department of Endodontics at Penn Dental Medicine.)

"The beauty of the DScD program is that I have been able to use my extra education and training to fill the gap between pure science and clinical practice," says Dr. Lee. "It has allowed me to become a true clinician-scientist."

Nishat Shahabuddin, D'17: **Dual Degree in Translational Research**

The daughter of a family dentist from Queens, New York, Shahabuddin, a student in Penn's seven-year bio-dental program, started dental school with the idea of someday taking over her father's practice, but she also had a keen interest in specialization and research. As a high school student, she had enjoyed interning with an oral surgeon, and as an undergraduate biology major, she developed a love of basic science. How would she combine her interests? The dual-degree program in Translational Research offered the perfect opportunity to find out (it is one of eight interdisciplinary dual degrees with Penn's other graduate schools available to students at Penn Dental Medicine).

As a first-year dental student, she was the first to enroll in the program, which, in conjunction with Penn's Perelman School of Medicine, was designed to give students a strong foundation in the fundamental techniques of translational research and enable them, using contemporary research tools, to conduct sound clinical research.

“Translational research is a balance between basic science and clinical research,” she explains. “Basic science is usually focused on reproducible results in a controlled setting, while clinical research is driven by what a patient needs. Translational research is interdisciplinary — it’s the direct application of basic science to the work of being a clinician and treating patients.” As an example, she cites the lab component of a drug trial, in which researchers use basic science to determine whether a drug is having the desired effect on patients.

Since starting the program more than a year ago, Shahabuddin is supplementing her dental school coursework with a range of research-related classes in areas like statistics, review writing, manuscript writing, study design and ethics, and disease measurement. For her, the opportunity to engage with scientists from such varied fields as medicine and veterinary science is stimulating, and allows her, as a dental student, to share her expertise on the oral cavity.

But the bulk of the degree’s workload is hands-on research, and Shahabuddin is already developing the tools she will need to carry out translational research when she graduates. She is assisting her mentors (Dr. Edward Lally, Professor, Dept. of Pathology, and Dr. Kathleen Boesze-Battaglia, Professor, Dept. of Biochemistry) in an investigation of a microorganism of the oral cavity that could be responsible for localized aggressive periodontitis, an extreme form of gum inflammation that largely affects children. She first started working with them when entering the School’s research honors program the summer before her freshman year. Currently, the team is testing for antibodies to the microorganism to see if it is causing the disease. In the future, the presence of the antibodies could be used as an identifier for patients who might be at risk for developing the disease, and will help clinicians develop effective treatments.

This rigorous combination of coursework and research, which will culminate in a thesis, “is challenging me to think about what I really want to do,” says Shahabuddin, who is considering being a clinician, a clinician educator, and a teacher of basic science, as well as a researcher.

“Penn has always been a leader in basic science,” she says, “but translational research is a newer concept, and Penn is paving the way for a new field. I’m excited to be a part of it.”