



Research Day 2017 Celebrates Faculty, Student Research

PENN DENTAL MEDICINE brought faculty and students together to share their research activities with one another and spotlight the depth of the School's research enterprise at Research Day 2017, held May 11 at the School. This was the second year for a combined student and faculty research event, designed to showcase the research being conducted throughout the Penn Dental Medicine community.

"Penn Dental Medicine Research Day now embraces all aspects and levels of research activities in the School, highlighting the great work of our faculty, junior researchers, and students," says Dr. Hyun (Michel) Koo, Chair of Penn Dental Medicine Research Day 2017. "It provides a forum for us all to learn more about each other's work."

The day's program included seven faculty presentations and two invited keynote speakers, along with a poster session that include 122 posters representing student as well as faculty/junior investigator projects.

Presenting faculty highlighted recently published research in both the basic and clinical sciences. Topics ranged from findings on the impact of diabetes on the oral microbiome (by Dr. Dana Graves, Dept. of Periodontics) and the role of the yeast-bacteria interaction in early childhood caries biofilm (by Dr. Geelsu Hwang, Dept. of Orthodontics) to a study on a receptor protein that may provide new approaches to inflammatory diseases (by Dr. Hydar Ali, Dept. of Pathology) and another on linking mechanical strain to neuroinflammation (by Dr. Claire Mitchell, Dept. of Anatomy & Cell Biology).

In other faculty presentations, Dr. Henry Daniell, Dept. of Biochemistry, talked on his work using a novel drug delivery approach, sharing that biopharmaceuticals can be delivered topically in chewing gum. The chewing gum, he explained, is impregnated with enzymes and antimicrobial peptides that are produced in plant cells to disrupt biofilms that form on teeth. In addition, Dr. Shuying (Sheri) Yang, Dept. of Anatomy & Cell Biology, discussed the discovery in her lab of a new bone protein (regulator of G protein signaling protein 12) that plays a key role in osteoporosis and inflammation-caused bone loss; and Dr. Chider Chen, also in the Dept. of Anatomy & Cell Biology, reported on findings that mesenchymal stem cell therapy can effectively rescue osteopenia and skin fibrosis in systemic sclerosis.

The day's keynote lecturers included Dr. Kam W. Leong, Samuel Y. Sheng Professor of Biomedical Engineering at Columbia University, speaking on the topic of "Bioengineering of Direct Cellular Reprogramming," and Dr. Martha Somerman, Director of the NIH's National Institute of Dental and Craniofacial Research, presenting the Joseph L. Rabinowitz Memorial Lecture on "NIDCR: Leading Advances in Oral Health Research and Innovation."

"I thoroughly enjoyed my visit to Penn Dental Medicine Research Day, which provided an opportunity for me to engage with faculty at the school and the broader campus," says Dr. Somerman. "The quality of research presented by the students was impressive, as is the vision set forth for the school by the leadership team."

A strong representation of the current research throughout the School was featured in the poster presentations, which along with 44 faculty/junior researcher posters, included 78 student projects from the Summer Research Program, the School's honors programs, the Bridging the Gaps community-internship program, and other independent student research. A faculty panel judged the student posters, presenting the Vernon Brightman Research Society Awards in first through third-place (see page 43). In addition, student and postdoctoral/young investigator research was also recognized with the awarding of the 2017 AADR Travel Grants; this year 10 DMD students and 12 individuals representing Master of Science in Oral Biology and Doctor of Science in Dentistry residents and junior investigators received Travel Grant awards. The AADR Travel Grant program was launched by Penn



Dental Medicine in 2014 to build opportunities to advance ongoing research and leadership among students and junior researchers; this year's recipients will attend and be encouraged to present their work at the 2108 AADR/CADR Annual Meeting to be held in Fort Lauderdale, Fla., in March 21-24, 2018. The 2017 Joseph and Josephine Rabinowitz Award for Excellence in Research was also presented to faculty (see page 43).

An event like Research Day can help advance research within the School in a number of ways, notes Dr. Dana Graves, Vice Dean for Research and Scholarship. "Research Day is a wonderful opportunity for researchers from different disciplines to share what they are doing and learn from each other," says Dr. Graves. "It allows students, basic research faculty, and clinical faculty to appreciate the accomplishments of each. It's a great day of exchange."

Research Day 2018 will be held Thursday, May 10, leading into Alumni Weekend 2018, May 11–12. “We encourage alumni to join us,” adds Dr. Koo. “It is a unique opportunity to interact with faculty and students and hear about the research at Penn Dental.” ■

VERNON BRIGHTMAN SOCIETY RESEARCH AWARDS

Following are highlights of the student research projects that received the Vernon Brightman Society Research Awards at Research Day 2017.

CBCT Assessment of Pubertal Growth Using Staging Methods in Orthodontics

Hassan M. Khan (D'18) was awarded first place for this study, conducted with preceptor Dr. Mel Mupparapu, Dept. of Oral Medicine

Assessment of pubertal and skeletal growth can play a pivotal role in assisting in timely orthodontic treatment. In his study, Hassan looked at three potential growth/development biomarkers to compare their reliability and validity. The study examined the speno-occipital synchondrosis, mandibular third molars, and cervical vertebrae using the 5-stage method, Demirjian method, and Cervical Vertebral Maturation Staging (CVMS) methods for prediction of pubertal growth using CBCT data sets. They found that the CVMS correlated most closely with pubertal growth and appears to be the best way to determine skeletal growth.

Changes in RPE Peroxisome Lipid Metabolism in Response to Light Onset

Jennifer A. Caughey (D'19) was awarded second place for this study, conducted with preceptors Dr. Kathleen Boesze-Battaglia and Lauren Daniel, Dept. of Biochemistry

Jennifer's research project was focused on evaluating the peroxisomal metabolism of cells found within the Retinal Pigment Epithelium (RPE) — a supportive layer of epithelium that faces the retina within the eye. It was found that there is a diurnal regulation of this metabolic pathway based on an increase in peroxisome function in the morning when compared to the afternoon. RPE cells are vital for healthy eye function, and a better understanding of this metabolic pathway can help assist in the treatment of degenerative eye diseases.



A Content Analytic Approach to Assessing Triggers of Dental Anxiety

Hallie Klein (D'19) was awarded third place for this study, conducted with preceptor Dr. Joan Gluch, Div. of Community Oral Health

In her research project, Hallie developed the Dental Anxiety Triggers Scale (DATS) based on reports from Penn Dental Medicine patients and found it to be an equally good measure of dental anxiety as the most widely used dental anxiety scale, the Modified Dental Anxiety Scale. However, the DATS has the advantage of being rooted in real patient experiences, not researcher intuitions. Because the DATS provides more concrete examples of triggers, it may be useful for dental practitioners who want to be sensitive to their patients' anxiety.

OTHER STUDENT AWARDS

2018 AADR Dentsply Sirona SCADA: Selected on Research Day to represent Penn Dental Medicine in the 2018 AADR Dentsply Sirona Student Competition for Advancing Dental Research (SCADA) program was Abby Syverson (D'19) for her research honors project titled “Lineage Specific NF-KB Inhibition in MSCs Resolves Lymphocyte Trafficking in Diabetic Fractures,” conducted with preceptor Dr. Dana Graves, Dept. of Periodontics. She will present her research at the 2018 AADR/CADR Annual Meeting in Fort Lauderdale, Fla, March 21–24, 2018

Radiology Honors: Students in the radiological sciences honors program also were recognized with awards for their joint projects — *1st place:* Thomas Yoo (D'18) and Minou Luo (D'18); *2nd place:* Heliya Ziai (D'17), Aaron Ivanhoe (D'17), Jon Shue (C'17) and Corey Toscano (D'17); and *3rd place:* Sara Gholam (D'17) and JV Cracke (D'17).

RABINOWITZ AWARD

The Joseph and Josephine Rabinowitz Award for Excellence in Research is presented annually to Penn Dental Medicine investigators. The endowed award was established by the Rabinowitz family in 2002 to support and encourage independent research. This year's award recipients, presented at Research Day 2017 include:

Dr. Sunday Akintoye, Associate Professor, Dept. of Oral Medicine

Radiation therapy for head and neck cancers can lead to the complication of jaw osteoradionecrosis. Dr. Akintoye's lab will explore the application of mesenchymal stem cells and osteoanabolic therapy for prevention and remediation of osteoradionecrosis.

Dr. Bei Zhang, Postdoctoral Fellow, Dept. of Biochemistry

Dr. Zhang will work on a project that focuses on the expression of human coagulation factors in edible plant chloroplasts for treatment of life-threatening bleeding disorders and evaluation of post-translational modifications. This approach offers noninvasive drug delivery and eliminates the immunogenic side effects of clotting actors currently used in the clinic.

