



# Meet the 2019 American Academy of Periodontology's **SUNSTAR** Innovation Grant recipients



Started in 2017, the AAP's SUNSTAR Innovation grant is intended to support member research and promote innovative periodontal treatment. Over three years, the \$250,000 grant program will be divided among six winning principal investigators, who are engaged in research that aims to identify novel and innovative evidence-based periodontal treatment approaches to enhance patient care.

*Periospectives* asked two of this year's recipients about their winning research and their inspiration.

## **An Atlas of Experimental Gingivitis in Humans at Single Cell Resolution**



**Kevin Byrd, DDS, PhD**

Kevin M. Byrd, DDS, PhD  
University of North Carolina at Chapel Hill

### **What is the goal of your research?**

Recently, there has been an exponential increase in our understanding of human diseases; however, even for common oral diseases like periodontitis, we have just begun to grasp the complexity of interactions at-play. One of the current goals of our lab is to 1) develop chairside tools to predict gingivitis to periodontitis conversion (i.e. at-risk individuals) and 2) to develop specific adjuvant therapies for periodontitis-afflicted individuals based on the principles of precision medicine.

### **What will this grant allow you to accomplish that you wouldn't have been able to do otherwise?**

To accomplish our research goal, our lab is committed to the idea that we need to better understand the various cell types that populate the gingiva in health and in

diseases such as gingivitis, periodontitis, peri-implant mucositis, and peri-implantitis. Currently, the diverse oral tissues—including the human gingiva—that comprise the oral cavity are not being included in the first version of the visionary project, the Human Cell Atlas (HCA). We--like the stated mission of the HCA--believe that “without maps of different cell types, where they are located in the body, and the genes they express, we cannot describe all cellular activities and understand the biological networks that direct them.” Recent advances in massively parallel single-cell RNA sequencing (scRNAseq) are rapidly enhancing the discovery and cataloging of resident tissue-specific cells in health and immune cell subpopulation shifts in disease. This 2019 SUNSTAR Innovation Grant is allowing us to conduct the first pilot study that uses scRNAseq of whole tissue biopsies from health and experimentally-induced inflammation in a select patient pool. These data will be submitted to the HCA to contribute some of the first oral data to this project. scRNAseq (and other single-cell sequencing technologies) are currently very expensive to conduct; without this initial funding, we would not be able to conduct this feasibility study that we hope to expand on in the next few years.

#### **What inspired the start of your research?**

Since a young age, I have been driven by a restless energy to discover. When it came to my clinical training, I also wanted to discover how to deliver the best clinical care I could, which led me to my current track as a clinician-scientist. Throughout every stage of my journey, from my high school history teacher Leslie Clark to my graduate advisor Dr. Scott Williams to my current chair Dr. Cristiano Susin, I have been fortunate to find invaluable mentors who have guided me to where I am today and continue to push me to be better as a clinician, as a scientist, and now as a mentor to the students that I have the privilege to interact with every day.



### **Improving Periodontal Health through a Precision Periodontal Health Care Chart**

Chun-Teh Lee, DDS, MS, DMSc  
University of Texas Health Science Center at Houston

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DDS, MS, DMSc**

#### **What is the goal of your research?**

The proposed project entitled “Improving Periodontal Health through a Precision Periodontal Health Care Chart” aims to effectively educate patients, monitor their risk profile for periodontitis progression, and improve treatment outcomes using a Precision Periodontal Health Care Chart in the electronic health record system. The Precision Periodontal Health Care Chart will provide patients information about the association between periodontitis and systemic diseases, risk factors, and personal risk profile for periodontitis.

#### **What will this grant allow you to accomplish that you wouldn't have been able to do otherwise?**

This grant provides a great opportunity for me to collaborate with excellent researchers in different fields including biomedical informatics and oral biology. Also, I will be able to establish a periodontal risk assessment tool in the electronic health record system and Risk Assessment Station integrated with the existing Oral Hygiene Wellness Center at UTHealth School of Dentistry.

#### **What inspired the start of your research?**

It is common to see patients with severe and uncontrolled periodontitis in the clinic because of the patient's lack of oral health knowledge and compliance. I always think it is critical to establish a practical tool in the dental electronic health record system to foster real-time provider feedback and individual risk assessment for patient education and precision health care. At the encouragement of my colleagues and department chair, I decided to apply for Sunstar Innovation Grant. ■

**Dr. Maria L. Geisinger** of the University of Alabama at Birmingham was also named a recipient of the **2019 SUNSTAR Innovation Grant**. Details about Dr. Geisinger's research will be shared in a future issue of *Periospectives*.