

Year: 2023

Type of Awards (Young)

Name of Principal Investigator: **Xi Wang** Affiliated Institution: **Sun Yat-sen University**

About of the PI (within 300 words, 12-point single-spaced font.)

- **Introduction & Education:**

Overview of your academic background and research focus, highlighting milestones of your journey as a researcher.

I began my academic journey in dental research with a specific focus on orthodontic treatment outcomes and innovations in oral health technology. Over the years, my interest has deepened in the intersection of technology and dentistry, particularly in how advanced tools such as quantitative light-induced fluorescence (QLF) and artificial intelligence (AI) can enhance patient care. My research has centered around developing and leveraging these technologies to improve plaque control and orthodontic care, marking a significant milestone in my academic career.

- **Career Trajectory:**

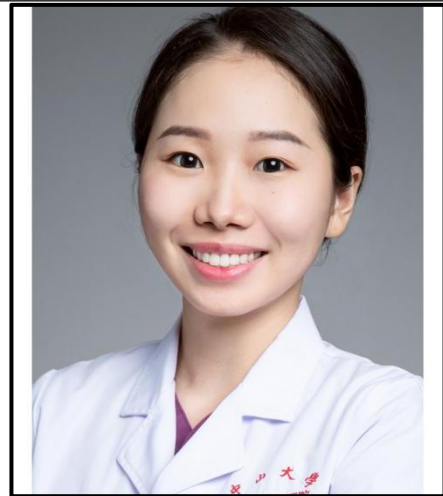
Pivotal moments in your career, including positions held, significant projects, and notable achievements.

My career in dental research has been centered on pioneering advancements in orthodontics and oral immunology. In the field of orthodontics, my work involves developing and testing new devices and technologies aimed at addressing clinical challenges. Notably, my contributions to the AI and QLF Assisted Biofeedback OHI Paradigm project have earned the 2023 New Clinical Technology Application award from the Stomatology Hospital of Sun Yat-sen University, and also led our undergraduate team to win a national science and technology competition. In the realm of basic research, I have published in esteemed journals such as the Journal of Clinical Periodontology and Cancer Research, with a focus on maintaining immune balance within the oral microenvironment.

- **Research Contributions, Impact & Recognition:**

Highlight major findings and contributions to your field, emphasizing the impact of your research.

My work demonstrates my dedication to enhancing healthcare through meticulous scientific research and interdisciplinary partnerships. I have served as the first or corresponding author on studies focusing on addressing orthodontic clinical challenges, including as a cover paper in the American Journal of Orthodontics and Dentofacial Orthopedics and in the Journal of Orofacial Orthopedics / Fortschritte der Kieferorthopädie. My basic research has also been published in the Journal of Clinical Periodontology, Cancer Research, Cancer Immunology Research, and Clinical Cancer Research. Additionally, my findings have been presented at the annual meetings of the Society of Stomatological



Biomedicine and the Chinese Stomatological Association, where I was honored with the first prize in the Youth Research Award of Stomatological Biomedicine by the Chinese Stomatological Association.

- **Personal Insights:**

Offer insights into your personal interests, values, and motivations as a researcher, sharing anecdotes that have influenced your perspective.

My motivation in research has been driven by a commitment to improve patient outcomes and make dental care more accessible and effective. A defining moment that shaped this perspective was witnessing the struggle many patients face in maintaining proper oral hygiene with orthodontics. This experience highlighted the need for more intuitive and engaging tools that empower patients in their own care. My passion for technology and patient education stems from this foundational experience, guiding my research and development efforts.

- **Future Directions:**

Outline your envisioned research directions and aspirations, detailing how you plan to continue advancing knowledge and addressing emerging challenges in your field.

Looking ahead, I am excited to expand the capabilities of our AI and QLF technologies to include broader diagnostic applications beyond plaque detection. I envision developing a platform that not only assists in oral hygiene but also helps in early detection and management of dental diseases. Another goal is to enhance the interactivity and user-friendliness of our applications, making them more adaptable to diverse patient needs and potentially integrating them with telehealth services. These advancements will continue to push the boundaries of what technology can achieve in dental medicine and orthodontics.

Brief Summary of the Project:

In orthodontic patients, inadequate plaque control is widespread and adversely affects the outcome of orthodontic treatment. Additionally, the rise of teleorthodontics and remote monitoring in clear aligner therapy has a lack of dental plaque supervision, heightening the risk of oral diseases during teleorthodontic procedures.

This research endeavor seeks to formulate and assess a novel oral hygiene instruction (OHI) approach specifically tailored to orthodontic patients, leveraging Quantitative Light-Induced Fluorescence (QLF) and Artificial Intelligence (AI). The significance of this study lies in its potential to enhance oral hygiene practices in orthodontic patients by offering both visual and mechanical feedback, thereby promoting dental and periodontal health and ultimately resulting in improved orthodontic treatment outcomes. Through the integration of state-of-the-art technology into daily health routines, this project aims to revolutionize patient care.