



Dr. Jonas Bianchi
2026 Biomedical Research Award
University of the Pacific

SHORT BIOGRAPHY

Dr. Jonas Bianchi is a tenured Associate Professor and Program Director at the University of the Pacific, Arthur A. Dugoni School of Dentistry in San Francisco. He completed orthodontic residency training and earned a master's degree at the University of the Pacific, Arthur A. Dugoni School of Dentistry, and also completed orthodontic residency training and earned a master's degree at the State University of

São Paulo, Brazil. He also earned a Ph.D. from the State University of São Paulo and completed a postdoctoral fellowship at the University of Michigan. He is a Diplomate of the American Board of Orthodontics. Dr. Bianchi collaborates with the University of North Carolina Orthodontics program on NIH-funded research at the intersection of artificial intelligence, natural language processing, and advanced 3D craniofacial imaging.

BRIEF DESCRIPTION OF THE PROJECT

The project, titled "ORTHO-NAV: AI-Powered Decision Navigator and Educational Platform for Orthodontic Treatment Planning," introduces an interactive, AI-powered orthodontic database designed to support clinical treatment planning and resident education. By organizing and analyzing real patient data from an institutional database of approximately 700 to 1,000 de-identified cases, ORTHO-NAV helps clinicians and students explore how similar cases were diagnosed and treated in the past, creating a transparent and data-driven foundation for clinical decision-making. The system will use decision models with SHAP-based interpretability to predict likely treatment pathway, such as extraction, orthopedics, surgical versus non-surgical approaches, across major clinical scenarios. Unlike existing orthodontic software that focuses on visualization or measurements alone, ORTHO-NAV emphasizes explainability, showing which diagnostic features most influenced past treatment choices. The platform planned to be deployed through a locally hosted interactive web interface that allows users to input patient data, visualize AI-generated decision trees, and explore similar historical cases for educational and clinical insight.

HOW ORTHODONTIC EDUCATION WILL BENEFIT FROM THIS AWARD

ORTHO-NAV directly transforms how orthodontic residents learn clinical reasoning. Traditional case-based education relies heavily on faculty experience and real-time teaching, which limits scalability and consistency. This platform converts our institutional database into a living, interactive educational resource that residents can search at any time. By allowing trainees to input diagnostic variables, observe AI-generated treatment pathways, and explore "what-if" scenarios, ORTHO-NAV builds critical thinking and diagnostic confidence in a way that passive case review cannot. The award will also expose students to the principles of explainable artificial intelligence in a meaningful clinical context, preparing them for a future where data-driven tools are central to orthodontic practice. Residents will learn to interpret SHAP-based feature importance plots, understand which diagnostic variables drive treatment decisions, and critically evaluate AI-generated recommendations with appropriate clinical oversight.

THE IMPORTANCE OF THE FOUNDATION TO THIS PROJECT

The AAOF's support is foundational to the successful development of ORTHO-NAV. The Foundation provides the funding necessary to build the computational infrastructure, acquire secure data management tools, and establish the high-performance computing environment required to train and validate the AI models at the core of this platform. Without this investment, the one-year development phase that establishes the database architecture, model training pipeline, and interactive interface would not be feasible within the constraints of current institutional resources. Beyond direct research support, the Foundation's funding brings professional credibility that strengthens efforts to attract additional federal funding and multi-institutional partnerships. The AAOF has been a big strength of my research trajectory at the University of the Pacific, and each prior award has expanded the infrastructure and collaborative network that makes this current project possible.

HOW FOUNDATION FUNDING HAS BENEFITED MY CAREER

The AAOF has been instrumental in my development as a faculty member and researcher. Beginning with the 2022 Orthodontic Faculty Development Fellowship Award, Machine Learning Approaches for Segmentation and Integration of Root Canal and Dental Crown, each successive award has built directly upon the previous one. The 2023 Orthodontic Faculty Development Fellowship Award, Can Artificial Intelligence Approaches Predict the Need for Orthognathic Surgery?, resulted in a peer-reviewed publication in Orthodontics & Craniofacial Research, a presentation at the AADOCR Annual Meeting, and preliminary data that supported an NIH R01 grant submission. Building on these accomplishments, I received a third Orthodontic Faculty Development Fellowship Award in 2024 for Orthognathic vs. Orthodontic Treatment: A Comparative Study of AI and Clinical Diagnosis. This project provided the foundation for a subsequent NIH R01 proposal comparing artificial intelligence and clinical decision-making in craniofacial patients, which is currently under review.

Beyond supporting my research, the AAOF's sustained investment has played a pivotal role in my professional advancement. It provided the scientific foundation that contributed to my promotion to Associate Professor with tenure and my appointment as Program Director. The funding has also supported additional scholarly accomplishments, including a book chapter in the 51st Moyers Symposium Monograph and multiple presentations at the AAO Annual Session and other national and international conferences.