# Orthodontic Faculty Development Fellowship Award

## Dr. Shivam Mehta, *Marquette University*

### Biography

Dr. Mehta is full-time faculty - assistant professor in the department of Developmental Sciences/Orthodontics at Marquette University School of Dentistry. He is a dental graduate from India. He also obtained his master's degree and certificate in orthodontics from India. In 2018 he completed a 1-year fellowship program on Recent Advances in Orthodontics at University of Illinois, Chicago. Following his fellowship, he was invited to join University of Connecticut for a dual degree/certificate program (Master of Dental Science and certificate in orthodontics). He completed his orthodontic residency from the University of Connecticut in 2021 and joined academia after graduation as a full-time faculty at Marquette University. He has been proactive in advancing his knowledge in clinical orthodontics and translational research.

### Project Synopsis

The current research proposal entails the development of a user-friendly artificial intelligence (AI) based decision making for orthodontic diagnosis. It will utilize more than 14,000 cephalometric radiographs and a multicomponent model using the deep learning technique - Regression convolutional neural networks (RCNN). The first aspect of the project entails the automated identification of landmarks on lateral cephalograms. The accuracy of AI based landmark identification will also be compared with human examiners with different levels of experience. The second part of the project includes the interpretation and automated diagnosis from the feature variables of the datasets including cephalometric radiographs, panoramic radiographs, and photographs. It will work by 1) receiving inputs in the form of specific data (feature variables) obtained from patient radiographs; 2) automatically applying its multicomponent model & RCNN to analyze data & provide diagnosis; and 3) recommend a primary and alternate treatment option out of 14 possible options. The RCNN model proposes to optimally combine safety, accuracy, and interpretability, allowing the clinician to understand why an extraction (or non-extraction) decision was taken. It will also continuously update itself with new information from patients, literature, and research.

### Importance of AAOF Funding

Dr. Mehta is very thankful to AAOF for funding the project. The support and generous funding from AAOF Orthodontic Faculty Development Fellowship (OFDFA) will play a key role in conducting his research. Dr. Mehta's desire is to excel in academia. The completion of this research will serve as a key professional steppingstone to advance his career goals in academia combining his interests in clinical excellence, teaching, personal development, and research.