# Biomedical Research Award

## Dr. Bingshuang Zoe, *The University of British Columbia*

I finished my Ph.D. and orthodontic specialty combined program from Peking University in Beijing, China in 1998, and began my academic career in the Department of Orthodontics, School and Hospital of Stomatology of Peking university after that. I have also had my visiting scholarship in Seoul National University, Korea in 2001, UIC, US in 2002, and UBC, Canada from 2014-2016. In 2017, I finished the dental specialty assessment and training (DSATP) program at UBC and became a clinical assistant professor teaching in the Orthodontic Graduate Program. In Oct 2018, I was appointed as an Associate Professor with responsibilities in both the graduate and pre-doctoral orthodontic programs at UBC. In the past academic years, I have gained robust teaching, research and clinical experience. I have been presented with Excellence in Teaching Award from both Peking University and UBC. I have been engaged in more than 20 national or international grants as PI or co-Investigator. My research area involves many topics, including open bite, TMD, airway and OSA, 3D imaging and orthodontic-surgery treatment. I have published more than 50 peer-reviewed articles, and 7 chapters or books collaborated with other researchers.

This protocol will apply AI and machine learning in identifying incidental findings on lateral cephalograms, which have been widely used in orthodontic field. With the use of convolutional neural networks (CNN) to develop a model for automatic detection of incidental findings, it will not only improve work efficiency but also provide early detection regarding some potentially serious incidental findings, such as Os odontiodeum, which is potentially lethal even with minor trauma. Our preliminary study published recently has evaluate the prevalence of incidental findings in lateral cephalograms for orthodontic diagnosis of patients seeking orthodontic treatment, and we have inspected a consecutive of 1765 patients aged from 12-20 years. The overall prevalence of incidental findings was 18.8%. This retrospective study (approved by the ethics board at the University of British Columbia, Vancouver, Canada, H22-01253) will not only include all the cephalograms manually evaluated in the previous study but also those others taken in the same clinic. All the cephalograms will be grouped into training, validation and testing sets, respectively. These labelled data will be used to build a classifier that can automatically extract information from LCs to accurately detect pathologies. As a result of these previous experiences, I have the expertise, leadership and motivation necessary to carry out this proposed research project successfully. I have established strong ties with principal advisor/mentor, and strictly following the constructed timeline and budget, I will successfully administer this project and produce several peer-reviewed publications from this proposal. The orthodontic resident will also have the chance to participate in the study as part of his/her thesis project.