UNIVERSITY OF ALBERTA

ORAL HEALTH

ANALYTICS & INFORMATICS UNIT

Bridging the gap between AI research, AI literacy, and the development of AI and digital tools in oral health

Mike Petryk School of Dentistry

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Dianne and Irving Kipnes Health Research Institute
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Edmonton, AB, Canada T6G 1C9

The Mike Petryk School of Dentistry was named on September 10, 2024 in recognition of a transformational gift from Mike Petryk, '60 DDS, and Pat Petryk, '57 Dipl(Ed), '59 BEd, and their family.

This generous donation in honour of Mike's 40-year dentistry career, work ethic and values provides exceptional student experiences, research and patient care for generations to come.

The University of Alberta is deeply grateful for the Petryk family's generosity and proud to bear its name as part of Mike's legacy.

AT A GLANCE

OUR VISION

Leading the Next Generation of Oral Health

The future of oral health research resides in the discovery of:

- Context-dependent artificial intelligence (AI) solutions
- Specialized training programs, and
- Augmented intelligence approaches;

to enhance expertise among oral health professionals.

The Oral Health Analytics & Informatics unit (OHAI-U) was established to advance these imperatives by empowering researchers and learners with the essential tools and insights needed to define the future of oral health.

Our unit drives AI-focused research, training, community support, and expert consultation.

MEET THE TEAM

Oral Health Analytics and Informatics Unit

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OUR PURPOSE

Improving AI Literacy and its Application

Our purpose aims to modernize oral health by bridging clinical practice with technological innovation to improve diagnostic accuracy, predictive care, and equitable access to high-quality oral health services. The following highlights some of our objectives.

INNOVATION & RESEARCH

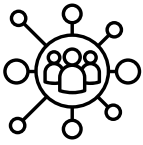
Facilitating a new research frontier focused on integrating AI into oral health research.

EDUCATION & TRAINING

Developing diverse training, ranging from interdisciplinary courses and course-based graduate programs to communities of practice.

EXPERT CONSULTATION

Providing knowledge, resources, and guidance for those pursuing data-driven or machine-learning research.



COMMUNITY OUTREACH

Fostering a collaborative network to exchange lessons learned and quality improvement (QI) strategies, to improve faculty outreach, community engagement and advancement opportunities.

APPLYING AI

Pathways for Applying Intelligent Methods

We focus on applying AI approaches for validation and capacities for commercial partners to build proof-of-concepts that help with oral health research, using publicly available approaches.

We apply intelligent methods via two pathways:

Natural Language Processing Through Chart Data Mining

Natural Language Processing, Classifiers

Image Classification & Annotation

Object Segmentation, Classification, Annotation

OUR INITIATIVES

Innovative Research & Clinical Applications

We leverage the school's large clinical infrastructure—serving over 12,000 patients annually across 140 dental chairs—to bridge the gap between AI research and practice.

We integrate intelligent methods by utilizing clinical data and imaging.

EXAMPLES

The following are selected examples of our diverse research initiatives that highlight our progress in advancing AI applications in oral health research.

Estimating Patient Anxiety through Children's Drawing

Stacked classifiers were utilized to analyze children's dental anxiety drawings, demonstrating promise for a scalable, automated approach to anxiety assessment.

Evaluation of Panoramic Radiograph Quality

Automated methods have demonstrated promising classification results for artifact detection, coverage area, patient positioning, contrast/density, and overall image quality.

Automatic Segmentation for Intraoral Scans

An automated segmenter and classifier comparing against a sponsor model was able to detect, annotate, and classify teeth from scans.

MORE EXAMPLES

Other examples of our work include:

- Airway segmentation from Cone Beam Computed Tomography (CBCTs)
- Natural Language Processing (NLPs) to aid in orthodontic triage
- AI to aid in three-dimensional landmarking of CBCTs
- NLPs on temporomandibular diagnosis triage
- AI to determine suitable bone characteristics from implant and miniscrew placement

TRAINING

Educational Pathways & Engagement

APPLIED AI IN ORAL HEALTH SUMMER PROGRAM

A national event funded by the National Committee on Oral Health Research since 2024 to provide training on AI literacy and methodology

DENTAL AI LITERACY - VIRTUAL JOURNAL CLUB

A student-driven program, featuring interactive discussions, hands-on tool demonstrations, guided literature reviews to explore clinical and research applications of AI in dentistry

AI IN HEALTH POST-GRADUATE CERTIFICATE

Graduate courses focused on AI for health professionals (late 2026)

AI COURSE-BASED MASTER OF SCIENCE IN DENTISTRY

Program to provide applied, practice-oriented training for professionals and researchers seeking expertise in AI within dental contexts (2027)

COLLABORATION

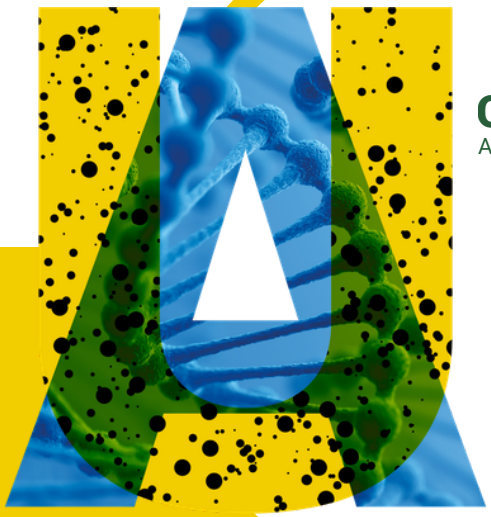
Leveraging AI Knowledge

We collaborate with commercial partners to:

- Leverage AI knowledge and foster knowledge sharing
- Validate and compare approaches
- Provide evidence for oral health research and its application in clinical environments

We welcome the opportunity to partner with you to explore tailored AI solutions for your clinic or company. Furthermore, funding may be available through Mitacs, a non-profit national research organization that partners with Canadian universities, industry and government, to support innovative research and training.

Please reach out to any of our team members (page 5) to begin the conversation.



Oral Health

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