Ken Christofferson

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Education

University of Toronto Computer Science   *Ph.D. 2025**
Advised by Professors Alex Mariakakis and Joseph Cafazzo

Tsinghua University Data Science and Information Technology
Advised by Professors Yuntao Wang and Yuanchun Shi   *MSE-DSIT 2021*

University of Washington Technology Innovation   *M.S. 2021*

American University International Studies, Economics (Minor)   *B.A. 2007*

Publications and Projects

ReHEarSE: Recognizing Hidden-in-the-Ear Silent Expressions
In Submission - ACM CHI
This paper leverages occluded ear canal ultrasonic sensing techniques to detect changes in ear canal deformation resulting from silent letter articulation in order to enable silent speech text entry.

EarSteth: Phonocardiogram Reconstruction Using Earbuds
In Submission - ACM Digital Health
Using a convolutional neural network and digital signal processing techniques, this project reconstructed phonocardiograms (heart sounds) from audio recorded using a modified commercial ANC-enabled earbud's feedback microphone.

Sleep Sound Event Detection Using ANC-Enabled Earbuds
Published - HCCS Workshop at PERCOM 2022
This research developed a lightweight convolutional audio classification algorithm capable of distinguishing between health-related (e.g., teeth grinding, leg movement) sounds made by sleeping humans collected using consumer ANC-earbuds.

An AI Driven, Mechanistically Grounded Geospatial Liquefaction Model for Rapid Response and Scenario Planning
Published - Soil Dynamics and Earthquake Engineering 2022
This work develops liquefaction risk prediction models using geospatial (e.g., distance to water) and earthquake features (e.g., shear wave velocity).

Induced Acoustic Resonance for Noninvasive Bone Fracture Detection Using Digital Signal Processing and Machine Learning
Published - IEEE GHTC 2020
This project developed an embedded system capable of noninvasive bone fracture detection. Data was collected from human limb facsimiles created from animal bones and simulated flesh.

A Benchmark Cuffless Blood Pressure Estimation Dataset *(Working Title)*
In Progress: Submission Planned (Nov 24) - ACM Interactive, Mobile, Wearable and Ubiquitous Technologies
This project collects 14 synchronous physiological signals which have been used in the cuffless blood pressure estimation literature from up to 150 healthy participants and up to 75 participants suffering from cardiovascular illness in order to enable research into wearable or ambulatory blood pressure estimation methods.

SCIO Rapid Diagnostic Test Reader
Project - GIX Launch Project 2020
This project developed an Android rapid diagnostic test (RDT) workflow application using human centered design principles and deep neural network RDT interpretation algorithm.

FaceSpace - Face Touching Detection for the Apple Watch
Project - BuiltForCovid19 Hackathon Featured Project
FaceSpace is an Apple Watch application which uses the watch's onboard IMU to detect when users' hands are moving to touch their face.

Work Experience

Computational Health and Interaction Lab, University of Toronto - Toronto, ON   ***Sept 2021 -***
Graduate Research Assistant

Centre for Digital Therapeutics, University Hospital Network - Toronto, ON   ***Sept 2021 -***
Doctoral Trainee

University of Toronto - Toronto, ON   ***Sept 2022 -***
Teaching Assistant

Smartsheet Inc. - Seattle, WA   ***Nov 2015 - Aug 2019***
Lead Technical Solutions Implementation Manager   *Dec 2018 - Aug 2019*
Lead Solutions Consultant   *Feb 2018 - Dec 2018*
Solutions Consultant   *Nov 2015 - Feb 2018*

Corporate Executive Board - Washington, DC   ***Mar 2014 - Jun 2015***
Research Analyst

The Language Co. - Puerto Montt, Chile   ***June 2013 - Dec 2013***
Regional Manager

Credit Builders Alliance - Washington, DC   ***May 2011 - Aug 2012***
Program Associate

Internships
PATH for Global Health - 2021
The United States Senate - 2009
The German Marshall Fund of the United States - 2008

Service and Volunteering

Graduate Volunteer   *Sept 2023 -*
Dynamic Graphic Project
I organize and manage visiting speaker seminars for the DGP lab at the University of Toronto.

Mentor and Project Lead   *2022 - 2023*
Tsinghua University Access Computing Program
Led and mentored a team of undergraduate and graduate students through a full research cycle resulting in a submission to ACM CHI.

Speaker and Panelist   *2022*
Pursue STEM Workshops
Held workshops on mobile health and introduction to AI for grade 11 students as part of an outreach program that encourages and supports historically marginalized students interested in STEM disciplines.

Reviewer - ACM CHI   *2023*
Student Volunteer - ACM CHI   *2023*

Skills and Proficiencies

Programming Languages, Frameworks and Tools
Python, PyTorch, Keras, Tensorflow, JAX, Unity, Arduino, Android Native, Flutter, Flask, Librosa, PyWavelet, Scikit-Learn, Pandas, NumPy, SciPy

Rapid Prototyping
Embedded System Development, CAD Modeling, 3D Printing, Laser Cutting, Woodworking

Languages
English (native), Spanish (fluent)