

JUSTIN CHAN

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EDUCATION

University of Washington

PhD in Computer Science & Engineering

2016 - present

Dartmouth College

Bachelor of Computer Science (High Honors)

2012-2015

RESEARCH IMPACT

- My work on detecting ear infections using smartphones (*Science Translational Medicine* '19) demonstrated performance on-par with specialist medical tools, and has been commercialized by UW startup **Wavely Diagnostics** where I am a co-founder. Wavely's first product using this technology is now FDA-listed and is available to select early access participants and healthcare systems.
- My earable device that performs low-cost newborn hearing screening using earbuds (*Nature Biomedical Engineering* '22) has been presented to government officials and clinicians at **Kenya's Ministry of Health and University of Nairobi**, and we are starting deployments at local clinics in Nairobi. It has led to a larger effort called **TUNE** with the goal of bringing universal newborn hearing screening across Kenya.
- My work on contactless cardiac arrest detection using smart speakers (*npj Digital Medicine* '19) has been licensed to a UW startup **Sound Life Sciences**, which has recently been acquired by Google.
- I was a lead contributor for CovidSafe (now WA Notify), a COVID-19 contact tracing and symptom tracking app built with **Microsoft**, which became part of official efforts by the **WA Department of Health** to manage the pandemic.

GRANTS

- **NIH R21/R33 (Co-investigator)** 2022
mHealth OAE: Towards Universal Newborn Hearing Screening in Kenya (mTUNE). (Under review)
Funding \$1,334,169
- **NIH SBIR, Phase I (PI)** 2019
Detecting Middle Ear Fluid Using Smartphones.
Funding: \$225,000. Impact score: 22 (10: Highest, 90: Lowest)
- **Washington Research Foundation Technology Development Program Phase I** 2019
Detecting Middle Ear Fluid Using Smartphones.
Funding: \$50,000

PUBLICATIONS

* = equal contribution.

1. Wireless earbuds for low-cost hearing screening

Justin Chan*, Antonio Glenn*, Malek Itani, Lisa R. Mancl, Emily Gallagher, Randall Bly, Shwetak Patel, and Shyam Gollakota
arXiv preprint, 2022

2. An off-the-shelf otoacoustic-emission probe for hearing screening via a smartphone

TUNE project for universal newborn hearing screening in Kenya
Justin Chan, Nada Ali, Ali Najafi, Anna Meehan, Lisa R. Mancl, Emily Gallagher, Randall Bly, and Shyam Gollakota
Nature Biomedical Engineering, 2022.

3. **Underwater Messaging Using Mobile Devices**
Tuochao Chen*, **Justin Chan***, and Shyam Gollakota
ACM SIGCOMM, 2022.
ACM SIGMOBILE Research Highlights
4. **Underwater Acoustic Ranging Between Smartphones**
Tuochao Chen*, **Justin Chan***, and Shyam Gollakota
arXiv preprint, 2022
5. **Real-time target sound extraction**
Banhav Veluri, **Justin Chan**, Malek Itani, Tuochao Chen, Takuya Yoshioka, Shyam Gollakota
arXiv preprint, 2022.
6. **Performing tympanometry using smartphones**
Justin Chan, Ali Najafi, Mallory Baker, Julie Kinsman, Lisa R. Mancl, Susan Norton, Randall Bly, and Shyam Gollakota
Nature Communications Medicine, 2022.
7. **Micro-mechanical blood clot testing using smartphones**
Justin Chan, Kelly Michaelsen, Joanne K Estergreen, Daniel E. Sabath and Shyam Gollakota
Nature Communications, 2022. Altmetric score: 732
AACC Annual Scientific Meeting, 2022.
Distinguished Abstract
Clinical Translational Science Division - Best Abstract Award
Hematology And Coagulation Division - Best Abstract Award
8. **Closed-loop wearable naloxone injector system**
Justin Chan, Vikram Iyer, Anran Wang, Alexander Lyness, Preetma Kooner, Jacob Sunshine and Shyam Gollakota
Scientific Reports, 2021. Altmetric score: 616
9. **Testing a Drop of Liquid Using Smartphone LiDAR**
Justin Chan, Ananditha Raghunath, Kelly Michaelsen and Shyam Gollakota
ACM IMWUT, 2021.
10. **PACT: Privacy sensitive protocols and mechanisms for mobile contact tracing**
Justin Chan, Dean Foster, Shyam Gollakota, Eric Horvitz, Joseph Jaeger, Sham Kakade, Tadayoshi Kohno, John Langford, Jonathan Larson, Puneet Sharma, Sudheesh Singanamalla, Jacob Sunshine, Stefano Tessaro
IEEE Data Engineering Bulletin, 2020.
11. **Towards a tricorder for diagnosing pediatric conditions**
Justin Chan, Sharat Raju and Eric Topol
The Lancet, 2019.
12. **Detecting Middle Ear Fluid Using Smartphones**
Justin Chan*, Sharat Raju*, Rajalakshmi Nandakumar, Randall Bly and Shyam Gollakota
Science Translational Medicine, 2019. Altmetric score: 1044
13. **Contactless Cardiac Arrest Detection Using Smart Devices**
Justin Chan, Thomas Rea, Shyam Gollakota and Jacob Sunshine
npj Digital Medicine, 2019. Altmetric score: 711
14. **DeepSense: Enabling Carrier Sense in Low-Power Wide Area Networks Using Deep Learning**
Justin Chan*, Anran Wang*, Arvind Krishnamurthy, Shyam Gollakota
arXiv preprint, 2019.
15. **Surface MIMO: Using Conductive Surfaces For MIMO Between Small Devices**
Justin Chan, Anran Wang, Vikram Iyer and Shyam Gollakota

MobiCom, 2018.

16. **Wireless Analytics for 3D Printed Objects**

Vikram Iyer, **Justin Chan**, Ian Culhane, Jennifer Mankoff and Shyam Gollakota
UIST, 2018.

17. **3D Printing Wireless Communication**

Vikram Iyer*, **Justin Chan*** and Shyam Gollakota
SIGGRAPH Asia, 2017.

18. **Data Storage and Interaction Using Magnetized Fabric**

Justin Chan and Shyam Gollakota
UIST, 2017.

19. **Customizing Indoor Wireless Coverage via A 3D-Fabricated Reflector**

Xi Xiong, **Justin Chan**, Ethan Yu, Nisha Kumari, Ardalan Amiri Sani, Changxi Zheng and Xia Zhou
BuildSys, 2017.

20. **3D Printing Your Wireless Coverage**

Justin Chan, Changxi Zheng and Xia Zhou
HotWireless / MobiCom poster, 2015

Hot Paper Award

MobiCom Student Research Competition Winner

AWARDS & RECOGNITION

SIGMOBILE Research Highlights	2022
AACC Annual Scientific Meeting - Distinguished abstract	2022
Clinical Translational Science Division - Best Abstract Award	
Hematology And Coagulation Division - Best Abstract Award	
Hot Paper Award	2015
MobiCom Student Research Competition Winner	2015

WORK EXPERIENCE

Wavely Diagnostics

Co-Founder 2018 - present
Leading efforts to bring our smartphone-based middle ear infection detection technology into the hands of as many people as possible.

Microsoft

Software Engineer (Cloud computing team) 2015 - 2016
Software Engineering Intern 2014

REVIEWING

Transactions on Mobile Computing	2022
IMWUT	2022
Cell Reports Medicine	2022
UIST	2022
Workshop on the Future of Digital Biomarkers (DigiBiom)	2021
ACM Transactions on Computing for Healthcare	2019, 2021
IMC Shadow PC	2017, 2018

SERVICE

MobiCom Web Chair	2019
<i>Led first major redesign of the site since 2006.</i>	
MobiSys mentorship program	2021
UW Systems and Networks Seminar organizer	2017-2019
PhD admissions reader	2019, 2021, 2022
PhD admissions DEI committee	2021
PhD Pre-Application Review Service	2020

TEACHING

University of Washington

Modern Mobile Systems (**course instructor**)
 Mobile Systems & Applications
 Intro to Computer Communication Networks

Dartmouth College

Software Implementation and Design
 Problem Solving via OOP
 Introduction to Programming and Computation

MENTORSHIP

Ph.D. Students

Antonio Glenn
 Ananditha Raghunath
 Tuochoao Chen

Undergraduates

Jordan Hsu
 Ian Culhane

High school student

Anish Sundar

SELECTED MEDIA COVERAGE

An off-the-shelf otoacoustic-emission probe for hearing screening via a smartphone

Wired "This Low-Cost Test for Hearing Loss Lives on a Smartphone"

Detecting Middle Ear Fluid Using Smartphones

AAAS "Annual Research Highlights for 2019"

NPR "A Smartphone App And A Paper Funnel Could Help Parents Diagnose Kids' Ear Infections"

Scientific American "Smartphone App Screens Kids for Ear Problems"

Micro-mechanical blood clot testing using smartphones

IEEE Spectrum "Blood Test Only Needs a Drop and a Smartphone for Results"

Contactless Cardiac Arrest Detection Using Smart Devices

MIT Tech Review "Alexa could spot your cardiac arrest—by listening to your breathing"

Stat News "Alexa, are you listening?' An experimental tool warns of cardiac arrest by monitoring breathing"

Bloomberg "Alexa, I'm Having a Heart Attack"

Performing tympanometry using smartphones

Stat News "Scientists design a cheap device that can detect ear problems with the help of a smartphone"

Wireless Analytics for 3D Printed Objects

MIT Tech Review "6 of the most amazing things that were 3D-printed in 2018"

Data Storage and Interaction using Magnetized Fabric

MIT Tech Review "Your Next Password May Be Stored in Your Shirt Cuff"

Scientific American "How Many Gigs Are You Wearing?"

3D Printing Your Wireless Coverage

TechCrunch “Researchers discover aluminum foil actually does improve your wireless speed”

Popular Science “You can use aluminum foil to strengthen your Wi-Fi signal”

Engadget “Aluminum foil can actually improve your wireless signal”

PATENTS

System and method for detection of middle ear fluids

US Patent App. 17/274,137

S Raju, S Gollakota, J Chan, R Bly, R Nandakumar

Detection of agonal breathing using a smart device

US Patent App. 172/973,82

J Sunshine, J Chan, S Gollakota

REFERENCES

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[Shwetak Patel](#)

Washington Research Foundation Entrepreneurship En-
dowed Professor
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[Randall Bly](#)

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