

Junzhe "Young" Wang

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Education

Rice University

PHD. IN ELECTRICAL AND COMPUTER ENGINEERING - SUPERVISOR: **DR. ASHOK VEERARAGHAVAN**

Houston, USA

2025 - Present

Dalhousie University

Halifax, Canada

MASC. IN BIOMEDICAL ENGINEERING - SUPERVISOR: **DR. ROBERT ADAMSON**

2019 - 2023

- Thesis Title: *Improved middle ear imaging with optical coherence tomography for clinical otology*

B.ENG. IN ELECTRICAL & COMPUTER ENGINEERING (CO-OP STREAM)

2013 - 2019

Honours & Awards

2024	University of Toronto Early Stage Technology (UTEST) Program , University of Toronto	Toronto
2024	Governor General's Academic Gold Medal , The Governor General of Canada	Canada
2024	Mitacs Business Strategy: \$60,000 , MITACS	University of Toronto
2022	1st Place in Department of Surgery Research Day(Graduate student category) , Department of Surgery	Dalhousie University
2022	Excellence in Research Award(MSc category) , Faculty of Medicine	Dalhousie University
2021	Top 10 Posters , 75th Canadian Society of Otolaryngology-Head & Neck Surgery(CSOHNS) Annual Meeting	Canada
2020/2021	Gillespie Graduate Scholars: \$5,000 , Faculty of Engineering	Dalhousie University
2020/2021	MITACS Accelerate Fellowship: \$13,333.33 , MITACS	Canada
2019/2020	MITACS Accelerate Fellowship: \$18,666 , MITACS	Canada
2019/2020	Research Grant: \$20,500 , Faculty of Graduate Studies	Dalhousie University
2019	3rd Place , IEEE Student Paper Competition	Halifax, Canada
2019	1st Place , Capstone Design Project Presentation, Department Electrical & Computer Engineering	Dalhousie University
2019	Investment: \$50,000 , Innovacorp Early Stage Commercialisation Fund	Halifax, Canada
2017/18	9th Place , Shell Eco-Marathon: Internal Combustion Engine Category	Detroit/Sonoma, U.S.A
2016 - 2019	Sexton Scholar , Faculty of Engineering	Dalhousie University

Publications

JOURNAL ARTICLES

Fusion of middle ear optical coherence tomography (OCT) and co-registered middle ear computed tomography (CT) in three ears

Junzhe Wang, Floor Couvreur, Joshua Farrell, Ghedia Reshma, Nael Shoman, David P Morris, Robert Adamson*

JAMA Otolaryngology - Head & Neckl. 2024 (submitted)

Geometrically accurate real-time volumetric visualization of the middle ear using optical coherence tomography

Joshua Farrell, **Junzhe Wang**, Dan MacDougall, Xiaojie Yang, Kimberly Brewer, Floor Couvreur, Nael Shoman, David P Morris, Robert Adamson*

Biomed. Opt. 14.7. 2023. doi: 10.1364/BOE.488845

Clinical applications of handheld middle ear optical coherence tomography (ME-OCT) with live volumetric visualization

Junzhe Wang, Joshua Farrell, Floor Couvreur, Xiaojie Yang, Nael Shoman, David P Morris, Robert Adamson*

Otol & Neurotol. 2023 (10.1097/MAO.0000000000003635)

Transtympanic visualization of cochlear implant placement with optical coherence tomography: A pilot study

Junzhe Wang, Gaurav Chawdhary, Joshua Farrell, Xiaojie Yang, Matthew Farrell, Dan MacDougall, Mathieu Trudel, Nael Shoman, David Morris, Robert Adamson*

Otol & Neurotol 43.8. 2022. doi: 10.1097/MAO.0000000000003635

Optical clearing agents for optical imaging through tympanoplasties: A pre-clinical feasibility study

Junzhe Wang, Gaurav Chawdhary, Xiaojie Yang, Francis Morin, Mamoona Khalid-Raja, Joshua Farrell, Dan MacDougall, Fangyi Chen, David Morris, Robert Adamson*

Otol & Neurotol. 43.4. 2022. doi: 10.1097/MAO.0000000000003502

Convolutional dictionary learning for blind deconvolution of optical coherence tomography images

Junzhe Wang, Brendt Wohlberg, Robert Adamson*

Biomed. Opt. 13.4. 2022. doi:10.1364/BOE.447394

CONFERENCE PRESENTATIONS

OCT hallmarks in conductive hearing loss **(Oral)**

Floor Couvreur, **Junzhe Wang**, Xiaojie Yang, Josh Farrell, David P Morris, Robert Adamson

the European Academy Of Otolology Neuro-Otology meeting (EAONO), 2024, Nijmegen, Netherlands

Functional and structural imaging of the otosclerotic ear using OCT **(podium)**

Floor Couvreur, **Junzhe Wang**, Xiaojie Yang, Josh Farrell, Nael Shoman, David P Adamson

5th international symposium on stapes and otosclerosis surgery, 2023, Brussels, Belgium

Clinical applications of the middle ear optical coherence tomography (ME-OCT) with live, Continuous volumetric visualisation **(podium)**

Floor Wang, Josh Farrell, Xiaojie Yang, Nael Shoman, David P Adamson

Annual otolaryngology - head & neck surgery resident research day, 2023, Halifax, Canada

Clinical application of middle ear optical coherence tomography (ME-OCT) with live, continuous volumetric visualisation **(podium)**

Junzhe Wang, Floor Couvreur, Josh Farrell, Xiaojie Yang, Nael Shoman, David P Morris, Robert Adamson

Department of Surgery Research Day, Dalhousie University, 2023, Halifax, NS

Middle ear optical coherence tomography (poster & podium)

Junzhe Wang, Josh Farrell, Robert Adamson, Mathieu Trudel, Floor Couvreur, Nael Shoman, David P Morris
IFOS Dubai ENT world Congress, 2023, Dubai, UAE

Middle ear optical coherence tomography (ME-OCT) for the detection of cochlear implant migration and insertion monitoring (podium)

Mathieu Trudel, Josh Farrell, **Junzhe Wang**, Nael Shoman, Xiao Yang, Gaurav Chawdhary, Robert Adamson, David P Morris
IFOS Dubai ENT world Congress, 2023, Dubai, UAE

Registration and fusion of CT and OCT for an improved assessment of the middle ear

Junzhe Wang, Joshua Farrell, Mathieu Trudel, Dan MacDougall, Nael Shoman, David Morris, Robert Adamson*
Department of Surgery Research Day, Dalhousie University, 2022, Halifax, Canada

Advancing hearing loss diagnostics: clinical applications of middle ear optical coherence tomography (ME-OCT) (invited talk)

Junzhe Wang, Mathieu Trudel, Joshua Farrell, Gaurav Chawdhary, Xiaojie Yang, Dan MacDougall, Nael Shoman, David Morris, Robert Adamson*
Faculty of Medicine Research Day, Dalhousie University, 2022, Halifax, Canada

Clinical applications of middle ear optical coherence tomography

Junzhe Wang, Mathieu Trudel, Joshua Farrell, Gaurav Chawdhary, Xiaojie Yang, Dan MacDougall, Nael Shoman, David Morris, Robert Adamson*
Otolaryngology Division Resident Grand Rounds, Dalhousie University, 2022, Halifax, Canada

Transtympanic visualizations of cochlear implant placement with optical coherence tomography

Mathieu Trudel, **Junzhe Wang**, Gaurav Chawdhary, Joshua Farrell, Xiaojie Yang, Matthew Farrell, Dan MacDougall, Nael Shoman, David Morris, Robert Adamson*
2nd Arab Cochlear Implant Conference, 2022, Dubai, UAE

Optical clearing agents for optical imaging through tympanoplasties: A pre-clinical feasibility study (poster & podium)

Junzhe Wang, Gaurav Chawdhary, Xiaojie Yang, Francis Morin, Mamoona Khalid-Raja, Joshua Farrell, Dan MacDougall, Fangyi Chen, David Morris, Robert Adamson*
75th Canadian Society of Otolaryngology-Head & Neck Surgery(CSOHNS) Annual Meeting, 2021, Virtual, Canada

Convolutional dictionary learning for blind deconvolution of optical coherence tomography images (poster)

Junzhe Wang, Brendt Wohlberg, Robert Adamson*
Photonics Online Meetup Canada(canPOM), 2021, Virtual, Canada

Non invasive, transtympanic visualization of cochlear implant electrode and middle ear driver position at the round window in a human cadaveric temporal bone (podium)

Junzhe Wang, Xiaojie Yang, Joshua Farrell, Dan MacDougall, Robert Adamson, David Morris*
75th Canadian Society of Otolaryngology-Head & Neck Surgery(CSOHNS) Annual Meeting, 2021, Virtual, Canada

Work Experience

Sunnybrook Research Institute

Toronto, Canada

MEDVENTIONS FELLOW - DEPARTMENT OF OPHTHALMOLOGY & VISION SCIENCES, SUNNYBROOK HOSPITAL

Jan. 2024 - Aug. 2024

- Conducted over 200 clinical observations through shadowing ophthalmologists, leading to the identification of 25 clinical challenges from a pool of 142 unique observations.
- Completed in-depth analysis of 25 identified clinical issues, encompassing stakeholder and market analysis, disease state fundamentals, and treatment options.
- Partnered with clinical experts to develop solutions with design requirements and technical specifications that address four key clinical needs with commercialization potential.

Dalhousie University

Halifax, Canada

RESEARCH ASSISTANT

Sept. 2019 - Aug. 2023

- Designed a Python-based sparsity-regularized blind deconvolution algorithm that substantially improved the diagnostic utility of OCT images by suppressing artifacts caused by light source non-linearity and noise, leading to a 2.2 dB gain in SNR and a 5.8 dB enhancement in contrast.
- Developed an optical clearing technique for OCT imaging of post-surgical ear cartilage grafts, achieving a significant 13 dB improvement in SNR and contrast.
- Led five cross-disciplinary end-to-end research projects, delivering engineering innovations for patient care, resulting in six peer-reviewed publications and multiple prestigious research awards.

TEACHING ASSISTANT: BIOMEDICAL ENGINEERING & BIOMEDICAL INSTRUMENTATION & ANALOG ELECTRONICS

Jan. 2020 - Aug. 2023

- Increased student engagement and subject comprehension by conducting interactive tutorials and providing personalized academic support during office hours.
- Co-developed course materials with instructors to improve student engagement and learning outcomes.

Audioptics Medical Inc.

Halifax, Canada

VERIFICATION ENGINEER

Jan. 2021 - Feb. 2022

- Managed design review and approval workflows, ensuring compliance with IEC60601-1-1, facilitating proactive identification of design challenges in design phase.
- Developed Python-based computer vision algorithms for biomedical applications, enhancing data analysis and visualization, and significantly expediting the R&D process.
- Performed optical experiments and analytical evaluations of test reports for assessing the performance of software & hardware.

RESEARCH ASSISTANT

May. 2018 - Aug. 2018

- Conducted detailed extraction & evaluation of requirements, design files, and test protocols, streamlining the PCB development process.
- Demonstrated proficiency in JIRA, Confluence, and Git, enhancing team collaboration, issue tracking, and version control across multiple projects.

Nova Scotia Power

Halifax, Canada

PROTECTION & CONTROL ENGINEERING STUDENT

Sept. 2017 - Apr. 2018

- Revised over 20 protection and control drawings, settings, and documents for the Maritime Link project at Nova Scotia Power, leading to improved grid reliability.
- Developed 12 wind farm and 18 transmission line models using Oneliner software, facilitating comprehensive fault studies and optimizing electrical grid compliance.

Activities & Contributions

IEEE Transactions on Medical Imaging; Optica; SPIE

Virtual

REVIEWER

Aug. 2021 - Aug. 2023

- Provided in-depth peer review for submitted manuscript