

# WANWEN CHEN

[aliciachenw.github.io](https://github.com/aliciachenw) [wanwenc@ece.ubc.ca](mailto:wanwenc@ece.ubc.ca) [aliciachenw](https://www.linkedin.com/in/aliciachenw)

## RESEARCH INTERESTS

---

Ultrasound Imaging and Analysis, Deep Learning, Image Guidance for Robotic Surgery

## EDUCATION

---

### University of British Columbia

*Ph.D. student in Electrical and Computer Engineering (GPA: 94%)*

Advisor: Dr. Tim Salcudean

Relevant courses: Medical Imaging, Advanced Machine Learning

**Vancouver, BC**

*Sep 2021 - present*

### Carnegie Mellon University

*M.S. in Robotics (GPA: 4.12/4.33)*

Advisor: Dr. John Galeotti

Thesis: Ultrasound-based Needle Tracking and Lateral Manipulation Planning for Common Needle Steering

Relevant courses: Mechanics of Manipulation, Computer Vision, Medical Image Analysis, SLAM, Deep Learning, Machine Learning, Visual Learning and Recognition

**Pittsburgh, PA**

*Aug 2019 - Aug 2021*

### Peking University

*B.S. in Theoretical and Applied Mechanics (GPA: 3.78/4.0)*

Thesis: Sensor Fusion for Attitude Measurement Based on Quaternions and Kalman Filter

Relevant courses: Data Structure and Algorithm, Circuits and Electronics, Principles of Automatic Control, Medical Imaging, Machine Learning, Finite Element Methods, Information Theory, Applied Stochastic Processes, Engineering CAD

**Beijing, China**

*Sep 2015 - Jul 2019*

### University of California, Los Angeles

*Cross-disciplinary Scholars (CSST) Summer Program (GPA:4.0/4.0)*

**Los Angeles, CA**

*Jul 2018 - Sep 2018*

## RESEARCH EXPERIENCE

---

### Robotics and Control Lab, University of British Columbia

*Research Assistant, Advisor: Dr. Tim Salcudean*

- Researching robot-assisted ultrasound guidance for transoral surgery.
- Researching deep learning for tumor segmentation and ultrasound-MRI registration.

**Vancouver, BC**

*Sep 2021 - present*

### Biomedical Image Guidance Lab, Carnegie Mellon University

*Research Assistant, Advisor: Dr. John Galeotti*

- Researched ultrasound-based needle tracking for autonomous robotic needle insertion.
- Developed an optical flow-based tissue motion segmentation algorithm to track hardly visible needle.
- Designed an on-line needle tracking algorithm fusing ultrasound-based needle detection algorithms and robot kinematics to track the needle under various visibility.
- Built a novel weighted-RANSAC real-time bent needle C++/Python binding tracking algorithm.
- Studied using classical image pre-processing and optical flow to guide AI learning better in lung disease diagnosis and segmentation in lung ultrasound.

**Pittsburgh, PA**

*Oct 2019 - Aug 2021*

### The Robotics Research Group, Peking University

*Advisor: Dr. Qining Wang*

- Researched inertial sensors-based human motion measurement and human locomotion recognition algorithms for prosthesis and wearable robots.
- Designed a joint angle measurement algorithm for swimming strokes measurement based on inertial sensors in Matlab and C.
- Analyzed the patterns of knee joint angle in four swimming strokes and built machine learning models to classify swimming strokes with inertial sensor signals.

**Beijing, China**

*Sep 2017 - May 2019*

- Developed deep learning models to classify locomotion mode using signals from a strain gauge in prosthesis.
- Wrote on-board neural network training and classification algorithms in C/C++ for real-time locomotion mode recognition in robotic transtibial prostheses.

**Biomechatronics Lab, University of California, Los Angeles**

Advisor: Dr. Veronica J. Santos

Los Angeles, CA

Jul 2018 - Sep 2018

- Researched human hand motion primitives during search and retrieval of a buried object in sand.
- Calibrated an inertial measurement units network with 18 sensors and created an animation framework for displaying hand movement in Python.
- Used machine learning models to discover human hand motion patterns and to classify motion intentions.

**PUBLICATIONS**

“\*” represents that the authors contributed to the manuscript equally.

- W2** Gare, G. R.\*, **Chen, W.\***, Hung, A. L. Y., Chen, E., Tran, H. V., Fox, T., Lowery, P., Zamora, K., deBoisblanc, B. P., Rodriguez, R. L. and Galeotti, J. The Role of Pleura and Adipose in Lung Ultrasound AI. In *Clinical Image-Based Procedures, Distributed and Collaborative Learning, Artificial Intelligence for Combating COVID-19 and Secure and Privacy-Preserving Machine Learning* (pp. 141-149). Springer, Cham.
- W1** Hung, A. L. Y., Sun, Z., **Chen, W.**, and Galeotti, J. (2021). Hierarchical Probabilistic Ultrasound Image Inpainting via Variational Inference. In *Deep Generative Models, and Data Augmentation, Labelling, and Imperfections, DGM4MICCAI 2021, DALI 2021* (pp. 83-92). Springer, Cham.
- C3** **Chen, W.**, Mehta, K. N., Bhanushali, B. D., and Galeotti, J. (2021, April). Ultrasound-Based Tracking Of Partially In-Plane, Curved Needles. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)* (pp. 939-943). IEEE.
- C2** Hung, A. L. Y., **Chen, W.**, and Galeotti, J. (2021, April). Ultrasound Confidence Maps Of Intensity And Structure Based On Directed Acyclic Graphs And Artifact Models. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)* (pp. 697-701). IEEE.
- J2** Wang, Q., Zhou, Z., Zhang, Z., Lou, Y., Zhou, Y., Zhang, S., **Chen, W.**, Mao, C., Wang, Z., Lou, W. and Mai, J. (2020). An Underwater Lower-Extremity Soft Exoskeleton for Breaststroke Assistance. *IEEE Transactions on Medical Robotics and Bionics*, 2(3), 447-462.
- J1** Feng, Y.\*, **Chen, W.\***, and Wang, Q. (2019). A strain gauge based locomotion mode recognition method using convolutional neural network. *Advanced Robotics*, 33(5), 254-263.
- C1** Mai, J., **Chen, W.**, Zhang, S., Xu, D., and Wang, Q. (2018, October). Performance analysis of hardware acceleration for locomotion mode recognition in robotic prosthetic control. In *2018 IEEE International Conference on Cyborg and Bionic Systems (CBS)* (pp. 607-611). IEEE.

**PRESENTATIONS**

**Ultrasound-based Needle Tracking and Lateral Manipulation Planning for Common Needle Steering**

Master of Robotics Thesis Talk, Pittsburgh, PA (Virtual)

Aug 2021

Presented as my speaking qualifier.

**Ultrasound-based Tracking of Partially In-plane, Bending Needle**

International Symposium on Biomedical Imaging 2021, Nice, France (Virtual)

Apr 2021

Presented in the poster session.

**Human Hand Motion Primitives During Haptic Search and Retrieval of Buried Objects in Sandbox**

UCLA CSST Research Program, Los Angeles, CA

Sep 2018

Presented in Mechanical and Aerospace Engineering Peer Seminar and awarded for Outstanding Research and Presentation.

Presented in a poster presentation for final presentation of CSST research program.

## ADDITIONAL TRAINING

---

### Medical Augmented Reality Summer School

University of Balgrist

Two weeks of lectures on medical AR/VR with a competition of projects in AR-assisted surgery.

Zürich, Switzerland (Virtual)

Aug 2021 - Sep 2021

## TEACHING EXPERIENCE

---

### College of Engineering, Peking University

Tutor for Mathematics in Engineering

- Provided classes and support to sophomores for concepts clarification and exam reviews.

Beijing, China

Feb 2019 - Jun 2019

### College of Engineering, Peking University

Tutor for Introduction to Computation

- Provided classes and supports to freshmen for concepts clarification, programming skills training and exam reviews.
- Advised freshmen on their academic development.

Beijing, China

Sep 2018 - Jan 2019

## AWARDS

---

- President's Academic Excellence Initiative PhD Award  
University of British Columbia, Sep 2021
- International Tuition Award  
University of British Columbia, Sep 2021
- **2021 Four Year Doctoral Fellowship**  
University of British Columbia, Sep 2021
- **Excellent Graduate (top 17%)**  
Peking University, Jun 2019
- Outstanding Project in Undergraduate Student Research  
in College of Engineering  
Peking University, Jun 2019
- Outstanding Research and Presentation at the Mechanical and  
Aerospace Engineering Peer Seminar  
CSST Program, UCLA, Sep 2018
- Cross-disciplinary Scholars in Science and Technology Scholarship  
CSST Program, UCLA, July 2018
- Meritorious Winner in Interdisciplinary Contest In Modeling  
COMAP, Apr 2018
- Gong Qiaoyu Scholarship  
Peking University, 2017, 2018
- Yang Fuqing and Wang Yangyuan Academician Scholarship  
Peking University, 2016

## SKILLS

---

<b>Programming</b>	Python, Matlab, C/C++
<b>Packages</b>	OpenCV, PyTorch, ROS, Tensorflow, dVRK, SimpleITK, VTK
<b>Tools</b>	Git, LaTeX, Docker, 3D Slicer, ITK-SNAP, AutoCAD
<b>Languages</b>	Mandarin, English, Cantonese
<b>Certifications</b>	Standard First Aid, CPR C and AED; TCPS 2: CORE

## EXTRA-CIRRUCLAR ACTIVITIES

---

### Multidisciplinary Research Program in Medicine, UBC

Undergraduate Mentorship

- The project provides undergraduate students with an opportunity to explore their interest in interdisciplinary and multidisciplinary research.
- Advise two undergraduate students on a summer project supervised by a cross-faculty pair of researchers. Mentor and support students in fulfilling their proposed research project.

Vancouver, BC

May 2022 - present

### Women in Engineering, University of British Columbia

High School Mentorship

- Provide inclusive and equitable access to information about engineering and support students as they navigate the university application process.
- Offer professional, academic, and interpersonal guidance to students as they transition into post-secondary.
- Meet with my mentee and develop learning objectives and review them periodically.

Vancouver, BC

Sep 2021 - Mar 2022

**The Robotics Institute, Carnegie Mellon University**

*Master Students Mentor*

- Provided advice on academic development for three first-year master students.

**Pittsburgh, PA**

*Sep 2020 - Dec 2020*

**Cantonese Development Society, Peking University**

*Vice President & Publicity Department*

- Managed the finance of the association.
- Organized Cantonese learning courses including student management and courses materials distribution.
- Designed publicity materials such as posters, tickets and souvenirs for multiple events.

**Beijing, China**

*Sep 2017- May 2018*