

RUI CHEN

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EDUCATION

Massachusetts Institute of Technology (MIT)	Cambridge, MA
Woods Hole Oceanographic Institution (WHOI)	Woods Hole, MA
Ph.D. Candidate, MIT-WHOI Joint Program	June 2021
Applied Ocean Science and Engineering	GPA: 4.9/5
Relevant Coursework: Array processing, Discrete-time signal processing, Environmental ocean acoustics, Applied machine learning, Unmanned marine vehicle autonomy, sensing & communications, Stochastic systems	
Northwestern University	Evanston, IL
B.A. with Honors, <i>Magna Cum Laude</i>	June 2016
Majors in Integrated Science, Physics, Earth Science	GPA: 3.88/4
Outstanding Student in Physics (2014, 2015)	
Inductee, Phi Beta Kappa Society	

RESEARCH EXPERIENCE

Arctic Ocean Underwater Ambient Noise	July 2016 - June 2021
<i>Graduate Research Assistant, MIT-WHOI</i>	<i>Cambridge, MA</i>
<ul style="list-style-type: none">Investigated environmentally-induced changes to Arctic underwater ambient noise using signal processing techniques including time-frequency analysis, beamforming, and transient event detection & estimation using Matlab and PythonModeled and correlated underwater acoustic propagation to environmental variability using raytracing (Bellhop), wavenumber integration (OASES), and normal modes (Kraken)Developed a convolutional neural network approach using Tensorflow and Keras to estimate range of surface noise sources that exhibit more robustness to environmental mismatch compared to conventional matched field methodImplemented image processing and hierarchical clustering with Python and OpenCV to automatically detect and group transient noise features in data spectrograms; allows for easier categorization of transients compared to amplitude-based approach	
Arctic Ice Cover Cryo-seismic Monitoring	December 2018 - June 2021
<i>Graduate Research Assistant, MIT-WHOI</i>	<i>Woods Hole, MA</i>
<ul style="list-style-type: none">Collaborated with WHOI scientist to monitor Arctic ice cover activity near the coast of northern Alaska with a deployed planar geophone array to better understand ambient noise generationDesigned and implemented an event detection and localization algorithm that combines match filtering followed by time-difference-of-arrival estimate using Matlab; able to locate events within array perimeter with < 10% error	
Cold, Diffuse Interstellar Clouds	September 2014 - June 2016
<i>Undergraduate Research Assistant, Northwestern University</i>	<i>Evanston, IL</i>
<ul style="list-style-type: none">Extracted and analyzed star UV spectrum data from telescope databases to determine cloud distance and density using the image reduction and analysis facility program (IRAF) to better understand star formation within these clouds	
Tsunami Danger Threshold Modeling	Summer 2015
<i>Student Research Project, Pacific Tsunami Warning Center</i>	<i>Honolulu, HI</i>
<ul style="list-style-type: none">Formulated a current velocity threshold for tsunami warning issuance by employing a 1-D shallow water model in Matlab to simulate tsunami events and quantifying the human and economic impacts of the waves	

TECHNICAL PROJECTS

AUV Mission for Temperature Front Estimation	MIT Marine Vehicle Autonomy Course
<ul style="list-style-type: none">Leveraged autonomy software (MOOS-IvP) and C++ to plan an adaptive underwater vehicles behavior for autonomous sampling of a temperature front in the Charles RiverIn simulation, the resultant mission enabled collaboration between two independent vehicles with acoustic message passing; reduced the required mission time compared to standard lawn-mower path planning	
Web Application for Logging Board Game Results	Personal Interest

- Utilized JavaScript and HTML to build a NodeJS application that allows for easy documentation of board game results and calculates player performance statistics; the logged data are automatically stored in a MongoDB and displayed through a web interface

RESEARCH EXPEDITIONS

U.S. Navy Ice Exercise 2020 (ICEX2020)

March 2020

Arctic Ocean

- Collaborated with labmates to facilitate the deployment of a Bluefin-21 autonomous underwater vehicle with a towed line array for noise data collection below the Arctic ice cover

Sea Ice Dynamics Experiment (SIDE_x)

December 2018

Barrow, AK

- Assisted in the deployment and calibration of a planar geophone array on the ice cover near Elson Lagoon to monitor cryo-seismic activities

PUBLICATIONS

R. Chen, A. Poulsen, and H. Schmidt, "Spectral, spatial, and temporal characteristics of underwater ambient noise in the Beaufort Sea in 1994 and 2016," *J. Acoust. Soc. Am.* **145**, 605–614 (2019), doi.org/10.1121/1.5088601.

R. Chen and H. Schmidt, "Temporal and spatial characteristics of the Beaufort Sea ambient noise environment," *J. Acoust. Soc. Am.* **148**, 3928–3941 (2020), doi.org/10.1121/10.0002955.

R. Chen and H. Schmidt, "Model-based convolutional neural network approach to underwater source-range estimation," *J. Acoust. Soc. Am.* **149**, 405–420 (2021), doi.org/10.1121/10.0003329.

TEACHING & ADVISING

Graduate Peer Career Advisor

MIT Career Advising & Professional Development, September 2019 - May 2021

- Conducted >100 individual career advising appointments with undergraduate and graduate students to review resumes/cover letters and offer career counseling; 95% of students rated sessions as extremely helpful

Course Facilitator

MIT edX, November 2019 - May 2020

- Prepared and facilitated weekly online lessons for ~20 students (industry professionals) on machine learning topics as part of MIT edX's MicroMasters program on Statistics and Data Science

Teaching Assistant

MIT Environmental Ocean Acoustics Course, Fall 2018 & 2020

- Led weekly recitations and advised students on coding projects in underwater acoustics modeling; guided novel programmers to produce functional raytracing, normal modes, and wavenumber integration codes

LEADERSHIP

Webmaster, Tour Coordinator, President (since September 2020)

MIT Concert Band, May 2019 - May 2021

- Actively maintained the concert band website and advertise band events; organized weekly music programs such as listening sessions and remote rehearsals to keep members engaged virtually during COVID-19 pandemic
- Spearheaded the planning of the band's 2019 performance tour in Washington D.C.; communicated with MIT administrators and various vendors to finalize travel logistics for ~40 band members and band equipment

President

MIT-WHOI Joint Program Student Representatives, October 2019 - October 2020

- Lead monthly representatives meeting and help manage the group's budget
- Collaborate with other representatives to organize program events such as student orientation, academic talks, social engagements, and diversity & inclusion efforts

SKILLS

Computer: Proficient in Matlab, Python, C++, OASES, Bellhop, Kraken. Familiar with HTML, JavaScript, NodeJS, React.

Language: Native fluency in English, Mandarin Chinese.