

# TEERAPAT JENRUNGROT

## AI Researcher (Audio/Computer Vision)

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## EDUCATION

- 2019 - current University of Washington, Seattle, WA**  
Ph.D. Student in Computer Science and Engineering (GPA: 3.97/4)  
‣ Advisors: Ira Kemelmacher-Shlizerman, Steve Seitz  
‣ Affiliations: UW Reality Lab, UW Graphics and Imaging Lab (GRAIL)  
‣ Research Interest: Audio-visual, Deep Learning, Music Information Retrieval
- 2015 - 2019 Harvey Mudd College, Claremont, CA**  
Bachelor of Science in Computer Science (GPA: 3.8/4, CS GPA: 3.87/4)  
‣ Graduated with High Distinction and Departmental Honors in Computer Science.

## EXPERIENCE

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|----------------------------|--|-------------|
| Current<br>September 2019  | <b>University of Washington</b><br>Research Assistant<br>‣ <b>Audio Source Separation:</b> Developed a novel method for speech separation using deep learning. Our method illustrates state-of-the-art separation performance, works with real-world voices, and handles arbitrary, unknown number of potentially moving speakers. We published our work as an oral paper in NeurIPS 2020.<br>Project Page: <a href="#">Here</a><br>   | Seattle, WA |
| August 2019<br>May 2019    | <b>Amazon.com, Inc.</b><br>Applied Scientist Intern, Customer Behavior Analytics Team<br>‣ <b>Customer Segmentation:</b> Developed a semi-supervised deep learning algorithm for clustering high-dimensional customer data using Python and MXNet Gluon. The proposed method improved clustering performance by 26% and is deployed to production for improving customer's downstream impact estimation.<br>‣ <b>Distributed Deep Learning:</b> Developed a pipeline for neural network distributed training and inference using Spark and Amazon EMR cluster.<br>       | Seattle, WA |
| May 2019<br>September 2018 | <b>Microsoft Corporation</b><br>Remote Co-op Technical Consultant, Advanced Reading Technologies Team<br>‣ <b>Reading Tool:</b> Collaborated with a research team from Microsoft Research on a project of developing a reading tool for improving users' reading experience based on an eye-tracking device.<br>‣ <b>Eye-tracking Data Analysis:</b> Developed an automated system to detect and classify points of interest based on user reading behavior into interested, confused, and skimming categories using Python.<br>    | Redmond, WA |

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|--------------------------|--|-----------------|
| May 2019<br>January 2016 | <b>Harvey Mudd College</b><br>Research and Teaching Assistant<br><ul style="list-style-type: none"> <li>➤ <b>Research Assistant - Music Information Retrieval:</b> Developed a dynamic programming algorithm for multi-modal alignment between sheet music and corresponding computer-synthesized MIDI. Designed a deep fully convolutional network for detecting musical notes on sheet music and generating compact representations for the alignment using Python, Keras, and Tensorflow. Our method is published in ISMIR 2019.</li> <li>➤ <b>Research Assistant - PCB Developer:</b> Designed and developed a PCB consisting of a microcontroller SAM4S and a Cyclone IV FPGA to be used in a microprocessor-based systems class and created lab instructions based on the developed PCB. Our work is published in GLSVLSI 2020.</li> </ul> | Claremont, CA   |
|                          | <ul style="list-style-type: none"> <li>➤ <b>Research Assistant - Stock Market Analysis:</b> Applied machine learning techniques to detect anomalies in stock market data. Developed a backtesting system and an actual automated trading system that connects to InteractiveBrokers for real-time trading. Developed the distributed system and front-end using Python, Django, and Celery for parallelization.</li> <li>➤ <b>Teaching Assistant:</b> Tutored students, held office hours, graded students' homework for Machine Learning, Big Data, and Microprocessor-based Digital System.</li> </ul> <div> Python C/C++ Keras Tensorflow Django Quartus </div>   |                 |
| August 2017<br>May 2017  | <b>Intel Corporation</b><br>Remote Summer Research Assistant<br><ul style="list-style-type: none"> <li>➤ Proposed a computational model for sound field separation and reconstruction of a 3-dimensional acoustic environment.</li> <li>➤ Designed a headphone-based system to simulate 3-dimensional sound localization effects using Head-Related Transfer Functions using Python.</li> </ul> <div> Python </div>  | Santa Clara, CA |
| May 2017<br>January 2017 | <b>Environmental Data Resources (EDR), Inc.</b><br>Remote Part-Time Software Developer<br><ul style="list-style-type: none"> <li>➤ Implemented a Hidden Markov model and support vector machine model for automatically parsing US addresses into computer-readable formats.</li> </ul> <div> Python C/C++ scikit-learn </div>   | Shelton, CT     |

## PUBLICATIONS

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### THE CONE OF SILENCE: SPEECH SEPARATION BY LOCALIZATION

2020

Proceedings of the 34th Conference on Neural Information Processing Systems (NeurIPS) [Oral Paper]

Vancouver, Canada

Teerapat Jenrungrot\*, Vivek Jayaram\*, Steven Seitz, Ira Kemelmacher-Shlizerman

[PDF](#) [Code](#) [Project Page](#)

### A BOARD AND PROJECTS FOR AN FPGA/MICROCONTROLLER-BASED EMBEDDED SYSTEMS LAB

2020

Proceedings of the 30th edition of the ACM Great Lakes Symposium on VLSI (GLSVLSI)

Beijing, China

Kaveh Pezeshki, Caleb Norfleet, Erik Meike, Teerapat Jenrungrot, Matthew Spencer, Joshua Brake, David M. Harris

[PDF](#) [Schematic](#) [Layout](#)

### USING CELL PHONE PICTURES OF SHEET MUSIC TO RETRIEVE MIDI PASSAGES

2020

IEEE Transactions on Multimedia

TJ Tsai, Daniel Yang, Mengyi Shan, Thitaree Tanprasert, Teerapat Jenrungrot

[PDF](#) [Code](#) [Data](#)

### MIDI PASSAGE RETRIEVAL USING CELL PHONE PICTURES OF SHEET MUSIC

2019

Proceedings of the 20th Conference of the International Society for Music Information Retrieval (ISMIR)

Delft, the Netherlands

Daniel Yang, Thitaree Tanprasert, Teerapat Jenrungrot, Mengyi Shan, TJ Tsai

[PDF](#) [Code](#) [Data](#) [Talk](#)

### MIDI-SHEET MUSIC ALIGNMENT USING BOOTLEG SCORE SYNTHESIS

2019

Proceedings of the 20th Conference of the International Society for Music Information Retrieval (ISMIR)

Delft, the Netherlands

Thitaree Tanprasert\*, Teerapat Jenrungrot\*, Meinard Müller, Timothy Tsai

[PDF](#) [Code](#) [Talk](#)

## PROJETS

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### COCONUT ONLINE INTERPRETER

2018

<https://cs121-team-panda.github.io/coconut-interpreter/>  [github.com/cs121-team-panda/coconut-interpreter](https://github.com/cs121-team-panda/coconut-interpreter)

Designed and implemented a web-based online interpreter for the open-source Coconut programming language using Flask, React, and AWS Lambda. Built fully automated CI/CD pipelines on CircleCI.

Python JavaScript React Flask Amazon Lambda CI/CD

### FPGA-BASED CRYPTOCURRENCY PLATFORM

2017

 [github.com/fangherk/MicroPCoin](https://github.com/fangherk/MicroPCoin)

Designed and implemented a simulated cryptocurrency platform with hash computations by FPGA using Raspberry Pi, C, Flask, and SystemVerilog.

Python C/C++ SystemVerilog Flask FPGA Raspberry Pi

## HONORS

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|----------------|---|
| November 2018  | <b>5<sup>th</sup> Place</b> , ACM-ICPC Southern California Regional 2018                  |
| March 2018     | <b>Honorable Mention</b> , North American Invitational Programming Contest 2018           |
| November 2017  | <b>5<sup>th</sup> Place</b> , ACM-ICPC Southern California Regional 2017                  |
| September 2017 | <b>1<sup>st</sup> Place</b> , Microsoft Coding Competition (MSFT3C) - Harvey Mudd College |
| November 2016  | <b>9<sup>th</sup> Place</b> , ACM-ICPC Southern California Regional 2016                  |
| November 2015  | <b>7<sup>th</sup> Place</b> , ACM-ICPC Southern California Regional 2015                  |
| May 2014       | <b>Honorable Mention</b> , Asia-Pacific Informatics Olympiad 2014                         |
| May 2013       | <b>1<sup>st</sup> Place/Gold Medal</b> , Thailand Olympiad in Informatics 2013            |

## SKILLS

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|------------------------|--|
| <b>Programming</b>     | Python, Spark, C/C++, JavaScript, $\text{\LaTeX}$ , SystemVerilog, Tensorflow, Keras, MXNet, PyTorch |
| <b>Services</b>        | Amazon EC2, Amazon EMR, Amazon S3, Amazon Lambda, CI/CD  |
| <b>Web Development</b> | Node.JS, Django, Flask, Redux, React, HTML5  |