

# TEERAPAT JENRUNGROT

## AI Researcher (Audio/Computer Vision)

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📍 Bill & Melinda Gates Center, 3800 E Stevens Way NE, Seattle, WA 98195

## 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

### August 2019 Amazon.com, Inc., Seattle, WA

May 2019 Applied Scientist Intern, Customer Behavior Analytics Team

- **Customer Segmentation:** 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.
- **Distributed Deep Learning:** Developed a pipeline for neural network distributed training and inference using Spark and Amazon EMR cluster.

Python MXNet PyTorch Amazon EMR Amazon EC2 Spark Hadoop

### May 2019 Microsoft Corporation, Redmond, WA

September 2018 Remote Co-op Technical Consultant, Advanced Reading Technologies Team

- **Reading Tool:** 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.
- **Eye-tracking Data Analysis:** Developed an automated system to detect and classify points of interest based on user reading behavior into interested, confused, and skimming categories using Python.

Python JavaScript Flask

### May 2019 Harvey Mudd College, Claremont, CA

January 2016 Research and Teaching Assistant

- **Research Assistant - Music Information Retrieval:** 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.
- **Research Assistant - PCB Developer:** 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.
- **Research Assistant - Stock Market Analysis:** 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.
- **Teaching Assistant:** Tutored students, held office hours, graded students' homework for Machine Learning, Big Data, and Microprocessor-based Digital System.

Python C/C++ Keras Tensorflow Django Quartus

August 2017 May 2017	<b>Intel Corporation, Santa Clara, CA</b> Remote Summer Research Assistant <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> Python
May 2017 January 2017	<b>Environmental Data Resources (EDR), Inc., Shelton, CT</b> Remote Part-Time Software Developer <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> Python C/C++ scikit-learn

## PUBLICATIONS

<b>THE CONE OF SILENCE: SPEECH SEPARATION BY LOCALIZATION</b> Teerapat Jenrungrot* , Vivek Jayaram* , Steve Seitz , Ira Kemelmacher-Shlizerman Proceedings of the 34th Conference on Neural Information Processing Systems (NeurIPS) [Oral Paper] Project Page Code PDF	2020
<b>A BOARD AND PROJECTS FOR AN FPGA/MICROCONTROLLER-BASED EMBEDDED SYSTEMS LAB</b> Kaveh Pezeshki , Caleb Norfleet , Erik Meike , Teerapat Jenrungrot , Matthew Spencer , Joshua Brake , David M. Harris Proceedings of the 30th edition of the ACM Great Lakes Symposium on VLSI (GLSVLSI) Schematic Layout PDF	2020
<b>USING CELL PHONE PICTURES OF SHEET MUSIC TO RETRIEVE MIDI PASSAGES</b> TJ Tsai , Daniel Yang , Mengyi Shan , Thitaree Tanprasert , Teerapat Jenrungrot IEEE Transactions on Multimedia PDF Code Data	2020
<b>MIDI PASSAGE RETRIEVAL USING CELL PHONE PICTURES OF SHEET MUSIC</b> Daniel Yang , Thitaree Tanprasert , Teerapat Jenrungrot , Mengyi Shan , TJ Tsai Proceedings of the 20th Conference of the International Society for Music Information Retrieval (ISMIR) PDF Code Data Talk	2019
<b>MIDI-SHEET MUSIC ALIGNMENT USING BOOTLEG SCORE SYNTHESIS</b> Thitaree Tanprasert* , Teerapat Jenrungrot* , Meinard Müller , and Timothy Tsai Proceedings of the 20th Conference of the International Society for Music Information Retrieval (ISMIR) PDF Code Talk	2019

## PROJETS

## FAST KDE WITH ERROR GUARANTEES

2019

Implemented a non-parametric approach for performing kernel density estimation using the nearest neighbor data structure Kd-tree. Evaluated the proposed method by comparing with the state-of-the-art baseline kernel density estimator.

C/C++ Python

## QUANTIFYING INFORMATION GAIN IN INFINITE SPACE

2018

Developed a theoretical framework used for quantifying an information gain when transitioning from infinite space to finite space by using cumulative distribution functions. Demonstrated the proposed framework on the decision tree algorithm.

Python

## 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

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

<b>Programming</b>	Python, Spark, C/C++, JavaScript, $\LaTeX$ , 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