HUAY **DIN**

B.S. Candidate in Math and Physics | Class of 2023

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Undergraduate Math and Physics Major at Case Western Reserve University; Will obtain degree by January 2023.

Education

Expected 2023 **B.S Mathematics and Physics Candidate**, at Case Western Reserve University School of Arts and Sciences.

Experience

August 2022 – Ongoing

Accelerating Kidney MRF with DL methods, PI : Yong Chen, Case Western Reserve University - University Hospitals

- Submitted a first author abstract to ISMRM 2023.
- Developed and optimized a spatial-constrained convolutional neural network to accelerate 2D kidney MRF acquisition
- Evaluated the model's capability to quantify T1 and T2 relaxation times for renal cell carcinomas.
- Handled clinical MRF data acquired from volunteers, patients with malignant RCC tumors, and from different Siemens scanners.

DL | MRF | Kidney MRF | Renal Cell Carcinomas | Pytorch

June 2022 – August 2022

Super-resolution for Dual Energy Dual Layer Flat Panel Detector CT Images, PI : Adam Wang, Stanford University

- Submitted a first author abstract to SPIE Medical Imaging 2023 (Accepted).
- Applied, measured and analyzed Fourier based characteristic transfer functions (modulation transfer function, noise-power spectrum, detective quantum efficiency) to model DEDL FPDs for super resolution.
- Applied a variety of classic super resolution convolutional neural network models as a metric to compare to investigate the particular research problem

CNNs | Super-resolution | Dual Layer Detector | Pytorch | CT

August 2021 - Ongoing

Machine Learning for Magnetic Resonance Fingerprinting, PI : Julia Dobrosotskaya, CWRU

- Designed a generalized MRF image reconstruction model through constructing a balanced training set (which contains synthetic and natural images) and using the framework of fully connected neural networks.
- Used the tools of real analysis to mathematically formulate the MRF problem to better inform the design of the training set and model.
- Emphasized the construction of a balanced and diverse training set to cover the desired T1 and T2 relaxation time range.

MRF | Neural Networks | MATLAB | Python

June 2021 – April 2022

Crystals of Sound, Collaborator : Jesse Berezovsky, CWRU

- Configured computer architecture and networking for reliable communication without Internet
- Created Pure Data patches to route live messages from original program to performers
- Held a concert in collaboration with CIM (click here for link to performance).

Pure Data | Music | Algorithmic Compositions

May 2020 – September 2022

Critical behavior and the Kibble-Zurek Mechanism in a musical phase transition, PI : Jesse Berezovsky, CWRU

- Paper currently in peer review for PLOS ONE
- Appplied Monte Carlo/Langevin algorithms to a novel 3D XY model for a lattice of notes.
- Conducted data analysis on simulations to investigate universality, critical behavior and the Kibble Zurek Mechansism.
- Performed simulations on high performance computing cluster.

Statistical Mechanics | HPC | MATLAB | Music

November 2020 – June 2021 | **Coding Scholar, Case Western Reserve University, CWRU**

- Programmed tools and other applets related to current research with Jesse Berezovsky with Pure-Data*.
- Created an in-browser markable Tonnetz Diagram**.
- Programmed three.js animated algorithmic composition based off of results from previous research with Jesse Berezovsky**.

*Tools used in Crystals of Sound Concert

*Apps can be found at huaydin.github.io

JavaScript | three.js | Boids | Algorithmic Compositions

Awards and Scholarships

Summer 2022	American Association of Physicists in Medicine Summer Undergraduate Research Fellow
Spring 2022	James C Wyant Award - Awarded by the CWRU Physics Department for research accomplishments outside the senior project
Spring 2021 - Spring 2023	Case Alumni Association Junior-Senior Scholarship
Summer 2020	SOURCE Research Fellow

Previous Presentations

March, 2022	@ the 2022 APS March Meeting Session Y08 : Chaos and Nonlinear Dynamics II; Title : Phase transitions, critical behavior, and emergent order in systems of musical harmony*
November, 2021	@ the Meeting of the Eastern Great Lakes Session C01 : Lightning Sessions Student Posters; Title : Phase transitions, critical behavior, and emergent order in systems of musical harmony*

Extracurriculars

2022 - Ongoing	Association for Women in Mathematics CWRU Chapter : (Fall 2022) Co-President + Founder
2020 - Ongoing	CWRU Math Club Exec : (Fall 2022 - Spring 2023) Co-President, (Fall 2021 - Spring 2022) Treasurer, (Fall 2020) Secretary
2020	Office of Multicultural Affairs - Advisory Council : (Spring 2020)
2019 - Ongoing	CWRU Literary Magazine Exec : (Fall 2019 - Spring 2022) Business Manager

Skills

Programming Languages	**MATLAB** , Python, Javascript (three.js) , HTML5/CSS, Bash & Shell, General Data Entry
Development Tools	Visual Studio Code, Atom, git.
Office Tools	LaTeX, Google Drive(Documents, Sheets, MS Office). High Performance Computing Cluster

Programming Languages

MATLAB	●●●●●
JavaScript	●●●●●
Bash & Shell	●●●●○
Pure Data	●●●●○
Python	●●●●○
Java	●●●○○

Languages

English	●●●●●
Chinese	●●●●○
Japanese	●●●○○

Interests

Professional Interests :	Phase Transitions, Non-equilibrium dynamics, Quantum Computing, Quantum Information, Machine Learning
Reading :	NK Jemison, Haruki Nakamura
Education :	Math Pedagogy
Music :	Viola, Composition, Algorithmic Composition