Takumi Matsuzawa

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EDUCATION

The University of Chicago (Chicago, IL) 2016 - Early 2023(expected)
Ph.D. candidate, Physics, Advisor: Dr. William T.M. Irvine, GPA: 3.81/4.0

The University of Chicago (Chicago, IL) 2016-17
Master of Science, Physics, Advisor: Dr. Sidney R. Nagel

Kalamazoo College (Kalamazoo, MI) 2013-16
Bachelor of Arts, Physics with honors and Chemistry, *summa cum laude*, GPA: 4.0/4.0

EXPERIENCE

The University of Chicago (Chicago, IL) *Graduate researcher* 2016-Present

- Engineered an innovative data acquisition system involving multiple high-speed cameras and a pulsed laser for volumetric analyses of complex fluid phenomena such as turbulence (Funded by Army Research Office over $500k)
- Created a data pipeline to process TB of raw image data into a few GB for statistical analyses, reducing the processing time from several days to a few hours
- Built and maintained a Python library (>20k lines) to analyze 3D/4D flow single-handedly
- Developed an optical flow estimator for particle image velocimetry using a CNN
- Mentored several graduate and undergraduate students for experimental and computational projects including machine-learning vortex dynamics and 4D data visualization

Kalamazoo College (Kalamazoo, MI) *Research Assistant* 2013-16

- Constructed a mathematical model about synaptic plasticity of Alzheimer's patients using MATLAB, which resulted in an academic paper and a book chapter
- Implemented Monte Carlo and molecular dynamics simulations in Java to study how a crystal melts

Fermi National Accelerator Laboratory (Batavia, IL) *Lee Teng Fellow* 2015

- Performed particle physics simulations in C++ (Geant4) to assess the merits of the proposed proton beamline upgrade for the Mu2e experiment, one of the flagship projects by Department of Energy

KEK- High Energy Accelerator Research Organization (Japan) *Visiting researcher* 2014

- Conducted the laser break-down spectroscopy to evaluate composition of alloys

SKILLS

Programming	Python (including NumPy,SciPy, Pandas, OpenCV, PyTorch, and Scikit-learn), Java, C, C#, SQL, HTML, CSS, Matlab, shell scripting
Software & Tools	Mathematica, Root, LabView, LAMMPS, Blender, Houdini, LaTeX, Git
Data analysis	Image processing, computer vision, machine learning; principal component analysis, Monte Carlo methods, parallel and distributed computing
Operating Systems	Linux, Mac, Windows
Techniques	Prototyping, 3D printing, machining, CAD, 2D & 3D velocimetry
Languages	English (proficient), Japanese (native) and German (conversational)

SELECTED AWARDS

Grainger Foundation Fellowship for Outstanding Research in Experimental Physics 2022
Sidney Nagel Prize for Creativity in Research 2020
John Wesley Hornbeck Prize for Excellence in Physics 2016
Senior Leadership Recognition Award for Excellence in Teaching 2016