Takumi Matsuzawa

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Education

The University of Chicago, Chicago, IL 2016-
Ph.D. candidate, Physics

The University of Chicago, Chicago, IL 2016-17
Master of Science, Physics

Kalamazoo College, Kalamazoo, MI 2013-16
Bachelor of Arts, Physics with honors and Chemistry, *summa cum laude*

Research Experience

Turbulence through Vortex Ring Collision, The University of Chicago 2017-
Investigates turbulent flows generated by colliding eight vortex rings, supervised by William T.M. Irvine

Splashing of Low Viscosity Fluids, The University of Chicago 2016-17
Studied on thin-sheet ejection process of splashing using low viscosity fluids, supervised by Sidney R. Nagel.

Targeting Studies for Mu2e-II, Fermi National Accelerator Laboratory 2015
Studied targeting a proton beam for the Mu2e experiment using a software called G4beamline, in the current configuration and in proposed upgrade scenarios, supervised by Eric Prebys and Thomas Roberts.

Phase Transition Simulation of Yukawa System, Kalamazoo College 2014-16
Investigated a phase transition of the Yukawa system by running the molecular dynamics simulator called LAMMPS, and simulations based on the Monte Carlo algorithm, supervised by Jan Tobochnik.

Modeling Altered Synaptic Plasticity, Kalamazoo College 2014-16
Constructed a mathematical model of the altered synaptic plasticity of Alzheimer's patients supervised by Pter rdi

Laser Break-Down Spectroscopy, KEK 2014
Conducted laser break-down spectroscopy to evaluate mechanical properties of alloys

A Guide to the Vaccination Debate 2014
Interdisciplinary study on effectiveness of vaccines to bridge parents and public health offices. See the report here.

Skills

Language: English (proficient), Japanese (native) and German (conversational)
Programming: C, C++, C#, Java, Python, OpenGL, HTML, CSS
Computer: Matlab, Mathematica, Root, LabView, LAMMPS, G4beamline, Neuron, MS Office, LaTeX, Github
Others: Particle image velocimetry, Laser tomography, Machining tools used in construction

Teaching Experience

Teaching Assistant, The University of Chicago
Fall 2016: Introductory Physics: Mechanics (PHYS 131)
Winter 2017: Introductory Physics: Electricity and Magnetism (PHYS 132)
Spring 2017: Introductory Physics: Waves, Optics, and Heat (PHYS 133)

Teaching Assistant, Kalamazoo College
Winter 2014: Introductory Physics (PHYS 150)
Spring 2014: Introductory Physics (PHYS 152)
Fall 2014: Modern Physics (PHYS 220)
Fall 2016: Quantum Mechanics (PHYS 420)
Fall 2016: Astrophysics (PHYS 480)
Spring 2016:Thermal Physics (PHYS 360)
Fall 2016: Astrophysics (PHYS 480)

Peer Consultant, Kalamazoo College 2014-16
Tutored students in mathematics and physics courses at Kalamazoo College Math-Physics Center. The topics include elementary calculus, elementary geometry, linear algebra, and introductory physics.

Publications

Matsuzawa T, Zalányi L, Kiss T and Érdi P, Multi-scale modeling of altered synaptic plasticity related to Amyloid β effects, Neural Networks, 2017.

Érdi P, **Matsuzawa T**, John T, Kiss T and Zalányi L.: Connecting Epilepsy and Alzheimers Disease: Modeling of Normal and Pathological Rhythmicity and Synaptic Plasticity Related to Amyloid β Effects. In: Érdi P, Bhattacharya BS and Cochran Al (Eds.): Computational Neurology and Psychiatry (Springer Series in Bio-/Neuroinformatics) 1st ed. 2017 Edition, pp 93-119.

Awards and Scholarships

John Wesley Hornbeck Prize for Excellence in Physics 2016
Senior Leadership Recognition Award for Excellence in Teaching Physics 2016
The 39th Lower Michigan Mathematics Competition, 2nd Place 2015
Lee Teng Undergraduate Fellowship in Accelerator Science and Engineering 2015
Anne W. Suck Scholarship for the Sciences 2014-16
J. Ward and Mary Greiner Grant 2014
The ACSJL Interdisciplinary Research Grant 2014
Deans' List, Kalamazoo College 2013-16
The 36th Professor Harry Messel International Science School 2011

Community Service

"Science Meets Art", Marwen Art School, *Volunteer* June 2016
Sukuma Menter For Underrepresented Students in Sciences, *Mentor* 2015 - 2016
Woodward School for Technology and Research, *Programming Tutor* 2015
Maple Street Magnet School for the Arts, *Tutor* 2013-14

Talks and Presentations

The University of Chicago, Experimental Physics Project, *Poster* May 2017
"Characterization of Thin-Sheet Ejection Using Low-Viscosity Fluids"
Kalamazoo College, Conference for Complex Systems, *Invited Talk* May 2017
"Multi-Scale Modeling of Altered Synaptic Plasticity Related to Amyloid-Beta Effects"
Kalamazoo College, *Talk and Poster* Apr. 2016
"Targeting Studies of the Second-Generation Mu2e Experiment"
Fermi National Accelerator Laboratory, *Talk and Poster* Aug. 2015
"Targeting Studies of the Second-Generation Mu2e Experiment"
Annual Meeting of Society for Neuroscience, Chicago *Poster* Oct. 2015
"Modeling Altered Synaptic Plasticity due to Amyloid-Beta"
KEK, Summer School, *Talk and Poster* Aug. 2014
"Laser Break-Down Spectroscopy on Alloys"

Extracurricular Activities

War Memories, Oral History in Liberal Arts 2015-16
"War Memories explores memories of World War II by Japanese-speaking people who lived in the Japanese Empire during the war." The project is guided by Noriko Sugimori at Kalamazoo College. I translated several interviews into English, added Japanese and English subtitles to the videos. The videos are available here.

TEDxKalamazooCollege Speaker 2016
I presented how mathematical mindset may enrich one's life.

Society of Physics Student, Head of Kalamazoo College Chapter 2015-16