Victoria Kala

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EDUCATION

University of California, Los Angeles — Los Angeles, CA
Ph.D. Mathematics — Expected: June 2023
Advisor: Joseph Teran

University of California, Santa Barbara — Santa Barbara, CA
M.A. Applied Mathematics — June 2017

Utah Valley University — Orem, UT
B.S. Mathematics, *cum laude* — May 2014
B.S. Physics, *cum laude*

RESEARCH INTERESTS

My research interests include physics-based simulations, material point methods (MPM), continuum mechanics, elasticity, plasticity, computer graphics, computational and applied mathematics.

RESEARCH EXPERIENCE

University of California, Los Angeles — Los Angeles, CA
Graduate Student Research — Apr 2019 – Present

I collaborate with several team members to develop and manage a codebase for physics-based simulations involving material point methods (MPM), finite element methods, and hybrid Lagrangian material point methods using C++ and multithreading.

University of Michigan, Ann Arbor — Ann Arbor, MI
Institut d'Optique Graduate School — Palaiseau, France
Optics in the City of Light International REU — Jun 2013 – Aug 2013
Simulation and Optimization of Multilayer Mirrors

I performed simulation and optimization of period and aperiodic multilayer mirrors using MATLAB and IMD. I also assisted with multilayer mirror deposition in a clean room.

California State University, Fresno — Fresno, CA
CSU Fresno Mathematics REU — Jun 2012 – Jul 2012
A Survival Analysis of the Duration of Olympic Records

I performed statistical analysis on Olympic data to determine the duration of Olympic records. My research group also made predictions on which Olympic records were at risk of being broken for the 2012 Olympics. Programming languages SAS and R were used to perform the analysis and predictions.

Utah Valley University — Orem, UT
Astrophysics Research Project — May 2012 – Jun 2012
Calibrating the IR Surface Brightness Fluctuation Distance Scale Using HST WFC3

I performed image processing techniques and data analysis on several galaxy images taken by Hubble Telescope WFC3/IR. These techniques were used to calculate surface brightness fluctuation magnitudes and determine distances to galaxies.

EMPLOYMENT EXPERIENCE

Weta Digital — Los Angeles, CA
Simulation Intern — Jun 2021 – Nov 2021

I collaborated with researchers at Weta Digital to develop a method for simulating burning of solid materials, as well as coupling between incompressible fluids and MPM solids.

TEACHING EXPERIENCE

University of California, Los Angeles — Los Angeles, CA
Graduate Teaching Assistant — Jun 2018 – Present

I hold weekly discussion sections and office hours, tutor in the Student Math Center, and grade homework and exams. I have been a teaching assistant for Precalculus, Integral Calculus, Vector Calculus, Linear Algebra, Differential Equations, and Applied Numerical Methods.

University of California, Los Angeles — Los Angeles, CA
Graduate Student Instructor — Jan 2021 – June 2021

I was the instructor for Applied Numerical Methods. I designed my own course, including the course outline, pen-and-paper assignments, programming assignments, exams, and lectures.

University of California, Santa Barbara — Santa Barbara, CA
Graduate Teaching Assistant — Sep 2014 – Jul 2017

I held weekly discussion sections and office hours, tutored in the Math Lab, and graded homework and exams. I was a teaching assistant for Integral Calculus, Vector Calculus, Linear Algebra, Differential Equations, Methods of Analysis, and Introduction to Numerical Analysis. I received the Graduate Student Association's campus-wide Excellence in Teaching Award for the 2015−2016 school year.

Utah Valley University — Orem, UT
Teaching Assistant — Aug 2013 – May 2014

I taught workshops and graded exams for a College Algebra course with 400 students.

Utah Valley University — Orem, UT
Grader — Oct 2012 – May 2014

I graded for several lower and upper division mathematics courses, including College Algebra, Trigonometry, Single- and Multi-variable Calculus, Linear Algebra, Ordinary Differential Equations, and Foundations of Abstract Algebra.

Utah Valley University — Orem, UT
Tutor — Sep 2007 – Oct 2012

I tutored lower and upper division mathematics and physics courses at the Math Lab, Academic Tutoring Lab, and Multicultural Center. I am a certified Level III Master Tutor through the College Reading & Learning Association.

PUBLICATIONS

Chen, Jingyu, **Victoria Kala**, Alan Marquez-Razon, Elias Gueidon, David A.B. Hyde, and Joseph Teran. "A momentum-conserving implicit material point method for surface tension with contact angles and spatial gradients." ACM Transactions on Graphics (TOG) 40, no. 4 (2021): 1-16.

Kala, Victoria, Katherine Guo, Elizabeth Swantek, Alan Tong, Monique Chyba, Yuriy Mileyko, Chris Gray, Thomas Lee, and Alice Koniges. "Pandemics in Hawai'i: 1918 Influenza and COVID-19." IARIA, 2020, 26-31.

Hollifield, Elliott, **Victoria Treviño**, and Adam Zarn. "A Survival Analysis of the Duration of Olympic Records." arXiv preprint arXiv:1207.6133 (2012).

French, Brigham S., Joseph B. Jensen, John P. Blakeslee, Nathan Boyer, and **Victoria Treviño**. "Calibrating the IR Surface Brightness Fluctuation Distance Scale Using HST WFC3." AAS 220 (2012): 332-02.

SKILLS

- **Mathematics:** solid background in applied and computational mathematics, including numerical analysis, numerical linear algebra, ordinary and partial differential equations
- **Programming:** C++, Python, MATLAB, Mathematica, Maple, LaTeX, Houdini, Git, CMake, vim, Eigen, TBB, GDB, Valgrind
- **Operating Systems:** Mac OS X, Windows, Linux

SELECTED AWARDS AND HONORS

- Balbes Award, UCLA, 2022
- Eugene V. Cota-Robles Fellowship, UCLA, 2020−2021
- Graduate Student Research Fellowship, UCLA, 2020
- Eugene V. Cota-Robles Fellowship, UCLA, 2017−2018
- Excellence in Teaching Award, UCSB, 2016
- Outstanding Teaching Assistant Award Nominee, UCSB, 2014
- Tutor of the Year, UVU, 2012
- Astrophysics Research Scholarship, UVU, 2012
- Exemplary Merit Scholarship, UVU, 2009−2014

PROGRAM PARTICIPATION

University of Nebraska, Lincoln — Lincoln, NE
Nebraska IMMERSE — Jun 2014 − July 2014

IMMERSE (Intensive Mathematics: a Mentoring, Education and Research Summer Experience) is a preparation program for students who are about to enter their first year of graduate study in mathematics.

Institute of Advanced Study — Princeton, NJ
IAS Women and Mathematics Program — May 2014
Topic: Random Matrix Theory

The Women and Mathematics program is an annual program with a mission to recruit and retain more women in mathematics.

SERVICE AND LEADERSHIP

University of California, Los Angeles — Los Angeles, CA
Women in Mathematics — Sep 2017 − present

University of California, Santa Barbara — Santa Barbara, CA
Graduate Student Association Excellence in Teaching Award Committee — Apr 2017

Utah Valley University Orem, UT
Math Girls Rock! Aug 2011 – May 2012

SELECTED PRESENTATIONS

- École Polytechnique, "Simulation and Optimization of Multilayer Mirrors," Palaiseau, France, July 2013
- Joint Mathematics Meeting, "A Survival Analysis of the Duration of Olympic Records," San Diego, CA, January 2013