

Joyce A. Chew

CONTACT INFORMATION	University of California, Los Angeles Department of Mathematics 520 Portola Plaza, Math Sciences Building Los Angeles, CA 90095, USA	joycechew@math.ucla.edu (714) 757-5810
RESEARCH INTERESTS	Numerical linear algebra, optimization, stochastic iterative methods	
EDUCATION	University of California, Los Angeles , Los Angeles, California USA	
	Ph.D., Applied Mathematics	Expected June 2025
	Cumulative GPA: 4.00	
	Qualifying Exams:	
	<ul style="list-style-type: none">• Numerical Analysis (Spring 2021)• Optimization/Numerical Linear Algebra (Spring 2021)	
	Graduate Courses:	
	<ul style="list-style-type: none">• Advanced Numerical Analysis• Optimization and Calculus of Variations• Numerical Linear Algebra	
	Calvin University , Grand Rapids, Michigan USA	
	B.S., Mathematics (Honors)	May 2020
	Cumulative GPA: 4.00	
	<ul style="list-style-type: none">• Honors Thesis: Applications of algebra in bifurcation theory• Minor in Computer Science	
	B.A., Chemistry	May 2020
	Cumulative GPA: 4.00	
HONORS AND AWARDS	National Science Foundation Graduate Research Fellowship, 2020 National Center for Women and Information Technology Collegiate Award Finalist, 2019 Goldwater Scholarship Honorable Mention, 2018 Calvin Student Research Fellowship, 2016	
PUBLICATIONS	Kazmierczak, N.P.; Chew, J.A. ; Michmerhuizen, A.R.; Kim, S.E.; Drees, Z.D.; Rylaarsdam, A.; Thong, T.; Van Laar, L.; Vander Griend, D.A. Sensitivity Limits for Determining 1:1 Binding Constants from Spectrophotometric Titrations via Global Analysis. <i>Journal of Chemometrics</i> , 2019, 33:e3119.	
PAPERS IN PREPARATION	Chew, J.A. ; Borum, A. Tension-induced instabilities of twisted springs. Kazmierczak, N.P.; Chew, J.A. ; Vander Griend, D.A. Estimation of Equilibrium Stoichiometry Parameters in Hard-Modeling of Spectrophotometric Titrations. Kazmierczak, N.P.; Chew, J.A. ; Vander Griend, D.A. Bootstrap methods for quantifying the uncertainty of binding constants in the hard modeling of spectrophotometric titration data.	

PRESENTATIONS

Chew, J.A. Slinkies, Gorges, and Ice Cream: What I Did on My Summer Vacation. Calvin University Mathematics and Statistics Colloquium, Grand Rapids, MI (oral presentation, September 26, 2019).

Chew, J.A. Tension induced instabilities of twisted springs. Cornell University Undergraduate Research Forum, Ithaca, NY (oral presentation, July 25, 2019).

Chew, J.A.; Kazmierczak, N.P.; Vander Griend, D.A. Defining the relationship: computer-driven characterization of the binding of host and guest molecules. West Michigan Regional Undergraduate Science Conference, Grand Rapids, MI (poster, November 10, 2018), and Joint Mathematics Meetings, Baltimore, MD (poster, January 18, 2019).

Kazmierczak, N.P.; **Chew, J.A.;** Vander Griend, D.A. The tie that binds: optimal design of equilibrium spectrophotometric titrations. West Michigan Regional Undergraduate Science Conference, Grand Rapids, MI (poster, November 10, 2018). *N. Kazmierczak presenting.*

Crow, E.; **Chew, J.A.;** Turner, J.M. Characterizing the Gröbner bases of generic ideals. West Michigan Regional Undergraduate Science Conference, Grand Rapids, MI (poster, November 4, 2017).

Chew, J.A. Cake and what I learned from cutting it. TEDx Valencia High School, Placentia, CA (oral presentation, April 23, 2015).

RESEARCH
EXPERIENCE

Cornell University Department of Mathematics, Ithaca, New York USA

NSF REU

June 2019-August 2019

Studied the equilibrium configurations of flexible helical springs using optimal control. Developed numerical methods to find unstable configurations and demonstrated the presence of saddle-node bifurcations in the equilibrium configurations of twisted springs.

Calvin University Department of Chemistry and Biochemistry, Grand Rapids, Michigan USA

Student Researcher

May 2018 - September 2020

1. *Development of a parallelized, high-throughput website for equilibrium binding analysis:* Applied several classes of optimization algorithms to the simultaneous determination of reaction stoichiometry and binding constants of equilibrium systems of host-guest binding. Evaluated speed, convergence, and accuracy to devise a new hybrid algorithm. Currently implementing this new methodology in a supercomputer software package to facilitate fast, high-throughput analysis via a website interface.
2. *Mathematical and computational analysis of 1:1 equilibrium binding:* Wrote Monte Carlo simulations to determine the robustness of global analysis for determination of binding constants of 1:1 host-guest equilibrium binding. Numerically demonstrated the benefits of using mathematically-derived optimal parameters for the titration experiment.

Calvin University Department of Mathematics and Statistics, Grand Rapids, Michigan USA

Student Researcher

May 2017 - August 2017

Worked towards a new proof of the 3-variable Moreno-Sociás conjecture to prove the

generalized conjecture. Used computer algebra systems to compute Gröbner bases of generic ideals. Formulated a conjecture characterizing generic Gröbner bases and proved the 2-variable case.

OTHER
PROFESSIONAL
EXPERIENCE

Calvin University Department of Computer Science, Grand Rapids, Michigan USA

Computer science grader

January 2019 - December 2019

Graded weekly problem sets and projects in algorithms and data structures classes in C#, Java, Ada, Clojure, and Ruby.

Girls Who Code facilitator

January 2017 - May 2017

Taught middle-school and high-school girls programming fundamentals using Python.

Calvin University Center for Student Success, Grand Rapids, Michigan USA

Mathematics and computer science tutor

September 2018 - January 2019

Taught calculus, scientific computing and modeling, data structures, and algorithm fundamentals. Assisted students with Python, C++, and C# projects.

CalvinHacks at Calvin University, Grand Rapids, Michigan USA

Operations Director

February 2019 - February 2020

Responsible for venue selection, resource allocation, and departmental communication for hackathon expecting 200+ participants.

Calvin University Campus Ministries, Grand Rapids, Michigan USA

Worship Coordinator

August 2017 - May 2020

Responsible for planning and leading worship services 2-3 times a week. Planned and led plenary services and workshops at annual international Symposium on Worship.

PROGRAMMING
LANGUAGES

MATLAB, C, C++, Python, R, L^AT_EX