Timothy M. Hsu

Curriculum Vitae

Educational History

6/90	S.B., Mathematics, Mass. Inst. of Technology
9/90	S.B., Music, M.I.T.
11/94	Ph.D., Mathematics, Princeton Univ.

Professional Experience

9/94–6/95	Princeton Univ., Lecturer; organizer, Rutgers-Princeton group theory seminar
9/95–6/98	U. Mich. Ann Arbor, Hildebrandt Res. Asst. Prof.
7/96	MSRI Summer graduate workshop, Mentor
9/97–12/97	U. Mich., Co-coordinator, Math 115 (Calculus I)
9/98–6/01	Pomona College, Visiting Asst. Prof.
8/01–8/06	San José State Univ., Asst. Prof.
8/01–6/12	Director, Center for Applied Mathematics, Computation and Statistics (CAMCOS), SJSU
8/06–8/12	San José State Univ., Assoc. Prof.
8/07–12/07	Member, Mathematical Sciences Research Institute (MSRI) program in Geometric Group Theory
8/12–present	San José State Univ., Prof.
8/13–present	San José State Univ., Coordinator, Math/Stats TA program and Math 18A (College Algebra)
8/15–present	San José State Univ., Assoc. Chair, Math/Stats
8/17–present	San José State Univ., Department Lead, Math Pathways (EO1110) initiative

Awards

5/90	Phi Beta Kappa, M.I.T.
9/90–8/94	NSF Graduate Fellowship
6/96–8/96	Rackham Summer Faculty Fellowship, U. Mich.
9/97	Krasny Prize for outstanding work in motivating undergraduate students, Math Dept., U. Mich.
6/04	Master's student J. Kittock awarded 2004 University Outstanding Thesis Award (two awarded SJSU-wide)
6/08	Master's student K. Shelley Nolan awarded 2008 University Outstanding Thesis Award (two awarded SJSU-wide)
1/12	Intel Science Talent Search advisee C. Day named 2012 semifinalist

Grants Awarded at SJSU

Fall 2001	SJSU Professional Development award, $1,500 for travel

Spring 2002	CAMCOS awarded $43,500 from Woodward Fund, for two semester projects with NASA Ames Research Center
2002–2003	CAMCOS awarded approx. $62,000 from Woodward Fund, for two year-long projects with NASA Ames Research Center
Summer 2002	SJSU summer faculty fellowship, one month summer salary
Fall 2002	SJSU Professional Development award, $1,175 for travel
Spring 2003	LPP planning grant: $2,285 for .1 release time
2003–2004	CAMCOS awarded $61,510 from Woodward Fund, for two year-long projects with NASA Ames Research Center
Fall 2003	SJSU Professional Development award, $1,000 for travel
Fall 2003	LPP implementation grant: $5,000 for .2 release time
Fall 2003	CAMCOS awarded $18,000 from NASA (Macready) for semester project with NASA Ames Research Center
Summer 2004	CAMCOS awarded $4,000 from Woodward Fund, for development of potential CAMCOS project with Numerical Algorithms Group (UK)
2004–2005	CAMCOS awarded $61,510 from Woodward Fund, for two year-long projects with NASA Ames Research Center
Fall 2004	SJSU Professional Development award, $1,000 for travel
Fall 2004	Junior Faculty Career Devlopment Grant: .2 release time
Spring 2005	$2,000 donation from Google to support Bay Area Discrete Math Day conference held at SJSU, 4/9/05
2005–2006	CAMCOS awarded $63,190 from Woodward Fund, for two year-long projects
2005–2006	Sally Casanova Pre-Doctoral $3,000 Scholarship awarded to student Jing-Wei Huang; up to $1,000 goes to faculty sponsor (Hsu) travel expenses
Fall 2005	CAMCOS awarded $15,796 from NASA Ames Research Center for “Intelligent Instruments on Robotic Helicopters”
Spring 2006	CAMCOS awarded $19,330 from Intel Corporation for “Analysis of Heat Pipe Performance Tailored for MEROM/Santa Rosa in Mobile Computers”
2006–2007	CAMCOS awarded $62,600 from Woodward Fund, for two year-long projects with NASA Ames Research Center
2007–2008	CAMCOS awarded $62,600 from Woodward Fund, for two year-long projects with NASA Ames Research Center
2008–2009	CAMCOS awarded $62,000 from Woodward Fund, for two year-long projects with NASA Ames Research

	Center
2009–2010	CAMCOS awarded $36,500 from Woodward Fund, for one semester-long project with NASA Ames Research Center
Spring 2010	University Planning Council Student Success Grant: .2 release time
Spring 2010	(w/ Dr. Maria Cayco) $2,750 awarded from Mathematical Association of America to support Northern California Undergraduate Mathematics Conference
Fall 2010	CAMCOS awarded $13,000 from Woodward Fund, for one semester-long project with NASA Ames Research Center
Spring 2010	CAMCOS awarded $20,400 from Woodward Fund, for one semester-long project with NASA Ames Research Center
Fall 2011	CAMCOS awarded $20,400 from Woodward Fund, for one semester-long project with NASA Ames Research Center
Spring 2013	$2,000 donation from D.E. Shaw to support Bay Area Discrete Math Day conference held at SJSU, 4/6/13
Summer 2013	Undergraduate Research Grant awarded for work with Charles Petersen
Fall 2013	SJSU Research, Scholarship, & Creative Activity Award: .2 release time
Fall 2015–Spring 2016	Undergraduate Research Grant awarded for work with S. Basole and P. Lau
Spring 2016–Fall 2018	Senior personnel, "First in the World" grant for teaching flipped calculus I: .2 release time in multiple semesters
Fall 2020–Spring 2022	PI, $100,000 California Education Learning Lab (CELL) seed grant, "Equity and Access in Discrete Mathematics"
Fall 2022–	Co-PI, $650,000 CELL scaling grant, "Expanding Equity and Access in Discrete Mathematics" (∼$175K subaward to SJSU)
Fall 2023–	Co-lead, Supported Pathways initiative for helping students struggling in first-year math classes
Spring 2025–	Co-PI, "Cost-effective, Bespoke Adaptive Tutoring using Open Source Tools and GenAI" (∼$10K subaward to SJSU)

Post-Graduate School Teaching Experience

Fall 1995	Calculus I (2 sections)
Winter 1996	Transformation groups and geometry
Fall 1996	Calculus II (2 sections)
Winter 1997	Applied modern algebra

1996–1997	Advisor, S. Molnar's senior thesis in math and creative writing (Virginia Voss award)
Summer 1997	Mentor, summer graduate workshop, MSRI
Fall 1997	Calculus I (also course co-coordinator)
Winter 1998	Introduction to linear algebra
Summer 1998	Codes, ciphers and secret messages, Mich. Math Scholars (mathematically talented high school students)
Fall 1998	Calculus I (2 sections); multivariable calculus
Spring 1999	Multivariable calculus; algebra I
1998–1999	Advisor, R. Derby-Talbot's senior thesis (honors)
Fall 1999	Calculus I; multivariable calculus; linear algebra
Spring 2000	Calculus II; linear algebra
1999–2000	Advisor, senior theses of A. Draganova (honors), R. Huston, and C. Meyers (honors)
Fall 2000	Calculus I; multivariable calculus; linear algebra
Spring 2001	Alternative calculus II; hyperbolic geometry
2000–2001	Advisor, senior theses of M. Dickerson, J. Singer (honors), and E. Zupunski
Fall 2001	Calculus I; Linear algebra
Spring 2002	Linear algebra; Abstract algebra I
2001–2002	Advisor, master's thesis of A. Vu
Fall 2002	Mathematics for general education (2 sections); Introduction to combinatorics; Reading course on Galois theory (J. Kittock)
Spring 2003–Spring 2004	Advisor, master's thesis of J. Kittock (university honors)
Spring 2003	Mathematics for general education; Linear algebra II
Fall 2003	Mathematics for general education; Linear algebra II
Spring 2004	Mathematics for general education; Introduction to number theory
Fall 2004–Spring 2007	Advisor, master's thesis of P. Darafshi
Fall 2004	Calculus I; Linear algebra II
Spring 2005	Introduction to analysis (2 sections)
Fall 2005–	Advisor, master's thesis of P. Friedenbach
Fall 2005	Calculus III; Abstract algebra I
Spring 2006–Spring 2007	Advisor, master's thesis of M. Bandari
Spring 2006	Calculus II; Vector calculus
Fall 2006–Spring 2007	Advisor, master's thesis of K. Shelley Nolan (university honors)
Fall 2006	Calculus III; Introduction to proof
Spring 2007	Calculus II; Introduction to proof
Spring 2008	Precalculus; Introduction to proof

Fall 2008–Spring 2009	Advisor, master's thesis of S. Dharia
Fall 2008–Spring 2010	Advisor, master's thesis of N. Vazquez
Fall 2008	Precalculus; Introduction to analysis
Spring 2009	Abstract algebra I
Fall 2009–Spring 2011	Advisor, master's thesis of P. Hansen
Fall 2009	Precalculus; Introduction to number theory
Spring 2010	Calculus II
Fall 2010	Precalculus; Abstract algebra I
Spring 2011	Abstract algebra II
Fall 2011–Spring 2013	Advisor, master's thesis of D. Adams
Fall 2011	Precalculus; Introduction to proof
Spring 2012	Linear algebra II; CAMCOS project in applied mathematics
Fall 2012	Precalculus; Introduction to proof
Spring 2013	Precalculus; Introduction to analysis
Summer 2013–Summer 2014	Advisor, student research of C. Petersen
Fall 2013	Analysis II (Hilbert spaces and applications)
Spring 2014–Spring 2015	Advisor, master's thesis of O. Zamoroueva
Spring 2014	Discrete math; Introduction to proof
Fall 2014–Spring 2016	Advisor, writing project of N. Mittal
Fall 2014	Discrete math; Euclidean geometry
Spring 2015–Summer 2017	Advisor, master's thesis of C. Parayil
Spring 2015	Introduction to number theory; Introduction to analysis
Summer 2015–Spring 2016	Advisor, student research team of S. Basole and P. Lau
Fall 2015	Calculus III; Analysis II
Spring 2016	Introduction to proof
Fall 2016	Calculus I (flipped); Analysis II
Fall 2017	Calculus I (flipped); Analysis II
Spring 2018	Applied and industrial algebra; Introduction to analysis
Summer 2018–Spring 2022	Advisor, student research team of R. Cho and A. Kapbasov
Fall 2018	Calculus I (lecture); Calculus I (flipped)
Spring 2019	Applied and industrial algebra; Higher algebra II
Fall 2019–Summer 2020	Advisor, master's project of G. Pérez Villalobos
Fall 2019	Abstract algebra I; Analysis II
Spring 2020	Applied and industrial algebra; Higher algebra II
Fall 2020–Spring 2021	Advisor, PUMP student research team of J. Crowley and J. Luu
Fall 2020	Abstract algebra I; Analysis II
Spring 2021	Applied and industrial algebra; Abstract algebra II

Fall 2021–Summer 2022	Advisor, master's project of A. Frank
Fall 2021	Higher algebra I; Analysis II
Spring 2022	Applied and industrial algebra; Higher algebra II
Fall 2022	Analysis II; Introduction to combinatorics
Spring 2023	Discrete math; Applied and industrial algebra
Fall 2023–	Advisor, master's project of H. Debrine
Fall 2023	Advisor, student research team of Z. Calusdian, W. Hong, and G. Tobar
Fall 2023	Applied and industrial algebra; Analysis II
Spring 2024	Introduction to analysis; Topology
Fall 2024	Applied and industrial algebra; Analysis II

Outreach and related activities

Summer 2011	Advised Intel Science Talent Search project of Cynthia Day (Lynbrook High School), *Time complexity and algorithms for Blue-Red CHOMP and its subgames*; project made semifinal round
07/22/20	MathILy Daily Gather, *Disc diagrams solve an unsolvable problem*
07/16/21	MathILy Daily Gather, *Fourier series (but mod 7)*

Conferences and Sessions Co-organized

Fall 2004–	Bay Area Discrete Math Day (bi-annual local conference)
Spring 2005	BAD Math Day at SJSU, local organizer
Summer 2005	MAXENT 2005 (25th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering)
Summer 2007	MAA Mathfest: Panel discussion on "Starting and maintaining a student industrial research progam in the mathematical sciences"
Summer 2007	MAA Mathfest: Contributed paper session on "Student Research in Industrial Mathematics"
Spring 2008	AMS Western Section Meeting: Special session on "Combinatorics of partially ordered sets"
Spring 2010	Northern California Undergraduate Mathematics Conference
Spring 2013	BAD Math Day at SJSU, local organizer
January 2024	AMS Special Session on Geometric Group Theory, Joint Math Meetings, co-organizer

Recent Talks and Presentations

05/11/22	SJSU Math Colloquium, SJSU, San José, CA: "Combinatorial game theory in six (or so) games"
10/15/22	INSPIRE Convening, UCLA: "'I learned how to be a voice': An approach to equitable collaboration"

02/22/24	SIGMAA on RUME (Research on Undergraduate Mathematics Education) Annual Conference: "Student and Instructor Experiences of Equity and Access for Team-Worthy Tasks in Discrete Mathematics" (poster)
08/09/24	MAA Mathfest, Indianapolis, IN: "Team-Worthy Tasks in Discrete Mathematics"
10/18/24	INSPIRE Convening, UCLA: "Team-worthy tasks increase student engagement and promote equitable teaching" (poster)
01/09/25	Joint Mathematics Meetings, Seattle, WA: "Team-worthy Activities for Discrete Mathematics Instruction" (workshop)

Research Interests

Geometric group theory; combinatorial game theory; combinatorics of partially ordered sets; ℓ^2 invariants; finite groups and related topics; cell complexes and low-dimensional topology; loops and quasigroups; computational group theory; undergraduate mathematics education.

Professional Societies

Member of the AMS, MAA, and SIAM.

Computer Skills

Fluent in LaTeX and HTML. Prior experience with C, FORTRAN, GAP, Java, LISP, Maple, Mathematica, MATLAB, Perl, and UNIX. Some professional programming and technical support experience.

Contact Information

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Phone: (408)924-5071 (office), (408)924-5080 (fax)
Home Page: `http://timhsu.net`

Publications

[1] *Change comes from without: Lessons learned in a chaotic year*, PRIMUS **31** (2020), no. 3–5, 504–516.

[2] *Fourier Series, Fourier Transforms, and Function Spaces: A Second Course in Analysis*, volume 59 of *AMS/MAA Textbooks*, MAA Press, 2020.

[3] *Rational nonaxis points on the unit circle have irrational angles*, Amer. Math. Monthly **123** (2016), no. 5, 490.

[4] (with D. T. Wise) *Cubulating malnormal amalgams*, Invent. Math. **199** (2015), no. 2, 293–331.

[5] (with J. H. Conway) *Some very interesting sequences*, in T. Shubin, D. F. Hayes, and G. Alexanderson (eds.), *Expeditions in Mathematics*, MAA Spectrum series, chapter 6, 75–86. MAA, Washington, DC, 2011.

[6] (with D. T. Wise) *Cubulating graphs of free groups with cyclic edge groups*, Amer. J. Math. **132** (2010), no. 5, 1153–1188.

[7] (with M. J. Logan and S. Shahriari) *Methods for nesting rank 3 normalized matching rank-unimodal posets*, Disc. Math. **309** (2009), no. 3, 521–531.

[8] (with I. J. Leary) *Artin HNN-extensions virtually embed in Artin groups*, Bull. Lon. Math. Soc. **40** (2008), no. 4, 715–719.

[9] (with M. J. Logan and S. Shahriari) *The generalized Füredi conjecture holds for finite linear lattices*, Disc. Math. **306** (2006), 3140–3144.

[10] (with D. T. Wise) *Groups with infinitely many types of fixed subgroups*, Israel J. Math. **144** (2004), 93–107.

[11] (with D. T. Wise) *Ascending HNN extensions of polycyclic groups are residually finite*, J. Pure Appl. Alg. **182** (2003), no. 1, 65–78.

[12] (with M. J. Logan, S. Shahriari, and C. Towse) *Partitioning the Boolean lattice into a minimal number of chains of relatively uniform size*, Eur. J. Comb. **24** (2003), no. 2, 219–228.

[13] (with M. J. Logan, S. Shahriari, and C. Towse) *Partitioning the Boolean lattice into chains of large minimum size*, J. Comb. Thy. (A) **97** (2002), no. 1, 62–84.

[14] (with D. T. Wise) *Separating quasiconvex subgroups of right-angled Artin groups*, Math. Z. **240** (2002), no. 3, 521–548.

[15] *Explicit constructions of code loops as centrally twisted products*, Math. Proc. Camb. Phil. Soc. **128** (2000), 223–232.

[16] *Moufang loops of class 2 and cubic forms*, Math. Proc. Camb. Phil. Soc. **128** (2000), 197–222.

[17] *Quilts: Central extensions, braid actions, and finite groups*, volume 1731 of *Lect. Notes Math.*, Springer-Verlag, 2000.

[18] (with D. T. Wise) *A non-residually finite square of finite groups*, in C. M. Campbell et al. (eds.), *Groups St. Andrews 1997 in Bath, I*, volume 260 of *LMS Lect. Notes*, 368–378. Cambridge Univ. Press, 1999.

[19] (with D. T. Wise) *On linear and residual properties of graph products*, Mich. Math. J. **46** (1999), 251–259.

[20] (with D. T. Wise) *Embedding theorems for non-positively curved polygons of finite groups*, J. Pure Appl. Alg. **123** (1998), 201–221.

[21] *Quilts, the 3-string braid group, and braid actions on finite groups: an introduction*, in J. Ferrar and K. Harada (eds.), *The Monster and Lie Algebras*, volume 7 of *Ohio State Univ. Math. Res. Inst. Pubs.*, 85–97. de Gruyter, 1998.

[22] *Permutation techniques for coset representations of modular subgroups*, in L. Schneps (ed.), *Geometric Galois Actions II: Dessins d'Enfants, Mapping Class Groups and Moduli*, volume 243 of *LMS Lect. Notes*, 67–77. Cambridge Univ. Press, 1997.

[23] *Identifying congruence subgroups of the modular group*, Proc. AMS **124** (1996), no. 5, 1351–1359.

[24] *Some quilts for the Mathieu groups*, in C. Dong and G. Mason (eds.), *Moonshine, the Monster, and Related Topics*, volume 193 of *Contemp. Math.*, 113–122. AMS, 1996.

[25] (with J. H. Conway) *Quilts and T-systems*, J. Alg. **174** (1995), 856–908.

[26] *Quilts, T-systems, and the combinatorics of Fuchsian groups*, PhD thesis, Princeton Univ., 1994.