CURRICULUM VITAE

CHIU-YEN KAO

Department of Mathematical Sciences
Claremont McKenna College (CMC)
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EDUCATION

- Ph.D., ***Mathematics***, University of California, Los Angeles — June 2004
  Dissertation: Fast sweeping methods for static Hamilton-Jacobi equations
  Advisor: Professor Stanley Osher
- M.S., ***Applied Mechanics***, National Taiwan University — June 1999
- B.S., ***Mathematics*** *with a minor in* ***Physics***, National Taiwan University — June 1997

RESEARCH EXPERIENCE

- ***Full Professor with Tenure*** (Mathematical Sciences, CMC) — July 2018 ~ now
- ***Associate Professor with Tenure*** (Mathematical Sciences, CMC) — Sept. 2012 ~ June 2018
- ***Visiting Associate Professor*** (Mathematical Sciences, CMC) — Sept. 2011~ Aug 2012
- ***Associate Professor with Tenure*** (Math, The Ohio State University) — Oct. 2010 ~ Aug 2012
- ***Assistant Professor*** (Math, The Ohio State University) — Sept. 2006 ~ Sept. 2010
  Perform over the full range of responsibilities: research, teaching, and service.
- ***IMA Industrial Postdoc*** (IMA, UMN) — Sept. 2004 ~ Aug. 2006
- ***Faculty Mentor for Research in Industrial Projects for Students (RIPS) Program*** (IPAM, UCLA) Jun. 2004 ~ Aug. 2004
- ***Research Assistant / Associate*** (Math, UCLA) — Apr. 2002 ~ Jun. 2004
- ***Research Assistant*** (Applied Mechanics, National Taiwan University) — Sept. 1997 ~ Jun. 1999

TEACHING EXPERIENCE

- ***Instructor, Math & Computer Science, Claremont McKenna College***

Math 60C Linear Algebra with Computing	Fall 2020
Math 195 Advanced Topics in Mathematics on Image Processing	Fall 2020
Math 111 Ordinary Differential Equations	Spring 2020
Math 165 Numerical Analysis	Spring 2020
Math 60C Linear Algebra with Computing	Fall 2019
Math 111 Ordinary Differential Equations	Fall 2019
Math 111 Ordinary Differential Equations	Spring 2019
Math 180 Partial Differential Equations	Spring 2019
Math 32 Calculus III	fall 2018
Math 111 Ordinary Differential Equations	fall 2018
Math 461 Level Set Methods	spring 2018
Math 111 Ordinary Differential Equations	spring 2018
Math 30 Calculus I	spring 2018
Math 111 Ordinary Differential Equations	fall 2017
Math 32 Calculus III	fall 2017

Math 180 Introduction to Partial Differential Equations spring 2017
Math 31 Calculus II spring 2017
Math 30 Calculus I (two sessions) fall 2016
Math 31 Calculus II spring 2016
Math 163 Numerical Analysis spring 2016
Math 30 Calculus I fall 2015
Math 111 Ordinary Differential Equations fall 2015
Math 31 Calculus II spring 2015
Math 180 Partial Differential Equations spring 2015
Math 31 Calculus II spring 2013
Math 163 Applied Numerical Analysis spring 2013
Math 31 Calculus II fall 2012
Math 111 Ordinary Differential Equations fall 2012
Math 32 Calculus III spring 2012
Math 182 Partial Differential Equations spring 2012
Math 31 Calculus II fall 2011
Math 111 Ordinary Differential Equations fall 2011

- ***Instructor, Math, OSU***

Math 865L Topics in Applied Mathematics: Math Biology Spring 2011
Math 809 Numerical Method for Partial Differential Equations III Spring 2011
MBI Special Course: Numerical Methods for Partial Differential Equations and Their Applications in Biology Winter 2011
Math 865L Topics in Applied Mathematics: Math Biology Spring 2010
Math 350 Introduction to Mathematical Biology Spring 2010
Math 415 Ordinary Differential Equations and Partial Differential Equations Spring 2010
Math 865L Topics in Applied Mathematics: Math Biology Spring 2009
Math 809 Numerical Method for Partial Differential Equations III Spring 2009
Math 807 Numerical Method for Partial Differential Equations I Autumn 2008
Math 865 Topics in Applied Mathematics: Image Processing Spring 2008
Math 415 Ordinary Differential Equations and Partial Differential Equations Autumn 2007
Math 809 Numerical Methods for Partial Differential Equations III Spring 2007
Math 572 Linear Algebra with Application II Winter 2007
Math 571 Linear Algebra with Application I Fall 2006

- ***Teaching Assistant /Associate (UCLA)*** Apr. 2000 ~ Mar. 2002

Math 31B Calculus and Analytic Geometry
Math 32A & 32B Calculus of Several Variables
Math 61 Introduction to Discrete Structures
Math 135A & 135B Ordinary Differential Equations
Math 151B Applied Numerical Methods
Math 266A Applied Ordinary Differential Equations
Math 269A Advanced Numerical Analysis

- ***Teaching Assistant (Applied Mechanics, National Taiwan University)*** Sept. 1998 ~ Jun. 1999
  Course: Applied Partial Differential Equations

GRANTS

- NSF Grant DMS 1818948 Numerical Spectral Study of Elliptic Operators (PI) 06/01/18-05/31/22
- Collaboration Grants for Mathematicians, Simons Foundation, 09/01/2017-08/30/2018
- CMC Faculty Summer Research Funding, 2016 (PI) 06/01/2016-08/30/2016
- Howard Hughes Medical Institute, Summer Undergraduate Research Program (HHMI SURP) fellowships, Summer 2016 (co-PI) 06/01/2016-07/30/2016
- NSF Grant DMS 1346466: AWM-SIAM Workshop and Kovalevsky Lecture, 2014 (co-PI) 04/15/2014-03/31/2016
- NSF Grant DMS 1318364 (1216742): Closest point methods for eigenvalue problems from inhomogeneous structures (PI) 01/01/2013 (08/01/12)-07/31/2016
- Northrop Grumman Corporation MOU: Application of level set numerical methods to the design of optical metamaterials 10/01/2010-09/30/2012
- OSU CCTS NCTMP Y3 Method Development Award: Mathematical and computational approaches to study burn propagation and intervention (co-PI) 09/01/2010-08/30/2011
- Alfred P. Sloan Research Fellowship 09/16/2009-09/15/2011
- NIH grant NEI K23EY019097: In vivo evaluation of Presbyopia (consultant & mentor) 05/01/2009-04/30/2014
- NSF Grant DMS 0811003: Shape and topological optimization on elliptic eigenvalue problems in inhomogeneous media (PI) 07/01/2008-06/30/2011

RESEARCH INTERESTS

- Shape Optimization for Eigenvalue Problems
- Numerical Methods for Hyperbolic Equations
- Mathematical Biology
- Level Set Methods and its Applications
- Numerical Analysis and Scientific Computing

HONORS

- Panelist for AWM workshop Panel: Perspectives and Advice from Women in Research, SIAM annual meeting, 2018 — 2018
- Institute of Mathematical Sciences Award, Claremont Graduate University — 2017
- IEEE Signal Processing Society 2013 Best Paper Award — 2014
- Alfred P. Sloan Research Fellowship — 2009-2011
- SIAM News: Geometry, Partial Differential Equations, and the Brain — Mar/Apr 2007
- IMA Impacts; NSF Highlights: Mind-Bending Math — 2006
- Medical Image Analysis Second Best MICCAI Paper Award — 2005
- The Ministry of Education Graduate Scholarship (Taiwan) — Sept. 1997 ~ Jun. 1999

- Scholarship for Gifted Senior High School Students Studying Mathematics and Natural Science (Taiwan) Sept. 1993 ~ Jun. 1997
- The Presidential Award (Taiwan) Jun. 1996

SUPERVISED Ph.D. STUDENTS

- Vladimir Delengov, Ph.D., 2018, Claremont Graduate University.
  Thesis: Computing Eigenmodes of Elliptic Operators on Manifolds Using Radial Basis Functions.
  Current Position: Product owner, EvoShare.
- Weaam Alhejaili, Ph.D., 2018, Claremont Graduate University.
  Thesis: *A Numerical Study of Steklov Eigenvalue Problems*
  Current Position: Department of Mathematical Sciences, College of Sciences, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia
- Patrick Choi, Ph.D., 2016, Claremont Graduate University.
  Thesis: *Optimization of the Principal Eigenvalue of an Elliptic Operator with Application to Heat Conductor* Current Position: Software Engineer, Raytheon.
- Ying Wang, Ph.D., 2010, The Ohio State University.
  Thesis: *Central Schemes for the modified Buckley-Leverett equation*
  Current Position: Associate Professor, Department of Mathematics, University of Oklahoma.
- Shu Su, Ph.D., 2010, The Ohio State University.
  Thesis: *Numerical approaches on shape optimization of elliptic eigenvalue problems and shape study of human brains*
  Current Position: Risk Analyst, American Electric Power

SUPERVISED UNDERGRADUATE THESIS STUDENTS

- Shu Bin, B.S., 2020, Claremont McKenna College.
  Thesis: *K-Means Stock Clustering Analysis Based on Historical Price Movements and Financial Ratios.*
- Ethan Kurz, B.S., 2020, Claremont McKenna College.
  Thesis: *Optimal Execution in Cryptocurrency Markets.*
- Yizhou Tao, B.S., 2018, Claremont McKenna College.
  Thesis: *Decoding Book Barcode Images.*
- Sam Malagon, B.S., 2015, Claremont McKenna College.
  Thesis: *Chladni Figures through Vibrating Plates.*

PRESENTATIONS

- DMS Applied Mathematics Seminar, Auburn University Nov 12, 2021
  Computational Approaches to Steklov Eigenvalue Problems and Free Boundary Minimal Surfaces
- Numerical Relativity Workgroup, IPAM, UCLA Nov 2,4,8, 2021
  Introduction to Numerical Methods for Hyperbolic Equations (I) Linear, (II) Nonlinear, and (III) ENO
- Theoretical Biology Seminar, Mathematics Department, The Pennsylvania State University Oct 13, 2021
  Optimization Problems in Reaction Diffusion Models for Population Dynamics
- Analysis/Applied Mathematics Seminar, University of Wisconsin-Milwaukee April 2, 2021
  Optimization Problems in Reaction Diffusion Models for Population Dynamics

- Cold Place Math Biology Seminar, University of Minnesota March 15, 2021
  Optimization Problems in Reaction Diffusion Models for Population Dynamics
- Claremont & Utah Joint Applied Math Seminar, Claremont Colleges Jan 25, 2021
  Minimization of the First Nonzero Eigenvalue Problem for Two-Phase Conductors with Neumann Boundary Conditions
- 2020 Canadian Mathematical Society (CMS) Winter Meeting Dec 3-8, 2020
  Computation of Free Boundary Minimal Surfaces via Extremal Steklov Eigenvalue Problems
- Fall 2020 Hackathon Workshop Nov, 6, 2020
  Mini-course on Image Processing and its Applications
- SIAM Conference on Analysis of Partial Differential Equations, La Quinta, California Dec, 13, 2019
  A Conformal Mapping Approach to Steklov Eigenvalue Problems
- 9th International Congress on Industrial and Applied Mathematics, Valencia, Spain July 15-19, 2019
  Clamping Interior Points of Vibrating Rods and Plates
- Theoretical and Numerical Methods for Shape Optimization June 21, 2019
  Interfacial Dynamics and Shape Optimizations
- Claremont Colleges Mathematics Colloquia Apr 24, 2019
  A Conformal Mapping Approach to Shape Optimizations
- 2019 AWM Research Symposium Apr 11, 2019
  Maximal Convex Combinations of Sequential Steklov Eigenvalues
- 2019 Claremont Math Weekend Jan 26, 2019
  Frequency control of Rods and Plates
- NCTS One-day Workshop on Applied Mathematics – Interplay of Data Science and Numerical PDEs, Taipei, Taiwan Dec. 25, 2018
  Extremal Rearrangement Problems Involving Poisson's Equation with Robin Boundary Condition
- 2018 Workshop on Nonlinear Analysis, Harvey Mudd College, Claremont Dec. 1, 2018
  Extremal Rearrangement Problems Involving Poisson's Equation with Robin Boundary Condition
- Applied Math Seminar, California State University, Northridge Oct 3, 2018
  Maximal Convex Combinations of Sequential Steklov Eigenvalues
- Johns Hopkins Center for Talented Youth Family Academic Programs, Science and Technology Series, Claremont McKenna College, California Oct. 13, 2018
  Finding Your Optimal Paths?
- 2018 SIAM Annual Meeting, Oregon Convention Center, Portland
  Extremal Spectral Gaps for Periodic Schrödinger Operators July 10, 2018
- The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, National Taiwan University, Taiwan, 2018
  Extremal Spectral Gaps for Periodic Schrödinger Operators July 8, 2018
  A Numerical Study of Steklov Eigenvalue Problem via Conformal Mapping July 6, 2018
- Plenary Speakers, Southern California Applied Mathematics Symposium (SOCAMS), 2018
  Extremal Spectral Gaps for Periodic Schrödinger Operators Apr 28, 2018
- AMS Sectional Meeting at Portland State University, Portland, OR
  Study of a Mixed Dispersal Population Dynamics Model Apr 14-15, 2018
- 26th Annual Meeting on Differential Equations and Related Topics, National Taiwan University
  Extremal Spectral Gaps for Periodic Schrödinger Operators Jan 6, 2018
- Mathematics Colloquium, Department of Mathematics and Statistics, California State University, Long Beach Dec 1, 2017

Minimization of Inhomogeneous Biharmonic Eigenvalue Problems

- AMS Sectional Meeting, University of California, Riverside Nov 4, 2017
  Optimal Spatial Arrangements of Favorable and Unfavorable Regions
- Applied Math Seminar, Department of Mathematics, University of Utah Oct 16, 2017
  Minimizing Eigenvalues for Inhomogeneous Rods and Plates
- Second USA-Uzbekistan Conference Aug. 8-12, 2017
  Minimizing Eigenvalues for Inhomogeneous Rods and Plates
- 70 Years of Mathematics at NTU: International Workshop on Applied Mathematics June 24-25, 2017
  Extremal Eigenvalues of Laplace (-Beltrami) Operators
- Numerical Methods for PDEs on Surfaces Workshop, Pacific Institute for the Mathematical Sciences, Vancouver, Canada June 11-15, 2017
  Optimization of Laplace-Beltrami Eigenvalues on Riemannian Surfaces
- Johns Hopkins Center for Talented Youth Family Academic Programs, Science and Technology Series, Claremont McKenna College, California Mar. 4, 2017
  Path Planning in Real World Examples and Beyond
- 2017 Claremont Math Weekend Jan 28, 2017
  Recent Numerical Approaches for Solving PDEs on Surfaces
- 2016 SIAM Annual Meeting, The Westin Boston Waterfront, Boston, Massachusetts July 11-15, 2016
  Computational Methods for Extremal Steklov Problems
- The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, July 1-5, 2016
  Computational Methods for Extremal Steklov Problems
- Applied Math Seminar, Department of Mathematics, University of California, Riverside May 25, 2016
  Computational Methods for Extremal Steklov Problems
- Colloquium, Department of Mathematical Sciences, University of Wisconsin-Milwaukee May 6, 2016
  Computational Methods for Extremal Steklov Problems
- Claremont Mathematics Weekend, Claremont Jan. 30, 2016
  Computational Methods for Extremal Steklov Problems
- Department of Mathematics, National Chung Hsing University, Taichung, Taiwan Dec. 31, 2015
  Shape Optimization for Eigenvalue Problems Involving Biharmonic Operators
- Department of Mathematics, National Cheng Kung University, Tainan, Taiwan Dec. 30, 2015
  Shape Optimization for Eigenvalue Problems Involving Biharmonic Operators
- NCTS/NTU/NCU/NTUST Joint Seminar on Applied Mathematics, Taipei, Taiwan Dec. 25, 2015
  Shape Optimization for Eigenvalue Problems Involving Biharmonic Operators
- IEEE NANOMED, Waikiki, Hawaii Nov. 17 2015
  Mathematical Modeling for Biological Processes Involving Tissue Growth and Granulomas
- Johns Hopkins Center for Talented Youth Family Academic Programs, Science and Technology Series, Claremont McKenna College, California Oct. 24 2015
  Path Planning in Real World Examples and Beyond
- Marian Miner Cook Athenaeum, Claremont McKenna College, California Oct. 7 2015
  Level Set Methods and Dynamic Implicit Surfaces
- 8th International Congress on Industrial and Applied Mathematics, Beijing, China Aug. 2015
  Shape Optimization for Eigenvalue Problems Involving Biharmonic Operators
  Eigenvalues Minimization for Biharmonic Equations
- Gateway to Exploring Mathematical Sciences (GEMS) 2014-2015, Claremont Apr.11 2015

The Mathematics of Musical Instruments

- Laplacian and Heat Kernels: Theory and Applications, BIRS, Canada Mar.23 2015
  Shape Optimization for Eigenvalue Problem Involving Biharmonic Operators
- W.M. Keck Science Department Feb.20 2015
  Introduction to Image Segmentation and Its Applications to Biomedical Images
- 2014 NCTS Christmas Workshop on Fast Solvers on Scientific Computing, Taiwan Dec.25 2014
  Fast Solvers for Time-Independent Fully Nonlinear First Order PDEs
- Department of Mathematics, National Central University, Taiwan Dec. 24 2014
  Maximal Laplace-Beltrami Eigenvalues on Closed Riemannian Surfaces
- Department of Mathematics, National Tsing Hua University, Taiwan Dec. 22 2014
  On the Dynamics of Radially Symmetric Granuloma
- Department of Mathematics, University of Alabama at Birmingham Oct. 3 2014
  Shape Optimization Problems Involving Eigenvalues and Their Applications
- Department of Mathematics, University of Alabama Oct. 2 2014
  Shape Optimization Problems Involving Eigenvalues and Their Applications
- Department of Aerospace and Mechanical Engineering, University of Arizona Sept. 11 2014
  Shape Optimization Problems Involving Eigenvalues and Their Applications
- SIAM Annual Meeting, The Palmer House, Chicago Jul. 7-11 2014
  Maximal Laplace-Beltrami Eigenvalues on Closed Riemannian Surfaces
- International Conference on Spectral and Higher Order Methods, Salt Lake City Jun. 27 2014
  Maximal Laplace-Beltrami Eigenvalues on Closed Riemannian Surfaces
- USA-Uzbekistan Conference, California State University, Fullerton May. 20 2014
  Optimal Eigenvalues of Laplace and Laplace-Beltrami Operators
- Department of Mathematics, Loyola Marymount University Nov. 6 2013
  Shape Optimization Problem Involving Eigenvalues and Their Applications
- SIAM Annual Meeting, Town and Country Resort & Convention Center, San Diego Jul. 8-12 2013
  Minimal Convex Combinations of Sequential Laplace-Dirichlet Eigenvalues
- 2013 Special Central AMS Meeting, Iowa State University, Ames, IA Apr. 27-28, 2013
  Geometric Optimization of Dirichlet-Laplacian Eigenvalues
- Mathematics Colloquium, Department of Mathematics, University of Houston Mar. 20, 2013
  Minimal Convex Combinations of Three Sequential Laplace-Dirichlet Eigenvalues
- AWM Research Symposium, Santa Clara University Mar. 16-17 2013
  Lax-Friedrichs Fast Sweeping Methods
- Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization, Mathematical Biosciences Institute, OSU Feb. 2013
  Semiautomatic Extraction Algorithm for Images of the Ciliary Muscle
- Level Set Seminar, Department of Mathematics, UCLA Jan. 2013
  Minimal Convex Combinations of Three Sequential Laplace-Dirichlet Eigenvalues
- National Center for Theoretical Sciences, National Tsing Hua University, Taiwan Dec. 2012
  Minimal Convex Combinations of Three Sequential Laplace-Dirichlet Eigenvalues
- One-Day Workshop on Partial Differential Equations, Analysis, Numerics and Applications, Center of Mathematical Modeling and Scientific Computing, National Chiao Tung University, Taiwan Dec. 2012
  Minimal Convex Combinations of Three Sequential Laplace-Dirichlet Eigenvalues
- CAM-ICCM Imaging Science: a workshop in honor of Stanley Osher, Mathematical Science Center of Tsinghua University, Beijing, China Dec. 2012

Minimal Convex Combinations of Sequential Laplace-Dirichlet Eigenvalues

- International Conference on Imaging Science 2012 (in honor of Professor Stanley Osher at his 70th birthday), Hong Kong Dec. 2012

  Level Set Methods and their Applications to Biomedical Image Processing
- AMS sectional meeting in Tucson, Arizona Oct. 2012

  Shape Optimization involving Eigenvalues of Laplace-Beltrami Operator
- Applied Math Seminar, Department of Mathematics, UC Davis Oct. 2012

  Shape Optimization involving Eigenvalues of Laplace-Beltrami Operator
- SIAM Annual Meeting at Minneapolis, Minnesota Jul. 2012

  Principal Eigenvalue Minimization for an Elliptic Problem with Indefinite Weight
- Department of Mathematics, University of California, Riverside Apr. 2012

  An Efficient Rearrangement Algorithm for Shape Optimization Problem Involving Principal Eigenvalue in Population Dynamics
- Department of Mathematics and Statistics, California State University, Long Beach Apr. 2012

  Shape Optimization Problem Involving Principal Eigenvalue in Population Dynamics
- Advances in Scientific Computing, Imaging Science and Optimization: Stan Osher's 70th Birthday Conference Apr. 2012

  Lax-Friedrichs Fast Sweeping Methods
- AMS 2012 Spring Western Section Meeting, Hawaii Mar. 2012

  Fast Sweeping Methods for Steady State Problems of Hyperbolic Conservation Laws with Source Terms
- Claremont Colleges Colloquium Feb. 2012

  An Efficient Rearrangement Algorithm for Shape Optimization Problem Involving Principal Eigenvalue in Population Dynamics
- Department of Mathematics, University of California, Irvine Jan. 2012

  I. Integro-differential Equations for Biomedical Image Processing and Modeling

  II. An Efficient Rearrangement Algorithm for Shape Optimization Problem Involving Principal Eigenvalue in Population Dynamics
- Taida Institute for Mathematical Sciences, National Taiwan University Jan. 2012

  I. Principal Eigenvalue Minimization for an Elliptic Problem with Indefinite Weight and Robin Boundary Conditions

  II. Closest Point Method for Eigenvalue Optimization on Surfaces
- Department of Mathematics, National Ysing Hua University Jan. 2012

  Principal Eigenvalue Minimization for an Elliptic Problem with Indefinite Weight and Robin Boundary Conditions
- Workshop on Mathematical Models of Electrolytes with Application to Molecular Biology, Taida Institute for Mathematical Sciences, National Taiwan University Jan. 2012

  A Moving Boundary Model Motivated by Electric Breakdown
- Department of Mathematics, University of Southern California Dec. 2011

  Principal Eigenvalue Minimization for an Elliptic Problem with Indefinite Weight and Robin Boundary Conditions
- Department of Mathematics, University of California, Los Angeles Nov. 2011

  An efficient algorithm for shape optimization of eigenvalue problems on surfaces
- AWM 40 Years and Counting: AWM's Celebration of Woman in Mathematics, Brown University, Providence Sept. 2011

  Bounded domain problem for the modified Buckley-Leverett Equation
- 7th International Congress on Industrial and Applied Mathematics, Vancouver, Canada July. 2011

An efficient algorithm for shape optimization of eigenvalue problems on surfaces

- Workshop on Surface Computing and Closest Point Method, Vancouver, Canada July. 2011
  Recent numerical methods for shape optimization of eigenvalue problems in inhomogeneous structures for both regular and irregular domains
- NCTS summer short course, Taipei, Taiwan Jun. 2011
  Introduction to Shape Optimization for Elliptic Eigenvalue Problems
- Department of Mathematics, Wright State University Apr. 2011
  Numerical methods for shape optimization of eigenvalue problems in inhomogeneous structures
- Special Session on Recent Advances in Hyperbolic and Kinetic Problems, AMS meeting, Iowa Mar. 2011
  Central Schemes for the Modified Buckley-Leverett Equation
- Department of Mathematics, Portland State University Mar. 2011
  Mathematical tools in Biomedical Image Processing
- Computing in Image Processing, Computer Graphs, Virtual Surgery, and Sports, IMA, UMN Mar. 2011
  Split Bregman Method for Minimization of Region-Scalable Fitting Energy for Image Segmentation
- Department of Electrical and Computer Engineering, The Ohio State University Feb. 2011
  Split Bregman Method for Minimization of Region-Scalable Fitting Energy for Image Segmentation
- Advancing Numerical Methods for Viscosity Solutions and Applications BIRS, Canada Feb. 2011
  Split Bregman Method for Minimization of Region-Scalable Fitting Energy for Image Segmentation
- Department of Mathematics, Claremont McKenna College Jan. 2011
  Numerical Methods for Shape Optimization of Eigenvalue Problems in Inhomogeneous Structure
- Department of Mathematics, University of Michigan, Ann Arbor Dec. 2010
  A pseudo-spectral method with window technique for initial value problems of KP equation
- Numerical Solutions of Partial Differential Equations: Fast Solution Techniques Nov. 2010
  An Efficient Rearrangement Algorithm for Shape Optimization on Eigenvalue Problems
- Applied Math Colloquium, Department of Mathematics, UCLA Oct. 2010
  Numerical study of the KP equation for non-periodic waves
- Level Set Seminar, Department of Mathematics, UCLA Oct. 2010
  An efficient rearrangement algorithm for shape optimization on eigenvalue problems
- IMA Hot Topics Workshop: Medical Device-Biological Interactions at the Material Tissue Interface, IMA University of Minnesota at Twin Cities Sept. 2010
  Mathematical tools in biomedical image processing
- Summer Course of Image Science, Taiwan Aug. 2010
  Connectome: Fiber connectivity in the white matter regions
- SIAM Annual Meeting at Pittsburg, Pennsylvania Jul. 2010
  A pseudo-spectral method with window technique for initial value problems of KP equation
- The Second International Conference: Nonlinear Waves – Theory and Applications, Beijing Jun. 2010
  KP solitons: Part 3. Simulations
- Symmetry Plus Integrability 2010, South Padre Travelodge, South Padre Island, Texas Jun. 2010
  A pseudo-spectral method with window technique for initial value problems of KP equation
- Computational and Mathematical Methods in Science and Engineering, UWM, Madison May. 2010
  Central Schemes for the Modified Buckley-Leverett Equation
  Modeling oxygen transport in surgical tissue transfer
- SIAM Great Lakes Conference: Modeling and Numerical PDEs in Mathematical Biology, University of Michigan-Dearborn, Dearborn, MI Apr. 2010
  Modeling oxygen transport in surgical tissue transfer

- Department of Mathematics, Graz University, Austria Mar. 2010
  Numerical Methods for Capturing Non-classical Shock Solutions of the Modified Buckley-Leverett Equation
- Department of Mathematics, Purdue University Nov. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Department of Mathematics, University of California, Irvine Nov. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Department of Mathematics, Case Western Reserve University Nov. 2009
  Image Segmentation Using Local and Global Intensity Fitting Active Contours/Surfaces
- Department of Mathematics, Georgia Tech Oct. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Department of Mathematics, University of Iowa Oct. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Department of Mathematics, Iowa State University Oct. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- The Twelfth IEEE International Conference on Computer Vision in Kyoto Oct. 2009
  Image Segmentation with Simultaneous Illumination and Reflectance Estimation: An Energy Minimization Approach
- 2nd International Conference on Reaction-Diffusion Systems and Viscosity Solutions at Providence University, Taiwan July. 2009
  Central Schemes for a new class of entropy solutions of the Buckley-Leverett equation
- International Conference of Mathematics, National Taiwan University, Taipei, Taiwan July. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- SIAM Annual Meeting at Denver, Colorado July. 2009
  An Efficient Algorithm for Shape Optimization on Elliptic Eigenvalue Problem
- The Sixth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia Mar. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Higher Order Geometric Evolution Equations Theory and Applications from Microfluidics to Image Understanding, IMA, UMN Mar. 2009
  A Spectral Method with Window Technique for the Initial Value Problems of Kadomtsev-Petviashvili Equation
- Department of Mathematics, Graz University, Austria Mar. 2009
  Shape Optimization for Elliptic Eigenvalue Problem
- Department of Mathematics, The Ohio State University Mar. 2009
  Asymptotic Phases in a Cell Differential Model
- Department of Mathematics, Tulane University Feb. 2009
  An Efficient Algorithm for Shape Optimization on Elliptic Eigenvalue Problem
- Department of Mathematics, South Carolina University Oct. 2008

Shape Optimization for Elliptic Eigenvalue Problem

- Recent Development for Hyperbolic Equations and its Applications, BIRS, Canada Sept. 2008
  Cell Cycle Control at the First Restriction Point and its Effect on Tissue Growth
- National Center for Theoretical Sciences, Mathematics Division, Taipei Aug. 2008
  Cell Cycle Control at the First Restriction Point and its Effect on Tissue Growth
- SIAM Annual Meeting: San Diego, CA Jul. 2008
  Legendre-Transform-Based Fast Sweeping Methods for Static Hamilton-Jacobi Equations
  Region-Scalable Active Contour Model for Image Segmentation
- SAMSI Workshop on Random Media Transition May. 2008
  Shape Optimization for Elliptic Eigenvalue Problems
- MCIAM Conference, Kellogg Center, Michigan State University Mar. 2008
  Shape Optimization for Elliptic Eigenvalue Problems
- SIAM Conference Analysis of Partial Differential Equations, Phoenix, Arizona Dec. 2007
  Maximization of the Quality Factor of an Optical Resonator
- School of Computational Science, Florida State University Oct. 2007
  Region Scalable Fitting Energy for Image Segmentation
- Center for Imaging Science, Johns Hopkins Sept. 2007
  Region Scalable Fitting Energy for Image Segmentation
- NCTS summer short course, Taipei, Taiwan Aug. 2007
  Introduction to Image Segmentation
- 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland July. 2007
  Inverse Problems Involving Shapes
- Computational and Mathematical Aspects of Materials and Fluids: Iowa State University Apr. 2007
  Shape Optimization for eigenvalue problems with applications in photonic crystals and vibrating systems
- Sweeping Seminar: Rice University Apr. 2007
  Lax-Friedrichs Fast Sweeping Method & Sweeping Schemes for Visibility Function
- Seminar (Invitation to Research): The Ohio State University Feb. 2007
  Mathematics behind Imaging Sciences
- Research Seminar: National Taiwan University, Taiwan Dec. 2006
  Implicit Active Contour/Surfaces Driven by Local Binary Fitting Energy
- Numerical Methods for Degenerate Elliptic Equations and Applications, BIRS, Canada Dec. 2006
  An adaptive spectral/DG method for a phase-space based level set approach to geometrical optics on curved element
- Seminar: University of California, Irvine Nov. 2006
  A Geometric Method of Automatic Extraction of Sulcal Fundi
- Oberwolfach mini-Workshop: Anisotropic Motion Laws: Germany Aug. 2006
  The Anisotropic Motion in human brains
- SIAM Annual Meeting: Boston, Massachusetts Jul. 2006
  Fast Sweeping Methods for Static Hamilton-Jacobi Equations
- NCTS International Workshop on Scientific Computing: National Taiwan University, Taiwan Jun. 2006
  A Geometric Method of Automatic Extraction of Sulcal Fundi
- NCTS International Workshop on Scientific Computing (Tutorial Week): National Taiwan University, Taiwan Jun. 2006
  Inverse Problems Involving Shapes

- 2006 IEEE International Symposium on Biomedical Imaging: From Nano to Macro, Virginia Apr. 2006
  A Geometric Method of Automatic Extraction of Sulcal Fundi
- Applied Seminars: UCLA, University of Massachusetts at Amherst, University of Colorado at Denver and Health Sciences Center, Southern Methodist University, Illinois Institute of Technology, University of Central Florida, University of Notre Dame, University of Illinois at Chicago, The Ohio State University, Georgia Tech Dec. 2005 ~ Feb. 2006
  A Geometric Method of Automatic Extraction of Sulcal Fundi
- SIAM Annual Meeting: New Orleans Jul. 2005
  Maximizing Band Gaps in Two Dimensional Photonic Crystals by Using Level Set Methods
- Applied Mathematics and Numerical Analysis Seminar, UMN Math Department Oct. 2004
  Fast Sweeping Methods for Static Hamilton-Jacobi Equations
- SIAM Annual Meeting: Portland Jul. 2004
  Fast Sweeping Methods for Static Hamilton-Jacobi Equations
- MURI On-Site Meeting at Stanford University Feb. 2004
  Lax-Friedrich Sweeping Methods for Static Hamilton-Jacobi Equations
- NCTS Dynamical Systems Seminar, Taiwan Dec. 2003
  Lax-Friedrich Sweeping Methods for Static Hamilton-Jacobi Equations
- MURI On-Site Meeting at Stanford University Jan. 2003
  Sweeping Methods for Static Hamilton-Jacobi Equations
- Geometrically Based Motions Reunion Conference at Lake Arrowhead Sept. 2002
  Sweeping Methods for Static Hamilton-Jacobi Equations
- Industrial Mathematics Modeling Workshop at NCSU Jul. 2002
  Recognizing Sand Ripple Patterns from Side-scan Sonar Images

PROFESSIONAL EXPERIENCE

- Conference Organizer for Hybrid Annual Conference of the Society of Mathematical Biology (SMB), June 13-17, 2021
- Conference Organizer for SMB Workshop on Education and Research Experiences for Undergraduates, April 1-2, 2021
- Minisymposium Organizer for SIAM Conference on Analysis of Partial Differential Equations, La Quinta, California, December 11-14, 2019
- Minisymposium Organizer for the 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, National Taiwan University, Taiwan, July, 2018
- WINASC Minisymposium Organizer for AWM Research Symposium 2017 at UCLA, April 2017
- Minisymposium Organizer for ICIAM (International Congress of Industrial and Applied Mathematics) Conference, Beijing, August 2015
- Organizer for WhAM! A Research Collaboration Workshop for Women in Applied Mathematics at IMA, Aug. 12-15, 2014
- AWM Minisymposium Organizer for SIAM Annual Conference, Chicago, July 2014
- Minisymposium Organizer for SIAM Annual Conference, San Diego, July 2013
- Minisymposium Organizer for SIAM Annual Conference, Minneapolis, July 2012
- Minisymposium Organizer for Conference on Applied Mathematics, Modeling and Computational Science Conference, Waterloo, Ontario, Canada, July 2011
- Minisymposium Organizer for Conference on Computational and Mathematical Methods in Science and Engineering, UWM, May 2010
- Organizer for Midwest PDE conference, OSU, Nov 2008

- Minisymposium Organizer for SIAM Conference on Analysis of PDE, Phoenix, Arizona, Dec 2007
- Organizer for 2006 NCTS International Workshop on Scientific Computing: National Taiwan University, Taiwan
- Editorial board member of Discrete Continuous Dynamical Systems – Series B, Cogent Mathematics, and Taiwanese Journal of Mathematics
- Reviewer for Advances in Numerical Analysis, Biomedicine and Biotechnology, Communications in Mathematical Sciences, Communications in Numerical Methods in Engineering, Computers & Mathematics with Applications, Digital Signal Processing, Discrete and Continuous Dynamical Systems B, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Image Processing, IEEE Transactions on Nuclear Science, International Journal for Numerical Methods in Biomedical Engineering, International Journal of Biomedical Imaging, International Journal of Innovative Computation and Application, Inverse Problems and Imaging, Journal of Biomedical Science and Engineering, Journal of Computational and Applied Mathematics, Journal of Computer Science and Technology, Journal of Computational Mathematics, Journal of Computational Physics, Journal of Mathematical Imaging and Vision, Journal of Scientific Computing, Machine Vision and Applications, Mathematical Biosciences and Engineering, Neuroimaging, NSF Panel, Physics Letters A, Pattern Recognition, Research in the Mathematical Sciences, SIAM Journal of Applied Mathematics, SIAM Journal of Numerical Analysis.

MEMBERSHIPS

- American Mathematical Society
- AWM Association for Women in Mathematics
- Society for Industrial and Applied Mathematics

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