Feng-Nan Hwang

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March 2018

Education

PhD in Applied Mathematics, 2000 – 2004.
University of Colorado Boulder, USA.
Dissertation Title: *Some Parallel Linear and Nonlinear Schwarz Methods with Applications in Computational Fluid Dynamics*
Dissertation adviser: Professor Xiao-Chuan Cai

MSc in Applied Mathematics, 1997 – 1999.
University of Colorado Denver, USA.
Thesis title: *A New Submesh Strategy in the Two-level Finite Element Method for the Advective-Diffusive Equation*
Thesis adviser: Professor Leo P. Franca

BSc in Applied Mathematics, 1991 – 1995.
Fu-Jen Catholic University, Taiwan.

Work Experiences

Professor, August 2017 – Present
Department of Mathematics, National Central University, Taiwan

Associate Chair, August 2016 – Present
Department of Mathematics, National Central University, Taiwan

Associate Professor, August 2011 – July 2017
Department of Mathematics, National Central University, Taiwan

Assistant Professor, February 2005 – July 2011
Department of Mathematics, National Central University, Taiwan

Visiting Scholar, 2010-2011
Department of Computing and Mathematical Sciences, Caltech, USA

Visiting Assistant Professor, Summers 2005, 2006, and 2007
Department of Computer Science, University of Colorado Boulder, USA

Research Associate, September 2004 – January 2005
Department of Computer Science, University of Colorado Boulder, USA

Research interests

Scientific and parallel computing

Domain decomposition and multilevel methods

Computational fluid dynamics and biomechanics

Parallel scientific package developments

Mathematical modelling in industrial applications

Academic Honers

- ◇ **O**utstanding Research Award, National Central University, 2018.
- ◇ **T**op Journal Paper Award, College of Science, National Central University, 2008, 2011, 2017.
- ◇ **E**xcellent Teaching Award, College of Science, National Central University, 2008, 2016.

◇ **S**tudent Travel Grant, The 11th SIAM Conference on Parallel Processing for Scientific Computing (PP04), 2004.

◇ **S**tudent Fellowship, The 7th US National Congress on Computational Mechanics, 2003.

Publications **A. Journal papers**.

[1] C.-H. Wang, Y.-S. Lo, F.-T. Hwang, and F.-N. Hwang, *A full-space quasi Lagrange-Newton-Krylov algorithm for trajectory optimization problems*, **Electronic Transactions on Numerical Analysis**, 2018, accepted.

[2] H. Yang and F.-N. Hwang. *An adaptive nonlinear elimination preconditioned inexact Newton algorithm for highly local nonlinear multicomponent PDE systems*, **Applied Numerical Mathematics**, 2018, in press.

[3] C.-C. Yao, Y.-Z. Su, and F.-N. Hwang, *An iteratively adaptive multiscale finite element method for elliptic interface problems*, **Applied Numerical Mathematics**, Vol. 127 (2018), pp. 211–225.

[4] Y.-F. Cheng and F.-N. Hwang, *A parallel two-level polynomial Jacobi-Davidson algorithm for large sparse PDE eigenvalue problems*, **Advances in Engineering Software**, Vol. 112 (2017), pp. 222–230.

[5] T. Hou, F.-N. Hwang, P. Liu, and Y.-C Yao, *An iteratively adaptive multi-scale finite element method for elliptic PDEs with rough coefficients*, **Journal of Computational Physics**, Vol. 336 (2017), pp. 375–400.

[6] H. Yang, F.-N. Hwang, and X.-C. Cai, *Nonlinear preconditioning techniques for full-space Lagrange-Newton solution of PDE-constrained optimization problems*, **SIAM Journal on Scientific Computing**, Vol. 38 (2016), pp. A2756-A2778.

[7] T. Zhao, F.-N. Hwang, and X.-C. Cai, *Parallel two-level domain decomposition based Jacobi-Davidson algorithm for pyramidal quantum dot simulation*, **Computer Physics Communications**, Vol. 204 (2016), pp. 74-81.

[8] W.-S. Shiu, F.-N. Hwang, X.-C. Cai, *Parallel domain decomposition method for the finite element approximation of 3D steady state non-Newtonian fluids*, **International Journal for Numerical Methods in Fluids**, Vol. 78 (2015) pp. 502-520.

[9] F.-N. Hwang, Y.-C. Su, and X.-C. Cai, *A parallel adaptive nonlinear elimination preconditioned inexact Newton method for transonic full potential equation*, **Computers and Fluids**, Vol. 110 (2015) pp. 96–107.

[10] C.-W. Tsao, K.-S. Chen and F.-N. Hwang, *Numerical simulation of droplet-based microfluidic chip interfacing with laser desorption/ionization mass spectrometry target substrate*, **Micro & Nano letters**, Vol. 10 (2015) pp. 192-197.

[11] Y.-M. Chiu, C.-H. Chiang, C.-T. Hung, M.-H. Hu, J.-S. Wu, F.-N. Hwang *Parallel 2D axisymmetric fluid modeling of CF_4 discharge in an inductively coupled plasma source during SiO_2 etching*, **Plasma Process and Polymers**, Vol. 11 (2014) pp. 366-390.

[12] F.-N. Hwang, X.-C. Cai, Y.-L. Chen, and C.-W. Tsao, *A parallel fully coupled implicit domain decomposition method for numerical simulation of microfluidic mixing in 3D*, **International Journal of Computer Mathematics**, Vol. 90 (2013) pp. 615-629.

[13] K.-M. Lin, M.-H. Hu, C.-T. Hung, J.-S. Wu, F.-N. Hwang, Y.-S. Chen, G. Cheng. *A parallel hybrid numerical algorithm for simulating gas flow and gas discharge of an atmospheric-pressure plasma jet*, **Computer Physics Communications**, Vol. 183 (2012) pp. 2550-2560.

[14] K.-M. Lin, C.-T. Hung, F.-N. Hwang, M. R. Smith, Y.-W. Yang, and J.-S. Wu, *Development of a parallel semi-implicit two-dimensional plasma fluid modeling code using finite-volume method*, **Computer Physics Communications**, Vol. 183 (2012) pp. 1225-1236.

[15] T.-M. Huang, F.-N. Hwang, S.-H. Lai, W. Wang, and Z.-H. Wei, *A parallel polynomial Jacobi-Davidson approach for dissipative acoustic eigenvalue problems*, **Computers and Fluids**, Vol. 45 (2011) pp. 207-214.

[16] H.-W. Hsu, F.-N. Hwang, Z.-H. Wei, S.-H. Lai, and C.-A. Lin, *A parallel multilevel preconditioned iterative pressure Poisson solver for the large-eddy simulation of turbulent flow inside a duct*, **Computers & Fluids**, Vol. 45 (2011) pp. 138-146.

[17] C.-T. Hung, Y.-M. Chiu, F.-N. Hwang, M.-H. Chiang, J.-S. Wu, Y.-C. Wang, and S.-H. Chen, *Investigation of Helium dielectric barrier discharge driven by a realistic distorted-sinusoidal voltage power source*, **Plasma Chemistry and Plasma Processing**, Vol. 31 (2011) pp. 1-21.

[18] Y.-M. Chiu, C.-T. Hung, F.-N. Hwang, M.-H. Chiang, J.-S, Wu, and S.-H. Chen, *Effect of plasma chemistry on the simulation of Helium atmospheric-pressure plasmas*, **Computer Physics Communications**, Vol. 182 (2011) pp. 167-169.

[19] K.-W. Cheng, C.-T. Hung, M.-H. Chiang, F.-N. Hwang, and J.-S. Wu, *One-dimensional simulation of Nitrogen dielectric barrier discharge driven by a quasi-pulsed power source and its comparison with experiments*, **Computer Physics Communications**, Vol. 182 (2011) pp. 164-166.

[20] C.-T. Hung, Y.-M. Chiu, F.-N. Hwang, and J.-S. Wu, *Development of a parallel implicit solver of fluid modeling equations for gas discharges*, **Computer Physics Communications**, Vol. 182 (2011) pp. 161-163.

[21] F.-N. Hwang, S.-R. Cai, Y.-L. Shao, and J.-S. Wu, *Parallel Newton-Krylov-Schwarz algorithms for the three-dimensional Poisson-Boltzmann equation in numerical simulation of colloidal particle interactions*, **Computer Physics Communications**, Vol. 181 (2010) pp. 1529-1537.

[22] C.-Y. Huang and F.-N. Hwang, *Parallel pseudo-transient Newton-Krylov-Schwarz continuation algorithms for bifurcation analysis of incompressible sudden expansion flows*, **Applied Numerical Mathematics**, Vol. 60 (2010), pp. 738-751.

[23] F.-N. Hwang, H.-L. Lin, and X.-C. Cai, *Two-level nonlinear elimination based preconditioners for inexact Newton methods with application in shocked duct flow calculation*, **Electronic Transactions on Numerical Analysis**, Vol. 37 (2010), pp. 239-251.

[24] F.-N. Hwang, C.-Y. Wu, and X.-C. Cai, *Numerical simulation of three-dimensional blood flows using domain decomposition method on parallel computer*, **the Journal of the Chinese Society of Mechanical Engineers**, Vol. 31 (2010), pp. 199-208.

[25] F.-N. Hwang, Z.-H. Wei, T.-M. Huang, and W. Wang, *A parallel additive Schwarz preconditioned Jacobi-Davidson algorithm for polynomial eigenvalue problems in quantum dot simulation*, **Journal of Computational Physics**, Vol. 229 (2010), pp. 2932-2947.

[26] C.-T. Hung, M.-H. Hu, J.-S. Wu, and F.-N. Hwang, *A new paradigm for solving plasma fluid modeling equations*, **Computer Physics Communications**, Vol. 177 (2007), pp. 138-139.

[27] F.-N. Hwang and X.-C. Cai, *A class of parallel two-level nonlinear Schwarz preconditioned inexact Newton algorithms*, **Computer Methods in Applied Mechanics and Engineering**, Vol. 196 (2007), pp. 1603-1611.

[28] F.-N. Hwang and X.-C. Cai, *Parallel fully coupled Schwarz preconditioners for saddle point problems*, **Electronic Transactions on Numerical Analysis**, Vol. 22 (2006), pp. 146-162.

[29] F.-N. Hwang and X.-C. Cai, *A parallel nonlinear additive Schwarz preconditioned inexact Newton algorithm for incompressible Navier-Stokes equations*, **Journal of Computational Physics**, Vol. 204 (2005), pp. 666-691.

[30] L.P. Franca and F.-N. Hwang, *Refining the submesh strategy in the two-level finite element method: application to the advection-diffusion equation*, **International Journal for Numerical Methods in Fluids**, Vol. 39 (2002), pp. 161-187.

B. Referred Conference papers

[1] W.-S. Shiu, Z. Yan, J. Liu, R. Chen, F.-N. Hwang, and X.-C. Cai, *Simulation of blood flow in patient specific cerebral arteries with a domain decomposition method*, **Lecture Notes in Computational Science and Engineering**, Vol. 116 (2017), pp. 407-415.

[2] T.-Zhao, F.-N. Hwang, and X.-C. Cai, *A domain decomposition based Jacobi-Davidson algorithm for quantum dot simulation*, **Lecture Notes in Computational Science and Engineering**, Vol. 104 (2016), pp. 415-423.

[3] F.-N. Hwang, Yi-Cheng Su, and X.-C. Cai *A parallel adaptive nonlinear elimination preconditioned inexact Newton for transonic full potential flow problems*, **Procedia Engineering**, Vol. 61 (2013), pp. 402.

[4] Z.-H. Wei, F.-N. Hwang, T.-M. Huang, and W. Wang, *A parallel scalable PETSc-based Jacobi-Davidson polynomial eigensolver with application in quantum dot simulation*, **Lecture Notes in Computational Science and Engineering**, Vol. 78 (2011), pp. 157-164.

[5] F.-N. Hwang, Z.-H. Wei, T.-M. Huang, and W. Wang, *Parallel implementation of Jacobi-Davidson algorithms for large-scale polynomial eigenvalue problems using PETSc and SLEPc*, The Proceedings of the HPC Asia 2009, (2009) Kaohsiung, Taiwan, pp. 522-527.

[6] C.-T. Hung, M.-H. Hu, Y.-M. Chiu, K.-M. Lin, Y.-C. Wang, J.-S. Wu, and F.-N. Hwang *Non-thermal plasma simulation using parallel 2D fluid modeling code*, The Proceedings of the HPC Asia 2009, (2009) Kaohsiung, pp. 528-533.

[7] C.-T. Hung, M.-H. Hu, Y.-M. Chiu, J.-S. Wu, and F.-N. Hwang, *Development of a parallel 2D fluid modeling code for non-thermal plasma simulations*, The Proceedings of the 26th International Symposium on Rarefied Gas Dynamics, (2008) Kyoto, Japan.

[8] F.-N. Hwang and X.-C. Cai, *A combined linear and nonlinear preconditioning technique for incompressible Navier-Stokes equations*, **Lecture Notes in Computer Science**, Vol. 3732 (2006), pp. 313-322.

[9] F.-N. Hwang and X.-C. Cai, *Improving robustness and parallel scalability of Newton method through nonlinear preconditioning*, **Lecture Notes in Computational Science and Engineering**, Vol. 40 (2005), pp. 201-208.

[10] X. Yue, F.-N. Hwang, R. Shandas, and X.-C. Cai, *Simulation of branching blood flows on parallel computers*, **Biomedical Sciences Instrumentation**, Vol. 40 (2004), pp. 325-330.

C. Submitted paper(s)

[1] Y.-T. Chien and F.-N. Hwang. *A Markov chain-based multi-elimination preconditioner for elliptic PDE problems*, under review, November 2017.

D. Technical reports

[1] J. Anderson, F.-N. Hwang, S. H. Kang, B. Momken, R. Schugart, and C. E. Torcaso, *Modeling molecular diffusion in soft tissues using fluorescence microscopy*, NCSU-CRSC Tech Report CRSC-TR00-24, (2000), pp. 77-90.

Research grants

- ◇ *High-performance Computing with Applications on Fluid Dynamics, Plasma, and Data Science*, PI, Ministry of Science and Technology, Taiwan, NT$467,320, 2018–2019.
- ◇ *Trajectory Optimization Problem: Parallel Algorithm Development and its Application in Space Mission*, PI, Ministry of Science and Technology, Taiwan, NT$3,397,000, 2017–2019.
- ◇ *A New Framework of Parallel Multiscale Finite Element Methods and their Applications*, PI, Ministry of Science and Technology, Taiwan, NT$683,000, 2016–2017.

- ◇ *Parallel Iteratively Adaptive Multiscale Finite Element Methods: Algorithm, Theory, Software Package Development, and Applications*, PI, Ministry of Science and Technology, Taiwan, NT$641,000, 2015–2016.
- ◇ *Parallel Nonlinear Elimination Methods and Related Iterative Methods for Large Sparse Nonlinear Systems: Algorithms and Applications*, PI, Ministry of Science and Technology, Taiwan, NT$740,000, 2014–2015.
- ◇ *GPU/CPU Computations for Numerical Partial Differential Equations with Applications in Multiscale/Multi physics Simulations*, PI, National Science Council, Taiwan, NT$735,000, 2013–2014.
- ◇ *Parallel Multilevel Polynomial Jacobi-Davidson Eigensolvers for Fluid-Structure Interaction Problems*, PI, National Science Council, Taiwan, NT$1,323,000, 2011–2013.
- ◇ *The Investigation of Three-dimensional Incompressible Turbulent Flows: Multiscale Analysis and Parallel Computing*, PI, National Science Council, Taiwan, NT$579,000, 2010.
- ◇ *The Development of a Parallel Scientific Software Package and Algorithms for Solving Large Sparse Polynomial Eigenvalue Problems*, PI, National Science Council, Taiwan, NT$1,593,000+ $510,167, 2009–2011.
- ◇ *Acquisition of a High-Performance Parallel Computers for Computational Mathematics and Applications in Computational Science and Engineering*, PI, Ministry of Education, Taiwan, NT$440,000+ NT$440,000, 2008, 2009.
- ◇ *Parallel Domain Decomposition Algorithms and Scientific Software Development for 3D Branching Blood Flow Simulation*, PI, National Science Council, Taiwan, NT$1,240,000+ NT$268,912, 2007–2009.
- ◇ *Development and Applications of Parallellized 2D and 3D Fluid Modeling Codes for Atmospheric Pressure Plasma Jet*, CO-PI, National Science Council, Taiwan, NT$983,000, 2007–2009.
- ◇ *Parallel Domain Decomposition algorithms for Semilinear Elliptic Partial Differential Equations with Applications in Computational Science and Engineering*, PI, National Science Council, Taiwan, NT$477,000, 2006–2007.
- ◇ *Parallel Multilevel Nonlinear Schwarz Methods with Applications in Computational Fluid Dynamics*, PI, National Science Council, Taiwan, NT$314,000, 2005–2006.

Conference Presentations

[1] *A parallel full-space Lagrange-Newton-Krylov Algorithm for Trajectory Optimization Problems in Space Missions*, the SIAM Conference on Parallel Processing, Tokyo, Japan, March 2018.

[2] *A full-space quasi-Lagrange-Newton-Krylov algorithm for trajectory optimization problems in space missions*, the 12th East Asia SIAM Conference, Seoul, Korea, June 2017.

[3] *A dynamic contrast-enhanced MRI-based data-driven computational technique for early detection of chronic liver diseases*, the 19th International Conference on Finite Elements in Flow Problems, Rome, Italy, April 2017.

[4] *Parallel iteratively adaptive multiscale finite element method and its applications*, the 20th IMACS World Congress, Xiamen, China, Dec. 2016.

[5] *Nonlinear Preconditioning Techniques for PDE- Constrained Optimization Problem*, the 11th East Asia SIAM Conference, Macau, China, June 2016.

[6] *Parallel domain decomposition-based numerical simulation of blood flows in branching arteries using a non-Newtonian model*, the 8th International Congress on Industrial and Applied Mathematics, Beijing, China, August 2015.

[7] *Nonlinear preconditioner for full-space Lagrange-Newton-Krylov algorithms with applications in PDE-constrained optimization problems*, the 23th International Conference on Domain Decomposition Methods, Jeju, Korea, July 2015.

[8] *A new framework of iteratively adaptive multiscale finite element method*, the 18th International Conference on Finite Elements in Flow Problems, Taipei, Taiwan, March 2015.

[9] *Nonlinear preconditioning techniques for full-space Lagrange-Newton algorithm with application in large-scale PDE-constrained optimization*, the 5th International Conference on Scientific Computing and Partial Differential Equations, Hong Kong, China, December 2014.

[10] *A new framework of iteratively adaptive multiscale finite element method*, the 6th East Asian Numerical Astrophysics Meeting, Suwon, Korea, September 2014.

[11] *A parallel two-grid polynomial Jacobi-Davidson algorithm for large sparse PDE eigenvalue Problems*, the 16th SIAM Conference on Parallel Processing for Scientific Computing, Portland, USA, February 2014.

[12] *A full-space Lagrange-Newton-Krylov algorithm for trajectory optimization problems*, the 9th East Asia SIAM Conference, Bandung, Indonesia, June 2013.

[13] *A parallel adaptive nonlinear elimination preconditioned inexact Newton for transonic full potential flow problems*, the 25th International Conference on Parallel Computational Fluid Dynamics, Changsha, China, May 2013.

[14] *Parallel multilevel polynomial Jacobi-Davidson eigensolver for dissipative acoustic problems*, the 21th International Conference on Domain Decomposition Methods, Rennes, France, June 2012.

[15] *A parallel polynomial Jacobi-Davidson approach for dissipative acoustic eigenvalue problems*, the 20th International Conference on Domain Decomposition Methods, La Jolla, USA, February 2011.

[16] *Parallel Newton-Krylov-Schwarz algorithms for the three-dimensional Poisson-Boltzmann equation in numerical simulation of colloidal particle Interactions*, the 20th International Conference on Domain Decomposition Methods, La Jolla, USA, February 2011.

[17] *A parallel scalable PETSc-based Jacobi-Davidson eigensolver for acoustic polynomial eigenvalue Problems*, the 22nd International Conference on Parallel Computational Fluid Dynamics, Kaohsiung, Taiwan, May 2010.

[18] *PJDPack, a parallel scalable PETSc-based eigensolver for large sparse polynomial eigenvalue problems*, (invited Speaker) 2nd International Workshops on Advances in Computational Mechanics, Yokohama, Japan, March 2010.

[19] *A PETSc-based Jacobi-Davidson approach for large sparse polynomial eigenvalue problems with application in Quantum Dot Simulation*, the 14th SIAM Conference on Parallel Processing for Scientific Computing, Seattle, Washington, USA, February, 2010.

[20] *A parallel additive Schwarz preconditioned Jacobi-Davidson algorithm for polynomial eigenvalue problems in quantum dot simulation*, the 19th International Conference on Domain Decomposition Methods, Zhangjiajie, China, August 2009.

[21] *Numerical simulation of three-dimensional blood flows in arteries using domain decomposition based scientific software packages in parallel computers*, the 19th International Conference on Domain Decomposition Methods, Zhangjiajie, China, August 2009.

[22] *PPJD, the parallel scientific package for large sparse polynomial eigenvalue problems*, International Conference on Engineering and Computational Mathematics, Hong Kong, China, May 2009.

[23] *Fully implicit parallel domain decomposition methods for the stabilized finite element Solution of unsteady 3D incompressible Navier-Stokes equations with unstructured meshes*, the 15th International Conference on Finite Elements in Flow Problems, Tokyo, Japan, April 2009.

[24] *Some Newton methods with nonlinear block Gaussian eliminations for the transonic compressible nozzle flow problem*, the 9th Frontier Science Symposium, Singapore, October 2008.

[25] *Fully implicit parallel domain decomposition methods for the finite element solutions of unsteady incompressible Navier-Stokes equations with unstructured meshes*, the 3rd Asian-Pacific Congress on Computational Mechanics, Kyoto, Japan, December 2007.

[26] *Some recent developments in parallel domain decomposition based nonlinear preconditioning methods*, the 9th US National Congress on Computational Mechanics, San Francisco, California, USA, July 2007.

[27] *Multilevel Schwarz methods for the Stokes and Navier-Stokes equations*, the 16th International Conference on Domain Decomposition Methods, New York City, New York, USA, January 2005.

[28] *Reducing nonlinear complexity of two-level nonlinear additive Schwarz preconditioned inexact Newton method*, The 8th Copper Mountain Conference on Iterative Methods, Colorado, USA, April 2004.

[29] *Detecting Newton's failure and improving its robustness and parallel scalability through nonlinear preconditioning*, The 11th SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, California, USA, February, 2004.

[30] *A parallel performance study of Schwarz type preconditioners for the Stokes problem*, International Conference on Preconditioning Techniques for Large Sparse Matrix Problems in Scientific and Industrial Applications, Napa, California, USA, October 2003.

[31] *A parallel nonlinear additive Schwarz preconditioned inexact Newton algorithm for incompressible Navier-Stokes equations*, The 7th US National Congress on Computational Mechanics, Albuquerque, New Mexico, USA, July 2003.

[32] *Simulations of branching blood fluids on parallel computers*, Poster, the 15th International Conference on Domain Decomposition Methods, Berlin, Germany, July 2003.

[33] *A parallel nonlinear additive Schwarz preconditioned inexact Newton algorithm for incompressible Navier-Stokes equations*, the 11th Copper Mountain Conference on Multigrid Method, Colorado, USA, March 2003.

Invited Talk

- ◇ 2018 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, Tainan, Taiwan, March 2018.
- ◇ The Workshop on High Performance Numerical Algorithms and Applications, Sanya, China, January, 2018
- ◇ Colloquium of Department of Applied Mathematics, National Cheng Chi University, Taipei, Taiwan, October 3, 2017.
- ◇ Half Day Workshop on Applied Mathematics, HKUST, Hong Kong, November 2017.
- ◇ Colloquium of Institute of Computational and Modeling Science, National Tsing Hua University, Hsinchu, Taiwan, October 3, 2017.
- ◇ The 24th National Conference for Computational Fluid Dynamics, Taoyoun, August, 2017.
- ◇ Second International Workshop on Deepening Performance Models for Automatic Tuning (DPMAT), Nagoya, Japan, August 2017.
- ◇ The 11th IEEE-EMBS International Summer School and Symposium on Medical Devices and Biosensors (MDBS' 2017), Shenzhen, China, July 2017
- ◇ 2017 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, Taipei, Taiwan, March 2017.
- ◇ First International Workshop on Deepening Performance Models for Automatic Tuning (DPMAT), Nagoya, Japan, September 2016.
- ◇ 2016 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, Taipei, Taiwan, February 2016.
- ◇ 2015 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, Taipei, Taiwan, February 2015.

- ◇ 2014 Annual Meeting of the Taiwanese Mathematical Society, Tainan, Dec 2014.
- ◇ 2014 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, Taipei, Taiwan, March, 2014.
- ◇ The 20th National Conference for Computational Fluid Dynamics, Nan-Tou, Taiwan, August, 2013.
- ◇ 2013 Conference on Advanced Topics and Auto Tuning in High Performance and Scientific Computing, March, 2013.
- ◇ Colloquium of Applied Mathematics Department, National Chao Tung University, Hsinchu, Taiwan, June 16, 2012.
- ◇ The 17th National Conference for Computational Fluid Dynamics, Taoyoun, July 30, 2010.
- ◇ Seminar of Power Mechanical Engineering Department, National Tsing Hua University, Hsinchu, Taiwan, December 10, 2009.
- ◇ Taiwan-Japan Joint workshop on Numerical Analysis and Scientific Computation, Taipei, Taiwan, November 7, 2009.
- ◇ 2009 The Workshop on Computational Mathematics and Mechanics, Taichung, Taiwan, April 18, 2009.
- ◇ 2008 Workshop on Nonlinear Analysis and Geometric Analysis, Chi-Tou, Taiwan, September 4, 2008
- ◇ Guest Lecturer, 2008 TIMS Computational Science Software Development Workshop, National Taiwan University, Taipei, Taiwan, August 2008.
- ◇ Seminar in Computational Sciences , Mathematics Division, National Center for Theoretical Sciences (Taipei Office), Taipei, Taiwan, June 24, 2008.
- ◇ 2007 Conference on Computational Mathematics, National Sun Yet-sen University, Kaohsiung, Taiwan, June 22, 2007.
- ◇ Colloquium of Mathematics Department, National Kaohsiung Normal University, Kaohsiung, Taiwan, June 6, 2007.
- ◇ Colloquium of Mathematics Department, Fu-Jen Catholic University, Taiwan, December 13, 2006.
- ◇ Short courses in Applied Mathematics Department, National University of Kaohsiung, Kaohsiung, Taiwan, October 11 and 18, 2006.
- ◇ Colloquium of Mathematics Department, Tamkang University, Taipei, Taiwan, March 8, 2006.
- ◇ Colloquium of Applied Mathematics Department, Providence University, Taichung, Taiwan, February 16, 2006.
- ◇ Colloquium of Mathematics Department, National Taiwan University, Taipei, Taiwan, December 12, 2005.
- ◇ Colloquium of Mathematics Department, Fu-Jen Catholic University, Taiwan, October 14, 2005.
- ◇ Colloquium of Applied Mathematics Department, National Chao Tung University, Hsinchu, Taiwan, June 16, 2005.
- ◇ Seminar in Scientific Computation, National Center for Theoretical Sciences, Mathematics Division, Hsinchu, Taiwan, March 16, 2005.
- ◇ Colloquium of Applied Mathematics Department, National Sun Set-sen University, Kaohsiung, Taiwan, March 10, 2005.
- ◇ Colloquium of Mathematics Department, National Central University, Jhongli, Taiwan, April 14, 2004.

- ◇ Colloquium of Mathematics Department, National Cheng Kung University, Tainan, Taiwan, April 12, 2004.
- ◇ Colloquium of Applied Mathematics Department, National University of Kaohsiung, Kaohsiung, Taiwan, April 9, 2004.

Graduate students supervised

- ◇ Current: Ph.D.: 3; M.S.: 9.
- ◇ Graduated: M.S.: 35.

Courses taught

- ◇ Undergraduate level: Calculus, Introduction to computer science I, II, Numerical analysis I, II, Matrix computation, Optimization problems, algorithm design and applications, and Mathematical modeling
- ◇ Graduated level: Numerical analysis I, II, High-performance computing I, II, and Special topics in scientific computing, Finite element method

Review papers and funding agency for

- ◇ SIAM Journal on Scientific Computing (2)
- ◇ Journal of Algorithms and Computational Technology
- ◇ International Journal of Mathematics and Mathematical Sciences
- ◇ Applications and Applied Mathematics: An International Journal
- ◇ Numerical Linear Algebra with Applications
- ◇ Computing (3)
- ◇ Journal of Computational Physics
- ◇ Computers & Fluids (5)
- ◇ Asia-Pacific Journal of Chemical Engineering
- ◇ International Journal of Computer Mathematics
- ◇ Journal of Mechanics (2)
- ◇ Modelling and Simulation in Engineering
- ◇ Journal of Scientific Computing
- ◇ Journal of Computational and Applied Mathematics (3)
- ◇ Mathematical Modelling and Analysis
- ◇ Taiwanese Journal of Mathematics
- ◇ Advances in Mechanical Engineering
- ◇ Advances in Applied Mathematics and Mechanics
- ◇ Mathematics & Computers with Applications (2)
- ◇ Communication in Computational Physics
- ◇ Journal of Applied Mathematics and Computing
- ◇ Nonlinear Engineering
- ◇ Engineering Optimization
- ◇ Engineering Applications of Computational Fluid Mechanics
- ◇ Ministry of Science and Technology, Taiwan (25)

Workshops attended

- ◇ 4th Workshop on the DOE Advanced CompuTational Software (ACTS) Collection, Robust and High Performance Tools for Scientific Computing, University of California at Berkeley, 2003.
- ◇ 18th Annual Workshop on Mathematical Problems in Industry, Rensselaer Polytechnic Institute, NY, 2002

- ◇ Workshop on the Preservation of Stability under Discretization, Colorado State University, 2001
- ◇ Industrial Mathematics Modeling Workshop for Graduate students, North Carolina State University, 2000

Affiliations

- ◇ SIAM membership
- ◇ TWSIAM membership

Services

- ◇ TWSIAM, General Secretary, 2015-2017.
- ◇ NCU Student Chapter of SIAM, Faculty Advisor, 2015-present.