LU ZHANG

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Department of Applied Physics and Applied Mathematics
Columbia University, 500 W. 120th Street Num. 200, New York, NY 10027

EMPLOYMENT

Columbia University, New York, NY, USA 2020 –
Ju Tang Chu and Wu Ping Chu Assistant Professor of Applied Mathematics

EDUCATION

Southern Methodist University, Dallas, TX, USA 2015–2017
M.S. in Computational and Applied Mathematics
Advisor: Prof. Thomas Hagstrom
Department of Mathematics

Southern Methodist University, Dallas, TX, USA 2017–2020
Ph.D. in Computational and Applied Mathematics
Advisor: Prof. Thomas Hagstrom
Department of Mathematics

SCIENTIFIC PAPERS

1. *A high order finite difference method for the elastic wave equation in bounded anisotropic and discontinuous media*, **L. Zhang**, S. Wang. Submitted

2. *Energy-based discontinuous Galerkin difference methods for second-order wave equations*, **L. Zhang**, D. Appelö and T. Hagstrom. Accepted by **Comm. Appl. Math. Comput.**

3. *Understanding the effects of on- and off-hotspot policing: Evidence of hotspot, oscillating and chaotic activities*, N. Rodriguez, Q. Wang, and **L. Zhang**. Accepted by **SIAM J. Appl. Dyn. Syst.**

4. *Elastic wave propagation in curvilinear coordinates with mesh refinement interfaces by a fourth order finite difference method*, **L. Zhang**, S. Wang and N.A. Petersson. **SIAM J. Sci. Comput.**, 43(2), A1472-A1496 (2021)

5. *An energy-based discontinuous Galerkin method for semilinear wave equations*, D. Appelö, T. Hagstrom, Q. Wang and **L. Zhang**. **J. Comput. Phys.**, 418(2020)

6. *Phase transitions and bump solutions of the Keller-Segel model with volume exclusion*, J. A. Carrillo, X. Chen, Q. Wang, Z. Wang and **L. Zhang**. **SIAM J. Appl. Math.**, 80(1), 232-261(2020)

7. *An energy-based discontinuous Galerkin method for the wave equation with advection*, **L. Zhang**, T. Hagstrom and D. Appelö. **SIAM J. Numer. Anal.**, 57(5), 2469-2492(2019).

8. *Convergence analysis of a discontinuous Galerkin method for wave equations in second-order form*, Y. Du, **L. Zhang** and Z. Zhang. **SIAM J. Numer. Anal.**, 57(1), 238-265(2019).

9. *Time–periodic and stable patterns of two–competing Keller–Segel chemotaxis model: Effect of cellular growth*, Q. Wang, J. Yang, and **L. Zhang**. **Discrete Contin. Dyn. Syst. Ser. B**, 22(9), 3547-3574(2017).

10. *On the multi–dimensional advective Lotka–Volterra competition systems*, Q. Wang, and **L. Zhang**. **Nonlinear Anal. Real World Appl.**, 37, 329-349(2017).

11. *Global existence and steady states of a two competing species Keller–Segel chemotaxis model*, Q. Wang, **L. Zhang**, J. Yang and J. Hu **Kinet. Relat. Models**, 8(4), 777-807(2015).

CONFERENCE PROCEEDING

12. Discontinuous Galerkin Methods for Electromagnetic Waves in Dispersive Media, T. Hagstrom, D. Appelö, and **L. Zhang**

PRESENTATIONS

Nov. 2021, "Coupling deep learning with full-waveform inversion.", **The 4th Annual Meeting of the SIAM Texas-Louisiana Section**

Mar. 2021, "An energy–based discontinuous Galerkin method with tame CFL numbers for the wave equation.", **SIAM Conference on Computational Science and Engineering** (Organizing a minisyposinum with T. Hagstrom and D. Appelö)

Oct. 2020, "An energy–based discontinuous Galerkin method for a nonlinear variational wave equation modelling liquid crystal.", **The 3nd Annual Meeting of SIAM Texas-Louisiana Section**

Nov. 2019, "An energy-based discontinuous Galerkin method for semi-linear wave equations", **The 2nd Annual Meeting of SIAM Texas-Louisiana Section**

Jun. 2019, "Energy-based discontinuous Galerkin method with Galerkin difference basis for second order wave equations", **North American High Order Methods Conference in San Diego State University**

Mar. 2019, "Galerkin difference basis for second order wave equations", **Finite Element Rodeo, University of Texas at Austin**

Jul. 2018, "An energy–based discontinuous Galerkin method for second order wave equations", **13th World Congress on Computational Mechanics in New York City**

Sep. 2017, "A new discontinuous Galerkin method for the wave equation With background flow", **Texas Applied Mathematics and Engineering Symposium, University of Texas at Austin**

Mar. 2017, "A new discontinuous Galerkin formulation for second order wave equations with background flow", **Finite Element Rodeo, University of Houston**

POSTERS

Oct. 2018, "An energy–based discontinuous Galerkin method for nonlinear wave equations", **SIAM TX-LA Sectional Meeting and LSU-UH-TAMU Undergraduate Conference**

EXPERIENCE

Research Assistant: Work on seismic problem, Computation Scholar Program in **Lawrence Livermore National Laboratory**, *Mentor:* Anders Petersson summer 2019

Research Assistant: Implement Multirate Solver to PETSc Library, Mathematics and Computer Science in **Argonne National Laboratory**, *Mentor:* Hong Zhang summer 2018

Parallel Scientific Computing: Solving Poisson Equation by preconditioned conjugate gradient and multigrid method with c++; parallelizing code by OpenMP, MPI and implementing Hypre solver, Department of Mathematics, **SMU** spring 2017

Multigrid: Solving two dimensional variable coefficient diffusion equation by multigrid method with matlab, Department of Mathematics, **SMU** fall 2016

Research Assistant, Department of Mathematics, **SMU** jun. 2016–dec. 2018

Teaching Assistant, Department of Mathematics, **SMU** jan. 2019–may. 2019

Teaching Assistant, Department of Mathematics, **SMU** aug. 2015–may. 2016

TEACHING

@ Columbia University (Fall 2020 –): (a) Graduate courses : (i) "APMA E4001: Principles of Applied Mathematics" (Fall 2020), (ii) "APMA E4990: Numerical Analysis and Optimization" (Spring 2021, Fall 2021).

SCHOLARSHIPS AND CERTIFICATES

Dean's Dissertation Fellowship, SMU 2019–2020

Travel Award, NAHOMCon Jun. 2019

Betty McKnight Speairs Math Award, Department of Mathematics, SMU May. 2019

Betty McKnight Speairs Math Award, Department of Mathematics, SMU May. 2017