

Changhui Tan

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Research Interests

Nonlinear partial differential equations, fluid mechanics, kinetic theory, multi-scale representation for the emergence of complex behavior in physical, biological and social systems.

Education

- Ph.D. Applied Mathematics and Statistics, and Scientific Computation program 2008-2014
Department of Mathematics, University of Maryland.
Thesis: *Multi-scale problems on collective dynamics and image processing*.
Advisor: Professor Eitan Tadmor.
- B.S. Mathematics, School of Mathematical Sciences, Peking University. 2004-2008
- B.S. Economics, National School of Development, Peking University. 2005-2008

Academic Position

- Lovett Instructor 2015-current
Department of Mathematics, Rice University
Mentor: Professor Alexander Kiselev.
- Postdoctoral Research Associate 2014-2015
Center for Scientific Computation and Mathematical Modeling, University of Maryland

Honors and Awards

- Ann G. Wylie Dissertation Fellowships 2013-2014
- Mark E. Lachtman Graduate Student Award 2011-2012
- Graduate Student Fellowship, University of Maryland 2008-2010

Publications

CHANGHUI TAN,
Finite time blow up for a 1D model with nonlocal velocity,
Submitted, arXiv:1708.09360.

ALEXANDER KISELEV, AND CHANGHUI TAN,
Global regularity for 1D Eulerian dynamics with singular interaction forces,
Submitted, arXiv:1707.07296.

ALINA CHERTOCK, CHANGHUI TAN, AND BOKAI YAN,
An asymptotic preserving scheme for kinetic models with singular limit,
Submitted, arXiv:1706.09568.

TAM DO, ALEXANDER KISELEV, LENYA RYZHIK, AND CHANGHUI TAN,
Global regularity for the fractional Euler alignment system,
 Accepted, to appear in Archive for Rational Mechanics and Analysis.

ALEXANDER KISELEV, AND CHANGHUI TAN,
Finite time blow up in the hyperbolic Boussinesq system,
 Submitted, arXiv:1609:02468.

CHANGHUI TAN,
A discontinuous Galerkin method on kinetic flocking models,
 Mathematical Models and Methods in Applied Sciences 27, no. 7 (2017): 1199–1221.

RAZVAN FETEAU, WEIRAN SUN, AND CHANGHUI TAN,
First order aggregation models with alignment,
 Physica D: Nonlinear Phenomena 325 (2016): 146–163.

THOMAS REY, AND CHANGHUI TAN,
An exact rescaling velocity method for some kinetic flocking models,
 SIAM Journal on Numerical Analysis 54, no 2 (2016): 641–664.

JOSÉ A. CARRILLO, YOUNG-PIL CHOI, EITAN TADMOR, AND CHANGHUI TAN,
Critical thresholds in 1D Euler equations with non-local forces,
 Mathematical Models and Methods in Applied Sciences 26, no. 01 (2016): 185–206.

EITAN TADMOR, AND CHANGHUI TAN,
Critical thresholds in flocking hydrodynamics with non-local alignment,
 Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences 372, no. 2028 (2014): 20130401.

EITAN TADMOR, AND CHANGHUI TAN,
Hierarchical Construction of Bounded Solutions of $\operatorname{div} U = F$ in Critical Regularity Spaces,
 In Nonlinear Partial Differential Equations, pp. 255–269. Springer Berlin Heidelberg, 2012.

KE HAN, HUIYI HU, EUNKYUNG KO, AHMET OZKAN OZER, CORY SIMON, AND CHANGHUI TAN,
A variational approach to modeling aircraft hoses and flexible conduits,
 Mathematics-in-Industry Case Studies 4, no. 2 (2012).

YANJUN GUO, MAO PAN, FEI YAN, ZHE WANG, CHANGHUI TAN, AND TIAO LU,
Application of natural neighbor interpolation method in three-dimensional geological model.
 Journal of PLA University of Science and Technology: Natural Science Edition 10, no. 6 (2009): 650–655.

Invited Talks

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| Joint Mathematics Meeting: AMS Special Session on Analysis of Nonlinear Partial Differential Equations and Applications, San Diego. | 2018.1 |
| SIAM Conference on Analysis of Partial Differential Equations, Baltimore. | 2017.12 |
| Hyperbolic and Mixed Type PDEs Seminar, Pennsylvania State University. | 2017.11 |
| AMS Sectional Meeting: Special Session on Mathematical Fluid Mechanics, University of California, Riverside. | 2017.11 |
| AMS Sectional Meeting: Special Session on Conservation Laws, Nonlinear Waves and Applications, University of California, Riverside. | 2017.11 |
| Differential Equations Seminar, North Carolina State University. | 2017.10 |
| Applied Mathematics and Analysis Seminar, Duke University. | 2017.10 |

Applied and Computational Mathematics Seminar, Tulane University.	2017.10
Young Researchers Workshop: Current Trends in Kinetic Theory, University of Maryland.	2017.10
Undergraduate Colloquium, Rice University.	2017.9
AMS Sectional Meeting: Special session on Recent Progress on Hyperbolic Conservation Laws, University of North Texas, Denton.	2017.9
SIAM Annual Meeting, Special Session on Recent Development on Fractional Diffusion Equation: Analysis and Computation, Pittsburgh.	2017.7
AMS Sectional Meeting: Special session on Analysis on the Navier-Stokes Equations and Related PDEs, Washington State University.	2017.4
Partial Differential Equation Seminar, University of Houston.	2017.4
Texas Differential Equations Conference, Texas A&M University.	2017.3
Young Researchers Workshop: Stochastic and Deterministic Methods in Kinetic Theory, Duke University.	2016.11
Geometric Analysis Seminar, Rice University.	2016.10
Summer School on Quantum and Kinetic Theory for Complex Systems, University of California, Santa Barbara.	2016.6
Mixing and Mixtures in Geo- and Biophysical Flows: A Focus on Mathematical Theory and Numerical Methods, University of Maryland.	2016.5
AMS Sectional Meeting: Special Session on PDE Analysis in Fluid Flows, University of Georgia.	2016.3
Partial Differential Equations Seminar, Georgia Institute of Technology.	2016.3
SIAM Conference on Analysis of Partial Differential Equations, Scottsdale.	2015.12
AMS Sectional Meeting: Special Session on Nonlinear Conservation Laws and Applications, University of Nevada.	2015.4
Geometry-Analysis Seminar, Rice University.	2015.1
Applied Mathematics and PDE Seminar, University of California, Santa Barbara.	2014.12
Applied Mathematics Seminar, Simon Fraser University.	2014.11
Modeling and Control in Social Dynamics, Rutgers University, Camden.	2014.10
Center for Nonlinear Analysis Seminar, Carnegie Mellon University.	2014.9
10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid.	2014.7
Collective Behavior: Macroscopic versus Kinetic Descriptions, Imperial College, London.	2014.5
Dynamics and Numerics for Non-local PDEs and Related Equations in the Physical and Biological Sciences, Iowa State University.	2014.5
AMS Spring Meeting, Special Session on Recent Development on Hyperbolic Conservation Laws, University of Tennessee.	2014.3
PDE Geometric Analysis Seminar, University of Wisconsin, Madison.	2014.2
72nd Midwest PDE Seminar, Purdue University.	2013.11

Young Researchers Workshop: Kinetic and Macroscopic Models for Complex Systems, University of Maryland	2013.10
AMS Spring Meeting, Special Session on Kinetic and Hydrodynamic PDE-based Descriptions of Multi-scale Phenomena,, Iowa State University.	2013.4
Workshop on Kinetic PDEs: Analysis and Computation, Iowa State University.	2013.4
Young Researchers Workshop: Kinetic Description of Model Scale Phenomena, University of Wisconsin.	2012.10
Mid Atlantic Numerical Analysis Day, Temple University.	2011.11

Teaching Experience

Lovett Instructor, Department of Mathematics, Rice University.

MATH513 / CAAM523 Partial Differential Equations I.	Fall 2017
MATH423 / CAAM423 Partial Differential Equations I.	Fall 2017, Fall 2015
MATH524 Topics in PDE.	Spring 2017
MATH211 Ordinary Differential Equations and Linear Algebra.	Fall 2016
MATH322 Introduction to Mathematical Analysis II.	Spring 2016

Instructor, Department of Mathematics, University of Maryland.

AMSC460 / CMSC460 Computational Methods.	Spring 2015, Fall 2014
STAT 100 Elementary Statistics and Probability.	Summer 2014, Summer 2012
MATH141 Calculus II.	Summer 2011, Summer 2010
MATH110 Elementary Mathematical Models.	Spring 2009

Teaching Assistant, Department of Mathematics, University of Maryland.

MATH461 Linear Algebra.	Spring 2013
MATH141 Calculus II.	Fall 2012, Fall 2009, Fall 2008

Service

Co-organizer. AMS Sectional Meeting, Special Session on Nonlocal PDEs in Fluid Dynamics, University of North Texas.	2017.9
Committee. Teaching Seminar, Department of Mathematics, Rice University.	2017-2018
Committee. Department of Mathematics Colloquium, Rice University.	2016-2017
Co-organizer. Young Researchers Workshop: Multiscale Phenomena: Modeling, Analysis and Computation, University of Maryland.	2014.10
Co-organizer. Young Researchers Workshop: Kinetic and Macroscopic Models for Complex Systems, University of Maryland.	2013.10

Journal referee for:

- Annales de l'Institut Henri Poincaré(C): nonlinear analysis,
- Kinetic and Related Models,
- Mathematical Models and Methods in Applied Sciences,
- Methods and Applications of Analysis,
- Networks and Heterogeneous Media,
- Nonlinearity,
- SIAM Journal on Mathematical Analysis,
- Mathematische Zeitschrift,
- SIAM Journal on Control and Optimization,
- SIAM Multiscale Modeling and Simulation,
- Zeitschrift für angewandte Mathematik und Physik.

Conferences and Schools Attended

Summer School and Workshop: Mathematical Analysis of Water Waves and Related Models, Bodega Marine Laboratory.	2017.6
Dynamics of Small Scales in Fluids, ICERM, Brown University.	2017.2
Analysis of PDEs of fluid mechanics, Rice University.	2016.5
Analysis of PDEs of fluid mechanics and related models mini-school and workshop, Rice University.	2015.10
Groups and interaction in data, networks and biology, Carnegie Mellon University	2015.5
Collective dynamics and model verification: connecting kinetic modeling to data, Arizona State University.	2015.4
Problems of PDEs Related to Fluids, Oklahoma State University.	2014.7
Summer Graduate School on Dispersive Partial Differential Equations, MSRI, Berkeley.	2014.6
Modern Perspectives in Applied Mathematics: Theory and Numerics of PDEs, Bethesda.	2014.5
Joint Mathematics Meeting, Baltimore.	2014.1
SIAM Conference on Analysis of Partial Differential Equations, Lake Buena Vista.	2013.12
Quantum Systems: A Mathematical Journey from Few to Many Particles, University of Maryland, College Park.	2013.5
Kinetic theory for the emergence of complex behavior in social and economic systems, Arizona State University, Tempe.	2013.2
Winter School: An introduction to kinetic models in the emergence of complex behavior in social and economic systems, University of Texas, Austin.	2013.2
Kinetic Description of Social Dynamics: From Consensus to Flocking, University of Maryland, College Park.	2012.11
Summer school: III Frontiers of Mathematics and Applications, UIMP, Santander, Spain.	2012.8
Summer School on Nonlocal Operators, University of Bielefeld, Germany.	2012.7
14th International Conference on Hyperbolic Problems, Padova, Italy.	2012.6
Nonlocal PDEs, Variational Problems and their Applications, UCLA.	2012.2

Summer school: Frontiers of Mathematics and Applications, UIMP, Santander, Spain.	2011.8
Kinetic Description of Multiscale Phenomena, University of Wisconsin, Madison.	2011.5
New Perspectives in Nonlinear PDE's, University of Michigan, Ann Arbor.	2011.5

References

José A. Carrillo

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Eitan Tadmor

Distinguished University Professor

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Stephen Wang (Concerning Teaching)

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