Tianran Chen

Curriculum Vitae

P.O. Box 244023
Montgomery, AL 36124
✉ tchen1@aum.edu
www.tianranchen.org

Experience

2016 – **Assistant Professor**, *Auburn University Montgomery*.
2012 – 2016 **Research Instructor**, *Michigan State University*.
2006 – 2012 **Research and Teaching Assistant**, *Michigan State University*.
2003 – 2005 **Research Assistant**, *Western Connecticut State University*.

Education

2012 **Ph.D. Applied Mathematics**, *Michigan State University*, (MI USA).
2005 **B.A. Computer Science**, *Western Connecticut State University*, (CT USA).
Secondary major in Mathematics

Honors & Awards

2016 AMS-Simons Travel Grant
2014 A paper selected for Journal of Chemical Physics Editors' Choice for 2014
2010 Dr. Paul & Wilma Dressel endowed scholarship award
(*Michigan State University*)
2005 Student leadership recognition award for outstanding leadership
(*Western Connecticut State University*)
2005 Sigma Xi research award in Physics, Astronomy & Meteorology
(*Western Connecticut State University*)
2004 Wohlever award in Computer Science
(*Western Connecticut State University*)

Research Interests

- Numerical analysis
- Scientific/parallel computing
- Numerical algebraic geometry
- Application of numerical methods in physics, chemistry, engineering

Publications

(11) 2015 Tianran Chen, Tsung-Lin Lee, and Tien-Yien Li.
Mixed cell computation in Hom4PS-3.
Journal of Symbolic Computation (2017), pp. 516-534.
(http://dx.doi.org/10.1016/j.jsc.2016.07.017)

(10) 2015 Tianran Chen and Dhagash Mehta.
Parallel degree computation for binomial systems.
Journal of Symbolic Computation (2017), pp. 535-558.
(http://dx.doi.org/10.1016/j.jsc.2016.07.018).

(9) 2015 Dhagash Mehta, Tianran Chen, John Morgan, and David Wales.
Response to "Comment on 'Exploring the potential energy landscape of the Thomson problem via Newton homotopies"'.
The Journal of Chemical Physics 143, 247102, 2015.
(http://dx.doi.org/10.1063/1.4939011)

(8) 2015 Tianran Chen and Tien-Yien Li.
Homotopy continuation method for solving systems of nonlinear and polynomial equations.
Communications in Information and Systems 15(2):119–307, 2015.
(http://dx.doi.org/10.4310/CIS.2015.v15.n2.a1)

(7) 2015 Dhagash Mehta, Tianran Chen, John Morgan, and David Wales.
Exploring the potential energy landscape of the Thomson problem via Newton homotopies. *The Journal of Chemical Physics* 142, 194113, 2015.
(http://dx.doi.org/10.1063/1.4921163)

(6) 2014 Tianran Chen, Tien-Yien Li, and Xiaoshen Wang.
Theoretical aspects of mixed volume computation via mixed subdivision.
Communications in Information and Systems 14(4):213–242, 2014.
(http://dx.doi.org/10.4310/CIS.2014.v14.n4.a1)

(5) 2014 Dhagash Mehta, Tianran Chen, Jonathan Hauenstein, and David Wales.
Newton homotopies for sampling stationary points of potential energy landscapes.
The Journal of Chemical Physics 141 (12), 121104, 2014.
(**Selected for a Journal of Chemical Physics Editors' Choice for 2014**)
(http://dx.doi.org/10.1063/1.4896657)
(http://scitation.aip.org/content/jcp-editors-choice-for-2014)

(4) 2014 Tianran Chen and Tien-Yien Li.
Solutions to systems of binomial equations.
Annales Mathematicae Silesianae 28:7–34, 2014.

(3) 2014 Tianran Chen, Tsung-Lin Lee, and Tien-Yien Li.
Hom4PS-3: A parallel numerical solver for systems of polynomial equations based on polyhedral homotopy continuation methods *Mathematical Software – ICMS 2014 – 4th International Congress, Seoul, South Korea, August 5-9, 2014. Proceedings* 8592:183–190, 2014. (http://dx.doi.org/10.1007/978-3-662-44199-2_30)

(2) 2014 Tianran Chen, Tsung-Lin Lee, and Tien-Yien Li.
Mixed cells computation in parallel.
Taiwanese Journal of Mathematics 18(1):93–114, 2014.
(http://dx.doi.org/10.11650/tjm.18.2014.3276)

(1) 2012 Tianran Chen and Tien-Yien Li.
Spherical projective path tracking for homotopy continuation methods.
Communications in Information and Systems 12(3):195–220, 2012.
(http://dx.doi.org/10.4310/CIS.2012.v12.n3.a2)

Preprints

2016 Christian Knoll, Franz Pernkopf, Dhagash Mehta, and Tianran Chen. Fixed points of belief propagation – An analysis via polynomial homotopy continuation. (https://arxiv.org/abs/1605.06451)

2016 Tianran Chen, Dhagash Mehta, and Matthew Niemerg. A network topology dependent upper bound on the number of equilibria of the Kuramoto model. (http://arxiv.org/abs/1512.04987)

2015 Tianran Chen and Dhagash Mehta. On the network topology dependent solution count of the algebraic load flow equations. (http://arxiv.org/abs/1512.04987)

2015 Tianran Chen and Dhagash Mehta. An index-resolved fixed-point homotopy and potential energy landscapes. (http://arxiv.org/abs/1504.06622)

Scientific Software

- Core developer of Hom4PS-3 (http://www.hom4ps3.org): A parallel numerical solver for systems of polynomial equations based on the Polyhedral Homotopy Method.
- Lead developer of MixedVol-3 (http://www.hom4ps3.org): A parallel software package for computing volume of polytopes, mixed volume, BKK bound, and fine mixed cells.
- Developer of libtropicana (https://github.com/chentianran/libtropicana): A software package for computing regular simplicial subdivision for lattice polytopes.

Invited Presentations and Lectures

Oct. 2016 Workshop on Numerical Algebraic Geometry (CSU). Fort Collins, CO USA.

Oct. 2016 AMS Fall Western Sectional Meeting. Denver, CO USA.

Jul. 2016 SIAM Annual Meeting. Boston, MA USA.

Mar. 2015 AMS Central Sectional Meeting Spring. East Lansing, MI USA.

Aug. 2014 The 4th International Congress on Mathematical Software. Seoul, South Korea.

Jan. 2014 AMS Joint Mathematics Meetings. Baltimore, MD USA.

Aug. 2013 SIAM Conference on Applied Algebraic Geometry. Fort Collins, CO USA.

Jun. 2013 Invited lecture for the Summer School On Numerical Algebraic Geometry, Chengdu Institute of Computer Applications. Chengdu, Sichuan, China.

Oct. 2011 SIAM Conference on Applied Algebraic Geometry. Raleigh, NC USA.

May 2011 Midwest Numerical Analysis Day. West Lafayette, IN USA.

Apr. 2011 Invited lecture for the Numerical Algebraic Geometry Lab seminar. Colorado State University, Fort Collins, CO USA.

Nov. 2010 1064th AMS Meeting. Notre Dame, IN USA.

Student Projects Supervised

2013 Reliable communication in large scale parallel computing (with Nick Ovenhouse)

2012 A web interface for a scientific database based on Flask (with Jared Jonckheere)

2012 A JIT compiler for automatic differentiation based on LLVM (with Nick Ovenhouse)

Teaching Experience

2016 – **Instructor**, *Pre-calculus, Calculus I,II.*

2012 – 2016 **Instructor**, *Calculus II, Linear Algebra, Transition to Advanced Mathematics.*

2007 – 2011 **Teaching assistant**, *College Algebra, Finite Mathematics and Elements of College Algebra, Survey of Calculus with Applications I & II, Calculus I.*

2006 – 2007 **Teaching assistant/grader**, *Calculus I & II..*

Professional Services

2015 Co-organizer for the *Special Session on Homotopy Continuation Methods and Their Applications to Science and Engineering* at the American Mathematical Society 2015 Central Spring Sectional Meeting, East Lansing, MI, March, 2015

Reviewer for *ACM Transactions on Mathematical Software*

Reviewer for *International Symposium on Symbolic and Algebraic Computation*

Reviewer for *LMS Journal of Computation and Mathematics*