

February, 2017

Guillermo Goldsztein, Ph.D.
Professor
School of Mathematics
Georgia Institute of Technology

I. Earned Degrees

Lic.	Mathematics	1986-1992	University of Buenos Aires, Buenos Aires, Argentina
Ph.D.	Mathematics	1992-1997	Massachusetts Institute of Technology (advisor: R. Rosales)

II. Employment History

1997-2000	Postdoctoral Research Fellow, Applied Mathematics, California Institute of Technology (advisor: O. Bruno)
1998-1999	Lecturer in Applied Mathematics, Applied Mathematics, California Institute of Technology
2000-2006	Assistant Professor, School of Mathematics, Georgia Institute of Technology
2006-2011	Associate Professor, School of Mathematics, Georgia Institute of Technology
2011-present	Professor, School of Mathematics, Georgia Institute of Technology

III. Honors and Awards

2000-present Several "Thank a Teacher" certificates

IV. Research, Scholarship, and Creative Activities

Articles with an asterisk resulted from work done at Georgia Tech. Names of student co-authors are in boldface.

A. Published Books, Parts of Books, and Edited Volumes

A1. Books

No data

A2. Refereed Book Chapters

No data

A3. Edited Volumes

No data

B. Refereed Publications and Submitted Articles

B1. Published and Accepted Journal Articles

- 1 Goldsztein, G. H. (2017) Crowd of individuals walking in opposite directions. A toy model to study the segregation of the group into lanes of individuals moving in the same direction. *Physica A: Statistical Mechanics and its Applications*, accepted for publication.*
- 2 Goldsztein, G. H. (2017) Mathematical model and analysis of the strength of particle reinforced ideally plastic composites. *Quarterly of Applied Mathematics*, accepted for publication.*
- 3 Goldsztein, G. (2017) Modeling Walking with an Inverted Pendulum Not Constrained to the Sagittal Plane. Numerical Simulations and Asymptotic Expansions. *Applied Mathematics*, **8**, 57-76. doi: 10.4236/am.2017.81006.*
- 4 Goldsztein, G. H. (2016). Reactions of Standing Bipedes on Moving Platforms to Keep Their Balance May Increase the Amplitude of Oscillations of Platforms Satisfying Hooke's Law. *PLoS one*, *11*(6), e0157675.*

- 5 Goldsztein, G. H. (2016). Particles Moving Around a Two-Lane Circular Track in Both Directions. Avoiding Collisions Leads to Self-Organization. *SIAM Journal on Applied Mathematics*, 76(4), 1433-1445.*
- 6 Goldsztein, G. H. (2015). Lateral oscillations of the center of mass of bipeds as they walk. Inverted pendulum model with two degrees of freedom. *AIP Advances* 5, 107208, <http://dx.doi.org/10.1063/1.4933078>.*
- 7 Goldsztein, G. H. (2015). A Mathematical Model of the Formation of Lanes in Crowds of Pedestrians Moving in Opposite Directions. *Discrete Dynamics in Nature and Society*, 2015 Article ID 872807, 7 pages, doi:10.1155/2015/872807.*
- 8 Goldsztein, G. H. (2012). Effects of the Fibers' Shape and Volume Fraction on the Strength of Ideally Plastic Fiber Reinforced Composites. *SIAM Journal on Applied Mathematics*, 72(3), 713-724.*
- 9 Claria, J. J., Goldsztein, G. H., & Santamarina, J. C. (2012). AC Diffusion: transport in porous networks subjected to zero-time-average advective flow. *Transport in porous media*, 93(1), 51-61.*
- 10 **Kampel, G.**, & Goldsztein, G. H. (2011). Transport of non-Brownian particles in porous media. *SIAM Journal on Applied Mathematics*, 71(3), 773-790.*
- 11 Goldsztein, G. H. (2011). Bound on the yield set of fiber reinforced composites subjected to antiplane shear. *Discrete and Continuous Dynamical Systems-Series B (DCDS-B)*, 15(2), 391-400.*
- 12 **Kampel, G.**, Goldsztein, G. H., & Santamarina, J. C. (2009). Particle transport in porous media: The role of inertial effects and path tortuosity in the velocity of the particles. *Applied Physics Letters*, 95(19), 194103.*
- 13 Goldsztein, G. H. (2009). Clogging of Multigraphs as Toy Models of Filters. *SIAM Journal on Applied Mathematics*, 70(4), 1078-1096.*
- 14 **Kampel, G.**, & Goldsztein, G. H. (2008). Filters. The number of channels that can clog in a network. *SIAM Journal on Applied Mathematics*, 69(3), 743-762.*
- 15 Goldsztein, G. H. (2008). Solute transport in porous media. Media with capillaries as voids. *SIAM Journal on Applied Mathematics*, 68(5), 1203-1222.*
- 16 **Kampel, G.**, Goldsztein, G. H., & Santamarina, J. C. (2008). Plugging of porous media and filters: Maximum clogged porosity. *Applied physics letters*, 92(8), 084101.*
- 17 Goldsztein, G. H. (2007). Solute transport in porous media: Dispersion tensor of periodic networks. *Applied Physics Letters*, 91(5), 054102.*
- 18 Goldsztein, G. H. (2005). Volume of suspension that flows through a small orifice before it clogs. *SIAM Journal on Applied Mathematics*, 66(1), 228-236.*
- 19 Goldsztein, G. H. (2005). Transport of nutrients in bones. *SIAM Journal on Applied Mathematics*, 65(6), 2128-2140.*
- 20 Pelesko, J. A., & Goldsztein, G. (2004). Modeling constrained capacitive systems. *Journal of Computational and Theoretical Nanoscience*, 1(4), 424-42.*
- 21 Goldsztein, G. H., & Santamarina, J. C. (2004). Suspension extraction through an opening before clogging. *Applied physics letters*, 85(19), 4535-4537.*
- 22 Goldsztein, G. H., & Santamarina, J. C. (2004). Solute transport during cyclic flow in saturated porous media. *Applied physics letters*, 85(12), 2432-2434.*

- 23 Goldsztein, G. H., & Bruno, O. P. (2004). A fast algorithm for the simulation of polycrystalline misfits. II. Martensitic transformations in three space dimensions. *Proceedings of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 460(2046), 1613-1630.*
- 24 Goldsztein, G. H. (2004). Collapse and rebound of a gas bubble. *Studies in Applied Mathematics*, 112(2), 101-132.*
- 25 Goldsztein, G. H. (2003). Two-dimensional rigid polycrystals whose grains have one ductile direction. *Proceedings of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 459(2036), 1949-1968.*
- 26 Goldsztein, G. H. (2001). Rigid perfectly plastic two-dimensional polycrystals. *Proceedings of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 457(2015), 2789-2798.*
- 27 Goldsztein, G. H. (2001). The effective energy and laminated microstructures in martensitic phase transformations. *Journal of the Mechanics and Physics of Solids*, 49(4), 899-925.*
- 28 Bruno, O. P., & Goldsztein, G. H. (2000). Numerical simulation of martensitic transformations in two- and three-dimensional polycrystals. *Journal of the Mechanics and Physics of Solids*, 48(6), 1175-1201.
- 29 Bruno, O. P., & Goldsztein, G. H. (1999). A fast algorithm for the simulation of polycrystalline misfits: martensitic transformations in two space dimensions. *Proceedings of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 455(1992), 4245-4276.
- 30 Goldsztein, G. H., Broner, F. & Strogatz, S. H. (1997). Dynamical hysteresis without static hysteresis: scaling laws and asymptotic expansions. *SIAM Journal on Applied Mathematics*, 57(4), 1163-1187.
- 31 Hohl, A., Van der Linden, H. J. C., Roy, R., Goldsztein, G., Broner, F., & Strogatz, S. H. (1995). Scaling laws for dynamical hysteresis in a multidimensional laser system. *Physical review letters*, 74(12), 2220.
- 32 Goldsztein, G., & Strogatz, S. H. (1995). Stability of synchronization in networks of digital phase-locked loops. *International Journal of Bifurcation and Chaos*, 5(04), 983-990.

B2. Conference Presentations with Proceedings (Refereed)

1. Goldsztein, G. H. (2010) The effect of the shape of the inclusions in ideally plastic matrix particulate composites, *Proceedings of PACAM XI*.*
2. Goldsztein, G. H. (2010) Analysis of a toy model of ideally plastic polycrystals, *Proceedings of PACAM XI*.*
3. Pelesko, J. A. & Goldsztein, G. H. (2003) Electrostatic deflection of volume constrained MEMS. *Proceedings of ICMENS 2003*, 76-80.*

B3. Other Refereed Material

No data

B4. Submitted Journal Articles (with date of submission)

1. Ellis, P., Pearce, D., Chang, Y. Goldsztein, G., Giomi, L. and Fernandez-Nieves, A. (2017) Defect Unbinding and Dynamics in Active Nematic Toroids. *Nature*.*
2. Goldsztein, G. H. (2016) Self-organization when pedestrians move in opposite directions. Multi-lane circular track model. *SIAM Journal on Applied Mathematics*.*

3. **Terzariol, M.**, Goldsztein, G. and Santamarina, J.C. (2016) Maximum Recoverable Gas from Hydrate Bearing Sediments by Depressurization. *Energy*.*

C. Other Publications

No data

D. Presentations

1. Mathematics Colloquium. Universidad de Buenos Aires, Buenos Aires, Argentina, December 7, 2016
2. Mathematics Colloquium. Instituto Tecnológico de Buenos Aires, Buenos Aires, Argentina, March 22, 2016
3. SIAM Conference on Analysis of Partial Differential Equations 2015, Scottsdale, Arizona, December 7-10, 2015
4. X Americas Conference on Differential Equations and Nonlinear Analysis, Buenos Aires, Argentina, February 18, 2015
5. 2014 Joint Mathematics Meetings, Baltimore, January 15-18, 2014
6. Mathematics Colloquium. University of Delaware, December 2, 2014
7. Georgia Scientific Computing Symposium, February 23, 2013. Plenary speaker
8. International Symposium on Plasticity 2011 and its Current Applications, Puerto Vallarta, Mexico, January 3-8, 2011
9. Mathematics Colloquium. Rochester Institute of Technology, September 19, 2011
10. PACAM XI, Iguazu, Brazil, January 3-7, 2010
11. SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009
12. International Symposium on Plasticity 2009 and its Current Applications, St. Thomas, US Virgin Islands, January 3-8, 2009
13. 45th Annual Technical Meeting Society of Engineering Science, Champaign, IL, October 12-15, 2008
14. Fifth World Congress of Nonlinear Analysts Orlando, FL, July 2-11, 2008
15. SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 11-14, 2008
16. University of Akron. Department of Mathematics. Colloquium. November 13, 2008
17. University of Delaware. Department of Mathematical Sciences. Applied Math. Seminar. May 12, 2008
18. SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 10-12, 2007
19. 44th Annual Technical Meeting Society of Engineering Science, College Station, TX, October 21-24, 2007
20. Rethinking the Mathematics Curriculum for Engineering and Science Students, Atlanta, GA, April 23-24, 2007
21. AMS National Annual Meeting joint with SIAM, New Orleans, LA, January 5-8 2007
22. QEM Network Workshop, Atlanta, GA, August 18-19, 2006

23. SIAM Conference on Analysis of Partial Differential Equations, Boston, MA, July 10-12, 2006.
McMat 2005 Mechanics & Materials Conference, Baton Rouge, LA, June 1-3, 2005
24. University of Delaware. Department of Mathematical Sciences. Applied Math. Seminar. March 22, 2005
25. Georgia Institute of Technology. School of Mathematics. A&CM Seminar. August 24, 2004
26. SIAM Conference on Mathematical Aspects of Materials Science, Los Angeles, CA, May 23-26, 2004
27. Workshop: Computational methods in multiscale analysis and applications, Gainesville, FL, February 29-March 2, 2004
28. Workshop on multi-scale challenges in soft matter materials, Research Triangle Park, NC, February 15-17, 2004
29. Louisiana State University. Department of Mathematics. Colloquium. April 15, 2004
30. AMS Sectional meeting, Baton Rouge, LA, March 14, 2003
31. The Fourth International Conference on Dynamical Systems and Differential Equations, Wilmington, NC, May 25-27, 2002
32. AMS Sectional meeting, Atlanta, GA, March 10, 2002
33. Annual meeting of the AMS, San Diego, CA, January 7, 2002
34. McMaster University. Department of Mathematics and Statistics. Colloquium. February 28, 2002
35. University of Akron. Department of Mathematics. Colloquium. November 29, 2001
36. 2001 SIAM Annual meeting, San Diego, CA, July 11, 2001
37. Third SIAM conference on mathematical aspects of material science, Philadelphia, PA, May 23, 2000
38. Workshop on applied mathematics. UC Irvine. May 14, 2000

Contributed presentations at conferences:

No data

E. Grants and Contracts

E1. As Principal Investigator

1. National Science Foundation DMS. Mathematical modeling of heterogeneous materials, \$170,493, August 2008 to August 2011. PI: Guillermo Goldsztein. No co-Pi.
2. National Science Foundation DMS. Mathematical modeling of heterogeneous media, \$114,939, June 2005 to May 2008. PI: Guillermo Goldsztein. No co-Pi.
3. National Science Foundation DMS. Mathematical modeling of transport in porous media, \$86,146, June 2002 to May 2005. PI: Guillermo Goldsztein. No co-Pi.

E2. As Co-Principal Investigator

No data

E3. As Senior Personnel or Contributor

No data

E4. Pending Proposals

1. Simons Foundation. Mathematical models of self-propelled particles and dynamics of crowds, \$42,000. PI: Guillermo Goldsztein. No co-Pi. (Submitted on January 2017. Pending)
2. National Science Foundation DMS. Mathematical models of self-organization in biological systems, \$ 277,594. PI: Guillermo Goldsztein. No co-Pi. (Submitted on November 2016. Pending)

E5. Proposals Submitted but not Funded (last 2 years)

1. National Science Foundation DMS. Dynamics of crowds, wobbling of pedestrian bridges, and systems of self-propelled particles, \$ 260,585. PI: Guillermo Goldsztein. No co-Pi. (Submitted on November 2015)

F. Other Scholarly Accomplishments

No data

G. Societal and Policy Impacts

No data

H. Other Professional Activities

No data

V. Teaching

A. Courses Taught (last 6 years)

1. Spring 2017, Math 4317 (Analysis I) 60 students
2. Summer 2016, Math 6701 (Mathematical Methods in Applied Sciences I) 196 students
3. Spring 2016, Math 4317 (Analysis I) 37 students
4. Fall 2015, Math 1553 (Introduction to Linear Algebra) 113 students
5. Fall 2015, Math 4318 (Analysis II) 20 students
6. Fall 2015, Math 4699 (Undergraduate Research) 1 student
7. Summer 2015, Math 6701 (Mathematical Methods in Applied Sciences I) 179 students
8. Spring 2015, Math 4699 (Undergraduate Research) 2 students
9. Spring 2015, Math 6635 (Numerical Methods in Finance) 47 students
10. Spring 2015, Math 4317 (Analysis I) 38 students
11. Fall 2014, Math 1503 (Calculus I for Life Sciences) 18 students
12. Fall 2014, Math 4320 (Complex Analysis) 18 students
13. Summer 2014, Math 6701 (Mathematical Methods in Applied Sciences I) 186 students
14. Spring 2014, Math 4107 (Abstract Algebra I) 32 students
15. Fall 2013, Math 1512 (Honors Calculus II) 65 students
16. Fall 2013, Math 2406 (Abstract Vector Spaces) 30 students
17. Summer 2013, Math 6701 (Mathematical Methods in Applied Sciences I), 130 students
18. Spring 2013, Math 1502 (Calculus II), 160 students

19. Spring 2013, Math 8803 GOL (Multiscale and variational methods) 8 students
20. Fall 2012, Math 6701 (Mathematical Methods in Applied Sciences I), 102 students
21. Summer 2012, Math 6701 (Mathematical Methods in Applied Sciences I), 100 students
22. Spring 2012, Math 1502 (Calculus II), 160 students
23. Spring 2012, Math 1502 (Calculus II, Biology version) 65 students
24. Fall 2011 Math 6701 (Mathematical Methods in Applied Sciences I), 106 students
25. Spring 2011 Math 2406 (Abstract vector spaces), 20 students
26. Spring 2011, Math 4581 (Classical Mathematical Methods in Engineering), 60 students

B. Individual Student Guidance

B1. PhD Students

1. Guido Kampel, PhD (Georgia Tech Mathematics, graduated in 2007). Thesis title: Mathematical modeling of fines migration and clogging in porous media.

B2. Master Students

1. Elizabeth Last (Fall 2015)

B3. Undergraduate Students

1. Bowen Zhang (Spring 2016)
2. Haodong Sun (Spring 2016)
3. Brayson Kagy (Fall 2015)
4. Fatheia Ahmeda (Spring 2015)
5. Adam Lieberman (Spring and Fall 2015)
6. Giles Santomauro (Summer 2008)

B4. Service on Thesis Committees

Since 2014

1. Ali Tabei, Mechanical Engineering, PhD, February 2015
2. Marco Terzariol, Civil and Environmental Engineering, PhD, December 2014

B5. Mentorship of Postdoctoral Fellows and Visiting Scholars

No data

C. Other Teaching Activities

Courses developed:

1. Math 8803 GOL (Mathematics of heterogeneous media. Composites, polycrystals and porous media) 2009
2. Math 8803 GOL (Multiscale and variational methods) 2013
3. Math 1503 (Calculus I for Life Sciences) 2014
4. Math 1504 (Calculus II for Life Sciences) 2014

Service on PhD proposal committees (since 2015)

1. Mark Bolding, Mathematics, November 2015
2. Qi Liu, Civil and Environmental Engineering, May 2015
3. Yuanjie Shen, Civil and Environmental Engineering, May 2015
4. Jenny Eaton, Civil and Environmental Engineering, May 2015

VI. Service

A. Professional Contributions

1. Co-organizer of a symposium at the 45th Annual Technical Meeting Society of Engineering Science, Champaign, IL, October 12-15, 2008.
2. Co-organizer of a symposium at the 44th Annual Technical Meeting Society of Engineering Science, College Station, TX, October 21-24, 2007
3. Co-organizer of a special session at the AMS Sectional meeting, Atlanta, GA. March 8-10, 2002.
4. Reviewed manuscripts for: Discrete Dynamics in Nature and Society, New Journal of Physics; Journal of Applied Physics; SIAM Journal of Applied Mathematics; Journal of Differential Equations; Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences; Acta Materialia; Discrete and Continuous Dynamical Systems; Chemical Engineering Science; SIAM Journal of Mathematical Analysis; Multiscale Modeling and Simulations; Discrete Dynamics in Nature and Society; Quarterly of Applied Mathematics.
5. Reviewed grant proposals for the NSF

B. Public and Community Service

No data

C. Institute Contributions

1. Graduate Committee, School of Mathematics of the Georgia Institute of Technology, 2016-2018.
2. PostDoc Committee, School of Mathematics of the Georgia Institute of Technology, 2013-2014.
3. CO-organizer of the Applied and Computational Mathematics Seminar, 2012-2014.
4. Hiring Committee, School of Mathematics of the Georgia Institute of Technology, 2010-2012.
5. Colloquium Committee, School of Mathematics of the Georgia Institute of Technology, 2008-2010.
6. Graduate Committee, School of Mathematics of the Georgia Institute of Technology, 2006-2008.
7. Organizer of the Applied and Computational Mathematics Seminar, 2005-2006.
8. Elections & Nominations Committee, School of Mathematics of the Georgia Institute of Technology, 2001-2005.
9. Chair of the Center for Dynamical Systems and Nonlinear Studies Colloquium, School of Mathematics, Georgia Institute of Technology, 2001-2002.