

## Joseph M. Teran

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### Professional Preparation

*Postdoctoral Institution:* Courant Institute of Mathematical Sciences. (2005-2007)

*Graduate Institution:* Stanford University. Degree: Ph.D. 2005

*Undergraduate Institution:* University of California, Davis. Degree: B.S. 2000

### Appointments

*Associate Professor:* Department of Mathematics, UCLA (July 2011-present)

*Assistant Professor:* Department of Mathematics, UCLA (July 2007-June 2011)

*Postdoctoral researcher:* Courant Institute of Mathematical Sciences (September 2005-June 2007)

### Awards

- Presidential Early Career Award for Scientists and Engineers (PECASE), 2011.
- Office of Naval Research, Young Investigator Award, 2010.
- Discover Magazine, Top 20 Scientists Under 40, 2009.
- National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship, 2005-2007.
- National Science Foundation Graduate Research Fellowship, 2000-2003.

### Current Research Support

- Office of Naval Research (N00014-10-1-0730): Young Investigator Award, Manycore Accelerated Algorithms for Computational Solid and Fluid Mechanics.
- National Science Foundation (DMS-0914813), A Novel Framework for Fluid/Structure Interaction in Subject-Specific Surgical Simulations Involving Elastic Cardiac Geometries.
- National Science Foundation (CCF-0830554), Theoretical Foundations: An Optimization Framework for the Estimation of Material Properties of Deformable Materials from Volumetric Measurements.
- National Science Foundation (DMS-0652427), FRG: Collaborative Research: Dynamics of elastic biostructures in complex fluids.
- Office of Naval Research (N000140310071): Level Set Methods for Fracture and Failure of Materials.
- UC Laboratory Research Program: Multiscale methods of fracture and multimaterial debris flow.
- Intel Larrabee Research Grant.

### Collaborators and Other Affiliations

- *Graduate and Postdoctoral Advisors:* Ronald Fedkiw, Michael Shelley, Charles Peskin, Court Cutting.
- *Ph.D. students:* Diego Cortegoso Assencio, Jeffrey Hellrung, Yuting Wang, Siwei Zhu, Russel Howes, Alexey Stomakhin, Andrew Ruf, Chenfanfu Jiang.
- *Postdoctoral researchers under my supervision:* Jinsun Sohn, Craig Schroeder.
- *Former students:* Alejandro Cantarero, Ph.D. 2011, Aleka McAdams, Ph.D. 2011, Jacob Bedrossian, Ph.D. 2011, Yongning Zhu, Ph.D. 2010.

### Publications

- D. Assencio, J. Teran, *A Second Order Virtual Node Algorithm for Stokes Flow Problems with Interfacial Forces and Irregular Domains*, Submitted.
- Y. Zhu, Y. Wang, J. Hellrung, A. Cantarero, E. Sifakis, J. Teran, *A Second-Order Virtual Node Algorithm for Nearly Incompressible Linear Elasticity in Irregular Domains*, Submitted.
- J. Hegemann, A. Cantarero, C. Richardson, J. Teran, *An Explicit Update Scheme for Inverse Parameter and Interface Estimation of Piecewise Constant Discontinuous Coefficients in Linear Elliptic PDEs*, Submitted.

- J. Hellrung, L. Wang, E. Sifakis, J. Teran, *A Second-Order Virtual Node Method for Elliptic Problems with Interfaces and Irregular Domains in Three Dimensions*, Journal of Computational Physics, In Press (DOI:10.1016/j.jcp.2011.11.023).
- A. McAdams, A. Selle, R. Tamstorf, M. Embrey, J. Teran E. Sifakis, *Efficient Elasticity for Character Skinning with Contact and Collisions*, ACM Transactions on Graphics (SIGGRAPH 2011), In Press.
- C. Richardson, J. Hegemann, E. Sifakis, J. Hellrung, J. Teran, *Simulating Crack Propagation with XFEM and a Hybrid Mesh*, International Journal for Numerical Methods in Engineering, 88(10), pp. 1042-1065 (DOI: 10.1002/nme.3211), 2011.
- A. McAdams, E. Sifakis, J. Teran, *A Parallel Multigrid Poisson Solver for Fluids Simulation on Large Grids*, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) edited by M. Otaduy and Z. Popovic, pp.1-10, 2010.
- J. Teran, L. Fauci, M. Shelley, *Viscoelastic Fluid Response Can Increase the Speed and Efficiency of a Free Swimmer*, Physical Review Letters, 104(3), 038101, 2010.
- J. Bedrossian, J. Von Brecht, S. Zhu, E. Sifakis, J. Teran, *A Second Order Virtual Node Method for Poisson Interface Problems on Irregular Domains*, Journal of Computational Physics, 229, pp. 6405-6426, 2010 (DOI=10.1016/j.jcp.2010.05.002).
- Y. Zhu, E., Sifakis, J. Teran, A. Brandt, *An Efficient Parallelizable Multigrid Framework for the Simulation of Elastic Solids*, ACM Transactions on Graphics (with presentation at SIGGRAPH 2010), 29(2), pp. 1-18, 2010 (DOI=10.1145/ 1731047.1731054).
- J. Hellrung, A. Selle, A. Shek, E. Sifakis, J. Teran, *Geometric Fracture Modeling in BOLT*, ACM SIGGRAPH 2009, Sketches and Applications.
- A. McAdams, K. Ward, E. Sifakis, A. Selle, J. Teran, *Detail Preserving Continuum Hair Simulation*, ACM Transactions on Graphics (SIGGRAPH 2009), 28(3), pp.385-392, 2009.
- J. Teran, C. Peskin, *Tether Force Constraints in Stokes Flow with the Immersed Boundary Method on a Periodic Domain*, SIAM Journal of Scientific Computing, 31(5), pp. 3404-3416, 2009.
- E. Sifakis, J. Hellrung, J. Teran, A. Olikier, C. Cutting. *Local Flaps: A Real-Time Finite Element Based Solution to the Plastic Surgery Defect Puzzle*, Studies in Health and Technology Informatics, 142, pp. 313-138, 2009.
- J. Teran, L. Fauci, M. Shelley, *Peristaltic Pumping and Irreversibility of a Stokesian Viscoelastic Fluid*, Physics of Fluids 20, 073101, 2008.
- E. Sifakis, S. Marino, J. Teran, *Globally Coupled Impulse-Based Collision Handling for Cloth Simulation*, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) edited by M. Gross and D. James, pp. 147-152, 2008.
- Z. Bao, J.-M. Hong, J. Teran, R. Fedkiw, *Fracturing Rigid Materials*, IEEE Transactions on Visualization and Computer Graphics, 13, pp. 370-378, 2007.
- R. Weinstein, J. Teran, R., Fedkiw, *Dynamic Simulation of Articulated Rigid Bodies with Contact and Collision*, IEEE Transactions on Visualization and Computer Graphics, 12, pp. 365-374, 2006.
- G. Irving, J. Teran, R. Fedkiw, *Tetrahedral and Hexahedral Invertible Finite Elements*, Graphical Models 68, pp. 66-89, 2006.
- R. Weinstein, J. Teran, R. Fedkiw, *Pre-stabilization for Rigid Body Articulation with Contact and Collision*, ACM SIGGRAPH 2005, Sketches and Applications.
- R. Bridson, J. Teran, N. Molino, R. Fedkiw, *Adaptive Physics Based Tetrahedral Mesh Generation Using Level Sets*, Engineering with Computers, 21 pp. 2-18, 2005
- S. Blemker, J. Teran, E. Sifakis, R. Fedkiw and S. Delp, *Fast 3D Muscle Simulations Using a New Quasistatic Invertible Finite-Element Algorithm*, International Symposium on Computer Simulation in Biomechanics, 2005.
- J. Teran, E. Sifakis, G. Irving and R. Fedkiw, *Robust Quasistatic Finite Elements and Flesh Simulation*, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) edited by K. Anjyo and P. Faloutsos, pp. 181-190, 2005.
- J. Teran, E. Sifakis, S. Blemker, V. Ng Thow Hing, C. Lau and R. Fedkiw, *Creating and simulating skeletal muscle from the Visible Human Data Set*, IEEE Transactions on Visualization and Computer Graphics, 11, pp. 317-328, 2005.

- G. Irving, J. Teran, R. Fedkiw, *Invertible Finite Elements for Robust Simulation of Large Deformation*, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA), edited by R. Boulic and D. Pai, pp. 131-140, 2004.
- N. Molino, R. Bridson, J. Teran, R. Fedkiw, *A Crystalline Red/Green Strategy for Meshing Highly Deformable Objects with Tetrahedra*, 12th International Meshing Roundtable, pp. 103-114, 2003.
- J. Teran, S. Blemker, V. Ng Thow Hing, R. Fedkiw, *Finite Volume Methods for the Simulation Skeletal Muscle*, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) edited by D. Breen and M. Lin, pp. 68-74, 2003.