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**EDUCATION**

- 1992 Ph.D., Mechanical Engineering, Stanford University  
(emphasis in Applied Mechanics)
- 1989 M.S., Mechanical Engineering, Stanford University
- 1986 B.S., Mechanical Engineering, Oregon State University

**PROFESSIONAL EXPERIENCE**

- 2008– Professor and Chair, Department of Mechanical Engineering and Materials  
Science, Duke University
- 2008– Professor of Civil and Environmental Engineering, Duke University (secondary)
- 2004– Professor of Biomedical Engineering, Duke University (secondary)
- 2003–2008 Senior Associate Dean for Education, Pratt School of Engineering,  
Duke University
- 2003–2008 Professor of Civil and Environmental Engineering, Duke University (primary)
- 2004–2008 Professor of Mechanical Engineering and Materials Science,  
Duke University (secondary)
- 1999–2003 Yoh Family Associate Professor of Civil and Environmental Engineering,  
Duke University (primary)
- 1998–2004 Associate Professor of Mechanical Engineering and Materials Science,  
Duke University (secondary)
- 1999–2004 Associate Professor of Biomedical Engineering, Duke University (secondary)
- 2001–2003 Director of Undergraduate Studies, Department of Civil and Environmental

|           |  |
|-----------|--|
|           | Engineering, Duke University   |
| 2001      | Faculty Sabbatical Employee, Sandia National Laboratories  |
| 1998–2000 | Director of Graduate Studies, Department of Civil and Environmental Engineering, Duke University |
| 1998–1999 | Associate Professor of Civil and Environmental Engineering, Duke University (primary)            |
| 1992–1998 | Assistant Professor of Civil Engineering, Duke University (primary)                              |
| 1997–1998 | Assistant Professor of Mechanical Engineering and Materials Science, Duke University (secondary) |
| 1989–1992 | Research Assistant, Stanford University  |
| 1986–1992 | Engineer, Lawrence Livermore National Laboratory   |
| 1985      | Summer Research Engineer, Boeing Commercial Airplane Company                                     |
| 1983–1984 | Lab and Research Assistant, Oregon State University Forest Research Laboratory                   |

### HONORS, AWARDS & EDITORSHIPS

- \* Editor-In-Chief, *Finite Elements in Analysis and Design*, Elsevier Science, 2001–present
- \* Advisory Board Member, *International Journal for Numerical Methods in Engineering*, John Wiley and Sons, 2003–present
- \* Editorial Board Member, *Computational Mechanics*, Springer, 2007–present
- \* Editorial Board Member, *International Journal of Mechanics and Materials in Design*, Kluwer Academic Publishers, 2004–present
- \* Editorial Board Member, *Computer-Aided Civil and Infrastructure Engineering*, Blackwell Publishing, 2006–present.
- \* Editorial Board Member, *Finite Elements in Analysis and Design*, Elsevier Science, 2001
- \* Yoh Family Endowed Chair, 1999–2003; Bass Fellow, Duke University, 1999–present
- \* Oregon State University Council of Outstanding Early Career Engineers Award, 1998
- \* Hunt Faculty Scholar, Duke University School of Engineering, 1997–1998
- \* National Science Foundation CAREER Award, 1997
- \* Office of Naval Research Young Investigator Award, 1997
- \* The Earl I. Brown II Outstanding Civil Engineering Faculty Award, Duke University Department of Civil and Environmental Engineering, 1997
- \* National Science Foundation Research Initiation Award, 1993
- \* IBM Graduate Fellowship, Stanford University, 1988–1989
- \* Most Outstanding Senior Award, Oregon State University Department of Mechanical Engineering, 1986

### PROFESSIONAL AND HONOR SOCIETY MEMBERSHIPS

- \* Fellow, ASME

- \* Member, American Society of Civil Engineers
- \* Member, American Society for Engineering Education
- \* Member, United States Association for Computational Mechanics
- \* Member, Tau Beta Pi, The National Engineering Honor Society
- \* Member, Pi Tau Sigma, National Honorary Mechanical Engineering Fraternity

## PUBLICATIONS

### Books

- Wriggers, P. & T.A. Laursen, eds. (2007), *Computational Contact Mechanics: CISM Courses and Lectures, vol. 298*, Springer, Wien & New York.
- Laursen, T.A. (2002), *Computational Contact and Impact Mechanics: Fundamentals of Modeling Interfacial Phenomena in Nonlinear Finite Element Analysis*, Springer-Verlag, Berlin.

### Refereed Journal Articles

- Chung, J.-H., V. Rajagopal, T.A. Laursen, P.M.F. Nielsen & M.P. Nash (2008), “Frictional Contact Mechanics Methods for Soft Materials: Application to Tracking Breast Cancers,” *Journal of Biomechanics*, **41**, 69–77.
- Yang, B. & T.A. Laursen (2008), “A Contact Searching Algorithm Including Bounding Volume Trees Applied to Finite Sliding Mortar Formulations,” *Computational Mechanics*, **41**, 189–205.
- Puso, M.A., T.A. Laursen & J. Solberg (2007), “A Segment-to-Segment Mortar Contact Method for Quadratic Elements and Large Deformations,” *Computer Methods in Applied Mechanics and Engineering*, **197**, 555–566.
- Yang, B. & T.A. Laursen (2007), “A Large Deformation Mortar Formulation of Self Contact with Finite Sliding,” *Computer Methods in Applied Mechanics and Engineering*, **197**, 756–772.
- Stanciulescu, I., L.N. Virgin & T.A. Laursen (2007), “Slender Solar Sail Booms: Finite Element Analysis,” *Journal of Spacecraft and Rockets*, **44**, 528–537.
- Kim, T.Y., J.E. Dolbow & T.A. Laursen (2007), “A Mortared Finite Element Method for Frictional Contact on Arbitrary Surfaces,” *Computational Mechanics*, **39**, 223–235.
- Upton, M.L., F. Guilak, T.A. Laursen & L.A. Setton (2006), “Finite Element Modeling Predictions of Region-Specific Cell-Matrix Mechanics in the Meniscus,” *Biomechanics and Modeling in Mechanobiology*, **5**, 140–149.
- Stanciulescu, I. & T.A. Laursen (2006), “On the Interaction of Frictional Formulations with Bifurcation Phenomena in Hyperelastic Steady State Rolling Calculations,” *International Journal of Solids and Structures*, **43**, 2959–2988.
- Laursen, T.A. & I. Stanciulescu (2006), “An Algorithm for Incorporation of Frictional Sliding Conditions Within a Steady State Rolling Framework,” *Communications in Numerical Methods in Engineering*, **22**, 301–318.

- Trickey, W.R., F.P.T. Baaijens, T. A. Laursen, L. G. Alexopoulos & F. Guilak (2006), “Determination of the Poisson’s Ratio of the Cell: Recovery Properties of Chondrocytes After Release from Complete Micropipette Aspiration,” *Journal of Biomechanics*, **39**, 78–87
- Bohrer, G., H. Mourad, T. Laursen, D. Drewry, R. Avissar, D. Poggi, R. Orin & G.G. Katul (2005), “Finite Element Tree Crown Hydrodynamics Model (FETCH) Using Porous Media Flow Within Branching Elements—A New Representation of Tree Hydrodynamics,” *Water Resources Research*, **41**, W11405.
- Baaijens, F.P.T., W.R. Trickey, T.A. Laursen & F. Guilak (2005), “Large Deformation Finite Element Analysis of Micropipette Aspiration to Determine the Mechanical Properties of the Chondrocyte,” *Annals of Biomedical Engineering*, **33**, 494–501.
- Yang, B., T.A. Laursen & X.N. Meng (2005), “Two Dimensional Mortar Contact Methods for Large Deformation Frictional Sliding,” *International Journal for Numerical Methods in Engineering*, **62**, 1183–1225.
- Puso, M.A. & T.A. Laursen (2004), “A Mortar Segment-to-Segment Frictional Contact Method for Large Deformations,” *Computer Methods in Applied Mechanics and Engineering*, **193**, 4891–4913.
- Matos, R.S., T.A. Laursen, J.V.C. Vargas & A. Bejan (2004), “Three-Dimensional Optimization of Staggered Finned Circular and Elliptic Tubes in Forced Convection,” *International Journal of Thermal Sciences*, **43**, 477–487.
- Puso, M.A. & T.A. Laursen (2004), “A Mortar Segment-to-Segment Contact Method for Large Deformation Solid Mechanics,” *Computer Methods in Applied Mechanics and Engineering*, **193**, 601–629.
- Matos, R.S., J.V.C. Vargas, T.A. Laursen & A. Bejan (2004), “Optimally Staggered Finned Circular and Elliptic Tubes in Forced Convection,” *International Journal of Heat and Mass Transfer*, **47**, 1347–1359.
- Laursen, T.A. & M.W. Heinstein (2003), “Consistent Mesh Tying Methods for Topologically Distinct Discretized Surfaces in Nonlinear Solid Mechanics,” *International Journal for Numerical Methods in Engineering*, **57**, 1197–1242.
- Love, G.R. & T.A. Laursen (2003), “Improved Implicit Integrators for Transient Impact Problems—Dynamic Frictional Dissipation Within an Admissible Conserving Framework,” *Computer Methods in Applied Mechanics and Engineering*, **192**, 2223–2248.
- Puso, M.A. & T.A. Laursen (2003), “Mesh Tying on Curved Surfaces in 3D,” *Engineering Computations*, **20**, 305–319.
- M.W. Heinstein & T.A. Laursen (2003), “A Three Dimensional Surface-To-Surface Projection Algorithm for Noncoincident Domains,” *Communications in Numerical Methods in Engineering*, **19**, 421–432.
- Baer, A.E., T.A. Laursen, F. Guilak & L.A. Setton (2003), “The Micromechanical Environment of Intervertebral Disc Cells Determined by a Finite Deformation, Anisotropic, and Biphasic Finite Element Model,” *Journal of Biomechanical Engineering*, **125**, 1–11.

- Meng, X.N. & T.A. Laursen (2002), “On Energy Consistency of Large Deformation Plasticity Models, with Application to the Design of Unconditionally Stable Time Integrators,” *Finite Elements in Analysis and Design*, **38**, 949–963.
- Puso, M.A. & T.A. Laursen (2002), “A 3D Contact Smoothing Method Using Gregory Patches,” *International Journal for Numerical Methods in Engineering*, **54**, 1161–1194.
- Meng, X.N., M.A. LeRoux, T.A. Laursen & L.A. Setton (2002), “A Nonlinear Finite Element Formulation for Axisymmetric Torsion of Biphase Materials,” *International Journal of Solids and Structures*, **39**, 879–895.
- Meng, X.N. & T.A. Laursen (2002), “Energy Consistent Algorithms for Dynamic Finite Deformation Plasticity,” *Computer Methods in Applied Mechanics and Engineering*, **191**, 1639–1675.
- Laursen, T.A. & G.R. Love (2002), “Improved Implicit Integrators for Transient Impact Problems—Geometric Admissibility Within the Conserving Framework,” *International Journal for Numerical Methods in Engineering*, **53**, 245–274.
- Laursen, T.A. & X.N. Meng (2001), “A New Solution Procedure for Application of Energy-Conserving Algorithms to General Constitutive Models in Nonlinear Elastodynamics,” *Computer Methods in Applied Mechanics and Engineering*, **190**, 6309–6322.
- Matos, R.S., J.V.C. Vargas, T.A. Laursen & F.E.M. Saboya (2001), “Optimization Study and Heat Transfer Comparison of Staggered Circular and Elliptic Tubes in Forced Convection,” *International Journal of Heat and Mass Transfer*, **44**, 3953–3961.
- Padmanabhan, V. & T.A. Laursen (2001), “A Framework for Development of Surface Smoothing Procedures in Large Deformation Frictional Contact Analysis,” *Finite Elements in Analysis and Design*, **37**, 173–198.
- Heinstein, M.W., F.J. Mello, S.W. Attaway & T.A. Laursen (2000), “Contact-Impact Modeling in Explicit Transient Dynamics,” *Computer Methods in Applied Mechanics and Engineering*, **187**, 621–640.
- McDevitt, T.W. & T.A. Laursen (2000), “A Mortar-Finite Element Formulation for Frictional Contact Problems,” *International Journal for Numerical Methods in Engineering*, **48**, 1525–1547.
- Laursen, T.A. (1999), “On the Development of Thermodynamically Consistent Algorithms for Thermomechanical Frictional Contact,” *Computer Methods in Applied Mechanics and Engineering*, **177**, 273–287.
- Mousseau, C.W., T.A. Laursen, M. Lidberg & R.L. Taylor (1999), “Vehicle Dynamics Simulations with Coupled Multibody and Finite Element Models,” *Finite Elements in Analysis and Design*, **31**, 295–315.
- Heinstein, M.W. & T.A. Laursen (1999), “An Algorithm for the Matrix-Free Solution of Quasistatic Frictional Contact Problems,” *International Journal for Numerical Methods in Engineering*, **44**, 1205–1226.
- Oancea, V.G. & T.A. Laursen (1998), “Investigations of Low Frequency Stick–Slip Motion: Experiments and Numerical Modelling,” *Journal of Sound and Vibration*, **213**, 577–600.
- Chawla, V. & T.A. Laursen (1998), “Energy Consistent Algorithms for Frictional Contact Problems,” *International Journal for Numerical Methods in Engineering*, **42**, 799–827.

- Oancea, V.G. & T.A. Laursen (1997), “A Finite Element Formulation of Thermomechanical Rate-Dependent Frictional Sliding,” *International Journal for Numerical Methods in Engineering*, **40**, 4275–4311.
- Oancea, V.G. & T.A. Laursen (1997), “Stability Analysis of State Dependent Dynamic Frictional Sliding,” *International Journal of Non-Linear Mechanics*, **32**, 837–853.
- Laursen, T.A. & V.G. Oancea (1997), “On the Constitutive Modeling and Finite Element Computation of Rate Dependent Frictional Sliding in Large Deformations,” *Computer Methods in Applied Mechanics and Engineering*, **143**, 197–227.
- Laursen, T.A. & V. Chawla (1997), “Design of Energy Conserving Algorithms for Frictionless Dynamic Contact Problems,” *International Journal for Numerical Methods in Engineering*, **40**, 863–886.
- Oancea, V.G. & T.A. Laursen (1996), “Dynamics of a State Variable Frictional Law in Finite Element Analysis,” *Finite Elements in Analysis and Design*, **22**, 25–40.
- Donescu, P. & T.A. Laursen (1996), “A Generalized Object-Oriented Approach to Solving Ordinary and Partial Differential Equations Using Finite Elements,” *Finite Elements in Analysis and Design*, **22**, 93–107.
- Laursen, T.A. & B.N. Maker (1995), “An Augmented Lagrangian Quasi-Newton Solver for Constrained Nonlinear Finite Element Applications,” *International Journal for Numerical Methods in Engineering*, **38**, 3571–3590.
- Vargas, J.V.C., T.A. Laursen & A. Bejan (1995), “Nonsimilar Solutions for Mixed Convection on a Wedge Embedded in a Porous Medium,” *International Journal of Heat and Fluid Flow*, **16**, 211–216.
- Laursen, T.A. & V.G. Oancea (1994), “Automation and Assessment of Augmented Lagrangian Algorithms for Frictional Contact Problems,” *Journal of Applied Mechanics*, **61**, 956–963.
- Laursen, T.A. & S. Govindjee (1994), “A Note on the Treatment of Frictionless Contact Between Nonsmooth Surfaces in Fully Nonlinear Problems,” *Communications in Numerical Methods in Engineering*, **10**, 869–878.
- Laursen, T.A. (1994), “The Convected Description in Large Deformation Frictional Contact Problems,” *International Journal of Solids and Structures*, **31**, 669–681.
- Maker, B.N. & T.A. Laursen (1994), “A Finite Element Formulation for Rod/Continuum Interactions: The One-Dimensional Slideline,” *International Journal for Numerical Methods in Engineering*, **37**, 1–18.
- Laursen, T.A. & J.C. Simo (1993), “Algorithmic Symmetrization of Coulomb Frictional Problems Using Augmented Lagrangians,” *Computer Methods in Applied Mechanics and Engineering*, **108**, 133–146.
- Laursen, T.A. & J.C. Simo (1993), “A Continuum-Based Finite Element Formulation for the Implicit Solution of Multibody, Large Deformation Frictional Contact Problems,” *International Journal for Numerical Methods in Engineering*, **36**, 3451–3485.
- Laursen, T.A. & J.C. Simo (1992), “A Study of the Mechanics of Microindentation Using Finite Elements,” *Journal of Materials Research*, **7**, 618–626.

Simo, J.C. & T.A. Laursen (1992), “An Augmented Lagrangian Treatment of Contact Problems Involving Friction,” *Computers and Structures*, **42**, 97–116.

### **Book Chapters**

Laursen, T.A. (2007), “Emerging Spatial and Temporal Discretization Methods in Contact and Impact Mechanics,” in *Computational Contact Mechanics: CISM Courses and Lectures, vol. 298*, P. Wriggers & T.A. Laursen, eds., Springer, Wien & New York, pp. 1–37.

Laursen, T.A., E.J. Kim & B. Yang (2007), “Recent Extensions of Mortar-Based Contact Formulations: Lubrication Modeling and Parallel Implementations,” in *IUTAM Symposium on Computational Contact Mechanics*, P. Wriggers & U. Nackenhorst, eds., Springer, Dordrecht, The Netherlands, pp. 123–146.

Laursen, T.A. (2006), “Mortar-Based Surface-to-Surface Contact Algorithms in Large Deformation Solid Mechanics,” in *Analysis and Simulation of Contact Problems*, P. Wriggers & U. Nackenhorst, eds., Springer-Verlag, Berlin, pp. 5–12.

Guilak, F., M.A. Haider, L.A. Setton, T.A. Laursen, and F.P.T. Baaijens (2006), “Multiphasic Models of Cell Mechanics,” in *Cytoskeletal Mechanics: Models and Measurements*, M.R.K. Mofrad & R.D. Kamm, eds., Cambridge University Press, New York, pp.84-102.

Laursen, T.A. & J.C. Simo (1991), “On the Formulation and Numerical Treatment of Finite Deformation Frictional Contact Problems,” in *Nonlinear Computational Mechanics – State of the Art*, P. Wriggers & W. Wagner, eds., Springer-Verlag, Berlin, pp. 716–736.

### **Conference Papers**

Sanders, J., J. Dolbow & T.A. Laursen (2007), “A Stabilized Treatment of Arbitrarily Oriented Interfaces,” in *Computational Plasticity IX: Fundamentals and Applications*, E. Onate, D.R.J. Owen and B. Suarez, eds., International Center for Numerical Methods in Engineering, Barcelona, Spain, pp. 145–148.

Upton M.L., T.A. Laursen, F. Guilak & L.A. Setton (2005), “Finite Element Modeling of Region-Specific Cell-Matrix Interactions in the Meniscus,” in *Proceedings of the 2005 Summer Bioengineering Conference* (abstract 0059881), American Society of Mechanical Engineers, CD-ROM format.

Laursen, T.A. & B. Yang (2005), “New Developments in Surface-to-Surface Strategies for Analysis of Interface Mechanics,” in *Computational Plasticity VIII: Fundamentals and Applications*, D.R.J. Owen, E. Onate and B. Suarez, eds., International Center for Numerical Methods in Engineering, Barcelona, Spain, pp. 61–63.

Puso, M.A., T.A. Laursen, & J. Solberg (2004), “A 3D Frictional Segment-to-Segment Contact Method for Large Deformations and Quadratic Elements,” in *Proceedings of ECCOMAS 2004*, P. Neittaanmaki, T. Rossi, K. Majava, and O. Pironneau, eds., University of Jyväskylä, Finland, CD-ROM format.

Laursen, T.A., Yang, B. & M.A. Puso (2004), “Implementation of Frictional Contact Conditions in Surface to Surface, Mortar Based Computational Frameworks,” in *Proceedings of ECCOMAS 2004*, P. Neittaanmaki, T. Rossi, K. Majava, and O. Pironneau, eds., University of Jyväskylä, Finland, CD-ROM format.

- Puso, M.A. & T.A. Laursen (2002), “A 3D Contact Smoothing Method,” in *Proceedings of WCCM V: Fifth World Congress on Computational Mechanics*, H.A. Mang, F.G. Rammerstorfer, & J. Eberhardsteiner, eds., Technical University of Vienna, CD-ROM format.
- Laursen, T.A., M.A. Puso & M.W. Heinsteinst (2002), “Practical Issues Associated with Mortar Projections in Large Deformation Contact/Impact Analysis,” in *Proceedings of WCCM V: Fifth World Congress on Computational Mechanics*, H.A. Mang, F.G. Rammerstorfer, & J. Eberhardsteiner, eds., Technical University of Vienna, CD-ROM format.
- LeRoux, M.A., M.L. Upton, T.A. Laursen & L.A. Setton (2001), “Biphasic Finite Element Modeling of Tear Effects on the Mechanics of the Meniscus,” in *Proceedings of the 2001 Bioengineering Conference*, volume BED-50, R.D. Kamm, G.W. Schmid-Schonbein, G.A. Ateshian & M.S. Hefzy, eds., American Society of Mechanical Engineers, New York, New York, pp. 851–852.
- Baer, A.E., T.A. Laursen & L.A. Setton (2001), “A Finite-Deformation, Anisotropic, Biphasic Finite Element Model of Cell-Matrix Interactions in the Intervertebral Disc,” in *Proceedings of the 2001 Bioengineering Conference*, volume BED-50, R.D. Kamm, G.W. Schmid-Schonbein, G.A. Ateshian & M.S. Hefzy, eds., American Society of Mechanical Engineers, New York, New York, pp. 799–800.
- Meng, X.N., M.A. LeRoux, L.A. Setton & T.A. Laursen (2001), “Biphasic Finite Element Formulation for Modelling Nonlinear Response of Articular Cartilage to Torsion,” in *Proceedings of the 2001 Bioengineering Conference*, volume BED-50, R.D. Kamm, G.W. Schmid-Schonbein, G.A. Ateshian & M.S. Hefzy, eds., American Society of Mechanical Engineers, New York, New York, pp. 549–550.
- LeRoux, M.A., D.M. Elliott, T.P. Vail, F. Guilak, T.A. Laursen & L.A. Setton (2000), “Tensile Properties of Meniscal Lesions Following Partial Healing in a Canine Model,” in *Transactions of the Orthopaedic Research Society*, **36**, p. 66.
- Hueckel, T. & T.A. Laursen (1998), “Chemo-Mechanics of Corrosion Processes at Metal/Oxide/Electrolyte Interfaces,” in *Modeling and Simulation Based Engineering*, S.N. Atluri & P.E. O’Donoghue, eds., Tech Science Press, Palmdale, CA, pp. 1787–1792.
- Mousseau, C.W., T.A. Laursen, M. Lidberg & R.L. Taylor (1998), “Vehicle Dynamics Simulations with Coupled Multibody and Finite Element Models,” in *Modeling and Simulation Based Engineering*, S.N. Atluri & P.E. O’Donoghue, eds., Tech Science Press, Palmdale, CA, pp. 1805–1809.
- Laursen, T.A. & V. Chawla (1998), “Development of Energy-Momentum Methods for Dynamic Contact Problems,” in *Computational Mechanics: New Trends and Applications*, S.R. Idelsohn, E. Onate & E.N. Dvorkin, eds., International Center for Numerical Methods in Engineering and International Association for Computational Mechanics, Barcelona, Spain, CDROM format.
- Elliott, D.M., M.A. LeRoux, T.A. Laursen & L.A. Setton (1997), “Formulation of a Continuum Anisotropic Model for the Anulus Fibrosus in Tension,” in *1997 Advances in Bioengineering*, BED-Vol. 36, B. Simon, ed., American Society of Mechanical Engineers, New York, New York, pp. 165–166.
- Chawla, V. & T.A. Laursen (1996), “Time Integration of Impact Phenomena in Solid Mechanics: A One-Dimensional Model Problem,” in *Proceedings of the 1996 ASME Computers in Engineering Conference*, American Society of Mechanical Engineers, New York, New York, CDROM format.



- Laursen, T.A. & V.G. Oancea (1996), “Prediction of Slip Instabilities in Large Deformation Finite Element Analysis,” in *Proceedings of the 1996 NSF Design and Manufacturing Grantees Conference*, Society of Manufacturing Engineers, Dearborn, Michigan, pp. 225–226.
- Heinstein, M.W., F.J. Mello & T.A. Laursen (1995), “Augmented Lagrangian Algorithms for Enforcement of Contact Constraints in Explicit Dynamic and Matrix-Free Quasistatic Applications,” in *Contact Mechanics II: Computational Techniques*, M.H. Aliabadi & C. Alessandri, eds., Computational Mechanics Publications, Southampton, United Kingdom, pp. 289–296.
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- Kay, G.J., S. Govindjee, T. Laursen & B. Maker (1992), “Development of Concrete Tensile Fracture and Concrete/Rebar Bond Strength Models,” in *Fracture Mechanics of Concrete Structures*, Z.P. Bazant, ed., Elsevier, London, United Kingdom, pp. 849–852.
- Laursen, T.A. & J.C. Simo (1992), “Formulation and Regularization of Frictional Contact Problems for Lagrangian Finite Element Computations,” in *Proceedings of the Third International Conference on Computational Plasticity Fundamentals and Applications, Part I*, D.R.J. Owen, E. Onate & E. Hinton, eds., Pineridge Press, Swansea, United Kingdom, pp. 395–408.

### **Conference Abstracts**

- Laursen, T.A., J. Dolbow & J. Sanders (2007), “Stabilized Treatment of Contact Mechanics on Arbitrarily Oriented Interfaces Using Nitsche’s Method,” in *9<sup>th</sup> U.S. National Congress on Computational Mechanics: CD-ROM Conference Proceedings*, University of California at Berkeley, Berkeley, CA.
- Jung, Y., J. Dolbow & T. Laursen (2007), “Transient Interaction of Structures with Fluids and Solids,” in *9<sup>th</sup> U.S. National Congress on Computational Mechanics: CD-ROM Conference Proceedings*, University of California at Berkeley, Berkeley, CA.
- Laursen, T.A. (2006), “Development of Mortar Frameworks as a Foundation for Surface-Based Approaches to Contact Mechanics,” in *International Conference on Multifield Problems: Book of Abstracts*, Universität Stuttgart, p. 93.
- Laursen, T.A. (2006), “Mortar-Based Surface-to-Surface Algorithms for Tribological Complexity in Transient Contact Mechanics,” in *Seventh World Congress on Computational Mechanics CD-ROM Conference Proceedings*, University of California at Los Angeles, Los Angeles, CA.
- Yang, B. & T.A. Laursen (2006), “A General Lubricated Contact Formulation with Mortar Finite Element Methods,” in *Seventh World Congress on Computational Mechanics CD-ROM Conference Proceedings*, University of California at Los Angeles, Los Angeles, CA.
- Yang, B. & T.A. Laursen (2005), “A General Contact Searching Algorithm for Large Deformation Mortar Contact Formulations with Finite Sliding,” in *8<sup>th</sup> U.S. National Congress on Computational Mechanics: CD-ROM Conference Proceedings*, University of Texas at Austin, Austin, TX.
- Stanciulescu, I. & T.A. Laursen (2005), “Nonlinear Finite Element Formulations and Bifurcations in the Newton-Raphson Map. Case Study: Steady State Rolling Contact,” in *8<sup>th</sup> U.S. National Congress on Computational Mechanics: CD-ROM Conference Proceedings*, University of Texas at Austin, Austin, TX.

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- Laursen, T.A. & M.W. Heinstein (2001), “On the Relation of Mortar Element Contact Formulations to Consistent Mesh Tying Schemes in Nonlinear Solid Mechanics,” in *USACM Sixth U.S. National Congress on Computational Mechanics: Abstracts*, Mechanical Engineering Department, University of Michigan, p. 475.
- Puso, M.A. & T.A. Laursen (2001), “A 3D Smoothing Method Using Gregory Patches,” in *USACM Sixth U.S. National Congress on Computational Mechanics: Abstracts*, Mechanical Engineering Department, University of Michigan, p. 480.
- Love, G.R. & T.A. Laursen (2001), “Adhering to Admissibility: The Application of Discrete Velocity Updates to Energy Consistent Dynamic Impact,” in *USACM Sixth U.S. National Congress on Computational Mechanics: Abstracts*, Mechanical Engineering Department, University of Michigan, p. 471.
- T.A. Laursen & X.N. Meng (2001), “Energy Consistent Algorithms for Large Deformation Dynamical Plasticity,” in *USACM Sixth U.S. National Congress on Computational Mechanics: Abstracts*, Mechanical Engineering Department, University of Michigan, p. 710.
- Laursen, T.A. (2000), “Recent Developments in Energy–Momentum Treatment of Impact Problems: Accurate Constraint Enforcement and Introduction of Physical Dissipation,” in *Book of Abstracts: European Congress on Computational Methods in Applied Sciences and Engineering 2000*, International Center for Numerical Methods in Engineering, Barcelona, Spain, p. 356.
- Laursen, T.A. (2000), “New Conservative Finite Element Algorithms for Dynamic Inelastic Impact,” in *ICTAM 2000 Chicago Abstract Book*, Technical Report No. 950, Department of Theoretical and Applied Mechanics, University of Illinois at Urbana–Champaign, p. 88.

- Laursen, T.A., G. Love & X. Meng (2000), “Energy-Momentum Finite Element Procedures for Inelastic Impact Problems—Recent Developments,” in *Mechanics and Materials in Design 3: Book of Abstracts*, S.A. Meguid, ed., Engineering Mechanics and Design Laboratory, University of Toronto, p. 125.
- McDevitt, T.W. & T.A. Laursen (1999), “A Mortar Finite Element Formulation for the Dynamic Solution of Frictional Contact Problems,” in *Fifth U.S. National Congress on Computational Mechanics: Book of Abstracts*, University of Colorado, Boulder, Colorado, p. 287.
- Jones, W.R., T.A. Laursen, H. P. Ting-Beall, M. Haider & F. Guilak (1998), “Elastic and Viscoplastic Properties of Articular Chondrocytes,” in *Sixth Annual Symposium on Computational Methods in Orthopaedic Biomechanics*, Tulane University, New Orleans, Louisiana.
- Laursen, T.A. & G.R. Love (1998), “Energy-Momentum Approaches to Impact Phenomena in Structural Dynamics,” in *Thirteenth U.S. National Congress of Applied Mechanics: Book of Abstracts*, University of Florida, Gainesville, Florida.
- Laursen, T.A. (1997), “A Thermodynamically Based Approach to the Constitutive Modeling and Numerical Treatment of Contact Interfaces,” in *Fourth U.S. National Congress on Computational Mechanics: Abstracts*, Rensselaer Polytechnic Institute, Troy, New York, p. 147.
- Laursen, T.A. (1996), “Constitutive Descriptions and Numerical Integrators for Transient Large Deformation Contact Problems,” in *XIXth International Congress of Theoretical and Applied Mechanics: Abstracts*, Local Executive Committee of XIXth ICTAM, Kyoto, Japan, p. 832.
- Oancea, V.G. & T.A. Laursen (1996), “Coupled Thermomechanical Analysis of Contact Constraints: Continuum Formulation and Finite Element Implementation,” in *1996 ASME Mechanics and Materials Conference Book of Abstracts*, The Johns Hopkins University, Baltimore, Maryland, p. 321.
- Oancea, V.G. & T.A. Laursen (1996), “Experimental and Numerical Study of Low Frequency Stick-Slip Motion,” in *Sixth Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures*, A.H. Nayfeh and D.T. Mook, Chairmen, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Chawla, V. & T.A. Laursen (1996), “Conservative Schemes for Finite Element Simulation of Dynamic Contact Problems,” in *Developments in Theoretical and Applied Mechanics: Volume XVIII*, School of Engineering, The University of Alabama, Tuscaloosa, Alabama, pp. 274–275.
- Laursen, T.A. & V.G. Oancea (1994), “A Viscoplastic State Variable Approach to Constitutive Modeling of Sliding Friction,” in *Twelfth U.S. National Congress of Applied Mechanics: Abstracts of Contributed Papers*, University of Washington, Seattle, Washington, p. 296.
- Laursen, T.A. (1993), “A New Class of Symmetric Algorithms for Computation of Frictional Mechanical Response,” in *Abstracts of Meet’N’93: First Joint ASCE/ASME/SES Meeting*, C.T. Herakovich & J.M. Duva, eds., University of Virginia, Charlottesville, Virginia, p. 101.

**SELECTED NATIONAL AND INTERNATIONAL PRESENTATIONS**

(only presentations given by T.A. Laursen, not by coauthors, are listed)

**Conference Talks**

- “Recent Extensions of Mortar-Based Contact Formulations: Lubrication Modeling and Parallel Implementations” (invited), International Union of Theoretical and Applied Mechanics Symposium on Computational Contact Mechanics, Hannover, Germany, November 5–8, 2006.
- “Development of Mortar Frameworks as a Foundation for Surface-Based Approaches to Contact Mechanics” (plenary lecture, invited), International Conference on Multifield Problems, Stuttgart, Germany, October 4–6, 2006.
- “Mortar-Based Surface-to-Surface Algorithms for Tribological Complexity in Transient Contact Mechanics” (keynote lecture, invited), Seventh World Congress on Computational Mechanics, Los Angeles, California, July 16–22, 2006.
- “New Developments in Surface-to-Surface Strategies for Analysis of Interface Mechanics” (keynote lecture, invited), Eighth International Conference on Computational Plasticity, Barcelona, Spain, September 5–7, 2005.
- “Mortar-Based Surface-to-Surface Contact Algorithms in Large Deformation Solid Mechanics” (keynote lecture, invited), Fourth Contact Mechanics International Symposium, Hannover, Germany, July 4–6, 2005.
- “Mortar Elements in Large Sliding Frictional Contact Analysis,” 16th International Conference on Domain Decomposition Methods, New York, New York, January 11–15, 2005.
- “Implementation of Frictional Contact Conditions in Surface to Surface, Mortar Based Computational Frameworks” (invited), Fourth European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2004), Jyväskylä, Finland, July 24–28, 2004.
- “The Influence of the Energy–Momentum Paradigm on the Development of Computational Contact Mechanics,” Seventh U.S. National Congress on Computational Mechanics, Albuquerque, NM, July 28–30, 2003.
- “Integral Representations of Contact Conditions in Computational Analysis of Interfacial Phenomena,” USNCTAM14: Fourteenth U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA June 23–28, 2002.
- “Surface Discretization in Computational Contact Mechanics: Mortar and Contact Smoothing Strategies” (invited), 277th WE-Heraeus Seminar on Contact and Fracture Problems, Bad Honnef, Germany, May 27–29, 2002.
- “On the Relation of Mortar Element Contact Formulations to Consistent Mesh Tying Schemes in Nonlinear Solid Mechanics,” Sixth U.S. National Congress on Computational Mechanics, Dearborn, Michigan, August 1–3, 2001.
- “New Conservative Finite Element Algorithms for Dynamic Inelastic Impact” (invited), ICTAM 2000–20th International Congress of Theoretical and Applied Mechanics, Chicago, Illinois, August 27–September 2, 2000.

- “Recent Developments in Energy–Momentum Treatment of Impact Problems: Accurate Constraint Enforcement and Introduction of Physical Dissipation,” ECCOMAS 2000 (European Congress on Computational Methods in Applied Sciences and Engineering), Barcelona, Spain, September 11–14, 2000.
- “Energy-Momentum Finite Element Procedures for Inelastic Impact Problems–Recent Developments” (keynote lecture), Mechanics and Materials in Design 3, Orlando, Florida, May 29–31, 2000.
- “Computation of Coupled Interfacial Phenomena: Toward a Numerical Model of Corrosion,” International Conference on Computational Engineering Science, Atlanta, Georgia, October 5–9, 1998.
- “Development of Energy-Momentum Methods for Dynamic Contact Problems” (keynote lecture, invited), Fourth World Congress on Computational Mechanics, Buenos Aires, Argentina, June 29–July 2, 1998.
- “An Algorithm for the Matrix-Free Solution of Quasistatic Frictional Contact Problems,” Fourth World Congress on Computational Mechanics, Buenos Aires, Argentina, June 29–July 2, 1998.
- “A Thermodynamically Based Approach to the Constitutive Modeling and Numerical Treatment of Contact Interfaces,” Fourth U.S. National Congress on Computational Mechanics, San Francisco, California, August 6–8, 1997.
- “Constitutive Descriptions and Numerical Integrators for Transient Large Deformation Contact Problems” (invited), XIXth International Congress of Theoretical and Applied Mechanics, Kyoto, Japan, August 25–31, 1996.
- “Augmented Lagrangian Algorithms for Enforcement of Contact Constraints in Explicit Dynamic and Matrix-Free Quasistatic Applications,” Contact Mechanics 95, the Second International Conference on Computational Methods in Contact Mechanics, Ferrara, Italy, July 11–13, 1995.
- “Automation and Assessment of Augmented Lagrangian Algorithms for Frictional Contact Problems,” International Mechanical Engineering Congress and Exposition, Chicago, Illinois, November 6–11, 1994.
- “A Viscoplastic State Variable Approach to Constitutive Modeling of Sliding Friction,” Twelfth U.S. National Congress of Applied Mechanics, Seattle, Washington, June 26–July 1, 1994.
- “Nonlinear Equation Solving in the Presence of Frictional Contact Constraints,” Seventeenth South-eastern Conference on Theoretical and Applied Mechanics, Hot Springs, Arkansas, April 10–12, 1994.
- “A New Class of Symmetric Algorithms for Computation of Frictional Mechanical Response,” Meet’N’93, the joint ASCE-ASME-SES meeting at Charlottesville, Virginia, June 6–9, 1993.

### **Talks at Universities, Industrial and Government Labs, and Contract Reviews**

- “New Developments in Computational Interface Mechanics—Perspectives Applicable to Particulate Media,” Workshop on Particulate Media in Extreme Environments (PMEE 2008), University of Florida Research & Engineering Education Facility, January 30, 2008.
- “Development of Mortar Frameworks as a Foundation for Surface-Based Approaches to Contact Mechanics,” Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana, November 16, 2007.

- “Recent Developments in Mortar-Based Simulation of Large Deformation Contact Mechanics,” Department of Mathematics, Universidade de Santiago de Compostela, Santiago de Compostela, Spain, October 22, 2007.
- “New Numerical Strategies for Transient Interaction of Structures with Fluids and Soils,” Air Force Office of Scientific Research Contractors’ Meeting (Structural Mechanics Program), Seattle, Washington, August 29, 2006–September 1, 2006.
- “Computational and Modeling Strategies for Damping and Multi-Physics Coupling on Interfaces,” National Science Foundation/Sandia National Laboratories Research Program Grantee Workshop, Livermore, California, March 1–2, 2006.
- “Numerical and Experimental Models of Dry Friction Damping in Aeroelastic Structures,” Air Force Office of Scientific Research Contractors’ Meeting (Structural Mechanics Program), Santa Fe, New Mexico, August 29, 2005–September 1, 2005.
- “Numerical and Experimental Models of Dry Friction Damping in Aeroelastic Structures,” Air Force Office of Scientific Research Contractors’ Meeting (Structural Mechanics Program), Wintergreen, Virginia, August 18–20, 2004.
- “Recent Developments in Surface to Surface, Mortar Based Computational Frameworks,” Sandia National Laboratories, Albuquerque, New Mexico, August 12, 2004.
- “Numerical and Experimental Models of Dry Friction Damping in Aeroelastic Structures,” Air Force Office of Scientific Research Contractors’ Meeting (Mechanics of Materials & Devices and Structural Mechanics Programs), Santa Fe, New Mexico, September 8–11, 2003.
- “New Spatial Discretization Techniques for Computational Contact Mechanics,” Sandia National Laboratories, Albuquerque, New Mexico, June 3, 2003.
- “New Spatial Discretization Techniques for Computational Contact Mechanics,” Department of Mechanical Engineering, Universidade Federal do Parana, Curitiba, Parana, Brazil, May 21, 2003.
- “New Finite Element Techniques for Frictional Contact Mechanics,” Department of Mechanical Engineering, Oregon State University, Corvallis, Oregon, January 27, 2003.
- “New Finite Element Techniques for Frictional Contact Mechanics,” Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida, December 6, 2002.
- “New Energy-Momentum Finite Element Algorithms for Impact Problems,” Numerical Analysis Seminar, Center for Research in Scientific Computing/Department of Mathematics, North Carolina State University, Raleigh, North Carolina, October 10, 2000.
- “Numerical Simulation of Impact Mechanics: New Energy-Momentum Algorithms and Mortar Element Methodologies,” Office of Naval Research Structural Mechanics, Computational Mechanics and Acoustics Signatures Review Meeting, Arlington, VA, May 22–25, 2000.
- “Formulations and Algorithms for Static and Dynamic Finite Element Analysis of Contact/Impact,” Michelin Americas Research and Development Corporation, Greenville, SC, October 28, 1999.
- “Improved Temporal and Spatial Discretization Strategies for Finite Element Analysis of Contact/Impact,” Office of Naval Research Computational Mechanics and Structural Acoustics Review Meeting, Boulder, CO, January 4–7, 1999.

- “Thermodynamically Consistent Numerical Algorithms in Contact Mechanics,” Mechanics and the Environment Interdisciplinary Colloquia, Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, April 15, 1998.
- “Recent Developments in the Numerical Simulation of Transient Interfacial Mechanics,” Office of Naval Research Computational Mechanics and Structural Acoustics Review Meeting, San Diego, CA, January 27–30, 1998.
- “A Thermodynamically Based Approach to Constitutive Modeling and Numerical Treatment of Contact Interfaces,” Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana, November 4, 1997.
- “Numerical Algorithms for Transient Contact Problems,” Mechanics and the Environment Interdisciplinary Colloquia, Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, April 10, 1996.
- “New Strategies for Finite Element Solution of Large Deformation Contact/Impact Problems,” Department of Mechanical Engineering and Applied Mechanics, University of Michigan, Ann Arbor, Michigan, August 15, 1995.
- “Formulation and Implementation of Finite Element Strategies for Large Deformation Contact/Impact Problems,” Ford Research Laboratory, Dearborn, Michigan, August 14, 1995.
- “Augmented Lagrangian Algorithms for Contact and Impact Problems,” Sandia National Laboratories, Albuquerque, New Mexico, August 23, 1994.
- “Constitutive Modeling of Kinetic Friction Processes,” Mechanics and the Environment Interdisciplinary Colloquia, Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, February 2, 1994.
- “Augmented Lagrangian Finite Element Algorithms for Computation of Frictional Mechanical Response,” Department of Mechanical Engineering and Material Science, Duke University, Durham, North Carolina, September 2, 1993.
- “Frictional Contact Problems: Continuum Mechanical Description and Finite Element Algorithms,” Department of Mathematics, Duke University, Durham, North Carolina, March 30, 1993.
- “Contact, Friction and Plasticity,” Mechanics and the Environment Interdisciplinary Colloquia, Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, February 2, 1993.
- “Development of Frictional Contact Algorithms for Nonlinear Finite Element Applications: Recent Advances & Future Directions,” Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, September 11, 1992.
- “Numerical Characterization of Microindentation Tests and Accompanying Development of Frictional Contact Algorithms,” IBM Almaden Research Center, San Jose, California, July 15, 1992.
- “New Methodologies in the Formulation of Frictional Contact Problems,” Lawrence Livermore National Laboratory, Livermore, California, July 7, 1992.
- “Formulation and Treatment of Frictional Contact Problems Using Finite Elements,” Lawrence Livermore National Laboratory, Livermore, California, March 13, 1992.

- “Formulation and Treatment of Large Deformation Frictional Contact Problems Using Finite Elements,” Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, March 10, 1992.
- “Formulation and Treatment of Large Deformation Frictional Contact Problems Using Finite Elements,” Department of Mechanical and Aerospace Engineering, Rutgers University, Piscataway, New Jersey, February 11, 1992.
- “Research into Finite Element Treatment of Frictional Contact Problems,” Lawrence Livermore National Laboratory, Livermore, California, January 18, 1991.
- “Application of Augmented Lagrangian Techniques to Frictional Contact Problems,” Lawrence Livermore National Laboratory, Livermore, California, August 23, 1990.
- “Finite Element Methods for Problems Involving Finite Deformation, Contact, and Friction: Application to Thin Film Structures,” IBM Almaden Research Center, San Jose, California, March, 1990.

## GRANT AND CONTRACT SUPPORT

### Support Obtained as PI or co-PI

- “Finite Element Modeling of Electrostatic Chucks and the Flattening of EUFL Masks,” S. Govindjee (PI), T.A. Laursen (co-PI), Intel Corporation, \$309,400 (Duke portion, \$153,200), September 2007–August 2009.
- “Local Smoothing Techniques and Consistent Sliding Formulation for Contact Analysis,” T.A. Laursen (PI), Sandia National Laboratories, \$79,681, October 2006–September 2008.
- “New Numerical Methods for Transient Interaction of Structures with Fluids and Soils,” T. Laursen (PI), John Dolbow (co-PI), Air Force Office of Scientific Research, \$307,426, February 2006–December 2008.
- “Bridging Macro and Micro Ethics: Advancing Ethics Education for Nano-scale Researchers,” T. Laursen (PI), Rob Clark, Elizabeth Kiss, Tim Lenoir and Dan Vallero (co-PIs), National Science Foundation, \$200,000, September 2005–August 2008.
- “Improved Numerical Algorithms for Steady-State Rolling Tire Contact,” T.A. Laursen (PI), Michelin Americas Research and Development Corporation, \$618,473, July 2000–June 2008.
- “Smoothing Techniques and Consistent Sliding Formulations for Contact Analysis,” T.A. Laursen (PI), Sandia National Laboratories, \$433,925, July 2001–September 2006.
- “Computational Modeling Strategies for Damping and Multi-Physics Coupling on Interfaces,” J. Dolbow (PI) & T. Laursen (co-PI), Sandia National Laboratories, \$322,086, October 2003–September 2006.
- “Computational Modeling and Test Validation of Solar Sail Booms,” L. Virgin (PI) & T. Laursen (co-PI), NASA Langley Research Center, \$60,000, March 2004–December 2004.
- “Thermomechanical Investigations of High Speed Machining of Aluminum,” J. Dolbow (PI) & T. Laursen (co-PI), National Science Foundation, \$150,699, June 2002–May 2005.



- “Numerical and Experimental Models of Dry Friction Damping in Aeroelastic Structures,” T. Laursen (PI), H. Gavin & L. Virgin (co-PIs), Air Force Office of Scientific Research, \$253,604, January 2002–June 2005.
- “Web-Based Educational Framework for Analysis, Visualization and Experimentation: WEAVE,” H. Gavin and J. Dolbow (PIs), T. Laursen, E. Dowell and R. Clark (co-PIs), National Science Foundation, \$341,285, January 2002–December 2005.
- “Dell STAR Program,” M. Gustafson (PI), C. Henriquez, T. Laursen & G. Ybarra (co-PIs), Dell Computer Corporation, \$24,430, January 2000–December 2000.
- “Numerical Algorithms for Deformable-Deformable Contact,” T.A. Laursen (PI), Sandia National Laboratories, \$150,619, August 1998–June 2001.
- “CAREER: Physical Descriptions and Numerical Strategies for Transient Interfacial Mechanics,” T.A. Laursen (PI), National Science Foundation, \$260,000, August 1997–July 2002.
- “Computational Strategies for Treatment of Transient Interfacial Behavior,” T.A. Laursen (PI), Office of Naval Research, \$325,000, May 1997–June 2001.
- “Improved Numerical Models for Transient Tire/Roadway Interaction,” T.A. Laursen (PI), Ford Motor Company, \$30,000, March 1996–February 1998.
- “Topics in Nonlinear Finite Element Analysis,” T.A. Laursen (PI), Sandia National Laboratories, \$179,901, March 1995–March 1998.
- “Research Initiation Award: Computational Evaluation of Material Response in Mechanical Systems Involving Contact and Friction,” T.A. Laursen (PI), National Science Foundation, \$86,533, September 1993–February 1997.

### **Projects Contributed to as Co-Investigator**

- “Mechanical Stimulation of IVD Cells,” L.A. Setton (PI), National Institutes of Health, \$1,669,625, February 2001–January 2006. (TAL’s total effort: approximately \$80,000 in direct costs)
- “Viscoelastic Properties of Normal and OA Chondrons,” F. Guilak (PI), National Institutes of Health, \$1,085,810, January 1998–December 2002. (TAL’s total effort: approximately \$50,000 in direct costs)

### **PROFESSIONAL SERVICE ACTIVITIES**

- \* Member-At-Large, Executive Committee, United States Association of Computational Mechanics, 2006–present.
- \* Member, Scientific Committee, IUTAM Symposium on Computational Contact Mechanics, Hannover, Germany, November 5–9, 2006.
- \* Co-coordinator (w/ P. Wriggers), Advanced Course on Computational Contact Mechanics, International Centre for Mechanical Sciences (CISM), Udine, Italy, September 25–29, 2006.
- \* Member, Technical Committee, Eighth International Conference on Computational Plasticity, Barcelona, Spain, September 5–7, 2005.
- \* Member, Scientific Committee, Eighth US National Congress on Computational Mechanics, Austin, TX, July 25–27, 2005.

- \* Member, Scientific Advisory Committee, Fourth Contact Mechanics International Symposium, Hannover, Germany, July 4–6, 2005.
- \* Member, Scientific Committee, Seventh US National Congress on Computational Mechanics, Albuquerque, NM, July 28–30, 2003.
- \* Minisymposium Organizer (with J. Dolbow) and Session Chairman, Sixth U.S. National Congress on Computational Mechanics, Dearborn, MI, August 1–3, 2001. Minisymposium Title: Computational Mechanics of Sharp Fronts and Interfaces
- \* Minisymposium Organizer and Session Chairman, Fifth U.S. National Congress on Computational Mechanics, Boulder, CO, August 4–6, 1999. Minisymposium Title: Contact-Impact Problems and Nonlinear Mechanics
- \* Invited Session Organizer and Session Chairman, International Conference on Computational Engineering Science, Atlanta, GA, October 6–9, 1998. Session Title: Computational Treatment of Interfaces
- \* Invited Participant, Third Annual Symposium on Frontiers of Engineering, National Academy of Engineering, Irvine, California, September 18–20, 1997
- \* Member, Policy Committee for the Southeastern Conference on Theoretical and Applied Mechanics, 1995–1996
- \* Member, Executive Committee of Sigma Xi, The Scientific Research Society, Duke University Chapter, 1995–1999
- \* Reviewer for several archival journals, including: *Computer Methods in Applied Mechanics and Engineering*, *International Journal for Numerical Methods in Engineering*, *Communications in Numerical Methods in Engineering*, *International Journal of Solids and Structures*, *Microcomputers in Civil Engineering*, *Finite Elements in Analysis and Design*, *Shock and Vibration Journal*, *International Journal of Engineering Science*, *Journal of Engineering Mathematics*, *Computational Mechanics*, *Structural Engineering and Mechanics*, *Computer Modeling in Engineering and Sciences*

## COURSES TAUGHT

### Undergraduate Courses

- \* EGR 10, Introduction to Engineering (given in Spring 2004, Fall 2004, Fall 2005, Fall 2006, Fall 2007)
- \* EGR 53L, Computational Methods in Engineering (given in Fall 1992, Spring 1994)
- \* EGR 75L, Mechanics of Solids (given in Fall 1994, Fall 1995, Fall 1998, Spring 2000, Fall 2001, Fall 2003, Fall 2004)
- \* EGR 150, Engineering Communication (given in Spring 2006)
- \* CE 122L, Fluid Mechanics (given in Spring 1996)
- \* CE 131L, Matrix Structural Analysis (given in Fall 2005)
- \* CE/ME 175, Analytical and Computational Solid Mechanics (developed and given in Spring 2003)

### **Graduate Courses**

- \* CE 201, Advanced Mechanics of Solids (given in Spring 1995)
- \* CE/BME 206, Elasticity (given in Spring 2008)
- \* CE 251, Systematic Engineering Analysis (given in Fall 1997, Fall 1999)
- \* CE 254, Introduction to the Finite Element Method (developed and given as CE 265 in Spring 1993, given as CE 254 in Fall 1994, Spring 1996, Spring 1998, Fall 2002, Spring 2007)
- \* CE 255, Nonlinear Finite Element Analysis (developed and given as CE 265 in Fall 1993, given as CE 255 in Fall 1996, Spring 1999, Fall 2001, Spring 2004, Spring 2006)

### **Other Graduate and Professional Teaching Activities**

- \* Six hours of lectures in Advanced Course on Computational Contact Mechanics, International Centre for Mechanical Sciences (CISM), Udine, Italy, September 25–29, 2006.

## **GRADUATE STUDENT SUPERVISION**

### **Ph.D. Dissertations Supervised**

- \* Bin Yang, *Mortar Finite Element Methods for Large Deformation Contact Mechanics*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 2006.
- \* Ilinca Stanciulescu, *Nonlinear Finite Element Formulations and Bifurcation Analysis for Structures Undergoing Large Deformations*, Department of Civil and Environmental Engineering, Duke University, degree completed in Summer 2005
- \* Xiaonong Meng, *Time Stepping Algorithms for Transient Analysis in Nonlinear Solid Mechanics*, Department of Civil and Environmental Engineering, Duke University, degree completed in Summer 2001.
- \* Garrett Love, *Velocity Update Algorithms for Transient Impact Problems: Consideration of Kinematic Discontinuities Within a Conserving Framework*, Department of Civil and Environmental Engineering, Duke University, degree completed in Fall 2000.
- \* Vikas Chawla, *Energy Consistent Algorithms in Computational Contact Mechanics*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 1997.
- \* Victor Oancea, *Constitutive Modeling of Friction Processes and Finite Element Implementations*, Department of Civil and Environmental Engineering, Duke University, degree completed in Summer 1996.

**Masters Theses Supervised**

- \* Jessica Sanders, *The Stabilized Enforcement of Constraints on Arbitrarily Oriented Interfaces for the Extended Finite Element Method*, Department of Civil and Environmental Engineering, Duke University, degree completed in Fall 2007.
- \* Ryan Greer, *Experimental and Numerical Investigation of Microslip*, Department of Mechanical Engineering and Materials Science, Duke University, degree completed in Fall 2004.
- \* Hongxia Xiong, *A Computational Model of Corrosion Processes*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 1999.
- \* Yingshu Yu, *Thermodynamically Consistent Dynamic Integrators for Dissipative Systems*, Department of Civil and Environmental Engineering, Duke University, degree completed in Fall 1998.
- \* Vivek Padmanabhan, *Surface Smoothing Procedures for Large Deformation Contact Analysis*, Department of Civil and Environmental Engineering, Duke University, degree completed in Summer 1998.
- \* Garrett Love, *An Accurate Energy-Conserving Numerical Method for Impacting Systems*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 1997.
- \* Renuka Srinivasan, *Numerical Modeling of Superplastic Forming*, Department of Civil and Environmental Engineering, Duke University, degree completed in Fall 1995.
- \* Srinath Alapati, *Performance of the Laplace Transform Galerkin Finite Element Method in Simulation of Advection Dominated Transport Phenomena*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 1995.
- \* Jeffrey Scott, *Examination of Petrov-Galerkin Finite Element Methods for Modeling Advection Dominated Contaminant Transport and Remediation Problems*, Department of Civil and Environmental Engineering, Duke University, degree completed in Spring 1995.

**Masters Projects Supervised**

- \* Bharathwajan Iyengar, *Surface Smoothing Schemes for Contact Problems using Gregory Patches in an Explicit Dynamic Finite Element Implementation*, Department of Civil and Environmental Engineering, Duke University, degree completed in Summer 2003.
- \* Timothy Jones, *A Study of Stability and Accuracy of HHT- $\alpha$  and Energy-Momentum Methods in Nonlinear Elastodynamics*, Department of Civil and Environmental Engineering, Duke University, degree completed in Fall 2000.

**UNIVERSITY SERVICE****University-Wide Activities**

- \* Member, Arts and Sciences Study Abroad Committee, 2002–present
- \* Member, Undergraduate Leadership Group, 2006–2008
- \* Member, Athletics Council, 2005–2007
- \* Member, Enrollment Management Group, 2003–2008

- \* Member, Task Force on the Undergraduate Experience, 2005–2006
- \* Member, Admissions and Financial Aid Committee, 2005–2008
- \* Member, Steering Committee for the Center for Computational Science, Engineering, and Medicine, 2003–2006
- \* Member, Bass Chairs Committee, 1999–2002
- \* Member, Executive Committee of the Graduate Faculty, 1999–2000
- \* Member, Engineering Admissions Committee, 1996–2000, 2001–2008
- \* School of Engineering Representative, Academic Council, 1994–1996, 1997–1999, 2001–2005
- \* School of Engineering Representative, Arts and Sciences Officer Education Committee, 1992–2005

### **Department and School Activities**

- \* Chair, Pratt School of Engineering Graduate Education Committee, 2003–2008
- \* Chair, Pratt School of Engineering Undergraduate Education Committee, 2003–2008
- \* Member, Pratt School of Engineering Curriculum Committee, 2002–2003
- \* Chief Advisor, North Carolina Gamma Chapter of Tau Beta Pi, Duke University, 1998–2000, 2001–2003
- \* Representative, Engineering Faculty Council, 1993–1995; 1996–2000; 2002–2003; 2004–2006
- \* Member, Civil and Environmental Engineering Chair Search Committee, 2000–2001
- \* Chairman, Engineering Faculty Council, 1999–2000
- \* Member, School of Engineering Investment Task Force, 1997–1998
- \* Coordinator, Annual Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis, 1994–2000
- \* Coordinator, Interdisciplinary Colloquia on Mechanics and the Environment, Spring 1994
- \* Member, Graduation with Distinction Committee, Civil and Environmental Engineering, 1993–1994
- \* Faculty Secretary, Civil and Environmental Engineering, 1992–1994