

# Serdar Göktepe

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## EDUCATION

- Dr.-Ing., Applied Mechanics, Civil Engineering  
2002-2007 University of Stuttgart, Germany  
Graduation with Distinction (Summa cum laude)  
Advisor: Prof. Dr. Christian Miehe  
Thesis: "Micro-Macro Approaches to Rubbery and Glassy Polymers:  
Predictive Micromechanically-Based Models and Simulations".
- M.Sc., Computational Mechanics of Materials and Structures (COMMAS)  
2000-2002 University of Stuttgart, Germany  
GPA: 1.2 (Scale: 1.0-5.0, 1.0 best)  
Advisor: Prof. Dr. Christian Miehe  
Thesis: "Micromechanically Based Description of Damage in Polymers at Large Strains".
- B.Sc., Civil Engineering  
1994-1999 Middle East Technical University, Ankara, Turkey  
GPA: 3.59/4.0

## ACADEMIC EXPERIENCE

- Postdoctoral Scholar at the Computational Biomechanics Group at Stanford University, 2007-present.
- Research Associate at the Institute of Applied Mechanics, University of Stuttgart, 2002-2007.
- Graduate Student Assistant at the Institute of Applied Mechanics, University of Stuttgart, 2001-2002.
- Graduate Teaching Assistant at the Department of Civil Engineering, Middle East Technical University, 1999-2000.

## TEACHING EXPERIENCE

- Lecturer, Continuum Mechanics, Stanford University, Winter 2009 (with Prof. E. Kuhl).
- Lecturer, Computational Modeling of Cardiac Electromechanics, COMMAS Summer School, University of Stuttgart, October 6-10, 2008.
- Lecturer, Continuum Mechanics, Stanford University, Spring 2008 (with Prof. E. Kuhl).
- Lecturer, Micromechanics of Materials and Homogenization Methods, University of Stuttgart, Spring 2007.
- Teaching Assistant, Micromechanics of Materials and Homogenization Methods, University of Stuttgart, Spring 2003.
- Teaching Assistant, Computational Mechanics of Materials, University of Stuttgart, Fall 2002.
- Teaching Assistant, Advanced Structural Analysis, Middle East Technical University, Fall 1999 and Spring 2000.
- Teaching Assistant, Structural Analysis, Middle East Technical University, Fall 1999.

## SKILLS

- Languages: Turkish (native), English, German.
- Programming languages: FORTRAN, C.
- Scientific computing programs: MATLAB<sup>®</sup>, MATHCAD<sup>®</sup>, and MAPLE<sup>®</sup>.
- Knowledge of Unix/Linux operating systems.

## HONORS

- Graduation with Distinction (Summa cum laude), Dr.-Ing., from the University of Stuttgart, 2007.
- Best Ph.D. student presentation award (jointly with Dipl.-Ing. P. Höfer) in the Fifth European Conference for Constitutive Models for Rubber (ECCMR), September 4-7, 2007, Paris, France.
- Graduation with Honors, M.Sc., from the master program COMMAS at the University of Stuttgart, 2002.
- Robert Bosch GmbH Scholarship – 2000-2002.
- Graduation with Honors, B.Sc., from the Department of Civil Engineering at the Middle East Technical University, 1999.

## PROFESSIONAL MEMBERSHIPS

- 1999– Turkish Chamber of Civil Engineers (TMMOB-IMO)
- 2007– International Association of Applied Mathematics and Mechanics (GAMM · Gesellschaft für Angewandte Mathematik und Mechanik e.V.)
- 2008– Stanford Cardiovascular Institute

## PROFESSIONAL ACTIVITIES

- Referee for:
  - International Journal of Solids and Structures (IJSS)
  - International Journal for Numerical Methods in Engineering (IJNME)
  - ASME Journal of Applied Mechanics (JAM)
  - Computer Methods in Biomechanics and Biomedical Engineering (CMBBE)
  - Macromolecular Materials and Engineering (MME)

## THESES SUPERVISED

- M.Sc. Thesis “Finite Elastic and Inelastic Behavior of Rubbery Polymers: Experiments and Modeling” of Joel Méndez Diez, 2004. (Co-supervisor: S. Lee)<sup>†</sup>
- M.Sc. Thesis “A Formulation of Finite Viscoplasticity for Glassy Polymers in the Logarithmic Strain Space” of Arun P. Balasubramanian, 2004.<sup>†</sup>
- M.Sc. Thesis “Parameter Identification for Material Models from Inhomogeneous Experiments with Three-Dimensional Surface Matching” of Aruna Prakash, 2005. (Co-supervisor: A. Rieger)<sup>†</sup>
- M.Sc. Thesis “Approaches to Modeling of Thermoviscoplastic Behavior of Glassy Polymers” of Hüsnü Dal, 2005.<sup>†</sup>
- M.Sc. Thesis “Micromechanically Based Thermo-Viscoplasticity of Glassy Polymers: Experiments and Constitutive Modeling” of Harish Iyer, 2006. (Co-supervisor: J. Méndez)<sup>†</sup>
- M.Sc. Thesis “Temperature-Dependent Finite Viscoplasticity of Glassy Polymers: Experiments and Simulations” of Shaofei Qu, 2007. (Co-supervisor: J. Méndez)<sup>†</sup>
- Diploma Thesis “Anisotropic Finite Viscoelasticity of Rubber-like Materials” of Dirk Liefeth, 2007. (Co-supervisor: Dr. Stefan Kolling, Daimler AG)<sup>†</sup>

## REFERENCES

References will be provided upon request.

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<sup>†</sup> Jointly supervised with Prof. C. Miehe at the Institute of Applied Mechanics, Stuttgart.

## Publications

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JOURNAL  
PUBLICATIONS

C. Miehe, **S. Göktepe** and F. Lulei: "A Micro–Macro Approach to Rubber–Like Materials. Part I: The Non–Affine Micro–Sphere Model of Rubber Elasticity", *Journal of the Mechanics and Physics of Solids*, vol. 52, 2004, pp. 2617–2660.

C. Miehe and **S. Göktepe**: "A Micro–Macro Approach to Rubber–Like Materials. Part II: The Micro–Sphere Model of Finite Rubber Viscoelasticity", *Journal of the Mechanics and Physics of Solids*, vol. 53, 2005, pp. 2231–2258.

**S. Göktepe** and C. Miehe: "A Micro–Macro Approach to Rubber–Like Materials. Part III: The Micro–Sphere Model of Anisotropic Mullins–Type Damage", *Journal of the Mechanics and Physics of Solids*, vol. 53, 2005, pp. 2259–2283.

K. Garikipati, **S. Göktepe** and C. Miehe: "Elastica-based Strain Energy Functions for Soft Biological Tissue", *Journal of the Mechanics and Physics of Solids*, vol. 56, 2008, pp. 1693–1713.

**S. Göktepe** and C. Miehe: "Efficient Two-Scale Modeling of Finite Rubber Viscoelasticity", *Technische Mechanik*, vol. 28, 2008, pp.22–31.

C. Miehe, **S. Göktepe** and J. Méndez: "Finite Viscoplasticity of Glassy Polymers in the Logarithmic Strain Space", *International Journal of Solids and Structures*, vol. 46, 2009, pp.181–202.

**S. Göktepe** and E. Kuhl: "Computational Modeling of Cardiac Electrophysiology: A Novel Finite Element Approach", *International Journal for Numerical Methods in Engineering*, vol. 79, 2009, pp.156–178.

M. Kotikanyadanam, **S. Göktepe** and E. Kuhl: "Computational Modeling of Electrocardiograms: A Finite Element Approach Towards Cardiac Excitation", *Communications in Numerical Methods in Engineering*, DOI:10.1002/cnm.1273, 2009.

**S. Göktepe**, J. Wong and E. Kuhl: "Atrial and Ventricular Fibrillation - Computational Simulation of Spiral Waves in Cardiac Tissue", *Archive of Applied Mechanics*, DOI:10.1007/s00419-009-0384-0, 2009.

**S. Göktepe**, W. Bothe, J-P. E. Kvitting, J. C. Swanson, N. B. Ingels, D. C. Miller and E. Kuhl: "Anterior Mitral Leaflet Curvature in the Beating Ovine Heart: A Case Study Using Videofluoroscopic Markers and Subdivision Surfaces", *Biomechanics and Modeling in Mechanobiology*, DOI:10.1007/s10237-009-0176-z, 2009.

**S. Göktepe** and E. Kuhl: "Electromechanics of the Heart: A Unified Approach to the Strongly Coupled Excitation–Contraction Problem", *Computational Mechanics*, DOI:10.1007/s00466-009-0434-z, in press, 2009.

JOURNAL  
PUBLICATIONS  
(IN REVIEW)

W. Bothe, J-P. E. Kvitting, J. C. Swanson, **S. Göktepe**, K. N. Vo, N. B. Ingels and D. C. Miller: "How Do Annuloplasty Rings Affect Mitral Leaflet Dynamic Motion?", submitted for publication, 2009.

**S. Göktepe**, S. N. S. Acharya, J. Wong and E. Kuhl: "Computational Modeling of Passive Myocardium", submitted for publication, 2009.

- M. U. Polat, **S. Göktepe** and E. Gürses: "Prefabrikte Çerçeve ve Panel Duvar Yapısal Sistemlerin Deprem Davranışı ve Sismik Rehabilitasyonu", *Deprem ve Prefabrikasyon - 10. Prefabrikasyon Sempozyumu Bildiri Kitabı*, 2000, pp. 117–126. (In Turkish)
- S. Göktepe** and C. Miehe: "A New Micromechanically Based Approach for the Elastic Response of Rubber-like Materials at Large Strains", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 3, 2003, pp. 174–175.
- S. Göktepe** and C. Miehe: "The Micro-Sphere Model for Rubber Viscoelasticity: A Micromechanically Based Network Model for Polymers", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 4, 2004, pp. 191–192.
- S. Göktepe** and C. Miehe: "A Micromechanically Based Network Model for Rubbery Polymers Incorporating Mullins-Type Stress Softening", *Proceedings of the XXI International Congress of Theoretical and Applied Mechanics ICTAM 2004*, 15-21 August 2004, Warsaw, Poland.
- S. Göktepe**, J. Méndez and C. Miehe: "A Formulation of Finite Viscoplasticity for Amorphous Glassy Polymers in the Logarithmic Strain Space", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 5, 2005, pp. 269–270.
- S. Göktepe** and C. Miehe: "A Micro-Macro Approach to Rubbery Polymers Incorporating Anisotropic Evolution of Mullins-type Damage", In Austrell, P.-E., Kari, L. (Editors), *Constitutive Models for Rubber IV*, vol. 4, 2005, pp. 215–221.
- S. Göktepe** and C. Miehe: "Coupled Finite Thermoviscoplasticity of Glassy Polymers", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 6, 2006, pp. 437–438.
- J. Méndez, **S. Göktepe** and C. Miehe: "Experiments and Identifications for Finite Polymer Inelasticity", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 6, 2006, pp. 401–402.
- S. Göktepe** and C. Miehe: "An Efficient Micro-Macro Approach to Finite Rubber Viscoelasticity", In Boukamel et al. (Editors), *Constitutive Models for Rubber V*, vol. 5, 2007, pp. 119–125.
- S. Göktepe**, J. Méndez and C. Miehe: "Finite Thermoviscoplasticity of Amorphous Glassy Polymers: Experiments, Modeling and Simulations", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 7, 2007, pp. 4060041–4060042.
- J. Méndez, **S. Göktepe** and C. Miehe: "Temperature and Rate Effects in Finite Viscoplasticity of Glassy Polymers at Different Deformation Modes: Experiments and Simulations", *Proceedings in Applied Mathematics and Mechanics PAMM*, vol. 8, 2008, pp. 10445–10446.
- J. Ulerich, **S. Göktepe** and E. Kuhl: "First Attempts Towards the Computational Simulation of Novel Stem-Cell Based Post-Infarction Therapies", *Proceedings of the ASME Summer Bioengineering Conference*, Marco Island, Florida, USA, SBC2008-192715, 2008.
- S. Göktepe**, J. Ulerich and E. Kuhl: "How to Treat the Loss of Beat: Modeling and Simulation of Growth and Remodeling and Novel Post-Infarction Therapies", *Proceedings of the ASME Summer Bioengineering Conference*, Marco Island, Florida, USA, SBC2008-193159, 2008.
- S. Göktepe**, J. Ulerich, O. Abilez, C.K. Zarins and E. Kuhl: "Computational Design of Novel Stem Cell Based Therapies for Myocardial Infarction", *Proceedings of the XXII ICTAM*, Adelaide, Australia, 2008.
- J. Ulerich, **S. Göktepe** and E. Kuhl: "Dilation and Hypertrophy – A Cell-Based Continuum Mechanics Approach Towards Ventricular Growth and Remodeling", *Proceedings of the IUTAM Symposium on Cellular, Molecular and Tissue Mechanics*, Woods Hole, Massachusetts, USA, 2008.

**S. Göktepe** and E. Kuhl: "Electromechanics of Cardiac Tissue: A Unified Approach to the Fully Coupled Excitation-Contraction Problem", *Proceedings in Applied Mathematics and Mechanics PAMM*, to appear, vol. 9, 2009.

J. Wong, **S. Göktepe** and E. Kuhl: "Computational Simulation of Traveling Arrhythmic Waves in Myocardial Tissue", *Proceedings of the ASME Summer Bioengineering Conference*, Lake Tahoe, California, USA, SBC2009-206552, 2009.

LECTURE  
PRESENTATIONS

S. Göktepe and C. Miehe: "A New Micromechanically Based Approach for the Elastic Response of Rubber-like Materials at Large Strains", GAMM Annual Scientific Conference, March 24-28, 2003, Abano Terme, Italy.

S. Göktepe and C. Miehe: "The Micro-Sphere Model for Rubber Viscoelasticity: A Micromechanically Based Network Model for Polymers", GAMM Annual Scientific Conference, March 21-27, 2004, Dresden, Germany.

S. Göktepe: "A Micromechanically Based Constitutive Approach to the Modeling of Hysteresis Effects in Rubbery Polymers", Colloquium at the Chair of Applied Mechanics, University of Kaiserslautern, July 22, 2004, Kaiserslautern, Germany.

S. Göktepe and C. Miehe: "A Micromechanically Based Network Model for Rubbery Polymers Incorporating Mullins-Type Stress Softening", ICTAM 2004, XXI International Congress of Theoretical and Applied Mechanics, August 15-20, 2004, Warsaw, Poland.

S. Göktepe, J. Méndez and C. Miehe: "A Formulation of Finite Viscoplasticity for Amorphous Glassy Polymers in the Logarithmic Strain Space", GAMM Annual Scientific Conference, March 28-April 01, 2005, Luxembourg.

S. Göktepe and C. Miehe: "A Micro-Macro Approach to Rubbery Polymers Incorporating Anisotropic Evolution of Mullins-type Damage", Fourth European Conference for Constitutive Models for Rubber (ECCMR), June 27-29, 2005, Stockholm, Sweden.

S. Göktepe and C. Miehe: "Coupled Finite Thermoviscoplasticity of Glassy Polymers", GAMM Annual Scientific Conference, March 27-31, 2006, Berlin, Germany.

S. Göktepe, J. Méndez and C. Miehe: "Viscoplasticity of Glassy Polymers: Experiments, Modeling and Simulations", Hybrid Materials for High Performance Systems (HYPER), October 12-13, 2006, Darmstadt, Germany.

S. Göktepe and C. Miehe: "Two-Scale Modeling of Rubbery and Glassy Polymers", First GAMM/GACM-Seminar on Multiscale Material Modeling, April 20-21, 2007, Saarbrücken, Germany.

S. Göktepe, J. Méndez and C. Miehe: "Finite Thermoviscoplasticity of Amorphous Glassy Polymers: Experiments, Modeling and Simulations" GAMM Annual Scientific Conference, July 16-20, 2007, Zurich, Switzerland.

S. Göktepe and C. Miehe: "An Efficient Micro-Macro Approach to Finite Rubber Viscoelasticity", Fifth European Conference for Constitutive Models for Rubber (ECCMR), September 4-7, 2007, Paris, France.

S. Göktepe: "Computational Modeling of Cardiac Electromechanics", Series of three lectures in Computational Mechanics of Materials and Structures (COMMAS) Summer School, October 6-10, 2008, Stuttgart, Germany.

S. Göktepe: "Micro-Macro Approaches to Rubbery and Glassy Polymers: Predictive Micromechanically-Based Models and Simulations", Middle East Technical University (METU), Structural Mechanics Laboratory, October 20, 2008, Ankara, Turkey.

S. Göktepe and E. Kuhl: "Electromechanics of Cardiac Tissue: A Unified Approach to the Fully Coupled Excitation-Contraction Problem", GAMM Annual Scientific Conference, February 9-13, 2009, Gdansk, Poland.

S. Göktepe and E. Kuhl: "A New Computational Approach to Fully Coupled Excitation- Contraction in Cardiac Electromechanics", 10. US National Congress on Computational Mechanics (USNCCM X), July 16-19, 2009, Columbus, OH, USA.

S. Göktepe and E. Kuhl: "Consistent Computational Procedures for Fully Coupled Excitation-Contraction in Cardiac Electromechanics", 1st International Conference on Material Modelling, September 15-17, 2009, Dortmund, Germany.