

Assistant Professor

Department of Mechanical Engineering, University of California, Merced

Other Affiliations: [Timetooth Technologies, Inc.](#), Health Science Research Institute (HSRI), UC Merced; SysIDEA Lab, IIT-Gandhinagar

M.S., Ph.D. 2006 (**Mechanical Engineering and Scientific Computing**, University of Michigan, Ann Arbor)

B.Tech. 1997 (**Mechanical Engineering**, Indian Institute of Technology, Varanasi, India)

Research Expertise and Interests

Core Expertise:

Nonlinear Continuum Mechanics, Computational Dynamics and Controls

Cross-disciplinary Expertise:

Single-Molecule Experiments, Theoretical Biophysics, Biochemistry, Molecular Biology, System Identification and Inverse Methods, Machine Learning

Research Page: <https://me.ucmerced.edu/research-areas/biomechanics-and-mechano-biology>

Awards and Honors

- NSF CAREER Award 2021
- Ali H. Nayfeh Prize in recognition of the exceptional, original research submitted to the NODYCON2019 Proceedings
- Best Paper Award at ASME IDETC 2019 in Nonlinear Dynamics
- Excellence-in-Research Fellowship, which accompanies a monthly honorarium over and above the regular salary at Indian Institute of Technology
- Ivor K. McIvor Award for outstanding research and scholarship in Applied Mechanics, College of Engineering, University of Michigan
- Rackham Pre-doctoral Fellowship, University of Michigan, the most prestigious graduate student fellowship
- Fellowship award to attend the 4th Q-Bio conference, Santa Fe, NM, 2010 from its sponsors, Los Alamos National Lab and Center for Nonlinear Studies
- Best Presentation award in Graduate Student Symposium, Bioengineering, Mechanical Engineering, University of Michigan
- Graduate Fellowship by Mechanical Engineering Department, University of Michigan
- 1st Rank in a Junior Year semester of B.Tech., ITBHU, India
- B.D. Bangur trust fellowship for study abroad

Professional Societies and Technical Committee Memberships

- Secretary (elected), Technical Committee – Multibody Systems, Nonlinear Dynamics, and Control (MSNDC), American Society of Mechanical Engineers (ASME)
- Co-chair, ASME Fellowship Subcommittee, MSNDC
- Co-chair, Publication and Information Subcommittee, MSNDC
- Member, International Scientific Advisory Committee of the International Conference on Mechanics in Medicine and Biology (ICMMB)
- American Society of Mechanical Engineers (ASME), Member
- IEEE, Member
- Biophysical Society, Member
- Society of Neuroscience (SfN), Member

Conferences and Workshops Organized

- Organizer, 17th International Virtual Online Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2021
- Program Chair, 16th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2020
- Chair/ Organizer, 13th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2017
- Co-organizer, Mini-Symposium on Nonlinear Dynamics in Biological Systems, 9th European Nonlinear Dynamics Conference (ENOC) by European Mechanics Society (EUROMECH) in Budapest, Hungary, in 2017
- Organizer, Student Paper Competition, 12th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2016
- Co-organizer, Symposium on Biomechanics, 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2015
- Organizer, Symposium on Biomechanics, 10th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2014
- Co-organizer, Mini-Symposium on Nonlinear Dynamics in Biological Systems, 8th European Nonlinear Dynamics Conference (ENOC) by European Mechanics Society (EUROMECH) in Vienna, Austria, in 2014
- Member, Conference Coordination Committee, 9th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2013
- Co-organizer, Symposium on Biomechanics, 9th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2013
- Co-organizer, Symposium on Molecular Modeling Methods and Applications, 7th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) in ASME IDETC 2009
- Invited Instructor, Full 3-day hands-on workshop on “Applied Computational Dynamics” for practitioners in CAE/ MBD industry organized and sponsored by Altair Eng. Inc., Bangalore, India in Jan 2009

Workshops Attended

- Workshop on Mathematical Foundations of Mechanical Biology, Banff, Alberta, Canada, Sept 2010 **(By invitation)**
- Summer School in the Center for the Physics of Living Cells (CPLC), Urbana-Champaign, July 2010
- NSF, AFOSR, ARO, ONR, NIH, USDA Workshop on New Frontiers in Dynamic Systems, Mar 2007 **(By invitation)**
- ICAM workshop on Physics of cellular objects, Cargèse, France, Aug 2006

STEM (Science, Technology, Engineering and Mathematics) Outreach in American Education

- Participated in the TEAM-E Science Project (Teaching, Experimentation and Mentoring through Engineering) for STEM outreach in Central Valley of CA as a UCM faculty member
- Developed discovery-based learning modules with physical toy models of DNA for K-12 students as a part of NSF funded outreach program of Cornell Center of Materials Research (CCMR)
- Conducted several educational programs for Cornell consumer science club, Nottingham high school, Bronx Science high school, etc.
- Offered teachers’ training workshop on “Mechanics of DNA” in Center for Nanoscale Systems Institute for Physics Teachers (CIPT)

Other Professional Activities

- Panel Reviewer, National Science Foundation (NSF), CMMI division
- Panel Reviewer, Netherlands Foundation for Fundamental Research on Matter, FOM
- Reviewer, Cambridge University Press, for textbooks in the field of computational dynamics and continuum mechanics
- Invited Instructor, Remote teaching at the Indian Institute of Technology, Gandhinagar (IIT-GN)
- Invited talks at several places including University of Maryland, Texas Tech University, Miami University, University of Auckland, Rensselaer Polytechnic Institute, Syracuse University, Tufts University, Tulane University, Bronx Science High School, Indo-Australia Symposium on Multifunctional Nanomaterials, Nanostructures and Applications (MNNA 2007), Indian Institutes of Technology, Institute of Engineering and Technology (IET), BIRS conference, Agilent Technologies, Inc., etc.
- Associate Editor, Journal of Mechanics in Medicine and Biology (JMMB)

- Guest Editor, Special Edition of ASME Journal of Nonlinear and Computational Dynamics (JCND)
- Reviewer, PLOS-ONE, Proceedings of the Royal Society A, ASME Journals (Journal of Applied Mechanics, Journal of Computational and Nonlinear Dynamics, Journal of Vibrations and Acoustics, Applied Mechanics Reviews), Journal of Elasticity, International Journal of Nonlinear Mechanics, International Journal of Structural Stability and Dynamics, European Journal of Mechanics, Journal of Mechanics in Medicine and Biology, Nonlinear Dynamics (NODY), Journal of the Mechanics and Physics of Solids, Journal of Physics A: Mathematical and Theoretical, Mathematics and Computers in Simulation, Journal of Statistical Mechanics, Biophysical Journal, Nucleic Acids Research (NAR), Automatica, IEEE-CDC, etc.
- Member of the advisory board of [Timetooth Technologies, Inc.](http://www.timetoothtechnologies.com), a company that specializes in CAE-based research and development services
- Panelist, Interview and Campus Recruitment at several IITs for TimeTooth Technologies, Inc.
- Media coverage: <http://www.ucmerced.edu/news/professor-and-students-study-deformations-increase-health>
<http://esciencecommons.blogspot.com/2011/01/undersea-cables-add-twist-to-dna-study.html>

Education

University of Michigan

MS + PhD, Mechanical Engineering and Scientific Computing (dual degree)

Ann Arbor, MI

May 2006

Dissertation Title: “A Dynamic Rod Model to Simulate Mechanics of Underwater Cables and DNA.” [\[PDF\]](#)

Relevant Graduate Coursework: Boundary Value Problems, Numerical Methods, Finite Element Method, Computational Inelasticity, Mechanical Vibrations, Analytical and Computational Dynamics, Vehicle Dynamics and Control, Linear Feedback Control, Nonlinear Systems and Control, Multi-Physical Phenomenon at Micro-scale, Biophysics of DNA and Proteins.

IIT Varanasi

B.Tech, Mechanical Engineering

Varanasi, UP, India

May 1997

Undergrad Project: “Conceptual Design of Ordinary Disc Cam Mechanism for Indexing Motion.” (thesis + demonstration with a working prototype)

Professional Experience

University of California

Assistant Professor

Merced, CA

July 2012 - present

- Regular graduate courses taught: Introduction to Multi-body Dynamics and Continuum Mechanics
- Regular undergraduate courses taught: Strength of Materials, Introduction to Multi-body Dynamics
- Other teaching service: Capstone Design, Service Learning, SPARK Seminar
- Launched online version of Strength of Materials course
- Launched a co-joined graduate and undergraduate course on “Introduction to Multi-body Dynamics”
- Several Committee services (faculty search, graduate council, academic personnel, department-level committees, Ph.D. and M.S. thesis committees, etc.)
- Advised Ph.D. students, M.S. students and several undergraduate student researchers

Indian Institute of Technology (IIT)

Assistant Professor (Employed by invitation)

Gandhinagar, India

Dec 2011 – Apr 2012

- Undergraduate courses taught: Simulation-Driven Engineering, Numerical Methods
- Mentored students on graduate research projects and B.Tech projects
- Administrative activities for building the new institute – faculty, scholars and student recruitments, campus planning, strategic planning, curriculum planning, proposal for design innovation center (DIC), multiversity initiatives in Gujarat state, etc.
- Served on interview panels for TimeTooth Technologies Inc. at several IITs

Emory University

Post-doctoral Fellow

Atlanta, GA

Jan 2010 – Dec 2011

- Performed magnetic-tweezers experiments to analyze non-specific interactions of CI proteins with DNA

- Analyzed Fluorescence Correlation Spectroscopy (FCS) experiments on CI-DNA interactions
- Applied Mechanics perspective on the theoretical and experimental Biophysics of DNA deformations
- Mentored several undergraduate and graduate students

Cornell University

Ithaca, NY

Visiting Assistant Professor

Aug 2007 – Dec 2009

- Undergraduate courses taught: Mechanics of Solids, Calculus for Engineers, Differential Equations for Engineers, Linear Systems
- Graduate courses taught: Intermediate Dynamics, Applied Computational Dynamics.
- Advised M.Eng. projects and co-advised Ph.D. students. Projects mentored:
 - Development of an interactive JAVA-based Multibody Dynamic Simulator.
 - Modeling the role of micro-fibril buckling in the gecko-inspired adhesion mechanics.
 - Kinematics and compliance (K&C) analysis and design optimization of a BMW car suspension
 - Multi-body simulation of a spring-mass pattern constituting a beam structure in long-length scale
- STEM Outreach activities: Bronx Science High School, other upstate NY schools, NSF funded Cornell Outreach
- Served on interview panels for Ph.D. qualifying exams

Woods Hole Oceanographic Institution

Woods Hole, MA

Post-doctoral Scholar

Oct 2006 – July 2007

- Extended research on applications to computational rod model to DNA and underwater cables
- Taught underwater sonar detection techniques to summer students on educational cruises

University of Michigan

Ann Arbor, MI

Research Fellow (post-doc)

June 2006 – Sept 2006

Research Assistant

Sept 2001 – April 2006

- Developed a dynamic rod model to simulate nonlinear structural mechanics of underwater cables and DNA
- Employed the model to conduct specific studies ranging from underwater cable applications to DNA-Protein interactions
- Provided insights for future experiments on DNA from model simulations
- Mobilized an interdisciplinary effort from research teams in Biophysics, Biochemistry and Mechanical Engineering departments within the University of Michigan

Teaching Assistant

Jan 2005 – April 2005

- Taught Graduate level course on Vehicle Dynamics (Tire Mechanics, Ride and Handling)
- Delivered video-recorded classroom sessions for off-campus students (employees of automotive industry)
- Guest lecture for a sophomore level course on Solid Mechanics (*Fall 2005*)

Independent Research

Jan 2001-April 2001

- Improved the method of “Component Mode Synthesis” to simulate mid-frequency range vibrations of welded structural assemblies (funded by automotive research center)

Larsen & Toubro Limited

Powai Works, Mumbai, India

Executive Engineer (Turnkey Projects)

July 1997 – July 2000

Turnkey Projects Division of Larsen & Toubro Limited develops infrastructure in four industrial sectors: - Oil and Gas, Power Plants, Cement Plants and Chemical Plants. In the first two years, I underwent versatile training through job rotation in all four sectors with different functional roles: Marketing, Engineering, Execution, and Erection & Commissioning. After two years, I opted to work in Oil and Gas Projects. I played a leadership role from Marketing to Detailed Engineering in “**Pipelines & Platform Modifications Project**” (Site: Bombay High & Neelam offshore oil-fields, Client: Oil & Natural Gas Corporation Limited, Engineering Consultant: Engineers India Limited).

- Coordinated engineering and procurement activities with consortium partners/consultants
- Developed vendors and followed-up procurement
- Optimized fabrication and procurement logistics
- Managed site construction, fabrication and commissioning
- Planned and negotiated with clients the milestones-based project billing schedules
- Performed proposal engineering and contract negotiation at the tendering stage
- Developed project plans using pert and monitored their execution/ progress
- Organized project specific taskforce and planned their work interface
- Implemented ERP (enterprise resource planning) in engineering and procurement and provided the end-user training

Escorts Yamaha Motors Limited

NOIDA, India

Intern

May – June 1996

- Studied and improved process plan and design of shock absorber assembly layout

Bharat Heavy Electricals Limited

Haridwar, India

Intern

May – June 1995

- Studied fabrication and assembly of 150MW gas turbine and its trial runs in a balancing tunnel.
- Learnt and supervised non-destructive testing (NDT) of welded structures.

Publications

Journal Articles:

Teaching Research:

1. Fatehiboroujeni, S., A. Qattawi and **S. Goyal**, 2020, “*Understanding Gaps in Student Engagement and Motivation in Online and Hybrid Mechanical Engineering Courses*”, **Journal of Online Engineering Education**, vol. 11 (1), Article 1.

Technical Research:

2. Fatehiboroujeni, S., A. Gopinath and **S. Goyal**, 2021, “*Three-dimensional nonlinear dynamics of prestressed active filaments: Flapping, swirling, and flipping*”, **Physical Review E**, vol. 103 (1), 013005.
3. Fatehiboroujeni, S., N. Petra and **S. Goyal**, 2020, “*Linearized Bayesian inference for Young’s modulus parameter field in an elastic model of slender structures*”, **Proceedings of the Royal Society A**, vol. 476 (2238), 20190476.
4. Shah, V. V., **S. Goyal** and H. J. Palanhandalam-Madapusi, 2020, “*Comparison of Theories of Rest Tremor Mechanism in Parkinson’s Disease: Central Oscillator (Source-triggered Oscillations) and Feedback-induced Instability in the Sensorimotor Loop (Self-sustained Oscillations)*”, **Journal of Mechanics in Medicine and Biology**, vol. 20 (04), 1950075.
5. Mishra, A., A. Hemeda, M. Torabi, J. Palko, **S. Goyal**, D. Li, Y. Ma, 2019, “*A simple analytical model of complex wall in multibody dissipative particle dynamics*”, **Journal of Computational Physics**, vol. 396, 416-426.
6. Fatehiboroujeni, S., A. Gopinath and **S. Goyal**, 2018, “*Nonlinear Oscillations Induced by Follower Forces in Prestressed Clamped Rods Subjected to Drag*”, **ASME Journal of Computational and Nonlinear Dynamics**, vol. 13 (12), pp. 121005.
7. Fatehiboroujeni, S., H. Palanhandalam-Madapusi and **S. Goyal**, 2018, “*Computational rod model with user-defined nonlinear constitutive laws*”, **ASME Journal of Computational and Nonlinear Dynamics**, vol. 13 (10), pp. 101006.
8. Sarkar-Banerjee, S., **S. Goyal**, N. Gao, J. Mack, B. Thompson, D. Dunlap, K. Chattopadhyay and L. Finzi, 2018, “*Specifically bound lambda repressor dimers promote adjacent non-specific binding*”, **PLoS one**, vol. 13 (4), pp. e0194930.
9. Shah, V. V., **S. Goyal** and H. J. Palanhandalam-Madapusi, 2017, “*A Possible Explanation of How High-frequency Deep Brain Stimulation Suppresses Low-frequency Tremors in Parkinson’s Disease*”, **IEEE Transactions on Neural Systems & Rehabilitation Engineering**, vol. 25 (12), pp. 2498-2508.
10. Shah, V. V., **S. Goyal** and H. J. Palanhandalam-Madapusi, 2017, “*Clinical Facts Along With a Feedback Control Perspective Suggest That Increased Response Time Might Be the Cause of Parkinsonian Rest Tremor*”, **ASME Journal of Computational and Nonlinear Dynamics**, vol. 12 (1), pp. 011007.
11. Hinkle, A. R., **S. Goyal** and H. J. Palanhandalam-Madapusi, 2012, “*Constitutive-law Modeling of Microfilaments from their Discrete-Structure Simulations - A Method based on an Inverse Approach Applied to a Static Rod Model*”, **ASME Journal of Applied Mechanics**, vol. 79 (5), pp. 51005.
12. Haeusler, A., K. Goodson, T. Lillian, **S. Goyal**, N. C. Perkins and J. D. Kahn, 2012, “*FRET Studies of a Landscape of Lac*

Repressor Mediated DNA Loops”, **Nucleic Acids Research**, vol. 40 (10), pp. 4432-4445.

13. **Goyal, S.**, C. Fountain, D. Dunlap, F. Family and L. Finzi, 2012, “*Stretching DNA to quantify non-specific protein binding*”, **Physical Review E**, vol. 86 (1), 011905.
14. Shao, Q., **S. Goyal**, D. Dunlap and L. Finzi, 2012, “*Physiological Levels of Salt and Polyamines Favor Writhe and Limit Twist in DNA*”, **Macromolecules**, vol. 45 (7), pp 3188–3196.
15. Palanthandalam-Madapusi, H. J. and **S. Goyal**, 2011, “*Is Parkinsonian Tremor a Limit Cycle?*”, **Journal of Mechanics in Medicine and Biology**, vol. 11 (5), pp. 1017–1023.
16. Palanthandalam-Madapusi, H. J. and **S. Goyal**, 2011, “*Robust estimation of nonlinear constitutive law from static equilibrium data for modeling the mechanics of DNA*”, **Automatica**, vol. 47 (6), pp. 1175-1182.
17. Naderman, N., A. Kumar, **S. Goyal** and C. Hui, 2010, “*Buckling of sheared rods and friction of microfibril arrays*”, **Journal of the Royal Society Interface**, vol. 7 (52), pp. 1581-1589.
18. Liebesny, P., **S. Goyal**, D. Dunlap, F. Family and L. Finzi, 2010, “*Determination of the number of proteins bound non-specifically to DNA*”, **Journal of Physics: Condensed Matter**, Special Issue: From DNA inspired physics to physics inspired biology, vol. 22(41), 414104.
19. Lillian, T., **S. Goyal**, J. D. Kahn, E. Meyhöfer and N. C. Perkins, 2008, “*Computational Looping Analysis of a Large Family of Highly Bent DNA by LacI*”, **Biophysical Journal**, vol. 95, pp. 5832-5842.
20. **Goyal, S.**, and N.C. Perkins, 2008, “*Looping mechanics of rods and DNA with non-homogeneous and discontinuous stiffness*”, **International Journal of Nonlinear Mechanics**, vol. 43(10), pp. 1121-1129.
21. **Goyal, S.**, N.C. Perkins and C.L. Lee, 2008, “*Non-linear dynamic intertwining of rods with self-contact*”, **International Journal of Nonlinear Mechanics**, vol. 43(1), pp. 65-73.
22. **Goyal, S.**, N.C. Perkins and J.C. Meiners, 2008, “*Resolving the Sequence-Dependent Stiffness of DNA using Cyclization Experiments and a Computational Rod Model*”, **ASME Journal of Computational and Nonlinear Dynamics**, vol. 3(1), 01103.
23. **Goyal, S.**, T. Lillian, S. Blumberg, J. C. Meiners, E. Meyhöfer and N. C. Perkins, 2007, “*Intrinsic Curvature of DNA Influences Lac-R Mediated Looping*”, **Biophysical Journal**, vol. 93, pp. 4342-4359.
24. **Goyal, S.**, N.C. Perkins and C.L. Lee, 2005, “*Nonlinear Dynamics and Loop Formation in Kirchhoff Rods with Implications to the Mechanics of DNA and Cables*”, **Journal of Computational Physics**, vol. 209, pp. 371-389.

Peer-reviewed Conference Articles:

Teaching Research:

25. S. Fatehboroujeni, A. Qattawi and **S. Goyal**, 2019, “*Assessing and Improving Student Engagement and Motivation in Mechanical Engineering Online Courses*”, Proceedings of the **American Society for Engineering Education**, Paper ID #25033.

Technical Research:

26. M. Mortazavi, V. Ayyaswamy, A. Gopinath and **S. Goyal**, 2021, “*Fluid-Structure Interaction of Slender Biofilaments at Low Reynolds Numbers*”, Proceedings of the **ASME 2021 IMECE**.
27. S. Fatehboroujeni, D. Hollenbeck, A. Mishra and **S. Goyal**, 2021, “*Post-buckling Stability of a Cantilever Beam with Cubic Non-linearity in Constitutive Laws*”, Proceedings of the **ASME 2021 IDETC/CIE**.
28. S. Fatehboroujeni, A. Gopinath and **S. Goyal**, 2019, “*Effect of Boundary Constraints on the Nonlinear Flapping of Filaments Animated by Follower Forces*”, Springer Proceedings of the **1st International Nonlinear Dynamics**

Conference NODYCON 2019. (Ali H. Nayfeh Prize winner)

29. S. Fatehiboroujeni, A. Gopinath and **S. Goyal**, 2018, “*Follower Forces in Pre-Stressed Fixed-Fixed Rods to Mimic Oscillatory Beating of Active Filaments*”, Proceedings of the **ASME 2018 IDETC/CIE. (Best Paper Award)**
30. S. Fatehiboroujeni, N. Petra and **S. Goyal**, 2016, “*Towards Adjoint-Based Inversion of the Lamé Parameter Field for Slender Structures With Cantilever Loading*”, Proceedings of the **ASME 2016 IDETC/CIE.**
31. Shah, V.V., **S. Goyal** and H. J. Palanthandalam-Madapusi, 2016, “*A perspective on the use of high-frequency stimulation in deep brain stimulation for Parkinson's disease*”, Proceedings of the **Indian Control Conference (ICC).**
32. Gray, J., S. Fatehiboroujeni and **S. Goyal**, 2015, “*Robustness analysis of algorithms to estimate constitutive laws of biological filaments*”, Proceedings of the **ASME 2015 IMECE**, V014T11A006.
33. Fatehiboroujeni, S., **S. Goyal** and A. Gramada, 2015, “*A Method for identification of the Constitutive Law of Biological Filaments from their Dynamic Equilibria*”, Proceedings of the **ASME 2015 IDETC/CIE.**
34. Chavan, R., H. Palanthandalam-Madapusi and **S. Goyal**, 2015, “*Estimating Constitutive Law of a Filament From its Deformed Shapes Using Input Reconstruction*”, Proceedings of the **ASME 2015 IDETC/CIE.**
35. Shah, V. V., **S. Goyal** and H. Palanthandalam-Madapusi, 2015, “*A Biomechanical Approach to Diagnosis and Monitoring of Parkinson's Disease*”, Proceedings of the **ASME 2015 IDETC/CIE.**
36. Shah, V.V., **S. Goyal** and H. J. Palanthandalam-Madapusi, 2015, “*Exploration of Diagnosis of Parkinson's Disease before Onset of Tremor*”, Proceedings of the **Indian Control Conference (ICC).**
37. Rafati, J., M. Asghari and **S. Goyal**, 2014, “*Effects of DNA Encapsulation on Buckling Instability of Carbon Nanotube Based on Nonlocal Elasticity Theory*”, Proceedings of the **ASME 2014 IDETC/CIE.**
38. Shah, V.V., **S. Goyal** and H. J. Palanthandalam-Madapusi, 2014, “*Experimental verification of observations relating to Parkinsonian tremor*”, Proceedings of the **American Control Conference (ACC)**, 2014, 2395-2400.
39. Appanasamy, N.R. and **S. Goyal**, 2014, “*Beaded elastic rods to simulate the diffusive dynamics of biofilament deformations*”, Proceedings of the **Biomedical Engineering (MECBME), 2014 Middle East Conference on**, 71-74.
40. **S. Goyal**, 2013, “*Modeling Thermal Fluctuations of Bio-filaments with Elastic Rod Theory*”, Proceedings of the **ASME 2013 IDETC/CIE.**
41. Verma, S., H. J. Palanthandalam-Madapusi and **S. Goyal**, 2012, “*Simulation-Based Analysis of constitutive behaviour of Microtubules*”, Proceedings of the **3rd Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2012)**, Indian Institute of Technology, New Delhi, India, December, pp. 11009.
42. **S. Goyal**, and Palanthandalam-Madapusi, H. J., 2012, “*Modeling Thermal Fluctuations of Bio-filaments with Kirchhoff Rods*”, Proceedings of the **3rd Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2012)**, Indian Institute of Technology, New Delhi, India, December, pp. 11013.
43. Palanthandalam-Madapusi, H. J. and **S. Goyal**, 2010, “*Modeling Structural Deformations of DNA Molecules Using Identification Techniques*”, Proceedings of the **49th IEEE Conference on Decision and Control**, Atlanta, USA, December, pp. 3385 - 3390. (**Invited Session on “System Identification in Biology and Medicine”**)
44. Ruimi, A., **S. Goyal** and Nour, B. M., 2009, “*An Interactive Web-based Simulation Tool for Surgical Threads*”, Proceedings of the **International Conference on Biological and Biomedical Engineering**, Amsterdam, the Netherlands, Sept. 23-25, 2009.
45. Hinkle, A. R., **S. Goyal** and Palanthandalam-Madapusi, H. J., 2009, “*An Estimation Method of a Constitutive-Law for the Rod Model of DNA using Discrete Structure Simulations*”, Proceedings of **ASME International Design Engineering Technical Conferences: 7th International Conference on Multibody Systems, Nonlinear Dynamics, and Control**, San Diego, CA.

46. Palanhandalam-Madapusi, H. J. and **S. Goyal**, 2008, “*Estimation of Nonlinear Sequence-dependent Constitutive Law for DNA Molecules*”, Proceedings of the 47th **IEEE Conference on Decision and Control**, Cancun, Mexico, December, pp. 2674-2679.
47. Wilson, D., T. Lillian, **S. Goyal**, A. Tkachenko, N. C. Perkins and J. C. Meiners, 2007, “*Understanding the Role of Thermal Fluctuations in DNA Looping*”, **Proceedings of SPIE**, Vol. 6602, 660208, Florence, Italy.
48. Lillian, T., N.C. Perkins and **S. Goyal**, 2007, “*Computational Elastic Rod Model Applied to DNA Looping*”, CD-ROM Proceedings of **ASME Design Engineering Technical Conference: 6th International Conference on Multibody Systems, Nonlinear Dynamics, and Control**, Las Vegas, NV.
49. **Goyal, S.** and N.C. Perkins, 2005, “*A Hybrid Rod-Catenary Model to Simulate Nonlinear Dynamics of Cables with Low and High Tension Zones*”, Proceedings of **ASME Design Engineering Technical Conference: 5th International Conference on Multibody Systems, Nonlinear Dynamics, and Control**, vol. 6 C, pp. 1691-1698.
50. **Goyal, S.**, T. Lillian, N.C. Perkins and E. Meyhöfer, 2005, “*Cable dynamics applied to long-length scale mechanics of DNA*”, CD-ROM Proceedings of Sixth International Symposium on Cable Dynamics, Charleston, SC. (**Keynote Speech**) [\[PDF\]](#)
51. **Goyal, S.** and N.C. Perkins, 2005, “*Modeling of Cables with High and Low Tension Zones using a Hybrid Rod-Catenary Formulation*”, CD-ROM Proceedings of Sixth International Symposium on Cable Dynamics, Charleston, SC. [\[PDF\]](#)
52. **Goyal, S.**, N.C. Perkins and C.L. Lee, 2003, “*Torsional buckling and writhing dynamics of elastic cables and DNA*”, Proceedings of **ASME Design Engineering Technical Conference: 19th Biennial Conference on Mechanical Vibration and Noise**, 2003, vol. 5 A, pp. 183-191.
53. **Goyal, S.**, N.C. Perkins and C.L. Lee, 2003, “*Writhing Dynamics of Cables with Self-contact*”, Proceedings of Fifth International Symposium on Cable Dynamics, Santa Margherita Ligure, Italy, pp. 27-36.

Conference Abstracts:

J. Nguessan and **S. Goyal**, “*Investigating Whether Feedback Delay Induced Limit-cycle Oscillations Must Diminish With Large Scale Motions Or Not*”, Aug 17-19, 2021, Presentation-only Abstract in ASME IDETC 2021 Virtual Conference.

Goyal, S. and H. J. Palanhandalam Madapusi, “*A New Approach to Understand Motor Symptoms of Parkinson’s Disease with Implications in Diagnosis and Treatment*”, Oct 11-13, 2017, Tysons Corner, Virginia, ASME Dynamic Systems and Control Conference. (**Invited Talk - Had to decline due to personal circumstances**)

Mehrabadi, G. L., A. Mishra, S. Fatehiboroujeni and **S. Goyal**, “*Modeling Nonlinear Dynamics of Biological Filaments in Continuum Limit*”, Aug 6-9, 2017, Cleveland, OH, Proceedings of the ASME 2017 IDETC/CIE.

Fatehiboroujeni, S., D. Hollenbeck and **S. Goyal**, “*Effect of softening constitutive law on column buckling*”, Jun 25 – Jun 30, 2017, Budapest, Hungary, European Nonlinear Dynamics Conference (ENOC).

Goyal, S. and H. J. Palanhandalam Madapusi, “*A New Approach to Understand Motor Symptoms of Parkinson’s Disease with Implications in Diagnosis and Treatment*”, May 24-25, 2017, Melbourne, Australia, International Conference on Mechanics in Medicine and Biology 2017. (**Poster**)

Fatehiboroujeni, S., N. Petra and **S. Goyal**, “*Bayesian Inversion of the Elasticity Field*”, The 2nd Central Valley Regional SIAM Student Chapter Conference, April 2017, University of California, Merced.

Fatehiboroujeni, S. and **S. Goyal**, “*Deriving Mechanical Properties of Microtubules from Molecular Simulations*”, Feb 20-Feb 24, 2017, HI, USA, 5th Annual Winter q-bio Conference (**Poster**)

Shah, V. V., T. Homayouni, **S. Goyal** and H. J. Palanhandalam Madapusi, “*Does impaired reaction time cause rest tremor in Parkinson’s disease*”, Nov 12-16, 2016, San Diego, CA, Neuroscience 2016, Abstract Control Number 3171. (**Poster**)

Fatehiboroujeni, S., D. Hollenbeck and **S. Goyal**, “*Effect of softening constitutive law on column buckling*”, Aug 21-24, 2016, Charlotte, NC, Proceedings of the ASME 2016 IDETC/CIE, Paper No. IDETC2016-60629.

Homayouni, T., V. V. Shah, **S. Goyal** and H. J. Palanhandalam-Madapusi, “*Feedback Delay Can Cause Rest Tremor in Parkinson's Disease*”, Aug 21-24, 2016, Charlotte, NC, Proceedings of the ASME 2016 IDETC/CIE, Paper No. IDETC2016-60630.

Hollenbeck, D., S. Fatehiboroujeni, and **S. Goyal**, “*Effect of non-linear constitutive law on column buckling*”, Aug 21-26, 2016, Montreal, Canada, Proceedings of the 24th International Congress of Theoretical and Applied Mechanics (ICTAM).

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