Stanford

Paul Mitiguy

Lecturer

Mechanical Engineering

Curriculum Vitae available Online

Bio

BIO

From Milton MA and shaped by La Salettes with Shaker roots, Paul did his undergraduate work at Tufts University and his mechanical engineering graduate work (PhD) at Stanford under Thomas Kane.

As a young adult, Paul worked summers landscaping, farming, logging, and construction, then worked at MIT Lincoln Laboratory, NASA Ames, Knowledge Revolution, and MSC.Software, was a consulting editor for McGraw-Hill (mechanics), and has been a consultant for the software, robotics, biotechnology, energy, automotive, and mechanical/aerospace industries.

He helped develop force/motion software used by more than 12 million people worldwide and translated into 11 spoken languages. These software applications include Interactive Physics, Working Model 2D/3D, MSC.visualNastran 4D (now SimWise), NIH Simbody/OpenSim, and the symbolic manipulators Autolev/MotionGenesis.

Paul currently works on Drake, open-source software developed by TRI (Toyota Research Institute) to simulate robots. In his role as Lead TRI/Stanford Liaison for SAIL (Toyota's Center for AI Research at Stanford), he facilitates research between TRI and Stanford.

At Stanford, Paul greatly enjoys working with students and teaches mechanics (physics/engineering), controls/vibrations, and advanced dynamics & computation/simulation. He has written several books on dynamics, computation, and control (broadly adopted by universities and professionals).

Paul is highly appreciative of support from Stanford alumni Dave Baszucki (Roblox CEO). Paul greatly appreciates having worked with Dave and team in developing internationally acclaimed physics, engineering, and educational software, including Interactive Physics, Working Model, and MSC.visualNastran.

He is very grateful to students, co-instructors (TAs), faculty, and staff.

ACADEMIC APPOINTMENTS

- Lecturer, Mechanical Engineering

ADMINISTRATIVE APPOINTMENTS

- Lead TRI/Stanford Liaison, Toyota Research Institute, (2018- present)

HONORS AND AWARDS

- Tau Beta Pi Teaching Honor Roll (one of 12 instructors in school of engineering), Tau Beta Pi (2022)
- Tau Beta Pi Teaching Honor Roll (one of 12 instructors in school of engineering), Tau Beta Pi (2019)
- Tau Beta Pi Teaching Honor Roll (one of 12 instructors in school of engineering), Tau Beta Pi (2018)
- Tau Beta Pi Teaching Honor Roll (one of 12 instructors in school of engineering), Tau Beta Pi (2017)
- Tau Beta Pi Professor of the Year, Tau Beta Pi (2010)
- SOLE Diversity Professor of the Year/Keynote, Stanford Society of Latino Engineers (2007, 2008, 2012, 2017, 2019)
- Co-PI Stanford K-12 Challenge, Stanford (2008)
- Outstanding Achievement in Engineering Practice (mid-career award), Tufts University (2003)
- NDES Best Desktop Software award, MSC Software (1998)
- NASA Tech Briefs Product of the Year, Knowledge Revolution (1998)
- Design News Product of the Year, Knowledge Revolution (1996)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, ASME - American Society of Mechanical Engineers (1984 - present)

Teaching

COURSES

2025-26

- Advanced Dynamics & Computation: ME 331A (Win)
- Advanced Dynamics, Simulation & Control: ME 331B (Spr)
- Mechanical Engineering Teaching Assistance Training: ME 492 (Aut)

2024-25

- Advanced Dynamics & Computation: ME 331A (Win)
- Advanced Dynamics, Simulation & Control: ME 331B (Spr)
- Dynamic Systems, Vibrations and Control: ME 161 (Aut)
- Mechanical Engineering Teaching Assistance Training: ME 492 (Win)

2023-24

- Advanced Dynamics & Computation: ME 331A (Win)
- Advanced Dynamics, Simulation & Control: ME 331B (Spr)
- Dynamic Systems, Vibrations and Control: ME 161 (Aut)
- Mechanical Engineering Teaching Assistance Training: ME 492 (Win)

2022-23

- Advanced Dynamics & Computation: ME 331A (Win)
- Advanced Dynamics, Simulation & Control: ME 331B (Spr)
- Dynamic Systems, Vibrations and Control: ME 161 (Aut)
- Vector and Mathematical Analysis for Mechanics: PHYSICS 40 (Aut)

Publications

PUBLICATIONS

- **Textbook: Dynamics of Mechanical, Aerospace, and Bio/Robotic Systems**
  Mitiguy, P.
  Prodigy Press.2024
- **Statics & Dynamics: Mechanical, Aerospace, and Bio/robotic Systems,**
  Mitiguy, P.
  Prodgy Press.2024
- **Textbook: Control, Vibration, and Design of Dynamic Systems**
  Mitiguy, P.
  Prodigy Press.2024
- **Textbook: Advanced Dynamics and Motion Simulation**
  Mitiguy, P.
  Prodigy Press.2024
- **SEED: Series Elastic End Effectors in 6D for Visuotactile Tool Use** *IEEE/RSJ International Conference on Intelligent Robots and Systems*
  Shuh, H., Kuppuswamy, N., Pang, T., Mitiguy, P., Alspach, A., Tedrake, R.
  arXiv:2111.01376v1.2022
- **A Unified Method for Multi-Body Systems Subject to Stick-Slip Friction and Intermittent Contact** *IEEE/RSJ International Conference on Intelligent Robots and Systems*
  Perkins, A. D., Abdallah, M. E., Mitiguy, P., Waldron, K. J.
  IEEE.2008: 2311–2316
- **A Unified Method for Multi-Body Systems Subject to Stick-Slip Friction and Intermittent Contact** *IEEE/RSJ International Conference on Intelligent Robots and Systems*
  Perkins, A., Abdallah, M., Mitiguy, P., Ken, W.
  2008
- **Interactive Physics Curriculum Workbook**
  Mitiguy, P.
  2008
- **A simple method to obtain consistent and clinically meaningful pelvic angles from Euler angles during gait analysis** *JOURNAL OF APPLIED BIOMECHANICS*
  Wren, T. A., Mitiguy, P. C.
  2007; 23 (3): 218-223
- **Theory, Simulation, and Hardware: Lab Design for an Integrated Systems Dynamics Education** *ASME Mechanical Engineering Congress and Exposition*
  Clark, J., Provancher, W., Mitiguy, P.
  2005
- **A Controversial Study of the Aerodynamics of a Baseball** *ASME International Conference on Multi-body Systems, Nonlinear Dynamics, and Control*
  Mitiguy, P., Woo, M.
  2005
- **Inputoutput** *MECHANICAL ENGINEERING*
  Mitiguy, P.
  2002; 124 (10): 88-88
- **Constraint Force Algorithm for Formulating Equations of Motion** *First Asian Conference on Multibody Dynamics*
  Mitiguy, P., Banerjee, A.
  2002

- **Efficient Dynamics for Systems Involving Gyrostats** *Journal of Guidance, Control, and Dynamics*
  Mitiguy, P., Reckdahl, K.
  2001; 24 (6): 1144-1156
- **In regards to the "ISB recommendations for standardization in the reporting of kinematic data."** *Journal of Biomechanics,*
  Sheehan, F., Mitiguy, P.
  1999
- **Efficient Simulation of Motions Involving Coulomb Friction** *Journal of Guidance, Control, and Dynamics*
  Mitiguy, P., Banerjee, A.
  1999; 22 (1)
- **Efficient Simulation of Motions Involving Coulomb Friction** *First Symposium on Multibody Dynamics and Vibrations*
  Mitiguy, P., Banerjee, A.
  1997
- **Kane's Checking Function: Modifications and Use in the Integration of Dynamical Equations** *AIAA Guidance, Navigation, and Controls Conference*
  Banerjee, A., Mitiguy, P.
  1997
- **Motion variables leading to efficient equations of motion** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
  Mitiguy, P. C., Kane, T. R.
  1996; 15 (5): 522-532
- **Unified Computation of Stick-Slide Friction: Application to Rattlebacks, Tops, and Journal Bearings** *AIAA Guidance, Navigation, and Controls Conference*
  Banerjee, A., Mitiguy, P.
  1995