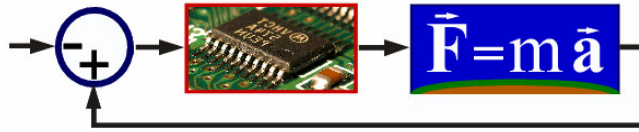


Dr. Paul Mitiguy
 mitiguy@Stanford.edu
 mitiguy@StanfordAlumni.org
 650-346-9595 (voice-only)



Education

1988 - 1995	Stanford University	Advisor Thomas Kane Dynamics, spacecraft, mechanics, robotics, control systems, computational methods.	PhD	3.9/4.0
1987 - 1988	University of Virginia	Classical dynamics, structural vibrations, fluid mechanics.	PhD Candidate	3.9/4.0
1986 - 1987	Stanford University	Computational dynamics, classical vibrations.	MSME	3.9/4.0
1982 - 1986	Tufts University	3 rd in engineering school (Summa cum Laude). Worked 20+ hours/week and paid 80% of tuition, room, and board (remainder was loans/aid).	BSME	3.9/4.0

Experience:

1998 - 2024 **Stanford University Mechanical Engineering & Physics: Consulting Professor, Adjunct Professor, ...**
 Adjunct Professor/Lecturer 2016-24, Consulting Professor 2008-16, Consulting Assoc Professor 2000-08, Lecturer 1998–2000.
 Taught **82+** classes, **10+** courses, **4700+** students, hundreds of PhD qualifying exams, green-lights, and orals.
5 Tau Beta Pi teaching awards (2010, 2017, 2018, 2019, 2022), including School of Engineering Professor of the Year.
5 SOLE (Society of Latino Engineers) Diversity Professor of the Year/Keynote speaker (2007, 2008, 2012, 2017, 2019).
 Worked with physics and vice-provost to create new on-ramp to STEM calculus-based physics classes. Worked with DEI students to co-authored Resolution for On-Ramp STEM support, passed unanimously by Undergraduate and Graduate Senates, support DEI student input to Stanford's new [Curriculum Transformation Institute](#). Mentorship to thousands of students, alumni, and professionals: careers & opportunities, personal growth, surviving failure, school-to-work/research transitions, **800+** reference letters for graduate/medical/law admissions, scholarships, immigration/Visa, grants, job placement, faculty searches and tenure cases, sponsored research, external funding.

Physics (Physics 40, 41A)	Statics/Introduction to Solid Mechanics (Engr14)	Strength of Materials (ME80)
Dynamics (Engr15)	Dynamic Systems, Vibrations, Control (ME161/ME261)	Design of Machinery (ME112)
Classical Dynamics (AA242A)	Advanced Dynamics & Computation (ME331A)	Simulation of Biological Structures (BioE215)
	Advanced Dynamics, Simulation, Control (ME331B)	

2016 – 2024 **Toyota Research Institute Staff Research Scientist, Lead TRI/Stanford Liaison** Los Gatos CA
 (part-time) Computational Dynamics & Simulation for Drake with rigorous validation for high-accuracy simulations.
 Facilitated interaction with 19 Stanford projects with **\$25 million** of funding. Recruited interns and employees.
 Tangentially: Rewrote URDF and SDF standards for mass, center of mass, and inertia specifications.





2006⁺ **Consultant: Force and motion technology, training, and business**

Motion Genesis	2009 ⁺	Engineering textbooks, software, services.	Menlo Park CA
Design-Simulation	2006 - 16	Business development (dynamics, controls, FEA)	Canton, MI
Applied Materials	2012 - 14	Robotics consultant	Sunnyvale, CA
NIH Simbios Center	2011 - 12	Co-PI Stanford K-12 Challenge	Stanford, CA
Morgan Lewis	2010 - 11	Expert witness mechanical engineering patent	Palo Alto, CA
d.Thinking/Business	2015 - 20	KAIST (Korea Business School), Munich Business School	Varies
d.Thinking/K-20	2012	Woodside K-8 Elementary: New design lab/program	Woodside CA
	2014 - 16	Las Lomitas Schools: Initiated d.Thinking program	Menlo Park CA
	2007 - 13	In-service teacher training (2007-8, 2010, 2012-13)	USA
MathGenesis	2010 - 18	Co-founder kinesthetic spatial STEM summer camp	Menlo Park, CA
ICUBED I³	2013 - 15	Engineering camp: 3 rd /4 th grade diversity/FLI students	Menlo Park, CA
General Dynamics	2009	Motion simulation training	Westminster, MD
Fish & Richardson	2008	Expert witness biomedical devices (confidential)	Minneapolis, MN
Twill Technology Inc	2008	Transportation systems consultant (confidential)	Menlo Park, CA
Vecna Technologies	2007 - 08	BEAR Evacuation Assist Robot consultant	Cambridge, MA
NIH Simbios Center	2006 - 09	Senior Research Associate Bioengineering Dept Software training/consultant	Stanford CA Stanford, CA
Phi-Technology	2006 - 07	Alternative energy consultant (confidential)	Durham, NC

2000 - 2006 **MSC.Software Director of Educational Products** Redwood City, CA
 Expanded physics/mechanics software to **12+ million** people worldwide, translated into **11** spoken languages.
 Directed multi-million dollar business, including international and direct sales, resellers, marketing, product development, pricing, acquisitions, personnel development, contracts, administration, hiring, facilities, and websites.
 Managed MSC.visualNastran 4D, Working Model, Interactive Physics, and MSC.FEA Textbook Edition. Acquired country site licenses in Brazil (3054 schools) and Greece (3200 schools). TRAC-PAC partnership with AASHTO (American Association for State Highway and Transportation) to 700 schools. Directed software/documentation translations in Dutch, French, German, Greek, Italian, Japanese, Korean, Portuguese, Russian, and Spanish. Created business partnerships with McGraw-Hill (25,000+ books/year), Prentice-Hall (30,000+ books/year), Addison-Wesley, Apple Computer (learning series), IBM Canada, Mathworks, SolidWorks, GM (General Motors)/PACE.
 Conferences: ASME, ASEE, DETC, AAPT, NSTA, CSTA, VPD.

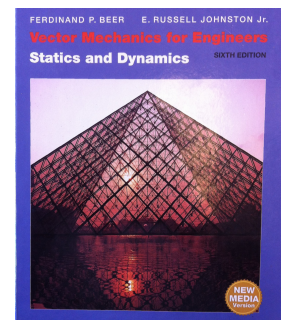
1994 - 2000	MSC.Software Knowledge Revolution	Principal Technical Developer (1998-2000) Principal Technical Developer, Dynamicist (1994-1998)	San Mateo, CA San Mateo, CA
		R&D for motion and FEA products including MSC.visualNastran4D, Working Model 3D (versions 1-7), Working Model 2D (versions 2-8), and Interactive Physics (versions 2-8). Architected C++ class hierarchy. Implemented kinematics, kinetics, constraints, solid modeling, contact response, numerical methods, CAD/FEA support.	
1992 - 2010	OnLine Dynamics Inc	Principal Developer, Senior Scientist, Board of Directors.	Sunnyvale, CA
2000 - 2003	McGraw-Hill Publishers	Consulting Editor, Mechanics Series	Boston, MA
1991 - 1993	San Jose Foundation	Contractor for NASA Ames	Moffet Field, CA
		Improved whirl flutter speed on the XV-15 (V-22) tiltrotor aircraft.	
1988 - 1993	Stanford University	Teaching Assistant to Dr. Thomas Kane	Stanford, CA
1992 - 1993	Stanford University	Graduate Resident Assistant	Stanford CA
1988 - 1990	Seagate Technology	Teaching Consultant	Scotts Valley, CA
1989 / 1990	MIT Lincoln Laboratory	Control Systems Division / Aerospace Division (intern)	Lexington, MA
1986 - 1988	Fed Construction Co	Construction	Milton, MA
1985 - 1986	Tufts University	Student Labor Manager (150 students, 8 managers, 4 admin)	Medford, MA
1977 - 1986	LaSalette	Farming, logging, construction	Enfield, NH

Software

Toyota Research Institute	Open-source C++ robotics and automotive software (Drake).	http://drake.mit.edu/
NIH/Stanford Simbody	Open-source C++ bioengineering software.	www.SimTK.org
Interactive Physics www.InteractivePhysics.com	12+ million educational users , in 11 spoken languages. Multi-international, with country-wide adoptions.	
Working Model 2D www.WorkingModel.com	2+ million educational/professional users. World's most popular engineering motion package. Translated to 10 spoken languages.	
SimWise 4D (MSC.visualNastran 4D) www.design-simulation.com	Integrated CAD, Motion, FEA, and Controls. SolidWorks, AutoDesk, Pro/E, Solid Edge, MATLAB/Simulink	
MotionGenesis and Autolev www.MotionGenesis.com www.Autolev.com	Symbolic manipulator for advanced force/motion analysis & control. Google, Mathworks, NASA, GM, General Dynamics, Space Systems Loral, Lockheed-Martin, Aerospace Corp, Applied Materials, Rafael, US Army, ...	

Software/Curriculum Integration

Textbook	Author	Publisher
<i>Vector Mechanics 6th Edition</i>	Beer & Johnston	McGraw-Hill
<i>Engineering Mechanics</i>	Hibbeler	Prentice-Hall
<i>Engineering Statics</i>	Hibbeler	Prentice-Hall
<i>Engineering Dynamics</i>	Hibbeler	Prentice-Hall
<i>Design of Machinery</i>	Norton	McGraw-Hill
<i>Mechanics of Machines</i>	Cleghorn	Oxford University Press
<i>Foundations of Engineering</i>	Holtzapple and Reece	McGraw-Hill
<i>Interactive Physics Workbook</i>	Schwarz and Ertel	Prentice Hall
<i>Physics for Realists</i>	Dr. Anthony Rizzi	Desktop publishing



Textbooks by Paul Mitiguy (15,000+ textbooks sold)

Advanced Dynamics & Motion Simulation, Professional Engineers/Scientists, 2005-24, 577 pgs.

Control, Vibration, and Design of Dynamic Systems, 2002-2024, 315 pgs.

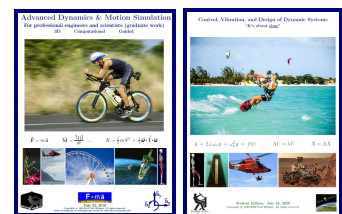
Dynamics of Mechanical, Aerospace, and Biomechanical Systems, 2001-2024, 336 pgs.

Statics & Dynamics: Mechanical, Aerospace, and Bio/robotic Systems, 2018-2024, 344 pgs

Statics & Introduction to Solid Mechanics (booklet), 2016, 134 pgs.

Interactive Physics Curriculum Workbook--with Michael Woo (English/Spanish) 2008, 125 pgs.

(3624+ Workbooks sold 2006-2010, including 2393+ Instructor Editions).



Journal Publications

Mitiguy Paul, and Banerjee, Arun., "A New Energy Integral of the Equations of Motion", *in preparation*.

Wren, Tishya A. L., and Mitiguy, Paul C., "A Simple Method to Obtain Consistent and Clinically Meaningful Pelvic Angles from Euler Angles during Gait Analysis", *Journal of Applied Biomechanics*. Vol. 23, No. 3, 2007, pp. 28-223.

Mitiguy, P.C., and Reckdahl, K.J., "Efficient Dynamics for Systems Involving Gyrostats", *Journal of Guidance, Control, and Dynamics*. Vol. 24, No. 6, November-December 2001, pp. 1144-1156.

Sheehan, F. T. and Mitiguy, P. (1999) In regards to the "ISB recommendations for standardization in the reporting of kinematic data." *Journal of Biomechanics*, 32:1135-6

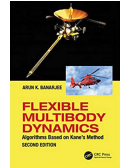
Mitiguy P.C., and Banerjee, A.K., "Efficient Simulation of Motions Involving Coulomb Friction", *Journal of Guidance, Control, and Dynamics*. Vol. 22, No. 1, January-February 1999, pp. 78-86.

Mitiguy, Paul C., and Kane, Thomas R., "Motion Variables Leading to Efficient Equations of Motion", *International Journal of Robotics Research*, Vol. 15, No. 5, Oct. 1996, pp. 522-532.

Mitiguy, P.C., Efficient Formulation and Solution of Equations of Motion, Ph.D. Thesis, Stanford University, Dept. of Mechanical Engineering, May 1995.

Conference and Other Publications

Hyung Ju Terry Suh, Naveen Kuppaswamy, Tao Pang, Paul Mitiguy, Alex Alspach, Russ Tedrake. "SEED: Series Elastic End Effectors in 6D for Visuotactile Tool Use". 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS October 20, 2022). <https://youtu.be/2-YuIfspDrk>



Contributions to textbook: Banerjee, Arun, *Flexible Multibody Dynamics*. John Wiley, September 2022.

Martin J.S., Mitiguy P., Laederach A. (2012) Modeling RNA Folding Pathways and Intermediates Using Time-Resolved Hydroxyl Radical Footprinting Data. In: Leontis N., Westhof E. (eds) RNA 3D Structure Analysis and Prediction. Nucleic Acids and Molecular Biology, vol 27. Springer, Berlin, Heidelberg.

Mitiguy Paul, Rajagopal Apoorva, Antonick Gary, "Numberplay: Which Way Will It Roll?", Sept 19, 2011, *Wordplay. The Crossword Blog of the New York Times*. <http://wordplay.blogs.nytimes.com/2011/09/19/numberplay-which-way-will-it-roll/>

Perkins, Alexander, Abdallah, Muhammad, Mitiguy, Paul, Waldron, Kenneth John, "A Unified Method for Multi-Body Systems Subject to Stick-Slip Friction and Intermittent Contact", *2008 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Nice France, Sept.22-26 2008.

Clark, Jonathan, Provancher, William, Mitiguy, Paul, "Theory, Simulation, and Hardware: Lab Design for an Integrated Systems Dynamics Education", *Proceedings of IMECE2005, 2005 ASME Mechanical Engineering Congress and Exposition*, Orlando FL, Nov. 5-11 2005.

Mitiguy, Paul and Woo, Michael, "A Controversial Study of the Aerodynamics of a Baseball", *Proceedings of the 5th ASME International Conference on Multi-body Systems, Nonlinear Dynamics, and Control*, Long Beach CA, Sept. 24-28 2005.

Also presented at AAPT American Association of Physics Teachers, Sacramento CA; August 2, 2004.

Reported by San Francisco Chronicle, August 16, 2004: [Unraveling the scientific secrets of the elusive 'Splash Hit'](#).

Fong, J.T., Mitiguy, P.C., and Taber, L.A., eds. (2005), *Applied Mechanics and Multi-Physics Simulations of High-Consequence Engineering Systems*, Proc. Symp., Stanford University, Stanford, CA, April 18, 2005.

Wren, T.A.L., Mitiguy P.C., "Calculating clinical pelvic angles from Euler angles using the conventional gait model", *Gait and Clinical Movement Analysis Society Annual Meeting*, Lexington, KY, April 23, 2004.

Mitiguy, Paul, "Input/Output – Life without Mechanical Engineering", *Mechanical Engineering* (ASME magazine), Vol. 125, No.10, Oct. 2002, pg. 88.

Mitiguy, P.C., and Banerjee A.K., "Constraint Force Algorithm for Formulating Equations of Motion", *Proceedings of the First Asian Conference on Multibody Dynamics*, Sept. 2002, pp. 606-608.

Mitiguy, P.C., and Banerjee, A.K., "Efficient Simulation of Motions Involving Coulomb Friction", *First Symposium on Multibody Dynamics and Vibrations*, Paper 65286: DETC97/VIB-4202, Sacramento CA., Sept. 15-17 1997

Banerjee, A.K., and Mitiguy, P.C., "Kane's Checking Function: Modifications and Use in the Integration of Dynamical Equations", *Presented at the AIAA Guidance, Navigation, and Controls Conference*, Aug. 19 1997.

Mitiguy, P.C., and Banerjee, A.K., "Determination of Spring Constants for Modeling Flexible Beams", *Working Model Technical Paper*, June 1996.

Banerjee, A.K., and Mitiguy, P.C., "Unified Computation of Stick-Slide Friction: Application to Rattlebacks, Tops, and Journal Bearings", *Proceedings of AIAA Guidance, Navigation, and Controls Conference*, Paper 95-3350, Aug. 7-10 1995, pp. 1616-1622, Baltimore MD.

Skills & Activities

Expert computational C++ programmer. Skilled in Java, Fortran, MATLAB, MotionGenesis, NASTRAN, Latex, html, Windows, Unix/Macintosh. Conversant in Spanish. Active in ASEE, ASME, AAPT, NSTA, SMAC (Stanford Mechanics Alumni Club, Board of Advisors 2004-2015), church/community. Sports/coaching: AYSO/soccer referee, basketball coach (2013-20), PlayFlag Football coach (2013-18). Assistant Chaplain San Jose Juvenile Hall (1986-94).