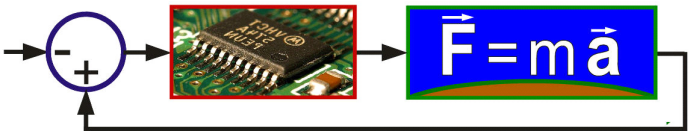
Dr. Paul Mitiguy
mitiguy@Stanford.edu
mitiguy@StanfordAlumni.org
650-346-9595 (voice-only)



Education

1988 - 1995	**Stanford University**	Advisor Thomas Kane	**PhD**	**3.9/4.0**
		Dynamics, spacecraft, mechanics, robotics, control systems, computational methods.		
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.	**MS ME**	**3.9/4.0**
1982 - 1986	**Tufts University**	3rd in engineering school (Summa cum Laude).	**BS ME**	**3.9/4.0**
		Worked 20+ hours/week and paid 80% of tuition, room, and board (remainder was loans/aid).		

Experience:

1998 - 2020 **Stanford University** **Consulting Professor, Adjunct Professor** Stanford, CA

Adjunct Professor 2016-20, Consulting Professor 2008-16, Consulting Assoc Professor 2000-08, Lecturer 1998–2000. Taught **70+** classes, **10+** courses, **4300+** students, hundreds of Ph.D. qualifying exams, green-lights, and orals. Tau Beta Pi teaching awards 2010 (Professor of the Year), 2017, 2018, 2019. Nominated 3 times for Gores award. SOLE (Society of Latino Engineers) Diversity Professor of the Year/keynote speech 2007, 2008, 2012, 2017, 2019. Mentorship to thousands of students, alumni, and professionals: STEM onboarding, careers & opportunities, personal growth, surviving failure, school-to-work and school-to-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 (Physics41A)	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 - now **Toyota Research Institute** **Staff Research Scientist & Lead TRI/Stanford Liaison** Palo Alto CA

Computational Dynamics & Simulation: Developed rigorous validation framework for high-accuracy simulations. Facilitated interaction with 19 Stanford projects with **$25 million** of funding. Recruited interns and employees.

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

Motion Genesis	2009 - now	Physics and math 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 I^3	2013 - 15	Engineering camp: 3rd/4th 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	Stanford CA
		Software training/consultant	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** **Principal Technical Developer (1998-2000)** San Mateo, CA
Knowledge Revolution **Principal Technical Developer, Dynamicist (1994-1998)** 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.

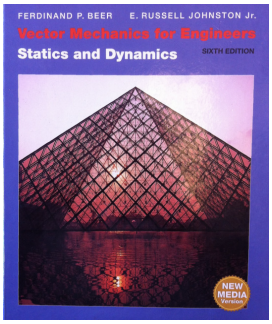
1992 - 2010	**OnLine Dynamics Inc**	**Principal Developer, Senior Scientist, Board of Directors.**	Sunnyvale, CA
2000 - 2003	**McGraw-Hill Publishers**	**Consulting Editor, Mechanics Series**	Boston, MA
1991 - 1993	**San Jose Foundation**	**Contractor for NASA Ames**	Moffet Field, CA
	Improved whirl 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**	**Carpenter**	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	Design Simulation Technologies
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, …	F=ma www.MotionGenesis.com

Software/Curriculum Integration

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



Textbooks by Paul Mitiguy

Advanced Dynamics & Motion Simulation, Professional Engineers/Scientists, 2005-20, 575 pgs.

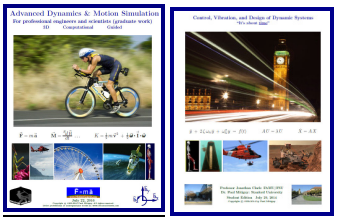
Control, Vibration, and Design of Dynamic Systems, 2002-2020, 316 pgs.

Statics & Dynamics: Mechanical, Aerospace, and Bio/robotic Systems, 2018-2020, 381 pgs

Dynamics of Mechanical, Aerospace, and Biomechanical Systems, 2001-2020, 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+ Instruction 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

Contributing Textbook Author: Banerjee, Arun, *Flexible Multibody Dynamics*. John Wiley, September 2015.

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. In honor of Professor C.R. Steeele, April 18, 2005, Stanford University, Stanford, CA. Published by Stanford Mechanics Alumni Club (SMAC), c/o Division of Mechanics & Computation, Stanford University, Durand 262, Stanford, CA 94305-4040 (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. Enjoy sports/coaching: AYSO/soccer referee, basketball coach (2013-19), PlayFlag Football coach (2013-18). Assistant Chaplain San Jose Juvenile Hall (1986-94).

Honors

Stanford School of Engineering Tau Beta Pi Professor of the Year (2010), Honor Roll (2017, 2018, 2019).
SOLE (Society of Latino Engineers) Diversity Professor of the Year or keynote speech 2007, 2008, 2012, 2017, 2019.
Stanford K12 Challenge Award (2008), MSC.Software Sales Award (2003), Tufts University Outstanding Achievement in Engineering Practice (2003), NDES Best Desktop Software award (1998, MSC.visualNastran Desktop), NASA Tech Briefs Product of the Year (1998, Working Model), Design News Product of the Year (1996, Working Model), Benson and Kenneth Chia Memorial Scholarship (1994), NASA Fellowship (1988), University of Virginia Dean's Fellow (1987), General Electric Scholar (1986), ASME Scholarship (1986), Tufts University Outstanding Senior Award (1986), Tufts University Mechanical Engineering Prize (1986), South Shore Plant Engineers Scholarship (1986), Hiram O'Tuell Citizenship Award (1982), Jesse Baxter Scholarship (1982), Harvard Book Prize (1981).

Additional Stanford Service

Faculty placement	Dr. Allison Okamura	1999	Dr. Katelyn Cahill-Rowley	2016
	Dr. Jonathan Clark	2004	Dr. Daniel Jacobs	2017
	Dr. Jennifer Bower-Dawson	2008	Dr. Hannah Stuart	2017
	Dr. Daniel Aukes	2014		
Award references and recommendations for students and faculty. Total multi-million dollars.	SBIR, NSF, NDSEG, NASA, ARCS, Rhodes scholarship, Honda Inspirational Award, Ford Foundation, National Physical Science Consortium, National Research Service Award, Diversify Academic Recruiting Doctoral Fellowship, Gores award, Haas Center, SGF scholarships, GEM Consortium Fellowship, …			
Stanford Terman Awards Top 5% of graduating seniors	Lillian Chang	2004	Kevin Tong	2012
	Roseanne Warren	2008	Jesse Shapiro	2015
	Thomas Fu	2011	Nicholas Cheung	2015
Stanford Centennial Awards Teaching Assistants	Melody Wu & Peling Lee	2008	Katelyn Cahill-Rowley	2015
	Kim Harris	2011	Chris Ploch	2016
	Dan Jacobs	2012	Lizzie Peiros	2017
	Linus Park	2013	Minh Ngo Duc	2018
	Apoorva Rajagopal	2014	Johanna O'Day	2019
			Cara Nunez	2019
New York Times Work with student/athletes	Andrew Luck, Februrary 2011. Front page: New York Times Sports. 1-week after NFL Superbowl.		Which Way Will It Roll?", Sept 19, 2011, *Wordplay. The Crossword Blog of the New York Times*	
Hoefer Prize: Excellence in Undergraduate Writing (with Professor Mark Cutksosky)	May 2016 Alex Le Roux, Aaron Oro, Jeff Sarsona, Jamie Young.		May 2017 Chase Porter, Devon MacNeil, Ben Fearon, Matthew Stevens	
Guest teaching mentorship	ME 492 (ME TA training)		Physics 294 (Physics TA training)