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I. Education

Ph.D.	Systems Engineering	University of Pennsylvania	8/87
B.S.	Engr Science and Mechanics	Georgia Tech	9/79
B.S.	Undesignated (Physics)	Ursinus College	5/79

II. Positions Held

2009–present	Professor, Department of Computer Science Rensselaer Polytechnic Institute, Troy NY.
2003–09	Professor and Chairman, Department of Computer Science Rensselaer Polytechnic Institute, Troy NY.
1998–03	Research Scientist, Robotics Center, Sandia National Laboratories, Albuquerque, NM.
1995–00	Associate Professor, Department of Computer Science, Texas A&M University, College Station, TX.
1996–97	Visiting Associate Professor, Department of Electrical and Computer Engineering, Rice University, Houston, TX.
1990–95	Assistant Professor, Department of Computer Science, Texas A&M University, College Station, TX.
1989–89	Summer Faculty Fellow, Artificial Intelligence Group, Jet Propulsion Laboratory, Pasadena, CA.
1988–90	Assistant Professor, Department of Systems and Industrial Engineering, University of Arizona, Tucson AZ.
1987–88	Lecturer, Department of Mechanical Engineering, University of Wollongong, Wollongong, NSW, Australia.
1979–82	Engineer, Fiber Composites Group, Lawrence Livermore National Laboratory, Livermore CA.

III. Honors and Awards

Best Student Paper, Robotics: Science and Systems	2007
Inducted into Athletic Hall of Fame, Ursinus College	2005
Kayamori Best Automation Paper, Int'l Conf. on Robotics and Automation	2004
Plenary Speaker, Int'l Conf. on Complementarity Problems	2002
Plank Company Faculty Fellow Award	1998
Texas A&M Center for Teaching Excellence Award	1994
NSF Research Initiation Award	1989
IBM T.J. Watson Research Fellow	1985–1987
University of Pennsylvania Research Fellow	1982–1983
Bell Labs Award: Outstanding senior in Engr. Science and Mechanics	1979

IV. Teaching and Student Supervision

A. Courses Taught

Date	Number	Title	Enrol.	
2009	Spring	CSCI 6490/4490	Robotics II	20
2008	Spring	CSCI 6966/4967	Robotics II	16
2006	Fall	CSCI 6965/4963	Robotic Manipulation: Analysis and Algorithms	5
2004	Spring	CSCI 6965/4969	Robotic Manipulation: Analysis and Algorithms	12
1998	Spring	CPSC 452	Robotics and Spatial Intelligence	30
1997	Spring	ELEC 436	Fundamentals of Control Systems	30
	Fall	ENGR 211	Engineering Principles	90
1996	Spring	CPSC 452	Robotics and Spatial Intelligence	13
	Spring	ENGR 109	Intro to Engineering	67
1995	Spring	CPSC 452	Robotics and Spatial Intelligence	20
	Fall	CPSC 652	Robot Motion Planning	10
	Fall	MEEN 446	Mechanical Engineering Cap Stone Design	24
1994	Spring	CPSC 452	Robotics and Spatial Intelligence	26
	Spring	CPSC 441	Computer Graphics	45
	Fall	CPSC 652	Robotics Programming	5
1993	Spring	CPSC 452	Robotics and Spatial Intelligence	21
	Fall	CPSC 652	Robotics Programming	6
1992	Spring	CPSC 452	Robotics and Spatial Intelligence	20
	Spring	CPSC 681	Graduate Seminar	33
	Fall	CPSC 652	Robotics Programming	6
1991	Spring	CPSC 452	Robotics and Spatial Intelligence	15
	Fall	CPSC 652	Robotics Programming	13
1990	Spring	SIE 350	Deterministic Systems	40
	Spring	SIE 685	Advanced Topics in Robotics	15
	Fall	CPSC 643	Robotics Programming	7
1989	Spring	SIE 350	Deterministic Systems	40
	Spring	SIE 685	Advanced Topics in Robotics	10
	Fall	SIE 350	Deterministic Systems	40
	Fall	SIE 485	Intro to Robotics	15
1988	Spring	SIE 685	Advanced Topics in Robotics	5
	Fall	SIE 550	Linear Systems Theory	10
	Fall	SIE 485	Intro to Robotics	15
1987	Fall	ME 321	Dynamics of Engineering Systems	37
	Fall	Phys 143	Physics for Engineers	192

B. Course Development

2008	New course CSCI 6965/4969	Robotics II
2004	New course CSCI 6965/4969	Robotic Manipulation: Analysis and Algorithms
1994	New course CPSC 643	Robot Motion Planning
1989	New course SIE 485	Introduction to Robotics
1988	New course SIE 685	Advanced Topics in Robotics

C. Student Supervision

- PhD Theses Completed

- [1] N. Chakraborty. *Optimization-Based Approaches for Geometric Constraints in Robot Motion Planning*. PhD thesis, Rensselaer Polytechnic Institute Department of Computer Science, 2008. Co-advised with S. Akella. Position: postdoc, Carnegie Mellon Robotics Institute.
- [2] W. Son. *A Generalized Interactive Dynamic Simulation for Multi-Rigid-Body Systems*. PhD thesis, Texas A&M University Department of Computer Science, 2001. Position: Research Scientist in Electronics and Telecommunications Research Institute, South Korea.
- [3] L. Han. *Dexterous Manipulation: Kinematics and Planning*. PhD thesis, Texas A&M University Department of Computer Science, 2000. Position: Assistant Professor of Computer Science, Clark University, Worcester MA.
- [4] S. Sudarsky. *Motion Data Manipulation and Reuse Using B-Splines*. PhD thesis, Texas A&M University Department of Computer Science, 1999. Position: Research Scientist, Siemens Research Labs, Princeton, NJ.
- [5] A. O. Farahat. *The Geometry of Whole-Arm Manipulation*. PhD thesis, Texas A&M University Department of Aerospace Engineering, 1994. Co-advised with John Junkins. Position: Research Scientist, Xerox PARC, Palo Alto, CA.

PhD Theses in Progress

- N. Nguyen, *Controlling Errors in Multibody Dynamics Simulation*, Department of Computer Science, RPI, expected May 2010.
- S.G. Berard, *Simulation-Based Planning of Robotic Manipulation with Contact*, Department of Computer Science, RPI, expected May 2009.
- E. Meisner, *Human-Friendly Robot Controllers*, Department of Computer Science, RPI, expected May 2009. Co-advising with Volkan Isler.

- Postdoctoral Study Supervision

- G. Liu, at RPI, 2003–2005. Currently at xraytex.com.
- D.E. Stewart, at Texas A&M, 1994–96. Now professor of Math, U. of Iowa.

- Other PhD Student Supervision

- Internal PhD Committee Memberships
 - * K. Bhalerao. *Algorithms for Multibody Dynamics with Unilateral Contact*, Department of Mechanical, Aerospace, and Nuclear Engineering, expected 2009. Advisor: K. Anderson.
 - * R. Quintanilla. *High-Performance Controllers for Nonlinear Dynamical Systems with Large Changes in Operating Conditions*, Department of Electrical, Computer and Systems Engineering, expected 2009. Advisor: J. Wen.
 - * L. Han. *The Zeno Problem with Polygonal Friction*, Department of Mathematical Sciences, December 2007. Advisor: J.S. Pang.
 - * R. Mukherjee. *Multibody Dynamics Algorithms for Modeling Biomolecular Systems*, Department of Mechanical, Aerospace, and Nuclear Engineering, May, 2007. Advisor: K. Anderson.
 - * Y.J. Lim. *Physics-based digital surgery using the point-associated finite field (PAFF) approach*, Department of Mechanical, Aerospace, and Nuclear Engineering, May, 2005. Advisor: S De.

- * Prior to 2003, served on several thesis committees in Computer Science and one in Mechanical Engineering at Texas A&M University.
- External PhD Committee Memberships
 - * D. Balkcom, Robotics Institute, Carnegie Mellon, 2004.
 - * A. Miller, Computer Science, Columbia, 2001.
 - * D. Austin, Engineering, Australian National, 2000.
 - * W. Huang, Robotics Institute, Carnegie Mellon, 1997.
 - * G. Lo, Mathematical Sciences, Johns Hopkins, 1996.
- PhD Student Advising while at Sandia National Labs
 - * D. Balkcom, Robotics Institute, Carnegie Mellon, Summer 2001.
 - * A. Miller, Computer Science, Columbia, Fall 2000.
 - * L. Hazer, Mechanical Engineering, Berkeley, Summer 1999.
 - * J. Esposito, Mechanical Engineering, UPenn, Summer 1999.
- Masters Theses
 - [1] W. Son. Dexterous manipulation planning for a planar whole-arm manipulator. Master's thesis, Texas A&M University Department of Computer Science, May 1996.
 - [2] S.L. Yeap. Dynamic dexterous whole-arm manipulation in the plane. Master's thesis, Texas A&M University Department of Electrical Engineering, September 1994.
 - [3] R.C. Ram. An implementation of a dexterous manipulator for a two-dimensional low-friction environment. Master's thesis, Texas A&M University Department of Electrical Engineering, 1993.
 - [4] C.T. Ang. On the computability of contact formations. Master's thesis, Texas A&M University Department of Computer Science, May 1991.
 - [5] D.C. Zeng. Mechanics of dexterous manipulation. Master's thesis, Texas A&M University Department of Computer Science, December 1991.
 - [6] J.J. Hunter. Frictionless manipulation planning in the plane. Master's thesis, Department of Systems and Industrial Engineering, University of Arizona, May 1990.
 - [7] M. Grier. Adaptive control of a robotic finger. Master's thesis, Department of Electrical Engineering, University of Arizona, May 1989.
- Undergraduate Research Projects or Theses
 - [1] B. Farman. Improvements to the user-interface of dvc, Summer 2008.
 - [2] P. Marion. Experiments in whole arm manipulation, Summer 2007.
 - [3] P. Marion. Development of experimental testbed for whole arm manipulation, Spring 2007.
 - [4] P. Marion. User interface for the dvc simulator, Summer 2006.
 - [5] B. Roghani. Haptic interaction in multibody dynamics simulation, May 2005.
 - [6] B. Roghani. Collision detection for multibody dynamics simulation, December 2004.
 - [7] B. Billbrey. Control of an instrumented compliant robotic wrist, May 1993.

VIII. Service

A. University Service

- Conducted external review of the Computer Science Department, January 2008. Visiting Committee: J.C. Latombe, J. Kurose, M. Lam, M. Snir, S. Kannan.
- Alumni Reunion Speaker
 - “Research in the Computer Science Department,” October 2006.
 - “What is IT Anyway?” June 2004
 - “Research in the Computer Science Department,” Fall 2003.
- Hiring
 - Member Athletic Director Search Committee, 2007.
 - Member Head Hockey Coach Search Committee, 2006.
 - Chair IT Constellation Search Committee, 2005. Result: Hired Constellation Professor J. Hendler from University of Maryland.
 - Member Multi-Scale Computation Constellation Search Committee, 2005.
 - Chair Tetherless Constellation World Search Committee, 2004. Result: Hired Constellation Professor A. Garcia from Los Alamos National Labs.
 - Member Dean of Engineering Search Committee, 2004.
 - Member IT Constellation Search Committee, 2003.
- Faculty Athletic Representative to the National Collegiate Athletic Association, 2005–present. Participate in alumni events, recruiting events, national FARA (Faculty Athletics Representative Association) meetings, and NCAA conventions. Represent the academic view to the Athletics Department staff.
- Evaluator, Doctoral Consortium, Richard Tapia Celebration of Diversity in Computing Conference, Albuquerque, Oct, 2005.
- Co-Host for P. Simon, Member of RPI’s Board of Trustees, “A Career in Information Technology,” 2004.
- Co-Host and co-sponsor of D. Hans, Manager of IBM Usability Program. Roundtable discussion, “Employee of the Future.” Presented D. Hans with a Rensselaer Alumni Association Fellows Award, 2004.
- Member of Texas A&M Faculty Senate, 1997–98.

B. School of Science Service

- Chair of Math Department Head Search Committee, Fall 2007–January 2008. Result: Hired D. Estep from Colorado State University.
- Member of School of Science Promotion and Tenure Committee, 2003–present.
- Member of Texas A&M Engineering Faculty Advisory Committee to the Dean, 1997–98.

C. Department of Computer Science Service

- Hiring
 - Chair or Member of Faculty Search Committee, 2003–present.
 - * Results: Full professors of Computer Science: J. Hendler (U Maryland, Semantic Web) 2007. D. McGuinness (Stanford, Inference and Knowledge Provenance) 2007.
 - * Results: Assistant professors of Computer Science: S. Das (MIT, Machine Learning) 2007; E. Anshelevich (Cornell, Theory and Networks) 2006; B. Cutler (MIT, graphics) 2005; V. Isler (UPenn, robotics and computer vision) 2005; A. Milanova (Rutgers, software engineering) 2003;
 - * Retention: Milanova received NSF CAREER Award, contract renewed at three-year point. Isler received CAREER Award, contract renewed at three-year point. Cutler received CAREER Award, contract renewed at three-year point.
- Initiated faculty mentoring program

- All faculty have official mentors. All faculty are expected to help other faculty at a minimum through feedback on grant proposals and resumes to prepare for promotion and tenure. Annual evaluation includes mentoring activities.
- Results: Improved sense of community and mutual investment among the CS faculty.
- Initiated Computer Science Day (CS Day)
 - Goals: Raise regional and national visibility of CS Department, broaden students’ educational experience and perspectives of faculty and students.
 - CS Day 2008: Data Mining and Machine Learning. Speakers: C. Faloutsos (CMU), U. Fayyad (Yahoo!), M. Kearns (UPenn), and T. Poggio (MIT).
 - CS Day 2007: The Future of Robotics. Speakers: D. Rus (MIT), V. Kumar (UPenn), O. Khatib (Stanford), R. Fearing (Berkeley).
 - CS Day 2006: Issues in Geometric Computing. Speakers: R. Kannan (Yale), P. Indyk (MIT), H. Edelsbrunner (Duke), J. Ponce (Ecole Normale Superior).
- Designed and renovated space for Landgraf Center for Computer Vision, Graphics, and Robotics.
- Initiated Department research mixers with poster presentations. Goals: Help students learn about research projects in the Department, improve student presentation skills, strengthen Department’s sense of community.
- Initiated CS Department Annual Report in 2006. First issue appeared in 2007.
- Department service prior to joining RPI is unavailable.

D. Service to Local Communities

- Judge for Texas Best, State High School Robotics Championships 1994–97.
- Volunteer math instructor for advanced students in first and second grade, River Oaks Elementary School, Houston, TX, 1992-1994.
- Volunteer assistant track coach for Livermore High School, 1980–1981.

E. Service to Research Communities

- Co-organizer of Manufacturing and Automation Robotics Workshops. Supported through a “visioning” grant from the Computing Community Consortium, June 2008, Washington DC.
- Initiated New England Manipulation Symposium (NEMS)
 - Goals: Provide regional venue for students to network and present research results.
 - NEMS 2008, Providence RI: about 60 researchers from Clark, U Connecticut, Dartmouth, ENERGIT, Harvard, MIT, Olin College, Roger Williams, RPI, UMass Amherst, Union, Worcester Polytechnic Institute, and Yale attended.
 - NEMS 2007, Troy NY: 53 faculty, staff, and students from Brown, Columbia, Harvard, MIT, Rochester Inst. of Tech., SUNY Buffalo, UMass Lowell, RPI, UMass Amherst, Union. Attendees also from iRobot, NASA Johnson Space Center, Columbia High School.
 - NEMS 2006, Amherst MA: 61 attendees from Brown, Clark, Columbia, Dartmouth, MIT, RPI, SUNY Buffalo, UMass Amherst, UMass Lowell, UPenn.
 - NEMS 2005, Troy NY: 27 attendees from RPI, Rutgers, UMass Amherst, UPenn.
- Member of committee that launched, *IEEE Transactions on Automation Science and Engineering*, 2002–2003.
- Editorships
 - Co-editor (with Shinichi Hirai) of special issue of selected papers from RSS 2008 in *International Journal of Robotics and Automation*, 2009.
 - Co-editor (with Jose Neira) of special issue of selected papers from RSS 2008 in *Autonomous Robots*, 2009.
 - Associate Editor, *Robotics and Automation Society Conference Editorial Board*, 2008–present.
 - Associate Editor, *Robotica*, 2006–present.
 - Associate Editor, *IEEE Transactions on Automation Science and Engineering*, 2003–2004.

- Associate Editor, *IEEE Transactions on Robotics and Automation*, 1994–1997.
- Conference/Workshop Participation
 - General Chair, Robotics: Science and Systems, Seattle, June 2009.
 - Program Chair, Robotics: Science and Systems, Zurich, June 2008.
 - Invited Panelist
 - * “Robotics and Cyber-Physical Systems” at *Cyber-Physical Systems Information Day*, Washington, DC, December, 2008.
 - * “NSF/ARO Workshop on Future Directions in Visual Navigation” at *International Conference on Robotics and Automation*, Pasadena, May, 2008.
 - * “The Future of Computing, the Internet, and the Law” at the *Inaugural National Institute on Computing and the Law*, sponsored by the Association for Computing Machinery and the American Bar Association, San Francisco, January, 2007. This is also listed under “Invited Lectures,” since a lecture was given.
 - * “Science and Technology Challenges for Robotics” at *Robotics: Science and Systems*, Philadelphia, August, 2006.
 - * *NSF Workshop on Collaborative Research between Mathematicians and Roboticians*, Arlington, VA, May 2000. Author of white paper to announce workshop. Co-Author of workshop report. This is also listed under “Invited Lectures,” since a lecture was given.
 - * *Game Developers Conference: Hardcore Technical Seminar*, San Francisco, December 1999. This is also listed under “Invited Lectures,” since a lecture was given.
 - * *ONR/ACM SIGGRAPH Workshop on Simulation and Interactive in Virtual Environments*, Iowa City, July, 1995. This is also listed under “Invited Lectures,” since a lecture was given.
 - Workshop/Special Session Organizing
 - * Two special sessions co-organizer (with Bruce Krogh) and moderator, “Robotics and Cyber-Physical Systems,” *International Conference on Intelligent Robot Systems*, Nice, France, September, 2008.
 - * Computing Community Consortium workshop co-organizer (with Henrik Christensen, Vijay Kumar, and Ken Goldberg) “A Research Roadmap for Robotics in Manufacturing and Automation,” Arlington, VA, June, 2008.
 - * Panel organizer and moderator, “PhD Student Forum,” *NSF Cyber-Enabled Discovery and Innovations*, Troy, NY, September, 2007.
 - * Co-organizer (with Friedrich Pfeiffer and John McPhee) of mini-symposium on contact dynamics at *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, “International Conference on Multibody Systems, Nonlinear Dynamics, and Control,” Las Vegas, 2007.
 - * Co-organizer (with Friedrich Pfeiffer and John McPhee) of mini-symposium on contact dynamics at *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, “International Conference on Multibody Systems, Nonlinear Dynamics, and Control,” Long Beach, 2005.
 - * Co-organizer (with Friedrich Pfeiffer and John McPhee) of mini-symposium on contact dynamics at *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, “International Conference on Multibody Systems, Nonlinear Dynamics, and Control,” Chicago, 2003.
 - * Workshop and Tutorials Committee member, invited speaker for two special sessions, *IEEE International Conference on Robotics and Automation*, San Francisco, April, 2000.
 - * Workshop and Tutorials Committee Member, *IEEE International Conference on Robotics and Automation*, Detroit, May, 1999.
 - * Session co-organizer, *IEEE International Conference on Robotics and Automation*, San Diego, May, 1994.

- * Session co-organizer, *IEEE International Conference on Robotics and Automation*, Atlanta, May, 1993.
- Program Committees
 - * Program committee and session chair: Many times for many robotics conferences from 1990–present. ICRA, IROS, ISATP (now ISAM), WAFR.
 - * Program Committee Area Chair, “Robotics: Science and Systems”, Atlanta, GA, June, 2007.
 - * Program Area Chair and Best Student Paper Award Committee Member, “Robotics: Science and Systems”, Philadelphia, PA, August 2006.
 - * Program committee, “Robotics: Science and Systems”, Cambridge, MA, June, 2005.
 - * Program committee member, *Euromech Colloquium 397: Impacts in Mechanical Systems*, Grenoble, July, 1999.
 - * Program committee member, *International Union of Theoretical and Applied Mechanics: Multibody Dynamics*, September, 1998.
 - * Program committee member, *Conference of the American Association for Artificial Intelligence*, Palo Alto, March, 1996.
- Reviewing
 - NSF Panels
 - * NSF CISE/IIS review panel, 1996, 1998, 1999, 2001, 2003, 2004, 2007.
 - * NSF Engineering/DDM review panel, 1993.
 - NSF Robotics Program, *ad hoc* reviewer, 1986.
 - Non-NSF funding agencies: European Commission, ONR, NSERC (Canada), HKUST (Hong Kong), Laboratory Directed Research and Development (Sandia Nat’l Labs), Sandia Labs University Research Program.
 - Journals: International Journal of Robotics Research, IEEE Transactions on Robotics and Automation, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Image Processing, IEEE Transactions on Systems, Man, and Cybernetics, Robotica, Algorithmica, ACM Transactions on Graphics, Journal of Dynamic Systems Measurement and Control, Journal of Applied Mechanics, Zeitschrift für Angewandte Mathematik und Mechanik, E-Haptics, Constraints, Control Systems Letters, Journal of Robotic Systems, International Journal of Robotics and Automation, Journal of Mechanical Design, International Journal on Numerical Methods in Engineering.
 - Conferences: Reviewer of many papers from most major robotics conferences and workshops. Also reviewer for SIGGRAPH, IDETC,

IX. Funding

A. External Funding

- “Special Sessions on Robotics and Cyber-Physical Systems at the International Conference on Intelligent Robots and Systems,” *National Science Foundation, CISE, Computer and Network Systems*, J.C. Trinkle (**PI, 100%**), 9/08–1/09 \$25k.
- “Student Travel Support for Robotics: Science and Systems 2008,” *National Science Foundation, CISE/IIS, Robust Intelligence program*, O. Brock (PI) and J.C. Trinkle (**co-PI, 50%**), 5/08–10/08, \$12k.
- REU Supplement to: “Collaborative Research: Grasp and Manipulation Planning in the Presence of Dynamics and Uncertainty,” *National Science Foundation, CISE, Information and Intelligent Systems*, J.C. Trinkle (**PI, 100%**), 11/04–10/09, \$6k.
- “From Internet to Robotics: The Next Transformative Technology,” *Visioning proposal to the Computing Community Consortium of the Computing Research Association.*, H. Christensen (PI), O. Brock, K. Goldberg, J. Hollerbach, S. Hutchinson, L. Kaebling, V. Kumar, M. Mason, G. Sukhatme, S. Thrun, J.C. Trinkle (**co-PI, 3%**), \$186k.

- “Fully-Implicit Time Stepping Methods with Integrated Proximity Queries for Accurate Simulation of Multi-Rigid-Body Systems with Intermittent Contact,” *National Science Foundation, CISE, Computing and Communications Foundations*, S. Akella (PI) and J.C. Trinkle (**co-PI, 50%**), 10/07–9/10, \$200k.
- “CRI:IAD Collaborative Research: Research/Education Infrastructure Based on Modular Miniature Robot Teams,” *National Science Foundation, CISE, Computer and Network Systems*, N. Papanikolopoulos (PI), V. Isler, P. Drineas, and J.C. Trinkle (**co-PI, 5%**), 8/07–7/11, \$750k.
- REU Supplement to: “Collaborative Research: Grasp and Manipulation Planning in the Presence of Dynamics and Uncertainty,” *National Science Foundation, CISE, Information and Intelligent Systems*, J.C. Trinkle (**PI, 100%**), 11/04–10/09, \$12k.
- “Collaborative Research: Grasp and Manipulation Planning in the Presence of Dynamics and Uncertainty,” *National Science Foundation, CISE, Information and Intelligent Systems*, J.C. Trinkle (**PI, 40%**), J.S. Pang, and Vijay Kumar, 11/04–10/09, \$585k.
- “MRI: Acquisition of Infrastructure for Research in Grid Computing and Multiscale Systems Computation,” *National Science Foundation*, M. Shephard (PI), C. Varela, S. Garde, C. Carothers, J.C. Trinkle (**co-PI, 15%**), 9/04–5/07, \$500k.
- “Differential Algebraic Inequalities and Their Application to Engineering,” *National Science Foundation, Division of Mathematical Sciences, Focused Research Group Program*, J.S. Pang (PI), F. Potra, D.E. Stewart, V. Kumar, J.C. Trinkle (**co-PI, 20%**) 8/02–7/05, \$1,050k.
- “Folding and Unfolding Process for Polygonal Linkages, with Applications in Robotics and Biology,” *National Science Foundation/Defense Advanced Research Projects Agency, CARGO program*, L. Guibas (PI), M. Levitt, R.J. Milgram, I. Strieniu, P.G. Xavier, J.C. Trinkle (**consultant**), 6/02–5/03, \$100k.
- “Real-Time Multibody Dynamics for Virtual Reality Training Systems with Haptic User Interface,” *Texas Higher Education Coordinating Board*, J.C. Trinkle (**PI, 50%**) and N.M. Amato 1/98–12/99, \$175k.
- “MRI: Training in Virtual and Real Environments,” *National Science Foundation*, R.A. Volz (PI), J. Yen, N.M. Amato, and J.C. Trinkle (**co-PI**), 9/98–8/01, \$91k.
- “Equipment Matching to: MRI: Training in Virtual and Real Environments,” *National Science Foundation*, R.A. Volz (PI), J. Yen, N.M. Amato, J.C. Trinkle (**co-PI**), and J. Wall, 9/98–8/01, \$64k.
- “Manipulation Planning with Contact Under Uncertainty,” *National Science Foundation, CISE, Robotics Program*, J.C. Trinkle (**PI, 43%**) N.M. Amato, and J.S. Pang, 8/97–7/00, \$400k.
- “CISE Postdoc in Real-Time Multibody Dynamics for Virtual Reality Training Systems with Haptic User Interface,” *National Science Foundation, CISE, Robotics Program*, N.M. Amato (PI) and J.C. Trinkle (**co-PI, 50%**), 4/98–3/00, \$66k.
- “REU Supplement to Manipulation Planning with Contact Under Uncertainty,” *National Science Foundation, CISE, Robotics Program*, N.M. Amato and J.C. Trinkle (**co-PI, 50%**), 8/97–7/00, \$10k.
- “AERCAM Enhancements (EVA Robot Camera Control),” *NASA Johnson Space Center*, R.A. Volz (PI), and J.C. Trinkle (**co-PI, 50%**) 9/96–6/98, \$68k.
- “Robotics, Automation, and Tele-Operation Program for Safe Handling and Long-Term Storage of Nuclear Components,” *The Amarillo National Resource Center for Plutonium*, J.C. Trinkle (**co-PI 10%**) 6/95–9/99, \$569k.
- “A Two-Stage Geometric Approach to Planning Robotic Tasks Involving Sliding and Rolling Contacts in Uncertain Environments,” *National Science Foundation*, J.C. Trinkle (**PI, 68%**) and P.F. Stiller, 8/93–7/96, \$309k.
- “Quasistatic Models and Algorithm Design for Dexterous Manipulation Planning,” *Texas Higher Education Coordinating Board, Texas Advanced Research Project*, J.C. Trinkle (**PI, 50%**) and P.F. Stiller, 1/94–12/95, \$161k.
- “Distributed Robotics Systems Integration with Fault-Tolerance in Space Operations,” *Texas Higher Education Coordinating Board, Texas Advanced Technology Program*, R.A. Volz (PI),

J.C. Trinkle (**co-PI, 30%**), and L.J. Everett, 1/94–12/95, \$96k.

- “Distributed Robotics Systems Integration with Fault-Tolerance,” *Texas Higher Education Coordinating Board, Texas Advanced Technology Program*, R.A. Volz (PI), J.C. Trinkle (**co-PI, 30%**) and L.J. Everett, 1/92–8/94, \$124k.
- “NSF Small-Scale Infrastructure Award,” *National Science Foundation*, L. Bhuyan, U. Pooch (PI), and R.A. Volz, J.C. Trinkle (**co-PI, 5%**), 1992–1994 \$750k.
- Various grants with the Universities’ Space Automation and Robotics Consortium, R.A. Volz (PI), J.C. Trinkle (**co-PI, 30%**) and L.J. Everett (co-PI), 6/90–5/93, \$191k.
- “A New Method for the Analysis of the Quasistatic Motion of Systems of Bodies in Contact,” *National Science Foundation Research Initiation Award*, J.C. Trinkle (**PI, 100%**), 6/89–11/92, \$70k.

B. Proposals pending

- “CRI: CI-P: SPADE: A High-Performance Computing Platform for Support of Robotics Research and Education,” *National Science Foundation, CISE, Computing Research Infrastructure*, C. Carothers and J.C. Trinkle (**PI, 50%**), \$130k.

X. Publications

A. Book Chapters, Books, and Monographs

- [1] O. Brock, J.C. Trinkle, and F. Ramos. *Proceedings of Robotics: Science and Systems*. MIT Press, 2008.
- [2] J.C. Trinkle and D. Prattichizzo. Grasping. In B. Siciliano and O. Khatib, editors, *Handbook of Robotics*. Springer-Verlag, 2008.
- [3] K.T. Egan, S. Berard, and J.C. Trinkle. Sensorless acquisition of multiple contact points between planar parts. In B. Federico and J.K. Salisbury, editors, *Tracts in Advanced Robotics: Multi-Point Interaction with Real and Virtual Objects*, volume 18, pages 113–130. Springer-Verlag, October 2005.
- [4] G.F. Liu, J.C. Trinkle, and R.J. Milgram. Toward complete path planning for planar 3r-manipulators among point obstacles. In M. Erdmann, D. Hsu, M. Overmars, and F. van der Stappen, editors, *Tracts in Advanced Robotics*, volume 17, pages 329–344. Springer-Verlag, October 2005.
- [5] D.E. Stewart and J.C. Trinkle. Dynamics, friction, and complementarity problems. In M.C. Ferris and J.S. Pang, editors, *Complementarity and Variational Problems*, pages 425–439. SIAM, 1997.
- [6] A.O. Farahat, P.F. Stiller, and J.C. Trinkle. On the algebraic geometry of contact formation cells for systems of polygons. In K. Goldberg, D. Halperin, J.C. Latombe, and R. Wilson, editors, *Proceedings, Workshop on Algorithmic Foundations of Robotics*, pages 477–494. A.K. Peters, Boston, MA, 1995.

B. Refereed Journal Articles

- [1] K. Bhalerao, K.S. Anderson, and J.C. Trinkle. A hybrid time-stepping scheme for inelastic collisions with coulomb friction in multi-rigid-body dynamics. *ASME Journal of Computational and Nonlinear Dynamics*. in press.
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F. Abstracts and Posters

- [1] Identification of physical parameters of rigid body systems. *Workshop on Contact Models for Manipulation and Locomotion*, Pasadena, CA, May 2008. (abstract with presentation by S. Berard).
- [2] N. Chakraborty, S. Berard, S. Akella, and J.C. Trinkle. Two new fully implicit time-stepping schemes for multibody systems with intermittent contact. In *International Conference Continuous Optimization*, August 2007. (abstract with presentation by N. Chakraborty).
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- [5] J.C. Trinkle. Multibody dynamics with friction: Time-stepping and applications. In *Proceedings, Workshop on Intelligent Human Augmentation and Virtual Environments*, pages D-24, D-54, E-28, E-29, October 2002. (abstract and poster presentation).

VIII Invited Lectures

- [1] Simulation-based design of robust grasping strategies. *GRASP Lab Seminar Series, University of Pennsylvania*, Philadelphia, PA, November 2008.
- [2] Overview of rpi robotics research. *GE Global Research*, Schenectady, NY, August 2008.
- [3] Robotics research: Current status and future directions. *National Science Foundation*, Arlington, VA, June 2008.
- [4] Robotics now and then. *Inaugural National Institute on Computing and the Law*, San Francisco, CA, January 2007. Sponsored by the Association for Computing Machinery and the American Bar Association.
- [5] A family of models for manipulation planning and design. *International Conference Complementarity Problems*, Stanford, CA, August 2005.
- [6] A family of rigid body models: connections between quasistatic and dynamic multibody systems. *First Siconos/da Vinci Meeting*, Grenoble, France, July 2005.
- [7] Sensorless acquisition of multiple contact points between planar parts. *Multipoint Interaction Workshop*, New Orleans, LA, April 2004.
- [8] Open problems in automation science and engineering. *Kick-off Workshop for IEEE Transaction on Automation Science and Engineering*, Las Vegas, NV, October 2003.

- [9] Exact motion planning for 2r-manipulators in the plane. *Robotics Institute Colloquium, Carnegie Mellon University, Pittsburgh, PA, October 2003.*
- [10] Complete motion planning for spatial polygonal circles. *Workshop on Topology and Robotics, Eidgenossische Technische Hochschule (ETH), Zurich, Switzerland, June 2003.*
- [11] Multi-body dynamics: Theory and applications. *Department of Mathematics, RPI, Troy, NY, April 2003.*
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- [13] Complete motion planning for planar polygonal chains. *Department of Mathematics, Stanford University, Stanford, CA, May 2002.*
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- [15] Recent results in constrained mechanical systems: Connections to computational biology. *Computational Sciences Department, Sandia National Labs, Livermore, CA, May 2002.*
- [16] Implications of rigid body dynamics on fixture loading and design. *Department of Mechanical Engineering, Northwestern University, Chicago, IL, March 2002.*
- [17] Motion planning for planar n-bar mechanisms with revolute joints. *Department of Computer Science, RPI, Troy, NY, November 2001.*
- [18] Designing fixture loading strategies. *International Conference on Scientific Computation and Differential Equations, Vancouver, BC, Canada, July 2001.*
- [19] Stability characterizations of rigid body contact problems with coulomb friction. *First SIAM Conference on Computational Science and Engineering, Washington, D.C., September 2000.*
- [20] Remote autonomous dexterity. *DOE Review of CESAR Research Programs, Oak Ridge National Labs, Oakridge, TN, September 2000.*
- [21] Stability of rigid body systems. *Department of Computer and Information Sciences, University of Pennsylvania, Philadelphia, PA, June 2000.*
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- [23] A new time-stepping scheme for rigid body dynamics with coulomb friction and collisions. *Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD, March 2000.*
- [24] Planning dexterous manipulation in the plane. *Department of Computer Science, Columbia University, New York, NY, March 2000.*
- [25] Rigid body dynamics as a complementarity system. *Game Developers' Conference: Hard Core Technical Seminar, San Francisco, CA, December 1999.*
- [26] Mathematical complementarity in rigid body dynamics. *General Robotics and Active Sensory Perception Laboratory, University of Pennsylvania, Philadelphia, PA, June 1998.*
- [27] Mathematical complementarity in rigid body dynamics. *Workshop on New Directions in Simulation of Multibody Systems, Leuven, Belgium, May 1998.*
- [28] Closure properties of grasps and fixtures. *Workshop on Grasping and Fixturing, Leuven, Belgium, May 1998.*
- [29] Optimal path planning and control for in-orbit inspection of space structures. *Johnson Space Center, Houston, TX, June 1997.*
- [30] Existence and uniqueness of solutions in multi-rigid-body contact problems. *Intelligent Systems and Robotics Center, Sandia National Labs, Albuquerque, NM, January 1996.*
- [31] Complementarity formulations of multi-rigid-body contact problems. *Robotics Institute Seminar Series, Carnegie Mellon University, Pittsburgh, PA, July 1995.*

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- [39] Stability of subassemblies. *Jet Propulsion Laboratory*, Pasadena, CA, August 1989.
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Available upon request.