Cumulative Bio-Bibliography
Jacob Rosen, Professor
Department of Mechanical & Aerospace Engineering (Primary Appointment)
Department of Surgery (Joint Appointment)
Department of Bioengineering (Joint Appointment)
University of California, Los Angeles, CA

EMPLOYMENT HISTORY (Academia)

2014 – Current	**Professor** Department of Mechanical & Aerospace Engineering School of Engineering, University of California Los Angeles, CA, USA
	Director of Surgical Robotics Engineering / Executive Member Center for Advanced Surgical and Interventional Technology (CASIT) School of Medicine, University of California Los Angeles, CA, USA
	Professor (Joint Appointment) Department of Surgery Department of Surgery, Division of General Surgery School of Medicine, University of California Los Angeles, CA, USA
2015 – Current	**Professor (Joint Appointment)** Department of Bioengineering School of Engineering, University of California Los Angeles, CA, USA
2012 – 2014	**Professor** Department of Computer Engineering School of Engineering, University of California, Santa Cruz, CA, USA
2008 – 2012	**Associate Professor** Department of Computer Engineering School of Engineering, University of California, Santa Cruz, CA, USA
2008 – 2012	**Affiliated Associate Professor** Department of Electrical Engineering University of Washington, Seattle WA, USA
2006 - 2008	**Research Associate Professor** Department of Electrical Engineering **Adjunct Positions with the Department of Surgery and the Department of Mechanical Engineering** University of Washington, Seattle WA, USA
2005 - 2008	**Co-Director of Research** **Institute for Surgical and Interventional Simulation** **School of Medicine** University of Washington, Seattle WA, USA
2000 – 2006	**Research Assistant Professor** Department of Electrical Engineering **Adjunct Positions with the Department of Surgery (Since 2002) and the Department of Mechanical Engineering (Since 2005)** University of Washington, Seattle WA, USA

1997 – 2000 **Research Associate (Post- Doc)**
BioRobotics Laboratory
Department of Electrical Engineering, and Department of Bioengineering
University of Washington, Seattle WA, USA
- Project: Biomechanics/Biorobotics of Minimally Invasive Surgery (MIS)

1993 – 1997 **Research Assistant**
Biomechanics Laboratory, Department of Biomedical Engineering
Faculty of Engineering, Tel-Aviv University, Israel
Exoskeleton Project (Leading Research Engineer)
- Developing a 3 DOF Exoskeleton (robotic arm) controlled by neural signal (electromyography - EMG Signals)
- Research fields : Human Body Modeling, Musculoskeletal Modeling, EMG Analysis, Real-Time Discrete Servo Control, Finite Element Analysis, Orthopedic Implants Design, Contact Mechanics.

1994 – 1995 **Teaching Assistant**
Department of Biomedical Engineering,
Faculty of Engineering, Tel-Aviv University, Israel
Courses: Engineering Principles of Biological Systems, Biomechanics, Measurements in Biomechanics, Biomaterials.

EMPLOYMENT HISTORY (Industry)

2013 – Present **Applied Dexterity Robotics LLC - Cofounder**

2012 – Present **ExoSense Inc. Cofounder**

2010 – Present **SPI Inc. Cofounder**

2015 **Surveyor Capital -** Surgical Robotics – Market Trends
Status – Completed

2015 **Tactile Feedback Technology vs. LLC v. Samsung & ZTE -** Working with Warner Narcross & Judd representing Tactile Feedback Technology – Consulting on Haptics, actuation, and mechanical engineering.
- Tactile Feedback Technology, LLC v. Samsung Electronics America, Inc. (E.D. Texas, Case No. 2:14-cv-940);
- Tactile Feedback Technology, LLC v. ZTE (USA) Inc. (E.D. Texas, Case No. 2:14-cv-943)

Status – Completed

2015 **Turiya Capital Management –** Lower Limb Exoskeleton - Technology & Market Analysis.
Status – Completed

2014 **Covidien -** Surgical robotics system development - advisory board
Status – Completed

2014 **Donald Gates vs. Sutter General Hospital & Intuitive Surgical – Malpractice –** Working with Wilke Fleueury Hoffelt, Gould & Birney LLP (Consoler Ronald Lamb) as an expert witness in a malpractice case (prostatectomy) involving a surgical robotic system.
- Donald Gates Plaintiff vs. Sutter General Hospital & Intuitive Surgical Defendants, Superior Court for the State of California – County of Sacramento – Case No. 34-2011-00103436

Status – Completed

2012 **McKinsey & Company, Inc.** - Overview of the surgical robotics field, and IP landscape analysis (two cases)
Status – Completed

2012 **Immersion versus HTC & Motorola - IP Infringement -–** Working with Morrison & Forster (Palo Alto) representing Immersion – Consulting on Haptics, actuation, and mechanical engineering.

- Immersion Corporation vs. Motorola Mobility, Inc., Motorola Mobility Holdings, Inc., HTC Corporation, HTC America Holding, Inc., HTC America, Inc., HTC (B.V.I.) Corporation U.S. International Trade Commission - Investigation No. 337-TA-834
- Immersion Corporation Plaintiff, Plaintiff, vs. Motorola Mobility Holding, Defendant. The United States District Court for the District of Delaware Case:1:12-cv-00148-RGA
- Immersion Corporation Plaintiff v. HTC Corporation et al Delaware District Court, Case No. 1:12-cv-00259

Status – Completed

2008 **Ridgetop Research LLC** – IP landscape overview of Surgical Robotics & Haptics
Status – Completed

2008 **Simulab Inc.** - Tech Transfer - Consulting Simulab Inc. regarding the development of the "Edge" – a system for assessing minimally invasive surgical skills based on haptics and kinematics of the surgical tools. The Edge is a technology based on the Red Dragon that was developed by my colleagues, students and myself at the University of Washington.
Status – Completed

2008 **Startup Company** – Technical consulting in design of surgical robotics systems and haptics
Status – Completed

2008 **Tektronix**
Status – Completed

2008 **Ridgetop Research LLC -** IP landscape overview of Surgical Robotics & Haptics
Status – Completed

2006 **Boston Consulting Group (BCG)** - Overview of the surgical robotics field, and IP landscape analysis comparing potential IP and claims with an existing IP by lead companies.
Status – Completed

2006 **St. Jude Medical** – Design principles of a surgical robotics console and haptics
Status – Completed

1993 – 1997 **Consultant**
RAMOT - University Authority for Applied Research & Industrial Development, Ramat-Aviv, Israel.

- NAYOT - ORTIM Ltd. Technological Incubator, Nazareth Illite, Israel.
  Design, Finite element analysis and biomechanical tests of innovative spine/pelvis implants (Ilio-Lumbar Fixation Device, Intra Vertebral Implant)
- NAYOT - MPRS Ltd. Technological Incubator, Nazareth Illite, Israel.
  3D Finite element analysis of modular pelvis replacement system

1987 - 1991 **Technical Officer**
Test and Evaluation Unit, Israel Defense Forces (IDF) - Ordnance Headquarters
Design and analysis of combat systems. Special Topics: Human machine Interface, Mechanical Engineering, Biomechanics
Rank on Discharge: Captain

EDUCATION

1993 - 1997 **Ph.D. in Biomedical Engineering (June 1997)**
Department of Biomedical Engineering,
Faculty of Engineering, Tel-Aviv University, Israel
Ph.D. Thesis: *Natural Integration of a Human-Arm / Powered Exoskeleton System*
Supervision: Prof. Mircea Arcan, Prof. Moshe B. Fuchs

1989 - 1993 **M.Sc. in Biomedical Engineering - *Magna Cum Laude* (June 1993)**
Department of Biomedical Engineering,
Faculty of Engineering, Tel-Aviv University, Israel
M.Sc. Thesis: *Modeling the Human Body/Chair System in a Vibrational Environment - Numerical Approach*
Supervision: Prof. M. Arcan

1983 - 1987 **B.Sc. in Mechanical Engineering (June 1987)**
Department of Solid Mechanics Materials and Structures
Faculty of Engineering, Tel-Aviv University, Israel

PROFESSIONAL COMPETENCE AND ACTIVITY

Honors and Awards

2012 **Healthcare Hero 2012 Award in the Research & Innovation Category** – Silicon Valley Business Journal Selected among 100 candidates grouped into in 7 categories

2008 EDGE surgical skills evaluation device, (Technology licensed to Simulab Inc.) one of 8 winners: - 2008 Innovation of the year, Society of Laparoscopic Surgeons.

2007 The James F. Lincoln Arc Welding Foundation Silver Award in recognition for the design of the Red Dragon System - Scott Gunther & **Jacob Rosen**

Medicine Meets Virtual Reality Conference - Winning Posters (2008)

- T. Lendvay**,** F. J Hseih, B. Hannaford, **J. Rosen**, The Biomechanics of Percutaneous Needle Insertion, Medicine Meets Virtual Reality (MMVR 16), Long Beach CA, Jan. 29 - Feb. 1, 2008

Medicine Meets Virtual Reality Conference - Winning Posters (2007)

- Lum M.J.H., **J. Rosen**, H. King, D.C.W. Friedman, G. Donlin, G. Sankaranarayanan, B. Harnett, L. Huffman, C. Doarn, T. Broderick and B. Hannaford, Telesurgery Via Unmanned Aerial Vehicle (UAV) With a Field Deployable Surgical Robot, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 313-315 , Long Beach CA, Feb. 6-9, 2007
- Mackel T., **J. Rosen**, C. Pugh, Application of Hidden Markov Modeling to Objective Medical Skill Evaluation, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 316-318, Long Beach CA, Feb. 6-9, 2007
- De. S., A. Dagan, P. Roan, **J. Rosen**, M. Sinanan, M. Gupta, B. Hannaford, CIELab and sRGB Color Values of in vivo Normal and Grasped Porcine Liver, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp.109-111, Long Beach CA, Feb. 6-9, 2007

2006 Medicine Meets Virtual Reality Conference - Winning Posters

- Fodero K. II, H. King, M.J.H. Lum, C. Bland, **J. Rosen**, M. Sinanan, B. Hannaford, Control System Architecture for a Minimally Invasive Surgical Robot Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006

2002 Best Paper award finalist – International Conference of Robotics and Automation (ICRA), May 2002, Washington DC. (9 Finalist 3 in each category out of 790 accepted papers)

1996 Valdimir Shraiber scholarship for Ph.D., Tel-Aviv University

1995 Dean's special recognition for excellence, Faculty of Engineering, Tel-Aviv University

1993 M.Sc. in Biomedical Engineering - *Magna Cum Laude*

1992 Leslie Porter scholarship for M.Sc., Tel-Aviv University

1994 Scholarship for Athletes (Graduate Studies)- Rowing Committee - The Israeli Sport Federation

1990 Award and special recognition of creative contribution to a new Human Engineering military standard, IDF, Israel.

1983-1985 Scholarship for Athletes (Undergraduate Studies)- Rowing Committee - The Israeli Sport Federation

Undergraduate Students' Awards

2010

- Dean of Engineering Undergraduate Awards for Capstone Project
  Lower Limb Exoskeleton (LEX)
  Students: Aimen Al-Refia (CE), Priyesh Panchal (CE), John Havener (BME), Jared Newmiller (CE), and Owen Ajioka (EE).
  Mentor: Jacob Rosen

- Best Poster Award
  Award for physical Sciences and Mathematics Research
  Annual Biomedical Research Conference for Minority Students (ABRCMS)
  Student: Ariel Anders
  Mentor: Jacob Rosen

- Best Poster Design Award
  Summer Undergraduate Research Fellowship in Information Technology (SURF-IT)
  Student: Ariel Anders
  Mentor: Jacob Rosen

GRANTS & CONTRACTS

SUMMARY: Total amount of funding from grants & contracts **6.583 M**

Active

- National Robotic Initiative (NRI) Large: Multilateral Manipulation by Human-Robot Collaborative Systems, Co-PI Jacob Rosen with PI Allison Okamura – Stanford, Co PIs Peter Abbeel UC – Berkeley, Gregory Hager John Hopkins University, $3.535M ($616K for UCLA), 2012-2016

- Electrocorticography Based Control of an Anthropomorphic Upper Limb Exoskeleton, Doris Duke Foundation – Researcher with PI Karunesh Ganguly, MD Ph.D. UCSF – (20K for UCSC) 2013-2014

Completed

- Neural Control of an Upper Limb Powered Exoskeleton System - National Science Foundation - 320K - PI with Co-PI Blake Hannaford Ph.D. (EE) and Consultant Stephen Burns MD (Rehabilitation Medicine - VA Seattle) Sep. 2002 – Sep. 2005.

- The Blue DRAGON - A System for Monitoring the Kinematics and the Dynamics of Endoscopic Tools in Minimally Invasive Surgery for Objective Laparoscopic Skill Assessment – Co-PI (Primary) with Mika Sinanan (Co Director of the Center of Video Endoscopic Surgery) – The Research was funded as part of the a gift to the Department of Surgery by US Surgical / Tyco – Jan 2000 – Jan 2004

- High Altitude Platforms Mobile Robotic Telesurgery – Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – 65K (to the UW)– Co-PI with Timothy Broderick (Surgery – University of Cincinnati) PI and Blake Hannaford Co-PI– January 2006

- Mini Robot design for Military Telesurgery in the Battlefield: Breaking the Size Barrier for Surgical Manipulators - Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity - $ 1.2 M - Co-PI (Primary) with PI - Blake Hannaford Ph.D. (EE), Co-PI - Mika Sinanan MD, Ph.D. (Surgery), Richard Satava MD (Surgery)) - May 2002 - May 2006

- Patient Safety Center Organization - Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – 267K – Co-PI with Mika Sinanan (Surgery) PI – June 2004-June 2007

- Developing a Generalized Algorithms for Objectively Assessing Medical and Surgical Skill with Various Modalities - Data Mining Using Markov Models – Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – 151K – PI – June 2004- January 2008

- Trauma Pod – The operating room of the Future (Phase 1) – Defense Advanced Research Projects Agency DARPA - 940K – PI – February 2005 – January 2008 (Phase 1)

- The Red Dragon – A multi-modal Experimental System for Objectively Assess Minimally Invasive Surgical Skills, Starting date Sep. 2005, 10K, Simulab Corporation, Seattle WA.

- Development Virtual Environment with Haptics for Upper Limbs Exoskeletons Utilizing Microsoft Robotics Studio, Microsoft Research – 54K – PI - July 2007- June 2008

- Lightweight Wearable Lower Limb Exoskeleton, 6 months, 112K, PI, US Army, Department of Defense.

- The surgical Cockpit, 100K (STTR – Phase 1 with SPI Inc.) Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – PI with Co-PI Blake Hannaford Ph.D. (UW) and Laligam N. Sekhar, MD (UW)- 9.2009 – 4. 2010

- NOTES – Surgical Robot for Brain Surgery, 100K (STTR Phase 1 with SPI Inc.) Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – Co-PI with PI Blake Hannaford Ph.D. (UW) and Laligam N. Sekhar, MD (UW) - 9.2009 – 4. 2010

- The Myoprocessor – Muscle Modeling for Neural Control of Upper Limb Powered Prosthetics and Orthotics, 375K –PI Jacob Rosen, Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity, 2007-2011

- Automated Support of Robotic Surgical Training, Operations, and Outcomes, 100K (STTR – Phase 1 with SPI Inc.) Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – Co-PI with PI Thomas Landvey MD. (UW)

- Paradigm Shift for Neurorehabilitation of Stroke Patients Using Wearable Robotics, CITRIS, PI Jacob Rosen with Co-PIs Nancy Byl Ph.D. and Gary Abrams MD (UCSF), $75K, 2010-2011

- A Network of Open Testbeds for Surgical Robotics Research, NSF, Co-PI Jacob Rosen with PI Blake Hannaford (UW), $800K (250K for UCSC), 2010-2011

- Robot-Assisted Tele-Surgery for Tele-Health: Proof-of-Concept for Robot Learning of Subtasks in Pediatric Appendectomy, CITRIS, Co-PI Jacob Rosen with PI Ken Goldberg (Berkley) CO-PIs Peter Abbeel (Berkeley) Walter Douglas Boyd MD (UC Davis), $75K (25K for UCSC), 2011-2012

- Raven II – Open Source Surgical Robotic System – Co-PI, with Blake Hannaford PI UW, 800K, (400K for UCSC) Sub Contract – Contact from 3 different resources including: University of Western Ontario (200K), University of Central Florida (100K), French National Center for Scientific Research (100K).

- The surgical Cockpit, (STTR – Phase 2 with SPI Inc.) Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity – PI with Co-PI Blake Hannaford Ph.D. (UW) and Laligam N. Sekhar, MD (UW) - 750K (350K for UCSC) 2010 - 2012

- Enabling Surgical Care through Autonomous Robotics Co-PI, with PI Pablo Garcia SRI, DARPA, 275K 2014-2015

WRITINGS AND CREATIVE ACTIVITIES IN PROGRESS

SUMMARY:	Book Co-Authored	**0**
	Book Chapters	**0**
	Journal Papers	**3**
	Conference Papers	**0**

Journal Paper in Review

- Zhi Li, Kris Hauser, Dejan Milutinovi´c and **Jacob Rosen**, From Reaching to Reach-to-grasp: the Arm Posture Difference and its Implications on Human Motion Control Strategy, Submitted to the IEEE Transaction on Robotics

- Zhi Li, Dejan Milutinovi´c and **Jacob Rosen,** Design of a Multi-Arms Surgical Robotic System for Optimized Manipulability, Submitted to the ASME Journal of Mechanisms and Robotics.

- Jay Ryan Roldan, Dejan Milutinovi´c Zhi Li,and **Jacob Rosen,** A low Dimensional Dissimilarity Analysis of Unilateral and Bilateral Stroke Impacted Hand Trajectory, ASME System Measurements and Control.
-

PUBLISHED WRITINGS AND CREATIVE ACTIVITIES

SUMMARY:	Book Co-Edited	**2**
	Book Chapters	**9**
	Journal Papers	**39**
	Conference Papers	**61**
	Patent (Applications)	**8**

Edited Books

- **Jacob Rosen,** Blake Hannaford**,** Richard Satava, Surgical Robotics – Systems Applications and Visions, 1st edition 2011 by Springer US, ISBN 978-1-4419-1126-1
  http://www.springerlink.com/content/978-1-4419-1125-4#section=841753&page=1

- Dejan Milutinovic, and **Jacob Rosen** (Editors), Redundancy in Robot Manipulators and Multi-Robot Systems, 1st edition 2013 by Springer. ISBN 978-3-642-33970-7
  http://www.springer.com/us/book/9781441911254

Book Chapters

- [BC10] Jacob Rosen, Dejan Milutinovi´c, Levi M. Miller, Matt Simkins, Hyunchul Kim, and Zhi Li, Unilateral and Bilateral Rehabilitation of the Upper Limb Following Stroke via an Exoskeleton. Chapter 15 In Neuro-robotics: From brain machine interfaces to rehabilitation robotics Panagiotis Artemiadis (Editor), pp. 405-446, Springer Netherlands 2014, ISBN: 978-94-017-8931-8

- [BC9] Zhi Li, Hyunchul Kim, Dejan Milutinovic and **Jacob Rosen**, Synthesizing Redundancy Resolution Criteria of the Human Arm Posture in Reaching Movements, Chapter 12 in: Redundancy in Robot Manipulators and Multi-robot systems, Springer-Verlag Berlin Heidelberg 2013, ISBN: 978-3-642-33970-7
  http://www.springer.com/us/book/9783642339707

- [BC8] Jacob Rosen, Surgical Robotics – Chapter 5, In "Medical Devices - Surgical and Image-Guided Technologies" edited by Martin Culjat, Rahul Singh, and Hua Lee, John Wiley & Sons Nov. 2012 pp. 63-97. ISBN: 978-0-470-54918-6
  http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470549181.html

- [BC7] Thomas S. Lendvay, **Jacob Rosen**, Blake Hannaford, Chapter 44: Telerobotics – Its Future in Clinical Application in Pediatric Robotic and Reconstructive Urology: A Comprehensive Guide, Mohan S. Gundeti (Editor), Wiley, March 2011, ISBN: 9781444335538
  http://onlinelibrary.wiley.com/doi/10.1002/9781444345292.ch44/summary

- [BC6] L.N. Sekhar, D. Ramanathan, **J. Rosen**, L.J. Kim, D. Friedman, D. Glozman, K. Moe, T. Lendvay, and B. Hannaford, Robotics in Neurosurgery, Chapter 30 in Surgical Robotics, Systems, Applications, and Visions, Jacob Rosen, Blake Hannaford, Richard M. Satava (Editors), 1 ed. Springer 2011.

- [BC5] **Jacob Rosen**, Mika Sinanan, and Blake Hannaford, Objective Assessment of Surgical Skills, Chapter 25 in Surgical Robotics, Systems, Applications, and Visions, Jacob Rosen, Blake Hannaford, Richard M. Satava (Editors), 1 ed. Springer 2011.

- [BC4] **Jacob Rosen**, Jeff Brown, Smita De, and Blake Hannaford, Macro and Micro Soft-Tissue Biomechanics and Tissue Damage: Application in Surgical Robotics, Chapter 24 in Surgical Robotics, Systems, Applications, and Visions, Jacob Rosen, Blake Hannaford, Richard M. Satava (Editors), 1 ed. Springer 2011.

- [BC3] **Jacob Rosen**, Mitchell Lum, Mika Sinanan, and Blake Hannaford, Raven: Developing a Surgical Robot from a Concept to a Transatlantic Teleoperation Experiment, Chapter 8 in Surgical Robotics, Systems, Applications, and Visions, Jacob Rosen, Blake Hannaford, Richard M. Satava (Editors), 1 ed. Springer 2011.

- [BC2] Perry Joel C., **Jacob Rosen**, Chapter 8: Case Study: An Upper-Limb Powered Exoskeleton, Wearble Robots: Biomechatronics Exoskeleton (Ed. Jose L. Pons) pp. 259-269, Wiley, 2008, ISBN: 978-0-470-51294-4

- [BC1] John E. Speich and **Jacob Rosen**, Medical Robotics, In Encyclopedia of Biomaterials and Biomedical Engineering, Gary Wnek and Gary Bowlin (Editors), pp. 983-993, Marcel Dekker, Inc, NY, 2004

Papers

Journal Papers (Peer Reviewed)

- [JP39] Hyunchul Kim , **Jacob Rosen**, Predicting Redundancy of a 7 DOF Upper Limb Exoskeleton Toward Improved Transparency between Human and Robot, Journal of Intelligent & Robotic Systems,. First online: 18 February 2015

- [JP38] Takafumi Otani, Ariel J. Raigrodski, Lloyd Mancl, Ikuru Kanuma,d and **Jacob Rosen**, In vitro evaluation of accuracy and precision of automated robotic tooth preparation system for porcelain laminate veneers, The Journal of Prosthetic Dentistry, Volume 114, Issue 2, pp 229–235, August 2015,

- [JP37] Zhi Li, Dejan Milutinovi´c and **Jacob Rosen**, Spatial Map of Synthesized Criteria for the Redundancy Resolution of Human Arm Movements, IEEE in Transactions on Neural Systems & Rehabilitation Engineering – Vo. 23 No. 6 pp. 1020-1030, Nov. 2015

- [JP36] Jacob Rosen, Ji Ma, Autonomous Operation in Surgical Robotics, Robotic Surgery: In Safe Hands, Special Issue in ASME Dynamic Systems and Control Magazine, Vol. 3, No. 3, pp. 2, September 2015, Mechanical Engineering, In Mechanical Engineering – The ASME Magazine, No. 9, 137, September 2015

- [JP35] Hyunchul Kim, Zhi Li, Jacob. Rosen, Bimodal Approach for Redundancy Resolution of Human Arm Based on Kinematic and Dynamic Constraint, Journal of Intelligent & Robotic Systems – Springer – Published on line 18 February 2015, DOI 10.1007/s10846-015-0212-4

- [JP34] Matt Simkins,·Anne Burleigh Jacobs,·Nancy Byle, **Jacob Rosen**, Stroke‐induced synergistic phase shifting and its possible implications for recovery mechanisms, Experimental Brain Research, Vol. 232, No. 11, 3489–3499, Nov. 2014

- [JP33] Matt Simkins, Aimen Al-Refai, and Jacob Rosen, Upper Limb Joint Space Modeling of Stroke Induced Synergies Using Isolated And Voluntary Arm Perturbations, IEEE Transactions on Neural System and Rehabilitation Engineering – pp. 491-500, Vol. 22, No.3, May 2014.

- [JP32] Tariq Maysarah Abuhamdia, Jacob Rosen, Constant Visual and Haptic Time Delays in Teleoperation – Quantifying the Human Operator Performance, Presence: Teleoperation and Virtual Environments – pp. 271-290, Vol. 22, No. 4 – Fall 2013

- [JP31] Nancy N. Byl, Gary M. Abrams, Erica Pitsch, Irina Fedulow, Hyunchul Kim, Matt Simkins, Srikantan Nagarajan, Jacob Rosen, Chronic stroke survivors achieve comparable outcomes following virtual task specific repetitive training guided by a wearable robotic orthosis (UL-EXO7) and actual task specific repetitive training guided by a physical therapist, Journal of Hand Therapy Vol. 26, pp. 343-362, 2013

- [JP30] Matt Simkins,·Anne Burleigh Jacobs,·**Jacob Rosen**, Rhythmic affects on stroke‐induced joint synergies across a range of speeds, Experimental Brain Research, Vol. 299, No. 4, 517–524, Sept. 2013

- [JP29] Matt Simkins, Irina Fedulow, Hyunchul Kim, Gary Abrams, Nancy Byl, **Jacob Rosen**, Robotic Rehabilitation Game Design For Chronic Stroke, Games For Health Journal - December 2012, 1(6): 422-430..

- [JP28] Blake Hannaford, **Jacob Rosen**, Diana W. Friedman, Hawkeye King, Phillip Roan, Levi Cheng, Daniel Glozman, Ji Ma, Sina Nia Kosari, Lee White, Raven-II: an open platform for surgical robotics Research, IEEE Transaction of Biomedical Engineering – Special Issue on Surgical Robotics VOL. 60, NO. 4, pp. 954-959 April 2013

- [JP27] Wen Yu, **Jacob Rosen**, Neural PID Control of Robot Manipulators with Application to an Upper Limb Exoskeleton, IEEE Transactions on Systems Man and Cybernetics – VOL. 43, NO. 2, pp. 673-684 April 2013

- [JP26] Hyunchul Kim, Levi Makaio Miller, Irina Fedulow, Gary M. Abrams, Nancy Byl and **Jacob Rosen**, Kinematic Data Analysis for Post Stroke Patients Following Bilateral Versus Unilateral Rehabilitation with an Upper Limb Wearable Robotic System, IEEE Transactions on Neural System and Rehabilitation Engineering – Vol. 21, No. pp. 153-164, March 2013.

- [JP25] Hyunchul Kim, Levi Miller, **Jacob. Rosen**, Redundancy Resolution of the Human Arm and an Upper limb Exoskeleton, IEEE Transactions on Biomedical Engineering – IEEE Transaction on Biomedical Engineering, Vol. 59, No. 6, June 2012

- [JP24] Diana C.W. Friedman, Tim Kowalewski, Radivoje Jovanovic, **Jacob Rosen** and Blake Hannaford, Freeing the serial mechanism designer from inverse kinematic solvability constraints, Applied Bionics and Biomechanics, Pages 209 – 216, Volume 7, Issue 3, 2010

- [JP23] Perry Joel, Janet Powell, **Jacob Rosen**, Isotropy of an Upper Limb Exoskeleton and the Kinematics and Dynamics of the Human Arm, Journal of Applied Bionics and Biomechanics, Vol. 6, No. 2, pp. 175–191, June 2009

- [JP22] Chanseop Park, Ariel J. Raigrodski, **Jacob Rosen**, Charles Spiekerman, Robert M. London, Accuracy of implant placement using precision surgical guides with varying occlusogingival heights: An in vitro study, The Journal of Prosthetic Dentistry, Volume 101, Issue 6, June 2009, Pages 372-381.

- [JP21] M.J.H. Lum, D. C. W. Friedman, , G. Sankaranarayanan, H. King, K. Fodero II, R. Leuschke, , and B. Hannaford, **J. Rosen,** M. N. Sinanan, The RAVEN - A Multidisciplinary Approach to Developing a Telesurgery System, the International Journal of Robotic Research, Special Issue: Medical Robotics Part I: Vol. 28, No. 9, pp. September 2009.

- [JP20] Pablo Garcia, **Jacob Rosen**, Chetan Kapoor, Mark Noakes, Greg Elbert, Michael Treat, Tim Ganous, Matt Hanson, Joe Manak, Chris Hasser, David Rohler, Richard Satava, Trauma Pod: a semi-automated telerobotic surgical system, The International Journal of Medical Robotics and Computer Assisted Surgery, Vol. 5, No. 2, pp. 136-146, June, 2009.

- [JP19] B. M. Harnett, Charles R. , **J. Rosen**, B. Hannaford, and T. J. Broderick, Evaluation of Unmanned Airborne Vehicles and Mobile Robotic Telesurgery in an Extreme Environment, Vol. 14, No. 6 pp. 534-544, July/August 2008, Telemedicine and e-Health.

- [JP18] **J. Rosen,** J. D. Brown, S. De, M. Sinanan B. Hannaford, Biomechanical Properties of Abdominal Organs In Vivo and Postmortem Under Compression Loads, ASME Journal of Biomedical Engineering, Vol 130 Issue 2, April 2008.

- [JP17] Mackel T. R., **J. Rosen**, C. Pugh, Markov Model Assessment of Subjects' Clinical Skill Using the E-Pelvis Physical Simulator, IEEE Transactions on Biomedical Engineering, Vol. 52, Issue 12, pp. 2133-2141, Dec. 2007

- [JP16] De S., **J. Rosen**, A. Dagan, P. Swanson, M. Sinanan, and B. Hannaford, Assessment of Tissue Damage due to Mechanical Stresses, International Journal of Robotic Research, Vol. 26, No. 11-12, 1159-1171, 2007

- [JP15] **J. Rosen,** and J.C. Perry, Upper Limb Powered Exoskeleton, Journal of Humanoid Robotics, Vol. 4, No. 3 (2007) 1–20

- [JP14] Doarn CR, Hufford K, Low T. **Rosen J**, Hannaford B. Telesurgery and Robotics: A Roundtable Discussion, Telemedicine and E-Health 2007; 13(4):369-380.

- [JP13] Perry J. C., **J. Rosen**, S. Burns, Upper-Limb Powered Exoskeleton Design, IEEE Transactions on Mechatronics, Volume 12, No. 4, pp. 408-417, August 2007

- [JP12] Cavallaro E., **J. Rosen**, J. C. Perry, S. Burns, Myoprocessor for Neural Controlled Powered Exoskeleton Arm, IEEE Transactions on Biomedical Engineering, pp. 2387-2396, Vol. 53, No. 11, November 2006

- [JP11] **Rosen J.**, B. Hannaford, Doc at a Distance, IEEE Spectrum, October 2006, pp. 34-39, [JP 11]

- [JP10] M.J.H. Lum, **J. Rosen**, M. N. Sinanan, B. Hannaford, Optimization of Spherical Mechanism for a Minimally Invasive Surgical Robot: Theoretical and Experimental Approaches, IEEE Transactions on Biomedical Engineering Vol. 53, No. 7, pp. 1440-1445, July 2006

- [JP09] **Rosen J.**, J. D. Brown, L. Chang, M. Sinanan B. Hannaford, Generalized Approach for Modeling Minimally Invasive Surgery as a Stochastic Process Using a Discrete Markov Model, IEEE Transactions on Biomedical Engineering Vol. 53, No. 3, pp. 399- 413, March 2006

- [JP08] **Rosen J.** and M. Arcan, Modeling the Apparent Mass of a Human Body/Chair System in a Vibration Environment, Transactions of the ASME, Journal of Biomechanical Engineering, April 2003, Volume 125, Issue 2, pp. 223-231. PMID: 12751284.

- [JP07] **Rosen J.**, M. Solazzo, B. Hannaford, M. Sinanan, Objective Evaluation of Laparoscopic Skills Based on Haptic Information and Tool/Tissue Interactions, Computer Aided Surgery, Volume 7, Issue 1, pp. 49-61 July 2002. PMID: 12173880.

- [JP06] **Rosen J.**, M. Brand, M. Fuchs and M. Arcan, A Myosignal-Based Powered Exoskeleton System, IEEE Transactions on System Man and Cybernetics - Part A: Systems and Humans, Vol. 31, No. 3, pp. 210 - 222, May 2001.

- [JP05] **Rosen J.**, B. Hannaford, Richards C., M. Sinanan, Markov Modeling of Minimally Invasive Surgery Based on Tool/Tissue interaction and Force/Torque Signatures for Evaluating Surgical Skills, IEEE Transactions on Biomedical Engineering Vol. 48. No. 5, pp. 579-591 May 2001. PMID: 11341532

- [JP04] Richards C., **J. Rosen**, B. Hannaford, M. MacFarlane, C. Pellegrini, M. Sinanan, Skills Evaluation in Minimally Invasive Surgery Using Force/Torque Signatures, Surgical Endoscopy, Vol 14, No. 9, pp. 791-798. PMID: 11000356

- [JP03] **Rosen J.,** M. B. Fuchs, and M. Arcan**,** Performances of Hill-Type and Neural Network Muscle Models - Towards a Myosignal Based Exoskeleton, Computers and Biomedical Research, Vol. 32, No. 5, pp. 415-439, October 1999. PMID: 10529300

- [JP02] **Rosen J.**, B. Hannaford, M. MacFarlane, M. Sinanan, Force Controlled and Teleoperated Endoscopic Grasper for Minimally Invasive Surgery - Experimental Performance Evaluation, IEEE Transactions on Biomedical Engineering, Vol. 46, No. 10, pp. 1212-1221, October 1999. PMID: 10513126

- [JP01] MacFarlane M., **J. Rosen**, B. Hannaford, C. Pellegrini, M. Sinanan, Force Feedback Grasper Helps Restore the Sense of Touch in Minimally Invasive Surgery, Journal of Gastrointestinal Surgery, Vol. 3, No. 3, pp. 278-285, May/June 1999. PMID: 10481120

Conference Papers (Peer Reviewed)

- [CP 61] Zhi Li, Kris Hauser, Jay Ryan Roldan, Dejan Milutinovi´c, and **Jacob Rosen,** A Novel Method for Quantifying Arm Motion Similarity, 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Milan Italy, August 25-29, 2015

- [CP 60] Zhi Li, Kierstin Gray, Jay Ryan Roldan, Dejan Milutinovi´c and **Jacob Rosen**, The Joint Coordination in Reach-to-grasp Movements, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014), Chicago IL, Sept. 14-18, 2014

- [CP 59] Zhi Li, Jay Ryan Roldan, Dejan Milutinovi´c and **Jacob Rosen**, Task-relevance of Grasping-related Degrees of Freedom in Reach-to-grasp Movements, 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Chicago IL, August 26-30, 2014

- [CP 58] Matt Simkins, Jay Ryan Roldan, Hyunchul Kim, Gary Abrams, Nancy Byl, **Jacob Rosen**, Kinematic Analysis of Virtual Reality Task Intensity Included by a Rehabilitation Robotic System in Stroke Patients, Proceedings of the ASME 2013 Dynamic System and Control Conference, DSCC 2013, DSCC2013-4042, October 21-23, Stanford University, Palo Alto, CA

- [CP 57] Zhi Li, Hyunchul Kim, Jacob Rosen, The Rotational Axis Approach for Resolving the Kinematic Redundancy of the Human Arm in Reaching Movements, Annual International Conference of the IEEE Engineering in Medicine and Biology, EMBC 2013, Osaka Japan, 2013

- [CP 56] Matt Simkins, Irina Fedulow, Hyunchul Kim, Gary Abrams, Nancy Byl, Jacob Rosen , Robotic Unilateral and Bilateral Upper-Limb Movement Training for Stroke Survivors Afflicted by Chronic Hemiparesis, International Conference on Rehabilitation Robotics ICORR 2013, Seattle, 2013

- [CP 55] Hyunchul Kim, Levi Makaio Miller, Zhi Li, Jay Ryan Roldan and Jacob Rosen, Admittance Control of an Upper Limb Exoskeleton – Reduction of Energy Exchange, 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), San Diego CA, August, 2012

- [CP 54] Hyunchul Kim, Jay Ryan Roldan, Zhi Li, and Jacob Rosen, Viscoelastic Model for Redundancy Resolution of the Human Arm via the Swivel Angle: Applications for Upper Limb Exoskeleton Control, 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), San Diego CA, August, 2012

- [CP 53] H. Hawkeye King, Lei Cheng, Philip Roan, Diana Friedman, Sina Nia Kosari, Ji Ma, Daniel Glozman Jacob Rosen, Blake Hannaford, Raven II™: Open Platform for Surgical Robotics Research, The Hamlyn Symposium on Medical Robotics, July 1-2 2012, London, UK.

- [CP 52] Barak Kashi, Idit Avrahami, Jacob Rosen, Moshe Brand, "A Bi-Criterion Model for Human ARM Posture Prediction", 2012 World Congress on Medical Physics and Biomedical Engineering, May 26-31 2012, Beijing, China.

- [CP 51] Hyunchul Kim, Levi Makaio Miller, Zhi Li and Jacob Rosen, Admittance Control of Seven-DOF Upper Limb Exoskeleton to Reduce Energy Exchange, ICRA 2012, Saint Paul, MN on May 14-18, 2012

- [CP 50] Barak Kashi, Moshe Brand, **Jacob Rosen**, Idit Avrahami, Synthesizing Two Criteria for Redundancy Resolution of Human Arm in Point Tasks, IEEE Third World Congress on Nature and Biologically Inspired Computing (NaBIC2011), October 19-21 2011, Salamanca, Spain

- [CP 49] Wen Yu, **Jacob Rosen**, Xiaoou Li, PID Admittance Control for an Upper Limb Exoskeleton, 2011 American Control Conference, 2011 American Control Conference - ACC 2011, San Francisco, California, USA, June 29 - July 1, 2011

- [CP 48] Hyunchul Kim, Levi Makaio Miller, Aimen Al-Refai, Moshe Brand, and **Jacob Rosen** Redundancy Resolution of a Human Arm for Controlling a Seven DOF wearable Robotic System, 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston MA, August, 2011

- [CP 47] Levi Miller, Hyunchul Kim, **Jacob Rosen**, Redundancy and Joint limits of a Seven Degree of Freedom Upper Limb Exoskeleton, 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston MA, August, 2011

- [CP 46] Zhi Li, Daniel Glozman, Dejan Milutinovic and **Jacob Rosen**, Maximizing Dexterous Workspace and Optimal Port Placement of a Multi-Arm Surgical Robot, ICRA 2011, Shanghai, China, May 2011,

- [CP 45] Wen Yu and **Jacob Rosen**, A Novel Linear PID Controller for an Upper Limb Exoskeleton, Proceedings of the 49th IEEE Conference on Decision and Control (CDC), pp. 3548-3553, Atlanta, GA, USA, December 15-17, 2010

- [CP 44] Mircea Teodorescu, Moshe Brand, **Jacob Rosen**, Homer Rahnejat, The Influence of Post Angioplasty Stent Implant Profile on Arterial Wall Stress Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2010 August 15-18, 2010, Montreal, Quebec, Canada

- [CP 43] Levi Makaio Miller and **Jacob Rosen**, Comparison of Multi-Sensor Admittance Control in Joint Space and Task Space for a Seven Degree of Freedom Upper Limb Exoskeleton, 3rd IEEE RAS &EMBS International Conference on Biomedical Robotics and Biomechatronics, September 26-29, 2010 Tokyo, Japan

- [CP 42] Hyunchul Kim, **Jacob. Rosen**, Epileptic Seizure Detection - An AR Model Based Algorithm for Implantable Device, 32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2010, Buenos Aires, Argentina, August 31 - September 4, 2010

- [CP 41] Mircea Teodorescu, H. Rahnejat, Moshe Brand, **Jacob Rosen**, Post –Angioplastic Contact mechanism with Different levels of Artherosclertic Plaque, Proceedings of the STLE/ASME 2010 International Joint Tribology Conference, IJTC 2010, October 17-20, 2010, San Francisco, California, USA

- [CP 40] Moshe Brand, Moshe. Ryvkin, Shmuel. Einav ,Idit Avrahami, **Jacob Rosen**, Mircea Teodorescu, Numerical Models of an Artery with Different Stent Types, The 12th Mediterranean Conference on Medical and Biological Engineering and Computing, MEDICON 2010, IFMBE Proceedings 29, pp. 545–548, May 27-30, 2010, Greece.

- [CP 39] H. Hawkeye King, Blake Hannaford, Ka-Wai Kwok, Guang-Zhong Yang,Paul Griffiths3, Allison Okamura, Ildar Farkhatdinov, Jee-Hwan Ryu, Ganesh Sankaranarayanan, Venkata Arikatla, Suvranu De, Kotaro Tadano, Kenji Kawashima, Angelika Peer, Thomas Schuß, Martin Buss, Levi Miller, Daniel Glozman, **Jacob Rosen**, Thomas Low, Plugfest 2009: Global Interoperability in Telerobotics and Telemedicine, IEEE International Conference on Robotics and Automation, ICRA May 2010, Alaska, USA

- [CP 38] Moshe Brand, Moshe Ryvkin, Shmuel Einav, and **Jacob Rosen**, Numerical Models of an Artery with a Net Structured Stent, World Congress of Medical Physics and Biomedical Engineering, Sept. 7-12, 2009, Munich, Germany

- [CP 37] Mitchell J.H. Lum, **Jacob Rosen**, Hawkeye King, Diana C.W. Friedman, Thomas Lendvay, Andrew S. Wright, Mika N. Sinanan, and Blake Hannaford, Teleopeartion in Surgical Robotics – Network Latency Effects on Surgical Performance, 31th Annual International Conference of the IEEE Engineering in Medicine and Biology Society EMBS, Minneapolis MN, Sept. 2009.

- [CP 36] Mitchell J.H. Lum, Jacob Rosen, Thomas S. Lendvay, Mika N. Sinanan, Blake Hannaford, Effect of Time Delay on TeleSurgical Performance, IEEE International Conference on Robotics and Automation, Kobe, Japan, May 12-17, 2009

- [CP 35] Mitchell J.H. Lum, Jacob Rosen, Thomas S. Lendvay, Andrew S. Wright, Mika N. Sinanan, and Blake Hannaford, TeleRobotic Fundamentals of Laparoscopic Surgery (FLS): Effects of Time Delay - Pilot Study, 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society EMBS, Vancouver, British Columbia, Canada, 20-25 Aug. 2008, pp. 5597-5600.

- [CP 34] T. Lendvay, F. J Hseih, B. Hannaford, **J. Rosen**, The Biomechanics of Percutaneous Needle Insertion, Proceedings of Medicine Meets Virtual Reality (MMVR 16) pp. 245-247, Long Beach CA, Jan. 29 - Feb. 1, 2008

- [CP 33] M. J.H. Lum, D.C.W. Friedman, G. Sankaranarayanan, H. King, A. Wright, M. Sinanan, T. Lendvay, J. Rosen, B. Hannaford, Objective Assessment of Telesurgical Robot Systems: Telerobotic FLS pp. 263-265, Long Beach CA, Jan. 29 - Feb. 1, 2008

- [CP 32] G. Sankaranarayanan, B. Hannaford, H. King, S.Y. Ko, M. Lum, D. Friedman, **J. Rosen**, and B. Hannaford, Portable Surgery Master Station for Mobile Robotic Surgery, Proceedings of the ROBOCOMM, the first International, conference on Robot Communication and Coordination, Athens, Greece, Oct 2007.

- [CP 31] Lum M., D. Friedman, H. King, R. Donlin, G. Sankaranarayanan, T. Broderick, M. Sinanan, **J. Rosen** and B. Hannaford, Teleoperation of a Surgical Robot via Airborne Wireless Radio and Transatlantic Internet Links, The 6th International Conference on Field and Service Robotics, July 9-12 2007, Chamonix, France.

- [CP 30] Friedman D., J. Dosher, T. Kowalewski, **J. Rosen**, B. Hannaford, Automated Tool Handling for the Trauma pod Surgical Robot, International Conference of Robotics and Automation (ICRA 2007), Rome, Italy

- [CP 29] Gunther S., **J. Rosen**, B. Hannaford, M. Sinanan, The Red DRAGON: A Multi-Modality System for Simulation and Training in Minimally Invasive Surgery, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 149-154, Long Beach CA, Feb. 6-9, 2007

- [CP 28] Lum M.J.H., **J. Rosen**, H. King, D.C.W. Friedman, G. Donlin, G. Sankaranarayanan, B. Harnett, L. Huffman, C. Doarn, T. Broderick and B. Hannaford, Telesurgery Via Unmanned Aerial Vehicle (UAV) With a Field Deployable Surgical Robot, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 313-315 , Long Beach CA, Feb. 6-9, 2007

- [CP 27] Mackel T., **J. Rosen**, C. Pugh, Application of Hidden Markov Modeling to Objective Medical Skill Evaluation, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 316-318, Long Beach CA, Feb. 6-9, 2007

- [CP 26] De. S., A. Dagan, P. Roan, **J. Rosen**, M. Sinanan, M. Gupta, B. Hannaford, CIELab and sRGB Color Values of in vivo Normal and Grasped Porcine Liver, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp.109-111, Long Beach CA, Feb. 6-9, 2007

- [CP 25] De S., P. Swanson, M. Sinanan, **J. Rosen**, A. Dagan, and B. Hannaford, Assessment of Tissue Damage due to Mechanical Stresses, Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- [CP 24] Perry J.C., **J. Rosen**, Design of a 7 Degree-of-Freedom Upper-Limb Powered Exoskeleton Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- [CP 23] Lum M.J.H., D. Trimble, **J. Rosen**, K. Fodero II, H. King, G. Sankarayanaranan, J. Dosher, R. Leushke, B. Martin-Anderson, M.N. Sinanan, and B. Hannaford. Multidisciplinary approach for developing a new minimally invasive surgical robot system. Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- [CP 22] Fodero K. II, H. King, M.J.H. Lum, C. Bland, **J. Rosen**, M. Sinanan, B. Hannaford, Control System Architecture for a Minimally Invasive Surgical Robot Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006. PMID: 16404036

- [CP 21] Mackel T., **J. Rosen**, C. Pugh, Data Mining of the E-pelvis Simulator Database A Quest for a Generalized Algorithm for Objectively Assessing Medical Skill Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006. PMID: 16404077

- [CP 20] Lum M. J. H., D. Warden, **J. Rosen**, M. N. Sinanan, and B. Hannaford. Hybrid analysis of a spherical mechanism for a minimally invasive surgical (MIS) robot - design concepts for multiple optimizations. Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006. PMID: 16404076

- [CP 19] **Rosen J,**, J. C. Perry, N. Manning, S. Burns, B. Hannaford, The Human Arm Kinematics and Dynamics During Daily Activities – Toward a 7 DOF Upper Limb Powered Exoskeleton, - ICAR 2005 – Seattle WA, July 2005.

- [CP 18] Cavallaro E., **J. Rosen**, J. C. Perry, S. Burns, B. Hannaford, Hill Based Model as a Myoprocessor for a Neural Controlled Powered Exoskeleton Arm – Parameter Optimization, Proceedings of the 2005 IEEE international Conference on Robotics and Automation, ICRA 2005, pp. 4525 – 4530, Barcelona Spain, April 2005

- [CP 17] **Rosen J.**, M. Lum, D. Trimble, B. Hannaford, M. Sinanan, Spherical Mechanism Analysis of a Surgical Robot for Minimally Invasive Surgery – Analytical and Experimental Approaches, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 111. pp. 422-428, IOS Press, January 2005. PMID: 15718772

- [CP 16] M.J.H. Lum, **J. Rosen**, M. N. Sinanan, B. Hannaford, Kinematic Optimization of a Spherical Mechanism for a Minimally Invasive Surgical Robot, 2004 IEEE International Conference on Robotics & Automation, pp. 829-834, New-Orleans, LA, USA, April 26-30, 2004.

- [CP 15] Brown J. D., **J. Rosen**, L. Chang, M. Sinanan, B. Hannaford, Quantifying Surgeon Grasping Mechanics in Laparoscopy Using the Blue DRAGON System, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, vol. 98, pp. 34-36, IOS Press, January 2004. PMID: 15544237.

- [CP 14] Kowalewski T.M., **J. Rosen,** L. Chang, M. Sinanan, B. Hannaford, Optimization of a Vector Quantization Codebook for Objective Evaluation of Surgical Skill, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, vol. 98, pp. 174-179, IOS Press, January 2004. PMID: 15544266.

- [CP 13] Brown J. D. **J. Rosen**, M. N. Sinanan, B. Hannaford, In-Vivo and Postmortem Compressive Properties of Porcine Abdominal Organs, Lecture Notes in Computer Science, Volume 2878 / 2003, pp. 238 –245, Medical Image Computing and Computer-Assisted Intervention - MICCAI 2003, Toronto, Canada.

- [CP 12] Brown J. D., **J. Rosen**, Y. S. Kim, L. Chang, M. Sinanan, B. Hannaford, In-Vivo and In-Situ Compressive Properties of Porcine Abdominal Soft Tissues, Studies in Health Technology and

Informatics - Medicine Meets Virtual Reality, vol. 94, pp. 26-32, IOS Press, January 2003. PMID: 15455858.

- [CP 11] **Rosen J.**, L. Chang, J. D. Brown, B. Hannaford, M. Sinanan, R. Satava, Minimally Invasive Surgery Task Decomposition - Etymology of Endoscopic Suturing, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, vol. 94, pp. 295-301, IOS Press, January 2003. PMID: 15455911.

- [CP 10] **Rosen J.**, J. D. Brown, L. Chang, M. Barreca, M. Sinanan, B. Hannaford, The Blue DRAGON - A System for Measuring the Kinematics and the Dynamics of Minimally Invasive Surgical Tools In–Vivo, Proceedings of the 2002 IEEE International Conference on Robotics & Automation, Washington DC, USA, May 11-15, 2002.

- [CP 09] Brown D. J., **J. Rosen**, M. Moreyra, M. Sinanan, B. Hannaford, 'Computer-Controlled Motorized Endoscopic Grasper for In Vivo Measurements of Soft Tissue Biomechanical Characteristics,' Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, vol. 85, pp. 71-73, IOS Press, January 2002. PMID: 15458062.

- [CP 08] **Rosen J.**, J. D. Brown, M. Barreca, L. Chang, B. Hannaford, M. Sinanan, The Blue DRAGON - A System for Monitoring the Kinematics and the Dynamics of Endoscopic Tools in Minimally Invasive Surgery for Objective Laparoscopic Skill Assessment, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 85, pp.412-418, IOS Press, January 2002. PMID: 15458124

- [CP 07] **Rosen J.**, M. Solazzo, B. Hannaford, M. Sinanan, Objective Laparoscopic Skills Assessments of Surgical Residents Using Hidden Markov Models Based on Haptic Information and Tool/Tissue Interactions, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 81, pp.417-423, IOS Press, January 2001. PMID: 11317782

- [CP 06] Longnion J., **J. Rosen**, M. Sinanan, B. Hannaford, Effects of Geared Motor Characteristics on Tactile Perception of Tissue Stiffness, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 81, pp. 286-292, IOS Press, January 2001. PMID: 11317757

- [CP 05] **Rosen J.**, M. Solazzo, B. Hannaford, M. Sinanan , Objective Evaluation of Laparoscopic Surgical Skills Using Hidden Markov Models Based on Haptic Information and Tool/Tissue Interactions, American College of Surgeons Annual Meeting - Washington State Chapter, Lake Chelan, June 2000.

- [CP 04] **Rosen J.**, C. Richards, B. Hannaford, M. Sinanan, Hidden Markov Models of Minimally Invasive Surgery, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 70 pp. 279-285, IOS Press, January 2000. PMID: 10977557

- [CP 03] **Rosen J.**, M. MacFarlane, C. Richards, B. Hannaford, C. Pellegrini, M. Sinanan, Surgeon/Endoscopic Tool Force-Torque Signatures In The Evaluation of Surgical Skills During Minimally Invasive Surgery, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 62, pp. 290-296, IOS Press, January 1999. PMID: 10538374

- [CP 02] Hannaford B., J. Trujillo, M. Sinanan, M. Moreyra, **J. Rosen**, J. Brown, R. Lueschke, M. MacFarlane, Computerized Endoscopic Surgical Grasper, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 50, pp. 265-271, IOS Press, January 1998. PMID: 10180551

- [CP 01] **Rosen J.** and M. Arcan, Modeling a Sitting Human Body/Chair System in a Vibration Environment, Recent Advances in Experimental Mechanics, Proceedings of the 10th International Conference on Experimental Mechanics, Lisbon, Portugal, July 1994.

Abstracts

- MacFarlane M., **J. Rosen**, B. Hannaford, C. Pellegrini, M. Sinanan, Biological and Simulated Soft Tissue Force Profiles Generated From a Force Feedback Grasper System, Society of American Gastrointestinal Endoscopy meeting, SAGES, Seattle, WA, April 1998.

- Richards C., **J. Rosen**, B. Hannaford, M. MacFarlane, C. Pellegrini, M. Sinanan, Skills Evaluation in Minimally Invasive Surgery Using Force/Torque Signatures, Proceedings SAGES-99, Society of American Gastrointestinal Endoscopic Surgeons, San Antonio, TX, March 1999.

- Sinanan M, **Rosen J**, Richards C, Hannaford B. Hidden Markov models of minimally invasive surgery. Annual Meeting of the Seattle Surgical Society, Seattle, WA, January 14, 2000.

- Solazzo M, Sinanan M, **Rosen J**, Hannaford B. Evaluation of laparoscopic skills based on haptic information and tool/tissue interaction. Washington State Chapter of the American College of Surgeons, Lake Chelan, June 23-25, 2000.

- Brown J. D., **J. Rosen**, B. Hannaford, M. Sinanan, A Passive Mechanical Pantograph System for Measuring Tool Position During Minimally Invasive Surgery, BMES 2000, Biomedical Engineering Society, Annual Meeting, October 2000 Seattle, WA - Annals of Bioengineering Vol. 28 Supplement 1.

- *Solazzo M., **J. Rosen**, B. Hannaford, M. N. Sinanan, D. Oleynikov, C. Pellegrini, Task Decomposition of Minimally Invasive surgery for Objective Evaluation of Laparoscopic skill, SAGES - 2001, April, 2001, St. Louis, Missouri. [A10]*

- Oleynikov D, **Rosen J**, Solazzo M, Hannaford B, Sinanan M Objective computer based skills assessment of laparoscopic surgery, Seattle Surgical Association Meeting, 2001 Seattle WA

- Brown J. D., **J. Rosen**, J. Longnion, M. Sinanan, B. Hannaford, Design and Performance of a Surgical Tool Tracking System for Minimally Invasive Surgery, International Mechanical Engineering Conference and Exposition Nov 11-16 2001 NYC, ASME Advances in Bioengineering BED-Vol. 51, 2001

- Barreca M., **J. Rosen**, L. Chang, J. D. Brown, B. Hannaford, M. Sinanan, The Blue DRAGON - A System for Objective Laparoscopic Skill Assessment, 8th World Congress of Endoscopic Surgery SAGES March 2002, NYC.

- M. J.H. Lum, **J. Rosen**, T. J. Broderick, M. N. Sinanan, B. Hannaford, Raven – A Surgical Robot for Teleoperation, American Telemedicine Association (ATA) Conference, April 6-8 2008, Seattle, WA.

- Daniel Glozman, **Jacob Rosen**, Raven IV – Surgical Robotics System for Collaborative Telesurgery, Israeli Conference on Robotics (ICR), The 3rd Israeli Conference on Robotics 2010, 10-11 November, 2010, Herzlia, Israel

Patents

- An Exoskeleton for Physical Therapy – Paten Application No. 2008/0009771, Filed on April 8 2006 to the U.S. Patent and Trademark Office.
- SURGICAL SHIELD FOR SOFT TISSUE PROTECTION, Paten Application No. 20120203069, Filed February 9, 2012
- INTRODUCER DEVICE Paten Application No. 20110257672 Filed: March 18, 2011
- Surgical Cockpit Comprising Multisensory and Multimodal Interfaces for Robotic Surgery and Methods Paten Application No. 20110238079 Filed: March 18, 2011
- SURGICAL DEVICE Paten Application No. 20110118543 Filed: November 10, 2010
- SKILL EVALUATION USING SPHERICAL MOTION MECHANISM Paten Application No. 20110020779 Filed: June 28, 2010

- SKILL EVALUATION Paten Application No. 20060243085 Filed: April 25, 2005
- Spherical motion mechanism, Paten Application No. 20110020779 Filed: June 28, 2010

Project Reports

- **Rosen J.**, Human Engineering - Analysis of Human Exposure to Acceleration, Military Standard No. 3208 Automotive Section, Test and Evaluation Unit, Ordnance Headquarters IDF, Mach 1990.

- Pruchi D., **J. Rosen**, and M. Arcan, " Natural Activation of a Powered Exoskeleton - Development of a Practical Myoprocessor Based on Voluntary Muscle Control Principles", Research Supported by the Israel Ministry of Defense, January 1993.

- **Rosen J.** and M. Arcan, "Development of an Human Arm/Exoskeleton System Simulation Integrating a practical Muscle Model", Research Report, MAFAT Ministry of Defense Israel, February 1994.

- **Rosen J.** and M. Arcan, " Spine Instrumentation - Ilio-Lumbar Fixation device, Intra vertebral Implant", NAYOT ORTIM, February 1995.

- **Rosen J.**, "Modular Pelvis Replacement System - Structural and Biomechanical Analysis ", NAYOT MPRS, April 1997

- Arcan M., M. B. Fuchs, **J. Rosen**, M. Brand, Natural Integration of a Human Arm / Powered Exoskeleton System, Research Report, MAFAT Ministry of Defense Israel, November 1998.

- Neural Control of Upper Limb Powered Exoskeleton - NSF
  Annual Progress Report 2003 (Authored)
  Annual Progress Report 2004 (Authored)
  Annual Progress Report 2005 (Authored)
  Final Report 2006 (Authored)
  PI Meeting Grant Report

- Mini Robot design for Military Telesurgery in the Battlefield: Breaking the Size Barrier for Surgical Manipulators - Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity
  Annual Progress Report 2002 (Authored)
  Annual Progress Report 2003 (Co-Authored)
  Annual Progress Report 2004 (Co-Authored)

- Developing a Generalized Algorithms for Objectively Assessing Medical and Surgical Skill with Various Modalities - Data Mining Using Markov Models
  Annual Progress Report 2004 (Authored)

- The Myoprocessor – Muscle Modeling for Neural Control of Upper Limb Powered Prosthetics and Orthotics, Annual Progress Report 2008 (Authored)

- Lightweight Wearable Lower Limb Exoskeleton, US Army, Department of Defense.
  Annual Progress Report 2008 (Authored)

UNIVERSITY SERVICE

UCLA (2014 - Current)

School of Medicine

- Center for Advanced Surgical and Interventional Technology (CASIT) – Executive committee member (2014 - Current)

Department (MAE)

- Graduate students admission committee (2014 - Current)
- ASME Student Advisor (2015 - Current)
- Merit Increase Committee member (2015 – current)

UCSC (2008 - 2013)

School of Engineering

- Space Committee – committee member (CE) – 2013 - 2014
- Baskin School of Engineering - Research Review Day – presentation
  - When a Human Meets a Robot - Three Close Encounters – 10.2012
  - Medical Robotics – 10.2009
- UC LEADS Faculty Mentor (Mentor one students from UC Merced) – 10 weeks Summers 2012
- Presentation and Lab Tour, Adept Technologies – 9/2012
- Presentation and Lab Tour, Toyota Motor Corp.- 7/2012
- Presentation and Lab Tour, Nissan Motors – 6/2012
- Presentation and Meeting, General Motors Research, Palo Alto, CA. – 4/2012
- Presentation and Lab Tour, Hosting, Honda Research – 2/2012
- SOE Graduation Ceremonies – 6/2012
- UC LEADS Faculty Mentor (Mentor one students from UCSD) – 10 weeks Summers 2009

Department

- Bioengineering – Curriculum Development Committee – 2008 – 2014
- UCSC Extensions Silicon Valley – Medical Devices – Curriculum Reviewer – 2011 – 2014
- NSF SURF-IT Mentor (3 undergraduates in my lab for summer) – Summer 2011
- NSF SURF-IT Mentor (3 undergraduates in my lab for summer) –Summer 2010
- NSF SURF-IT Mentor (4 undergraduates in my lab for summer) –Summer 2009
- CMPE123A/B Faculty Advisor (various projects) – 2008-2012
- Robotics & Control – Curriculum Committee – Chair – 2008 – 2014
  Assist in developing and maintaining all the academic aspects related to the undergraduate degree in Robotics Engineering (offered for the first time in Fall 2011) along with the graduate degree in Robotics and Control.
- CE Outreach Committee - Member – 2008
- Internal departmental review of tenure and promotion cases – 3 Cases – 2008 - 2014

Outreach K-12 Elementary and Secondary Education

- Hosting a lab visit for elementary school students (Westlake Elementary) –2014
- Hosting a lab visit for middle school students – Middle School Summit - 2013
- Hosting a lab visit for elementary school students (Westlake Elementary) –2013

- Hosting a lab visit for high school students (PCT) - 2011
- Hosting a lab visit for elementary school students (Westlake Elementary) –2009

University of Washington (2000 - 2008)

School of Engineering

- UW - Collage of Engineering representative and the co-director of research of ISIS – Institute of Surgical Intervention and Simulation – School of Medicine – 2004 - 2008

Office of the President

- UW - Washington Research Foundation – Grant Review – 2 Panels 2003, 2006

OUTSIDE PROFESSIONAL ACTIVITIES

SUMMARY:	Invited Lectures (listed below)	**32**
	Papers Presented at Professional Meetings (see conference list)	**61**

Public Lecture or Forum Participation

Invited Lectures

- Exoskeletons – Shaping Body and Mind, Metamorphosis, Human Animal Armor, An international Confreance, UCSB, Dec. 3-5, 2015
- When a Human Meets a Robot – A tale of Close Encounters – Institute of Green and Intelligent Technology, Chinese Academy of Science, Chongqing, China, August 27, 2015.
- Medical Robotics, ASME - The Los Angeles Chapter, UCLA, May 21, 2015
- Surgical Robotics – Robo Madness West, Xconomy, SRI, Menlo Park, April 7, 2015.
- Spotlight Talks: Robots for Rehab – Robo Madness Boston, Xconomy, Google Campus, Boston, March. 11, 2015
- Medical Robotics – Bioengineering Dept. Seminar Winter 2015, UCLA
- Surgical Robotics – 6th Summer European University, September 3-11, 2013, Montpellier, France.
- Medical Robotics – 2012 Korea – US Green Technology Symposium, Seoul Korea, Nov. 29, 2012
- Upper Limb Exoskeleton - Korea Institute of Industrial Technology (KITECH), Seoul Korea, Nov. 28, 2012
- Medical Robotics – Science Table at Crown Collage, Hosted by Joel Ferguson, Crown College Provost , UCSC, Oct. 11, 2012
- Medical Robotics – Human Centered Robotics, Baskin School of Engineering Research Day, UCSC, Oct. 18, 2012
- Raven – Open Source Robotic Platform for Research in Surgical Robotics, The 3ed Annual Open Science Summit, Sunnyvale, Oct. 23-24, 2012

- Raven – Developing A surgical Robotic System – Robotic Summer School, August 13-17, London Ontario CA,

- Surgical Robotics – 5th Summer European University, September 7-14, 2011, Montpellier, France.

- Medical Robotics – Guest Lecture, Robot Renaissance: The Future of Human-Machine Interaction Institute for the Future (IFTF), Berkeley CA, Nov. 10, 2010

- Medical Robotics – The Human Machine Interface, Guest Lecture IEEE International Conference of Robotics and Automation, Anchorage, Alaska, May, 2010

- Medical Robotics – Bioports to the human Body , Guest Lecture IEEE Robotics and Automation Society, Santa Clara Valley Chapter December 10, 2009

- Medical Robotics – Bioports to the human Body , CITRIS – Center for Information Technology Research in the Interest of Society, UC Berkley, October 28, 2009

- Medical Robotics Center for Applied Biomechanics and Rehabilitation Research, National Rehabilitation Hospital, and the Catholic University of America, Washington D.C., March 2009.

- Use of Robotics for Physical Rehabilitation, Military Collaboration: Bioengineering Challenges of Brain Trauma, American Institute for Medical and Biological Engineering (AIMBE), National Academy of Sciences, Washington DC, Feb 20 , 2008

- Medical Robotics – Bioports to the Human Body, The Robotic Institute, School of Computer Science, Carnegie Melon University, Pittsburgh, PA, October 2007.

- Medical Robotics, School of Science and Engineering, Oregon Graduate Institute, Oregon Health and Science University, Portland, Oregon, September 2007

- Telesurgery: Healthcare Delivered through Wired and Wireless Communication, Medical Automation, Washington DC, November, 2006

- Human Centered Approach in Surgical and Rehabilitation Robotics, Robotics Based Medicine Workshop, International Conformance of Robotics and Automation, ICRA 2006, Orlando Fl, May 2006

- Surgical Robotics and The operating Room of the Future – Seattle Robotic Society, December 15, Renton, WA

- Robotic Exoskeletons for Physical Rehabilitation, November 16, 2005, 590W Compute & Disabilities, Department of Computer Science and Engineering, University of Washington

- Surgical Robotics - 2nd Summer European University, September 7-14, 2005, Montpellier, France.

- A Surgical Robot as an Information System Integrated into the Operating Room of the Future – Control and Robotics Seminar Series (EE 591), University of Washington, April 2005.

- Multimode Approach for Objective Skill assessment in Medicine – Product Line Review – Telemedicine and Advanced Technology Research Center (TATRC), Department of the Army, DoD, February 2005, Marina Del Ray, CA

- The Operating Room of the Future - New Generation of Surgical Robotics, Biomechanics Seminar Series (ME 598), University of Washington, October 2004.

- Neural Control of an Upper Limb Powered Exoskeleton System, Biomechanics Seminar Series (ME 598), University of Washington, December 2002.

- BioRobotics in Rehabilitation, Department of Rehabilitation Medicine, Monthly Rehab Research Seminar, University of Washington, June 2001.

- Workshop: Simulating Minimally Invasive Surgical Procedures in Virtual Environments: MODELING**,** Human Machine Interfaces in Minimally Invasive Surgery, Medicine Meets Virtual Reality, Newport Beach, CA, January 2001.

- An Upper Limb Myosignal-Based Powered Exoskeleton System, Exoskeletons for Human Performance Augmentation (EHPA) Workshop - DARPA, Washington, D.C., March, 2000.

- Biomechanics and Biorobotics in Minimally Invasive Surgery, Medical Robotics Workshop, Smart System 2000, Huston, TX, September, 2000.

Membership or Activities in Professional Associations

Memberships

- IEEE – Member since 2001
- IEEE Society of Engineering in Medicine & Biology (EMB) – Member since 2009

Conference Organizing Committee

- ICAR2005 Seattle – Organizing Committee - Chair of the Tutorials and Special Sessions - 2003 – 2005
- BioRob Pisa Italy - Organizing Committee - 2006
- EMBC 08 – 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Organizing Committee, Co-Chair Theme 08 – Biorobotics Surgical Planning and Orthopedic Biomechanics, 20-24 August 2008
- Biorob 2008, Scottsdale AZ – Surgical Robotics Workshop – Co-Organizer
- EMBC 09 – 31th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Organizing Committee, Workshop Co-Chair, Sept. 2-6 2009
    - Surgical Robotics (With Co-Chair Philippe Poignet)
    - Frontiers of microrobotics in endo-and transluminal therapy (With Co-Chair Paolo Dario)
- 2010 Surgical Robotics Summer School – Co-Organizer, University of Washington, Seattle WA August 2010.
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011), Redundancy in Robot Manipulators and Multi-Robot Systems, Workshop, Co-Organizer (with Co-Chair - Dejan Milutinovic – AMS, UCSC)

Papers Presented at Professional Meetings (Presenter is marked in bold letters)

- **Rosen J.** and M. Arcan, Modeling a Sitting Human Body/Chair System in a Vibration Environment, Recent Advances in Experimental Mechanics, Proceedings of the 10th International Conference on Experimental Mechanics, Lisbon, Portugal, July 1994.

- **Rosen J.** and M. Arcan, Seat Optimization in Static and Dynamic Conditions - A Numerical and Experimental Approach, Proceedings of the 7th Mediterranean Conference on Medical and Biological Engineering, Jerusalem, Israel, September 1995.

- Hannaford B., J. Trujillo, M. Sinanan, M. Moreyra, **J. Rosen**, J. Brown, R. Lueschke, M. MacFarlane, Computerized Endoscopic Surgical Grasper, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 1998.

- **MacFarlane** M., J. Rosen, B. Hannaford, C. Pellegrini, M. Sinanan, Biological and Simulated Soft Tissue Force Profiles Generated From a Force Feedback Grasper System, Society of American Gastrointestinal Endoscopy meeting, SAGES, Seattle, WA, April 1998.

- **MacFarlane M**., J. Rosen, B. Hannaford, C. Pellegrini, M. Sinanan, Force Feedback Grasper Helps Restore the Sense of Touch in Minimally Invasive Surgery, Proceedings SSAT-98, The Society for Surgery of the Alimentary Tract SSAT, New Orleans, LA, May 1998.

- **Rosen J.**, M. MacFarlane, C. Richards, B. Hannaford, C. Pellegrini, M. Sinanan, Surgeon/Endoscopic Tool Force-Torque Signatures In The Evaluation of Surgical Skills During Minimally Invasive Surgery, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 1999.

- **Richards C.**, J. Rosen, B. Hannaford, M. MacFarlane, C. Pellegrini, M. Sinanan, Skills Evaluation in Minimally Invasive Surgery Using Force/Torque Signatures, Proceedings SAGES-99, Society of American Gastrointestinal Endoscopic Surgeons, San Antonio, TX, March 1999.

- **Rosen J.**, C. Richards, B. Hannaford, M. Sinanan, Hidden Markov Models of Minimally Invasive Surgery, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2000.

- Sinanan M, Rosen J, **Richards C,** Hannaford B. Hidden Markov models of minimally invasive surgery. Annual Meeting of the Seattle Surgical Society, Seattle, WA, January 14, 2000.

- Rosen J., **C. Richards**, B. Hannaford, C. Pellegrini, M. Sinanan, Evaluation of Skills in Minimally Invasive Surgery Using Hidden Markov Models, SAGES - 2000, Society of American Gastrointestinal Endoscopic Surgeons, Atlanta, GA, March 2000.

- Rosen J., **M. Solazzo,** B. Hannaford, M. Sinanan , Objective Evaluation of Laparoscopic Surgical Skills Using Hidden Markov Models Based on Haptic Information and Tool/Tissue Interactions, American College of Surgeons Annual Meeting - Washington State Chapter, Lake Chelan, June 2000.

- **Solazzo M.,** M. Sinanan, J. Rosen, B. Hannaford, Objective laparoscopic performance assessment system based on haptic information and tool/tissue interactions, North Pacific Surgeon Association Meeting, Idaho 2000.

- **Solazzo M**, Sinanan M, Rosen J, Hannaford B. Evaluation of laparoscopic skills based on haptic information and tool/tissue interaction. Washington State Chapter of the American College of Surgeons, Lake Chelan, June 23-25, 2000.

- **Brown J. D.**, J. Rosen, B. Hannaford, M. Sinanan, A Passive Mechanical Pantograph System for Measuring Tool Position During Minimally Invasive Surgery, BMES 2000, Biomedical Engineering Society, Annual Meeting, October 2000 Seattle, WA - Annals of Bioengineering.

- **Rosen J.**, M. Solazzo ,B. Hannaford, M. Sinanan, Task Decomposition of Minimally Invasive Surgery for Objective Evaluation of Laparoscopic Surgical Skills Using Hidden Markov Model, BMES 2000, Biomedical Engineering Society, Annual Meeting, October 2000 Seattle, WA - Annals of Bioengineering Vol. 28 Supplement 1.

- **Longnion J.**, J. Rosen, M. Sinanan, B. Hannaford, Effects of Geared Motor Characteristics on Tactile Perception of Tissue Stiffness, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2001.

- **Rosen J.**, M. Solazzo, B. Hannaford, M. Sinanan, Objective Laparoscopic Skills Assessments of Surgical Residents Using Hidden Markov Models Based on Haptic Information and Tool/Tissue Interactions, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2001.

- **Solazzo M.,** J. Rosen, B. Hannaford, M. N. Sinanan, D. Oleynikov, C. Pellegrini, Task Decomposition of Minimally Invasive surgery for Objective Evaluation of Laparoscopic skill, SAGES - 2001, April, 2001, St. Louis, Missouri.

- **Oleynikov D,** Rosen J, Solazzo M, Hannaford B, Sinanan M Objective computer based skills assessment of laparoscopic surgery, Seattle Surgical Association Meeting, 2001 Seattle WA

- **Brown J. D.,** J. Rosen, J. Longnion, M. Sinanan, B. Hannaford, Design and Performance of a Surgical Tool Tracking System for Minimally Invasive Surgery, International Mechanical Engineering Conference and Exposition Nov 11-16 2001 NYC.

- **Rosen J.**, J. D. Brown, M. Barreca, L. Chang, B. Hannaford, M. Sinanan, The Blue DRAGON - A System for Monitoring the Kinematics and the Dynamics of Endoscopic Tools in Minimally Invasive Surgery for Objective Laparoscopic Skill Assessment, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, Vol. 85, January 2002.

- Brown D. J., **J. Rosen**, M. Moreyra, M. Sinanan, B. Hannaford, 'Computer-Controlled Motorized Endoscopic Grasper for In Vivo Measurements of Soft Tissue Biomechanical Characteristics,' Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2002

- **Rosen J.**, J. D. Brown, L. Chang, M. Barreca, M. Sinanan, B. Hannaford, The Blue DRAGON - A System for Measuring the Kinematics and the Dynamics of Minimally Invasive Surgical Tools In–Vivo, IEEE International Conference on Robotics & Automation, Washington DC, USA, May 11-15, 2002.

- **Barreca M.**, J. Rosen, L. Chang, J. D. Brown, B. Hannaford, M. Sinanan, The Blue DRAGON - A System for Objective Laparoscopic Skill Assessment, 8th World Congress of Endoscopic Surgery SAGES March 2002, NYC.

- **Rosen J.**, L. Chang, J. D. Brown, B. Hannaford, M. Sinanan, R. Satava, Minimally Invasive Surgery Task Decomposition - Etymology of Endoscopic Suturing, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2003.

- Brown J. D., **J. Rosen**, Y. S. Kim, L. Chang, M. Sinanan, B. Hannaford, In-Vivo and In-Situ Compressive Properties of Porcine Abdominal Soft Tissues, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2003.

- **Brown J. D.** J. Rosen, M. N. Sinanan, B. Hannaford, In-Vivo and Postmortem Compressive Properties of Porcine Abdominal Organs, Lecture Notes in Computer Science, Volume 2878 / 2003, pp. 238 –245, Medical Image Computing and Computer-Assisted Intervention - MICCAI 2003, Toronto, Canada.

- Kowalewski T.M., **J. Rosen,** L. Chang, M. Sinanan, B. Hannaford, Optimization of a Vector Quantization Codebook for Objective Evaluation of Surgical Skill, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2004.

- Brown J. D., J. Rosen, L. Chang, M. Sinanan, **B. Hannaford,** Quantifying Surgeon Grasping Mechanics in Laparoscopy Using the Blue DRAGON System, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, vol. 98, pp. 34-36, IOS Press, January 2004.

- **M.J.H. Lum,** J. Rosen, M. N. Sinanan, B. Hannaford, Kinematic Optimization of a Spherical Mechanism for a Minimally Invasive Surgical Robot, 2004 IEEE International Conference on Robotics & Automation, New-Orleans, LA, USA, April 26-30, 2004.

- **Rosen J.**, M. Lum, D. Trimble, B. Hannaford, M. Sinanan, Spherical Mechanism Analysis of a Surgical Robot for Minimally Invasive Surgery – Analytical and Experimental Approaches, Studies in Health Technology and Informatics - Medicine Meets Virtual Reality, January 2005

- **Cavallaro E.**, J. Rosen, J. C. Perry, S. Burns, B. Hannaford, Hill Based Model as a Myoprocessor for a Neural Controlled Powered Exoskeleton Arm – Parameter Optimization, Proceedings of the 2005 IEEE international Conference on Robotics and Automation, ICRA 2005, pp. 4525 – 4530, Barcelona Spain, April 2005

- Rosen J,, **J. C. Perry**, N. Manning, S. Burns, B. Hannaford, The Human Arm Kinematics and Dynamics During Daily Activities – Toward a 7 DOF Upper Limb Powered Exoskeleton, - ICAR 2005 – Seattle WA, July 2005.

- **Mitchell J.H. Lum**, Diana Warden, Jacob Rosen, Mika N. Sinanan, and Blake Hannaford. Hybrid analysis of a spherical mechanism for a minimally invasive surgical (MIS) robot - design concepts for multiple optimizations. Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006.

- **Thomas Mackel,** Jacob Rosen, Carla Pugh, Data Mining of the E-pelvis Simulator Database A Quest for a Generalized Algorithm for Objectively Assessing Medical Skill Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006.

- **Kenneth Fodero II**, H. Hawkeye King, Mitchell J.H. Lum, Clint Bland, Jacob Rosen, Mika Sinanan, Blake Hannaford, Control System Architecture for a Minimally Invasive Surgical Robot Proceedings of Medicine Meets Virtual Reality, Long Beach, CA, USA, January 2006.

- Mitchell J.H. Lum, Denny Trimble, Jacob Rosen, Kenneth Fodero II, Hawkeye King, Ganesh Sankarayanaranan, Jesse Dosher, Rainer Leushke, Brandon Martin-Anderson, Mika N. Sinanan, and **Blake Hannaford.** Multidisciplinary approach for developing a new minimally invasive surgical robot system. Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- **Joel C. Perry,** Jacob Rosen, Design of a 7 Degree-of-Freedom Upper-Limb Powered Exoskeleton Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- Smita De, Paul Swanson, Mika Sinanan, Jacob Rosen, Aylon Dagan, and **Blake Hannaford,** Assessment of Tissue Damage due to Mechanical Stresses, Proceedings of the 2006 BioRob Conference, Pisa, Italy, February, 2006.

- **Lum M.J.H**., J. Rosen, H. King, D.C.W. Friedman, G. Donlin, G. Sankaranarayanan, B. Harnett, L. Huffman, C. Doarn, T. Broderick and B. Hannaford, Telesurgery Via Unmanned Aerial Vehicle (UAV) With a Field Deployable Surgical Robot, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 313-315 , Long Beach CA, Feb. 6-9, 2007

- **Mackel T**., J. Rosen, C. Pugh, Application of Hidden Markov Modeling to Objective Medical Skill Evaluation, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp. 316-318, Long Beach CA, Feb. 6-9, 2007

- **De. S.**, A. Dagan, P. Roan, J. Rosen, M. Sinanan, M. Gupta, B. Hannaford, CIELab and sRGB Color Values of in vivo Normal and Grasped Porcine Liver, Proceedings of Medicine Meets Virtual Reality (MMVR 15) pp.109-111, Long Beach CA, Feb. 6-9, 2007

- **Friedman D.**, J. Dosher, T. Kowalewski, J. Rosen, B. Hannaford, Automated Tool Handling for the Trauma pod Surgical Robot, International Conference of Robotics and Automation (ICRA 07), Rome, Italy

- **G. Sankaranarayanan**, B. Hannaford, H. King, S.Y. Ko, M. Lum, D. Friedman, J. Rosen, and B. Hannaford, Portable Surgery Master Station for Mobile Robotic Surgery, ROBOCOMM, the first International, conference on Robot Communication and Coordination, Athens, Greece, Oct 2007.

- **T. Lendvay,** F. J Hseih, B. Hannaford, J. Rosen, The Biomechanics of Percutaneous Needle Insertion, Medicine Meets Virtual Reality (MMVR 16) pp. 245-247, Long Beach CA, Jan. 29 - Feb. 1,, 2008

- **M. J.H. Lum**, D. C. W. Friedman, G. Sankaranarayanan, H. King, A. Wright, M. Sinanan, T. Lendvay, J. Rosen, B. Hannaford, Objective Assessment of Telesurgical Robot Systems: Telerobotic FLS, Medicine Meets Virtual Reality (MMVR 16) pp. 263-265, Long Beach CA, Jan. 29 - Feb. 1, 2008.

- **J. Rosen**, A. Wright, B. Hannaford, M. Sinanan, Objective Laparoscopic Skills Assessments of Surgical Residents – Five Years Longitudinal Study, Medicine Meets Virtual Reality (MMVR 16) pp. 263-265, Long Beach CA, Jan. 29 - Feb. 1, 2008.

- **M. J.H. Lum**, J. Rosen, T. J. Broderick, M. N. Sinanan, B. Hannaford, Raven – A Surgical Robot for Teleoperation, American Telemedicine Association (ATA) Conference, April 6-8 2008, Seattle, WA.

- **M. J.H. Lum**, D.C.W. Friedman, G. Sankaranarayanan, H. King, A. Wright, M. Sinanan, T. Lendvay, J. Rosen, B. Hannaford, Objective Assessment of Telesurgical Robot Systems: Telerobotic FLS pp. 263-265, Long Beach CA, Jan. 29 - Feb. 1, 2008

- **T. Lendvay**, F. J Hseih, B. Hannaford, J. Rosen, The Biomechanics of Percutaneous Needle Insertion, Proceedings of Medicine Meets Virtual Reality (MMVR 16) pp. 245-247, Long Beach CA, Jan. 29 - Feb. 1, 2008

- **Mitchell J.H. Lum**, Jacob Rosen, Thomas S. Lendvay, Andrew S. Wright, Mika N. Sinanan, and Blake Hannaford, TeleRobotic Fundamentals of Laparoscopic Surgery (FLS): Effects of Time Delay - Pilot Study, 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society EMBS, Vancouver, British Columbia, Canada, 20-25 Aug. 2008, pp. 5597-5600.

- Mitchell J.H. Lum, Jacob Rosen, Thomas S. Lendvay, Mika N. Sinanan, **Blake Hannaford**, Effect of Time Delay on TeleSurgical Performance, IEEE International Conference on Robotics and Automation, Kobe, Japan, May 12-17, 2009

- **Moshe Brand**, Moshe Ryvkin, Shmuel Einav, and Jacob Rosen, Numerical Models of an Artery with a Net Structured Stent, World Congress of Medical Physics and Biomedical Engineering, Sept. 7-12, 2009, Munich, Germany

- Mitchell J.H. Lum, **Jacob Rosen**, Hawkeye King, Diana C.W. Friedman, Thomas Lendvay, Andrew S. Wright, Mika N. Sinanan, and Blake Hannaford, Teleopeartion in Surgical Robotics – Network Latency Effects on Surgical Performance, 31th Annual International Conference of the IEEE Engineering in Medicine and Biology Society EMBS, Minneapolis MN, Sept. 2009.

- H. Hawkeye King, Blake Hannaford, Ka-Wai Kwok, Guang-Zhong Yang,Paul Griffiths3, Allison Okamura, Ildar Farkhatdinov, Jee-Hwan Ryu, Ganesh Sankaranarayanan, Venkata Arikatla, Suvranu De, Kotaro Tadano, Kenji Kawashima, Angelika Peer, Thomas Schuß, Martin Buss, Levi Miller, Daniel Glozman, **Jacob Rosen**, Thomas Low, Plugfest 2009: Global Interoperability in Telerobotics and Telemedicine, IEEE International Conference on Robotics and Automation, ICRA May 2010, Alaska, USA

- **Moshe Brand**, Moshe. Ryvkin, Shmuel. Einav ,Idit Avrahami, Jacob Rosen, Mircea Teodorescu, Numerical Models of an Artery with Different Stent Types, The 12th Mediterranean Conference on Medical and Biological Engineering and Computing, MEDICON 2010, IFMBE Proceedings 29, pp. 545–548, May 27-30, 2010, Greece.

- **Mircea Teodorescu**, H. Rahnejat, Moshe Brand, Jacob Rosen, Post –Angioplastic Contact mechanism with Different levels of Artherosclertic Plaque, Proceedings of the STLE/ASME 2010 International Joint Tribology Conference, IJTC 2010, October 17-20, 2010, San Francisco, California, USA

- **Hyunchul Kim**, Jacob. Rosen, Epileptic Seizure Detection - An AR Model Based Algorithm for Implantable Device, 32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2010, Buenos Aires, Argentina, August 31 - September 4, 2010

- **Levi Makaio Miller** and Jacob Rosen, Comparison of Multi-Sensor Admittance Control in Joint Space and Task Space for a Seven Degree of Freedom Upper Limb Exoskeleton, 3rd IEEE RAS &EMBS International Conference on Biomedical Robotics and Biomechatronics, September 26-29, 2010 Tokyo, Japan

- **Mircea Teodorescu**, Moshe Brand, Jacob Rosen, Homer Rahnejat, The Influence of Post Angioplasty Stent Implant Profile on Arterial Wall Stress Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2010 August 15-18, 2010, Montreal, Quebec, Canada

- **Wen Yu** and Jacob Rosen, A Novel Linear PID Controller for an Upper Limb Exoskeleton, Proceedings of the 49th IEEE Conference on Decision and Control (CDC), pp. 3548-3553, Atlanta, GA, USA, December 15-17, 2010

- Daniel Glozman, **Jacob Rosen**, Raven IV – Surgical Robotics System for Collaborative Telesurgery, Israeli Conference on Robotics (ICR), The 3rd Israeli Conference on Robotics 2010, 10-11 November, 2010, Herzlia, Israel

- **Wen Yu**, Jacob Rosen, Xiaoou Li, PID Admittance Control for an Upper Limb Exoskeleton, 2011 American Control Conference, 2011 American Control Conference - ACC 2011, San Francisco, California, USA, June 29 - July 1, 2011

- **Hyunchul Kim**, Levi Makaio Miller, Aimen Al-Refai, Moshe Brand, and Jacob Rosen Redundancy Resolution of a Human Arm for Controlling a Seven DOF wearable Robotic System, 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston MA, August, 2011

- **Levi Miller**, Hyunchul Kim, Jacob Rosen, Redundancy and Joint limits of a Seven Degree of Freedom Upper Limb Exoskeleton, 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston MA, August, 2011

- Barak Kashi, Moshe Brand, Jacob Rosen, Idit Avrahami, Synthesizing Two Criteria for Redundancy Resolution of Human Arm in Point Tasks, IEEE Third World Congress on Nature and Biologically Inspired Computing (NaBIC2011), October 19-21 2011, Salamanca, Spain

- Hyunchul Kim, Levi Makaio Miller, Zhi Li and Jacob Rosen, Admittance Control of Seven-DOF Upper Limb Exoskeleton to Reduce Energy Exchange, ICRA 2012, Saint Paul, MN on May 14-18, 2012

- Hyunchul Kim, Levi Makaio Miller, Zhi Li, **Jay Ryan Roldan** and Jacob Rosen, Admittance Control of an Upper Limb Exoskeleton – Reduction of Energy Exchange, 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), San Diego CA, August, 2012

- Hyunchul Kim, **Jay Ryan Roldan**, Zhi Li, and Jacob Rosen, Viscoelastic Model for Redundancy Resolution of the Human Arm via the Swivel Angle: Applications for Upper Limb Exoskeleton Control, 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), San Diego CA, August, 2012

- **Matt Simkins**, Irina Fedulow, Hyunchul Kim, Gary Abrams, Nancy Byl, Jacob Rosen , Robotic Unilateral and Bilateral Upper-Limb Movement Training for Stroke Survivors Afflicted by Chronic Hemiparesis, International Conference on Rehabilitation Robotics ICORR 2013, Seattle, 2013

- Zhi Li, Jay Ryan Roldan, Dejan Milutinovi´c and **Jacob Rosen**, Task-relevance of Grasping-related Degrees of Freedom in Reach-to-grasp Movements, 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Chicago IL, August 26-30, 2014

- Zhi Li, Kierstin Gray, Jay Ryan Roldan, Dejan Milutinovi´c and **Jacob Rosen**, The Joint Coordination in Reach-to-grasp Movements, IEEE/RSJ International Conference on Inteligent Robots and Systems (IROS 2014), Chicago IL, Sept. 14-18, 2014

- **Jacob Rosen** (Invited speaker), Raven IV: An open source surgical robotics system, IROS2014 "Medical Robotics" Workshop: Community Consensus Benchmarks for Clinical Translation of Medical Robots, 2014 Chicago IL

- **Zhi Li**, Kris Hauser, Jay Ryan Roldan, Dejan Milutinovi´c, and Jacob Rosen**,** A Novel Method for Quantifying Arm Motion Similarity, 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Milan Italy, August 25-29, 2015

Manuscripts Review

Conferences

- International Conference on Intelligent Robotic Systems - IROS 1998 Victoria, B.C., Canada, October 13-17, 1998. – 3 Manuscripts
- International Conference on Intelligent Robotic Systems - IROS 2001, Maui, Hawaii October 29- Nov. 3, 2001. - 2 Manuscripts
- IEEE International Conference on Robotics and Automation - ICRA 2002, Washington DC, April 2002 - 4 Manuscripts
- IEEE Virtual Reality 2003 (IEEE-VR2003) -Eleventh Symposium on Haptic Interfaces for virtual Environment and Teleoperator Systems, Mach 22-26, 2002, LA - 1 Manuscript
- IEEE international Conference on Robotics and Automation - ICRA 2005, Barcelona Spain, April 2005 - 2 Manuscripts
- ICAR International Conference of Advanced Robotics, ICAR 2005, Seattle WA, July 2005 - 5 Manuscripts
- International Conference on Intelligent Robotic Systems - IROS 2005, China, 2005. - 1 Manuscript
- BioRob 2006 – The first IEEE RAS –EMBS International Conference on Biomedical Robotics and Biomechatronics, February 2006, Pisa Italy - 6 Manuscripts
- IEEE International Conference on Robotics and Automation - ICRA 2006, Orlando Florida, May 2006 – 1 Manuscript
- IEEE International Conference on Robotics and Automation - ICRA 2007, Rome Italy, May 2007 – 7 Manuscripts
- IEEE Biorob 2008, Scottsdale AZ – 6 Manuscripts
- IEEE EMBC 09 – 31th Annual International Conference of the IEEE Engineering in Medicine and Biology Society - 6 Manuscripts
- IEEE International Conference on Robotics and Automation - ICRA 2010, Anchorage, Alaska, May 2010 – 3 Manuscripts
- IEEE Biorob 2010, Japan – 3 Manuscripts

- IEEE International Conference on Robotics and Automation - ICRA 2011, Shanghai, China, May 2010 – 6 Manuscripts
- IEEE International Conference on Intelligent Robotic Systems - IROS 2011 San Francisco, CA, September, 2011. – 4 Manuscripts
- IEEE International Conference on Rehabilitation Robotics, June 24 Seattle WA, 2013 – 2 Manuscripts

Journals

- IEEE Transactions on Robotics and Automation – Ad hoc reviewer - 3 Manuscripts
- IEEE Transactions on Mechatronics – Ad hoc reviewer - 3 Manuscripts
- IEEE Transactions on Education – Ad hoc reviewer - 2 Manuscripts
- IEEE Transactions on Biomedical Engineering – Ad hoc reviewer - 3 Manuscripts
- IEEE Spectrum - Ad hoc reviewer - 1 Manuscript
- International Journal of Robotics Research – Ad hoc reviewer - 1 Manuscript
- Medical & Biological Engineering & Computing - Ad hoc reviewer - 2 Manuscripts
- Ergonomics - Ad hoc reviewer - 1 Manuscript
- Haptic-e - The Electronic Journal of Haptics Research (http://www.haptics-e.org) - 2 Manuscripts

Service to Local, State, or Federal Government

- Federal Drug Admiration (FDA) – Panel member - Public Workshop - Robotically-Assisted Surgical Devices: Challenges and Opportunities, July 27-28, 2015
- American College of Surgeons, Curriculum Development Committee, Committee Member (2009-Current)
- Independent Scientific Peer Review Committee Member of Center for Advanced Surgical and Interventional Technology (CASIT)- UCLA, American Institute of Biological Sciences (AIBS) is charged by the US Army Medical Research and Materiel Command (USAMRMC) and Advanced Technology Research Center (TATRC) - 1 panel 2009

Panel Reviewer - Grant Proposals

- National Science Foundation - Robotics and Human Augmentation CISE – 5 Panels (2003, 2005, 2007, 2012, 2015)
- Doris Duke Charitable Foundation – Clinical Interface Award Advisory Panel – 2 Panels
- National Institutes of Health – 3 Panels (2009, 2011)

STUDENTS AND RESEARCH ASSOCIATES

SUMMARY:	Ph.D. Students – Graduated	**5**
	M.Sc. Students – Graduated	**9**
	Post Doc – Mentored – Completed	**4**
	Ph.D. Students – Current	**8**
	M.Sc. Students – Current	**2**
	Post Doc – Mentored – Current	**1**
	Undergraduate students (Research – Independent Study)	**44**
	Chair / Committee Member (Ph.D. Students)	**14**

Undergraduate Students (Research)	Degree	Years
Mitch Lum (UW – Marry Gates Fellow)	EE	2000
Jeff Longion (UW – Marry Gates Fellow)	EE	2001
Michael K. Louie (UW)	ME	2002
Lillis Taylor	Industrial Design	2003
Teresa Masumoto	Industrial Design	2003
Alex Campbell (U. of Ottawa, CAN) – Summer Fellowship	EE	2003
Tim Kowalewski (UW – Marry Gates Fellow)	EE	2003
Brandon Martin (UW)	ME	2003
John Lu	EE	2003
Linh Tran (UW)	EE	2004
Nathan Manning(UW)	EE	2004
Alan Sledd (Rice)	ME	2004
Ann Sakata (UW)	CS	2005
Lim Fangpin (UW)	EE	2005
Saumil M. Gandhi (UW)	ME	2005
Huang Allen Shen-Wei (UW)	EE	2005
Av Daniel (UW)	EE	2005
Tian Xia (UW – Marry Gates Fellow)	EE	2004-2005
Lisa Oh (UW – Marry Gates Fellow)	EE	2005-2007
Trevor Fowler (UW – Marry Gates Fellow)	BioEngineering	2005-2006
Kelcie Kawamura (UW - Dean of Eng. Fellowship)	EE	2007-2008
Radivoje Jovanovic (UW)	EE	2007-2008
Asis Lopes (UCSC)	CE	2008-2010
Aimen Al-Refai (UCSC)	CE	2008-2010
Jay Rolden (UCSC)	CE	2008-2011
Evan von Lockum (UCSC)	Bioengineering	2008
Samuel Ramirez (UCSC)	CE	2008
Brady Boone (UCSC)	CE	2008
Nolan Lau (UCSC)	CE	2008
Sarah Richardson (NSF SURF-IT Summer Internship)	CS	2008
Ben Farley (NSF SURF-IT Summer Internship)	CS	2008
Pate Motter (NSF SURF-IT Summer Internship)	CS	2008
Tina Nguyen (NSF SURF-IT Summer Internship)	EE	2008
Hector Medina (UC LEADS - Summer Internship)	EE	2008
Joshua Cottrell Schloemer (UCSC)	Psychology	2009-2012
Maria Simbirsky (UCSC)	Math / Biology	2009-2010
Zachary Wells (UCSC)	BioE	2009-2013
Amanda Gentzel (NSF SURF-IT Summer Internship)	CS	2010
Ariel Anders (NSF SURF-IT Summer Internship)	CE	2010 - 2013
Celvin Yoo (UCSC)	BioE	2011 - 2013
Farhad Ighani (UCSC)	CE	2011 - 2013
Kyle Fujisawa (UCSC)	CE	2011 - 2013
Carol Owens (NSF SURF-IT Summer Internship)	EE	2011
Rachel Rieger (NSF SURF-IT Summer Internship)	ME	2011

Graduate Students		
Jeff Brown (UW)	Ph.D. - BioE	1999-2003
Joel C. Perry (UW)	Ph.D. – ME	2001-2006
Mitch Lum (UW)	MS – EE	2002-2004
Denny Trimble (UW)	MS – ME	2003-2005
Tim Ramsey (Stanford - Internship)	MS – ME	2004
Mitch Lum (UW)	Ph.D. – EE	2004-2008
Levi M. Miller (UW)	MS – ME	2004-2006
Robert F. Davis (UW)	MS – EE	2004-2006
Shane Souza Draney (UW)	MS – ME	2004-2006
Tariq Abuhamdia (UW)	MS – ME	2006-2008
Levi M. Miller (UW – UCSC Employee)	Ph.D. – ME	2006 - 2012

Jared Mednick (UCSC)	MS – CE	2008 - 2011
Hyunchul Kim (UCSC)	Ph.D. - EE	2010 - 2012
Matt Simkins (UCSC)	Ph.D. - CE	2009 - 2013
Aimen Al-Refai (UCSC)	MS – CE	2010 - 2012
Zhi (Jane) Li (UCSC)	Ph.D. - CE	2009 - 2014
Yang Shen	Ph.D. - MAE	2014 - Current
Te Kang Chao	Ph.D. - MAE	2014 - Current
Erik Kramer	Ph.D. - MAE	2015 - Current
Hao Lee	Ph.D. – MAE	2015 – Current
Chang Li	Ph.D. – MAE	2015 – Current
Gautam Suri	MS – MAE	2015 – Current
Changyeob Shin	Ph.D. – MAE	2015 – Current
Peter Ferguson	Ph.D. – MAE	2015 – Current
Haoran Wang	Ph.D. – MAE	2015 – Current
Brando Dimapasoc	MS – MAE	2015 - Current

Postdoctoral Associates		
Etore Cvallaro Ph.D. (UW)	Bioengineering	2005-2006
Joel C. Perry Ph.D. (UW)	Mechanical Eng.	2006
Rainer Leuschke Ph.D. (UW)	Mechanical Eng.	2006-2007
Daniel Glozman Ph.D. (UCSC)	Mechanical Eng.	2008-2010
Ji Ma Ph.D. (UCSC / UCLA)	Mechanical Eng.	2010-Current

Laboratory Assistants		
Brandon Martin	ME	2004-2006

Visiting Scholars		
Allert Bosch - Graduate Student - Internship Delft, Netherlands	MS - Bioengineering	2010
Michel Bovy - Graduate Student - Internship Delft, Netherlands	MS - Bioengineering	2008
Riccardo Signoretti - Graduate Student - Internship Polytech of Turin, Italy	MS – EE	2008
Raunak K. Khandelwal – Undergraduate Student – Internship, IIT Bombay, India	ME	2008
Byoung Loh, Ph.D. - Associate Professor – Sabbatical Hansung University, Seoul, Korea	ME	2009
Wen Yu, Ph.D. - Professor – Sabbatical Departamento de Control Automatico CINVESTAV-IPN, Mexico	Control	2009-2010
Choon Young, Associate Professor - Sabbatical School of Mechanical Engineering, Kyungpook National University, Daegu, Korea	Robotics	2011 - 2012
Ofir Shany, Visiting Scholar REFAEL, Israel	Robotics	2013 - 2014
Sahba Aghajani Pedram – Graduate Students – University of Hawaii	Robotics	2015 - Current

Collaborators		
Blake Hannaford Ph.D. – University of Washington	EE	1997- Current
Nancy Byl Ph.D. - UCSF	Rehab Medicine	2008 - Current
Gary Abrams MD - UCSF	Neurology	2008 - Current
Thomas Lendvey MD - University of Washington	Urology	2006 - Current
Laligam Sekhar MD – University of Washington	Neurological Surgery	2006 - Current
Louis Kim MD – University of Washington	Neurological Surgery	2006 - Current
Howard Chizeck Ph.D. – University of Washington	EE	2005 - Current
Ken Goldberg Ph.D. – UC Berkley	CSE	2011 - Current
Peter Abbeel Ph.D.– UC Berkley	CSE	2011 - Current

Walter Douglas Boyd MD - UC Davis	Surgery	2011 - Current
Sri Nagarjan Ph.D. – UCSF	Radiology	2010 - Current
Dejan Milutinovic Ph.D. - UCSC	AMS	2009 - Current
Mircea Teodorescu Ph.D. - UCSC	CE	2011 - Current
Mika Sinanan MD Ph.D. - University of Washington	Surgery	1997 - 2008
Richard Satava MD – University of Washington	Surgery	2001 - 2008
Sara Kim Ph.D. – University of Washington	Medical Education	2006 - 2008
Janet Powell Ph.D. - University of Washington	Rehab Medicine	2005 - 2008

TEACHING

Quarter	Course Name	Units	Enrolled
	TEACHING Years 2014-15 (UCLA)		
15F	MECH&AE 182A (1) – Advanced Mathematics		110
	TEACHING Years 2014-15 (UCLA)		
151	MECH&AE 199 (1) – Research in MAE		1
15S	MECH&AE 182A (1) – Advanced Mathematics		117
15S	MECH&AE 199 (1)		4
15S	MECH&AE 375 (13)		2
15S	MECH&AE 597B (40)		2
15W	MECH&AE 263D (1) - Advanced Robotics	4	25
15W	MECH&AE 597B (40)		3
15W	MECH&AE 99 (1)		1
14F	MECH&AE 597B (40) - Preparation for Ph.D. Preliminary Exam		2
151	MECH&AE 199 (1)		1
15S	MECH&AE 182A (1)		117
	TEACHING Years 2013-14 (UCSC)		
Summer	CMPE 198 - 01 – Individual Study Or Research	5	2
Summer	CMPE 198F - 01 - Individual Study Or Research	2	2
Fall	CMPE 141 - 01 - Feedback Control Systems	5	3
Fall	+ EE 154 - 01 - Feedback Control Systems	5	28
Fall	CMPE 198 - 06 - Individual Study Or Research	5	3
Fall	CMPE 241 - 01 - Feedback Control Systems	5	3
Fall	+ EE 241 - 01 - Feedback Control Systems	5	7
Fall	CMPE 297B - 41 - Individual Study	10	1
Fall	CMPE 297C - 22 - Individual Study	15	1
Fall	CMPE 299B - 32 - Thesis Research	10	1
Fall	CMPE 299F - 02 - Thesis Research	2	1
Winter	CMPE 009 - 01 - Statics & Dynamics	5	74
Winter	CMPE 195 - 07 - Senior Thesis Res	5	1
Winter	CMPE 198 - 10 - Individual Study Or Research	5	1
Winter	CMPE 198F - 01 - Individual Study Or Research	2	1
Winter	CMPE 215 - 01 - Model Robot Manipulation	5	8
Winter	CMPE 280C - 02 - Seminar on Control	2	2
Winter	CMPE 299B - 22 - Thesis Research	10	2
Spring	CMPE 195F - 01 - Senior Thesis Research	2	1
Spring	CMPE 198 - 06 - Individual Study Or Research	5	10

Spring	CMPE 198F - 01 - Individual Study Or Research	2	5
Spring	CMPE 280C - 02 - Seminar on Control	2	2
Spring	CMPE 297A - 06 - Individual Study	5	1
Spring	CMPE 299C - 22 - Thesis Research	15	1
Spring	EE 299B - 18 - Thesis Research	10	1
	TEACHING Years 2012-13 (UCSC)		
Summer	CMPE 195F - 01 - Senior Thesis Research	2	1
Summer	CMPE 198F - 01 - Individual Study Or Research	2	2
Summer	CMPE 299 - 01 - Thesis Research	5	1
Summer	EE 198F - 01 - Independent Field Study	2	1
Fall	CMPE 198 - 06 - Individual Study Or Research	5	3
Fall	CMPE 198F - 02 - Individual Study Or Research	2	4
Fall	CMPE 241 - 01 - Feedback Control Systems	5	4
Fall	+ EE 241 - 01 - Feedback Control Systems	5	4
Fall	CMPE 280C - 02 - Seminar on Control	2	1
Fall	CMPE 297C - 22 - Individual Study	15	2
Fall	CMPE 299C - 22 - Thesis Research	15	1
Fall	EE 154 - 01 - Feedback Control Systems	5	36
Fall	+ CMPE 141 - 01 - Feedback Control Systems	5	5
Winter	CMPE 009 - 01 - Statics & Dynamics	5	60
Winter	CMPE 198 - 10 - Individual Study Or Research	5	1
Winter	CMPE 198F - 01 - Individual Study Or Research	2	6
Winter	CMPE 297C - 02 - Individual Study	15	2
Winter	CMPE 299C - 05 - Thesis Research	15	1
Spring	CMPE 198 - 06 - Individual Study Or Research	5	1
Spring	CMPE 198F - 01 - Individual Study Or Research	2	6
Spring	CMPE 215 - 01 - Model Robot Manipulation	5	11
Spring	CMPE 297A - 06 - Individual Study	5	1
Spring	CMPE 297C - 41 - Individual Study	15	1
Spring	CMPE 299C - 22 - Thesis Research	15	1
Spring	EE 299A - 14 - Thesis Research	5	1
	TEACHING Years 2011-12 (UCSC)		
Summer	CMPE 198 - 01 - Individual Study Or Research	5	1
Summer	EE 299 - 02 - Thesis Research	5	1
Fall	CMPE 194 - 03 - Group Tutorial	5	1
Fall	CMPE 198 - 06 - Individual Study Or Research	5	2
Fall	CMPE 198F - 02 - Individual Study Or Research	2	4
Fall	CMPE 280C - 01 - Seminar on Control	2	9
Fall	CMPE 297B - 41 - Individual Study	10	1
Fall	CMPE 299C - 22 - Thesis Research	15	1
Fall	EE 154 - 01 - Feedback Control Systems	5	27
Fall	EE 241 - 01 - Feedback Control Systems	5	7
Fall	+ CMPE 241 - 01 - Feedback Control Systems	5	7
Fall	EE 299B - 17 - Thesis Research	10	1
Winter	CMPE 009 - 01 - Statics & Dynamics	5	58
Winter	CMPE 198 - 10 - Individual Study Or Research	5	2
Winter	CMPE 198F - 01 - Individual Study Or Research	2	4
Winter	CMPE 280C - 01 - Seminar on Control	2	4
Winter	CMPE 297A - 65 - Individual Study	5	2
Winter	CMPE 299B - 22 - Thesis Research	10	1
Winter	CMPE 299C - 05 - Thesis Research	15	1
Spring	CMPE 193F - 02 - Field Study	2	1

Spring	CMPE 195 - 09 - Senior Thesis Res	5	1
Spring	CMPE 198 - 06 - Individual Study Or Research	5	3
Spring	CMPE 198F - 01 - Individual Study Or Research	2	6
Spring	CMPE 215 - 01 - Model Robot Manipulation	5	6
Spring	CMPE 280C - 02 - Seminar on Control	2	6
Spring	CMPE 297A - 06 - Individual Study	5	1
Spring	CMPE 297C - 41 - Individual Study	15	1
Spring	CMPE 299C - 22 - Thesis Research	15	2
Spring	EE 299B - 18 - Thesis Research	10	1
	TEACHING Years 2010-11 (UCSC)		
Fall	CMPE 195 - 08 - Senior Thesis Res	5	2
Fall	CMPE 198 - 06 - Individual Study Or Research	5	1
Fall	CMPE 198F - 02 - Individual Study Or Research	2	2
Fall	CMPE 297B - 41 - Individual Study	10	1
Fall	CMPE 299C - 22 - Thesis Research	15	1
Fall	EE 154 - 01 - Feedback Control Systems	5	30
Fall	EE 241 - 01 - Feedback Control Systems	5	9
Fall	+ CMPE 241 - 01 - Feedback Control Systems	5	9
Fall	EE 299C - 01 - Thesis Research	15	1
Winter	CMPE 009 - 01 - Statics & Dynamics	5	43
Winter	CMPE 198 - 10 - Individual Study Or Research	5	4
Winter	CMPE 198F - 01 - Individual Study Or Research	2	1
Winter	CMPE 299C - 05 - Thesis Research	15	1
Winter	EE 299C - 04 - Thesis Research	15	1
Spring	CMPE 195 - 09 - Senior Thesis Res	5	1
Spring	CMPE 198 - 06 - Individual Study Or Research	5	2
Spring	CMPE 198F - 01 - Individual Study Or Research	2	3
Spring	CMPE 215 - 01 - Model Robot Manipulation	5	7
Spring	CMPE 280C - 01 - Seminar on Control	2	6
Spring	CMPE 297A - 06 - Individual Study	5	1
Spring	CMPE 297B - 02 - Individual Study	10	2
Spring	CMPE 299C - 22 - Thesis Research	15	2
	TEACHING Years 2009-10 (UCSC)		
Fall	CMPE 198 - 06 - Individual Study Or Research	5	2
Fall	CMPE 241 - 01 - Feedback Control Systems	5	5
Fall	+ EE 241 - 01 - Feedback Control Systems	5	5
Fall	CMPE 280C - 01 - Seminar on Control	2	7
Fall	CMPE 297A - 02 - Individual Study	5	1
Fall	EE 154 - 01 - Feedback Control Systems	5	16
Winter	CMPE 009 - 01 - Statics & Dynamics	5	38
Winter	CMPE 195 - 07 - Senior Thesis Res	5	1
Winter	CMPE 198 - 10 - Individual Study Or Research	5	4
Winter	CMPE 198F - 01 - Individual Study Or Research	2	4
Winter	CMPE 280C - 01 - Seminar on Control	2	4
Winter	CMPE 297A - 65 - Individual Study	5	1
Winter	EE 297B - 18 - Independent Study	10	1
Spring	CMPE 198 - 06 - Individual Study Or Research	5	2
Spring	CMPE 198F - 01 - Individual Study Or Research	2	3
Spring	CMPE 215 - 01 - Model Robot Manipulation	5	10
Spring	CMPE 280C - 01 - Seminar on Control	2	3
Spring	CMPE 297A - 06 - Individual Study	5	2
Spring	EE 299B - 18 - Thesis Research	10	1

TEACHING Years 2008-9 (UCSC)			
Winter	CMPE 198 - 10 - Individual Study Or Research	5	1
Winter	CMPE 280C - 01 - Seminar on Control	2	6
Winter	CMPE 297B - 64 - Individual Study	10	1
Winter	EE 154 - 01 - Feedback Control Systems	5	20
Winter	EE 241 - 01 - Feedback Control Systems	5	3
Winter	CMPE 241 - 01 - Feedback Control Systems	5	3
Spring	CMPE 198 - 06 - Individual Study Or Research	5	1
Spring	CMPE 215 - 01 - Model Robot Manipulation	5	8
TEACHING Years 2006-2007 (UW)			
Winter 06	EE543 - UW - Models of Robotic Manipulators	5	11
Spring 06	EE544 - UW - Advanced Robotic Manipulation	**5**	8
Winter 07	EE543 - UW - Models of Robotic Manipulators	5	15

Graduate Students Committees – Membership on Degree and Reading Committees

UCLA

Student Name	Degree	Role	Year	Advisor
Jinxin Zhao	Ph.D.	Committee Member	2014	Tetsuya Iwasaki
Cheng-Wei Chen	Ph.D.	Committee Member	2014	Tsu-Chin Tsao

UCSC

Student Name	Degree	Role	Year	Advisor
Ji-Wung “Karl” Choi	Ph.D.	Committee Member	2009-2010	Gabriel Elkaim
Daniel Garalde	Ph.D.	Chair	2009-	William Dunbar
Brett Gyarfas	Ph.D.	Chair	2009-	William Dunbar
Noah Wilson	Ph.D.	Committee Member	2008	William Dunbar
Levi Miller (UW)	Ph.D.	Chair	2007-2011	Jacob Rosen
Brant Jameson	Ph.D.	Committee Member	2010	Roberto Manduchi
Jiyuan Luan	Ph.D.	Committee Member	2010	Wentai Liu
KuanFu Chen	Ph.D.	Committee Member	2009-	Wentai Liu
Matt Simkins	Ph.D.	Committee Member	2011 - 2013	Jacob Rosen
Zhi (Jane) Li	Ph.D.	Committee Member	2011 -	Jacob Rosen
Nick Carmer	Ph.D.	Chair	2014	Mircea Teorodesco

UW

- J. Dosher, 'Detection Thresholds and Performance Gains for Small Haptic Effects,' MSEE Thesis, University of Washington, Department of Electrical Engineering, December 2002.
- G.S. Lee, 'Low Power Haptic Devices: Ramifications on Perception and Device Design,' Ph.D. Thesis, University of Washington, Department of Electrical Engineering, June 2004.
- X. Yu, Control Methods for Automated Surgery, Ph.D. Committee Member, 2006
- Timothy Kowalewski, Objective Assessment of Surgical Skills, Ph.D., Co Committee Member, 2009-2012
- Levi Millar, Control for a 7 Degree of Freedom Powered Upper Limb Exoskeleton Ph.D., Committee Chair 2007

Other Teaching Experience

- Workshop: Simulating Minimally Invasive Surgical Procedures in Virtual Environments: MODELING**,** Human Machine Interfaces in Minimally Invasive Surgery, Medicine Meets Virtual Reality, Newport Beach, CA, January 2001.

- Faculty at European Summer School on Surgical Robotics, Montpellier, August 2004.

- Workshop: Robotics Based Medicine Human Centered, Approach in Surgical and Rehabilitation Robotics, International Conformance of Robotics and Automation, ICRA 2006, Orlando Fl, May 2006

- Developing Cognitive Simulator for performing the Central Venus Catheter (CVC) Procedure – Version 1 release 2008, Version 2 release 2010. The CVC module includes multimedia content and available on-line at http://bionics.soe.ucsc.edu/research/CVC/CVC.html

- Faculty at European Summer School on Surgical Robotics, Montpellier, August 2009.

- Workshop: Medical Robotics - The Human Centered Approach, Medical Cyber-Physical Systems, International Conformance of Robotics and Automation, ICRA 2010, Anchorage Alaska May 2010

- Faculty and Co-Organizer, North American Sumer School on Surgical Robotics and Simulation, Seattle, August 2010.

- Faculty at European Summer School on Surgical Robotics, London Ontario Canada, 2012.

- Medical Robotics Workshop (Invited Speaker): Raven IV: An open source surgical robotics system, IROS2014 Community Consensus Benchmarks for Clinical Translation of Medical Robots, 2014 Chicago IL

Media Exposure

- ***Silicon Valley Business Journal - Healthcare Hero 2012***

UCSC Site
http://news.ucsc.edu/2012/05/health-care-hero.html

Silicon Valley Business Journal
http://www.bizjournals.com/sanjose/blog/2012/05/health-care-heroes-award-winners-named.html?page=all

- ***Surgical Robotics – Raven***

The Economist - The kindness of strangers
http://www.economist.com/blogs/babbage/2012/01/surgical-robots

Cnet -Paging Raven II, the open-source surgery robot
http://news.cnet.com/8301-17938_105-57362450-1/paging-raven-ii-the-open-source-surgery-robot/

- ***Exoskeleton***

Erico Guizzo and Harry Goldstein, The Rise of the Body Bots, Oct. 2005, IEEE Spectrum
http://spectrum.ieee.org/biomedical/bionics/the-rise-of-the-body-bots
http://bionics.soe.ucsc.edu/publications/Spectrum_Body_Bot.pdf

Getting Your Robot On: Wearable Machines' Intimate Interface
CITRIS Newsletter, August 2009
http://citris-uc.org/news/2009/08/18/getting_your_robot_wearable_machines%E2%80%99_intimate_interface

Turbo Power Physical Therapy - The future of Medicine
Popular Science Magazine, July, 2009
http://www.popsci.com/scitech/article/2009-06/turbo-powered-physical-therapy

Armada International, The Incredible Hulks, Thomas Withington
pp. 31-35, Issue 5, Nov/Dec 2010
http://www.armada.ch/Flip/issue5_2010/pageflip.html

Robots to aid stroke patients with physical therapy - Smart Plant
Aug 31, 2010
http://www.smartplanet.com/business/blog/smart-takes/robots-to-aid-stroke-victims-with-physical-therapy/10346/?tag=content;col1

Masters Of Innovation: Biological Frontiers – Palm TV, Jan 19, 2011
http://www.plumtv.com/videos/masters-of-innovation-biological-frontiers

- ***Trauma Pod***

USA Today
http://www.usatoday.com/tech/news/2005-03-28-trauma-pod-pentagon_x.htm?csp=34&POE=click-refer

- ***Surgical Robotics / Raven Missions***

NASA Extreme Environment Mission Operations (NEEMO 12)
http://www.nasa.gov/mission_pages/NEEMO/NEEMO12/mission_journal_2.html

USA Today
http://www.usatoday.com/tech/news/techinnovations/2007-04-19-nasa-robot-surgeon_N.htm

Science Daily
http://www.sciencedaily.com/releases/2007/04/070418170041.htm

Fox News
http://www.foxnews.com/story/0,2933,270530,00.html

The American Association for the Advancement of Science
http://www.eurekalert.org/pub_releases/2006-08/udod-rbs082106.php

Science Daily - New Simulator Technology To Give Surgeons 'Feel' Of Really Operating
http://www.sciencedaily.com/releases/1997/11/971119072155.htm

Mechanized Medicine, The Intersecting Roles of Human Doctors and Medical Robotics
Singapore Sessions, Wired Magazine Jan. 2011
http://www.sedb.com/future_ready/singapore_sessions/sessions/medicalrobotics.html

Raven 2 - A Robo-Surgeon That Does the Work of Two Doctors
Popular Science Magazine, August, 2010
http://www.popsci.com/technology/gallery/2010-07/gallery-rise-helpful-machines