

Curriculum Vitae

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Personal Data

Name: **Francisco J. Valero-Cuevas**

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Status: US Citizen

Primary Academic Appointments

2011-present Full Professor with Tenure
Department of Biomedical Engineering
Division of Biokinesiology and Physical Therapy

2011-present Full Professor joint appointment
Department of Aerospace and Mechanical Engineering
Department of Computer Science

2017-present Department of Electrical Engineering (Systems)

Professional Areas

Neuromuscular Control, Sensorimotor Integration, Human Dexterous Manipulation, Biomechanics, Robotics, Computer Modeling of Neuromuscular Systems, Optimization of Surgical and Non-Surgical Rehabilitation, Electromyography, Nonlinear System Dynamics, Mechanical Design.

Academic Summary

PhD April, 1997
Design and Biomechanical Engineering Divisions
Mechanical Engineering Department
Stanford University
Specialization: Neuromuscular systems

MS Eng June, 1991
Queen's University
Mechanical Engineering Department
Specialization: Biomechanics

BS June, 1988
Swarthmore College
Major: Engineering
Specialization: Structural Engineering

Prior Academic Positions

2012-2013	Guest Professor Institute of Sport Sciences, Leopold-Franzens-Universität Innsbruck, Austria Department of Health Sciences and Technologies, Swiss Federal Institute of Technology, ETH Zurich, Switzerland
2007-2011	Associate Professor with Tenure Department of Biomedical Engineering Division of Biokinesiology and Physical Therapy University of Southern California
2008-2011	Associate Professor joint appointment Department of Aerospace and Mechanical Engineering Department of Computer Science University of Southern California
2005-2007	Associate Professor with Tenure Sibley School of Mechanical & Aerospace Engineering Cornell University
2006-2008	Associate Professor of Applied Biomechanics Department of Orthopaedic Surgery Joan and Sanford I. Weill Medical College Cornell University
2005-2008	Associate Scientist, Research Division The Hospital for Special Surgery, New York, NY.
1999-2005	Assistant Professor, Sibley School of Mechanical & Aerospace Engineering, Cornell University.
1999-2005	Assistant Scientist, Research Division The Hospital for Special Surgery, New York, NY.
1999-2000	Consulting Assistant Professor, Department of Functional Restoration Stanford University School of Medicine.
1997-1999	Research Associate, Biomechanical Engineering Division Mechanical Engineering Department, Stanford University.
1997-1999	Lecturer, Mechanical Engineering Department, Stanford University.

Teaching

Engineering Courses Taught at the University of Southern California

Fall 2011, 2013-17	BME 504: Neuromuscular Systems (Lectures available as webcast at http://bbdl.usc.edu/BMEBKN504.php)
Fall 2009, 2010	BME 599: Graduate course in Neuromuscular Biomechanics.
2007-present	Fall and spring seminar series on Engineering, Neuroscience and Health (all seminars available as webcasts at http://bbdl.usc.edu/ENH). Weekly speakers at both the University Park and Health Sciences Campuses.
Fall 2007, 2017	ENGR 102: Engineering Freshman Academy. Taught two section, total enrollment of 52 students.

University of Southern California, Guest Lectures

Fall 2010	NEUR 532 Systems and Behavioral Neurobiology. Lecture. “Neuromechanics of dynamic manipulation in humans” BKN 550 Neurobehavioral Basis of Movement. Lecture “Modeling Biomechanical function and neuromuscular control”
Fall 2009	NEUR 532 Lecture. “Neuromechanics of dynamic manipulation in humans” ENGR105 lecture. Muscles as actuators.
Fall 2008	NEUR 532 Lecture. “Neuromechanics of dynamic manipulation in humans”, December 10 ENGR105 lecture. Muscles as actuators, September 11 ENGR 105 lecture. Sensorimotor integration, September 23
Fall 2007	ENGR105 lecture. Muscles as actuators, September 6 ENGR 105 lecture. Sensorimotor integration, September 11 BME 452 lecture. Complex biomechanical systems. September 20

Engineering Courses Taught at Cornell University, Sibley School of Mechanical & Aerospace Engineering

Fall 2000-6	MAE479/579: Analysis and Simulation of Mechanical and Aerospace Systems. Enrollment: 42 (2000), 36 (2001), 40 (2002), 35 (2003), 30 (2004), 30 (2006)
Spring 2004	MAE663: Neural Control. Enrollment: 10
Spring 2001	MAE663: Advanced Topics in Neuromuscular Biomechanics. Enrollment: 10
Spring 2000-03, 05	ENGRG 606: Fundamentals of Biomedical Engineering II. Module 3: Section on Muscle mechanics, College of Engineering. In conjunction with Profs. Bartel and van der Meulen. Enrollment: 12 (2000), 24 (2001), 24 (2002), 14 (2003). Lecture on “Muscle function” and “EMG “ Laboratory
Spring 2000, 2, 3, 5, 7	MAE463: Neuromuscular Biomechanics. Enrollment: 10 (2000), 40 (2002), 25 (2003), 26(2005), 28 (2007).
Fall 1999	MAE325: Mechanical Design and Analysis. Sibley School of Mechanical & Aerospace Engineering. In conjunction with Prof. Ruina. Enrollment: 85

Cornell University, Guest Lectures

Summer 2002	Curie Academy. College of Engineering. “Neuromuscular Biomechanics”
Spring, Fall 2001	ENGG 501: Bioengineering Seminar. College of Engineering. “Neuromuscular Biomechanics of the Hand”
Fall 2000	ENGR1 120: Introduction to Biomedical Engineering. College of Engineering. “Rehabilitation of hand function”
Spring 2000	Ergonomics Class. College of Human Ecology. “Biomechanics”.

Fall 1999 ENGG 501: Bioengineering Seminar.
College of Engineering.
“Hand Biomechanics” (November 18th).

Stanford University, Mechanical Engineering Department

1997-1999 Graduate Seminar in Biomechanics for the Biomechanical Engineering
Division. Fall, Winter and Spring (1997-1998), Spring (1999).

Stanford University, Mechanical Engineering Department, Guest Lectures

Spring 1998 Lecture on Moment Arms, Gear Ratios and Structural Elements of the Body for
the undergraduate class ME180 “Form and Function of the Musculoskeletal
System.”

Fall 1998 Two lectures on Muscle Physiology, Muscle Modeling and Muscle Coordination
for the graduate class ME281 “Orthopedic Biomechanics.”

Fall 1997 Two lectures on Muscle Mechanics for the graduate class ME281 “Orthopedic
Biomechanics.”

Teaching Assistantships

1989-1991 Air Compressor Laboratory, Fall 1991
Tempering Laboratory, Spring 1990
Kinematics Class, Fall 1989
Mechanical Engineering Department, Queen's University

Research

Research Positions

Post-doctoral:

2006 Visiting Scientist, Karolinska Institute, Neuropediatric Research Unit.
Stockholm, Sweden. Sabbatical Leave position funded by the Wenner-Gren
Foundation.

2005-2006 Visiting Scientist, Max Planck Institute for Human Cognitive and Brain
Sciences, Sensorimotor Coordination Group. Munich, Germany. Sabbatical
Leave. Sabbatical Leave position funded by the Alexander von Humboldt
Foundation.

1999-present Director, Neuromuscular Biomechanics Laboratory, Sibley School of
Mechanical & Aerospace Engineering, Cornell University.

1991-1999 Biomedical Engineer, Neuromuscular Systems Section
Rehabilitation Research and Development Center
VA Palo Alto Health Care System, Palo Alto, CA
Established and directed a program to study the coordination of hand
musculature during grasping to improve surgical restoration of grasp in
quadriplegia

Pre-doctoral:

1991-1997 Research Assistant, Doctoral Program
Design and Biomechanical Engineering Divisions
Mechanical Engineering Department, Stanford University

1989-1991	Queen's-CIDA Scholar Mechanical Engineering Department, Queen's University Developed non-invasive <i>in-vivo</i> method to quantify wrist kinematic integrity
1988	Swarthmore College, Engineering Program Senior Year Project Finite element model of stress profile at boundary between total wrist implant metal stem and metacarpal bone
1987	Swarthmore College, Engineering Program Junior Year Independent Project Biomechanics of the wrist joint, design specifications for total wrist prostheses, and evaluation of the three common models
1986	Swarthmore College, Engineering Program Sophomore Year Independent Project Designed and built uni-axial force plate to investigate the impact force attenuation properties of running shoes Swarthmore College, Engineering Program Sophomore Year Summer Internship Computer simulation of bird migration trajectories U. of Pennsylvania Biomedical Engineering Program Design of a tooth-root implant as part of a Graduate Level Biomaterials Class

Faculty support and mentoring at USC

2016-present	Christopher Laine, PhD. Research Assistant Professor in Biokinesiology and Physical Therapy. Projects: Mechanisms for physiological tremor, cortico-muscular and musculo-muscular coherence for motor control.
2010-2011	Jason Kutch, PhD. Research Assistant Professor in Biomedical Engineering. Projects: Motor noise in the planning and execution of sensorimotor function; Neural control finger motion and force.

Sabbatical and visiting faculty

2014	Prof. Maria Makarov, Assistant Professor, SUPELEC, Automatic Control Department, Paris, France. Model predictive control of tendon-driven systems.
2012-2013	Prof. Robert Riener. Sensory-Motor Systems Lab. Department of Mechanical & Process Engineering. Institute of Robotics and Intelligent Systems. ETH Zurich. Creation of meaningful rehabilitation cohorts through Bayesian classification. Sabbatical Stay at USC.
2010	Marta Covadonga Mora Aguilar, PhD. Optimal control and estimation for tendon actuation of biomechanical systems. Visiting Assistant Professor from the Mechanical Engineering and Construction Department, at Universitat Jaume I, Spain. Sabbatical stay at USC.
2004-2005	Jae Woong Yi, PhD. Projects: Servo-actuation of cadaveric tendons. On sabbatical leave from the Agency for Defense Development, South Korea. Sabbatical Stay at Cornell.
2005-2007	Anupam Saxena, PhD. Project: Computational inference of complex biological structures. Visiting Professor from IIT Kangpur. Sabbatical stay at Cornell.

Post-Doctoral Fellow supervision at USC

2015-2017	Jun Yong Shin, PhD. VLSI architecture for real-time neuromorphic circuits.
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2015-present	Kian Jalaaliddini, PhD. Neuromorphic control of finger muscles.
2015-2016	Christopher Laine, PhD. Physiological bases of tremor, tone and dystonia.
2012-2015	Chuanxin Minos Niu (牛传欣), PhD. Secondary advisor. Terence Sanger, primary advisor. Implementation and use of neuromorphic circuitry to simulate spinal circuitry for afferented muscles. <i>Now Junior Faculty in Department of Rehabilitation, School of Medicine, Shanghai Jiao Tong University, China.</i>
2012-2014	Susan Duff, PT, OT, EdD, CHT. Training in Rehabilitation Efficacy and Effectiveness Trials (TREET) Fellow for NICHD T32 training grant. Secondary Advisor. Paths to clinical interventions to retain and improve dexterity in persons with neurological conditions. <i>Now Associate Professor, Department of Physical Therapy, Associate Professor, Secondary Appointment, Department of Occupational Therapy, Associated Faculty, Department of Neuroscience, Thomas Jefferson University.</i>
2012-2014	Isabella Fassola, MD. Effects of Osteoarthritis on thumb dexterity. <i>Now staff surgeon at Charité and St. Marien hospitals, Berlin, Germany.</i>
2011-2013	Srideep Musuvathy, PhD. Optimal and robust control of anatomical and robotic tendon driven systems.
2009	Heiko Hoffmann, PhD. Project: Machine learning applied to slow finger movements. <i>Now Research staff, Information and Systems Sciences Laboratory, HRL Laboratories, Malibu, CA, USA.</i>
2008-2010	Jason Kutch, PhD. Projects: Motor noise in the planning and execution of sensorimotor function; Neural control finger motion and force. <i>Now faculty member, Division of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, USA.</i>
2007-2008	Kevin Keenan, PhD. Projects: Stochastic combination of single motor unit action potentials into surface EMG; Control of finger motion and force. <i>Now faculty member at the University of Wisconsin-Milwaukee, USA.</i>
2007-2008	Weiwei Li, PhD. Projects: Extraction of optimal control strategies in the neuromuscular system; Real-time estimation of biomechanical parameters.

Post-Doctoral Fellow supervision at Cornell University

2006-2007	Madhusudhan Venkadesan. Nonlinear dynamical approach to quantification of sensorimotor integration. <i>Now tenure-track faculty member at Yale University.</i>
2005-2007	John Rieffel, PhD. with Dr. Hod Lipson. Project: Locomotion in biologically inspired tensegrity structures. <i>Now Faculty member at Tufts University.</i>
2005-2007	Sanjay Kumar, PhD. Project: Machine-learning approaches to estimate the structure of complex biological systems.
2005-2007	Robert Clewley in Mathematics with Dr. John Guckenheimer. <i>Now Faculty member at Georgia State University.</i>
2005-2007	Kevin Keenan, PhD. Projects: Stochastic combination of single motor unit action potentials into surface EMG; Control of finger motion and force
2004-2005	Chandana Paul, PhD. Project: Locomotion in biologically inspired tensegrity structures.
2001-2007	Stephanie Roach, MD, Board Certified Hand Surgeon. Visiting Scientist. Project: Biomechanical analysis of distal radius fracture plates.

2000-2001 Natalia Castillo, MD, Specialist in Physical Medicine and Rehabilitation. Visiting Scientist. Project: Pinch strength and dexterity in osteoarthritis of the thumb.

Student Supervision at USC

As Primary Adviser

Doctoral Students in Computer Science

2016-present Jasmine Berry. Sensorimotor manifolds for behavior.
 2015-present Brian Cohn. Big Data approaches to the neural control of limbs. *NSF Graduate Research Fellow*.
 2008-2011 Evangelos Theodorou. Optimal control of finger movement and force. (with Prof. Stefan Schaal as co-Primary Adviser). *Now faculty member at Georgia Tech*.

Doctoral Students in Electrical Engineering

2015-present Suraj Chakravarthi Raja. VLSI implementation of neuromorphic spinal circuitry.

Doctoral Students in Biomedical Engineering Department

2016-present Darío Urbina Melendez. Bio-inspired robotic systems. *USC-CONACyT Fellow*.
 2016-present Daniel Hagen. Neurophysiological constraints on kinematic redundancy. *Viterbi Fellow*.
 2015 Ali Marjaninejad. Brain Machine Interfaces for predictive real-time control of prosthetic limbs. With Richard Andersen, Caltech. *Provost Fellow*.
 2013-2016 Emily Lawrence. Systemic and limb-specific mechanisms for dexterity. *Now at Nike, Inc*.
 2014-2015 Victor Barradas. Neuromorphic muscle models. *Provost Fellow*.
 2012-2015 Sarine Babikian. Potential energy formulation of muscle function (co-advised with Prof. Eva Kanso).
 2010-2015 Alexander Reyes. Signal processing of brain and muscle activity.
 2009-2012 Joshua Inouye. Design of innovative mechanisms for manipulation.
 2007-2012 Manish Kurse. Unsupervised inference of biomechanical systems.

Doctoral Students in Biokinesiology and Physical Therapy

2015-present Akira Nagamori. Physiological bases of afferented muscle function, and Dynamic control of the shoulder joint.
 2011-2016 Nahyeon (Hannah) Ko. Sensorimotor integration for manipulation in Parkinson's disease.
 2007-2012 Sudarshan Dayanidhi. Clinical estimation and therapeutic enhancement of sensorimotor integration.

Doctoral Students in the Neuroscience Program

2007-2012 Kornelius Rácz. Neuromuscular control of multifinger manipulation.

Doctoral Students at Other Institutions

2016-17 Anton Doganov. Bio-inspired quadrupeds. Electrical Engineering. GIPSA-LAB Grenoble Images Parole Signal Automatique, University of Grenoble, Grenoble, France.

2015-2017 Benjamin Dourthe. Orthopaedics Biomechanics. Jan Palfijn Anatomy Lab. KU Leuven, Kortrijk, Belgium.

Medical Students at the Keck School of Medicine

2012-2013 Analiese DiConti. Changes in Hand Coordination in Patients with Neurocognitive Deficiencies. Required Scholarly Project.

2012-2013 Jonathan Lerner. Changes in Finger Dexterity in Neurodegenerative Disorders. Required Scholarly Project.

Masters Students in Global Medicine

2016-present Priyanka Vachhani. Smartphone games to assess neurotoxicity of air pollution.

Masters Students in Biomedical Engineering

2016-2017 Victor Esparza. Neuromorphic quadrupeds.

2014-2015 Akira Nagamori. Effect of eccentric contractions on soleus H-reflex and leg dexterity.

2011-2014 Juan Miguel Ramirez Rocamora. Real-time mechatronic simulation of spinal circuitry for control of tendon-driven systems.

2013-2014 KangWoo Lee. Control of motors to simulate musculotendon forces.

2010-2012 Brendan Holt. Mechanisms for rehabilitation with immersion technologies.

2011-2012 Wenhsin (Alice) Hu. Early detection of Parkinsonian sensorimotor deficits via nonlinear dynamical analyses.

2009-2010 Nora Nelson. Novel sensors for robotic hands and objects.

2007-2009 Jonathan Weisz. Sensorimotor control in response to perturbations.

Masters Students at other institutions

2017 Théo-Tim Denisart. Bio-inspired quadrupeds. Ecole Polytechnic (EPFL), Lausanne, Switzerland.

2014 Hörður Yngvason. Physiologically-meaningful query of high-dimensional zonotopes for tendon-driven systems. Master's Degree student at the Swiss Federal Institute of Technology, ETH Zurich, Switzerland.

2012 Richard Bumann. Control of finger musculature at the verge of failure. Master's Degree student at the Swiss Federal Institute of Technology, ETH Zurich, Switzerland.

2008-2010 Corey Baker. Control of linear motors as unstable haptic systems. Master's Degree student supported by the Louis Stokes Minority Participation (LSAMP) Bridges to the Doctorate program at California State University Los Angeles (CSULA) funded by the National Science Foundation.

Undergraduate Students at other institutions

2016 Darío Urbina. Undergraduate thesis: Observability of posture using a simulated sacro-lumbar organ in a robotic guinea fowl, National Autonomous University of Mexico, UNAM, Mexico.

2013-2014 Victor Barradas. Undergraduate thesis: Controllability of tendon-driven systems, National Autonomous University of Mexico, UNAM, Mexico.

Undergraduate Students at the Viterbi School of Engineering:

2017-present	Jamie Flores, Madeline Walter, Meredith Troy, and Sydney Mayer. Leg dexterity in health and disease.
2016-2017	Sebastien Arnold. Supervised deep learning for control of tendon-driven fingers and robots. Computer Science.
2015-2016	Taegyum Kim. High dimensional data visualizaations. Computer Sciences.
2013-2014	Kristianna Gadalla: Bench-top simulation of brain stimulation.
Spring 2008	Rohit Majumdar: Perturbation analysis for biomechanical systems.
Spring 2008	Robert Taft: Control of a six degree-of-freedom robot.
Summer 2008	Kari Oki: Designing and implementing a motion capture system for finger movement. Scripps College, NSF- Research Experiences at the Biology-Mathematics Interface (REBMI)

Visiting Medical Students

Fall 2010	Novalie Lilja and Isak Hägg, Karolinska Medical School, Stockholm.
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Visiting Undergraduate Students

Summer 2012	Bryn Nisbet, Claremont McKenna College, Michelle Chen, Harvey Mudd College. Portable device for quantifying upper and lower extremity dexterity. NSF- Research Experiences at the Biology-Mathematics Interface (REBMI).
Summer 2011	Dana Canfield, Scripps College, Alison Kent, Pitzer College, Timothy Law, Claremont McKenna College, Akshata (Tasha) Ramesh, Scripps College. NSF- Research Experiences at the Biology-Mathematics Interface (REBMI).
Summer 2010	Devin von Stade, Pitzer College, and Kevin Varela Ohara, Harvey Mudd College. NSF- Research Experiences at the Biology-Mathematics Interface (REBMI).
Summer 2009	Vy Vo: Algorithms for control of electrical motors. Swarthmore College. NSF- REU site in Computer Science.
Summer 2009	Cecilia Jou: Swarthmore College. NSF-REU site in Computer Science.
Summer 2008	Alexandra (Lolly) Simoni: Designing and control of a pneumatic perturbation device for the fingertips. Harvey Mudd College, NSF- Research Experiences at the Biology-Mathematics Interface (REBMI)

As Co-Adviser

Doctoral students

2015-present	Enrique Argüelles, in BME with Dr. Terence Sanger
2014-present	Cassie Borish, in BME with Dr. Terence Sanger
2016-present	Sam Huynh, in BME with Dr. Terence Sanger
2016-present	Rebecca Lee in EE-S with Dr. Alice Parker.
2016-present	Roberto Marín del Campo Vera in EE-S with Dr. Edmond Jonckheere.
2015-present	Yupeng Xiao, in NGP with Dr. Stefan Schaal.
2012-present	Vincent Enachescu, in NGP with Dr. Stefan Schaal.
2012-present	Yupeng Xiao, in NGP with Dr. Stefan Schaal.
2017-present	Iván Trujillo Priego, in BKN with Dr. Beth Smith.

2014-2017	Shanie Liyanagamage, in BME with Dr. Terence Sanger
2014-2017	Amber Dunning, in BME with Dr. Terence Sanger
2014-2017	Xuechen Huang, in BME with Dr. Gerald Loeb.
2014-2015	Dorsa Beroukhim Kay, in BKN with Dr. Carolee Winstein.
2014-2016	K. Michael Rowley, in BKN with Dr. Carolee Winstein.
2012-2015	Won Joon (Eric) Sohn, in BME with Dr. Gerald Loeb.
2012-2015	Hyeshin Park, in BKN with Dr. Nicolas Schweighofer.
2011-2015	Kristamarie Pratt, in BKN with Dr. Susan Sigwart.
2010-2015	Adam Feinman, in BME with Dr. Terrence Sanger.
2009-2014	Chia-Hsien Lin, in BME with Dr. Gerald Loeb.
2009-2010	Nicholas Wettels, in BME with Dr. Gerald Loeb.
2009-2011	Jeremy Fishel, in BME with Dr. Gerald Loeb.
2007-2009	Taehoon Shin, in EE with Dr. Krishna Nayak.
2007-2012	Mark Lyle, in BME with Dr.. Chris Powers.
2007-2008	Dan Song, in BME with Dr. Gerald Loeb.

Student Supervision at Cornell University

As Primary Adviser

Doctoral Students in the Sibley School of Mechanical and Aerospace Engineering

2006-2007	Manish Kurse. 1st year student.
2004-2007	Daniel Brown. NSF-IGERT Graduate Research Fellow: Control of multifinger manipulation.
2001-2007	Veronica Santos. NSF Graduate Research Fellow: Bayesian approach to patient-specific biomechanical models. <i>Now tenured faculty member at UCLA.</i>
2000-2006	Madhusudhan Venkadesan. M&AE Graduate Fellow (2001-2): Control of finger musculature during manipulation of objects with unstable nonlinear dynamical behavior. <i>Now tenure-track faculty member at Yale University.</i>

Masters Students in the Biomedical Engineering Department

2005-2007	Alicia Medina Cianchetti: Muscle coordination for manipulation.
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Research Associates at the Sibley School of Mechanical and Aerospace Engineering

2002-2003	Rebecca J Avrin Zifchock, MS. A hybrid cadaveric/optimization investigation of the actions of tendon transfers to restore thumb opposition. <i>Now faculty member at the United States Military Academy, West Point.</i>
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Masters of Science Students at the Sibley School of Mechanical and Aerospace Engineering

2001-2003	Laurel Kuxhaus. NSF Graduate Research Fellow. MS Thesis title: Changes in thumb 3D force production with selective paralysis. <i>Now faculty member at Clarkson University.</i>
2001-2002	Jonathan Pearlman. NSF Graduate Research Fellow. MS Thesis title: Fundamental actions of the muscles of the thumb. <i>Now faculty member at the University of Pittsburgh.</i>

- 2003-2005 Saurabh Mahapatra: The production of slow finger motion.
- 2003-2005 Vikrant Anand. M&AE Graduate Fellow (2004): Genetic algorithms to extract musculoskeletal models from experimental data. *Now faculty member at Emory University.*

Masters of Engineering Students at the Sibley School of Mechanical and Aerospace Engineering

- 2004-2005 David Ashley. NSF Graduate Research Fellow; IGERT Fellow: Simultaneous control of finger motion and force.
- 2003-2004 Stanley Song: Sequential control of finger motion and force.
- 2001-2002 Michael Lin: Study of the evolution of the extensor mechanism of the fingers using computational geometry. Co-Advised with Prof. Hod Lipson.
- 2000-2001 Jeonghoon Oh: Design of a non-metallic exoskeleton to measure wrist kinematics under load.
- 1999-2000 Erika Anderson: Computer-control of tendon tensions in cadaver hands.
- 1999-2000 Michael Graffeo: Programming of force-feedback virtual reality robots.

Masters of Engineering Students in Computer Science

- 2000-2001 Xiaozheng Zhong: Programming of force-feedback virtual reality robots.
- 1999-2000 Nathan Wilson: Web-based visualization of biomechanical function.

Undergraduate Students at the Sibley School of Mechanical and Aerospace Engineering

- 2005-2007 Shannon Marilee Miller: Motion capture of the human hand.
- 2006-2007 William Hughes Seidel: Inference of the structure of artificial tendon networks.
- 2005-2006 Karen Chin: Viscoelastic actuators.; Motion capture of the human hand
- 2005 Demelza Guizar: Tendon-driven robotic finger.
- 2003-2004 Christopher Kim: Feedback control of arm movements.
- 2002-2004 Joshua Savrin: Load dependence of thumb kinematics.
- 2002-2003 Nicole M Graf: Apparatus to quantify the response of the skeletal column of the thumb to loading during prehension.
- 2002-2003 Joseph Munaretto: Apparatus to study the state-estimation abilities of the nervous system.
- 2002-2003 Manuel Hernandez: Computer-controlled system to test tendon-gliding friction.
- 2002-2004 Richard W Ducharme: Analysis of electromyography of the thumb.
- 2002 Paul Scholten: Characterization of muscle timing in mudskippers gait from intramuscular EMG recordings.
- 2000-2001 Michal Weisman: Design and construction of a computer-controlled system to apply tension to cadaver tendons of the hand.
- 2000-2001 Michael Lin: Manufacturing of devices to test grasp dexterity.
- 2000-2001 Paul Wilson: Design of virtual objects to test manipulation ability using a force-feedback robot.
- 2000-2001 Jennifer Pretz: Measurement of hand impairment in patients with osteoarthritis of the thumb.
- 2000-2001 Kirana Ramakrishna: Measurement of manipulation ability in unimpaired adults.

Undergraduate Students in Biological and Environmental Engineering

2005-2006	Brenda Chen: Computed tomography of thumb bones during pinch.
2004-2006	Eric Samorodnitsky: Quantification of load-dependent carpometacarpal kinematics.
2004	Alexander M. Deyle: Quantification of load-dependent carpometacarpal kinematics.

Undergraduate Students in Biology

2003-2005	Erica Weiss: Distortion of thumb force production in median nerve palsy.
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Undergraduate Students in Architecture

2003	Nina F Shih: Computer animation of the human hand.
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Undergraduate Students in Computer Science

2000-2001	Joel Skaliotis: Programming of a force-feedback robot to create virtual objects to study dynamic manipulation.
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Underrepresented Minority Undergraduate Students hosted for the Leadership Alliance summer program

2003	Salvador Turrubiarres: Building a dual processor computer.
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Underrepresented Minority High School Students hosted for the NASA-SHARP summer program

2002	Luis Rodriguez: Building a computer model of the hand.
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As Co-Adviser

Doctoral students

2005-2007	Michael Sherback in Controls with Dr. Raffaello D'Andrea.
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Student Supervision at Stanford University

As Co-Adviser

Doctoral Students in Mechanical Engineering:

1999-2005	Niels Smaby: Measurement of strength and dexterity impairments in spinal cord injured patients. With Mark Cutkosky.
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Undergraduate Students in the Department of Mechanical Engineering:

1998	Supervised three Mechanical Engineering Student Team to develop an MRI-friendly instrumented wrist exoskeleton for the undergraduate class ME113 "Mechanical Engineering Design." Primary Adviser.
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Development

Gifts

2016-2017	Support for summer internships for Mexican students at USC. IME-Becas program/Parents Alliance \$30,000
2015-2016	Support for summer internships for Mexican students at USC. IME-Becas program. Consulate General of Mexico \$39,000

2014-2015 Support for summer internships for Mexican students at USC. IME-Becas program. Consulate General of Mexico
\$35,000

Research Support

Current Research Support

2013-2018 **Principal Investigator**, "Structure and function of the fingers' tendinous apparatus"
National Institutes of Health, R01-AR052345-06
\$2,543,557 total cost
Co-Investigators: Loeb GE, Sanger TD, Lightdale N, Stevanovic, M.
Goal: To implement a physiologically realistic synthetic analog of spinal circuitry to control finger function via populations of spiking neurons.

2016-2019 **Co-PI (USC Lead)**, "*Design and Validation of Implantable Passive Mechanisms for Orthopedic Surgery.*"
Department of Defense, MR150091
Principal Investigator: Balasubramanian, Oregon State University
\$283,497 USC total cost
Goal: To maximize the functional capability of tendon transfers. Percent effort: 5%

Completed Research Support

2016-2017 **Principal Investigator, Research Supplements to Promote Diversity in Health-Related Research Program for Victor Esparza**
"Neuromorphic quadrupeds"
Valero-Cuevas (PI)
National Institutes of Health, 3R01AR052345-09S1.
\$115,737 total cost
Goal: Using physiologically faithful neuromorphic models of the human spinal cord to control quadruped robots.

2010-2016 **Principal Investigator**, "Control of finger movement and force for precision pinch" Valero-Cuevas (PI)
National Institutes of Health, R01-AR050520-A6.
\$1,900,060 total cost
New Priority score 11; Percentile priority score: 1%.
Goal: To describe and explain how multifinger musculature enables manipulation.

2013-2016 **Co-Investigator**, "Redundancy in Linear and Neuromuscular Systems"
Swiss National Science Foundation
160'000 CHF (Swiss Francs)
Principal Investigators: B. Gärtner, K. Fukuda
Goals: On the theoretical level, understand the structure of redundancy and the

complexity of redundancy explicitly or implicitly. On the application side, compute redundancy and assess the role of redundancy in neuromuscular control.

- 2010-2015 **Co-Investigator**, “TREET: Training in Rehabilitation Efficacy and Effectiveness Trials”
NIH T32 Doctoral Training grant. Clark, F (PI)
- 2012-2015 **Principal Investigator, Research Supplements to Promote Diversity in Health-Related Research Program for Alexander Reyes**
“Efficient functional mapping of human brain via sparse experimentation”
Valero-Cuevas (PI)
National Institutes of Health, 3R01-AR050520 - 08W1.
\$184,887 total cost
Goal: Understand cortical activity for hand function using intra-operative ECoG.
- 2008-2013 **Thrust Leader of Project 1** “Optimizing Participation Through Technology (OPTT) Rehabilitation Engineering Research Centers Program (RERC)”
Award – 84-133E2008-8: (Winstein & Requejo, Co-PI’s)
\$4,750,000 total cost
The National Institute on Disability and Rehabilitation Research (NIDRR) program for Technologies for Successful Aging with Disability
Department of Education
Goal: To enhance the lives of individuals aging with and into disability through cutting-edge technologies made accessible for all intended beneficiaries while providing training opportunities for future rehabilitation researchers.
- 2008-2012 **Principal Investigator** “Reverse-engineering the human brain’s ability to control the hand”
National Science Foundation EFRI-COPN 0836042
E. Todorov and Y. Matsuoka, U. Washington, Co-Principal Investigators
Goal: Dexterous hand manipulation remains at the frontier of engineering research that requires a synergistic combination of novel computational and experimental approaches.
- 2005-2011 **Principal Investigator**, “Structure and function of the fingers’ tendinous apparatus ”
National Institutes of Health; R01-AR052345-01
Priority score: 108; Percentile priority score: 0.5%
Lipson, H, Roach, SS, Co-Investigators; Michael Hausman, Co-Investigator (Mount Sinai Medical Center)
Goal: To characterize the biomechanical coupling within and across fingers due to the tendinous anatomy.
- 2004-2010 **Principal Investigator**, “Control of finger movement and force for precision pinch” Valero-Cuevas (PI)
National Institutes of Health, R01-AR050520-01A1.

- Priority score 132; Percentile priority score: 0.8%.
Goal: To describe and explain how the musculature of the index finger is coordinated to orchestrate fingertip motion and force, a fundamental requirement of dexterous manipulation.
- 2004-2009 **Co-Investigator**, (L. Mandl, PI), “An RCT for Treating Carpometacarpal Osteoarthritis”
National Institutes of Health, K23 AR050607-01
Goal: To establish the optimal medical treatment for carpometacarpal osteoarthritis, and evaluate accurate outcome measures of hand impairment for carpometacarpal joint dysfunction.
- 2006-2008 **Principal Investigator** (No number), “Cortical Development of dexterity in children”
Stiftelsen Frimurare Barnhuset
(Swedish Freemason Children’s Hospital Foundation)
Goal: Travel grant to establish the changes in cortical networks for hand dexterity that accompany natural development in young children.
H. Forssberg (Host, Karolinska Institute)
- 2005-2008 **Principal Investigator**, “Developing a clinically useful measure of dynamic pinch”
National Institutes of Health, R21-HD048566
Priority score 163; Percentile priority score: 12.8%.
Guckenheimer, J (Co-Investigator); Hotchkiss, R, Mandl L, Co-Investigators
(The Hospital for Special Surgery)
Goal: To combine robotics concepts of grasp stability with bifurcation analysis of nonlinear systems to quickly characterize dynamic pinch function in the clinic.
- 2004-2007 **Co-Principal Investigator**, (Guckenheimer, PI), “Integrative Graduate Education and Research Traineeship (IGERT): Program in Nonlinear Systems.”
National Science Foundation, Division of Graduate Education. Gilmour, Sethna, Strogatz Co-Principal Investigators
Award No. 0333366.
Goal: Graduate fellows in the IGERT program participate in courses, seminars internships and projects that give them experience in doing interdisciplinary research involving nonlinear systems.
- 2003-2007 **Principal Investigators** (Lipson and Valero-Cuevas) "Biologically Inspired Hexapod Platform with Decentralized Neurocontrol and Adaptive Morphology"
National Geospatial-Intelligence Agency (NGA)
NMA501-03-1-2013 DCI Post Doctoral Fellowship
Goal: To use topological and parametric co-optimization to design and build a legged robot to navigate rough terrain.

- 2003-2008 **Principal Investigator**, “CAREER: Educational Program in Neuromuscular Biomechanics & Uncovering the Neuromuscular Biomechanics of Dexterous Manipulation”
National Science Foundation
Faculty Early Career Development Program CAREER award.
BES-0237258
Directorate for Engineering, Biomedical Engineering/Research to Aid Persons with Disabilities Program, Division of Bioengineering and Environmental Systems.
Goal: To develop an integrative characterization of human dexterous manipulation by combining biomechanics, nonlinear mathematics, electromyography and functional brain imaging.
- 2002-2007 **Co-Principal Investigator** (Cornell), “Alliance for Graduate Education and the Professoriate (AGEP): The Central New York to Puerto Rico-Mayagüez (CNY-PR)”
National Science Foundation, Division of Human Resources Development, Minority Graduate Activities. Johnson (PI, Syracuse University). Warhaft, Bustamante Co-Principal Investigators
Goal: To increase the number of science, mathematics and engineering professors from underrepresented groups.
- 2003-2006 **Principal Investigator** (Cornell University), "Collaborative Research: Information Technology Research (ITR): A Robotics-Based Computational Environment to Simulate the Human Hand"
National Science Foundation
Directorate for Computer and Information Science and Engineering, Robotics and Computer Vision Program, Division of Information and Intelligent Systems.
ITR-0312271
P. Allen, Principal Investigator (Columbia University).
Goal: To create a realistic computer model of the human hand for robotic and motor control research.
- 2002-2006 **Principal Investigator**, “Load dependence of thumb and carpal bone configuration during static pinch”
Weill Cornell Center for Aging Research and Clinical Care Grant.
Goal: To characterize the naturally occurring *in-vivo* movement of the skeletal column of the thumb during pinch to develop measures of degeneration of thumb joints in osteoarthritis.
- 2004-2005 **Principal Investigator**, “A hybrid cadaveric/optimization simulation of static force production in the paretic and post-operative thumb”
Whitaker Foundation, Transitional Funding Grant.
Research Grant No. RG-00-0397
Goal: To apply nonlinear parameter optimization techniques to create subject-specific models of cadaveric human digits.

- 2001-2004 **Principal Investigator**, “A hybrid cadaveric/optimization simulation of static force production in the paretic and post-operative thumb”
Whitaker Foundation Biomedical Engineering Research Grant. Research Grant No. RG-00-0397
Goal: To establish the biomechanical interactions among thumb muscles that produces thumbtip forces in the able, paretic and post-operative thumb.
- 1999-2001 Lead-author as post-doctoral research associate, “Functional Restoration of Grasp in Quadriplegia”
Development Service. Three-year Merit Review continuation project to study the restoration of index-thumb grasps. 10% effort. Drs. Felix Zajac and Vincent R. Hentz, Co-Principal Investigators.
- 1996-1999 Lead-author as graduate student, “Functional Restoration of Grasp in Quadriplegia”
Development Service. Three-year Merit Review project to study the biomechanics of index-thumb grasps. 100% effort. Drs. Felix Zajac and Vincent R. Hentz, Co-Principal Investigators.
- 1994-1996 Lead-author as graduate student, “Functional Restoration of Grasp: Pilot Proposal”
Development Service. One year project to establish feasibility of modeling the force generating capabilities of human fingers. 100% effort. Drs. Felix Zajac and Vincent R. Hentz, Co-Principal Investigators.
- 1989-1991 Queen’s-CIDA Research Scholarship
Two-year grant to pursue graduate studies and research. Mechanical Engineering Department, Queen's University & Canadian International Development Agency. 100% effort.
- 1986 Eugene M. Lang Foundation Independent Research Award
Grant to study wrist joint total prostheses
Swarthmore College. 100% effort.

Research Support for Undergraduate Students

Past Research Support

- Summer 2005 Eric Samorodnitsky
Demelza Guizar
Brenda Chen
Karen Chin
- Summer 2004 Erica Weiss
Alexander M. Deyle
Eric Samorodnitsky
Competitive Research Experience for Undergraduates, National Science Foundation, Summer stipends. Principal Adviser

Fall 2001	Michal Weisman, GE “Faculty of the Future” research grants for Undergraduate women in Science. Competitive, \$1,500 Stipend. Principal Adviser
Summer 2000, 2001	Michal Weisman, “Bartel Family Fund” research grants for Undergraduate students Competitive, \$1,500 Summer Stipend. Principal Adviser
Summer 2000	Kirana Ramakrishna, GE “Faculty of the Future” research grants for Undergraduate women in Science Competitive, \$1,500 Stipend. Principal Adviser

Engagement

Engagement outside the University of Southern California

2014-present	Co-Chair, México Innova Initiative, Los Angeles Chapter. Education, Science and Technology Group. The Consulate General of Mexico in Los Angeles
2015-present	Co-Founder of the non-profit Acceso Academy (accesoacademy.org) to provide low-cost SAT preparatory courses to low-income Latino students.
2016-present	Founding President, <i>México Innova Initiative</i> a 501(c)3 non-profit corporation for community projects.

Academic Engagement at the University of Southern California

2017-present	Chair, Neuroengineering Search Committee (2 positions), BME Department.
2017-present	Member, Research Infrastructure Sub-Committee, Engineering Faculty Council (EFC).
2016-present	BME representative, Engineering Faculty Council (EFC).
2016-present	Member, Research Advancement Committee (RAC). Division of Biokinesiology and Physical Therapy.
2016-present	Faculty Adviser, Mexican Student Association.
2017	Char, Promotion Committee, BME Department.
2017	Chair, Vice Dean Evaluation Committee, Engineering Faculty Council (EFC).
2010-present	Academic Director, USC-CONACYT Collaborative Agreement
2014-2017	Member, University Committee on Academic Review (UCAR).
2015-2016	Chair, Neuroengineering faculty search committee, Department of Biomedical Engineering
2014-2016	Viterbi School of Engineering Transformative Faculty Committee
2014-2016	Viterbi School of Engineering Appointments, Promotion and Tenure (APT)
2014-2016	Viterbi School of Engineering Appointments, Promotion and Tenure (APT) Executive Committee
2014-2016	Division of Biokinesiology and Physical Therapy Promotion and Tenure Committee
2012-2015	T32 TREET NIH Training Grant Minority Recruitment Advisory Board

	member.
2013-2014	Faculty liaison, <i>Vice Provost for Faculty Affairs</i> “Casting the Net Widely” initiative for the recruitment of top scholars.
2011-2014	Member, Ostrow School of Dentistry Faculty Development Committee (FDC) for promotion and tenure.
2010-2012	Member, Viterbi School of Engineering Viterbi IT Advisory Council (VITAC)
2010-2012	Member, Viterbi School of Engineering Women in Science and Engineering (WISE) Program Committee
2010-2012	Member, Viterbi School of Engineering Faculty Council (EFC)
2009-2012	At-large-member, Viterbi School of Engineering Appointment, Promotion Tenure (APT) Committee.
2009-2014	Director, Education and Outreach, NIDRR funded research center: RERC-OPTT
2010	Member, Office of the Provost for Global Initiatives, Search Committee for Director of Mexico City Office
2010	Member, Viterbi School of Engineering Merit Review Committee
2009-2010	Member, Academic Senate and the Office of the Provost Committee on Academic Programs and Teaching (CAPT).
Spring 2009	BME interim representative, Engineering Faculty Council (EFC).
March 2009	Speaker, USC Neurorehabilitation Retreat, Huntington Library, Pasadena, CA.
February 2009	Participant, BMES ERC Annual Retreat, Mandalay Beach, Oxnard, CA.
2009	Chair, Biomedical Engineering Department, Chair Evaluation Committee.
2008-2010	Member, Viterbi School of Engineering Academic Programs Committee. Task force on Improving the Quality and Image of the VSoE Masters’ Programs.
August 2008	Participant, Provost’s Research Leadership Retreat, Descanso Gardens.
October 2008	Participant, Keck School of Medicine and Viterbi School of Engineering Research Retreat, Huntington Beach.
2008	Member, BME neuroengineering faculty search committee.
February 2008	Participant, USC Research Summit, Huntington Beach
2008-2009	Director, Diversity and Training, BMES ERC
2008	Member, delegation to launch Viterbi-UNAM collaboration
2008-2009	Chair, Ad hoc BME appointment committee
2008	Interview Committee, Trustee Scholarship Program
2008	Member, Engineering Faculty Council
2007-present	Lead, UCS-CONACyT collaborative agreement application

Academic Engagement at Cornell University

2007	Search Committee Member, Biomechanics Position
2007-2008	Member Undergraduate Biology Curriculum Task Force
2004-present	Founder and faculty coordinator International Undergraduate Engineering Research Internship/Mexico. Program to host outstanding undergraduate engineering students from first-rank Mexican

	universities to do a research internship with a Cornell engineering faculty member.
2003-present	Founder and faculty coordinator Graduate Fellowship Agreement between Mexico's National Committee on Science and Technology (CONACYT) and Cornell University to continually fund 10 3-year graduate research fellowships across Cornell.
2003	Member Search Committee for Director of Minority Programs in the School of Engineering
2004-5	Cornell Representative at the Postgraduate Recruitment Fair, Mexican National Council for Science and Technology (CONACyT), Mexico City.
2002-2007	Faculty Adviser Mexican Student Association

Academic Engagement at the Sibley School of Mechanical & Aerospace Engineering, Cornell University

2003-2004	Educational Programs Assessment Committee (EPAC)
2001-2003	Masters in Mechanical Engineering Committee
2001-2003	Academic Committee
1-2001	Department Secretary

Recruitment of Underrepresented Minorities, Cornell University

2004	University of Puerto Rico at Mayagüez, Ivy League Graduate Fair, September 27.
2003	University of Puerto Rico at Mayagüez, CNY-PR Alliance for Graduate Education and the Professoriate, Inaugural Event, February 20.

Professional Engagement

Advisory Board	Member, NSF-ERC Center for Sensorimotor Neural Engineering (CSNE), University of Washington. Director: Rajesh Rao (2012-present)
Editor:	IEEE Transactions on Biomedical Engineering (2003-2008) PLoS Computational Biology, guest editor 2014-present Co-Editor for Frontiers Research Topic "Neuromechanics and Control of Physical Behavior: from Experimental and Computational Formulations to Bio-inspired Technologies" 2016- Frontiers in Computational Neuroscience Frontiers in Neurorobotics
Journal Reviewer:	Brain Research Clinical Biomechanics Experimental Brain Research IEEE Transactions on Biomedical Engineering IEEE Transactions on Rehabilitation Engineering IEEE Transactions on Systems, Man and Cybernetics Journal of Applied Biomechanics Journal of Applied Physiology Journal of Biomechanical Engineering

Journal of Biomechanics
Journal of Hand Surgery
Journal of Neuroscience
Journal of Neurophysiology
Journal of Orthopaedic Research
Journal of Theoretical Biology
Medical & Biological Engineering & Computing
Muscle & Nerve
Public Library of Science (PLOS) Computational Biology
Robotica

Curator: Scholarpedia, section on Neuromechanics

Article Reviewer: Yearbook of Hand Surgery (1995, 1996)
IEEE International Conference on Robotics and Automation (1997)

Contributing Editor: Yearbook of Hand Surgery (1997-2000)

Review Panels:

National Science Foundation

- Directorate for Engineering, Division of Bioengineering and Environmental Systems, Biomedical Engineering and Research to Aid Persons with Disabilities: **2002; 2003.**
- Directorate for Social, Behavioral and Economic Sciences, Division of Behavioral and Cognitive Sciences, Physical Anthropology Program: **2003.**
- Directorate for Social, Behavioral and Economic Sciences, Division of Behavioral and Cognitive Sciences, Perception, Action, and Cognition program: **2015.**

National Institutes of Health, Center for Scientific Review

- Sensorimotor Integration (SMI) Study Section. Regular member **2016-2020.**
- Special Emphasis Panel ZRG1 Biobehavioral and Behavioral Processes (ZRG1 BBBP-D (04)), February 24, **2015.**
- NIH Application Comparison Pilot, October 6, **2014**
- Special Emphasis Panel, Musculoskeletal, Oral and Skin Sciences (MOSS) IRG, June 26, **2012.**
- Special Emphasis Panel ZRG1 Biobehavioral and Behavioral Processes (BBBP-D 03), January 28, **2011.**
- Motor Function, Speech and Rehabilitation (MFSR) Study Section. *Ad hoc* member: **2004.** Regular member **2005-2009.**
- Musculoskeletal Rehabilitation Sciences (MRS) Study Section. Musculoskeletal, Oral and Skin Sciences Integrated Review Group. *Ad hoc* member: **2004, 2011.**

College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE)

- Fellow Review Subcommittee for Neural Engineering, **2014**

UW-Milwaukee Research Foundation, 2009

Christopher & Dana Reeve Foundation, Science Advisory Council (SAC) for our next grant review, 2010

- Alberta Innovates**, Alberta Ingenuity New Faculty Awards, **2010**
- Shriners Hospitals for Children**, Research Advisory Board, **2011, 2012, 2015**
- ETH Zurich Research Commission for scientific evaluation**, Reviewer, **2013**
- Taskforces:** **National Institutes of Health**, Taskforce on childhood motor disorders. Bethesda, MD. June 7-9, **2008**. January **2012**.
- Awards Committee** **Canada Council for the Arts**
Expert evaluator of nominees for the The Killam Prizes, **2017**.
- East Los Angeles College, Monterey Park, CA**
Math, Engineering, Science Achievement (MESA) and Minority Science and Engineering Improvement (MSEIP) programs
Summer research Science Presentations, September **2008**
- The Claremont Colleges, Monterey Park, CA**
Research Experiences at the Biology-Mathematics Interface (NSF-REBMI)
Summer Science Projects, September **2008**
- Summer Schools** Faculty, 2014 First European Computational Motor Control Summer School, Valflaunès, France.
Faculty, 2015 Second European Computational Motor Control Summer School, Valflaunès, France.
2016 Summer School in Computational Sensory-Motor Neuroscience (CoSMo 2016), Minneapolis, MN.
2017 Emory-Tibet Science Initiative by His Holiness the 14th Dali Lama. Taught Year 3 of neuroscience curriculum to Tibetan Monks during the summer intensive program. Gaden Shartse Monastery, Karnataka, India, June 11-21, 2017.
Soft Manipulation (SOMA) Summer school sponsored by IEEE/ Deutches Zentrum für Luft und Raumfahrt DLR (German Center for Aerospace Sciences), Taught neuromuscular control of human manipulation. Fraueninsel, Bavaria, Germany, July 17-21, 2017.
- Conferences:** **Workshops**
Invited Participant, DARPA ElectRx Proposer's Day, Washington, DC, December 16, 2014.
Invited Participant, Computing Community Consortium (CCC) & NSF, Brain Workshop, Washington, DC, December 4, 2014.
Invited Speaker, RSS 2014 Workshop on Human Versus Robot Grasping and Manipulation, Robotics Science and Systems, Berkeley, CA. July 12, 2014.
Invited Participant, DARPA HAPTIX Sensorimotor Prosthetics Workshop, Scottsdale, AZ, February 12, 2014.
51st Winter Conference on Brain Research, Manipulation in Humans and Robots, Big Sky, Montana, January 17, 2018.
- Review Committees**
2013, 2014, 2016, 2017 Society for the Neural Control of Movement

2011 ICRA

2011 Advances in Computational Motor Control (ACMC), Society for Neuroscience, San Diego, CA

2011 35th Annual Meeting of the American Society of Biomechanics, Long Beach, CA

2010 IEEE Engineering in Medicine and Biology Conference
Buenos Aires, Argentina

ASME 2010 Summer Bioengineering Conference (SBC2010)
Naples, FL

2010 Advances in Computational Motor Control (ACMC), Society for Neuroscience, San Diego, CA

The Advances in Motor Learning and Motor Control (MLMC) SFN 2017
satellite meeting

Session Chair: Technology for Contemporary Rehabilitation Engineering (with Zev Rymer). RERC State of the Science Conference (SOSC): Building Rehabilitation Research Capacity at the Nexus of New Technologies, Aging, and Disability October 26, Marina del Rey, CA

Scientific Advisory Board, Member

21st International Society of Electrophysiology and Kinesiology (ISEK) Congress, Chicago from July 5-8, 2016 (in progress)

Chair (2008)

ICRA 2008 Tutorial "Is human-like dexterous manipulation within our robotic grasp?"

Pasadena, CA

Symposium Chair, Progress in Motor Control V

August 17-20, 2005

State College, PA.

Program Committee Member

28th Annual Meeting of the American Society of Biomechanics

and Co-Chair of session on Neuro-Orthopedics

September 8-11, 2004

Portland, OR.

Chair of session on Control of Neuromuscular control of a fascinatingly complex system: The hand

26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, September 1-4, 2004

San Francisco, CA.

Program Committee Member

27th Annual Meeting of the American Society of Biomechanics

September 24-27, 2003

Toledo, OH.

35th Annual Meeting of the American Society of Biomechanics, Long Beach, CA, Virtual Tours chair.

Co-Chair of Upper extremity biomechanics session

25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, September 17-21, 2003
Cancun, Quintana Roo, Mexico.

Program Committee Member

26th Annual Meeting of the American Society of Biomechanics
World Congress of Biomechanics, August 4-9, 2002
Calgary, Alberta, Canada.

Co-Chair of ASB Symposia on the Hand and Upper Extremity

World Congress of Biomechanics, August 4-9, 2002
Calgary, Alberta, Canada.

Chair of Instructional Course on the Neuromuscular Biomechanics of the Hand

Meeting of the American Society for Surgery of the Hand, October 4-6, 2001,
Baltimore, Maryland, U.S.A.

Chair of Symposium on hand and finger control

In Progress in Motor Control II Conference: Structure-Function Relations in Voluntary Movements, August 19-22, 1999, The Pennsylvania State University, State College, Pennsylvania, U.S.A.

Chair of Review Board

ICORR '99, Sixth International Conference on Rehabilitation Robotics, July 1-2, 1999, Stanford University, Stanford, California, U.S.A.

Memberships:

American Society of Biomechanics
American Society of Mechanical Engineers
Institute of Electrical and Electronics Engineers: Engineering in Medicine and Biology Society
International Society of Biomechanics
Society for Neuroscience
American Physiological Society

Awards and Distinctions

Awards

- | | |
|------------------|--|
| 2018 (scheduled) | Honorary Degree Recipient , Swarthmore College, Swarthmore, PA. For <i>combining multiple fields to understand how the brain controls the body, and its clinical and robotic applications</i> |
| 2015 | Orange County Engineering Council OCEC President's Prestigious Award . <i>For Scholarly and Outstanding Contributions to the Engineering Profession</i> |
| 2014 | Elected Fellow , College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE). <i>For Outstanding Contributions to the Mathematical and Engineering Understanding of the Neural Control of Limbs to Produce Versatile Function</i> |
| 2013 | Elected Senior Member of the IEEE |

- 2013 **Outstanding Technical Achievement Award.** 25th Conference Hispanic Engineer National Achievement Awards Corporation (HENAAC), Great Minds in STEM
- 2011 **Mellon Award** for Undergraduate Mentoring
- 2006 **Wenner-Gren Fellowship.** From the Wenner-Gren Foundation to work at Neuropediatric Research Unit of the Karolinska Institute in Stockholm, Sweden.
- 2005-2006 **Humboldt Research Fellowship.** From the Alexander von Humboldt Foundation to work at the Max Planck Institute for Human Cognitive and Brain Sciences in Munich, Germany.
- 2003 **Post-Doctoral Young Scientist Award,** American Society of Biomechanics. Annual Meeting, Univ. of Toledo, Toledo, OH.
- 2003 **National Science Foundation Faculty Early Career Development Program CAREER award.**
- 1999 **Ersten Preis, Tiroler Innovationspreis**
(First Prize, Innovation Prize from the State of Tirol)
For the design of a reusable frame system to create architectural arch forms, Innsbruck, Austria.
- 1998 **Best Poster Post-Doctoral Award**
First National Meeting of the Rehabilitation Research and Development Service of the Department of Veterans Affairs. Washington, DC.
- 1988-1989 **Fellow, The Thomas J. Watson Foundation**
Award to study Sankhya Yoga Philosophy in India and Nepal.
- 1987 **First Prize, Outstanding Undergraduate Research Paper Award,**
Philadelphia Club of Engineers.
- 1984 **4-year Undergraduate Engineering Scholarship**
Institute for International Education and Swarthmore College

Awards to students

- 2017 Brian A. Cohn. **National Science Foundation Graduate Research Fellowship** (NSF GRF)
- 2017 Brian A. Cohn. **3rd Place, Oral Presentations.** 6th Annual SWOB SICB Meeting, October 2017
- 2017 Brian A. Cohn. **Alternative Muscle Club Young Investigator Award,** by Genera Biocells, September 2017
- 2017 Brian A. Cohn. **Student Travel Grant,** De Luca Foundation, May 2017
- 2017 Darío Urbina Meléndez, **PhD Scholarship,** Consejo Nacional de Ciencia y Tecnología (CONACyT), Mexico. 2017-2021.
- 2017 Ali Marjaninejad. **Summer School Fellowship:** Health Data Exploration at UCSD (HDE 2017), the Robert Wood Johnson Foundation.
- 2016 American Society of Biomechanics. **Pre-Doctoral Young Scientist Award.** Emily Lawrence.
- 2015 **Platform First Place Award.** 19th Annual Fred S. Grodins Research Symposium. Department of Biomedical Engineering, USC. Alexander Reyes.
- 2015 **Neuroscience Category Poster First Place Award.** 19th Annual Fred S. Grodins Research Symposium. Department of Biomedical Engineering, USC. Victor Barradas-Patiño.

- 2014 **Finalist for Best Paper Award.** 6th Annual USC Graduate Research Symposium. Health Sciences category. Emily Lawrence.
- 2011 Science, Technology, Engineering and Medicine category, Graduate and Professional Students Senate Poster Competition, University of Southern California. **2nd Place:** Manish U Kurse, Lipson H, **Valero-Cuevas FJ**, “Inference of computational models of the fingers' tendinous networks through sparse experimentation”
- 2010 USC Herman Ostrow School of Dentistry Annual Research Day, **Best Poster Award** in Category of Neural Control & Motor Behavior. 2nd Place: Mark Lyle “Relationship Between Lower Extremity Dexterity and Agility”
- 2006 **Journal of Biomechanics Award.** M Venkadesan. 30th Annual Meeting of the American Society of Biomechanics. Venkadesan, M, J Guckenheimer, **FJ Valero-Cuevas**. Dynamic multisensory integration at the boundary of instability is explained by a simple data-based model. Blacksburg, VA.
- 2005 **Boeing Company Best Paper Award.** Paul C. International Conference on Advanced Robotics, ICAR. "Gait Production in a tensegrity based robot" C. Paul, J W Roberts, H Lipson, FJ Valero-Cuevas
- 2005 **First Place Award.** 3rd Annual Bioengineering Expo, Institute for Biological Engineering, Cornell University Chapter. “Load dependence of carpal bone kinematics” A Deyle, E Samorodnitsky, S Wolfe, S Backus, D Mintz, FJ Valero-Cuevas.
- 2005 **ISB Young Investigator Award for Poster Presentation.** VJ Santos. XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics, Cleveland, OH. Santos VJ, Miller AT, Allen PK, and Valero-Cuevas FJ. Implementing data-driven models of the human thumb into a robotic grasp simulator to predict grasp stability.

Distinctions

- 2014 **Best paper award, Gait and Clinical Movement Analysis Society: GCMAS conference,** University of Delaware Clayton Hall in Newark, DE. Nina Lightdale-Miric, Nicole M. Mueske, Jamie Berggren, Jennifer Loiselle, Emily L. Lawrence, Sudarshan Dayanidhi, Francisco J. Valero-Cuevas, Tishya A. L. Wren. Quantitative Assessment of Dynamic Control of Fingertip Forces After Pollicization.
- 2007 **Program Chair.** 30th Annual Meeting of the American Society of Biomechanics. Stanford, CA
- 2005-2009 **Study Section Regular Member.** National Institutes of Health, Center for Scientific Review. Motor Function, Speech and Rehabilitation (MFSR) Study Section.
- 2004 **Sloan Faculty.** Elected by the Alfred P. Sloan Foundation to serve as mentor to Sloan Scholars at Cornell University Alfred P. Sloan Foundation Minority Ph.D. Program.
- 2003 **Doctoral Dissertation Opponent.** Dept. of Woman and Child Health, Neuropediatrics Research Unit, The Karolinska Institute, Stockholm, Sweden. Anders Fagergren, Candidate. Prof. Hans Forssberg, Principal Adviser. December 5, 2003.
- 2002 **Finalist, Post-Doctoral Young Scientist Award,** American Society of Biomechanics. IVth World Congress of Biomechanics. Calgary, Alberta, Canada.

2002	Elected participant in the <i>New Century Scholars Workshop</i> for young faculty sponsored by the National Science Foundation at Stanford University.
2002-2005	Featured engineer in the “ <i>Ask an Engineer</i> ” traveling interactive show “Tech City” sponsored by the National Science Foundation.
1999	Finalist, ISB Young Investigator Award 17th Congress of the International Society of Biomechanics. Calgary, Alberta, Canada.
1988	Associate Member, The Scientific Research Society Sigma-Xi.
1996	Finalist, ASB Pre-Doctoral Young Scientist Award Meeting of the American Society of Biomechanics Atlanta, Georgia.
1989-1991	Queen's-CIDA Scholar. Canadian International Development Agency Two-year full scholarship to pursue Masters Degree.
1986	Eugene M. Lang Foundation Independent Research Award Swarthmore College.
1986, 1987	Twice Recipient, Scott Lilly Engineering Scholarship Swarthmore College.

Media Coverage

January 2009	Front page feature article, <i>La Opinión</i> http://www.impre.com/laopinion/noticias/primera-pagina/2009/1/25/de-inmigrante-a-bioingeniero-105403-1.html
February 2008	What gives us finger dexterity? www.usc.edu/uscnews/stories/14839.html www.physorg.com/news121616418.html www.physorg.com/pdf120313173.pdf www.sciencedaily.com/releases/2008/01/080123085319.htm viterbi.usc.edu/news/news/2008/what-gives-us.htm
April 2002	Feature Article in the <i>Cornell Engineering Magazine</i> www.engineering.cornell.edu/engrMagazine/magazine.cfm?issue=SPRING2002&page_number=1&section=feature4
November 2001	Radio interview in the program <i>Science Update</i> from the American Association for the Advancement of Science. www.scienceupdate.com/Nov01.html#011120 Link “The Thumb”
October 2001	Newspaper article in the <i>Ithaca Journal</i> www.ithacajournal.com/news/stories/20011001/topstories/1034517.html

Professional

2008-2010	Seed funding to develop commercial products to assess and improve dexterity. Karolinska Institute Development Office (KIAB). With Prof. Hans Forssberg.
1996-present	Co-Founder and Engineering Director, Multiarc Vertriebs GmbH & CoKG. A Corporation for structural and architectural design
1988	Engineer-in-Training exam

Mechanical Design Experience

1998	A multi-actuator system to test muscle function, simulate specific palsies and evaluate surgical outcomes on cadaver forefingers
1997	A sensory-motor system to enhance, exercise and clinically quantify grasping ability
1996	A reusable, adjustable form-work mechanism to construct architectural arches and archways
1995	Robot-based finger force testing station
1992	A tape dispenser for the masking of automotive parts. Funded by Ford Motor Co.
1990	Low-cost apparatus to quantify wrist joint integrity
1987	Low-cost uniaxial force plate for human jumping studies
1985	Tooth-Root incisor implant

Invited Presentations

Keynote Lectures

2017	Keynote Speaker. Soft Manipulation (SOMA) Summer School. Fraueninsel, Bavaria, Germany, July 19 th .
2016	Keynote Speaker. International Symposium on the Neuromechanics of Human Movement. A Ruperto-Carola symposium funded by the Klaus-Georg and Sigrid Hengstberger Prize. Heidelberg, Germany, <i>October 5th</i>
2016	Keynote Speaker. Jornada de Investigación de Sistemas Biomédicos (Seminar on Biomedical Systems Research), Department of Biomedical Systems Engineering, Universidad Nacional Autónoma de México, Mexico City, Mexico, <i>May 6th</i> .
2016	Keynote Speaker. Evnin Lecture, Department of Mechanical Engineering, Princeton University, Princeton, NJ, <i>April 20th</i> .
2016	Keynote Speaker. Distinguished Lecture Series, College of Engineering at the University of Tennessee, Knoxville, TN. <i>January 27th</i> .
2015	Keynote Speaker. Latino Youth Summit, Centralia College, Centralia, WA, November 17 th .
2015	Keynote Speaker. Leibniz-Zentrum für Informatik, Multimodal Manipulation Under Uncertainty Conference. Schloss Dagstuhl, Germany, <i>October 7th</i> .
2015	Keynote Speaker. USC President C.L. Max Nikias Presidential Event. Mexico City, <i>March 4th</i> .
2014	Keynote Speaker. Hand, Brain and Technology Conference, Locarno, Switzerland, <i>September 10th</i> .
2014	Keynote Speaker. International Running Symposium held in honor of the retirement of Dr. Benno Nigg, Calgary, Alberta, Canada, <i>August 16th</i> .
2014	Keynote Speaker. <i>México Innova</i> Conference, Residence of the Consul General of Mexico, Los Angeles, CA, <i>May 26th</i> .
2014	Keynote Speaker. Northwest Biomechanics Symposium, American Society of Biomechanics, Willamette University, Willamette, OR, <i>May 16th</i> .

- 2014 **Keynote Speaker.** USC Center for Neurorestoration Van Der Meulen Symposium. *University of Southern California, Los Angeles, CA, May 3rd.*
- 2014 **Keynote Speaker.** Department of Mechanical Engineering Distinguished Centennial Lecture. *University of Texas at Austin, Austin, TX, April 11th.*
- 2012 **Keynote Speaker.** Canadian Society of Biomechanics Annual Meeting, Burnaby, B.C., Canada, June 9th.
- 2010 **Keynote Speaker.** XXXIII Congreso Nacional de Ingeniería Biomedica, Sociedad Mexicana de Ingeniería Biomedica, Leon, Guanajuato, October 8th.
- 2009 **Keynote Speaker.** School of Dentistry Research Day, The University of Southern California, Los Angeles, CA. February 18th 2009.
- 2008 **Keynote Speaker.** National Polytechnic Institute, UPIBI Bioengineering Conference, Mexico City. April 4, 2008.
- 2007 **Presidential Keynote Speaker.** 2007 The Gait and Clinical Movement Analysis Society (GCMAS) Annual Meeting.
- 2007 **Plenary Speaker.** 2007 Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems.

Invited Seminars

- 2018** “Neuroanatomical substrates for human dexterous manipulation”
Society for Brain Mapping & Therapeutics:
Los Angeles, CA, April 14, 2018
(scheduled).
- “Neuromorphic systems for the study of the mammalian spinal cord”
AbilityLab (Formerly the Rehabilitation Institute of Chicago), Chicago, IL, April 11, 2018 (Scheduled).
- 2017** “Reverse Engineering the Brain”
Seminar series in honor of the retirement of Prof. Rachel Merz, Department of Biology, Swarthmore College, Swarthmore, PA, December 11, 2017.
- “Reverse engineering neural principles for physical behavior”
Chalmers Tekniska Högskola Institutionen för Signaler och System, Medicinsk Teknik, Chalmers Institute of Technology, Departments of Signals and Systems; and Medical Technology, Göteborg, Sweden, September 4, 2017.
- “Feasibility Theory: A new approach to biomechanics”
Royal Veterinary College, London, England, September 1, 2017.
- “Neuromorphic spinal reflexes for robotic quadrupeds”
Guggenheim School of Aerospace Engineering, Georgia Institute of Technology, June 29, 2017.
- “Fundamentals of neuromechanics”
Department of Rehabilitation Medicine, Ruijin Hospital, School of Medicine and School of Biomedical Engineering, Shanghai Jiao Tong University, Shanghai, China, May 18, 2017.
- “From Mechanics to Neuromechanics”
11th THU-USC Faculty Research Symposium on “The 4th Industrial Revolution: Enabling Tools and Methods,”
Tsinghua University, Beijing, China, May 16, 2017.
- “Neuromorphic circuits to emulate spinal reflexes”
Computer Science Department, University of Innsbruck, Innsbruck, Austria, April 19, 2017.
- 2016** “Neuromechanics”
Department of Mechanical Engineering, Columbia University, New York, NY, November 11, 2016.
- “Development of Dexterity Measures for Basic Science, Athletic and Clinical Research”
Biomechanics Laboratory, The Hospital for Special Surgery, New York NY, November 10, 2016.

- “From Mechanics to Neuromechanics”
Mechanical Engineering Colloquium. Yale University, November 8, 2016.
- “An Engineering Approach to Dexterity: From Basic Science to Athletic and Clinical applications”
Physiology & Biomedical Engineering Seminar Series at Mayo Clinic, October 27, 2016.
- “Dexterity”
Nike Global Research Symposium, Beaverton, OR, October 26, 2016.
- “Neuromorphic Systems to Reverse Engineer Reflex Function”
Biomedical Engineering Department, McGill University, Montreal, Quebec, Canada, September 30, 2016.
- “Reverse Engineering Spinal Circuitry”
Convergent Biosciences Seminar Series, University of Southern California, Los Angeles, CA, September 14, 2016.
- “Dexterity”
Institute for the Developing Mind, Children’s Hospital Los Angeles, Los Angeles, CA, August 25, 2016.
- “Challenging classical tenets of biomechanics and neural control”
Biomechanics and Neural Control of Movement 20th Anniversary meeting, Sterling, OH, June 14, 2016.
- “Reverse Engineering Spinal Circuitry”
Center for Sensorimotor Neural Engineering (CSNE), University of Washington, Seattle, WA, May 16, 2016.
- “Fundamentals of neuromechanics”
Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ, April 22, 2016.
- “A computational approach to the neural control of limbs”
Perceptual Robotics Laboratory (PERCRO), The Institute of Communication, Information and Perception Technologies (TeCIP), Scuola Superiore Sant’Anna, Pisa, Italy, March 22, 2016.
- 2015** “Computer chips that simulate the basic functions in the spinal cord”
Timberland Regional Library, Olympia, WA, November 16, 2015.
- “A Neuromorphic Approach to Neuromechanics”
Department of Integrative Physiology, University of Colorado at Boulder, October 30, 2015.
- “Cuantificación ingenieril de mecanismos neuronales de destreza manual y corporal”
Mechantronics Department, Universidad Nacional Autónoma de México. October 23, 2015.
- “Dexterity”
Boston Scientific, Valencia, CA, October 20, 2015.
- “Reverse engineering of hand control, in order to understand neural control of finger motions and forces”
Italian Institute of Technology (IIT), Genoa, Italy, June 15, 2015.
- “Using linear algebra to understand the neuromechanical control of vertebrate limbs”
Howard Hughes Medical Institute Summer Project at the Claremont Colleges, Claremont, CA, June 10, 2015.
- “Challenges to the classical notion of muscle redundancy: Does the CNS face an under- or over-determined control problem?”
USC Joint Symposium on Neural Computation. USC, Los Angeles, CA, May 16, 2015.
- “How to pursue a graduate degree”
Dezember House, Whittier College, Whittier, CA, April 10, 2015
- “Neuromechanics: What control problem does a biological brain face when controlling a mechanical body?”
Departments of Biology and Engineering, Swarthmore College, Swarthmore, PA, March 20, 2015.
- “Clinical quantification and scientific exploration of finger dexterity”
Department of Orthopaedics’ Grand Rounds at Mt. Sinai School of Medicine. New York, NY, March 18, 2015.
- 2014** “The strength-Dexterity Paradigm”
Novel GmbH, Munich, Germany, October 27, 2014.
- “Robots and Dexterity”
Department of Computer Engineering and Microelectronics, Technische Universität Berlin, Berlin, Germany, October 25, 2014

- “Neural control of Dexterity”
Department of Bioengineering &
Department of Computing, Imperial
College, London, England, April 28, 2014.
- “Challenging the cortico-centric view of the
neural control of the hand”
Department of Neurorehabilitation
Engineering & Bernstein Center for
Computational Neuroscience
Universitätsmedizin Göttingen & Georg-
August-Universität, Göttingen, Germany,
April 22, 2014
- 2013** “What is the central problem of motor
control?”
Department of Neuromotor Physiology,
IRCCS Fondazione Santa Lucia, Rome,
Italy, July, 2013.
- “Leg dexterity: A novel means to quantify
the sensorimotor capabilities of the leg to
dynamically control instabilities during
ground contact” Department of Neurological
& Movement Sciences, University of
Verona, Verona, Italy, June 17, 2013.
- “Is the neuromechanical system truly
redundant?” Department of Bioengineering,
University College, London, England, May
23, 2013.
- “Computational methods for hypothesis
testing in neuromuscular systems”
Department of Bioengineering &
Department of Computing, Imperial
College, London, England, May 22, 2013.
- “The business model of science” Lion’s
Club, Kitzbühel Chapter, Kitzbühel, Austria,
April 14, 2013.
- “Sensorimotor control for dynamic
stabilization” Department of Applied
Mechanics, Budapest University of
Technology and Economics, Budapest,
Hungary, April 26, 2013.
- “Computational Neuromechanics”
Computer Science Department, University
of Innsbruck, Innsbruck, Austria, March 14,
2013.
- “Tendon-driven systems” Innsbruck Robot
Learning Summit in Obergurgel, Austria,
March 7, 2013.
- 2012** “What is the central problem of motor
control?” NSF ERC Center for Sensorimotor
Neural Engineering, University of
Washington, Seattle, WA, December 11,
2012.
- “Novel way to assess, and potentially train,
sensorimotor function in the upper and
lower extremities across the lifespan: Cases
from healthy subjects, patients, and athletes”
Adidas AG - World of Sports - Adidas
Innovation Team, Herzogenaurach,
Germany, November 29, 2012.
- “Applications of vertex enumeration to
understanding the neural control of
musculature” Theory of Combinatorial
Algorithms Seminar, Institute of Theoretical
Computer Science, Eidgenössische
Technische Hochschule, ETH, Swiss
Federal Institute of Technology, Zurich,
Switzerland, November 13, 2012.
- “Mechanical Engineering as a critical
contributor to sensorimotor neuroscience
and the design of the next generation of
versatile robots” Department of Mechanical
and Aerospace Engineering, University of
California at Los Angeles, Los Angeles, CA,
June 21, 2012.
- “Brain-hand interactions for successful
dexterous manipulation” Department of
Neurosurgery, Keck School of Medicine of
USC, Los Angeles, CA, May 30, 2012.
- “Hypothesis testing in neuromuscular
systems” Department of Computer Science,
University of British Columbia, Vancouver,
BC, Canada, June 8, 2012.
- “Neuroimaging: fMRI studies of the
neuroanatomical substrates for dexterous
manipulation” Department of Neurology,
Keck School of Medicine of USC, Los
Angeles, CA, May 30, 2012.
- “A mathematical introduction to muscle
redundancy” California State University,
Los Angeles, CA, May 29, 2012.
- “Reverse engineering brain control of the
hand” NSF EFRI Grantees Conference,
Bethesda, MD, March 8, 2012.
- “Combining orthopedics and neuroscience:
Some new directions” Joseph H. Boyes
Hand Conference, Hand Surgery Service,
LAC+USC Healthcare Network, Los
Angeles, CA, March 6, 2012.
- “Exploring the anatomical and neural bases
of dexterity: Implications to diagnosis and
rehabilitation” Human Adaptation and
Countermeasures Office, NASA Johnson

- Space Center, Houston, TX, January 24, 2012.
- “An integrated neuro-mechanical approach to sensorimotor function and dysfunction” Department of Human Physiology, University of Oregon, Eugene, OR, January 20, 2012.
- “Hypothesis testing in neuromuscular systems” Department of Mechanical Engineering, Oregon State University, Corvallis, OR, January 19, 2012.
- 2011** “Computational methods for realistic models of neuromuscular systems” Institute of Robotics and Intelligent Systems. Eidgenössische Technische Hochschule, ETH, Swiss Federal Institute of Technology, Zurich, Switzerland, April 14, 2011.
- “Towards an integrated neuro-mechanical approach to sensorimotor function and dysfunction” Fakultät für Psychologie und Sportwissenschaft, Faculty for Psychology and Sports Sciences. Innsbruck University, Innsbruck, Austria, October 21, 2011.
- “The mechanics of engineered and biological tendon driven systems” Deutsches Zentrum für Luft und Raumfahrt DLR, German Center for Aerospace Sciences. Institute of Robotics and Mechatronics. Weßling, Germany, October 20, 2011.
- “Theoretical and computational neuroscience approaches to understanding brain-body interactions for dexterous manipulation” Division of Engineering and Applied Science. Harvard University, Cambridge, MA, April 15, 2011.
- “Computational methods for realistic models of neuromuscular systems” Biology, Electrical and Computer Engineering, and Physics Departments. Northeastern University, Boston, MA, April 14, 2011.
- “Reverse engineering brain control of the hand via mechatronic control of cadaveric hands” Sensorimotor Performance Program, Rehabilitation Institute of Chicago, Chicago, IL, March 4, 2011.
- “Computational methods for realistic models of neuromuscular systems” Mechanical Engineering and Biomedical Engineering Departments. Northwestern University, Evanston, IL, March 3, 2011.
- 2010** “Reverse engineering sensorimotor function” Mechanical Engineering and Material Sciences Colloquium. Yale University, November 10, 2010.
- “Towards an integrated neuro-mechanical approach to sensorimotor function” CNS Seminar, California Institute of Technology, Pasadena, CA October 25th, 2010.
- “The central and peripheral bases for dexterous sensorimotor function “ Japan Institute of Sport Sciences, Tokyo, Japan, September 24, 2010.
- “COPN-EFRI 0836042: Reverse-engineering the human brain's ability to control the hand” NSF-EFRI PI's Conference Arlington, VA March 18th, 2010.
- “Combinando ingeniería, neurociencia y matemática para entender la función motora humana, mejorar la rehabilitación y crear robots versátiles” Colloquium, Mechatronic Engineering Department. Universidad Nacional Autónoma de México, Mexico City, Mexico March 4th, 2010.
- “How does the brain control a complex musculoskeletal system?” talk in the session Linking Mechanics, Robotics, and Neuroscience: Novel Insights from Novel Systems, AAAS meeting, Washington, DC, February 19, 2010.
- “Understanding finger manipulation: Using a little math to understand brain-body interactions at the neural and anatomical levels” Research Experiences at the Biology-Mathematics Interface. The Claremont Colleges, Claremont, CA. February 1st, 2010.
- 2009** “Studies in hand dexterity: Opportunities to understand complex sensorimotor systems and create better robots” University of Calgary, Calgary, Alberta, Canada. November 12th, 2009.
- “Studying the spectrum of strength vs. dexterity in multifinger manipulation” Department of Orthopedics, Erasmus University, Rotterdam, Netherlands September 17th, 2009.
- “Lessons learned from the sensorimotor control of hand dexterity: Opportunities for the design of dexterous robots?”

- Swiss Federal Institute of Technology (ETH), Zürich, Switzerland. July 9th, 2009.
- “A short introduction to the study of complex neuromuscular systems”
Chemistry Seminar Series, East Los Angeles Community College, Los Angeles, CA, March 18th, 2009.
- 2008** “Brain-body interactions for hand dexterity: a clinical view”
Noon conference, Orthopedics Department, University of California at San Diego, San Diego, CA, December 8th, 2008.
- “Exploring the hand-brain system to develop clinically useful measures of hand function”
Grand Rounds, UCLA/Orthopaedic Hospital Center for Cerebral Palsy, University of California at Los Angeles, Los Angeles, CA, July 16th, 2008.
- “The challenge of dexterous robotic manipulation: Lessons learned from the human hand”
Defense Advanced Research Projects Agency (DARPA) NeuroRobotics Workshop, San Diego, CA, May 22nd, 2008.
- “Anatomical features of the hand enabling brain-body co-evolution for dexterous function”
Joint Science Department of The Claremont Colleges, Claremont, CA, April 6th, 2008.
- “Neuromechanics of dynamic manipulation in humans”
Mathematical Challenges in Developmental Biology 2008-2009. Workshop 4: Neuromechanics of Locomotion: Participants. Mathematical Biosciences Institute. The Ohio State University. April 3rd, 2008.
- 5th APS Workshop on Opportunities in Biological Physics
American Physical Society Meeting, New Orleans, LA, March 9, 2008.
- “Towards understanding dexterous manipulation in humans”
Mathematical Challenges in Developmental Biology 2008-2009. Workshop 3: Biomechanics and Neural Control - Muscle, Limb, and Brain. Mathematical Biosciences Institute. The Ohio State University. January 17th, 2008.
- 2007** "Bioengineering approaches to neurological problems." Department of Neurology & Neuroscience, Burke-Cornell Medical Research Institute, Weill Medical College of Cornell University. March 2, 2007.
- 2006** "Training digital precision movements." Control of Movement - Cellular bases of motor behavior. Course directors Professors Ole Kiehn and Sten Grillner. Department of Neuroscience, Karolinska Institute, Stockholm. November 3, 2006.
- "Is the human hand versatile because of, or in spite of, its anatomy." The School of Computer Science, Carnegie Mellon University, Pittsburgh, PA. September 29, 2006.
- "Inverse biomimetism: Understanding neuromuscular systems through the lens of engineering science." The Robotics Institute, Carnegie Mellon University, Pittsburgh, PA. March 29, 2006.
- "Integrative biomechanical and neurophysiological approach to understanding complex neuromuscular systems." Aerospace and Mechanical Engineering Department, University of Southern California, Los Angeles, CA. March 6, 2006.
- 2005** "Experimental, computational and theoretical advances in the study complex neuro-musculo-skeletal systems." Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany. December 7, 2005.
- "Cortical modulation of dynamic sensorimotor integration." Neuropediatric Research Unit, Karolinska Institut, Stockholm, Sweden. September 22, 2005.
- "Studies on sensorimotor integration during grasp." Max Planck Institute for Human Cognitive and Brain Sciences, Munich, Germany. September 12, 2005.
- "Experimental, computational and theoretical advances in the study complex neuro-musculo-skeletal systems." Concord Field Station, Harvard University. June 10, 2005.
- "Experimental, computational and theoretical advances in the study complex neuro-musculo-skeletal systems." Bioengineering Department, University of Southern California, Los Angeles, CA. March 21, 2005.

- “From lab to bedside: Clinical applications of basic research on the human hand.” Joint meeting of the Board of Trustees of Cornell University and the Board of Supervisors of Cornell Weill Medical College. January 20, 2005.
- 2004** “Applying engineering to solve biological and clinical problems.”
Department of Engineering, Swarthmore College. December 6, 2004.
- “Hybrid motion/force control in human fingers.”
Department of Integrative Physiology, University of Colorado at Boulder. July 15, 2004.
- “An integrative paradigm to study the neuromuscular biomechanics of the fingers and their clinical rehabilitation.”
Nemours Biomedical Research, Alfred I duPont Hospital for Children, Wilmington, DE. June 14, 2004.
- “An integrative approach to the neuromuscular biomechanics of the fingers.”
Department of Kinesiology, Penn State University. April 9, 2004.
- “An integrative approach to the neuromuscular biomechanics of the fingers.”
Bioengineering Department, University of Southern California, Los Angeles, CA. April 6, 2004.
- “An integrative approach to the impairment and rehabilitation of finger function.”
Department of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, CA. April 5, 2004.
- “Neuromuscular Biomechanics of the hand.”
Bioengineering Department, Universidad Iberoamericana, Mexico, D.F., Mexico. March 12, 2004.
- 2003** “An integrative paradigm to understand hand function and its clinical rehabilitation.”
Department of Woman and Child Health, Neuropediatrics Research Unit, The Karolinska Institute, Stockholm, Sweden. December 4, 2003.
- “Biomechanics in the 21st Century”
Keynote speaker. 2nd Mechantronics Symposium, Instituto Tecnológico de Estudios Superiores de Monterrey, Monterrey, Nuevo León, México, September 13.
- “Clinical quantification of hand function: An engineering challenge”
Grand Rounds, Orthopedics Department, University of California at San Diego, San Diego, CA, August 6.
- 2002** “Stochastic Modeling of Biomechanical Systems”
Department of Bioengineering, Arizona State University, Tempe, AZ, October 3.
- “Current State of Hand Models”
A.E. Mann Institute for Biomedical Engineering, University of Southern California, Los Angeles, CA, September 13-15.
- “Neuroanatomical Localization (Cortical) of a Neural System for Visual and Tactile Guidance of Dexterous Manipulation Tasks”
Sensorimotor Performance Program, The Rehabilitation Institute of Chicago, Chicago, IL, September 6
- “Neuroanatomical Localization (Cortical) of a Neural System for Visual and Tactile Guidance of Dexterous Manipulation Tasks”
Biomechanical Engineering Division, Mechanical Engineering Department, Stanford University, Stanford, CA, July 26
- 2001** “Neuromuscular Biomechanics of the Hand”
Neural Prosthesis Seminar Series, Cleveland FES Center, Case Western Reserve University, Cleveland, OH, October 11
- “Modeling of the Hand”
10th Anniversary Symposium of the National Center for Medical Rehabilitation Research, National Institutes of Health, Bethesda, MD March 8
- “Neuromuscular Biomechanics of the hand: Clinical Implications”
Institute for Human Performance, SUNY Syracuse
Syracuse, NY February 1.
- “Modeling of the Hand”
Hospital La Raza, Servicio de Mano Instituto Mexicano del Seguro Social México, DF, January 9.
- 2000** “Novel Surgical Procedures of the hand”
Grand Rounds
The CV Starr Hand Surgery Center
The St. Luke’s-Roosevelt Hospital Center
New York, NY, June 6.

- “Electromyography of the hand”
Hand Therapy Colloquium
Hand Therapy Clinic, The Hospital for
Special Surgery
New York, NY, May 12.
- “Biomechanics and motor control of human
digits”
Neurosciences Colloquium
Department of Neurology, University of
Rochester
Rochester, NY, May 5.
- “Applying principles of robotics to
understand the biomechanics,
neuromuscular control and clinical
rehabilitation of human digits”
Symposium on Dexterous Manipulation
International Conference on Robotics and
Automation
San Francisco, CA, April 25.
- “Biomechanics and motor control of human
digits”
Department of Biomedical Sciences
College of Veterinary Medicine
Cornell University, April 11
- “Biomechanics and motor control of human
digits”
Theoretical and Applied Mechanics
Colloquium
Cornell University, February 2
- 1999** “Biomechanics and motor control of human
digits”
Biomedical Engineering Seminar, ENGRG
501
Cornell University, November 18
- “Biomechanics and motor control of human
digits”
Biomedical Engineering Society
Cornell University, November 10
- “Biomechanics and motor control of human
digits”
Department of Neurobiology and Behavior
Cornell University, October 14.
- “Biomechanics and motor control of the
human hand”
Innovative Product Division of SRI
International, Inc.
Menlo Park, CA, July 27.
- “Biomechanics and motor control of the
human hand”
Therapiezentrum West Clinic (Therapy
Center West), Innsbruck, Austria, May 10.
- “Novel approaches in the restoration of hand
function”
Orthopedische Abteilung der
Universitätskliniken Innsbruck (Department
of Orthopedics of the University Clinics of
Innsbruck)
Innsbruck, Austria, May 3.
- “Novel approaches in the restoration of hand
function”
Department of Biomechanics and
Biomaterials, The Hospital for Special
Surgery. New York, New York, April 12.
- “Biomechanics and motor control of the
human hand”
Department of Mechanical and Aerospace
Engineering
Cornell University. Ithaca, New York,
March 4.
- “Biomechanics and motor control of the
human hand”
Department of Biomedical Engineering,
Northwestern University. Evanston, Illinois,
January 13.
- “Novel approaches in the restoration of hand
function”
Sensory Motor Performance Program of the
Rehabilitation Institute of Chicago,
Department of Physical Medicine and
Rehabilitation, Northwestern University
School of Medicine. Chicago, Illinois,
January 14.
- 1998** “High fingertip forces are produced by
subject-independent patterns of muscle
excitation”
Ergonomics Program, Mechanical
Engineering Department, University of
California at Berkeley. Richmond,
California, December 7.
- “Application of Robotics concepts to the
study of the human hand”
Dexterous Manipulation Laboratory, Design
Division of the Mechanical Engineering
Department, Stanford University. Stanford,
California, December 2.
- “Modification of the Zancolli Lasso tendon
transfer to improve post- operative fingertip
strength”
Orthopedic Surgery Grand Rounds.
Department of Functional Restoration,
Stanford University School of Medicine.
Stanford, California. February 3.

- 1997 “Muscle Coordination of the Human Index Finger”
Electrical Engineering and Computer Science Department, University of California at Berkeley. Berkeley, California, November 21st.

Patents

- 2017 Ravi Balasubramanian, Taymaz Homayouni , **Valero-Cuevas FJ**. Implanted Passive Engineering Mechanisms And Methods For Their Use And Manufacture. U.S. Patent Application No. 14/725,971 filed May 29, 2015, Approved November 15, 2017.
- 2012 Valero-Cuevas FJ, Alexander Reyes, Christianne Heck, and Charles Liu. Efficient functional mapping of human brain via sparse experimentation. US Provisional Patent filed October 19, 2012.
- 2003 **Valero-Cuevas FJ**. Finger force and grasping dexterity measuring device. US Patent No. 6,537, 075. Filed: December 12, 2000. Granted: March 27, 2003.
- 1999 **Valero-Cuevas FJ**, Sulzenbacher E, Hetzenauer S. Easily adjustable, reusable arch forming assembly for creating a framework for constructing arches and archways. European Union Patent No. 0808965. US Patent No. 6,000, 193. Filed: March 3, 1998. Granted: December 14, 1999.

Publications

Dissertations & Theses

PhD Dissertation (1997) *Muscle coordination of the human index finger*.
Mechanical Engineering Department, Biomechanical Engineering Division.
Stanford University

MS Eng Thesis (1991) *Non-invasive detection of carpal mechanics in wrist flexion under load*.
Mechanical Engineering Department.
Queen’s University

Books

[Fundamentals of Neuromechanics](#)

Valero-Cuevas, FJ.

Springer-Verlag London 2015

Series in Biosystems & Biorobotics Vol. 8, DOI 10.1007/ ISBN 978-1-4471-6747-1

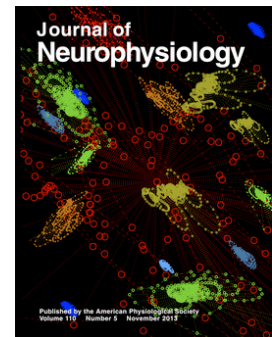
Peer-reviewed Journal Articles

To download PDFs and see all publications organized by topic, go to <http://valerolab.org/publications/>

1. Nagamori A, Laine CM, **Valero-Cuevas FJ**. Cardinal features of involuntary force variability can arise from the closed-loop control of viscoelastic afferented muscles, *PLoS Computational Biology*, 2018.
2. Jalaaliddini K, Nagamori A, Laine CM, Golkar MA, Kearney RE, **Valero-Cuevas FJ**. Physiological tremor increases when skeletal muscle is shortened: implications for fusimotor control. *The Journal of Physiology*, 2017.
3. Lawrence EI, Peppoloni L, **Valero-Cuevas FJ**. [Sex differences in leg dexterity are not present in elite athletes](#). *Journal of Biomechanics*, 2017. **By Invitation**. Winner of the 2016 American Society of Biomechanics Pre-Doctoral Young Scientist Award.
4. Laine CM and **Valero-Cuevas FJ**. [Intermuscular coherence reflects functional coordination](#). *Journal of Neurophysiology*, 2017.
5. **Valero-Cuevas FJ** and Santello M. [On Neuromechanical Approaches for the Study of Biological and Robotic Grasp and Manipulation](#). *Journal of Neuroengineering and Rehabilitation*, 2017. **By Invitation**.
6. Hagen, DA and **Valero-Cuevas FJ**. [Similar movements are associated with drastically different muscle contraction velocities](#). *Journal of Biomechanics*, 2017.
7. Von Walden F, Jalaaliddini K, Evertsson B, Friberg J, **Valero-Cuevas FJ**, Ponten E. [Forearm flexor muscles in children with cerebral palsy are weak, thin and stiff](#). *Frontiers in Computational Neuroscience*, 11, 2017.
8. Peppoloni L, Lawrence EL, Ruffaldi E, **Valero-Cuevas FJ**. [Characterization of the Disruption of Neural Control Strategies for Dynamic Fingertip Forces from Attractor Reconstruction](#). *PLoS ONE*, 12(2), 2017.
9. Reyes A, Laine CM, Kutch JJ, **Valero-Cuevas FJ**. [Beta Band Corticomuscular Drive Reflects Muscle Coordination Strategies](#). *Frontiers in Computational Neuroscience*, 11, 2017.
10. Niu CM, Jalaaliddini K, Sohn WJ, Rocamora J, Sanger TD, **Valero-Cuevas FJ**. [Neuromorphic meets Neuromechanics PART I: The Methodology and Implementation](#). *Journal of Neural Engineering*, Accepted 2017.
11. Jalaaliddini K, Niu CM, Chakravarthi Raja S, Sohn WJ, Loeb GE, Sanger TD, **Valero-Cuevas FJ**. [Neuromorphic meets Neuromechanics PART II: The Role of Fusimotor Drive](#). *Journal of Neural Engineering*, 2017.
12. Nagamori A, **Valero-Cuevas FJ**, Finley JM. [Unilateral Eccentric Contraction of the Plantarflexors Leads to Bilateral Alterations in Leg Dexterity](#). *Frontiers in Physiology*, 2016.
13. **Valero-Cuevas FJ**, Klamroth-Marganska V, Winstein CJ, Riener R. [Robot-assisted and conventional therapies produce distinct rehabilitative trends in stroke survivors](#) . *Journal of NeuroEngineering and Rehabilitation*, October 2016.
14. Laine CM, Nagamori A, **Valero-Cuevas FJ**. [The Dynamics of Voluntary Force Production in Afferented Muscle Influence Involuntary Tremor](#). *Frontiers in Computational Neuroscience*, Accepted 2016.

15. Brock O, Valero-Cuevas FJ. [Transferring synergies from neuroscience to robotics, Comment on "Hand synergies: Integration of robotics and neuroscience for understanding the control of biological and artificial hands" by M. Santello et al.](#) *Physics of Life Reviews*, 2016.
16. Babikian S, Valero-Cuevas FJ, and Kanso E. [Slow Movements of Bio-inspired Limbs.](#) *Journal of Nonlinear Science*, 2016.
17. Inouye, JM and Valero-Cuevas, FJ. [Muscle synergies heavily influence the neural control of arm endpoint stiffness and energy consumption.](#) *PLoS Computational Biology*. 2016.
18. Lawrence EL, Cesar GM, Bromfield M, Peterson R, Valero-Cuevas FJ, Sigward SM. [Strength, multi-joint coordination, and sensorimotor processing are independent contributors to overall balance ability.](#) *BioMed Research International, Special Issue "Motor Functional Evaluation from Physiology to Biomechanics to Clinical and Training Application,"* <http://dx.doi.org/10.1155/2015/561243>, 2015. By Invitation.
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Book Chapters

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2. Inouye JM, Kutch JJ, and **Valero-Cuevas FJ**. Optimizing the Topology of Tendon-Driven Fingers: Rationale, Predictions and Implementation in *The Human Hand: A Source of Inspiration for Robotic Hands*, Springer Tracts in Advanced Robotics (STAR) series, Eds Balasubramanian, R. and Santos, V.J., Eds., Springer, Heidelberg. 2014.
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Peer-reviewed Full-length Conference Papers

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3. **Valero-Cuevas FJ**, Cohn BA, Szedlák M, Fukuda K, Gärtner B. "Structure of the set of feasible neural commands for complex motor tasks." *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Milan, Italy, August 25-29, 2015*.
4. Lawrence EL, Fassola I, Dayanidhi S, Leclercq C, **Valero-Cuevas FJ**. "An evaluation of clustering techniques to classify dexterous manipulation of individuals with and without dysfunction." *6th International IEEE EMBS Conference on Neural Engineering*, pp. 1274-7, San Diego, CA, November 6-8, 2013.

5. Towles J, Hentz V, **Valero-Cuevas FJ**. "Capacity of Small Groups of Muscles to Accomplish Precision Grasping Tasks," 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society pp. 6583-6, Osaka, Japan, July 3-7, 2013.
6. Reyes A and **Valero-Cuevas FJ**. "Inexpensive, Wearable, Wireless, Multi-Channel and Multi-Sensor Data Acquisition System," IEEE EMBS Special Topic Conference on Point-of-Care Healthcare Technologies pp. 216-9, Bangalore, India, January 16-18, 2013.
7. Inouye JM and **Valero-Cuevas FJ**. "Asymmetric routings with fewer tendons can offer both flexible endpoint stiffness control and high force-production capabilities in robotic fingers," IEEE International Conference on Biomedical Robotics and Biomechatronics, Rome, Italy, June 24-27, 2012.
8. Theodorou E, Todorov E, and **Valero-Cuevas FJ**. [Neuromuscular stochastic optimal control of a tendon-driven index finger model.](#) *American Control Conference*, San Francisco, CA, June 29-July 1, 2011.
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10. Flynn S, Lange B, Rizzo A, Requejo P, **Valero-Cuevas FJ**, Baker L, Winstein C. "An overview of a USC Rehabilitation Engineering Research Center: The use of virtual reality for a range of motor impairments." Virtual Rehabilitation 2009. University of Haifa, Haifa, Israel, June 29 – July 2, 2009.
11. Li W and **Valero-Cuevas FJ**. Linear Quadratic Optimal Control of Contact Transition with Fingertip. American Controls Conference (ACC). Paper WeC11.1 Regular Session "Optimal Control III" (WeC11), Wednesday, June 10, 16:00–16:20, Mills Studio 3. American Control Conference June 10-12, 2009, St. Louis, Missouri, USA.
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Invited Symposia

1. **Valero-Cuevas FJ**. "A computational approach to the neuromechanical structure of feasible activations for complex tasks "Fifth Annual Winter Workshop on Neuromechanics and Dynamics of Locomotion Tulane University - New Orleans, Louisiana January 21 – 22, 2016
2. **Valero-Cuevas FJ**. "Neuromorphic meets Neuromechanics" The 2015 International Conference on Brain Informatics and Health Informatics for Human Brain, Behavior and Health. London, United Kingdom, August 30 2015.
3. **Valero-Cuevas FJ**. "Neuromechanics: how brain-body coevolution shaped the nervous system." *3rd DEMOVE Symposium on Translational Engineering for Neurorehabilitation*, Department of Neurorehabilitation Engineering, Universitätsmedizin Göttingen, Göttingen, Germany, October 24, 2014.
4. **Valero-Cuevas FJ**. "Reversing bio-inspired engineering: Applying engineering principles to understand neuroscience." *2014 Society for Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS) National Conference "Creativity, Vision, & Drive: Toward Full Representation in STEM,"* Los Angeles Convention Center, Los Angeles, CA, October 17, 2014.
5. **Valero-Cuevas FJ**. "Finger dexterity: Manipulating objects at the edge of instability." *International Symposium on Biomathematics and Ecology: Education and Research (BEER)*. The Claremont Colleges, Claremont, CA, October 11, 2014.
6. **Valero-Cuevas FJ**. "Is subject-specific modeling necessary? Probabilistic approaches can classify populations of models by functional features." *ASB Symposium on Subject- and patient-specific musculoskeletal modeling, 7th World Congress of Biomechanics*, Boston, MA, July 9, 2014.
7. **Valero-Cuevas FJ**. "If information is everywhere already, Why should people come to class?" *Special session on Innovations in Biomechanics Teaching, 7th World Congress of Biomechanics*, Boston, MA, July 9, 2014.
8. Fassola I*, Lawrence EL*, Dayanidhi S, Ko N, Leclercq C, **Valero-Cuevas FJ**. "Is osteoarthritis of the thumb a strictly orthopedic condition?" *Proceedings of the 1st International Thumb Osteoarthritis Workshop*, Newport, RI, October 25-26, 2013. *denotes equal contribution

9. Kutch JJ and **Valero-Cuevas FJ**. “Computational Hypothesis Testing for Neuromuscular Systems.” *32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Buenos Aires, Argentina, August 31-September 4 2010.
10. Kutch JJ, Kurse MU, Hentz VR, Lightdale N, Fassola I, **Valero-Cuevas FJ**. “Biomechanical and experimental confounds to the detection of neurally-generated muscle synergies.” *The Annual Meeting for the American Society of Biomechanics*, August 18-21, 2010, Providence, Rhode Island.
11. **Valero-Cuevas FJ**. “Manipulating the edge of stability: The thumb-finger spring compression paradigm” Workshop on Noise, Time Delay and Balance Control, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Alberta, Canada. November 8-13th, 2009.
12. Kurse M, Lipson H, and **Valero-Cuevas FJ**. “A fast simulator to model complex tendon-bone interactions: Application to the tendinous networks controlling the fingers.” Modeling Analyses of Human Movement Session, Thursday, June 18. ASME Summer Bioengineering Conference, Lake Tahoe, CA. June 17-21, 2009.
13. **Valero-Cuevas FJ**. “The neuromuscular system does ordinary manipulation tasks the ‘hard’ way: Lessons for robotic manipulators?” RSS 2009 Workshop on Understanding the Human Hand for Advancing Robotic Manipulation. Robotic Science and Systems Conference, June 28, Seattle, WA. 2009
14. **Valero-Cuevas FJ**. “The evolutionary quest for limb versatility lies at the core of many motor control riddles.” In Panel Session 5: The distributed control of movement: interactions between neural and musculoskeletal systems in the control of movement. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, Waikaloa, HI. April 30th, 2009.
15. **Valero-Cuevas FJ**. Reverse-engineering the human brain's ability to control the hand. National Science Foundation Conference on Emerging Frontiers in Research and Innovation (EFRI), Cognitive Optimization and Prediction: From Neural Systems to Neurotechnology (COPN) Program, March 5th, Washington, DC. 2009
16. Vollmer B, Holmström L, Forsman, L, Krumlinde-Sundholm L, **Valero-Cuevas FJ**, Forssberg H, Ullén F. “A new Principle for the Assessment of Dexterity in Children and Adolescents, February 6th, 2009. Genval, Belgium.
17. **Valero-Cuevas FJ**. “Why Haven’t We Made Better Artificial Hands?” 5th American Physical Society (APS) Workshop on Opportunities in Biological Physics. March 9th, 2008. New Orleans, Louisiana.
18. **Valero-Cuevas FJ**. “How tactile information is used to stabilize grasp in humans with and without neurological and biomechanical deficits.” Workshop No. 59: Give Haptics A Hand. 41st Annual Winter Conference on Brain Research. January 26–February 1, 2008. Snowbird, Utah. Page 75.
19. **Valero-Cuevas FJ**. Neuro-anatomical basis for dexterous manipulation in children. NICHD Taskforce on childhood motor disorders, National Institutes of Health, Bethesda Maryland. June 7-9, 2008.
20. **Valero-Cuevas, FJ**. Neuromechanical foundations of sensorimotor function. Mathematical Biosciences Institute Workshop 4 on Neuromechanics of Locomotion, The Ohio State University. Cleveland, Ohio. March 31-April 4, 2008.
21. **Valero-Cuevas, FJ**. Why haven’t we made better artificial hands? 5th Workshop on Opportunities in Biomological Physics. Annual Meeting of the American Physical Society. New Orleans, March 9, 2008.
22. **Valero-Cuevas, FJ**. Use of tactile information to stabilize grasp in humans with and without neurological and biomechanical deficits. In “Give Haptics a Hand” Symposium. 41st Annual Winter Conference on Brain Research, Jan. 30, 2008.

23. **Valero-Cuevas, FJ.** Towards understanding dexterous manipulation in humans. Mathematical Biosciences Institute Workshop 3 Muscle, Limb, Brain Workshop, The Ohio State University. Cleveland, Ohio, Jan. 14-18, 2008.
24. Backus S, Venkadesan M, Mandl LA, **Valero-Cuevas FJ.** Development of a clinically useful measure of dynamic pinch. NICHD Outcomes Measurement Meeting, National Institutes of Health. Rockville, Maryland. December 9, 2005.
25. **Valero-Cuevas FJ,** Lipson H, Santos VJ and Anand V. Shifting to population-based models and inferring model structure from data are two directions that will enhance the clinical usefulness of modeling. XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics, Cleveland, OH, ISB Technical Group: Simulation Symposium, August 1, 2005.
26. **Valero-Cuevas, FJ.** Identifying the functional mechanism by which biological hands meet the necessary and sufficient physical requirements for dexterous manipulation. Workshop on Humanoid Manipulation, in Robotics: Science and Systems Conference 2005. Massachusetts Institute of Technology, Cambridge, MA. June 11, 2005
27. Venkadesan M, **Valero-Cuevas FJ,** Guckenheimer JM. The Boundary of instability as a powerful experimental paradigm for understanding complex dynamical sensorimotor behavior: Dexterous manipulation as an example. In Advances in Computational Motor Control II. Symposium at the 33th Annual Meeting of the Society for Neuroscience. New Orleans, LA, 2003.

Peer-reviewed Conference Abstracts

1. Cohn BA, Jalaeddini K, **Valero-Cuevas FJ.** "Neuromechanical implications of postural changes to motor learning and performance." Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO. Aug 8-11, 2017.
2. Jalaeddini K, Nagamori A, Laine CM, Golkar MA, Kearney RE, **Valero-Cuevas FJ.** "Evidence That Tuning of Muscle Spindles Can Be Decoupled from Muscle Activation." Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO. Aug 8-11, 2017.
3. Marjaninejad A, Taherian B, Jalaeddini K, and **Valero-Cuevas FJ.** "Simple and Two-Element Hill-Type Muscle Models Cannot Replicate Realistic Muscle Stiffness." Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO. Aug 8-11, 2017.
4. Nagamori A, Laine CM, Jalaeddini K, **Valero-Cuevas FJ.** "Interactions between Tendon Stiffness and Spindle Afferent Feedback Determine the Magnitude of Involuntary Force Variability." Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO. Aug 8-11, 2017.
5. Laine CM, **Valero-Cuevas FJ.** "Specific Manual Tasks Transform EMG into a Probe for Neural Dysfunction in Parkinson's Disease." Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO. Aug 8-11, 2017.
6. Arnold S., Pun TK., Denisart TJ, **Valero-Cuevas FJ.** "Shapechanger: Environments for transfer learning." SoCal Robotic Symposium, Los Angeles, CA. April 14, 2017
7. Arnold S, Chu E, **Valero-Cuevas FJ.** "A Performance Comparison between TRPO and CEM for Deep Reinforcement Learning." Southern California Machine Learning Symposium, Pasadena CA, November 18, 2016.

8. Ko N, Laine CM, Fisher BE, **Valero-Cuevas FJ**. "Dynamic fingertip force variability in individuals with Parkinson's disease." Hand Rehabilitation Section, American Physical Therapy Association Combined Sections Meeting, Anaheim, CA, Feb 17-20, 2016.
9. Peppoloni L, Ruffaldi E, **Valero-Cuevas FJ**. "The strength dexterity test quantifies age-related differences in the sensorimotor control dynamics." International Symposium on the Neuromechanics of Human Movement, Heidelberg, DE, October 4-6, 2016.
10. Lawrence EL, Peppoloni L, **Valero-Cuevas FJ**. "Evidence that lower levels of leg dexterity may be a previously unrecognized risk factor for knee ligament injury in women." Proceedings of the 40th Annual Meeting of the American Society of Biomechanics, Raleigh NC, August 2-5, 2016.
11. Hagen DA, Caja S, Chakravarthi S, **Valero-Cuevas FJ**. "Kinetically Similar Basketball Free Throws Have Surprisingly Different Muscle Contraction Velocity Profiles." Proceedings of the 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, August 2-5, 2016.
12. Nagamori A, Laine CM, Jalaeddini K, **Valero-Cuevas FJ**. "A closed-loop neuromuscular simulation can provide insights into the origins and task-dependencies of force fluctuations." XXI Congress of the International Society for Electrophysiology and Kinesiology, Chicago, IL, July 5-8, 2016.
13. Laine CM and **Valero-Cuevas FJ**. "Investigating neural strategies for muscle coordination." XXI Congress of the International Society for Electrophysiology and Kinesiology, Chicago, IL, July 5-8, 2016.
14. Nagamori A, Lawrence EL, Finley JM, **Valero-Cuevas FJ**. "The ability to dynamically regulate instabilities with the leg is susceptible to repetitive eccentric contractions." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
15. Laine CM, Nagamori A, Shin JY, **Valero-Cuevas FJ**. "Task-Dependent Coherence Across Finger Muscles." Proceedings of the 46th Annual Meeting of the Society for Neuroscience, San Diego CA, November 12-16, 2016.
16. Nagamori A, Lawrence EL, Finley JM, **Valero-Cuevas FJ**. "The ability to dynamically regulate instabilities with the leg is susceptible to repetitive eccentric contractions." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
17. Ko N, Laine CM, Nagamori A, Hooyman A, Diconti A, Lerner J, Fisher BE, **Valero-Cuevas FJ**. "Distinctive control strategy of dynamic fingertip force in individuals with mild to moderate Parkinson's disease and its clinical implications." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
18. Cohn BA, Yngvason HF, **Valero-Cuevas FJ**. "Visualizing the structure of high dimensional feasible activation sets for static force production." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
19. Lawrence EL, Cesar GM, Bromfield M, Peterson R, Sigward SM, **Valero-Cuevas FJ**. "Outcome Measures for hand and leg function naturally reveal latent domains of strength, limb coordination, and sensorimotor processing." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.

20. Laine CM, Dosen S, Dideriksen J, **Valero-Cuevas FJ**, Farina D. "Modulation of tremor during isometric force tracking." Proceedings of the 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
21. Lawrence EL, Cesar GM, Bromfield M, Peterson R, Sigward SM, **Valero-Cuevas FJ**. "Sex differences in control strategies for both static and dynamic balance in young adults." Proceedings of the 25th Annual Conference of the Society for Neural control of Movement, Charleston, SC, April 21-24, 2015.
22. Jalaleddini K, Barradas V, Niu CM, Kearney RE, and **Valero-Cuevas FJ**. "Identification of dynamic stiffness: From the ankle to a neuromorphic joint." Proceedings of the 25th Annual Conference of the Society for Neural control of Movement, Charleston, SC, April 21-24, 2015.
23. Laine CM, Reyes A, Farina D, **Valero-Cuevas FJ**. "Stability-dependent modulation of neural drive to the thumb during precision grip." Proceedings of the 25th Annual Conference of the Society for Neural control of Movement, Charleston, SC, April 21-24, 2015.
24. Nagamori A, Lawrence EL, Finley JM, **Valero-Cuevas FJ**. "Eccentric contractions impede the ability of the leg to regulate dynamic instabilities." Proceedings of the 25th Annual Meeting of the Society for the Neural Control of Movement, Charleston SC, April 21-24, 2015.
25. Reyes A, Kutch JJ, **Valero-Cuevas FJ**. "Changes in corticomotoneuronal drive during stable and unstable object manipulation." Proceedings of the 25th Annual meeting of the Society for the Neural Control of Movement, Charleston, SC, April 20-25, 2015.
26. Ko N, Laine CM, Fisher BE, **Valero-Cuevas FJ**. "Distinctive motor control strategies in Parkinson's disease during an unstable object manipulation and its implications to clinical evaluation." Proceedings of the 25th Annual meeting of the Society for the Neural Control of Movement, Charleston, SC, April 20-24, 2015.
27. Babikian S, Kanso E, **Valero-Cuevas FJ**. "Quasi-static and smooth motions of tendon-driven limbs require non-smooth, highly posture-dependent, neural drive." Proceedings of the 25th Annual Meeting of the Society for the Neural Control of Movement, Charleston SC, April 21-24, 2015.
28. Cohn BA, **Valero-Cuevas FJ**. "Vectormap: Visualization of the feasible force space to observe neuromuscular coordination constraints." Proceedings of the 25th Annual Society for the Neural Control of Movement, Charleston, SC, April 20-24, 2015.
29. Lawrence EL, Werner I, Sigward SM, **Valero-Cuevas FJ**. "Sex differences in sensorimotor mechanisms for dynamic function of the upper and lower extremities." Proceedings of the Annual Meeting of the Organization for the Study of Sex Differences, Stanford CA, April 21-23, 2015.
30. Lawrence EL, Nagamori A, **Valero-Cuevas FJ**, Finley JM. "Prolonged immobilization and unloading leads to profound and long-lasting changes in spinal excitability." Proceedings of the 44th Annual Meeting of the Society for Neuroscience, Washington DC, November 15-19, 2014.
31. Rocamora J, Buchli J, **Valero-Cuevas FJ**. "Robustness of policy learning for optimal control of motion of tendon-driven systems." Proceedings of the 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.

32. Reyes A, Liu CY, Heck C, **Valero-Cuevas FJ**. "Context-sensitive Cortical Rhythms During Static and Dynamic Manipulation." Proceedings of the 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
33. Lawrence EL and **Valero-Cuevas FJ**. "Can the Force-Velocity Curve Predict Realistic Muscle Forces for High-Speed Athletic Movements?" Proceedings of the 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
34. Ko N, Lawrence EL, Fisher B, and **Valero-Cuevas FJ**. "While still able to manipulate unstable objects, individuals with Parkinson's disease exhibit distinct neural control strategies." Proceedings of the 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
35. Babikian S, Kanso E, **Valero-Cuevas FJ**. "Slow limb movements require precise muscle control." Proceedings of the 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
36. Miric-Lightdale N, Mueske NM, **Valero-Cuevas FJ**, Wren TAL. "Quantitative Assessment Of Fine Motor Control Of Fingertip Forces After Pollicization." Proceedings of the 15th EFORT Congress, London, England, June 4-6, 2014.
37. Miric-Lightdale N, Mueske NM, Berggren J, Loiseau J, **Valero-Cuevas FJ**, Dayanidhi S, Wren TAL. "Quantitative assessment of fine motor control of fingertip forces after pollicization." Proceedings of the Annual Meeting of the American Association for Hand Surgery, Kauai, HI, January 8-11, 2014.
38. Lawrence EL, Posch M, Melmer F, Dilitz S, Stern V, Werner I, **Valero-Cuevas FJ**. "Does long-term exposure to skiing enhance dynamical leg control in old age?" Proceedings of Translational and Computational Motor Control, San Diego, CA, November 8, 2013.
39. Niu CM*, Rocamora J*, **Valero-Cuevas FJ**~, Sanger T.~ "Assessing the role of neuromuscular components using a tendon-driven robotic plant controlled by neuromorphic hardware." Proceedings of Translational and Computational Motor Control, San Diego, CA, November 8, 2013. * denotes equal contribution, ~ denotes equal leadership
40. **Valero-Cuevas FJ** and Bumann R. "The evolution of fine muscle control for dexterous manipulation in humans is surprisingly incomplete. " Proceedings of Translational and Computational Motor Control, San Diego, CA, November 8, 2013.
41. Babikian S, Kutch JJ, Kanso E, **Valero-Cuevas FJ**. "Feasibility of limb postures and slow motions throughout the workspace with muscles as elastic actuators." Proceedings of the 6th International IEEE EMBS Conference on Neural Engineering, San Diego, CA, November 6-8, 2013.
42. Reyes A, Nayak KS, Loeb GE, Valero-Cuevas, FJ. "Structural MRI identifies precise location of intramuscular electrode recording site based on presence of micro-hematoma." Proceedings of the 6th International IEEE/EMBS Conference of Neural Engineering, San Diego, CA, November 6-8, 2013.
43. Niu CM, Rocamora JM, Sohn WJ, **Valero-Cuevas FJ**, Sanger TD. "Force-velocity property of muscle is critical for stabilizing a tendon-driven robotic joint controlled by neuromorphic hardware." Proceedings of the 6th International IEEE/EMBS Conference of Neural Engineering, San Diego, CA, November 6-8, 2013.

44. Rocamora JM, Niu CM, Sanger TD, **Valero-Cuevas FJ**. "Series Elastic Element Is Critical for Stabilizing a Tendon-Driven Robotic Joint Controlled by Physiologically Realistic Models." Proceedings of the 6th International IEEE/EMBS Conference of Neural Engineering, San Diego, CA, November 6-8, 2013.
45. Stern V*, Lawrence EL*, Hu W, Lyle M, Winstein C, Requejo P, and **Valero-Cuevas FJ**. "Reduced ability to stabilize ground contact with the leg may explain gait changes in aging," 65th Annual Gerontological Society of America Meeting, symposium presentation, San Diego, CA, November 11-14, 2012. *equal contribution
46. Sohn WJ, Niu CM, Nandyala SK, **Valero-Cuevas FJ**, and Sanger TD. "VLSI emulation of excessive involuntary cortical activity as a model of hypertonic dystonia," 2012 Annual Meeting of the Society for Neuroscience, New Orleans, LA, October 13-17, 2012.
47. Inouye JM and **Valero-Cuevas FJ**. "Asymmetric routings with fewer tendons can offer both flexible endpoint stiffness control and high force-production capabilities in robotic fingers," IEEE International Conference on Biomedical Robotics and Biomechanics, Rome, Italy, June 24-27, 2012.
48. Dayanidhi S, Hedberg Å, Forssberg H, and **Valero-Cuevas FJ**. "Small force dexterous manipulation reveal changes across the lifespan," Canadian Society of Biomechanics / Societe Canadienne de Biomechanique Conference (CSB/SBC), Burnaby, BC, June 6-9, 2012.
49. Kurse MU, Lipson H, and **Valero-Cuevas FJ**. "Inference of compact analytical functions describing tendon routing in the fingers," Canadian Society of Biomechanics / Societe Canadienne de Biomechanique Conference (CSB/SBC), Burnaby, BC, June 6-9, 2012.
50. Inouye JM and **Valero-Cuevas FJ**. "An optimized solution to the grasping problem: the human hand," Canadian Society of Biomechanics / Societe Canadienne de Biomechanique Conference (CSB/SBC), Burnaby, BC, June 6-9, 2012.
51. Reyes A and **Valero-Cuevas FJ**. "Design of a general purpose multi-channel wireless data acquisition system," Canadian Society of Biomechanics / Societe Canadienne de Biomechanique Conference (CSB/SBC), Burnaby, BC, June 6-9, 2012.
52. Ko N, Kurse M, and **Valero-Cuevas FJ**. "Musculoskeletal model of arm position for casting or splinting and muscle selection or botulinum toxin in individuals with cerebral palsy," Canadian Society of Biomechanics / Societe Canadienne de Biomechanique Conference (CSB/SBC), Burnaby, BC, June 6-9, 2012.
53. Inouye JM and **Valero-Cuevas FJ**. "A novel computational approach helps explain and reconcile conflicting experimental findings on the neural control of arm endpoint stiffness." Podium Presentation, 22nd Annual Society for the Neural Control of Movement Conference, Venice, Italy, April 21-28, 2012.
54. Dayanidhi S, Hedberg Å, **Valero-Cuevas FJ**, and Forssberg H. "Measurable improvements in dexterous manipulation throughout adolexcense reveal previously undetected functional effects of neuromaturation," 22nd Annual Society for the Neural Control of Movement Conference, Venice, Italy, April 21-28, 2012.
55. Lawrence E*, Stern V*, Lyle M, Winstein C, Requejo P, **Valero-Cuevas FJ**. "Lower Extremity Dynamic Control Declines with Aging," 22nd Annual Society for the Neural Control of Movement Conference, Venice, Italy, April 21-28, 2012. *equal contribution

56. Mark Lyle, Liang-Ching Tsai, **Valero-Cuevas FJ**, Robert Gregor, Christopher Powers. "Dynamic Coordination of Leg Musculature is Associated with Agility in High School Soccer Athletes" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
57. Reyes A, **Valero-Cuevas FJ**. "Wireless Multi-Channel Device to Capture Dynamics of Complex Sensorimotor Tasks" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
58. Kurse MU, Lipson H, **Valero-Cuevas FJ**. "A comprehensive Experimental Evaluation of Existing Models of the Extensor Mechanism Calls for Novel Data-Driven Models" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
59. S Dayanidhi, Å Hedberg, Isak Hägg, Novalie Lilja, Hans Forssberg, **Valero-Cuevas FJ**. "Dynamic control of fingertip forces: development in childhood and decline with aging" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
60. Rácz, K, **Valero-Cuevas FJ**. "Simulations of Optimal Reweighting of Muscle Coordination Reveal Important Benefits of Muscle Redundancy" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
61. Rácz, K*, Sindhurakar A*, Bradley NS, **Valero-Cuevas FJ**. "Prenatal Motor Development Affects Observed Motor Behavior for Different Incubation Periods in Domestic Chick" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011. *equal contribution
62. B Holt, A Reyes, **Valero-Cuevas FJ**. "A Prototype Video Game System for Studying Rehabilitative Learning" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
63. Joshua M Inouye, Jason J Kutch, **Valero-Cuevas FJ**. "Quantitative Prediction of Grasp Impairment Following Peripheral Neuropathies of the Hand" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
64. Joshua M Inouye, Jason J Kutch, **Valero-Cuevas FJ**. "A Novel Methodology to Compare Grasp Quality: Application to two Dominant Tendon-Driven Designs" 35th Annual American Society for Biomechanics Conference, Long Beach, CA, August 10-13, 2011.
65. Joshua M Inouye, Jason J Kutch, **Valero-Cuevas FJ**. "A Comprehensive Computational Framework to Evaluate Grasp Quality of Tendon-Driven Hands with Arbitrary Topology" Proceedings of the 21th Annual Meeting of the Society for the Neural Control of Movement, San Juan, Puerto Rico, April 26-May 1, 2011.
66. Rácz, K*, Sindhurakar A*, Bradley NS, **Valero-Cuevas FJ**. "Prenatal motor development for different incubation periods affects postural control but not early gait." Proceedings of the 21th Annual Meeting of the Society for the Neural Control of Movement, San Juan, Puerto Rico, April 26-May 1, 2011. *equal contribution
67. Rácz, K, **Valero-Cuevas FJ**. "A computational approach to quantifying muscle redundancy, and a sample application to guide the detection of strategies to mitigate fatigue." Proceedings of the 21th Annual Meeting of the Society for the Neural Control of Movement, San Juan, Puerto Rico, April 26-May 1, 2011.
68. E.A. Theodorou and Francisco J. Valero-Cuevas "Optimality in Neuromuscular Systems." In 32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2010, pp 4510 - 4516.

69. E.A. Theodorou, E. Todorov, and Francisco J. Valero-Cuevas. "A first optimal control solution for a complex, nonlinear, tendon driven neuromuscular finger model" Proceedings of the ASME 2010 Summer Bioengineering Conference August 30-September 2, 2010, Naples, Florida, USA.
70. Rácz, K, **Valero-Cuevas FJ**. "Motion and force are not controlled independently in multi-finger manipulation tasks." 40th Annual Meeting of the Society for Neuroscience, San Diego, CA, 2010.
71. Kutch JJ, Kurse MU, **Valero-Cuevas FJ**. "Muscle redundancy does not imply robustness to muscle dysfunction" 40th Annual Meeting of the Society for Neuroscience, San Diego CA, November 2010.
72. Kutch JJ, **Valero-Cuevas FJ**. "Obtaining complete solution sets for neuromuscular models", ASME 2010 Summer Bioengineering Conference, Naples, FL, June 2010.
73. E.A. Theodorou, Francisco J. Valero-Cuevas. "High Actuation Gains are necessary to control a fast finger-tapping motion optimally." Motor Control Session, Proceeding of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA. August 29th, 2009.
74. Dayanidhi S, Weisz J, Junker L, Hedberg Å, Forssberg H, **Valero-Cuevas FJ**. "Control of an unstable object with dynamic precision grip: Effect of friction." Poster Session II: Integrative Control of Movement. Proceedings of the Nineteenth Annual Meeting of Society for the Neural Control of Movement, p 116. Poster H-58, Waikoloa, HI, May 1st, 2009.
75. Dayanidhi S., Weisz J., Junker L., Hedberg Å., Forssberg H., Valero-Cuevas F.J. "A hand-held instrumented device to quantify dexterous manipulation for clinical use." Interactive Poster(PFRI16), Rehabilitation Society of North America (RESNA) Conference 2009. New Orleans, LA.
76. Dayanidhi S, Weisz J, Junker L, Hedberg Å, Forssberg H, **Valero-Cuevas FJ**. "Control of an unstable object with dynamic precision grip." APTA Section on Research Retreat 2009, Pacific Grove, California.
77. Kutch JJ, Kurse MU, Hoffmann H, Kuo AD, **Valero-Cuevas FJ**. "Muscle synergies may be artifacts of biomechanics rather than neural constraints, and are not necessary to simplify control", 39th Annual Meeting of the Society for Neuroscience, Chicago IL, October 2009.
78. Kutch JJ, **Valero-Cuevas FJ**. "All muscles are redundant, but some are less redundant than others", 19th Annual Meeting of the Society for the Neural Control of Movement, Waikoloa Beach, Hawaii, April 2009.
79. Kurse MU, Schmidt M, Lipson H, and **Valero-Cuevas FJ**. "Extracting appropriate mathematical expressions defining moment arm relationships using symbolic regression." Proceedings of the American Society of Mechanical Engineers 2010 Summer Bioengineering Conference, Naples, FL, June 18th, 2010. (finalist in the PhD Student Paper Competition).
80. Rácz, K, Inouye J, **Valero-Cuevas FJ**. "The spatio-temporal structure of force variability in static grasp suggests a continually active neural controller." Summer Bioengineering Conference of the American Society of Mechanical Engineers, Naples, FL, 2010.
81. Kurse MU, Kutch JJ, Hoffmann H, Fassola I, Lipson H, **Valero-Cuevas FJ**. "A strain-energy approach to simulating slow finger movements and changes due to loss of musculature." Proceedings of the Annual Meeting of the American Society of Biomechanics, State College, PA. August 27, 2009.

82. Kurse MU, Lipson H, and **Valero-Cuevas FJ**. "A fast simulator to model complex tendon-bone interactions: Application to the tendinous networks controlling the fingers." Proceedings of the American Society of Mechanical Engineers 2009 Summer Bioengineering Conference, Lake Tahoe, CA, June 18, 2009.
83. Rácz, K, **Valero-Cuevas FJ**. "Grip force fluctuations are more than just noise." Podium presentation, Annual Meeting of the American Society for Biomechanics, Penn State U, State College, PA, 2009.
84. Rácz, K and **Valero-Cuevas FJ**. The grip force dynamics of multi-finger static grasp reveals a control hierarchy.
85. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p 51. Poster B-73, Waikoloa, HI. April 29th, 2009.
86. Sherback M, **Valero-Cuevas FJ** and D'Andrea R. Prompt yet slower corrections are an optimal adaptation to increased noise in the elderly. Reinforcement Learning and Optimality Session, September 15. Computational principles of sensorimotor learning, September 13-15, Irsee, Germany, 2009.
87. **Valero-Cuevas FJ**. Computational principles for sensorimotor control of hand dexterity. Poster session. Computational principles of sensorimotor learning, September 13-15, Irsee, Germany, 2009.
88. Theodorou EA, **Valero-Cuevas FJ**. Optimality Principles in Controlling Contact Transitions with Finger. Poster Session II: Theoretical & Computational Motor Control. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p 127. Abstract I-77, Waikaloa, HI, May 1st, 2009.
89. Hoffmann H, Kutch J, Manish K, **Valero-Cuevas FJ**. Control of muscle strain energy as a robust means to produce slow and accurate finger movements: Proof of concept via hardware and cadaver implementation. Proceedings of the Nineteenth Annual Meeting of Society for the Neural Control of Movement, Abstract No. H57, Waikaloa, HI, May 1st, 2009.
90. Dayanidhi S, Weisz J, Junker L, Hedberg Å, Forssberg H, **Valero-Cuevas FJ**. Control of an unstable object with dynamic precision grip: Effect of friction. Poster Session II: Integrative Control of Movement. Proceedings of the Nineteenth Annual Meeting of Society for the Neural Control of Movement, p 116. Abstract H-58, Waikaloa, HI, May 1st, 2009.
91. Sherback M, **Valero-Cuevas FJ**, D'Andrea R. Age related slowing in a dynamic visuomotor task does not affect latency and is an optimal response to increased noise. Poster Session II: Theoretical & Computational Motor Control. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p 119. Abstract I-62, Waikaloa, HI. May 1st, 2009.
92. Kurse MU, Lipson H, **Valero-Cuevas FJ**. Computational method to study tendinous interactions across fingers. Poster Session II: Integrative Control of Movement. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p 117. Abstract H-59, Waikaloa, HI. May 1st, 2009.
93. Rácz K, **Valero-Cuevas FJ**. The dynamics of static grasp reveals a control hierarchy. Poster Session I: Fundamentals of Motor Control. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p 51. Abstract B-73, Waikoloa, HI. April 29th, 2009.
94. Kutch J and **Valero-Cuevas FJ**. All muscles are redundant, but some are less redundant than others. Poster Session I: Fundamentals of Motor Control. Proceedings of the Nineteenth Annual Meeting of the Society for the Neural Control of Movement, p. 52. Abstract B-74, Waikoloa, HI, April 29, 2009.
95. Kutch JJ, Kurse MU, Hoffmann H, Theodorou E, Hentz VR, Leclercq C, Fassola I, **Valero-Cuevas FJ**. Simple finger movements require complex coordination of excursions and forces across all muscles. Motor

- Control I session. Proceedings of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA. August 29th, 2009.
96. Theodorou E, Valero-Cuevas **FJ**. High Actuation Gains are necessary to control a fast finger-tapping motion optimally. Motor Control Session. Proceeding of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA. August 29th, 2009.
 97. Kurse MU, Valero-Cuevas **FJ**. A strain-energy approach to simulating slow finger movements and changes due to loss of musculature, Upper Extremity session, Proceedings of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA. August 29th, 2009.
 98. Kurse MU, Kutch JJ, Hoffmann H, Fassola I, Lipson H, Valero-Cuevas **FJ**. A strain-energy approach to simulating slow finger movements and changes due to loss of musculature, Upper Extremity session, Proceedings of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA. August 29th, 2009.
 99. Rác K, Valero-Cuevas **FJ**. Grip force fluctuations are more than just noise. Proceedings of the 32nd Annual Meeting of the American Society of Biomechanics, State College, PA, August 29th, 2009.
 100. Medina FA, Backus SL, Keenan KG, McNamara III RV, Song S, Price C, Venkadesan M, Valero-Cuevas **FJ**. The transition between muscle coordination patterns is context dependent. Motor Control I session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 101. Santos VJ, Bustamante C, Valero-Cuevas **FJ**. A data-driven Markov Chain Monte Carlo Metropolis-Hastings algorithm for a model of the human thumb. Hand session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 102. Saxena A, Lipson H, Valero-Cuevas **FJ**. Blind inference of tendon networks through minimal testing. Hand session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 103. Keenan KG, Valero-Cuevas **FJ**. Improving models of motor unit function is best done by refining their neural mechanisms. Motor units session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 104. Venkadesan M, Lau C, Wang Y, Mosier KM, Valero-Cuevas **FJ**. Cortical networks for controlling instabilities in dexterous manipulation. Motor Control II session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 105. Brown D, Valero-Cuevas **FJ**. Principal component analysis reveals control strategies in static grasp at multiple time scales. Manipulation session. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Stanford, CA. August 2, 2007.
 106. Rieffel J, Stuk RJ, Valero-Cuevas **FJ**, and Hod Lipson. Locomotion of a tensegrity robot via dynamically coupled modules. International Conference on Morphological Computation ICMC07. Presentation 27-2. Venice, Italy. March 27, 2007.
 107. Venkadesan, M, Guckenheimer J, Valero-Cuevas **FJ**. Dynamic multisensory integration at the boundary of instability is explained by a simple data-based model. Proceedings of the 30th Annual Meeting of the American Society of Biomechanics, Blacksburg, VA. September 6-9, 2006. Abstract no. 189. 2006.
 108. Medina FA, McNamara RV III, Backus SL, Venkadesan M, Santos VJ, Valero-Cuevas **FJ**. Muscle redundancy enables the transition between, and adjustments of, complex motor tasks. Proceedings of the Fifth

- World Congress of Biomechanics, Munich, Germany, July 29 –August 4, 2006. *Journal of Biomechanics* 2006; Vol. 39 Suppl. 1, page S33.
109. Brown D, **Valero-Cuevas FJ**. Task instability reduces maximum voluntary forces in dynamic multi-fingered grasp. Proceedings of the Fifth World Congress of Biomechanics, Munich, Germany, July 29 –August 4, 2006. *Journal of Biomechanics* 2006; Vol. 39 Suppl. 1, page S95.
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Other

Languages

English, Spanish, German (All fluent)