

EMPLOYMENT

- 2014 - present Robotacist Google - San Francisco, CA
Controls and dynamic modeling for low-level robotics platform.
- 2007 - 2008 Research Engineer Network Biosystems - Woburn, MA
Electromechanical designer of microfluidic systems for portable DNA sequencing machines.
- 2007 Co-founder/Sr Engineer SolidJoint Research, Inc. - Cambridge, MA
Founder of company and developer of a structural insulation material for buildings.
- 2006 - 2007 Research Scientist Massachusetts General Hospital - Boston, MA
Researcher of in-vivo cartilage contact kinematics in healthy and ligament injured knees.
- 2001 - 2004 Junior Engineer Walker Engineering - Pocatello ID
Designer of process control and plant design of industrial steam and refrigeration systems.
- 2000 - 2002 Lab Assistant Idaho State University - Pocatello, ID
Maintainer of small RISC server and lab/faculty computers.

EDUCATION

- 2008 - 2013 Ph.D. (BIOE) Georgia Institute of Technology - Atlanta, GA 4.0/4.0
- 2004 - 2006 M.S. (ME) Massachusetts Institute of Technology - Cambridge, MA 4.8/5.0
- 1999 - 2003 B.S. (ME) Idaho State University - Pocatello, ID 3.8/4.0

RESEARCH

- 2013 - 2104 Georgia Institute of Technology - Atlanta, GA - Adviser: K. Liu and J. Ueda
Configuration control of articulated robots for inertial guidance during free flight and simulation of human-robot interaction during cooperative tasks with force sharing.
- 2008 - 2013 Georgia Institute of Technology - Atlanta, GA - Adviser: L. Ting
The role of skeletal configuration in postural stability of human standing. Predictive modeling and experimental testing of human subjects' ability to adapt neural feedback to changes in stance width in order to maintain balance in the frontal-plane.
- Fall 2010 Ecole Polytechnique Fedarale - Lausanne - Lausanne, CH - Adviser: A. Ijspeert
Center-of-mass control of an articulated bipedal robot. Six-week visit to Switzerland where I implemented a biomimetic controller on a HOAP bipedal robot.
- 2004 - 2006 Massachusetts Institute of Technology - Cambridge, MA - Adviser: G. Li
Development of an automated matching algorithm for use with dual-orthogonal fluoroscopic imaging and human subject experiments to determine in vivo articular cartilage contact of healthy and ligament deficient knees.
- Fall 2003 Idaho State University - Pocatello, ID - Adviser: M. Schoen
Classification of electromyographic signals with system identification for determining hand-grip motion from forearm muscles.
- Summer 2003 University of Missouri-Rolla - Rolla, MO - Adviser: K. Krishnamurthy
Development of a micro assembly station for use with fabrication of micron sized machines.

AWARDS

- 2008 - 2012 Georgia Institute of Technology Presidential Fellowship
- 2008 - 2012 Woodruff School of Mechanical Engineering Fellowship
- December 2009 Teaching recognition for outstanding service (Intro to biomechanics)

February 2005 Philips ARM Design Contest – Distinctive Excellence (Inertial rolling robot)
 December 2003 Senior capstone project award for best project (Fluid brake dynamometer)
 2000 - 2003 ISU Dean's list and engineering departmental scholarship

TEACHING EXPERIENCE

June 2012 BMED 1300 – Problems in Biomedical Engineering, Guest Evaluator
 Guest evaluator on experiment design for postural balance in a problem based learning course.
 2010 - 2014 Undergraduate research mentor
 9/2006 - 5/2007 (C. Gross) Quantification of cartilage thickness in healthy knees.
 6/2010 - 12/2010 (Q. Fang) Development of a Wii Balance game for improving balance.
 8/2011 - 5/2013 (H. Bartlett) Calibration and validation of Wii Balance board; scaling of
 dynamic stability across inter-species animal morphology.
 6/2013 - 1/2014 (R. Haksar) Development of frictionless surface for studying planar falling.
 Fall 2009 BMED 3400 – Introduction to Biomechanics, Teaching assistant
 Responsible for fill-in lectures, recitations and grading homework. Helped write and grade exams.
 Spring/Fall 2001 ENGR 112 – Introduction to Computer Aided Drafting, Teaching assistant
 Responsible for fill-in lectures, developing homework, and grading homework and exams.

PUBLICATIONS

Patents (8 applied for)

Peer Reviewed Journal Articles (h-index: 8)

12. JT Bingham, LH Ting. The Effect of Stance Width on Standing Stability in the Frontal Plane, *Journal of Neurophysiology*, In preparation.
11. HL Bartlett, LH Ting, JT Bingham. Accuracy of Force and Center of Pressure Measures of the Wii Balance Board, *Gait and Posture*, 2013. 39(1): 224-8.
10. JT Bingham, LH Ting. Stability Radius as a Method for Comparing Dynamics of Neuromechanical Systems, *IEEE Trans. Neural Systems and Rehabilitation Engineering*, 2013. 21(5): 840-8.
9. NE Bunderson, JT Bingham, MH Sohn, LH Ting, and TJ Burkholder. Neuromechanic: A Computational Platform for Simulation and Analysis of the Neural Control of Movement, *International Journal for Numerical Methods in Biomedical Engineering*, 2012. 28(10): 1015-27.
8. JT Bingham, JT Choi, and LH Ting. Stability in a Frontal Plane Model of Balance Requires Coupled Changes to Postural Configuration and Neural Feedback Control, *Journal of Neurophysiology*, 2011. 106(1): 437-48.
7. SK Van De Velde, JT Bingham, TJ Gill, and G Li. Increased In-vivo Tibiofemoral Cartilage Contact Deformation in Anterior Cruciate Ligament-deficiency, *Journal of Bone & Joint Surgery*, 2009. 60(12): 3693-702.
6. LH Ting, KW van Antwerp, JE Scrivens, JL McKay, TD Welch, JT Bingham, and SP DeWeerth. Neuromechanical Tuning of Nonlinear Postural Control Dynamics, *Chaos*, 2009. 19(2).
5. SK Van De Velde, JT Bingham, TJ Gill, and G Li. Analysis of Tibiofemoral Cartilage Deformation in Posterior Cruciate Ligament-Deficient Patients, *Journal of Bone & Joint Surgery*, 2009. 91(1): 167-75.
4. JT Bingham, R Papannagari, SK Van De Velde, C Gross, TJ Gill, DT Felson, HE Rubash, and G Li. In-vivo Cartilage Contact Deformation in the Healthy Human Tibiofemoral Joint. *Rheumatology*, 2008. 47(11): 1622-27.

3. G Li, SK Van De Velde, and JT Bingham. Validation of a Non-invasive Imaging Technique for the Measurement of Dynamic Knee Joint Motion. *Journal of Biomechanics*, 2008. 41(7): 1616–22.
2. G Li, R Papannagari, M Li, JT Bingham, K Nha, D Allred, and TJ Gill. Effect of the Posterior Cruciate Ligament Deficiency on In-vivo Translation and Rotation of the Knee During Weightbearing Flexion. *American Journal of Sports Medicine*, 2008. 36(3): 474–79.
1. JT Bingham and G Li. An Optimized Image Matching Method for Determining In-Vivo TKA Kinematics with a Dual-orthogonal Fluoroscopic Imaging System. *Journal of Biomechanical Engineering*, 2006. 128(4). pp 588-95.

Popular Science

1. JT Bingham and LH Magnusson. *An Inertial Rolling Robot*, Circuit Cellar, 2007.

Conference Proceedings (* podium presentation)

22. *JT Bingham, J Lee, RN Haksar, J Ueda, and CK Liu. Orienting in Mid-air through Configuration Changes to Achieve a Rolling Landing for Reducing Impact after a Fall. *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2014.
21. *JT Bingham and LH Ting. Quantifying Sensitivity of Biomechanical and Neural Feedback Parameters to Stable Behavior with the Stability Radius Method. *Computer Methods in Biomechanics and Biomedical Engineering*, 2013.
20. NE Bunderson and JT Bingham. *Neuromechanic: A Computational Platform for Investigating Neural Control of Movement and Biomechanical Performance*. *Computer Methods in Biomechanics and Biomedical Engineering*, 2013.
19. *JT Bingham and LH Ting. Stability Radius as a Method to Identify Neural Feedback Parameters Necessary to Stabilize Changes in Biomechanics. *Biomechanical Engineering Society*, 2012.
18. JT Bingham and LH Ting. Stability Radius as a Method for Comparing the Dynamics of Neuromechanical Systems. *American Society of Biomechanics*, 2012.
17. HL Bartlett, JT Bingham and LH Ting. Validation and Calibration of the Wii Balance Board as an Inexpensive Force Plate. *American Society of Biomechanics*, 2012.
16. JT Bingham and LH Ting. Changes In Stance Width and Feedback Gain Can Compensate for Slowed Responses in a Frontal-Plane Delayed Feedback Model of Standing Balance: Implications for Aging. *Society for Neuroscience*, 2011.
15. JT Bingham, JT Choi and LH Ting. Is Wide Stance Stabilizing? Predictions of Postural Stability and Stepping Threshold from a Frontal-plane Delayed Feedback Model. *Society for Neuroscience*, 2010.
14. JT Choi, JT Bingham and LH Ting. Stability and Flexibility Trade-offs in Standing Balance Control at Different Stance Widths. *Society for Neuroscience*, 2010.
13. JT Bingham, JT Choi and LH Ting. A Feedback Model Predicts Changes in Postural Responses as Stance Width Increases. *Neural Control of Movement*, 2009.
12. SK Van De Velde, JT Bingham, TJ Gill and G Li. The Location and Magnitude of Cartilage Deformation in PCL Deficiency: an Injurious Jab and Cross Combo. *Orthopedic Res. Soc. Trans.*, 2009.
11. SK Van De Velde, JT Bingham, LE DeFrate, TJ Gill and G Li. The Analysis of Cartilage Deformation, Reconstruction of the ACL, and the Development of Osteoarthritis. *Orthopedic Res. Soc. Trans.*, 2009.
10. JT Bingham, SK Van De Velde, and G Li. In-vivo Tibiofemoral Cartilage Contact in PCL Deficient Subjects. *Orthopedic Res. Soc. Trans.*, 2008.

9. JT Bingham, SK Van De Velde, and G Li. Validation of a Non-invasive Imaging Technique for the Accurate Measurement of Dynamic Knee Joint Motion. Orthopedic Res. Soc. Trans., 2008.
8. A Hosseini, R Papannagari, JT Bingham, TJ Gill, and G Li. 6 DOF Kinematics of Human Knee Joint in Response to Full Body Weight. Orthopedic Res. Soc. Trans., 2008.
7. A Hosseini, R Papannagari, JT Bingham, TJ Gill, and G Li. In-vivo ACL Deformation in Response to Axial Tibial Loads. Orthopedic Res. Soc. Trans., 2008.
6. *JT Bingham, C Gross, R Papannagari, TJ Gill, and G Li. In-vivo Tibio-femoral Cartilage Contact Strain in Healthy Individuals. Orthopedic Res. Soc. Trans., 2007.
5. JT Bingham, C Gross, R Papannagari, HE Rubash, and G Li. Thicker Cartilage Observed in Regions of Articular Contact in the In-vivo Knee. Orthopedic Res. Soc. Trans., 2007.
4. A Hosseini, R Papannagari, JT Bingham, TJ Gill, and G Li. In-vivo Load-Elongation Relationship of the Anterior Cruciate Ligament. Orthopedic Res. Soc. Trans., 2007.
3. JT Bingham, HE Rubash, and G Li. Orthogonal Segmentation of NMR Images for Precision Models of Knee Cartilage. Orthopedic Res. Soc. Trans., 2006.
2. JT Bingham, HE Rubash, and G Li. Automated Matching Algorithm for Recreating In-Vivo TKA Kinematics Using A Dual Orthogonal Fluoroscopic System. Orthopedic Res. Soc. Trans., 2006.
1. *JT Bingham and MP Schoen. Characterization of Myoelectric Signals Using System Identification Techniques. ASME IMECE, 2004.

INVITED TALKS

- Mar. 2015 Podcast: How Robocats Land on Their Feet. The American Physical Society, <http://physicsbuzz.physicscentral.com/2015/03/podcast-how-robocats-land-on-their-feet.html>
- Mar. 2013 Robust movement requires the interaction of neural control and biomechanical structure: The neuromechanics of postural balance control. Department of Mechanical Science and Engineering, Univ. of Illinois, Urbana-Champaign.
- Oct. 2012 Requirements of neural control to maintain stable balance as stance width changes. InSciTech, Atlanta, GA.

GRANT WRITING

- 2012 Partnered Rehabilitative Movement: Cooperative Human-Robot Interactions for Motor Assistance, Learning, and Communication. Contributor. NSF EFRI-M3C. Awarded.
- 2007 Insulative Composite Wood Framing Members. Co-PI. USDA SBIR.
- 2007 In-vivo ACL Reconstruction Biomechanics. Contributor. NIH NIAMS R01AR055612. Awarded.
- 2002 System Identification of Myoelectric Signals. Sole author. ISU Undergrad Research Fund. Awarded.

SERVICE

- 2013 - 2014 Taught small “makers” class to teach software programmers how to design and build small robotic systems.
- 2010 - 2014 Rebuilt 64-node parallel computing cluster to run Matlab; maintain and support new users.

- 2008 - 2014 Machine shop facilitator; train students on proper use of band-saw, drill-press, lathe and CNC mill.
- January 2011 Developed an inexpensive, portable EMG amplifier, instrumented tendon hammer, and custom data collection software as teaching aid for Emory-Tibet Science Initiative.
- Fall 2008 Demoed motor illusions at GT BBUGS educational.

SKILLS

Programming: C/C++, C#, Java, Fortran, Python, Matlab Solid modeling: SolidWorks, Pro/E, Inventor, Rhinoceros, Mastercam Metal working: Manual/CNC mill and lathe Electronics: soldering, discrete components, microprocessors