

# Adam Eric Leeper

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## EXPERIENCE

**Software Engineer** - Google, Inc. Mountain View, CA **Sept. '14 - present**  
• Project Tango: Develop algorithms and applications for Visual- Inertial SLAM and sparse mapping.

**Senior Systems Engineer** - hiDOF, Inc., South San Francisco, CA **July '13 - Sept. '14**  
• Key software developer for major client. C++ system design, algorithm development, and build-system support.  
• Projects in wheeled vehicle motion planning, visual inertial navigation, and visual monocular SLAM.

**Research Intern** - Willow Garage, Inc., Menlo Park, CA **Sept. '10 - June '13**  
• Developed novel optimization-based controller and user interfaces for assisted collision-free teleoperation.  
• Conducted user experiments and authored papers published in major robotics conferences. robot teleoperation.

**Graduate Researcher** - Salisbury Robotics Lab, Stanford, CA **Aug. '08 - June '13**  
• Developed new algorithms for haptic rendering and robot control (in collaboration with Willow Garage).  
• Implemented miniature stereo camera sensor for a robot gripper (PCB design, mechanical hardware prototyping).

**Electrical Engineering Intern** - Qual-Tron, Inc., Tulsa, OK **March '06 - Feb. '07**  
• Designed and implemented test procedures for IR and magnetic sensor products.  
• Led redesign of a magnetic sensor product to reduce cost and simplify assembly.

### Consulting:

**Motion Genesis, LLC** - Developed web-based visualization software for multi-body systems. **Spring '11 - Fall '13**

**Applied Materials, Inc.** - Subcontracting consultant for robot motion visualization. **Fall '12**

**Charm Labs** - Dynamics and control. Confidential. **Summer '12**

## SKILLS

**Applied Math** - Expert in dynamics, kinematics, and 3D geometry as applied to robotics, simulation, and graphics.

**Software Languages** - C++ (6 years) in large, complex projects featuring multi-threaded, event-driven, and multi-process designs, with a focus on quality and maintainability. Proficient in Python, Javascript, and MATLAB.

**Software Tools** - Expert knowledge of ROS. Experience with Eigen, OpenMP, MoveIt!, PCL, OpenCV, OpenGL, Qt. Development in Ubuntu Linux (expert) and Windows (proficient) using version control (git, svn) and issue tracking.

**Electronics** - Circuit design/debugging, prototype PCB layout/fabrication, embedded systems.

**Hardware** - General machine shop rapid-prototyping skills, and proficient in CAD tools (Solidworks).

**Languages** - English (native), Spanish (fluent), French (proficient).

**Other** - Private pilot, recording engineer, bassist.

## EDUCATION

**Ph.D.** Mechanical Engineering under Professor Ken Salisbury, Stanford University, 3.94 GPA **June '13**

**Thesis:** Robot Telemanipulation in Unstructured Environments: Sensors, Algorithms, Interfaces.

**M.S.** Mechanical Engineering, Stanford University, 3.97 GPA **March '09**

**B.S.** Engineering Physics, The University of Tulsa, 3.99 GPA **May '07**

## TEACHING

**Instructor:** ENGR 105 Controls, Stanford University, 72 students. **Winter 2015**

**Instructor:** ENGR 14 Statics, Stanford University, 77 students. **Spring 2014**

**Instructor:** ME 101 Dynamics, San Jose State University, 35 students. **Fall 2013**

**Instructor:** ME 101 Dynamics, San Jose State University, 49 students. **Fall 2012**

**Instructor:** ME 101 Dynamics, San Jose State University, 56 students. **Fall 2011**

**Instructor:** Programming and Robotics, EPGY Summer Institutes at Stanford. **Summer 2010**

Course Assistant: ME 331b - Dynamics and Control with Paul Mitiguy. **Spring 2012**

Course Assistant: CS 277 - Experimental Haptics with Ken Salisbury. **Winter 2011**

Course Assistant: CS 223a - Robotics with Oussama Khatib. **Winter 2010**

Course Assistant: ENGR 15 - Dynamics with Paul Mitiguy. **Fall 2009**

## PUBLICATIONS

**A. Leeper**, K. Hsiao, M. Ciocarlie, I. Sukan, and K. Salisbury. Methods for Collision-Free Arm Teleoperation in Clutter Using Constraints from 3D Sensor Data. 2013 International Conference on Humanoid Robots. October, 2013. Atlanta, Georgia.

**A. Leeper**, K. Hsiao, M. Ciocarlie, I. Sukan, K. Salisbury. Assisted Arm Teleoperation in Clutter Using Constraints from 3D Sensor Data. In 2nd Workshop on Robots in Clutter: Preparing robots for the real world (in conjunction with RSS). June 2013, Berlin, Germany.

Chen, Tiffany., Ciocarlie, Matei., Cousins, Steve., Grice, Phillip M., Hawkins, Kelsey., Hsiao, Kaijen., Kemp, Charlie., King, ChihHung., Lazewatsky, Daniel., **Leeper, Adam Eric.**, Nguyen, Hai., Paepcke, Andreas., Pantofaru, Caroline., Smart, William., and Takayama, Leila. Robots for humanity: using assistive robotics to empower people with disabilities. IEEE Robotics and Automation Magazine special issue on Assistive Robotics. Volume 20, Issue 1, 2013.

A. Pratkanis, **A. Leeper**, K. Salisbury. Replacing the Office Intern: An Autonomous Coffee Run with a Mobile Manipulator. ICRA, May 2013, Karlsruhe, Germany.

M. Ciocarlie, K. Hsiao, **A. Leeper**, D. Gossow. Mobile Manipulation Through an Assistive Home Robot. IROS, October 2012, Algarve, Portugal.

**A. Leeper**, S. Chan, and K. Salisbury. Point Clouds Can Be Represented as Implicit Surfaces for Constraint-Based Haptic Rendering. ICRA, May 2012, St. Paul, MN.

**A. Leeper**, S. Chan, K. Hsiao, M. Ciocarlie, K. Salisbury. Constraint-based Haptic Rendering for Teleoperated Robot Grasping. IEEE Haptics Symposium, March 2012, Vancouver, Canada.

**A. Leeper**, K. Hsiao, M. Ciocarlie, L. Takayama, D. Gossow. Strategies for Human-in-the-Loop Robotic Grasping. HRI, March 2012, Boston, MA.

R. Brewer, **A. Leeper**, K. Salisbury. A Friction Differential and Cable Transmission Design for a 3-DOF Haptic Device with Spherical Kinematics. IROS, Sept. 2011, San Francisco, CA.

D. Gossow, **A. Leeper**, D. Hershberger, M. Ciocarlie. Interactive Markers: 3-D User Interfaces for ROS Applications [ROS Topics]. IEEE Robotics and Automation Magazine, December 2011.

**A. Leeper**, S. Chan, and K. Salisbury. Constraint-based 3-DOF Haptic Rendering of Arbitrary Point Cloud Data. RSS Workshop on RGB-D Cameras, June 2011, Los Angeles, CA.

**A. Leeper**, K. Hsiao, E. Chu, and K. Salisbury. Using Near-Field Stereo Vision for Robotic Grasping in Cluttered Environments. ISER, Dec. 2010, Delhi, India.

Caruso, John F; Hari, P; **Leeper, Adam E**; Coday, Michael A; Monda, Julie K; Ramey, Elizabeth S; Hastings, Lori P; Golden, Mallory R; Davison, Steve W. Impact of Acceleration on Blood Lactate Values Derived From High-Speed Resistance Exercise. Journal of Strength & Conditioning Research. 23(7):2009-2014, October 2009.

Caruso J.F., Hari P., Coday M.A., **Leeper A.**, Ramey E.S., Monda J.K., Hastings L.P., and Davison S. (2008). Performance evaluation of a high-speed inertial exercise trainer. The Journal of Strength & Conditioning Research. 22(6): 1760-1768.

**A. Leeper**, M. Coday, P. Hari, J. Caruso. Instrumentation of a High-Speed Inertial Exercise Device Using Load Cell Transducers. Proceedings of 53rd International Instrumentation Symposium, April 2007, Tulsa, OK.

## PRESENTATIONS

### Invited Talks:

“Telemanipulation using PCL.” PCL Tutorial at Robotics: Science and Systems 2011. Los Angeles, CA. July 2011.

“Instrumentation of a High-Speed Inertial Exercise Device Using Load Cell Transducers.” ISA EXPO 2007. Houston, TX. October 2007.

### Conference Presentations:

“Assisted Arm Teleoperation in Clutter Using Constraints from 3D Sensor Data.” 2nd Workshop on Robots in Clutter: Preparing Robots for the Real World (in conjunction with RSS). Berlin, Germany. June 2013.

“Point Clouds Can Be Represented as Implicit Surfaces for Constraint-Based Haptic Rendering.” International Conference on Robotics and Automation. St. Paul, MN. May 2012.

“Constraint-based Haptic Rendering for Teleoperated Robot Grasping.” IEEE Haptics Symposium. Vancouver, Canada. March 2012.

“Constraint-based 3-DOF Haptic Rendering of Arbitrary Point Cloud Data.” RGB-D: Advanced Reasoning with Depth

Cameras (workshop in conjunction with RSS). Los Angeles, CA. June 2011.

“Using Near-Field Stereo Vision for Robotic Grasping in Cluttered Environments.” International Symposium on Experimental Robotics. New Delhi, India. December 2010.

“Instrumentation of a High-Speed Inertial Exercise Device Using Load Cell Transducers.” 53rd International Instrumentation Symposium. Tulsa, OK. April 2007.

#### **OPEN SOURCE SOFTWARE ([github.com/aleeper](https://github.com/aleeper))**

MGView - Javascript web app for visualizing rigid body simulations. Author and maintainer.

ROS - Contributor and maintainer of packages in the visualization and device driver stacks.

MoveIt! - Contributor to the user interaction and visualization tools within MoveIt!

three.js - Contributed STL parser module to enable importing of CAD parts (e.g. from SolidWorks).

#### **AWARDS**

2007-2012 National Science Foundation Graduate Research Fellowship

2007 Stanford Graduate Fellowship

2007 John McCamey Award presented by ISA

Member, Tau Beta Pi Engineering Honor Society

Member, Sigma Pi Sigma Physics Honor Society

Member, Phi Kappa Phi Honor Society

Member, Mortar Board National College Senior Honor Society

#### **REFERENCES**

Dr. Kenneth Salisbury, Professor (Research) of Computer Science, 650.465.5700, [jks@robotics.stanford.edu](mailto:jks@robotics.stanford.edu)

Dr. Paul Mitiguy, Motion Genesis LLC and Stanford University Lecturer, 650.346.9595, [mitiguy@stanford.edu](mailto:mitiguy@stanford.edu)

Dr. Kaijen Hsiao, Bosch Research and Technology Center, 617.304.1759, [kaijenhsiao@gmail.com](mailto:kaijenhsiao@gmail.com)