

Adam Eric Leeper

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EXPERIENCE

Google, Mountain View, CA - Engineering Manager 2018 - present

- Led the team for C++/Java API design, system architecture, and sensor management in ARCore.
- Managed hiring for my team and grew the team from 5 to 12 engineers.

Google, Mountain View, CA - Software Engineer 2014 - 2018

- Developed algorithms and applications for visual-inertial SLAM and sparse mapping in Project Tango.

hiDOF, South San Francisco, CA - Senior Systems Engineer 2013 - 2014

- Developed algorithms in C++ for visual monocular SLAM and wheeled vehicle motion planning.

Willow Garage, Menlo Park, CA - Research Intern 2010 - 2013

- Developed novel optimization-based controller and user interfaces for assisted collision-free teleoperation.
- Conducted user experiments and authored papers published in major robotics conferences.

Salisbury Robotics Lab, Stanford, CA - Graduate Researcher 2008 - 2013

- Developed new algorithms for haptic rendering and robot control.
- Implemented miniature stereo camera for robot gripper.

Electrical Engineering Intern - Qual-Tron, Inc., Tulsa, OK 2006 - 2007

- 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. 2011 - 2013

Applied Materials, Inc. - Subcontracting consultant for robot motion visualization. 2012

Charm Labs - Dynamics and control. Confidential. 2012

SKILLS

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

Software Languages - C++ (10 years) and Android Java (4 years) in large codebases featuring multi-threaded, event-driven, and multi-process designs, with a focus on 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, Stanford University, 3.94 GPA 2013

Thesis Advisor: Dr. J. Kenneth Salisbury

M.S. Mechanical Engineering, Stanford University, 3.97 GPA 2009

B.S. Engineering Physics, The University of Tulsa, 3.99 GPA 2007

TEACHING

Instructor: ENGR 105 Controls, Stanford University, 72 students. Winter 2016

Instructor: ENGR 105 Controls, Stanford University, 70 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.
Course Assistant: CS 277 - Experimental Haptics with Ken Salisbury.
Course Assistant: CS 223a - Robotics with Oussama Khatib.
Course Assistant: ENGR 15 - Dynamics with Paul Mitiguy.

Spring 2012
Winter 2011
Winter 2010
Fall 2009

PUBLICATIONS

A. Leeper, K. Hsiao, M. Ciocarlie, I. Sucas, 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. Sucas, 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)

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

Available on request.