Ariel S. Anders h

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Education

Massachusetts Institute of Technology · Cambridge, MA

Ph.D., Electrical Engineering and Computer Science · Fall 2014 - present

Advisors: Prof. Leslie Kaelbling and Prof. Tomás Lozano Pérez.

Passed the Technical and Research Qualifying Examinations.

Completed minor: Mechanical Engineering/Aeronautics and Astronautics (courses in controls and autonomous vehicles)

S.M., Electrical Engineering and Computer Science· Fall 2012 - Spring 2014

Advisors: Prof. Leslie Kaelbling and Prof. Tomás Lozano Pérez.

Thesis: "Learning a Strategy for Whole Arm Grasping"

GPA: 4.9/5.0

Relevant Coursework

6.867: Machine Learning	6.831: User Interface Design and Implementation
6.375: Design of Complex Digital Systems	6.852: Distributed Algorithms
16.31: Feedback and Control Systems	2.166 Autonomous Vehicles
6.811 Principles and Practices of Assistive Technology	

University of California, Santa Cruz · Santa Cruz, CA

B. S., Computer Engineering· Fall 2008 - Spring 2012

University of California Regent Scholar

University Honors: *Summa Cum Laude*, Department Honors: Highest Honors in the major

GPA: 3.96/4.00

Senior Design Capstone Project
Team project to improve the performance of arithmetic functions for Oracle numbers within the Oracle Database; this software development project was completely done in C on x86 and ARM processors using code profilers to find performance bottle necks and applying vectorized hardware instructions (SSE) and different number representations to achieve speedup.

Relevant Coursework

CMPE 215: Models of Robotic Manipulation	CMPE 118: Introduction to Mechatronics
CMPE 121: Microprocessor System Design	CMPE 110: Computer Architecture
CMPE 100: Logic Design	EE 101: Electornic Circuits
AMS 114: Introduction to Dynamical Systems	EE 103: Signals and Systems
EE 154: Feedback Control Systems	CMPS 101: Algorithms and Abstract Data Types

Journal Publications

[1] C. Amato, G. Konidaris, A. Anders, G. Cruz, J. P. How, and L. P. Kaelbling, "Policy search for multi-robot coordination under uncertainty," *The International Journal of Robotics Research*, vol. 35, no. 14, pp. 1760–1778, 2017. [Online]. Available: http://lis.csail.mit.edu/pubs/amato-ijrr17.pdf

[2] D. J. Preston, A. Anders, B. Barabadi, E. Tio, Y. Zhu, D. A. Dai, and E. N. Wang, "Electrowetting-on-dielectric actuation of a vertical translation and angular manipulation stage," *Applied Physics Letters*, vol. 109, no. 24, p. 244102, 2016. [Online]. Available: http://aip.scitation.org/doi/abs/10.1063/1.4971777

Conference Publications

[1] C. Amato, G. Konidaris, A. Anders, G. Cruz, J. How, and L. Kaelbling, "Policy search for multi-robot coordination under uncertainty," in *Robotics: Science and Systems XI (RSS)*, 2015. [Online]. Available: http://lis.csail.mit.edu/pubs/amato-konidaris-rss15.pdf

[2] A. Anders and S. Karaman, "Visual servoing," in *EAAI-17: The 7th Symposium on Educational Advances in Artificial Intelligence*, 2017. [Online]. Available: http://modelai.gettysburg.edu/2017/visual-servo/index.html

[3] A. S. Anders and J. Rosen, "Dynamic registration for dental robotics," in *National Society of Black Engineers Technical Proceedings*, vol. 38, 2012.

[4] D. J. Preston, A. Anders, B. Barabadi, E. Tio, Y. Zhu, D. A. Dai, and E. N. Wang, "Electrowetting-on-dielectric actuation of a spatial and angular manipulation mems stage," in *The 30th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2017)*, 2017. [Online]. Available: http://lis.csail.mit.edu/pubs/preston-mems17.pdf

[5] A. S. Anders, "Learning a strategy for whole-arm grasping," Master's thesis, Massachusetts Institute of Technology, 2014. [Online]. Available: http://lis.csail.mit.edu/pubs/anders-14.pdf

[6] S. Karaman, A. Anders, M. Boulet, J. Connor, K. Gregson, W. J. Guerra, O. Guldner, M. Mohamoud, B. Plancher, R. Shin, and J. Vivilecchia, "Project-based, collaborative, algorithmic robotics for high school students: Programming self-driving race cars at MIT," in *2017 IEEE Integrated STEM Education Conference (ISEC) (ISEC'17)*, Princeton, USA, Mar. 2017. [Online]. Available: http://lis.csail.mit.edu/pubs/anders-isec-17.pdf

Professional Experience

Lead Technology Developer, Lab Energy Assessment Center (LEAC)   Massachusetts Institute of Technology · Cambridge, MA · January 2017- Present

LEAC provides low cost and minimally invasive tools to detect and analyze energy inefficiencies. I develop scalable software for wireless power monitoring for tools. All software is available open source at `https://github.com/leac-mit`.

See `https://leac.mit.edu` for more information

Software Engineering Intern, Intel   Santa Clara, CA · Summer 2014

Responsibilities included designing, writing, testing, and documenting design automation software that uses machine learning techniques to determine proper and efficient simulation points. These simulation points are used during architecture analysis of future Intel Architecture based products and platforms.

Research Experience

Graduate Research Assistant, CSAIL   Massachusetts Institute of Technology · Cambridge, MA · Summer 2012 - Present

Research focus: planning, reinforcement learning and robotic manipulation

Undergraduate Research, Bionics Lab   University of California, Santa Cruz · Santa Cruz, CA · Summer 2010 - Spring 2012

Advisor: Jacob Rosen

Research focus: CAD/CAM applications in dentistry, autonomous control with mechanical systems, and UI development for robotic programs.

Developed a workflow to execute dental crowning and implant placement procedures on static dental models that I verified experimentally. Worked on a system to implement dynamic dental procedures.

Teaching Experience

6.141 Robotics: Science and Systems I   Massachusetts Institute of Technology · Spring 2017

Course Description: Presents concepts, principles, and algorithms for sensing and computation related to the physical world. Topics include motion planning, geometric reasoning, kinematics and dynamics, state estimation, tracking, map building, manipulation, human-robot interaction, fault diagnosis, and embedded system development. Students specify and design a small-scale yet complex robot capable of real-time interaction with the natural world.

Beaverworks Summer Institute Lead Associate Instructor   · Summer 2016

The Massachusetts Institute of Technology (MIT) Beaver Works (BW) Summer Institute is a 4-week residential STEM-based program for talented rising high school seniors (entering the 12th grade). This years exciting project is the MIT Mini Grand Prix Challenge, a hands-on, intensive 4-week program that will focus on demonstrating fast, autonomous navigation of small racecars in a complex environment. As lead associate instructor I lead a team of 6 associate instructors during the lab portions of the course. Additionally, I assisted in creating lab curriculum throughout the course and lead the material creation for the computer vision session of the course. See racecar.mit.edu for more details.

6.141 Robotics: Science and Systems I   Massachusetts Institute of Technology · Spring 2016

Course Description: Presents concepts, principles, and algorithms for sensing and computation related to the physical world. Topics include motion planning, geometric reasoning, kinematics and dynamics, state estimation, tracking, map building, manipulation, human-robot interaction, fault diagnosis, and embedded system development. Students specify and design a small-scale yet complex robot capable of real-time interaction with the natural world.

6.01 Intro to EECS Teaching Assistant   Massachusetts Institute of Technology · Spring 2015

Course Description: An integrated introduction to electrical engineering and computer science, taught using substantial laboratory experiments with mobile robots. Key issues in the design of engineered artifacts operating in the natural world: measuring and modeling system behaviors; assessing errors in sensors and effectors; specifying tasks; designing solutions based on analytical and computational models; planning, executing, and evaluating experimental tests of performance; refining models and designs. Issues addressed in the context of computer programs, control systems, probabilistic inference problems, circuits and transducers, which all play important roles in achieving robust operation of a large variety of engineered systems.

Math Teaching Assistant   University of California, Santa Cruz · Fall 2009 - Winter 2012

College math sections: Pre-Calculus and College Algebra. I prepared section material and lead sections. http://www2.ucsc.edu/lss/

Academic Excellence Math Co-Leader   University of California, Santa Cruz · Fall 2008 - Winter 2009

College math sections: Pre-Calculus and Single Variable Differential Calculus.

Held office hours and co lead math sections.

http://ace.ucsc.edu

Girls in Engineering Robotics Instructor   University of California, Santa Cruz · Summer 2009

Taught middle school girls how to program Lego Mindstorm Robots!

Prepared course material on programming the robots and an introduction to Processing.

Resume last updated: April 21, 2017

Research Fellowships

Graduate Research Fellowships Massachusetts Institute of Technology · Cambridge, MA

GEM Ph.D. Engineering Fellowship Sponsored by Intel, Summer 2014

Edwin S. Webster Graduate Fellowship in Electrical Engineering, Spring 2013

Lemelson Minority Graduate Fellowship, Fall 2012

Undergraduate Research Fellowships University of California, Santa Cruz · Santa Cruz, CA

Minority Access to Research Careers, Summer 2010- Spring 2012

Summer Undergraduate Research Fellowship in Information Technology, Summer 2010.

Personal Projects Portfolio

RACECAR Web designer: `http://racecar.mit.edu`

Boop Light Detector, iOS phone app (4+ review, over 500 downloads)

Green Net - reducing energy consumption at MIT

RoboCon 2016 Web Designer: http://robocon.mit.edu/

Ariel Anders personal webpage: http://people.csail.mit.edu/aanders/

Projects listed at http://people.csail.mit.edu/aanders/projects.html:

> drone line following project
> outreach game designed for UCSC Tau Beta PI
> mechatronics robot
> vibeaware

Open source software: https://github.com/arii

Honors and Awards

Grant Recipient

2017 Earth Day Mini Grant
Award for developing new fume hood technologies, in partnership with LEAC at MIT.

2017 MIT Green Labs Innovation Award
5000$ Award received in collaboration with Daniel Preston and the Device Research Lab for developing most innovative technology to improve sustainability efforts at campus at MIT.

MindHandHeart Innovation Fund Grant Recipient, Fall 2015
"Removing SAD from Winter", *Planning for public artificial lightbox locations on campus for people with Seasonal Affective Disorder*

University Center of Exemplary Mentoring at MIT Scholar, Innaugural class of 2015.

Tech Competitions

Boop, 4th place Assitive Technology Hackathon, Spring 2016

lingui-scense, 1st place at Make Cool Shmit, Spring 2016

Haptic++, 2nd place at Meet++ Hackathon, Spring 2016

Beer Bots, 2nd place at CSAIL Research Highlights, Spring 2015

Academic Honors and Scholarships

MIT Graduate Women of Excellence, class of 2017 Honorees

University of California Regent Scholarship, Fall 2010-Spring 2012

Google Travel Scholarship for NSBE, Winter 2012

Mantey Undergraduate Leadership Award, Spring 2011

ARGV Scholarship, Spring 2010

Science Learning Community GPA Award, Spring 2009

Travel Scholarship Recipient for SACNAS, Fall 2008

Research Presentation Awards

1st Place Poster Presentation, NSBE Technical Research Exhibit, NSBE Annual conference 2012

Special Merit in Research Award, 2011 CAMP Symposium

National Poster Presentation Award, 2010 ABRCMS Annual Conference

Best Poster Design, UCSC, 2010 Undergraduate Research Symposium

Service and Leadership Activities

Student Organization Activities

RoboCon 2016 Committee chairperson

CSAIL Student Committee, President, AI Representative, Publicity Czar

MIT Concert Band, Vice President and Tour Manager

Ashdown House Officer, Coffee Hour Officer, Events Committee Officer

MIT EECS Prospective Students volunteer (Robotics RAISINS Organizer)

MIT Rowing Club, Avid Rower

MIT GSC Activities Committee, Committee Member

CSAIL Student Workshop 2012 & 2013, Committee Chairperson

UCSC National Society of Black Engineers, President (2 years), Peer Adviser

UCSC Society of Women Engineers , Treasurer, Undergrad Hardware Lab Representative

UCSC Tau Beta Pi, Corresponding Secretary, Exec. Board Member

Volunteer Activities

LIS Robot Tour guide 2012-present

UCSC NSBE Math Boot Camp Tutor 2012

UCSC Google Student Ambassador 2009-2011

Mathematics Engineering and Science Achievement Judge 2009-2011

Expanding Your Horizons conference workshop liaison 2009-2010

Computer Skills

Languages Python, C, C++, Java, Matlab, Perl, HTML, shell script, Javascript

Software Robot Operating System, SolidWorks, Simics, BlueSpec, Wincaps

OSs Unix, Linux, Mac, Windows

Robot platforms Denso VM-series, PR2, TurtleBot, DuckieBot, 6.141 Racecar

Embedded Systems Arduino, Raspberry Pi, Jetson TX1, Pandaboard, Microchip PIC 32, Virtex5 FPGA, and 68HC11E1 Microcontroller

Miscellaneous

Born in California, USA. United States citizen.

Resume last updated: April 21, 2017