

Matthew Gardner

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EDUCATION

- IOWA STATE UNIVERSITY** | Ph.D Computer Science 2014–Now
- GPA: 3.8
 - Expected graduation: *Dec 2019*
 - Thesis topic: *Motion Estimation and Impact Planning for a Robot Arm Batting Objects to a Target*
- UNIVERSITY OF CALIFORNIA, IRVINE** | B.S. Computer Science 2012–2014
- GPA: 3.8, Cum Laude Honors
- SANTA MONICA COLLEGE** | Computer Science 2009–2012
- GPA: 3.4

EXPERIENCE

GOLDMAN SACHS | Summer Analyst New York, NY | May 2018 – Aug 2018

- Worked with a team of five to extend functionality of a visual programming tool used by more than 1,500 non-developers to build scalable applications.
- Helped lead the project through multiple milestones during design and implementation, and worked directly with 10+ users to satisfy requirements.
- Utilized test-driven development to implement features using Apache Spark in Java, allowing interoperability with SharePoint, Excel and MongoDB.

ISU, ROBOTICS LAB | Research Assistant Ames, IA | Jan 2015 – Present

Current project involves integrating impact dynamics and impulsive manipulation into robotics tasks. The current task is batting an object of arbitrary shape to a target location. Research problems include:

- Building a high-speed vision system to accurately track objects, making use of Kalman filtering, image processing, GPU computing, and multithreading to ensure speed and robustness.
- Deriving and analyzing a generalized model of impact dynamics for a robotic arm manipulator interacting with 3-D objects.
- Development of an algorithm to plan the motion of an arm manipulator subject to impact dynamics, and capable of executing 150+ times a second.

IOWA STATE UNIVERSITY | Teaching Assistant Ames, IA | Aug 2014 – Present

One semester as TA of graduate level course *Problem Solving Techniques for Applied Computer Science*.

- Graded assignments/exams and held office hours to help with course material, including advanced topics in data fitting, optimization, curves & surfaces, calculus of variations, coordinate systems, and more.

Four semesters as Head TA of the project course *Software Development Practices*.

- Managed 10+ TA's and 160+ students each semester to ensure sufficient project progress and proper software development practices.
- Implemented and administered a new grading system involving the creation of rubrics and grading tools, resulting in significantly more efficient evaluation of team projects.
- Produced weekly reports to enforce best practices in grading of demos, software documentation, and exams.
- Provided technical assistance to students and teams in all areas (mobile, web, game development, etc.).

WORKIVA | Software Development Intern

Ames, IA | May 2015 – Aug 2015

- Implemented features to improve *Vessel*, a brokered message queue in Golang used to synchronize data among Workiva's cloud services.
- Solely built a benchmark to simulate machines distributed across the U.S. (via Google Cloud Engine) communicating with a cluster of Vessels. The benchmark maintains the state of various machines while exchanging data in a pub/sub pattern, and measures relevant statistics. The system helped identify bottlenecks and bugs, and resulted in a *20x increase in performance* after optimizations.

SMILEFISH, INC. | Mobile App Developer + Project Manager

Irvine, CA | Mar 2014 – Aug 2014

- Implemented features and bug fixes for the social e-commerce app **eddi.com**, a challenging project in iOS, Android, and Web with fully custom UI and a wide range of features.
- Redesigned the front and backend of an iOS app to improve English speech. Deployed as *American Speechsounds* for iPhone and iPad users.
- Led a team of 5 through concept and design of a language-learning app aimed at Chinese speakers learning English. Produced various design and concept documentation for *TutorGroup*, a global leader in online education. The app is currently in development by a 3rd-party for iOS and Android, and aims to provide access to language learning material for millions of existing TutorGroup users in China.

UC, IRVINE | Undergraduate Research

Irvine, CA | Nov 2013 – Mar 2014

- Designed and built course planning software that models a student's four year program of study as a nonlinear optimization problem in Java, and solves it using Gurobi Optimization. The software includes an intuitive UI for configuring input and storing data, and currently assists the Vice Chair of Undergraduate Education in choosing courses to offer.
- Built a database extension in Node.js that stores timings, metadata, and other analytics data for use in Intel-funded research on benchmarking WebRTC performance.

NUMECENT, INC. | Quality Assurance Intern

Irvine, CA | Jun 2013 – Sep 2013

- Created and managed test cases to ensure thorough validation of client-server cloudpaging technology, nearly doubling the number of reported bugs.
- Wrote scripts to automate test cases, and integrated them into daily smoke and regression tests to efficiently identify bugs in development code.

FBI | Intern with Cyber Division

Westwood, CA | Sep 2008 – Feb 2010

- Used various data analytics tools to organize and visualize case data for a team of Special Agents investigating cyber crime.
- Assisted with parsing and organizing confidential data (of anywhere between 100 to 100k data points) to be analyzed.
- Networked and built a moderate-sized lab used as a "hacking environment" in more than 3 investigations during my time period, including reverse engineering of a malicious operating system.

PUBLICATIONS

- [1] Matthew Gardner and Yan-Bin Jia. Estimating the linear and angular velocities of a free-flying object. In *IROS, IEEE/RSJ* (Submitted), Madrid, Spain, 2018. <<http://robotics.cs.iastate.edu/papers/IROS18a-submit.pdf>>.
- [2] Yan-Bin Jia, Matthew Gardner, and Xiaoqian Mu. Batting an in-flight object to the target. Accepted to *International Journal of Robotics Research*, 2017. <<http://robotics.cs.iastate.edu/papers/IJRR17.pdf>> <VIDEO:<https://youtu.be/dGBevZ54E3s>>.
- [3] Matthew Gardner and Yan-Bin Jia. Batting flying objects to the target in 2d. In *IROS, IEEE/RSJ*, pages 3225–3232, Daejeon, Korea, 2016. <<http://robotics.cs.iastate.edu/papers/IROS16.pdf>>.

TECHNICAL PRESENTATIONS

"Batting Flying Objects to the Target in 2D," IEEE International Conference on Intelligent Robots and Systems, Daejeon, Korea, Oct 2016.

AWARDS

- Robert Stewart Early Research Recognition Award** Ames, IA | 2016
Recognition of early success in Robotics research.
- Hack ISU Hackathon (1st/48)** Ames, IA | 2016
Built FallWatch, an iOS+iWatch app that uses sensor data to learn when the user falls, and send out a distress signal.
- Graduate Research Contest (2nd/20+)** Ames, IA | 2016
Presented research on robotic batting of objects to a target in 2D.
- Ingenuity Showcase (1st/100+)** Irvine, CA | 2014
Showcased a course project called River, an iOS app where users can collaboratively stream music.
- MedAppJam (6th/19)** Irvine, CA | 2012
Built NearMiss, an iOS app for quickly reporting accidents in an effort to preempt future harmful medical accidents.
- National Youth Leadership Forum on National Security** Washington, D.C. | 2010
Attended a week long program on building leadership and learning about various systems of National Security.

SKILLS

PROGRAMMING

Proficient: C++ ◦ Java ◦ Obj-C ◦ C# ◦ SQL ◦ Matlab ◦ L^AT_EX

Familiar: C ◦ Swift ◦ CSS+HTML ◦ PHP ◦ Javascript ◦ R ◦ AutoIT

COURSEWORK

Selected graduate-level coursework: *Computational Geometry, Advanced Machine Learning, Artificial Intelligence, Problem Solving Techniques for Applied CS, Computer Graphics & Geometric Modeling, Computational Perception, Surface Modeling, Database Systems*

PERSONAL PROJECTS

- www.mgardner.me** 2015
My personal website developed in HTML5/CSS3 and JavaScript to showcase my work and help build connections.
- ISOC Ramadan 2015** 2015
Built an iOS and Android app for the Islamic Society of Orange County that provides information on events during the month of Ramadan. Users can sign up to volunteer and make donations over Paypal, resulting in \$50,000+ of donations to charities during Ramadan in 2015.
- collab.dj: Collaborative music streaming** 2014-Present
A mobile app (iOS+C#.NET) for users to collaborate in groups to stream music. Rooms are used to house a queue of songs that members prioritize using tokens. Music can be contributed from Spotify, YouTube, and more, and users can either tune in, or listen with others.

LINKS

Website:// mgardner.me

Github:// [mattga](https://github.com/mattga)

LinkedIn:// [mgardner91](https://www.linkedin.com/in/mgardner91)

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