Benjamin T. Fine

CONTACT
INFORMATION

Benjamin T. Fine
Assistant Professor of Computer Science
School of Theoretical and Applied Science
Ramapo College of New Jersey
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RESEARCH
INTERESTS

Understanding, modeling, and manipulating groups that display social behaviors: distributed robotics, group-level modeling, social behaviors, emergence and self organization, autonomous systems, computer science education, robotics, music education, robotics in the performing arts, bio-inspired algorithms.

CURRENT
ACADEMIC
APPOINTMENT

Assistant Professor of Computer Science
Ramapo College of New Jersey
School of Theoretical and Applied Science   **September 2015 – *Present***

EDUCATION

Texas A&M University, College Station, TX

Ph.D., Department of Computer Science and Engineering, 2015

- Dissertation Focus: Flocking and swarming behaviors are widely considered archetypal emergent behaviors due, in part, to the local interactions among the individual agents and the environment. My dissertation research explored and designed geometric methods for reasoning about the effects an environment has on a group of autonomous agents that exhibit such motions.

University of South Carolina, Columbia, SC

B.S., Department of Computer Science and Engineering, 2009

- Mathematics specialization
- Minor in Psychology

TEACHING
EXPERIENCE

Ramapo College of New Jersey, Mahwah, NJ

Introduction to Computer Science I

- Assisted both Computer Science and non-Computer Science students in learning the fundamentals of Computer Science and programming in C++.
- Last semester taught: Spring 2020
- **Total number of sections:** 8

Introduction to Computer Science II

- Assisted both Computer Science and non-Computer Science students in learning the fundamental concepts of object-oriented programming in C++.
- Last semester taught: Summer 2020
- **Total number of sections:** 10

Data Structures and Algorithms

- Assisted students in learning basic data structures and related algorithms.
- Last semester taught: Spring 2020
- **Total number of sections:** 8

Assembly Language Programming

- Assisted students in learning basic assembly language programming for x86 processors.
- Using this as a vehicle, provided students with an introduction to computer architecture.
- Last semester taught: Fall 2019
- **Total number of sections:** 6

Computers and Society

- Assisted students in exploring how technology impacts various aspects of society.
- Last semester taught: Spring 2019
- **Total number of sections:** 2

The UNIX Environment

- Assisted students in learning the UNIX environment from both a user's and programmer's prospective.
- Last semester taught: Spring 2020
- **Total number of sections:** 4

Object-Oriented Programming

- Assisted students in understanding object-oriented design and software development.
- Last semester taught: Spring 2019
- **Total number of sections:** 2

Mobile Robotics

- Introduced first robotics course to Ramapo's curriculum.
- Students developed and demonstrated the ability to design and implement control-laws for autonomous mobile robots.
- Through literature review, students explored the current state of Robotics and the difficulties modern day robotics faces.
- Last semester taught: Fall 2019
- **Total number of sections:** 3

Mobile Development

- Introduced first mobile development course to Ramapo's curriculum.
- Students developed a working understanding of Test-Driven development.
- Students gained experience designing software for mobile deceives.
- Last semester taught: Summer 2020
- **Total number of sections:** 1

Texas A&M University, College Station, TX

Teaching Assistant: Senior Capstone Design (Computer Engineering)

- Responsible for mentoring students in problem discovery, system design, and developing software applications to address real world problems.
- Exemplar Projects:
    - Networked smoke detection system for developing countries.
    - Remote flood water monitoring device.
- Last semester taught: Spring 2015
- **Total number of sections:** 1

Teaching Assistant: Introduction to Program Design Concepts

- Responsible for supervision of one honors and one regular section.Students used C++14 libraries to explore and learn the fundamentals of computer science and programming.
- Last semester taught: Fall 2014
- **Total number of sections:** 1

Teaching Assistant: Introduction to Computer Science and Programming

- Assisted non-computer science students in learning the fundamentals of computer science and programming in Java and Python.
- Responsible for selecting the homework assignments and generating the three exams.
- Last semester taught: Summer 2014
- **Total number of sections:** 2

Teaching Assistant: Senior Capstone Design (Computer Science)

- Responsible for mentoring students in problem discovery, system design, and developing software applications to address real world problems.
- Exemplar Projects:
  - Web-based data management system for a local equestrian center.
  - Multi-platform phone and web-based application for managing photos taken at events by a large number of users.
  - Adaptive video game that tracks a user's facial expressions using the Microsoft Kinect.
  - Bio-feedback *Tug-of-War* game with the Sphero robot and heart-rate and respiration monitors.
- Last semester taught: Spring 2014
- **Total number of sections:** 2

Teaching Assistant: Computer Organization

- Assisted students in learning simple logic design, data representation and processor architecture, memory, and control flow using the Logisim educational tool.
- Last semester taught: Fall 2012
- **Total number of sections:** 1

Teaching Assistant: Seminar

- Assisted upper division students in developing technical writing skills with a focus on computer science.
- Last semester taught: Spring 2011
- **Total number of sections:** 1

Teaching Assistant: Introduction to Computing

- Assisted first-year students in developing technical writing skills with a focus on computer science.
- Last semester taught: Fall 2009
- **Total number of sections:** 1

University of South Carolina, Columbia, SC

Teaching Assistant: Algorithm Design I

- Conducted weekly programming labs focused on increasing students' problem-solving, algorithm design, and object-oriented programming skills using Java.
- Last semester taught: Spring 2009
- **Total number of sections:** 1

RESEARCH
EXPERIENCE

Ramapo College of New Jersey, Mahwah, NJ

Independent Study Advisor

- Niraj Bhattarai, "Navigation of Partially Known Enviroments
  via Reeb Graphs"   **Summer 2019**

- Salil Maharjan, "Navigation of Partially Known Enviroments via Reeb Graphs" **Summer 2019**

- Simeon Dorelov, "Refactoring and Extending the Elisa-3 Driver Library" **Spring 2019**

- Chloe Veras, "Automatic Generation of Musical Etudes" **Fall 2018**

- Andrew Holmes, "Developing CS1 Assignments and Learning Objectives using the Sparki Mobile Robot" **Fall 2017**

- Liana Lintes, "Automatic Generation of Musical Etudes" **Fall 2017**

Visiting Scholar at University of Richmond **June 2017 and June 2018**

- Established collaboration with Dr. Jory Denney's spatial planning and robotics lab.
- Worked with University of Richmond students on developing and implementing robot detection methods.
- Developed and launched the start of future robot experiments in group navigation using Reeb graphs in partially unknown environments.

Honors Thesis Advisor

- Justina Celentano, "Impact of Technology on US Economy" **2019 – 2020**

Honors Thesis Committee Member

- Bryan Delfing, "A Bioinformatics Approach to the Identification of Protein Active Sites" **2016 – 2017**

- Vivek Pandey, "Booksterdam – An Online, Campus-centric Bookstore" **2016 – 2017**

- Sujil Maharjan, "Graphical-based Programing System for non-Programmers" **2016 – 2017**

- Andrew Krygoski, "Virtual Environment Generation from Topological LIDAR Data" **2015 – 2016**

[Texas A&M University](), College Station, TX

Research Assistant **Summer 2011 – Summer 2012**

- Developed a system for automatically generating environments that could elicit desired behaviors from a group of autonomous agents exhibiting flocking motions.
- Explored the use of Shape Grammars for manipulating groups of autonomous agents exhibiting flocking motions.
- Explored the effects of sensing requirements and limitations on flocking motions using both robotic implementations and computer simulations.
- Developed computer simulation software using Matlab.

Research Assistant **Spring 2010 – Fall 2010**

- Extended the flocking motion implementation to explore the underlying assumptions of multiple flocking algorithms proposed in the literature.
- Designed and implemented software to explore flocking motions using the iRobot Create and the Hokuyo URG-04LX-UG01 scanning laser range-finder.
- Developed a hardware research platform for the iRobot Create and implemented multiple robot detection methods using a Hokuyo URG-04LX-UG01 scanning laser range-finder.

Undergraduate Researcher   **Summer 2008**

- Working under advisement of Dr. Dezhen Song during the NSF REU summer program, I integrated two inertial measurement units onto a skid-steered ground robot.

University of South Carolina, Columbia, SC

Undergraduate Researcher   **2008 – 2009**

- Working under advisement of Dr. Jason O'Kane, I developed an algorithm for detecting anomalies in human behaviors based on location data. Additionally, I developed a hardware platform for the iRobot Create for robot vision applications.

REFEREED JOURNAL PUBLICATIONS

[1] **Benjamin T. Fine** and Dylan A. Shell. "Unifying Microscopic Flocking Motion Models for Virtual, Robotic, and Biological Flock Members", *Autonomous Robots*. Springer Netherlands, October 2013.

[2] Robin Murphy, Dylan Shell, Amy Guerin, Brittany Duncan, **Benjamin Fine**, Kevin Pratt, Takis Zourntos. "A Midsummer Night's Dream (with Flying Robots)", *Autonomous Robots*, special issue on Community-Based Robotics (1-14). Springer Netherlands, 2010.

REFEREED CONFERENCE PUBLICATIONS

[3] Jory Denny and **Benjamin T. Fine**. "Topology-based Group Routing in Partially Known Environments". *35th ACM/SIGAPP Symposium on Applied Computing (SAC)* 2020, Brno, Czech Republic, to appear, March 30 – April 2, 2020, Brno, Czech Republic.

[4] Benjamin T. Fine and Jory Denny. "Review of Robots for Computer Science Curriculum". *The Journal of Computing Sciences in Colleges*. CCSC Northeastern Conference. Mahwah, New Jersey. June 2020.

[5] **Benjamin T. Fine**. "Developing a Robotics Courses for Undergraduate Curriculum - Poster", *The Journal of Computing Sciences in Colleges*. CCSC Northeastern Conference. West Haven, Connecticut. June 2019.

[6] **Benjamin T. Fine**. "Algorithm Impossible: A CS1 Algorithm Design Exercise - Lightning Talk", *The Journal of Computing Sciences in Colleges*. CCSC Northeastern Conference. Manchester, New Hampshire. June 2018.

[7] **Benjamin T. Fine** and Dylan A. Shell. "Eliciting Collective Behaviors through Automatically Generated Environments", *IEEE/RSJ International Conference on Intelligent Robots and Systems*. Tokyo, Japan. November 2013.

[8] **Benjamin T. Fine** and Dylan A. Shell. "Examining the Information Requirements for Flocking Motion", *International Conference on Adaptive Behaviour*. Odense, Denmark. August 27-31, 2012.

[9] **Benjamin T. Fine** and Dylan Shell. "Flocking: don't need no stinkin' robot recognition", *IEEE/RSJ International Conference on Intelligent Robots and Systems*. San Francisco, California, USA. September 25-30, 2011.

[10] Lantao Liu, **Benjamin Fine**, Dylan Shell and Andreas Klappenecker. "Sublinear-time approximate characterization of multi-robot swarm shape", *IEEE International Conference on Robotics and Automations*. Shanghai International Convention Center, Shanghai, China. May 2011.

[11] **Benjamin T. Fine**. "Unsupervised anomaly detection with minimal sensing", *ACM-SE 47: Proceedings of the 47th Annual Southeast Regional Conference.* Clemson, South Carolina, March 2009.

OTHER PUBLICATIONS	[12] **Benjamin T. Fine** and Jory Denny. "Narrow the Scope to Deepen the Study: A Recommendation for Undergraduate Robotics Courses", *IEEE Robotics & Automation Magazine*, March 2019.
	[13] **Benjamin T. Fine** and Jory Denny. "IEEE RAS Investment in Education", *IEEE Robotics & Automation Magazine*, September 2018.
	[14] **Benjamin T. Fine** and Dylan A. Shell. "Flocking Motions: Examination of Information Requirements", *The 2012 Symposium on Emerging Topics in Control and Modeling: Networked Systems (CMNS)*. Urbana-Champaign, IL. Oct 2012.
PAPERS IN PREPARATION	[15] **Benjamin T. Fine** and Jory Denny. "Introduction to Mobile Robotics". Textbook under development.
POSTERS	[16] **Benjamin T. Fine** and Dylan A. Shell. "Examining the Information Requirements for Flocking Motions". *Department of Computer Science and Engineering at Texas A&M University Industrial Affiliates Poster Competition*. College Station, Texas. September 2012.
	[17] **Benjamin T. Fine** and Dylan A. Shell. "Information Required for Flocking Behaviors". *Department of Computer Science and Engineering at Texas A&M University Industrial Affiliates Poster Competition*. College Station, Texas. February 2010.
	[18] **Benjamin T. Fine** and Dylan A. Shell. "Robot Herd: Exploring Collective Aggregate Motion". *Department of Computer Science and Engineering at Texas A&M University Industrial Affiliates Poster Competition*. College Station, Texas. September 2009.
	[19] **Benjamin T. Fine** and Jason O'Kane. "Computer Vision with Low Cost Mobile Robots". *University of South Carolina Student Research Week*. Columbia, South Carolina. May 2009.

INVITED LECTURES	• "**Biological Insights Gained from Robots**" a talk delivered to Ramapo Faculty	**March 2019**
	• A guided discussion of "**The Shallows: What the Internet Is Doing To Our Brains**" by Nicholas Carr for the Lee Memorial Library in Allendale, NJ lecture series.	**Febuarary 2017**
	• "**Bio-inspired Robotics**" a lecture delivered to the students at Ramapo College of New Jersey.	**November 2015**
	• "**What is Robotics?**" a lecture delivered to the Ramapo Robotics club.	**October 2015**
	• "**Biological Insights Gained from Robots**" a lecture delivered to the upper-division seminar students at Texas A&M University.	**March 2015**
	• "**Biological Insights Gained from Robots**" a lecture delivered to the Artificial Intelligence honors students at Texas A&M University.	**February 2015**
	• "**Multi-agent Planning**" a lecture delivered to the Artificial Intelligence students at Texas A&M University.	**March 2014**
	• "**Emergent Behaviors**" a lecture delivered to the Artificial Intelligence students at Texas A&M University.	**November 2013**
	• "**Eliciting Collective Behaviors through Automatically Generated Environments**" a lecture at the Australian Centre for Field Robotics.	**July 2013**

- "**Cost, Precision, and Task Structure in Aggression-based Arbitration for Minimalist Robot Cooperation**", presented on behalf of Tanushree Mitra and Dylan A. Shell at *International Conference on Adaptive Behaviour*.   **October 2012**

FUNDED
GRANTS

- "Support for ACM Programming Team", Ramapo College of New Jersey Foundations Grant (665.00)   **04/01/2017 – 05/01/2017**

- "Exploring Energy Autonomy for Large Swarms of Autonomous Robots", Ramapo College of New Jersey Faculty Development Grant (9,750.00)   **07/01/2017 – 09/01/2017**

- "Developing Ramapo's first Robotics Lab", Ramapo College of New Jersey Foundations Grant (4,325.00)   **04/01/2016 – 4/01/2017**

- "Using the Finch Robot for Teaching CS1 Concepts", Technology in Learning and Teaching Round-table at Ramapo College of New Jersey (1,514.85)   **01/01/2016 – 12/30/2016**

AWARDS

- Outstanding Teaching in Computer Science award from the 6th Annual Conference of Chairs of NJ/NY Computer Science Departments   **Spring 2018**

- 2016 Ramapo Online Course Development Award   **Spring 2017**

- 2015 Ramapo College Faculty Research Challenge   **Spring 2016**

- 2013 East Asia and Pacific Summer Institute Fellowship – Australia   **Summer 2013**

- Texas A&M University Student Research Week – 2nd place in division   **Spring 2013**

- IEEE/RSJ International Conference on Intelligent Robots and Systems 2011 Student Travel Award   **September 2011**

- Magellan Mini-Grant Scholar   **Fall 2008**

CURRENT
PROFESSIONAL
MEMBERSHIPS

- Sigma Xi Full Member

- Association for Computing Machinery Professional Member
  - ACM-W Member
  - SIGCSE Online Member

- Faculty Athletic Representative Association Member

PROFESSIONAL
SERVICE

Ramapo College of New Jersey, Mahwah, NJ

- NCAA Covid-19 Action Team member for Ramapo College   **Fall 2020**

- Search committee member for a tenure-track Computer Science faculty member   **Fall 2020**

- Search committee member for a tenure-track Computer Science faculty members   **Fall 2019 – Spring 2020**

- CCSCNE Programming Conference Chair **2019 – 2020**

- Search committee chair for the Assistant to the
  Director of Athletics - Sports Performance Coordinator **Summer 2019**

- CCSCNE Programming Conference Chair **2019 – 2020**

- Middle States Standard IV co-chair **Fall 2018 – Spring 2019**

- Advisor for the Women in Computing Club **Fall 2018 – *Present***

- CCSCNE Programming Contest Co-Chair **2018 – 2019**

- Education committee member for the IEEE Robotics
  and Automation Society **Spring 2018 – *Present***

- Member of Computer Science Futures advisory committee
  for Passaic County **Spring 2018 – *Present***

- IEEE RAS CEMRA Reviewer **2019**

- WAFR Reviewer **2018**

- Educational Opportunity Fund Mentor **Fall 2017 – *Present***

- Computer Science Tutoring Coordinator **Fall 2017 – *Present***

- Reviewer and Poster Judge for CCSCNE **2017, 2018**

- Search committee member for a tenure-track Computer Science
  faculty member **Fall 2017 – Spring 2018**

- Chair of grants subcommittee for Technology in Learning
  and Teaching Round-table **Fall 2017 – *Present***

- Ramapo College Sigma Xi Vice President **Fall 2016 – *Present***

- Advisor for the ACM Competition Team **Fall 2016 – *Present***

- Committee member for Technology in Learning
  and Teaching Round-table **Fall 2015 – *Present***

- Transfer and new student advisement days **Fall 2015 – *Present***

- NCAA Faculty Athletic Representative **Fall 2015 – *Present***

- STEAM Summer Explorers Program instructor **Summer 2016, Summer 2017**

- Search committee member for the Vice Provost for Curriculum
  and Assessment **Fall 2016 – Spring 2017**

- Search committee member for a tenure-track Computer Science
  faculty member **Fall 2016 – Spring 2017**

- School of Theoretical and Applied Science Student Research
  Symposium committee member **Fall 2016 – Spring 2017**

- Cahill Career Development Center career services management
  system task force School of Theoretical and Applied
  Science representative **Fall 2016 – Spring 2017**

- Co-chair of grants subcommittee for Technology in Learning
  and Teaching Round-table **Spring 2017**

- American Association of University Women (AAUW)
  Teentech Day Workshop leader **Spring 2017**

- Take your child to work day workshop leader **Spring 2017**

- Search committee member for the Assistant to the
  Director of Athletics - Sports Performance Coordinator **Spring 2016**

- Keynote Speaker for a local Hour of Code event **December 2015**

- Advisor for the Ramapo Robotics student organization **Fall 2015 – Spring 2017**

- Grant committee member for Technology in Learning
  and Teaching Round-table **Fall 2015**

Texas A&M University, College Station, TX

- Department of Computer Science and Engineering Recruiter at
  a First Robotics Competition **March 2015**

- Robot Demonstrations at AAAI 2015 Conference, Austin, TX **January 2015**

- Mentor in the Computer Science and Engineering Graduate Student
  Association **Fall 2014 – Spring 2015**

- Judge for the Texas Junior Science and Humanities Symposium **October 2014**

- Panelist for the upper division undergraduate seminar course
  "Why should I go to Grad School?" **October 2014**

- Speaker for the Computer Science and Engineering Graduate Student
  Association Fall Mentor kick-off "How to Read
  Research Papers" and "How to Present One's Research" **August 2014**

- Panelist for the Computer Science and Engineering Graduate Student
  Association Fall Mentor kick-off "Life as a
  Graduate Student", "How to be a Great TA", and "Finding a Research Topic" **August 2014**

- Judge for the Texas Junior Science and Humanities Symposium **Spring 2013**

- Co-director for the mentoring program of the Computer Science
  and Engineering Graduate Student Association **2013**

- Panelist for the NSF REU program "Academia: A
  Grad Student's Prospective" **June 2012, June 2014**

- Vice President of the Computer Science and Engineering
  Graduate Student Association **2010 – 2012**

- Committee member on Graduate Student Culture for the
  Department of Computer Science and Engineering **Fall 2010**

University of South Carolina, Columbia, SC

- President for ACM student chapter **2006 – 2008**

- Tutor for ACM student chapter **2007 – 2009**

PERSONAL
SERVICE

- French Horn player in the New Jersey Wind Symphony **2015 – *Present***

- Founding member and French Horn player in the Brazos Brass Quintet **2013 – 2015**

- French Horn player and private instructor for two Texas not-for-profit community ensembles **2012 – 2015**

- Habitat for Humanity Volunteer **2003 – 2015**

- Judge for Middle School All-Region Band (Texas) **November 2014**

- Mission work through University Lutheran Chapel at Texas A&M University in Brownsville, Texas **March 2010**

- Mission work through Good Shepherd Lutheran Church (Jacksonville, Florida) in Tarma and Lima, Peru **July 2009**

- Mission work through University of South Carolina in Petersfield, Jamaica **March 2009**

Last updated: August 21, 2020