Benjamin Hardin

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Interests: *Human-Computer Interaction, Autonomous System Safety, Explainable AI, LLMs*

Skills: Java, Python, C, C++, Javascript, scikit learn, PyTorch, Matlab, Swift, SwiftUI, Dart, React, OpenGL, Unreal, Unity, Docker, R, Git, Bash/Shell Scripting, Unix, ARM/x86-64 Assembly

Education

University of Oxford, Oxford, UK — *October 2022 – May 2026*

Ph.D. in Computer Science — *Advisors: Prof. Lars Kunze, Prof. Marina Jirotka, & Dr. Pericle Salvini*

Researching interfaces and visualizations to better support passengers in autonomous vehicles through affective computing multimodal large language models (MLLMs).

Purdue University, West Lafayette, IN, USA — *August 2018 – May 2022*

B.S. in Computer Science Honors

GPA: 3.81/4.00

Mathematics Minor • Certificate in Entrepreneurship and Innovation • Honors College • Dean's List

Study Abroad Experiences:

– Computer Science at ETH Zürich (Spring 2022 semester)

Focus: Human-Computer Interaction (HCI), Mobile Health, 3D Computer Vision

– Honors College 4-week courses in Italy (May 2019)

- Collaborated with a researcher from the Open Networking Foundation to bring industry advice to our work.

Professional Engineering Experience

Microsoft, Redmond, WA — *June 2022 – September 2022*

Software Engineer Intern – Azure App Service

- Developed Azure WebJobs for Windows Containers that allow developers to run extra functions on their container sites. Built with C#.

Microsoft, Redmond, WA — *May 2021 – August 2021*

Software Engineer Intern – Azure App Service

- Designed and implemented Remote Debugging on Azure Windows containers to allow customers to debug NT services and reduce developer costs. Built with C#.
- Future-proofed Remote Debugging to support Visual Studio 2017, 2019, and 2022.
- Architected Azure Site Extensions for Windows containers to deliver greater extensibility and metrics to developers about their containers.

General Motors, Warren, MI — *June 2020 – August 2020*

Vehicle Architecture Intern – Automated Driving

- Consolidated vehicle sensor alignment with Python, reducing the alignment process from 2-3 weeks to 3-5 days.
- Implemented multicore computation in sensor alignment, resulting in runtimes 2-3 times faster.
- Automated the OS updates for data collection vehicles to decrease the time to test new features.

General Electric Aerospace, Grand Rapids, MI — *June 2019 – August 2019*

Software Engineer Intern – Model-Based Development Team

- Designed algorithms utilizing Python and MySQL to manage Enterprise Architect models.
- Coordinated with Aviage Systems to fulfill Comac C919 aircraft requirements and documentation.

Research Experience

Graduate Research Assistant, University of Oxford *October 2022 – Present*

- Developing an interface to predict autonomous vehicle disengagements
- Investigating the experiences of teleoperators of autonomous vehicles
- Defining psychological safety of autonomous vehicles, creating risk assessment methods for psychological safety, and developing new interfaces to improve this safety

Networks Research Project, Purdue University *January 2021 – October 2022*

- DARPA Software Defined Networking (SDN) project under supervision of Distinguished Professor Douglas Comer to change the interpretation of MAC addresses to provide reliable VM migration.
- Designed tests utilizing Mininet and ONOS to simulate the architecture and test network performance, working 10 hrs/week under the supervision of Distinguished Professor Douglas Comer.

Teaching & Mentoring

Requirements Engineering Teaching Assistant – Oxford Dept. of Computer Science *Fall 2023*

Software Group Design Mentor – Oxford Dept. of Computer Science *Spring 2023, Spring 2024*

C++ Programming Lab Demonstrator – Oxford Dept. of Engineering Science *Spring 2023, Spring 2024*

Undergraduate Teaching Assistant – Purdue CS252 Systems Programming. *August 2021 – December 2022*

- Under Professor Gustavo Rodriguez-Rivera, I led 2 lab sessions each week to explain concepts, grade lab assignments, and write exam questions.

Publications

- **How well do drivers adapt to remote operation? Learning from remote drivers with on-road experience**
  ***Benjamin Hardin**, Pericle Salvini, Marina Jirotka, and Lars Kunze*
  IEEE IV 2024
  PDF
- **(Pre-print) Safety assurance challenges for autonomous drones in Underground Mining Environments**
  *Philippa Ryan, Arjun Badyal, Samuel Sze, **Benjamin Hardin**, Hasan Bin Firoz, Paulina Lewinska, and Victoria Hodge*
- **Human Involvement in Autonomous Decision-Making Systems. Lessons learned from three case studies in aviation, social care and road vehicles**
  *Pericle Salvini, Tyler Reinmund, **Benjamin Hardin**, Keri Grieman, Carolyn Ten Holter, Aaron Johnson, Lars Kunze, Alan Winfield, and Marina Jirotka*
  Frontiers in Political Science
  PDF
- **A Cross-Sectional Examination of Evictions in Lafayette, Indiana in August 2020 during a Gap in Federal and State Eviction Moreatoria**
  Mary Lang, Justin MacNeill, Ethan Edwards, Ethan Glaser, Benjamin Hardin, Jared Huber, Elizabeth Spyratos, Jason Ware
  Local Development & Society Journal
  PDF
- **DCnet: Evaluation of a New Data Center Architecture**
  Benjamin Hardin, Douglas Comer, Adib Rastegarnia
  2023 Innovation in Clouds, Internet, and Networks (ICIN)
  PDF
- **On the Unreliability of Network Simulation Results From Mininet and iPerf**
  Benjamin Hardin, Douglas Comer, Adib Rastegarnia
  2023 International Conference on Computer, Control, and Robotics (ICCCR)
  PDF

Merit-Based Awards

- **Capgemini Studentship** *October 2022 – May 2026*
  Full-tuition scholarship for PhD studies
- **Lilly Endowment Scholarship** *August 2018 – May 2022*
  Full-tuition scholarship for undergraduate studies awarded to one student in my county for dedication to academics, leadership, community, and extracurriculars.
- **Purdue College of Science Zimmerly Scholarship** *May 2021*
- **Salesforce Scholarship** *April 2021*
- **Purdue CS Corporate Partners Scholarship** (Twice Awarded) *April 2019, April 2020*

Projects

Outdoor Classroom – Historic Eleutherian College, Inc. *July 2021 – August 2021*

- Sought out a Lilly Scholars Network Lead Forward Grant, searched for community needs by talking to high school teaches, proposed the project, and was awarded $2500.
- Designed, built, and installed an outdoor classroom for 24 students to facilitate STEM training for minority student teachers.
- Over 155 man-hours in total.

Augmented Reality Tutorials – ETH Zürich *Spring 2022*

- Built a Microsoft HoloLens app in Unity to allow a user to record AR tutorials that can be shared with other HoloLens users.
- Records the users hands for interactive playback and features a LiDAR object scan to add user-defined objects to the tutorial.

SkillZone – Minigame published on the Apple App Store *July 2021 – August 2021*

- Built components of a minigame app with over 135,000 users.
- Developed using Xcode, Swift, and SwiftUI with a Firebase backend

Biodegradable Soy Polymer Business Plan (Firestarter Training) *July 2019 – August 2019*

- Developed a business plan for a custom soy polymer to create single-use biodegradable foodware that reduces plastic waste for Purdue Dining.
- Took Firestarter Startup Training at the Purdue Foundry to gain skills to design and market startup ideas.

Community Engagement

President – Wolfson College Boat Club *June 2024 – Present*

Captain – Wolfson College Boat Club *June 2023 – June 2024*

President – Purdue Honors College App Development Committee *August 2018 – June 2022*

- Guided teams to develop and maintain a client-server app to over 900 students and faculty to encourage community involvement by incentivizing academic achievements, event attendance, and volunteer work.
- Grew development team from 4 members to 20 members and guided 34 app update releases.

President – Lilly Scholars Network Purdue *August 2018 – January 2022*

- Led volunteering events in the community and statewide with Lilly Scholars from Indiana.
- Held monthly professional events to connect members and foster a scholar community at Purdue.

Marketing & Design Executive – Purdue Association of IT Professionals *September 2018 – May 2019*

- Created over 30 designs for shirts, flyers, and graphics to promote club spirit and outreach.
- Mentored members to foster professional development.
- Worked 7+ hrs/week to plan events and create materials to benefit the club's impact and future.

Eagle Scout – Boy Scouts of America *June 2012 – June 2019*

- 200 man-hour landscaping project for the North Madison Church of Christ in Madison, IN.
- Raised funds, drafted and revised plans, selected plants, and organized labor to accomplish the project.