JARED CLAYPOOLE

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EDUCATION

University of California, Los Angeles (UCLA) | Master of Science | Physics June 2018

Cornell University | Bachelor of Science in Engineering | Engineering Physics May 2015

OVERVIEW

I'm a passionate problem solver with proven ability to deliver quality software and research outcomes. My training in applied physics has allowed me to learn and thrive in a wide variety of application areas. I've become accustomed to doing what it takes to get the job done, learning new skills on the fly.
I have strong math, science, and programming skills, and I enjoy solving problems and delivering on projects using these skills. I routinely work with hardware and sensors as applications call for them.
I also have strong writing, presentation, listening, and interpersonal communication skills.

I'm proficient with the latest software languages and tools for AI/ML, including:

- Python, C++, git, pytorch/ pytorch lightning
- Devops: Kubernetes, helm, docker-compose, airflow

WORK EXPERIENCE

Software engineering and machine learning March 2020 - October 2025

Software Engineer *Center for Vision Technologies, SRI International*

- Solved problems and implemented software and machine learning systems for clients in a variety of domains, including cybersecurity (NSA), manufacturing (JTEKT/ Toyota), cosmetics (L'Oreal), social media analytics (AFRL), 3-D scene reconstruction (IARPA WRIVA), person tracking and threat assessment (DTRA/DOD), and fundamental research (internal funding)
- Prepared, presented, and secured internal funding for an applied research project involving summarization of content using large language models
  - Modeled the summarization problem using rate-distortion/ lossy compression theory
  - Achieved summarization question-answering accuracy comparable to SOTA LLM methods but with greater interpretability
  - Using LLMs, extended rhetorical structure parsing to capture key inferences implicit in text
  - Represented document content using category theory, allowing more systematic and interpretable understanding of documents, summaries, and extensions using LLMs
    - Showed any document can be represented by our partial order category of question-answers
    - This enables myriad entropy measures that in turn allow optimal training data selection, task difficulty estimation, etc.
    - Leads to a novel formal statement of summarization and exegesis that enables interpretable summarization and transfer learning algorithms using exegesis
    - Supports applications such as student writing analysis tools, rewriting documents, merging documents (e.g., scientific papers), aligning systems with principles such as safety, etc.
  - Systematically engineered and refined LLM prompts for document structure extraction
  - Modeled and manipulated categories using graph representations and algorithms
- Created prompts and software systems for parallel, cached querying of large language model APIs
  - Used for our BloomVQA and document modeling using category theory work (see publications)
- Converted IARPA WRIVA's wrapper of Airflow to run on local Kubernetes, providing 10x data processing for 3-D scene reconstruction using a pipeline that orchestrates dozens of pods/containers
- Created web demo GUIs deployed on Kubernetes for various projects (social norm detection demo for DARPA CCU; counterfactual analysis and causal graph determination demo for COVID-19 data; numerous data dasboards for document summarization and document structure extraction using category theory; image upload and reconstructed scene viewing dashboard for IARPA WRIVA) using Flet, a python wrapper of Flutter

- Ran GPU computations on a local Kubernetes cluster (24 nodes, 192 GPUs) and onboarded others
- Wrote software and assembled/integrated with hardware to automate micro-robot control and path planning with vision feedback
- Contributed to, evaluated, and interpreted multiple deep reinforcement learning (RL) cybersecurity systems, providing insights into black-box behavior beyond reporting aggregate metrics
  - Explained RL defender agent decisions for SYN-Flood and Range Header attack simulations
    - Determined decision and probability boundaries in IP address space
  - Interpreted actions of pre-trained cyber-battle challenge RL agents using state space transitions
- Performed implicit knowledge capture of machinists' activities in a manufacturing process through sensing and modeling of sensor data
  - Reconstructed machinist's tool motion using IMU and April tag tracking
    - Modified custom camera driver C++ code to diagnose and eliminate frame drops
    - Troubleshooted and preprocessed raw IMU (accelerometer and gyroscope) data
  - Designed, programmed, and deployed on-site in Japan a mm-scale machining surface scanner using a 4k webcam, motors, lighting, and relevant APIs
  - Using differently skilled machinists' tool pressure and accelerometer readings, determined ideal tool motion patterns, even distinguishing between different levels of expert machinists
- Developed C++ pipelines for person tracking, ML-based threat assessment, automated camera pan/tilt/zoom, and results display, for DTRA/DOD
  - Created a 3-D Unity simulation interfacing with the C++ pipeline, including camera control
- Applied traditional and non-Euclidean multimedia embeddings to derive social network hierarchies (on Twitter) and to identify noteworthy global events, for AFRL

Graduate research and teaching experience Sept 2015 - March 2019

Graduate Student Researcher / Teaching Assistant *UCLA Dept of Physics and Astronomy*

- Performed programmatic consistency checks for symbolic physics calculations, determining n-point 1 loop level amplitudes for scattering of $\mathcal{N} = 4$ (half-maximal) supergravity gravitons
- Using graph algorithms and symbolic calculations, computed 3 and 4 loop level amplitudes for scattering of $\mathcal{N} = 4$ (maximal) super Yang-Mills gluons and $\mathcal{N} = 8$ (maximal) supergravity gravitons
- Implemented an object-oriented framework in Mathematica
  - Created to represent a hierarchy of attributes of amplitudes in relevant physics theories
- Taught more than 12 quarters of physics discussion or lab course sections, including advanced electromagnetism, mathematical physics, and computational physics
  - Clarified and corrected lab instruction manuals after teaching from them for several quarters
  - Adapted an autograder for a computational physics course, including the ability to incrementally correct students' work to prevent small mistakes from disproportionally affecting grades

Co-developed and later managed a scientific outreach project June 2016 - Dec 2018

Outreach Program Developer *UCLA Dept of Atmospheric and Oceanic Sciences*

- Synthesized UCLA atmospheric science research into lessons for high school students
- Managed a team of 5-6 undergraduate students for two quarters

PUBLICATIONS

- **J. Claypoole**, ..., Ajay Divakaran, *et al.*, Document Understanding, Measurement, and Manipulation Using Category Theory, arxiv preprint 2025 (`https://arxiv.org/abs/2510.21553`)
- R. Abdullah, **J. Claypoole**, ..., Ajay Divakaran, *et al.*, Punching Bag vs Punching Person: Motion Transferability in Videos, ICCV 2025 (Top-tier conference; 24% acceptance rate) (link)
- **J. Claypoole** *et al.*, Interpreting Agent Behaviors in Reinforcement-Learning-Based Cyber-Battle Simulation Platforms, AI in Cyber Security (AICS) Workshop at AAAI 2025 (link)
- Y. Gong, ..., **J. Claypoole**, ..., Ajay Divakaran, *et al.*, BloomVQA: Assessing Hierarchical Multi-modal Comprehension, ACL Findings 2024 (link)
- M. Schiappa, ..., **J. Claypoole**, ..., Ajay Divakaran, *et al.*, Probing Conceptual Understanding of Large Visual-Language Models, CVPR Workshops 2024 (link)
- S. Cheung, **J. Claypoole**, *et al.*, EIReLaND: Evaluating and Interpreting Reinforcement-Learning-based Network Defenses, 3rd Workshop on Adaptive Cyber Defense (ACD) 2023 (link)