

# Jacob Zietek

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## EDUCATION

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### Purdue University

August 2020 – December 2023

*Bachelor of Science in Computer Science; GPA: 3.67*

*West Lafayette, IN*

**Extracurricular Activities:** [ML@Purdue](#) Founding President, Undergraduate Research, Working multiple jobs

**Relevant Coursework:** CS593ROB Robotics, CS471 Intro to Artificial Intelligence, CS473 Web Information Search And Management, CS381 Intro to the Analysis of Algorithms, CS373 Machine Learning, CS252 Systems Programming, CS251 Data Structures & Algorithms, MA351 Elementary Linear Algebra, CS511 Statistical Methods

## PAPERS

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Y.Hu, J.Setpal\*, D.Zhang\*, **J.Zietek**, J.Lambert, R.Gonzalez, J.Rayz. [BoilerBot: A Reliable Task-oriented Chatbot Enhanced with Large Language Models](#), Alexa Prize TaskBot Challenge 2 Proceedings. 2023

**J.Zietek**, N.Wade, C.Roberts, A.Malek, M.Pylla, W.Xu, S.Patil. [Pac-Man Pete: An extensible framework for building AI in VEX Robotics](#), arXiv Technical report. 2023

**J.Zietek\***, J.Setpal\*, R.Gonzalez. [BoilerBot: Amazon Alexa TaskBot](#), Technical report and research proposal. Awarded \$250,000 in funding for Purdue's AKRaNLU Laboratory. 2022

## EXPERIENCE

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### Artificial Intelligence Engineer

June 2023 – Present

*Armada AI, Series A startup*

*San Francisco, CA*

- First hire on the AI team, building general purpose computer vision applications for our powerful mobile compute centers. Specific details are under NDA
- Independently researched and developed each project. Performed literature review, programmed data pipelines, built training infrastructure, ran experiments, etc.
- EdgeXray: Built a state video restoration model for removing obstructions from cameras in real time
- EdgeDetect: Demoed state of the art object detection on the edge
- EdgeVideoQnA: Built an LLM agent for real-time video question and answering on the edge

### Undergraduate Research Assistant

November 2022 – December 2023

*Purdue University CoRAL Lab*

*West Lafayette, IN*

- PurdueNav: built an interactive robot-dog tour guide system for Purdue University with custom knowledge of Purdue's campus. Build global navigation, location localization, and conversation system. Passed project to new students, publication goal of Summer 2024
- GazeInstruct: inferring objectives from ambiguous language prompts using operator gaze point
- Implemented the Language-table environment, comprising a tabletop with multiple distinct objects and a UR5e robotic arm in PyBullet, and generated a dataset of trajectories for behavioral cloning with RRT\*
- Heavily modified Google's Language-table training environment for local training, new data augmentations, and custom model architectures; optimized all additions to work with TensorFlow graph execution
- Trained an end-to-end policy which directly manipulates objects based on ambiguous language commands, visual information of the surroundings, and user gaze point, predicting the positional change required for the robot's end effector at 5hz
- Relabeled the original Language-table dataset to include a predicted gaze; identified the target block's class from the language prompt and used a custom YOLOv5 model to simulate a gaze point
- Replicated the Language-table environment in real life and ran experiments

### Undergraduate Research Assistant

November 2022 – August 2023

*Purdue University AKRaNLU Lab*

*West Lafayette, IN*

- Competed in the Amazon Alexa Prize TaskBot 2 Challenge
- Developed a task-oriented multi-modal conversational agent, primarily focusing on developing NLP models with optimized inference speed for real time use
- Fine-tuned Distil-BERT to classify user intent while navigating menus, with 72.4% accuracy

- Trained profanity/misuse classifiers and aligned open source LLMs to domain-specific data
- Built an internal website to display competition analytics and user conversations
- Continuously worked on UX improvements and bug fixes in our back end
- Primary author of a research proposal which was awarded \$250,000 from Amazon Alexa

### Software Development Engineering Intern

August 2022 – November 2022

*Amazon*

*Santa Clara, CA*

- Health Storefront and Tech Applied Science team, AI R&D
- Built a customer-facing recommendation engine for health guidance
- Experimented with AWS name entity recognition models to extract relevant information from health records
- Presented a demo to Amazon Health leadership, including our organization's Vice President

### Artificial Intelligence Intern

May 2022 – August 2022

*Shield AI*

*San Diego, CA*

- Developed a malleable end-to-end supervised ML pipeline with custom models, losses, data pipelines, & metrics to train fully autonomous pilots using simulation data
- Built a pipeline to process simulation dogfighting data and train reinforcement learning models
- Behavior cloned expert pilot policies to build foundational pilot models

### TensorFlow Model Garden Contributor

January 2021 – May 2022

*Purdue University Duality Lab & Google*

*West Lafayette, IN*

- Led the re-implementation of computer vision models and complementary tutorials for TensorFlow 2.x's Model Garden to be used by the greater machine learning community
- Increased the average precision of our YOLOv4-tiny model from 16% to 21.2% with hyperparameter optimization
- Created a TF-Record generator from the Pix3D dataset for the development of a 3D mesh predictor model
- Found a bug within TensorFlow where evaluating popular models on TPUs causes out-of-memory crashes

## PROJECTS

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### VEX Robotics AI Competition | ML@Purdue | *Python, Unity*

August 2021 – Dec 2022

- Led the development of a fully autonomous robot to compete in a robotics tournament
- Developed a simulation of the VEX Robotics playing field to train a Sim2Real digital twin using RL
- Trained a custom YOLOv5s model and developed generalized localization algorithms to detect game elements
- Open sourced code, published findings and best practices for the greater VEX Robotics community

### NASA's Zero Robotics | Team Founder | *C*

August 2018 – January 2019

- Programmed SPHERES satellites on the International Space Station to autonomously retrieve space debris
- Competed in the World Championship where our team's code was run live aboard the International Space Station

## AWARDS

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**HackRPI 2020: Best use of GCP, 2nd place in AI track**

**Mary-Ann Neel Computer Science Scholarship**

**North American Computational Linguistics Olympiad 3<sup>rd</sup> Place in age group**

**VEX Robotics Competition World Championship Competitor**

**Zero Robotics International Space Station Programming Challenge Finalist**

## SKILLS

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**Proficient Languages:** Python, Java, C++, C, JavaScript, p5.js/Processing, R

**Related Technologies:** AWS, Google Cloud, LambdaLabs, OpenCV, GitHub, Jupyter, Linux, Unity, TurtleBot, VEX Robotics, SLURM, Hugging Face, ROS, Pybullet

**Data Science:** PyTorch, TensorFlow, Pandas, NumPy, Matplotlib, Scipy