Dhanush Karthikeyan

dkarthikeyan@cpp.edu | (714) 244-8671 | Pomona, CA

Results-oriented researcher looking to secure a role where I can apply my strong work ethic towards innovative research in embedded software and hardware applications.

EDUCATION

BS, Electrical Engineering **Class of 2022**

California State Polytechnic University, Pomona *GPA: 3.85*

BS, Computer Engineering **Class of 2022**

California State Polytechnic University, Pomona *GPA: 3.85*

RESEARCH EXPERIENCE

Lockheed Martin Internal Research and Development (IRAD) June 2022 – Present

Lockheed Martin Corporation, Aeronautics Division – Advanced Developmental Programs

Project: Classified Edge Computing Applications

- Full-stack support for internal research and development on edge computing and hardware acceleration
- Implementing signals processing, computer vision, and AI/ML on the edge for pilot augmentation

NASA MUREP Innovative New Designs in Space (MINDS) Dec 2021 – May 2022

California State Polytechnic University, Pomona

Advisor: Mohamed El-Hadedy Aly, PhD (Professor of Electrical and Computer Engineering)
Project: Securing Space Applications using Post-Quantum Cryptographic Algorithms

- Led a team of undergraduates to design, fabricate, and deploy a simulated space mission to demonstrate the robustness of post-quantum security in the NASA Artemis Program

Cyber Adaptive Learning Systems Lab Researcher Aug 2021 – Apr 2022

California State Polytechnic University, Pomona

Advisor: Ericsson Marin, PhD (Professor of Computer Science)
Project: Cascade Virality and Hacker Adoption Prediction

- Extended on my previous research work on virality prediction and finalizing paper for publication
- Directed team of graduate students on three independent research directions to assess different methods for hacker prediction using temporal network analysis

NSF Research Experience for Undergraduates (REU) Jun 2021 – Aug 2021

California State Polytechnic University, Pomona

Advisor: Ericsson Marin, PhD, (Professor of Computer Science)
Project: Topology Driven Virality Detection in Malicious Cascades

- Mined hacker data from CYR3CON database to construct static, directed networks to extract social influence
- Generated and cleaned various datasets to train/test various classification models that determine virality of a malicious cascade to anticipate hacktivism campaigns and mass-adoptions of cyber threats
- Final models yielded average F1 scores of 0.94 with balanced datasets and 0.74 with imbalanced datasets

NASA MUREP Space Technology Artemis Nov 2020 – Mar 2021

California State Polytechnic University, Pomona

Advisor: Mohamed El-Hadedy Aly, PhD (Professor of Electrical and Computer Engineering)
Project: Low Power Implementation of Flight Software

- Worked with NASA JPL and NASA Goddard Space Flight Center to deliver a new overlay architecture of F' flight software on FPGA kits for low-power cube satellites

- Developed discrete components in C++ and Python to benchmark hardware capabilities of PYNQ-Z2

NSF Research Experience for Undergraduates (REU) **Jun 2020 – Aug 2020**

University of Washington, Bothell, WA

Advisor: Kaibao Nie, PhD (Professor of Electrical Engineering)
Project: Automatic Fall Detection using Spectral and Temporal Features

- Developed automatic fall detection algorithms and machine learning models to identify falls based on FARSEEING database of recorded falls in the elderly population
- Made use of various classifiers and neural networks to assess possible IoT deployment in the field

NASA MUREP Innovative New Designs in Space (MINDS) **May 2019 – July 2019**

California State Polytechnic University, Pomona

Advisor: Mohamed El-Hadedy Aly, PhD (Professor of Electrical and Computer Engineering)
Project: S-Curve Motion Controller Project

- Developed motion controllers with reconfigurable profiles, producing higher order derivatives of velocity to achieve a customized "smoothness" of desired motion profiles
- Researched, programmed, and implemented an efficient way for autonomous drones to move by mapping out different environments and using a camera-based system for it to move collision-free

Zhen Lab Undergraduate Researcher **Sep 2017 – July 2019**

California State Polytechnic University, Pomona

Advisor: Zhen Yu, PhD (Professor of Electrical and Computer Engineering)
Project: Aeroelastic Induced Power Generation

- Designed and tested the automated manufacturing of graphene supercapacitor power storage units
- Integrated my research to set new UAV endurance world record by harnessing aeroelastic effects

INDUSTRY EXPERIENCE

Embedded Software Engineer **June 2022 – Present**

Lockheed Martin, Fort Worth, TX

- Writing safety critical software for the NASA X-59 experimental supersonic aircraft

Software / Hardware Engineering Intern **June 2020 – Aug 2021**

Amazon Lab126, Sunnyvale, CA

- Contributed to the large-scale Amazon initiative of establishing automated Coronavirus testing laboratories
- Successfully pitched to management and oversaw the development of an automated regression script framework for end-to-end logic tracing and data validation
- Developed software using Python, Flask, Pandas, and SQL for full-stack support for various teams
- Integrated AWS CloudWatch to analyze permissions issues, slow response times, and system functionality
- Project Fire: Presented to senior management about future direction of consumer products and smart homes

Product Developer **July 2019 – Jan 2021**

NASA-CPP Business Startup – Posturonic, Pomona, CA

- Designed consumer-grade hardware utilizing NASA fiber-optic patents to capture human motion
- Managed embedded software in assembly, C, and micropython to interface with IOS application
- Conducted complete product development cycle from market research, R&D, schematic design, rapid prototyping, PCB design, field failure analysis, and product pitching to potential stakeholders
- Created end-to-end design and implementation of test framework for sensors, ranging from pressure sensors, flex sensors, strain gauges, accelerometers, and gyroscopes

Electrical / Systems Engineering Intern **June 2019 – May 2020**

Safran Electronics and Defense Avionics USA, Irvine, CA

- Directed failure and root cause analysis on flight hardware using proprietary hardware instruments
- Conducted High Intensity Radiated Fields and Lightning testing on proprietary Horizontal Stabilizer Control Systems to ensure immunity to exposure to electromagnetic environments
- Communicated with customer to define project requirements and worked with cross-functional mechanical, materials, electrical, and systems teams on engineering roadmap for successful project execution

Galley Decorative Specialist **May 2018 – Aug 2018**

Zodiac Aerospace, Huntington Beach, CA

- Communicated engineering renders and work orders to technical teams in assembly line
- Inspected for non-conformities in a timely manner at different workstations of production

Population Health Management Intern **May 2016 – Aug 2016**

St. Joseph Health, Orange, CA

- Applied data analytics principles towards the management of population health in the Orange County area
- Created campaign to identify and reach out to vulnerable communities at risk for colorectal cancer

LEADERSHIP EXPERIENCE

Maximizing Engineering Potential – Center for Gender, Diversity & Student Excellence

Peer Mentor **Jun 2019 – Aug 2022**

- Tutored undergraduate students (11 total) pursuing the Electrical Engineering or Computer Engineering track in class material ranging from programming, circuit analysis, and upper-level courses
- Advised on career development, interview practice, and fostered interest in research opportunities

RECO-IoT Lab

Lab Manager, Researcher **Dec 2021 – Aug 2022**

- Mentored undergraduates to design, fabricate, and deploy simulated space missions using post-quantum security for space applications
- Promoted cross-functional collaboration and diverse engineering applications in several national competitions
- Key stakeholders have included JPL, NASA Goddard, UIUC, etc.

Association of Energy Engineers (AEE)

President **Apr 2018 – May 2019**

- Networked with industry representatives and organized knowledge-sharing sessions with campus community
- Corresponded with other engineering organizations, the student government, and the college of engineering

Treasurer **Apr 2017 – Apr 2018**

- In my freshman year, founded the Cal Poly Pomona chapter of AEE to connect student body to energy industry
- Managed finances, membership fees, and industry sponsorships in accordance with university bylaws

PRESENTATIONS *Type*

"Post-Quantum Cryptography for Space Communication". Research, Scholarship & Creative Activities Conference (RSCA), Pomona, California. May 2022. **Poster**

"Topology Driven Virality Detection in Malicious Cascades". Research, Scholarship & Creative Activities Conference (RSCA), Pomona, California. August 2021. **Poster**

"Topology Driven Virality Detection in Malicious Cascades". Creative Activities Research Symposium (CARS). August 2021. **Oral**

"Topology Driven Virality Detection in Malicious Cascades". NSF Computer and Information Science and Engineering Virtual Symposium. August 2021. **Poster**

"Low Power Implementation of Flight Software". NASA Minority University Research and Education Project (MUREP) Space Technology Artemis Research. March 2021. **Poster**

"Improving Automatic Fall Detection with Spectral and Temporal Features". University of Washington STEM Symposium. August 2020. **Oral**

"S-Curve Motion Controllers for Space Applications". Research, Scholarship & Creative Activities Conference (RSCA), Pomona, California. 2019. **Poster**

"Manufacturing Graphene Supercapacitors". Research, Scholarship & Creative Activities Conference (RSCA), Pomona, California. 2018. **Poster**

AWARDS & HONORS

	Scale	*Awarded On*
Wilborn ECE Engineering Scholarship 2022 Merit-based memorial scholarship	*University*	**July 2022**
NASA Minds ASGSR Conference Invitation Full stipend to present my research on post-quantum cryptography	*National*	**Nov 2021**
Amazon Project Fire Selected to present future direction of IoT to senior VP's	*International*	**Aug 2021**
Wilborn ECE Engineering Scholarship 2020 Merit-based memorial scholarship	*University*	**July 2020**
Lockheed Martin Engineering Scholarship Merit-based corporate scholarship	*University*	**July 2020**
Boeing Engineering Scholarship Merit-based corporate scholarship	*University*	**July 2020**
Kellogg's Honor College Suzuki Scholarship Merit-based scholarship with Honors distinction	*University*	**June 2020**
John Jutiyasantayanon Memorial Scholarship Merit-based memorial scholarship	*University*	**Sep 2019**
Edison STEM Scholarship Merit-based corporate scholarship	*University*	**Sep 2019**
Dean's List (10x), President's List (5x) Distinction for high grade point average	*University*	**2017–2022**
National Merit Scholar	*National*	**May 2017**

RELEVANT TECHNICAL COURSEWORK

Circuit Analysis I/II, Object Oriented Programming, Control Systems, Network Forensics, Data Structures and Algorithms, Assembly/Microcontrollers, Robotics, Instrumentation, Operating Systems, Signals Processing, Power Engineering, VLSI Design, Computer Architecture, Communications Systems, RF Integrated Circuit Design, TCP/IP, Project Design

SKILLS

C, C#, Python, PIC Assembly Language, SQL, Verilog, VHDL, UNIX, LINUX, MPLAB, MATLAB, JavaScript, LabVIEW, React, HTML, PSPICE, LTSpice, Autodesk Eagle, EasyEDA, Solidworks, CATIA, Cura, Vivado HLS, Vitis AI