

# Levi Burner

## Postdoctoral Associate

Intelligent Sensing Lab  
Perception and Robotics Group  
Maryland Robotics Center Fellow  
Department of Computer Science  
University of Maryland, College Park

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Scholar: Google Scholar

## Research Interests

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Embodied representation (see [J1]), perception for action, learning quickly from interaction, ornithopters, event based vision, computational imaging, system identification.

## Education

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### University of Maryland

Ph.D. in Electrical Engineering, GPA: 3.97/4.0

Dissertation: *Foundations of Embodied Representation: Robotics Without a Ruler*

M.S. in Electrical Engineering

Certificate in Computation and Mathematics for Biological Networks

College Park, MD

Fall 2025

Fall 2023

Fall 2022

### University of Pittsburgh

B.S. in Electrical Engineering, GPA: 3.82/4.0

Concentration in Communications and Signal Processing

Pittsburgh, PA

Fall 2018

## Awards and Fellowships

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Maryland Robotics Center Postdoctoral Fellowship

*University of Maryland, Fall 2025*

Ann G. Wylie Dissertation Fellowship

*University of Maryland, Fall 2024*

Maryland Robotics Center Graduate Research Assistantship

*University of Maryland, Summer 2023*

Google Open Source Peer Bonus for contributions to MuJoCo

*Google DeepMind, April 2023*

Outstanding Teaching Assistant Award

*University of Maryland, Spring 2023*

Future Faculty Fellow

*University of Maryland, Spring 2023*

Computation and Mathematics for Biological Networks Fellow

*University of Maryland, Fall 2020*

Dean's Fellowship

*University of Maryland, Fall 2019*

Outstanding Graduate in Electrical Engineering

*University of Pittsburgh, Fall 2018*

Best System Design, Best Technical Paper for Aerial Autonomy

*RoboNation IARC American Venue, 2018*

## Research Experience

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### Postdoctoral Associate

*Intelligent Sensing Lab, Perception and Robotics Group, Department of Computer Science*

Advisors: Prof. Christopher Metzler, Prof. Yiannis Aloimonos

Computational Imaging: Visual odometry in near darkness, Imaging through turbulence

Embodied Representation: Robots that quickly understand the world from interaction

University of Maryland

October 2025 – Present

### Graduate Assistant

*Perception and Robotics Group, Department of Electrical and Computer Engineering*

Advisor: Prof. Yiannis Aloimonos

Embodied Representation, Event Based Vision

University of Maryland

Fall 2019 – Summer 2025

### Student Trainee Electrical Engineer

*Spacecraft Engineering Division*

Developed software infrastructure for research in space robotics using MuJoCo, C++, and Python.

Naval Research Laboratory

July 2021 – February 2022

## Professional Experience

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### Contributor to MuJoCo

Google DeepMind

**Remote**  
August 2022 – June 2025

Developed a parallel simulation interface, “rollout”, which made possible several research initiatives in the areas of system identification [J2], model predictive control, and CPU based reinforcement learning. Used extensive micro-benchmarking to find and fix communication bottlenecks.

Developed Python compatibility for the interactive physics visualizer, “simulate”, which required solutions for unique Python/C++ interoperation challenges related to GUI management. The software is used by almost every MuJoCo user.

### Software Engineer I (7 mo.), Intern (7 mo.)

Carnegie Robotics LLC

**Pittsburgh, PA**  
June 2018 – July 2019

Designed electronics/software for embedded cameras in extreme environments, deployed on robots you have seen.

### Embedded Software Engineer

KLC Electronics

**Remote**  
June 2012 – January 2019

Programmed Microchip PIC based embedded systems for utility grade wind turbines ranging in size from 60 to 750 kW.

### Embedded Software Engineering Co-Op

Rockwell Automation

**Mayfield Heights, OH**  
May 2016 – December 2016

Memory-bus and CPU diagnostics for a safety-certified controller. Co-led development of an interactive checkers robot.

## Teaching Experience

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### Teaching Assistant

CMSC 477: Robotics Perception and Planning

ENEE 408I: Capstone Design Project: Autonomous Control of Interacting Robots

ENEE 661: Nonlinear Control Systems

ENEE 440: Microprocessors

ENEE 324: Engineering Probability

**University of Maryland**

Spring 2023, Spring 2025

Spring 2020 – Spring 2023

Spring 2021

Fall 2020

Fall 2019

Designed CMSC477 with a \$50,000 startup budget. Showcased it at ASEE 2023.

Redesigned ENEE408I for and after COVID with a \$14,000 budget to maximize inclusivity during lockdown.

Won ECE department’s outstanding teaching assistant award.

### Anonymous Student Feedback:

“Levi Burner is one of the all time greatest TAs ... approachable to help students work through issues while still proactively helping them realize how they can solve their own problems”

“Levi was the best TA i have ever had ... easy to approach as well as good at giving advice/answers.”

“Levi was one of the best TAs I’ve had ... I got a lot better at troubleshooting issues on my own thanks to his help.”

“knowledgeable, approachable, and clearly cares about every student. Give him a raise.”

“It is rare for me to ask a deep question of a TA and get a thoughtful, deep, and informative response.”

“Levi always made it a pleasure to come to the early discussion time! He was always very helpful and willing to help”

## Thesis

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[T1] L. Burner, **Foundations of Embodied Representation: Robotics Without a Ruler**, *Doctoral Dissertation*, University of Maryland, College Park, 2025. [Link](#)

## Refereed Publications

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[J3] L. Burner, G. C. H. E. de Croon, and Y. Aloimonos, **Artificial Microsaccade Compensation: Stable Vision for an Ornithopter**, *Nature Robotics (npj Robot)*. (Under Review) [Link](#)

[J2] K. Zakka, L. Burner, Q. Liao, N. Gileadi, S. W. Abeyruwan, S. Jardim, X. Huang, Y. Aloimonos, K. Sreenath, P. Abbeel, and Y. Tassa, **Practical System Identification**. (In preparation, preliminary results to be released with MuJoCo 4.0 in Dec. 2025)

[J1] L. Burner, C. Fermüller, and Y. Aloimonos, **Embodied Visuomotor Representation**, *Nature Robotics (npj Robot)*, 3, 30, 2025. [Link](#)

- [C5] Chenqi Zhu, **L. Burner**, and Y. Aloimonos, **Odometry Without Correspondence from Inertially Constrained Ruled Surfaces**, *arXiv preprint*, 2025. (To be submitted to a conference) [Link](#)
- [C4] **L. Burner**, P. Mantripragada, G. Caddeo, L. Natale, C. Fermüller, and Y. Aloimonos, **Extremum Seeking Controlled Wiggling for Tactile Insertion**, *arXiv preprint arXiv:2410.02595*, 2024. (Under Revision) [Link](#)
- [C3] D. Yuan, **L. Burner**, J. Wu, M. Liu, J. Chen, Y. Aloimonos, and C. Fermüller, **Learning Normal Flow Directly From Event Neighborhoods**, *IEEE/CVR International Conference on Computer Vision (ICCV)*, 2025. [Link](#)
- [C2] J. Chen, B. Feng, H. Cai, T. Wang, **L. Burner**, D. Yuan, C. Fermüller, C. Metzler, and Y. Aloimonos, **Repurposing Pre-trained Video Diffusion Models for Event-based Video Interpolation**, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 12456-12466, 2025. [Link](#)
- [C1] **L. Burner**, N. J. Sanket, C. Fermüller, and Y. Aloimonos, **TTCDist: Fast Distance Estimation From an Active Monocular Camera Using Time-to-Contact**, *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4909-4915, 2023. [Link](#)

## Non-Refereed Publications

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- [O2] **L. Burner**, A. Mitrokhin, C. Fermüller, and Y. Aloimonos, **EVIMO2: An Event Camera Dataset for Motion Segmentation, Optical Flow, Structure from Motion, and Visual Inertial Odometry in Indoor Scenes with Monocular or Stereo Algorithms**, *arXiv preprint arXiv:2205.03467*, 2022. (40 citations) [Link](#)
- [O1] A. Miller, **L. Burner**, E. Becker, R. Misra, A. Saba, and L. Berti, **A Novel UAV for Interaction with Moving Targets in an Indoor Environment**, *International Aerial Robotics Competition Symposium on Indoor Flight Issues*, 2018. (Won Best Paper) [Link](#)

## Invited Talks

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<b>Embodied Representation: Robotics Without a Ruler</b> <i>Open Neuromorphic Student Talk</i>	<b>Open Neuromorphic</b> September 2025
<b>Embodied Visuomotor Representation</b> <i>Communication, Control and Signal Processing Seminar</i>	<b>University of Maryland</b> November 2024
<b>Coupling Control and Vision</b> <i>Perception and Autonomous Robotics Seminar Series</i>	<b>Worcester Polytechnic Institute</b> October 2023
<b>The Advantages of a Control Theoretic Approach to Monocular Computer Vision</b> <i>Maryland Robotics Center Student Seminar</i>	<b>College Park, MD</b> October 2022

## Mentoring and Advising

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Stephen Jardim ([J2], also preparing paper: "Flying Without a Ruler") Bachelors Student in ECE at University of Maryland College Park	2024 – Present
Jason Zhao (Preparing paper: "Putting a Golf Ball Without a Calibration") Bachelors Student in CS at University of Maryland College Park	2025 – Present
Chenqi Zhu ([C5], Masters Thesis: <i>Inertially Constrained Ruled Surfaces for Egomotion Estimation</i> ) Researcher at Panasonic Connect	2023 – 2025

## Service

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Assistant to the Editor of Short Publications of Automatica (Prof. André Tits)	2020 – 2024
<b>Reviewing:</b>	
Nature Robotics (npj Robotics)	2025 – Present
IEEE Transactions on Robotics (T-RO)	2023 – Present
IEEE Robotics and Automation Letters (RA-L)	2022 – Present
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)	2022 – Present
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)	2025 – Present

IEEE/CVF International Conference on Computer Vision (ICCV)	2025 – Present
IEEE International Conference on Robotics and Automation (ICRA)	2022 – Present
Automatica	2022 – 2023
IEEE Transactions on Geoscience and Remote Sensing	2024
Frontiers in Robotics and AI	2023
IEEE Intelligent Vehicles Symposium	2023
IEEE International Conference on Development and Learning	2022
IEEE Signal Processing Letters	2022

### Outreach:

Mentor for Robotics@Maryland	2025 – Present
Maryland Day Demonstrations	2024 – Present
Maryland Robotics Center Tours for Pre-college Students, Ind. and Gov. Leaders (>10 a year)	2023 – Present
Organizer for <a href="#">PRG Seminar Series</a> on Robotics and Computer Vision (> 12 invited speakers)	2022 – Present
Student Ambassador for Maryland Robotics Center	2023 – 2024
Workshop Organizer for Maryland Robotics Center Youth Outreach	2023
Terps in Space Mentor	2021
ECE TA Training and Development Fellow	2020 – 2021
Technical Director of University of Pittsburgh Undergraduate Robotics Club (RAS)	2016 – 2018

## Technical Skills

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**Programming Languages:** *Experienced:* Python, C, Matlab *Capable:* ARM assembly, C++, Go

**Software:** *Experienced:* MuJoCo, OpenCV, ROS, SciPy, NumPy, ChibiOS *Capable:* JAX, PyTorch, Buildroot, L<sup>A</sup>T<sub>E</sub>X

**CAD:** *Capable:* KiCad, SolidWorks *Beginner:* Altium Designer, Eagle, LTSpice

**Embedded Platforms:** *Experienced:* NVIDIA Jetson, PIC, STM32

**Other:** *Experienced:* System Identification, Camera Calibration *Capable:* Electronics and PCB design, 3D Printing

## References

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### Prof. Yiannis Aloimonos

Professor, Department of Computer Science  
University of Maryland, College Park  
Email: jyaloimo@umd.edu

### Prof. P. S. Krishnaprasad

Professor, Department of Electrical and Computer Engineering  
University of Maryland, College Park  
Email: krishna@umd.edu

### Prof. Guido C.H.E. de Croon

Professor, Faculty of Aerospace Engineering  
Delft University of Technology  
Email: g.c.h.e.decroon@tudelft.nl

### Prof. Christopher Metzler

Assistant Professor, Department of Computer Science  
University of Maryland, College Park  
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