

# ETHAN LEW

<https://eth01ew.com>

## TECHNICAL SKILLS

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<b>Research Experience</b>	Formal Verification, Cyber-physical Systems, Data-driven Controls
<b>Programming</b>	Python, R, Rust, C/C++, L <sup>A</sup> T <sub>E</sub> X, Bash
<b>Libraries/Frameworks</b>	PyTorch, Tensorflow, Apache Spark, Gurobi, ONNX

## WORK EXPERIENCE

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**Galois, Inc., 421 SW 6th Ave, Portland, OR 97204** 2019-Present  
*Research Engineer*

- Excelled in developing research methodologies, writing sophisticated software prototypes, and exceeding project deliverables.
- Contributed significant research and engineering to high-profile DARPA programs at the company: SSITH (2019-2021), Assured Autonomy (2019-2022), SDCPS (2021-2023), and Space-BACN (2022-Present).
- Demonstrated expertise in system analysis and auditing, particularly in relation to the US Census Bureau's Disclosure Avoidance System (2021-Present).

**Johns Hopkins APL, 11100 Johns Hopkins Rd, Laurel, MD 20723** 2019  
*Electrical Engineering Intern*

- Research Projects: troposcatter communication system feasibility, FDTD solver for bodies of revolution, and methods and benchmarks for an adaptive radar resource manager (RRM).

**Summit Wireless Technologies, 20575 Von Neumann Dr., Beaverton, OR 97006** 2018-2019  
*Electrical Engineering Intern*

- Contributed engineering across several teams including the development of a RF power meter, a Linux wireless driver, and the wireless audio stack core.

**Portland State University, 1825 SW Broadway, Portland, OR 97201** 2017  
*Climate Research Intern*

- Research Project: *Sensitivity of Global Methane Bayesian Inversion to Surface Observation Data Sets and Chemical-Transport Model Resolution.*
- Presented project at the Center for Climate and Aerosol Research (CCAR) symposium, Council on Undergraduate Research (CUR) symposium, and the American Geophysical Union (AGU) Fall Meeting.

## EDUCATION

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<b>Portland State University, OR</b>	<i>June 2016 - June 2019</i>
BS Electrical Engineering <i>Summa Cum Laude</i>	GPA: 4.00
<b>Portland Community College, OR</b>	<i>March 2015 - June 2017</i>
Transfer Program	GPA: 4.00

## PROGRAM COMMITTEES

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**26th ACM International Conference on Hybrid Systems: Computation and Control 2021**  
*Repeatability Evaluation Program Committee* *HSCC 2023*

**25th ACM International Conference on Hybrid Systems: Computation and Control 2021**  
*Repeatability Evaluation Program Committee* *HSCC 2022*

## PUBLICATIONS

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(**authors alphabetical**) Bak, S., Bogomolov, S., Hekal, A., Kochdumper, N., **Lew, E.**, Mata, A., and Rahmati, A. (2023). Falsification using reachability of surrogate koopman models. *submitted to HSCC 2024*

**Lew, E.**, Hekal, A., Potomkin, K., Kochdumper, N., Hencey, B., Bak, S., and Bogomolov, S. (2023). Autokoopman: A toolbox for automated system identification via koopman operator linearization. In André, É. and Sun, J., editors, *Automated Technology for Verification and Analysis*, pages 237–250, Cham. Springer Nature Switzerland

Davis, E., Dey, S., Karvonen, A., **Lew, E.**, Quick, D., Shyamshankar, P., Hille, T., and Lebeau, M. (2023). Leveraging manifold learning and relationship equity management for symbiotic explainable artificial intelligence. In *International Conference on Applied Human Factors and Ergonomics*, pages 490–510. AHFE International

(**authors alphabetical**) Bak, S., Bogomolov, S., Hencey, B., Kochdumper, N., **Lew, E.**, and Potomkin, K. (2022). Reachability of koopman linearized systems using random fourier feature observables and polynomial zonotope refinement. In *International Conference on Computer Aided Verification*, pages 490–510. Springer

## AWARDS

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**Generalized RAcIng Intelligence Competition (GRAIC)**

2022

*1st Place Head-to-Head Category*

*CPS-IoT Week*

**Electrical and Computer Engineering Capstone Poster Competition**

2019

*Best Overall Project*

*PSU ECE*

**Intel Compute Stick Challenge**

2016

*1st Place*

*Intel*

## PROJECTS

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**AutoKoopman: A Toolbox for Automated System Identification via Koopman Operator Linearization**

2022-Present

- AutoKoopman is a python library for learning Koopman operators for data-driven dynamical systems analysis and control. The library has convenient functions to learn systems using a few lines of code. It has a variety of linearization methods under shared class interfaces. These methods are pluggable into hyperparameter optimizers, which can automate the process of model optimization.

**Control System Analysis Framework (CSAF)**

2019-Present

- CSAF is a framework to minimize the effort required to evaluate, implement, and verify controller design (classical and learning enabled) with respect to the system dynamics.

**BESSPIN Automotive Demonstrator**

2020-2021

- The BESSPIN CyberPhysical Demonstrator was developed under the DARPA SSITH Program. The demonstrator is intended to showcase the use of the SSITH secure hardware technology in a passenger vehicle. Visitors will experience driving a vehicle as it is being hacked, and the process of hacking an unprotected and a SSITH protected car.