

# Ellis L. Brown, II

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## Education

### Carnegie Mellon University

M.S., Computer Science; Advised by Professors [Deepak Pathak](#) and [Alexei Efros](#)

Pittsburgh, PA  
(expected) May 2023

### Stanford University

Non-Degree Graduate Student, Computer Science

Palo Alto, CA  
Jun. 2020

### Columbia University

Non-Degree Graduate Student, Computer Science

New York, NY  
May 2019

### Vanderbilt University

B.S., Computer Science; B.A., Mathematics; Advised by Professor [Maithilee Kunda](#)

Nashville, TN  
May 2017

## Publications

- 2022 A. Li\*, **E. Brown\***, A. Efros, D. Pathak. *Internet Curiosity: Directed Unsupervised Learning on Uncurated Internet Data*. *ECCV 2022 Workshop, "Self Supervised Learning: What is Next?"*
- 2018 **E. Brown**, S. Park, N. Warford, A. Seiffert, K. Kawamura, J. Lappin, and M. Kunda. An Architecture for Spatiotemporal Template-Based Search. *Advances in Cognitive Systems, Volume 6*, 101-118.
- 2018 **E. Brown**, S. Park, N. Warford, A. Seiffert, K. Kawamura, J. Lappin, and M. Kunda. SpatioTemporal Template-based Search: An Architecture for Spatiotemporal Template-Based Search. *Sixth Annual Conference on Advances in Cognitive Systems*, Stanford, CA. (Oral Presentation)

\*equal contribution

## Awards and Honors

- *Scholar*, Lighting the Pathways to Faculty Careers for Natives in STEM, AISES 2021–Pres.
- Intel Growing the Legacy Graduate Scholarship 2021; 2022
- *Scholar*, Computer Science Research Mentorship Program, Google Research 2021
- 3<sup>rd</sup> Place, Graduate Student Research Competition, AISES National Conference 2019
- Osage Nation Higher Education Scholarship 2013–2017; 2021–Pres.
- (2x) *Academic All-American*, USA Water Polo 2012, 2013

## Experience

### Robotics Institute, Carnegie Mellon University

Graduate Student Researcher, Advised by Professors [Deepak Pathak](#) and [Alexei Efros](#)

2022–Pres.

- Researching self-supervised learning, curiosity-driven exploration, and generalization.
- Lead contributor to securing a \$30m cross-institutional DARPA [Machine Common Sense](#) for CMU, UC Berkeley, MIT, and UMich—team “MESS” (Model-building, Exploratory, Social-learning Systems).

### BlackRock AI Labs

Advised by Professors [Mykel Kochenderfer](#), [Stephen Boyd](#), and [Trevor Hastie](#).

Founding team member and culture carrier. Launched bi-weekly reading group. Co-launched external [website](#).

Research Engineer | Palo Alto, CA

2020–2021

- Formulated the securities lending process as a Markov decision process; designed and wrote a multi-agent lending market simulator for the learning and evaluation of policies; showed that learned policies outperform the rule-based policy used by the lending desk.
- Open-sourced two Julia packages for separable optimization problems. Presented at JuliaCon 2021. [[blog](#), [talk](#)]

Machine Learning Engineer | New York, NY

2018–2019

- Proposed a model of portfolio “operational risk”—decomposable into an interpretable set of factors. Built a Spark ETL pipeline that extracts 3k+ features from various portfolio management systems and outputs daily predictions for all portfolios in the firm.
- Designed a system to identify and parse compliance rules in legal documents automatically; previously performed by 30+ FTEs.

## BlackRock

*Software Engineer* | New York, NY

2017

- Built an ETL pipeline to ingest daily mutual fund reference data using Apache Storm.

*Software Engineering Intern* | New York, NY

2016

- Won intern hackathon with a NLP system to extract contract terms from legal documents during new client onboarding.

## Department of Computer Science, Vanderbilt University

*Undergraduate Student Researcher*, Advised by Professor [Maithilee Kunda](#)

2016–2018

- Developed a computational cognitive architecture of human attention during spatiotemporal visual search.
- Contributed to the development of the [Toybox Dataset](#) for small sample learning and hand-object interaction.

## Open-Source

[JuliaFirstOrder](#) / { [PiecewiseQuadratics.jl](#), [SeparableOptimization.jl](#) }

2021

- Co-authored Julia packages for solving the problem of minimizing a sum of piecewise-quadratic functions subject to affine equality constraints via a derivative of the Alternating Direction Method of Multipliers (ADMM). Formed the [JuliaFirstOrder](#) organization.

[amdegroot/ssd.pytorch](#)

★ 4.7k 🍷 1.7k

2017

- Co-authored the canonical PyTorch implementation of the [Single Shot MultiBox Detector](#), a real-time object detection framework using a single network, 3 months after PyTorch's alpha release.

## Talks

- 2021 Linearly Constrained Separable Optimization (oral), *JuliaCon 2021 JuMP-dev track*. [[talk](#)]
- 2019 Modeling Uncertainty in Bayesian Neural Networks with Dropout: the effect of weight prior and network architecture selection (poster), *American Indian Science and Engineering Society National Conference 2019*, Madison, WI. [[poster](#)]
- 2018 SpatioTemporal Template-based Search: An Architecture for Spatiotemporal Template-Based Search (oral), *Sixth Annual Conference on Advances in Cognitive Systems*, Stanford, CA. [[slides](#)]
- 2017 Computational Cognitive Systems to Model Information Saliency (oral), *American Indian Science and Engineering Society National Conference 2017*, Denver, CO. [[slides](#), [link](#)]

## Extracurricular Activities

### American Indian Science & Engineering Society (AISES)

*Volunteer*

2019–2021

- Mentored an undergraduate AISES student studying CS through the 2020–2021 Full Circle Mentorship Program.
- Reviewed scholarships for the 2020 AISES Undergraduate Scholarship.
- Judged posters for Undergraduate Student Research Competition at the 2019 National Conference.

### Code/Interactive

*Mentor*

2018

- Advised and tutored (weekly) an underprivileged high schooler interested in CS; helped prepare college applications.

### Vanderbilt Admissions

*Tour Guide*

2014–2016

- Led weekly campus tours to groups of 10-50+ prospective students and families.

### Kappa Sigma Fraternity (Kappa Chapter)

*Social Chairman*

2014–2016

- Managed \$90k annual budget; planned & executed dozens of large-scale events; served on Executive Council.

### Water Polo

*Captain & President*, Vanderbilt Club Team (2014 SEC Champions)

2014–2016

- Coordinated and led a team of 20+ players through a 10 week season with 2+ travel tournaments.

*Trainee*, USA Olympic Development Program

2010–2013

- Trained in the United States National Team Pipeline program. Competed in Junior Olympics.

## Graduate Coursework

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- CMU: Deep Reinforcement Learning for Robotics, Visual Learning & Recognition, Deep Reinforcement Learning & Control, Advanced Intro Machine Learning, Philosophical Foundations of Machine Intelligence, Math Fundamentals for Robotics, Distributed Systems, Intro to Computer Systems
- Stanford: Engineering Design Optimization
- Columbia: Mathematics of Deep Learning

## Reports.....

- 2022 Alvin Shek, **Ellis Brown**, Nilay Pande, David Noursi. Self-Supervised Representation Learning via Curiosity-Driven Exploration. Robotics Institute, Carnegie Mellon University, Pittsburgh, PA. [[report](#)]
- 2021 **Ellis Brown**, Aaron M. Roth. Scaling Interpretable Reinforcement Learning via Decision Trees to Minecraft. Robotics Institute, Carnegie Mellon University, Pittsburgh, PA. [[report](#)]
- 2020 **Ellis Brown**. Securities Lending Policy Optimization. Computer Science Department, Stanford University, Palo Alto, CA. [[report](#), [video](#)]
- 2019 **Ellis Brown\***, Melanie Manko\*, Ethan Matlin\*. Modeling Uncertainty in Bayesian Neural Networks with Dropout. Department of Electrical Engineering and Computer Science, Columbia University, New York, NY. [[report](#), [slides](#)]

\*equal contribution