

# Curriculum Vitae - Sara Beery

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## Academic Positions

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- September 2023 Assistant Professor in AI & Decision Making  
**Massachusetts Institute of Technology**, Cambridge, MA  
Academic Unit: Electrical Engineering and Computer Science  
Research Unit: Computer Science & Artificial Intelligence Laboratory  
PI at the Woods Hole Oceanographic Institution
- September 2022 Visiting Faculty Researcher  
**Google Research**, Mountain View, CA  
Visual Dynamics Team
- May 2022 Doctorate of Philosophy in Computing and Mathematical Sciences  
**California Institute of Technology**, Pasadena, CA  
Advisor: Pietro Perona | Computational Vision Lab  
Committee: Yisong Yue (chair), Pietro Perona, Serge Belongie, Katie Bouman
- June 2016 Bachelor of Science in Electrical Engineering  
Bachelor of Science in Mathematics  
**Seattle University**, Seattle, WA  
Computer Engineering and Applied Mathematics Specializations  
Computer Science Minor

## Fellowships, Scholarships, Awards, and Honors

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- 2022 Caltech Amori Doctoral Prize
- 2021 Caltech Resnick Sustainability Institute Graduate Scholar  
Caltech Engineering and Applied Science Division DEI New Horizons Award  
Caltech Computing and Mathematical Sciences Gradient for Change DEI Award  
University of Chicago Center for Data and Computing Rising Star in Data Science
- 2020-21 Amazon AI4Science Fellowship  
PIMCO Fellowship in Data Science
- 2016-20 National Science Foundation Graduate Research Fellowship
- 2015-16 Center for Environmental Justice and Sustainability Research Fellowship  
SWE Wanda Munn Scholarship  
American Women in Science Scholarship  
Seattle University Bannan Scholarship
- 2015 Mathematical Contest in Modeling Honorable Mention
- 2014-15 General Electric Women's Network Scholarship  
American Women in Science Scholarship  
Seattle University Bannan Scholarship

## Publications and Patents

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(\*denotes co-first authorship)

### **Peer-Reviewed Conference and Journal Publications**

Kay, Kulits, Stathatos, Deng, Young, **Beery**, Van Horn, Perona. The Caltech Fish Counting Dataset: A Benchmark for Multiple-Object Tracking and Counting. ECCV 2022.

**Beery**, Wu, Edwards, Pavetic, Majewski, Mukherjee, Chan, Morgan, Rathod, Huang, The Auto Arborist Dataset: A Large-Scale Benchmark for Multimodal Urban Forest Monitoring Under Domain Shift. CVPR 2022.

Sagawa, Koh, Lee, Gao, Xie, Shen, Kumar, Hu, Yasunaga, Marklund, **Beery**, David, Stavness, Guo, Leskovec, Saenko, Hashimoto, Levine, Finn, Liang. Extending the WILDS Benchmark for Unsupervised Adaptation. ICML 2022 (Oral).

Tuia\*, Kellenberger\*, **Beery\***, Costelloe\*, Zuffi, Risse, Mathis, Mathis, Langvelde, Burghardt, Kays, Klink, Wikelski, Couzin, van Horn, Crofoot, Stewart, Berger-Wolf (2022). Perspectives in Machine Learning for Wildlife Conservation. Nature Communications.

**Beery\***, Cole\*, Winner, Parker, Perona (2021). Species Distribution Modeling for Machine Learning Practitioners: A Review. In Proceedings of the ACM SIGCAS Conference on Computing and Sustainable Societies.

Kulits, Wall, Bedetti, Henley, **Beery** (2021). ElephantBook: A Semi-Automated Human-in-the-Loop System for Elephant Re-Identification. In Proceedings of the ACM SIGCAS Conference on Computing and Sustainable Societies.

Van Horn, Cole, **Beery**, Wilber, Belongie, Mac Aodha (2021). Benchmarking Representation Learning for Natural World Image Collections. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. **(Oral)**

Koh, Sagawa, Marklund, Xie, Zhang, Balsubramani, Hu, Yasunaga, Phillips, **Beery**, Leskovec, Kundaje, Pierson, Levine, Finn, Liang (2021). WILDS: A Benchmark of in-the-Wild Distribution Shifts. In Proceedings of the International Conference on Machine Learning. **(Oral)**

Norouzzadeh, Morris, **Beery**, Joshi, Jojic, Clune. (2021). A deep active learning system for species identification and counting in camera trap images. In Methods in Ecology and Evolution. doi:10.1111/2041-210X.13504

**Beery**, Wu, Rathod, Votel, Huang (2020). Context R-CNN: Long Term Temporal Context for Per-Camera Object Detection. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (pp. 13075-13085).

**Beery**, Liu, Morris, Piavis, Kapoor, Joshi, Meister, Perona. (2020). Synthetic examples improve generalization for rare classes. In The IEEE Winter Conference on Applications of Computer Vision (pp. 863-873).

**Beery**, Van Horn, Perona. (2018). Recognition in terra incognita. In Proceedings of the European Conference on Computer Vision (ECCV) (pp. 456-473).

Miguel, **Beery**, Flores, Klemesrud, Bayrakcismith. (2016). Finding areas of motion in camera trap images. In 2016 IEEE international conference on image processing (ICIP) (pp. 1334-1338). **(Oral)**

### **Patents**

**Beery**, Loukili, Borgstadt, Rich, Kise, Davis. (2016), Methods and apparatus to track a blade, US Patent Application No. US20200217660A1, European Patent Application No. EP3290592A1

### **Invited Articles**

**Beery** (2021). Scaling Biodiversity Monitoring for the Data Age. Feature for ACM XRDS Special Issue on Sustainability.

### **Peer-Reviewed Workshop Publications**

Sagawa, Koh, Lee, Gao, Xie, Shen, Kumar, Hu, Yasunaga, Marklund, **Beery**, David, Stavness, Guo, Leskovec, Saenko, Hashimoto, Levine, Finn, Liang. Extending the WILDS Benchmark for Unsupervised Adaptation. DistShift Workshop at NeurIPS 2021.

**Beery**, Agarwal, Cole, Birodkar. The iWildCam 2021 Competition Dataset. The Eighth Fine-Grained Visual Categorization Workshop at CVPR 2021.

**Beery\*** & Bondi\*. Can poachers find animals from public camera trap images?. CV4Animals Workshop at CVPR 2021.

Lanzino & **Beery**. Image-to-Image Translation for Synthetic Samples of Rare Classes. CV4Animals Workshop at CVPR 2021.

Kulits, Pan, Van Horn, **Beery**, Young, Perona. Automated Salmonid Counting in Sonar Data. Climate Change AI Workshop at NeurIPS 2020.

Koh\*, Sagawa\*, Marklund, Xie, Zhang, Balsubramani, Phillips, **Beery**, Kundaje, Pierson, Levine, Finn, Liang. WILDS: A Survey and Benchmark of in-the-Wild Distribution Shifts. Workshop on ML Retrospectives, Surveys & Meta-Analyses at NeurIPS 2020.

**Beery**, Cole, Gjoka. The iWildCam 2020 Competition Dataset. The Seventh Fine-Grained Visual Categorization Workshop at CVPR 2020.

**Beery**, Wu, Rathod, Votel, Huang. Context R-CNN: Long Term Temporal Context for Per-Camera Object Detection. The Women in Computer Vision Workshop at CVPR 2020.

**Beery**, Morris, Yang. Efficient Pipeline for Camera Trap Image Review. Data Mining and AI for Conservation Workshop at Knowledge Discovery and Data (KDD) 2019. **(Selected to be featured in the KDD Earth Day Session.)**

**Beery**, Morris, Perona. The iWildCam 2019 Challenge Dataset. The Sixth Fine-Grained Visual Categorization Workshop at CVPR 2019.

**Beery**, Van Horn, Perona. Recognition for Camera Traps in Unknown Territory. AI for Wildlife Conservation Workshop at the Federated Artificial Intelligence Meeting (FAIM) 2018.

**Beery**, Van Horn, Mac Aodha, Perona. The iWildCam 2018 Challenge Dataset. The Fifth Fine-Grained Visual Categorization Workshop at CVPR 2018.

### **Conference Abstracts**

Iannarilli, Oliver, Birch, **Beery**, Fegraus, Flores, Kays, Ahumada, Jetz. Wildlife Insights: How Camera Trap Data Can Foster Global Biodiversity Conservation. AGU Fall Meeting 2021.

**Beery**, Wu, Rathod, Votel, Huang. Improving Computer Vision for Camera Traps: Leveraging Practitioner Insight to Build Solutions for Real-World Challenges. Ecological Society of America Meeting 2020.

**Beery**, Wu, Rathod, Votel, Huang. Context R-CNN: Long Term Temporal Context for Per-Camera Object Detection. 4th Annual Digital Data Conference, Integrated Digitized Biocollections (iDigBio) 2020.

**Beery**, Morris, Yang, Simon, Norouzzadeh, Joshi. Efficient pipeline for automating species id in new camera trap projects. Biodiversity Information Science and Standards 2019.

Robertson, Belongie, Hartwig, Kaeser-Chen, Zhang, Tan, Liu, Brulé, Deltheil, Loarie, Van Horn, Mac Aodha, **Beery**, Perona, Copas, Waller. Training machines to identify species using gbif-mediated datasets. Biodiversity Information Science and Standards 2019.

Edwards, **Beery**, Railey. An investigation into bio-inspired sonar search performance. The Journal of the Acoustical Society of America, 2017.

**Beery**, Flores, Miguel. Snow Leopard Identification Using Digital Image Processing. Murdock College Science Research Conference, 2013.

## Invited Talks & Panels

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### *The Auto Arborist Dataset*

- Stanford Computer Vision Seminar, 2022
- Cornell Urban AI Seminar, 2022

### *Pre-training for Environmental Monitoring*

- Pre-training Workshop at ICML 2022

### *Computational Imaging Challenges in Ecological Monitoring*

- Keynote at the International Conference in Computational Photography 2022

### *Open Challenges in Generalizeable Computer Vision for Ecology*

- Session on the Promise of Automated Methods at IntECOL 2022
- Camera Trap Ecology Meets AI Workshop 2022

### *Participatory Human-AI Elephant Population Modeling*

- Keynote at the Computer Vision for Animals Workshop at CVPR 2022
- Edge AI Frontiers: Models, Systems and Applications Workshop at AJCAI 2022

### *Towards Animal-Centric AI (Panelist) – Queer in AI Workshop at NeurIPS 2021*

### *Computer Vision for Global-Scale Biodiversity Monitoring - Scaling Geospatial and Taxonomic Coverage Using Contextual Clues*

- Harvard University Center for the Environment Seminar, 2022
- DeepLabCut AI Residency Invited Talk, 2022
- EPFL School of Computer Communication Sciences Seminar, 2022
- ETH Zurich Sustainability Seminar, 2022
- MIT EECS Seminar, 2022
- Caltech Environmental Science and Engineering Seminar, 2022
- UC Berkeley EECS Seminar, 2022
- University of Washington Computer Science Engineering Seminar, 2022
- Cornell University Computer Science Seminar, 2022
- UCSB PSTATS Seminar, 2022
- UCSB Computer Science Computer Engineering Joint Seminar, 2022
- The Ohio State University Computer Science Engineering Seminar, 2022
- University of Melbourne Computer Science Seminar, 2022
- Stevens Institute of Technology Data Science Seminar, 2022
- UCLA Electrical and Computer Engineering Seminar, 2022
- MIT Operations Research Center Seminar on Sustainability and Climate Change, 2022
- University of Sydney Computer Science Seminar, 2022
- Climate Change AI Webinar Series, 2022 (With Dave Thau)
- Max Planck Institute for Intelligent Systems and Cyber Valley Scientific Symposium, 2022
- Georgia Tech Computational Science and Engineering Seminar, 2021
- University of New South Wales Cognitive Robotics Seminar, 2021
- Reed College Computer Science Seminar, 2021
- Berkeley AI + Climate Seminar, 2021
- University of Guelph CARE-AI and Biodiversity Institute Joint Seminar, 2021
- Seminar at Microsoft Research Cambridge, 2020
- Computational Sustainability (CompSust) Doctoral Consortium, 2020

### *Beyond Benchmarks - Going from Competition-Winning Methods to Real-World Solutions*

- Keynote at LifeCLEF, 2021
- Queer in AI at ICML, 2021

### *AI-Assisted Biodiversity Monitoring*

- Data Science Frontiers Seminar at the African Institute for Mathematical Sciences, 2021
- Leveraging AI to Extend Specimen Networks at iDigBio, 2021
- Princeton AI4All, 2021
- Caltech i-STEM Initiative Panelist, 2021

*Out in Technology and Math* (Panelist) – UCSD, 2021

*Computer Vision for Biodiversity Monitoring and Conservation*

- EPFL Joint Mathis Lab Seminar, 2021
- AI for Mankind, 2021
- Yale Center for Biodiversity and Global Change Seminar, 2020

*Deep Learning & Camera Traps*

- Plenary at Imagin ecology Workshop at Le GDR EcoStat, 2020

*Improving Computer Vision for Camera Traps: Leveraging Practitioner Insight to Build Solutions for Real-World Challenges*

- Ecological Society of America Annual Meeting, 2020
- CompSust Open Graduate Seminar, 2020
- Camera Trap Technology Symposium, 2019

*Animal Re-ID from Camera Traps: Can We Deal with Low-Quality Data?* – Deep Learning Methods and Applications for Animal Re-Identification at WACV, 2020

*AI for Camera Traps - Challenges, Best Practices, Benchmarks, and De-Siloing Data*

- World Agroforestry Centre (ICRAF) Seminar, 2020
- WILDLABS Virtual Meetup on Camera Trapping, 2019
- Computer Vision for Wildlife Conservation Workshop at ICCV, 2019

*What's Next in Computer Vision for Wildlife Monitoring* (Panelist) – Computer Vision for Wildlife Conservation Workshop at ICCV, 2019

*Computer Vision for Camera Traps*

- Caltech AI4Science Workshop, 2019
- USC Center for AI in Society Symposium on AI for Conservation, 2019
- Research Seminar at Google Venice, 2019

*An investigation into bio-inspired sonar search performance* – NASA-JPL Robotics Seminar, 2017

*Identifying snow leopards in camera trap images* –Seattle U. S.M.A.R.T. Seminar, 2016

## Funding Awarded

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**Beery, S.**, Huang, J., Goldman, K., Yu, S. *Learning Fine-grained, Long-tailed Tree Species Segmentation and Phenotyping from Ground and Aerial Imagery*, Google/Berkeley Research Collaboration Grant, awarded August 2022, \$100,000

**Beery, S.**, and Perona, P., *Summer School on Computer Vision Methods for Ecology*, Resnick Sustainability Institute Large-Scale Proposal, Computational costs supported by Microsoft AI for Earth and Amazon AWS, awarded August 2021, \$222,285 + \$180,000 in-kind

Lanzini, E., van Gemert, J., Brintjes, R., Lengyel, A., and **Beery, S.**, *Using Style Transfer to Improve Realness of Synthetic Camera Trap Images*, Microsoft AI for Earth Grant, awarded December 2020, \$10,000 in-kind

**Beery, S.**, PIMCO Data Science Fellowship, awarded December 2020, \$15,000

**Beery, S.**, Cole, E., and Perona, P., *Automated Ecological Monitoring - Learning from Context*, Resnick Sustainability Institute, awarded October 2020, \$120,000

**Beery, S.**, Amazon AI4Science Fellowship, awarded September 2020, \$20,000

Shippee, T., Cole, E., Rubenstein, D., and **Beery, S.** *Investigating efficient transfer of ML species identification models from nearby regions*. Microsoft AI for Earth Grant, awarded September 2020, \$10,000 in-kind, additional \$10,000 in-kind awarded September 2021.

Kulits, P., Wall, J., Hahn, N., Lefcourt, J., Parham, J., Holmberg, J., Berger-Wolf, T., Stere, T., and **Beery, S.**, *Wildbook for Elephants with the Mara Elephant Project*, Microsoft AI for Earth Grant, awarded May 2020, \$10,000 in-kind

**Beery, S.**, *A Network of 100 Camera Traps to Estimate Grevy's Zebra Population in Comparison to the Great Grevy's Rally*, Google AI for Nature and Society Grant, awarded January 2020, \$15,000 + \$5,000 in-kind

Kulits, P., **Beery, S.**, Van Horn, G., Young, E., and Perona, P. *Automated Salmonid Counting in Sonar Data*, Amazon AWS Grant, awarded July 2019, \$80,000 + \$30,000 in-kind

**Beery, S.**, *The Microsoft MegaDetector - Robust Animal Detection in Global Camera Trap Data*, Microsoft AI for Earth Grant, awarded August 2018, \$10,000 in-kind

**Beery, S.**, National Science Foundation Graduate Research Fellowship, awarded April 2016, \$138,000

## Mentorship

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Summer 2021	<p>High School Research Mentor Summer Research Connection, Caltech</p> <p>Mentored a team of four minoritized high school students in their first exposure to research. Facilitated their successful curation of a gold-standard evaluation dataset for our Mpala Camera Trap data.</p>
Fall 2020- Present	<p>Postbac Research Mentor Building efficient methods for generalizing computer vision models to new regions of the world, Caltech</p> <p>Curating and efficiently labeling over a year of data collected from our network of cameras at Mpala Research Centre using model distillation, domain adaptation, and active learning.</p>
Fall 2020- Spring 2021	<p>Graduate Research Mentor Improving generalization with synthetic data, TU Delft</p> <p>Co-advised 4 TU Delft computer vision masters students alongside Prof. Jan van Gemert. We are investigating several extensions to my 2020 WACV paper using synthetic data to improve generalization for rare classes. These included training GANs to encourage more overlap between the synthetic and real data in feature space, performing panoptic segmentation on the camera trap data and augmenting with PanDA, and testing data-efficient GANs to directly synthesize new imagery, as opposed to relying on a graphics engine. First paper accepted to CV4Animals at CVPR 2021, next paper in submission.</p>
Summer 2020- Present	<p>Graduate Research Mentor Context-based weakly-supervised object segmentation in static cameras, Caltech</p> <p>Mentoring an incoming PhD student in her first research project at Caltech. We are investigating using temporal context and bounding boxes as weak supervision to train accurate segmentation models for camera trap data.</p>
Summer 2020- Present	<p>Undergraduate Research Mentor Building an automated Elephant Re-Identification database, Caltech</p> <p>Developed a joint project between Mara Elephant Project, Vulcan AI Center for Impact, and WildMe to build the first WildBook for Elephants with API-to-API support for Vulcan's EarthRanger. Hired an excellent, motivated undergrad and mentored him through the software development and the computer vision research for automated re-identification based on ear curvature and attributes. First paper accepted to ACM COMPASS 2021.</p>
Summer 2019- Present	<p>Undergraduate &amp; Graduate Research Mentor Automating salmonid escapement estimation from sonar data, Caltech</p> <p>Co-developed a joint project between Trout Unlimited and the Alaska Department of Fish and Game to build a detection, tracking, and length estimation system for salmonid species in ARIS sonar imagery. Co-mentored two undergraduate students, a postbac student, and a first-year graduate student in the development of a prototype system. First paper accepted to Climate Change AI at NeurIPS 2020.</p>
Summer 2020	<p>Undergraduate Research Mentor Freshman Summer Research Institute, Caltech</p> <p>Mentored an incoming Caltech freshman through her first research project. Designed and managed a conservation-focused computer vision research project on the effect of image quality on accuracy.</p>
January 2017 to Present	<p>Undergraduate Academic Mentor Caltech Women Mentoring Women, Caltech</p> <p>Mentoring 1-2 undergraduate women in computer science per year, helping them to navigate their academic careers.</p>



## Professional Experience

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May 2019 to Present	<p>Research Intern, Student Researcher, Wildlife Insights AI Team Google Research, Seattle, WA &amp; Los Angeles, CA</p> <p><i>Context-aware Object Detection</i></p> <p>Building a weakly-supervised multimodal approach for monitoring the urban forest. Developing context-aware object detection architectures for object detection in static cameras, with work published at CVPR 2020 and the Ecological Society of America Meeting 2020. Working with the Wildlife Insights AI team towards developing a fully automated species detector for camera traps in order to enable widespread, scalable wildlife monitoring.</p>
August 2021	<p>Field Work Mara Elephant Project, Mara North Conservancy, Kenya</p> <p><i>Deploying ElephantBook</i></p> <p>Trained a team of four rangers to use ElephantBook, our AI-assisted long-term elephant monitoring system, to collect daily elephant sightings in the field.</p>
January 2020	<p>Field Work Mpala Research Center, Laikipia, Kenya</p> <p><i>Placing and managing a network of 100 camera traps</i></p> <p>Planned, budgeted, raised funds (\$25K), and executed field-based ecological data collection. This data will be used to investigate bias in camera trap placement and visual re-identification accuracy vs human ground truth (from the Great Grevy's Rally 2020).</p>
Summer 2018	<p>Research Intern Microsoft Research &amp; AI for Earth, Seattle, WA</p> <p><i>Computer Vision and Generalization</i></p> <p>As one of Microsoft AI for Earth's first interns, I jump-started their camera trap workflow and built and open-sourced the MegaDetector, a globally-generalizeable class-agnostic animal detector for camera trap data. We also investigated the use of synthetic data to improve generalization for rare classes, leading to publications at BiodiversityNext 2019, DMAIC at KDD 2019, WACV 2020, and a journal paper in ME&amp;E in January 2021.</p>
June 2013 to June 2016	<p>Research Assistant Seattle University, Seattle, WA</p> <p><i>Image Processing and Computer Vision</i></p> <p>Collaborated with Dr. Agnieszka Miguel on novel AI-based methods to identify snow leopards within sets of camera trap photos. Publication selected as an Oral at IEEE ICIP 2016</p>
Summer 2016	<p>Summer Research Internship MIT Lincoln Laboratory, Boston, MA</p> <p><i>Advanced Undersea Systems and Technology</i></p> <p>Worked on implementation of a sonar-based biomimetic ocean floor search procedure for UAVs. Results published in the 2016 Journal of the Acoustical Society of America</p>
Summer 2015	<p>Machine Automation Engineering Co-Op John Deere Intelligent Solutions Group, Des Moines, IA</p> <p><i>Computer Vision-based Machine Automation</i></p> <p>Developed two new systems for vision-based automation using computational geometry and motion tracking. Managed both projects: designed the algorithms and systems, coordinated camera and computing hardware, ordered prototype parts, scheduled testing time in the field, verified the algorithm to 12mm using a Total Station. Patent awarded as Primary Inventor.</p>
Summer 2014	<p>Electronic Hardware Design Intern John Deere Electronic Solutions, Fargo, ND</p> <p><i>Electronic Hardware Design</i></p> <p>Supported the Field Connect Wireless verification process through RF and battery testing.</p>

## Datasets, Models, and Competitions

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June 2021	<p>iNat 2021 and NeWT</p> <p>iNat 2021 contains 2.7M images of 10,000 species collected from the iNaturalist community science platform. NeWT is a suite of challenging natural world binary classification tasks that go beyond standard species classification, such as age, sex, and counts. These two datasets allow us to explore questions related to large-scale representation and transfer learning in the context of fine-grained categories.</p>
June 2021	<p>The iWildCam 2021 Competition</p> <p>Fourth iWildCam competition, focused on counting individuals of 786 different species across sequences of imagery in novel camera trap deployments from 11 countries, with multi-modal data from iNaturalist and paired satellite imagery.</p>
December 2020	<p>WILDS</p> <p>Open sourced domain adaptation benchmark dataset, captures real-world distribution shifts across diverse applications including camera trap imagery.</p>
June 2020	<p>Context R-CNN</p> <p>Open sourced object detection architecture released in the Tensorflow Object Detection API, uses attention to aggregate information across long time horizons.</p>
June 2019	<p>The iWildCam 2020 Competition</p> <p>Third iWildCam competition, focused on classification of 786 different species in novel camera trap deployments from 11 countries, with multi-modal data from iNaturalist and paired satellite imagery.</p>
June 2019	<p>The iWildCam 2019 Competition</p> <p>Second iWildCam competition, focused on open-set classification of species in camera trap images in Idaho, with training data from camera traps in the American Southwest and multi-modal data from iNaturalist and Microsoft AirSim.</p>
January 2019	<p>The MegaDetector (v1-v5)</p> <p>Open sourced models trained to detect animals, humans, and vehicles in camera trap data released in the Microsoft AI for Earth CameraTrap GitHub repository and used in the data processing workflows of over 30 conservation organizations globally.</p>
August 2018	<p>The Caltech Camera Traps Dataset</p> <p>Publicly released camera trap dataset covering locations and species from the American Southwest with species and bounding box labels, curated from data provided by the USGS and NPS and hosted on LILA.science.</p>
June 2018	<p>The iWildCam 2018 Competition</p> <p>First iWildCam competition, focused on classifying animal/blank images in novel camera trap deployments.</p>

## Selected Media

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Mapping Urban Trees Across North America with the Auto Arborist Dataset, Google AI Blog, June 2022

Boosting human and machine expertise with conservation tech: QA with Sara Beery, Mongabay, December 2021

Leveraging Temporal Context for Object Detection, Google AI Blog, June 2020

CNNs Catch Animals in the Wild, Communications of the ACM, April 2020

The Big Picture, Caltech Breakthrough Campaign, November 2018

Internships Ahoy! with Kirsten Bray, Wei Dai and Sara Beery, Microsoft Research Podcast, September 2018

## Academic Service

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June 2021	Co-organizer and Competition Chair The 8th Fine-Grained Visual Categorization Workshop CVPR 2021, Nashville, TN
September 2020 to Present	Community of Practice Co-Leader Remote Sensing/Machine Learning for Wildlife Surveys U.S. Fish and Wildlife Service Branch of Migratory Bird Surveys
March 2020 to Present	Steering Committee Member Resnick Sustainability Institute Quantitative Ecology Initiative Caltech, Pasadena, CA
March 2020	Co-organizer AI for Animal Re-ID Workshop WACV 2020, Aspen, CO
February 2020	Co-organizer Visipedia Research Group Yearly Meeting New York, NY
June 2019	Organizing Committee Member Seventh Fine Grained Visual Categorization Workshop CVPR 2020, Virtual
November 2019	Organizing Committee Member Camera Trap Technology Symposium Mountain View, CA
June 2019	Organizing Committee Member Sixth Fine Grained Visual Categorization Workshop CVPR 2019, Salt Lake City, Utah
February 2019	Co-organizer Visipedia Research Group Yearly Meeting San Diego, CA
June 2018	Organizing Committee Member Fifth Fine Grained Visual Categorization Workshop CVPR 2018, Long Beach, CA
February 2018	Co-organizer Visipedia Research Group Yearly Meeting Pasadena, CA

## Program Committees

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DistShift Workshop, NeurIPS 2021  
Fine Grained Visual Categorization Workshop, CVPR 2018, 2019, 2020, 2021  
CV4Animals Workshop, CVPR 2021  
EarthVision: Large Scale Computer Vision for Remote Sensing Imagery, CVPR 2021  
Webly-Supervised Fine-Grained Workshop, ACCV 2020  
AI for Social Good Workshop, 2020, Harvard Center for Research on Computation and Society  
Emerging Track on AI for Social Impact, AAAI 2020  
Computer Vision for Wildlife Conservation Workshop, ICCV 2019  
Data Mining and AI for Conservation Workshop, KDD 2019  
AI for Wildlife Conservation Workshop, IJCAI 2018

## Editing and Grant Reviews

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Guest Member of the Editorial Board for the AI for Sustainability Special Issue of IEEE Latin America Transactions  
Guest Subject Matter Editor for Ecological Applications  
Meta-Reviewer for the Climate Change AI Innovation Grants Program  
Reviewer for the Google AI for Social Good Workshop & Grants Program

## Reviewing

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NeurIPS (**Outstanding Reviewer 2021**)  
ICLR  
ICML  
WACV  
Special Track on AI for Social Impact, AAAI  
ISPRS Journal of Photogrammetry and Remote Sensing  
Methods in Ecology and Evolution  
Journal of Mammalogy  
Mammalian Biology  
Ethology  
Remote Sensing in Ecology and Conservation  
ISPRS Journal of Photogrammetry and Remote Sensing  
Ecosphere  
Ecological Informatics  
PeerJ Computer Science  
European Journal of Wildlife Research

## Teaching

Summer 2022	<p>Director</p> <p><i>Summer School on Computer Vision Methods for Ecology</i></p> <p>Designed and secured funding (\$402K) for an intensive, three-week program will teach applied computer vision methods to senior ecology graduate students and postdocs, to be hosted yearly at Caltech starting Summer 2022. Students will develop hands-on computer vision systems to help answer their own ecological research questions, using their own data.</p>
Spring 2021	<p>Co-Instructor</p> <p>Caltech EE 148</p> <p><i>Advanced Topics in Computer Vision: Conservation and Sustainability</i></p> <p>Co-designed and led a course in computer vision with a focus on building solutions to real-world problems in conservation and sustainability</p>
October 2020	<p>Invited Lecture</p> <p>Georgia Tech VIP-4601 VVS</p> <p><i>HumaniTech</i></p> <p>"Towards global-scale biodiversity monitoring: scaling geospatial and taxonomic coverage"</p>
October 2020	<p>Invited Lecture</p> <p>Georgia Tech VIP-4601 VWE</p> <p><i>GaTech4Wildlife</i></p> <p>"Towards global-scale biodiversity monitoring: scaling geospatial and taxonomic coverage"</p>
October 2020	<p>Invited Tutorial</p> <p>CompSust Doctoral Consortium</p> <p>"Building models for static sensors: the good, the bad, and the ugly"</p>
April 2020	<p>Invited Tutorial</p> <p>WILDLABS Tech Tutor Talk Series</p> <p>"How do I get started using machine learning for my camera traps?"</p>
April 2020	<p>Invited Lecture</p> <p>Caltech EE/CNS/CS 148</p> <p><i>Advanced Topics in Computational Vision</i></p> <p>"Computer Vision for Conservation"</p>
Winter 2015	<p>Teaching Assistant</p> <p>Seattle University ECEGR 3000</p> <p><i>Introduction to Matlab</i></p> <p>Teaching and Tutoring Introductory Coding</p>
Spring 2014	<p>Facilitated Study Group Coordinator</p> <p>Seattle University Mathematics Dept., Seattle, WA</p> <p>Led a once-weekly study group and ran oral exam reviews.</p>
Winter 2014 to Spring 2015	<p>Learning Assistant</p> <p>Seattle University Math Lab and Learning Commons, Seattle, WA</p> <p>Drop-in mathematics and physics tutor for subjects through differential equations</p>
Fall 2012 to Winter 2014	<p>STEM Teaching Assistant</p> <p>University Tutors for Seattle Schools, Seattle, WA</p> <p>Classroom assistant and one-on-one tutor at a low-income public middle school. Focused on inspiring ELL and special needs students to succeed in STEM.</p>

## Leadership, Diversity, Inclusion, and Equity

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October 2020 to Present	Member Caltech CMS DEI Steering Committee, Pasadena, CA
June 2020	Co-Lead and Organizer Caltech CMS Town Hall on Removing Racism in Academia, Pasadena, CA
January 2019 to Present	Member Caltech Women's Engagement Board, Pasadena, CA
January 2017 to Present	Founder and Chair Caltech Graduate Women in CMS, Pasadena, CA
January 2017 to Present	Member Caltech EAS Division Graduate Council, Pasadena, CA
January 2017 to Present	Member Caltech CMS Department Graduate Council, Pasadena, CA
June 2015 to June 2016	Regional Collegiate Communications Editor SWE Region J, Seattle, WA
June 2015 to June 2016	Chapter President Alpha Sigma Nu, Seattle, WA <i>Jesuit Honors Society for Scholarship and Service</i>
June 2015 to June 2016	Vice President SWE Seattle University Section, Seattle, WA
June 2013 to June 2014	President IEEE Seattle University Branch, Seattle, WA
June 2013 to 2014	SWE Future Leader SWE Seattle University Section, Seattle, WA
June 2013 to June 2014	Outreach Coordinator SWE Seattle University Section, Seattle, WA
September 2012 to June 2014	Student Advisory Board Member Seattle University, Seattle, WA
September 2012 to June 2013	Fundraising Chair SWE Seattle University Section, Seattle, WA

## Professional Dance

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July 2010 to September 2012	<p>Company Dancer and Assistant Rehearsal Director Armitage Gone! Dance, New York, NY <i>Contemporary Choreography and Investigation</i></p> <p>Toured internationally as part of an 11-person company. Performed throughout the USA, as well as in Italy, Germany, and the U.K. Directed rehearsals with 16 Italian dancers in preparation for a performance in Milan, working to communicate through language and cultural barriers.</p>
June 2009 to September 2009	<p>Original Workshop Dancer gloATL, Atlanta, GA <i>Contemporary Improvization</i></p> <p>Explored dance as a performance art in public spaces with this ground-braking Atlanta-based contemporary company.</p>
June 2007 to July 2010	<p>Professional Dancer Atlanta Ballet, Atlanta, GA <i>Classical Ballet, Contemporary Choreography</i></p> <p>Performed and trained with the Atlanta Ballet, taking featured roles such as the Evil Queen in <i>Snow White</i>, The Widow in <i>Dracula</i>, Princess in <i>Swan Lake</i>, and Navigator in <i>Mozart's Magic Flute</i>. Originated roles in Victor Quijada's <i>Impending Savour Assessment</i>, John McFall's <i>Cinderella</i> and <i>The Nutcracker</i>, and Lauri Stalling's <i>big</i>. Toured to Monterrey, Mexico to perform <i>Swan Lake</i>.</p>



## References

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