John Lambert

CONTACT INFORMATION	*Email:* johnwlambert3 [AT] gmail.com https://johnwlambert.github.io/

BACKGROUND
Machine learning, computer vision, and robotics leader with significant experience. Develops cutting-edge technology in these fields and pushes the state-of-the-art in top conferences such as CVPR, ECCV, and NeurIPS. Experience in leading research teams to solve open-ended problems.

Technical depth in generative modeling, ML-based simulation, behavior prediction, image understanding (object classification and segmentation), 3D perception (3D reconstruction, 3D object pose/shape estimation and tracking), and SLAM (mapping, localization).

EDUCATION

Georgia Institute of Technology
Doctor of Philosophy in Computer Science (Aug. 2018 - Mar. 2022).
Ph.D. Advisors: James Hays, Frank Dellaert. President's Fellow, 2018-2022.
Thesis Title: *Deep Learning for Building and Validating Geometric and Semantic Maps*.
Thesis Committee: James Hays, Frank Dellaert, Simon Lucey, Zsolt Kira, Cedric Pradalier.

Stanford University
Master of Science in Computer Science, with specialization in Artificial Intelligence (Jun. 2018).

Stanford University
Bachelor of Science in Computer Science, with specialization in Artificial Intelligence (Dec. 2017).
B.S. Minor, Mathematics.

SELECTED WORK EXPERIENCE

Waymo LLC, Senior Research Scientist (Mar. 2022-Present)
Research on generative world models for autonomous driving simulation. Publish papers, develop and deploy models to production, interview candidates, mentor research interns, co-organize conference workshop competitions.

Argo AI, Academic Research Associate, Cambridge, Massachusetts (Nov 2021-Mar. 2022)
Developed and prepared large-scale Argoverse 2.0 datasets and open-source development kit for public release.

Zillow Research, Research Intern, Cambridge, Massachusetts (May 2021 - November 2021).
Developed deep models and a system for home floorplan reconstruction from sparse panoramas. Work was accepted to ECCV 2022 (SALVe) and patent pending. Supervisor: Sing Bing Kang.

Argo AI, Research Intern, Atlanta, Georgia (May 2020-May 2021)
Computer vision research for self-driving technology. Work resulted in two accepted papers at NeurIPS 2021, focused on online map change detection, behavior prediction, and object detection. Supervisor: James Hays.

Intel Labs, Research Intern, Santa Clara, California (May 2019-May 2020)
Computer vision research at the Intelligent Systems Lab focused on domain generalization capabilities for semantic, panoptic, and instance segmentation [MSeg, CVPR 2020]. Supervisor: Vladlen Koltun.

Argo AI, Machine Learning Research Intern, Mountain View, California (June 2018-May. 2019)
Research at the intersection of mapping, perception and machine learning for self-driving. Collaborated with many to create the Argoverse self-driving datasets [CVPR 2019] and was the main code contributor for the `argoverse-api` repository. Supervisors: James Hays, Simon Lucey, Deva Ramanan, Ersin Yumer.

Argo AI, Machine Learning Intern, Pittsburgh, Pennsylvania (June 2017-Sept. 2017)
Developed and benchmarked real-time machine perception algorithms in C++11/14 for autonomous vehicles. Implemented a key portion of the tracking algorithm that was immediately deployed on-vehicle. Designed and presented research proposals to company leadership for the next-generation sensor fusion system.

CONFERENCE PUBLICATIONS	C. M. Jiang, Y. Bai*, A. Cornman*, C. Davis*, X. Huang*, H. Jeon*, S. Kulshrestha*, **J. Lambert***, S. Li*, X. Zhou*, C. Fuertes, C. Yuan, M. Tan, Y. Zhou, D. Anguelov. *SceneDiffuser: Efficient and Controllable Driving Simulation Initialization and Rollout.* (*equal contribution, listed alphabetically). Neural Information Processing Systems (NeurIPS), 2024.

Nico Montali, **John Lambert**, Paul Mougin, Alex Kuefler, Nick Rhinehart, Michelle Li, Cole Gulino, Tristan Emrich, Zoey Yang, Shimon Whiteson, Brandyn White, Dragomir Anguelov. The Waymo Open Sim Agents Challenge. Proceedings of the Neural Information Processing Systems Track on Datasets and Benchmarks (NeurIPS), 2023 (Spotlight).

J. Lambert, Y. Li, I. Boyadzhiev, L. Wixson, W. Hutchcroft, M. Narayana, J. Hays, F. Dellaert, S.B. Kang. *SALVe: Semantic Alignment Verification for Floorplan Reconstruction from Sparse Panoramas.* European Conference on Computer Vision (ECCV), 2022.

J. Lambert, J. Hays. *Trust, but Verify: Cross-Modality Fusion for HD Map Change Detection.* Proceedings of the Neural Information Processing Systems Track on Datasets and Benchmarks (NeurIPS), 2021.

Benjamin Wilson, William Qi, Tanmay Agarwal, **J. Lambert**, Jagjeet Singh, Siddhesh Khandelwal, Bowen Pan, Ratnesh Kumar, Andrew Hartnett, Jhony Kaesemodel Pontes, Deva Ramanan, Peter Carr, James Hays. *Argoverse 2.0: Next Generation Datasets for Self-Driving Perception and Forecasting.* Proceedings of the Neural Information Processing Systems Track on Datasets and Benchmarks (NeurIPS), 2021.

J. Lambert*, Z. Liu*, O. Sener, J. Hays, V. Koltun. *MSeg: A Composite Dataset for Multi-domain Semantic Segmentation.* IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020. [Video]

M. Chang*, **J. Lambert**, P. Sangkloy*, J. Singh*, A. Hartnett, D. Wang, P. Carr, S. Lucey, D. Ramanan, J. Hays. *Argoverse: 3D Tracking and Forecasting with Rich Maps.* IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019 (Oral).

J. Lambert*, O. Sener*, and S. Savarese. *Deep Learning Under Privileged Information Using Heteroscedastic Dropout.* IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018 (Spotlight).

PREPRINTS	Ayush Baid*, **John Lambert***, Travis Driver*, Akshay Krishnan*, Hayk Stepanyan, Frank Dellaert. *Distributed Global Structure-from-Motion with a Deep Front-End.* arXiv, 2023.

JOURNAL PUBLICATIONS	**J. Lambert***, Z. Liu*, O. Sener, J. Hays, V. Koltun. *MSeg: A Composite Dataset for Multi-domain Semantic Segmentation.* Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022.

WORKSHOP PUBLICATIONS	**J. Lambert***, O. Sener*, and S. Savarese. *Deep Learning Under Privileged Information.* Workshop on Bayesian Deep Learning, Neural Information Processing Systems (NIPS), 2017 (Spotlight).

A. Hoogi*, **J. Lambert***, Y. Zheng, D. Comaniciu, and D. Rubin. *A Fully-Automated Pipeline for Detection and Segmentation of Liver Lesions and Pathological Lymph Nodes.* Workshop on Machine Learning in Healthcare, Neural Information Processing Systems (NIPS), 2016.

PATENTS	**J. Lambert**, Y. Li, L. Wixson, I. Boyadzhiev. Zillow Group. *Patent pending.* (No. 17/585,433).

J. Lambert, J. Hays., Francesco Ferroni, Richard Kwant. Argo AI. *Patent pending.* (No. 17/169,970).

RESEARCH EXPERIENCE	**Hays Lab, Research Assistant**, Georgia Institute of Technology (Aug. 2018-Mar. 2022) 3D computer vision for robotics. Developing machine learning algorithms for multi-modal sensor data, with applications in 3d object detection, 3d multi-object tracking, trajectory forecasting, high-definition 3D semantic mapping, HD map change detection, and stereo vision.

BORG Lab, Research Assistant, Georgia Institute of Technology (Oct. 2018-Mar. 2022)
Structure from Motion (SfM) and 3d scene reconstruction research with Prof. Frank Dellaert.

Stanford Vision and Learning Lab, Research Assistant, Stanford, California (May 2017-June 2018)
Developed methods to utilize extra knowledge only available during training (*privileged information*) in neural networks. Showed how our model significantly increases sample efficiency during learning, resulting in higher accuracy with a large margin when the number of training examples is limited. Work focused on image classification (ImageNet) and machine translation and was accepted to CVPR 2018. Worked under the supervision of Professor Silvio Savarese.

Stanford Vision Lab, Research Associate, Stanford, California (Jan. 2017-June 2017)
Developed self-supervised representation learning methods for human action recognition from RGB video input in the laboratory of Dr. Fei-Fei Li.

Quantitative Imaging Lab, Research Assistant, Stanford, California (June 2016-Dec. 2016)
Worked with Dr. Daniel Rubin to develop algorithms for organ lesion segmentation, detection in 3-D microscopy, and automatic clinical narrative generation from images.

TEACHING EXPERIENCE

Georgia Institute of Technology
Teaching Assistant for CS 6476A: *Computer Vision* (Graduate Level), taught by Prof. James Hays. Spring 2021. Enrollment: 180. Designed new assignments and provided a guest lecture.

Teaching Assistant for CS 4476: *Introduction to Computer Vision* (Undergraduate Level), taught by Prof. Frank Dellaert. Fall 2019. Enrollment: 242. Designed new assignments and provided a guest lecture.

Teaching Assistant for CS 6476A: *Computer Vision* (Graduate Level), taught by Prof. James Hays. Fall 2018. Enrollment: 202.

PROGRAMMING

Python, C/C++/CUDA, MATLAB, MPI, XHTML, CSS, Java, JavaScript.

FRAMEWORKS

JAX, PyTorch, TensorFlow, GTSAM, Beam, Dask, OpenGL, AngularJS, Node.js, MongoDB, Flex, Bison.

ADDITIONAL WORK EXPERIENCE

Varian Medical Systems, Software Engineering Intern, Palo Alto, California (June-Aug. 2015)
Developed probabilistic graphical models (PGMs) in order to predict advantageous treatment plans for lung cancer patients. Implemented corresponding front-end and back-end infrastructure (AngularJS and Java) to deliver the machine learning models in a point-of-care Cloud application to oncologists. The models and work were showcased in early 2016 as part of the 360 Oncology$^{\mathrm{TM}}$ product launch.

EAS Advisors LLC, Summer Analyst, New York, New York (June-Aug. 2012)
Created models and investor presentations for non-deal and deal roadshows at an investment advisory firm. Performed market research in natural resource industries, compiled the results, and presented findings to potential investors. Capital requirements of projects ranged from $2M-40M USD.

ACADEMIC TALKS

Simulation Agents
Invited Talk at IROS 2023 Workshop on Traffic Agent Modeling for Autonomous Driving Simulation, October 2023.

GTSfM: Georgia Tech Structure from Motion
Talk at Skydio, January 2022 (Remote).

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ACADEMIC TALKS	**Trust, but Verify: Cross-Modality Fusion for HD Map Change Detection** Talk at Cruise, December 2021 (Remote). Talk at Tesla AI, December 2021 (Remote). Talk at Waymo, January 2022 (Remote).

MSeg: A Composite Dataset for Multi-domain Semantic Segmentation
Invited Speaker, ROS World 2020 Conference, *Recent Advances in Robotic Perception*, November 2020.
Invited Panelist Talk, Robust Vision Challenge Workshop, ECCV 2020, October 2020. [Video]

Argoverse: 3D Tracking and Forecasting with Rich Maps
Oral Presentation. Session on Learning, Physics, Theory, & Datasets, CVPR, June 2019. Long Beach, CA.
Talk at Intel Labs, June 2019, Santa Clara CA.

Deep Learning Under Privileged Information
Spotlight Presentation. Session on Machine Learning for Computer Vision, CVPR, June 2018. SLC, UT.
Spotlight Presentation. Bayesian Deep Learning Workshop, NIPS, Dec. 2017. Long Beach, CA.

PRESS
COVERAGE

Argoverse: 3D Tracking and Forecasting with Rich Maps
Forbes Magazine. *Argo AI And Waymo Release Automated Driving Data Sets*. June 19, 2019.
TechCrunch. *Self-driving car startup Argo AI is giving researchers free access to its HD maps*. June 19, 2019.
CNET. *Ford's Argo AI will release its HD maps for free to autonomy researchers*. June 19, 2019.

SELECTED
HONORS

Highest scoring paper, Machine Learning for Autonomous Driving (ML4AD) Symposium, NeurIPS 2023.
2nd Place, Robust Vision Challenge *Semantic Segmentation* Track, ECCV 2020.
Runner-up, Argoverse 3D Tracking Challenge at the Machine Learning for Autonomous Driving Workshop,
        NeurIPS 2019 (Rank 2nd)
Outstanding Reviewer Award, CVPR 2018
Travel Award, Bayesian Deep Learning Workshop, NIPS 2017 (8 awarded out of 68 accepted abstracts)
President, Latter-day Saint Student Association (LDSSA) at Stanford University (2016-2017)
13th Place, USA Intercollegiate Rowing Association National Championship Regatta, Stanford
        University Varsity Crew Team (2012)
National Merit Finalist and National AP Scholar (2011)
Shell Oil Company Technical Scholarship Winner (2011)
Eagle Scout, Silver Palm (2007)

LANGUAGES

Russian (ACTFL "Advanced High" Oral and Writing Proficiency); French (elementary proficiency)

SERVICE
ACTIVITIES

Co-Organizer, Waymo Open Dataset Competitions, Workshop on Autonomous Driving, CVPR 2024 [Site].
Co-Organizer, Waymo Open Dataset Competitions, Workshop on Autonomous Driving, CVPR 2023 [Video].
Co-Organizer, Argoverse Competitions, Workshop on Autonomous Driving, CVPR 2021 [Video].
Co-Organizer, Argoverse Competitions, Workshop on Autonomous Driving, CVPR 2020 [Video].
Reviewer for the IEEE Conference on Computer Vision and Pattern Recognition (CVPR).
Reviewer for the International Conference on Computer Vision (ICCV).
Reviewer for the European Conference on Computer Vision (ECCV).
Reviewer for Conference on Neural Information Processing Systems (NeurIPS).

Volunteer Mission, Rostov-na-Donu, Russia (Aug. 2012-Sept. 2014)
Full-time missionary and volunteer representative of church. Taught lessons in Russian to people
daily while leading and training a group of 20 missionaries in the cities of Volgograd, Astrakhan,
and Volzhsky. Organized and taught free English language classes and carried out community
service projects.

MENTORED STUDENTS	**Undergraduate Students**

Undergraduate Students

Jan. 2021 – Mar. 2022   Adi Singh (CS, Georgia Tech)
Topic: RasterNet: Online Bird's Eye View Mapping using Transformers

Jan. 2021 – Mar. 2022   Anshul Ahluwalia (CS, Georgia Tech)
Topic: Transformer Pointer Networks for Autoregressive Lane Polyline Estimation

Master's Students

Dec. 2018 – Aug. 2019   Alex Butenko (CS, Georgia Tech)
Topic: Deep Front Ends for SfM

Aug. 2019 – Dec. 2019   Vivek Vanga (CS, Georgia Tech)
2nd place, Argoverse 1.1 3D Tracking NeurIPS Competition, Nov. 2019

Aug. 2019 – Dec. 2020   Hemanth Chittanuru (CS, Georgia Tech)
Topic: End-to-End 3d Object Tracking

Jan. 2020 – Dec. 2020   Chen Liu (CS, Georgia Tech)
Topic: End-to-End 3d Object Tracking

Aug. 2020 – May 2021   Bhavya Bahl (CS, Georgia Tech)
Topic: A Study of Cross-Dataset Transfer Learning for 3d Object Detection
1st place, Argoverse 1.1 3D Object Detection Leaderboard

Dec. 2019 – May 2021   Ayush Baid (CS, Georgia Tech)
Topic: Deep Front Ends for SfM
Topic: Georgia Tech Structure from Motion (GTSfM)

Jan. 2020 – May 2021   Shubhangi Upasani (CS, Georgia Tech)
Topic: Deep Directed Lane Polyline Estimation Using Attraction Fields

Jan. 2020 – May 2021   Jeevanjot Singh (CS, Georgia Tech)
Topic: The Argoverse 3d Lane Estimation Benchmark

Ph.D. Students

Jan. 2020 – Dec. 2020   Andrey Pak (Robotics, Georgia Tech)
Topic: End-to-End 3d Object Tracking
2nd place on Argoverse 1.1 3D Tracking CVPR '20 Competition (Hon. Mention)