

BRIAN OKORN

Research scientist and technical lead with 15+ years of experience in robotics perception, 3D vision, and robot learning. Expert in designing and deploying large-scale deep learning systems for manipulation, novel object detection, and 3D scene understanding. Proven track record of leading multi-person research teams from initial problem formulation through peer-reviewed publication and real-robot deployment.

EMPLOYMENT HISTORY

ROBOTIST AND PROJECT LEAD

Feb 2022 – Present

Robotics and AI Institute

Cambridge, MA

- ◆ **Co-lead a 15+ person research team** building perception and learning systems that enable robots to learn new tasks by watching human demonstrations.
- ◆ **Directly manage 4 Research Scientists and Research Engineers** and coordinate milestones across cross-functional embedded software engineering, ML infrastructure and perception teams.
- ◆ *Show, Don't Tell - Novel Object Detection from Human Demonstrations (Corresponding Author)*
 - ◇ **Designed a self-supervised pipeline** training a bespoke object detector from a single human video, removing language-prompt or manual annotation dependencies.
 - ◇ Authored the Salient Objects pipeline to auto-generate a labeled bounding-box dataset via Human-Object Interaction models.
 - ◇ Fine-tuned a lightweight Manipulated Objects Detector that runs end-to-end (dataset creation to trained detector) in under 10 minutes from a 15-second clip.
 - ◇ Achieved a **66% improvement over RexOmni** and a 150% improvement over GroundingDINO with zero manual annotations.
 - ◇ Deployed systems onto a Boston Dynamics Spot robot for novel object sorting tasks across unseen environments.
 - ◇ Evaluated gaze detection algorithms on EgoExo dataset to capture rich object importance data from human demonstrators.
- ◆ *Anytime Mesh Generation for Robotic Manipulation (Lead)*
 - ◇ **Lead the adaptation of 3D reconstruction models** (SAM3D, TRELLIS) for sub-second object model updates during live robotic manipulation.
 - ◇ **Fine-tuned a 2B parameter flow matching transformer** using depth and multi-view images for joint pose and full-shape estimation from a single frame.
 - ◇ **Designed compressed memory modules** to incrementally update coarse mesh structure and pose as new views stream in.
- ◆ *Geometrically Conditioned Policy Learning (Manager / Technical Advisor)*
 - ◇ Spearheaded a new research initiative to **replace language-only task specifications with rich perceptual representations** (scene graphs, affordance heatmaps), improving diffusion policy generalization.
 - ◇ Benchmarked representations against purely language conditioned policies in generalization to unseen object configurations.

PHD RESEARCHER

Sep 2016 – Dec 2021

Carnegie Mellon Robotics Institute

Pittsburgh, PA

- ◆ **TAX-Pose: Task-Specific Cross-Pose Estimation (CoRL 2022)**: Designed a point cloud based transformer model for estimating task-specific object placement relationships via cross-object correspondences, enabling generalization to novel objects with as few as one demonstration on real robot platforms.
- ◆ **Deep Projective Rotation Estimation through Relative Supervision (CoRL 2022)**: Developed an orientation estimation method utilizing relative supervision and stereographic projection to bypass SO(3) non-convexity, accelerating convergence.
- ◆ **ZePhyR: Zero-Shot Pose Hypothesis Rating (ICRA 2021)**: Invented a hybrid learned/classical hypothesis scoring network estimating 6-DoF pose for novel objects without category-specific training.
- ◆ **Self-Supervised Scene Flow Estimation (CVPR 2020)**: Engineered the first self-supervised method for 3D scene flow estimation from LiDAR point clouds, matching fully supervised models on the real-world KITTI benchmark without ground-truth labels.

PHD RESEARCH INTERN

Jun 2021 – Oct 2021

NVIDIA Seattle Robotics Lab

Seattle, WA

- ◆ Designed and built a photorealistic rendering pipeline dedicated to object-centric learning tasks.
- ◆ Developed zero-shot object detection, segmentation, and relocation methods utilizing neural network-generated feature descriptors.

PHD RESEARCH INTERN

Sept 2018 – Jun 2021
Houston, TX

NASA Johnson Space Center, Robotic Systems Technology Branch

- ◆ Designed and deployed perception algorithms for Robonaut 2, NASA's dexterous humanoid robot.
- ◆ Developed an uncertainty-aware pose estimation system for surgical tool tracking in robot-assisted surgery.
- ◆ Designed visual localization for Robonaut 2 on the International Space Station.

COMPUTER SCIENTIST

Sept 2011 – Aug 2016
San Diego, CA

SPAWAR Systems Center Pacific, Unmanned Systems Branch

- ◆ Researched, developed, and published perception algorithms for autonomous maritime and subterranean systems. Wrote and reviewed government research proposals.
- ◆ **Radar Coastline Localization** (*Technical Lead*): Developed a Furuno Radar ROS driver and point cloud / image-based coastline matching algorithms for maritime localization.
- ◆ **Range Image Odometry** (*Principal Investigator*): Developed and published a 3D flow estimation algorithm from LiDAR range images; managed team budget within 5% of projections.
- ◆ **Counter Tunnel** (*Subject Matter Expert*): Developed subterranean localization algorithms; implemented and open-sourced the 3D Normal Distributions Transform (3DNDT) to PCL with documentation and tutorials.

EDUCATION

PHD IN ROBOTICS

Carnegie Mellon University Robotics Institute

Pittsburgh, PA

MS IN COMPUTER SCIENCE

Vanderbilt University

Nashville, TN

B.E. IN COMPUTER ENGINEERING

Vanderbilt University

Nashville, TN

SKILLS

AI/ML: Transformers, Flow Matching, Self-Supervised Learning, Foundation Models, Fine-tuning, Multimodal Conditioning.

Robotics/Vision: 6-DoF Pose Estimation, 3D Reconstruction, Manipulation, Zero-shot Detection, Tracking, Goal Prediction.

Languages/Tools: Python, C++, PyTorch, Rerun, WandB, ROS, Pytorch3D, Copilot, Claude.

ADDITIONAL INFORMATION

PATENTS

- ◆ **Okorn, B.** et al. *Identifying Objects Using Neural Network-Generated Descriptors*. US20240096074A1, NVIDIA Corporation. Filed Jan. 2022, published Mar. 2024.

SELECTED PUBLICATIONS

- ◆ Akl, J., Avendano Arbelaez, J.N., Barabas, J., Barry, J.L., Ching, K., Eshed, N., Fu, J., Hidalgo, M., Hoelscher, A., Kusnur, T., Messing, A., Nagler, Z., **Okorn, B.**, Passerino, M., Perkins, T.J., Rosen, E., Shah, A., Shankar, T., Shaw, S. "Show, Don't Tell: Detecting Novel Objects by Watching Human Videos." ArXiv 2026
- ◆ Luo, Y., Wonsick, M., Hodgins, J., **Okorn, B.** "Tactile Embeddings for Multi-Task Learning." ICRA 2024.
- ◆ Nan, J., Hodgins, J., **Okorn, B.** "Learning Interaction Constraints for Robot Manipulation via Set Correspondences." ICRA 2024.
- ◆ Pan, C., **Okorn, B.**, Zhang, H., Eisner, B., Held, D. "TAX-Pose: Task-Specific Cross-Pose Estimation for Robot Manipulation." CoRL 2022.
- ◆ **Okorn, B.**, Pan, C., Hebert, M., Held, D. "Deep Projective Rotation Estimation through Relative Supervision." CoRL 2022.
- ◆ **Okorn, B.**, Gu, Q., Hebert, M., Held, D. "ZePHyR: Zero-Shot Pose Hypothesis Rating." ICRA 2021.
- ◆ Mittal, H., **Okorn, B.**, Held, D. "Just Go with the Flow: Self-Supervised Scene Flow Estimation." CVPR 2020, Seattle, WA.

AWARDS & FELLOWSHIPS

- ◆ NASA Space Technology Research Fellowship (NSTRF), 2018