Karthik Desingh, Ph.D.

Assistant Professor

Department of Computer Science and Engineering | Minnesota Robotics Institute (MnRI)
University of Minnesota, Twin Cities
311 Shepherd Labs, 100 Union St. SE, Minneapolis, MN 55455
kdesingh[at]umn[dot]edu | https://rpm-lab.github.io/

Research Interests

Research on robot–object interaction, emphasizing representation learning for multisensory perception, spatial–geometric reasoning, and action learning to advance robot's grasping, manipulation, and mobile manipulation capabilities.

Education

University of Michigan *Ann Arbor, MI, USA*
Ph.D. Computer Science and Engineering *2016 - 2020*
- Advisor: Chad Jenkins
- Committee: Dmitry Berenson, Benjamin Kuipers, Edwin Olson, Gaurav Sukhatme
- Thesis: Efficient Belief Propagation for Perception and Manipulation in Clutter

Brown University *Providence, RI, USA*
MS Computer Science *2013 - 2015*
- Advisor: Chad Jenkins

International Institute of Information Technology *Hyderabad, India*
MS Computer Science *2010 - 2013*
- Advisor: K. Madhava Krishna
- Thesis: Visual Saliency and Next Best View Models for Object Recognition and Search

Osmania University *Hyderabad, India*
BE Electronics and Communication Engineering *2004 - 2008*

Professional Experience

2022- **Assistant Professor**, Department of Computer Science and Engineering, University of Minnesota
2020-2022 **Postdoctoral Scholar**, University of Washington, PI: Dieter Fox
2016-2020 **Graduate Student Research Assistant**, University of Michigan, PI: Chad Jenkins
2013-2015 **Graduate Student Research Assistant**, Brown University, PI: Chad Jenkins
2014-2014 **Summer Intern**, Google Summer of Code, PI: Zoltan Csaba Marton (DLR Germany)
2010-2013 **Graduate Student Research Assistant**, IIIT Hyderabad, PI: K Madhava Krishna
2008-2010 **Software Engineer**, Capgemini, Chennai

Honors & Awards

2022 **Best Workshop Paper Finalist**, Workshop on Scaling Robot Learning,
IEEE International Conference on Robotics and Automation (ICRA)
2021 **Best Systems Paper Finalist**, Conference Oral Presentation,
Conference on Robot Learning (CoRL)
2019 **Best Workshop Paper**, Workshop on Task-Informed Grasping (TIG-II): From Perception to Physical Interaction,
Robotics: Science and Systems (RSS)

Grants

External Sources

2025 — Medtronic-UMN Grant — $ 250,000
- Role: Co-PI
- Lead PI: Dr. Andy Grande (Neurosurgery)
- Other Co-PI(s): Prof. Tim Kowalewski
- Sponsoring organization: Medtronic, Inc.
- Title: “Tele Robotics Used for Stroke Treatment”

University Sources

2025 — Grant-in-Aid of Research, Artistry, and Scholarship — $ 5,200
- Role: Co-PI
- Lead PI: Prof. Lana Yarosh
- Other Co-PI(s): Prof. Daniel Keefe
- Title: “Advanced Laser Cutting and Multi-Material 3D Printing Equipment for Rapid Prototyping in Computing”

2025 — MnRI Seed Grant — $ 35,000, conditional ext $15,000
- Role: Co-PI
- Lead PI: Dr. Andy Grande (Neurosurgery)
- Other Co-PI(s): Prof. Tim Kowalewski
- Title: “Transforming Stroke Treatment via Telerobotic Stroke Intervention”
- Sponsoring Institute: Minnesota Robotics Institute

2025 — MnRI Seed Grant — $ 35,000
- Role: Co-PI
- Lead PI: Prof. Jean-Paul Noel
- Title: “Developing efficient, robust, and general-purpose networks for navigate-to-target tasks by brain-demonstration”
- Sponsoring Institute: Minnesota Robotics Institute

2025 — MnDRIVE DSI Rapid Response Grant - 2025 — $ 15,000
- Role: Lead-PI
- Other Co-PI(s): Mark Wehde
- Title: “Leveraging Large Foundation Models for Semantic Mapping of University Buildings by Robot Dog”
- Sponsoring Institute: Data Science Institute

2024 — MnDRIVE DSI Rapid Response Grant - 2025 — $ 15,000
- Role: Co-PI
- Lead PI: Prof. Jean-Paul Noel
- Title: “Learning latent causal structures and making predictions from multisensory observations”
- Sponsoring Institute: Data Science Institute

2024 — MnRI Seed Grant — $ 30,000
- Role: Lead-PI
- Other Co-PI(s): Prof. Bradley T. Holschuh
- Title: “Embracing Contacts in Robotic Manipulation Tasks with *Robot-Worn* Technologies”
- Sponsoring Institute: Minnesota Robotics Institute

2023 — Early Innovation Fund — $ 10,000
- Role: Single-PI
- Title: “Scaled Robotic-Arm-Gripper Setup for Collecting Human-Demonstrations”
- Sponsoring Institute: Research & Innovation Office

2023	MnDRIVE UMII Seed Grant • Role: Single-PI • Title: "Sensing and Perceiving Recyclables for Robotic Sort-Empty-Clean-Drying Tasks" • Sponsoring Institute: University of Minnesota Informatics Institute	$ 10,000
2023	MnRI Seed Grant • Role: Lead-PI • Other Co-PI(s): Prof. Dongyeop Kang • Title: "Controlling Robot Manipulator with Language Instructions" • Sponsoring Institute: Minnesota Robotics Institute	$ 40,000

Grant Efforts before PI Desingh joined UMN

- Co-authored a grant proposal for REU program with Dieter Fox (PI) as a supplement to an existing *NSF-NRI Award #2024057*, titled "Collaborative Research: NRI: FND: Graph Neural Networks for Multi-Object Manipulation," *2022, Awarded $16,000*.
- Authored a research proposal for undergraduate research project "Spatial and Geometrical Reasoning of Objects for Robot Task Planning" to UW Allen School Postdoc Research Award, Autumn 2021 cycle, *Awarded $10,000*.
- Co-authored a grant proposal for REU program with Dieter Fox (PI) as a supplement to an existing *NSF-NRI Award #2024057*, titled "Collaborative Research: NRI: FND: Graph Neural Networks for Multi-Object Manipulation," *2021, Awarded $8,000*.
- Co-authored NSF-NRI grant proposal with Chad Jenkins (PI) and Joseph J. LaViola (PI) on "NRI: Collaborative Research: Sketching Geometry and Physics Informed Inference for Mobile Robot Manipulation in Cluttered Scenes," *Award #1638047, 2016-2019, $400,000*.

Publications

Underlined names indicates students advised by PI Desingh

Conference Publications

C17. Ryan Diaz, Adam Imdieke, Vivek Veeriah, **Karthik Desingh**, "AugInsert: Learning Robust Visual-Force Policies via Data Augmentation for Object Assembly Tasks," *IEEE/RSJ International Conference on Intelligent Robots and Systems. (IROS) 2025, Accepted for publication.*

C16. Xun Tu, **Karthik Desingh**, "SuperQ-GRASP: Superquadrics-based Grasp Pose Estimation on Larger Objects for Mobile-Manipulation," *IEEE International Conference on Robotics and Automation. (ICRA) 2025.*

C15. Chahyon Ku, Carl Winge, Ryan Diaz, Wentao Yuan, **Karthik Desingh**, "Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning," *IEEE International Conference on Robotics and Automation 831-837. (ICRA) 2024.*

C14. Alireza Rezazadeh, Athreyi Badithela, **Karthik Desingh***, Changhyun Choi*, "SlotGNN: Unsupervised Discovery of Multi-Object Representations and Visual Dynamics," *IEEE International Conference on Robotics and Automation, 17508-17514. (ICRA) 2024.* (*equal contributions).

C13. Aaron Walsman, Muru Zhang, Klemen Kotar, **Karthik Desingh**, Ali Farhadi, Dieter Fox, "Break and Make: Interactive Structural Understanding Using LEGO Bricks," *European Conference on Computer Vision. (ECCV) 2022.*

C12. Wentao Yuan, Chris Paxton, **Karthik Desingh**, and Dieter Fox, "SORNet: Spatial Object-Centric Representations for Sequential Manipulation," *Proceedings of the Conference on Robot Learning. (CoRL) 2021,* Finalist best systems paper.

C11. Junha Roh, **Karthik Desingh**, Ali Farhadi, and Dieter Fox, "LanguageRefer: Spatial-Language Model for 3D Visual Grounding," *Proceedings of the Conference on Robot Learning. (CoRL) 2021.*

C10. Jana Pavlasek, Stanley Lewis, **Karthik Desingh**, and Odest Chadwicke Jenkins. "Parts-based articulated object localization in clutter using belief propagation." *In IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 10595-10602. (IROS) 2020*.

C9. **Karthik Desingh**, Shiyang Lu, Anthony Opipari, and Odest Chadwicke Jenkins. "Factored pose estimation of articulated objects using efficient nonparametric belief propagation." *In International Conference on Robotics and Automation, pp. 7221-7227. (ICRA) 2019*.

C8. Zhen Zeng, Yunwen Zhou, Odest Chadwicke Jenkins, and **Karthik Desingh**. "Semantic mapping with simultaneous object detection and localization." *In IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 911-918. (IROS) 2018*.

C7. Mehran Maghoumi, Joseph J. LaVioia, **Karthik Desingh**, and Odest Chadwicke Jenkins. "Gemsketch: Interactive image-guided geometry extraction from point clouds." *In IEEE International Conference on Robotics and Automation, pp. 2184-2191. (ICRA) 2018*.

C6. Sai R. Gouravajhala, Jinyeong Yim, **Karthik Desingh**, Yanda Huang, Odest Chadwicke Jenkins, and Walter S. Lasecki. "Eureca: Enhanced understanding of real environments via crowd assistance." *In Sixth AAAI conference on human computation and crowdsourcing. (HCOMP) 2018*.

C5. Nediyana Daskalova, **Karthik Desingh**, Alexandra Papoutsaki, Diane Schulze, Han Sha, and Jeff Huang. "Lessons learned from two cohorts of personal informatics self-experiments." *In the proceedings of the ACM on interactive, mobile, wearable and ubiquitous technologies 1, no. 3 : 1-22. (UbiComp) 2017*.

C4. **Karthik Desingh**, Odest Chadwicke Jenkins, Lionel Reveret, and Zhiqiang Sui. "Physically plausible scene estimation for manipulation in clutter." *In IEEE-RAS 16th International Conference on Humanoid Robots, pp. 1073-1080. (Humanoids) 2016*.

C3. Zhiqiang Sui, Odest Chadwicke Jenkins, and **Karthik Desingh**. "Axiomatic particle filtering for goal-directed robotic manipulation." *In IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 4429-4436. (IROS) 2015*.

C2. **Karthik Desingh**, K. Madhava Krishna, Deepu Rajan, and C. V. Jawahar. "Depth really Matters: Improving Visual Salient Region Detection with Depth." *In British Machine Vision Conference, pp. 1-11. (BMVC) 2013*.

C1. **Karthik Desingh**, Akhil Nagariya, and K. Madhava Krishna. "Viewpoint based mobile robotic exploration aiding object search in indoor environment." *In Proceedings of the Eighth Indian Conference on Computer Vision, Graphics and Image Processing, pp. 1-8. (ICVGIP) 2012*.

Journal Articles

J6. Alireza Rezazadeh, Houjian Yu, **Karthik Desingh**, and Changhyun Choi. "InvSlotGNN: Unsupervised Discovery of Viewpoint Invariant Multi-Object Representations and Visual Dynamics." *In IEEE Transactions on Robotics, vol. 41, pp. 1812-1824, 2025.*

J5. Carl Winge, Adam Imdieke, Bahaa Aldeeb, Dongyeop Kang, and **Karthik Desingh**. "Talk Through It: End User Directed Manipulation Learning." *In IEEE Robotics and Automation Letters, 9(9), 8051-8058, 2024.*

J4. Anthony Opipari, Jana Pavlasek, Chao Chen, Shoutian Wang, **Karthik Desingh** and Odest Chadwicke Jenkins. "DNBP: Differentiable Nonparametric Belief Propagation." *In ACM / IMS Journal of Data Science, 2023.*

J3. Thomas Cohn, Odest Chadwicke Jenkins, **Karthik Desingh**, and Zhen Zeng. "TSBP: Tangent Space Belief Propagation for Manifold Learning." *In IEEE/RSJ International Conference on Intelligent Robots and Systems. (RA-L) 2020, Presented at IROS 2020*.

J2. **Karthik Desingh**, Shiyang Lu, Anthony Opipari, and Odest Chadwicke Jenkins. "Efficient nonparametric belief propagation for pose estimation and manipulation of articulated objects." *Science Robotics 4, no. 30 (2019)*.

J1. Zhiqiang Sui, Lingzhu Xiang, Odest Chadwicke Jenkins, and **Karthik Desingh**. "Goal-directed robot manipulation through axiomatic scene estimation." *In the International Journal of Robotics Research 36, no. 1 : 86-104. (IJRR) 2017.*

Peer Reviewed Workshops

W17. Raj Surya Rajendran Kathirvel, Zachary Chavis, Stephen J. Guy, and **Karthik Desingh**. "SENT-Map: Semantically Enhanced Topological Maps with Foundational Models." *Workshop on Foundation Models and Neuro-Symbolic AI for Robotics at ICRA 2025.*

W16. Ryan Diaz, Adam Imdieke, Vivek Veeriah, and **Karthik Desingh**. "AugInsert: Learning Robust Visual-Force Policies via Data Augmentation for Object Assembly Tasks." *Beyond Pick and Place — Unifying Learning-Based and Model-Based Approaches for Contact-Rich Manipulation at ICRA 2025.*

W15. Adam Imdieke, and **Karthik Desingh**. "SPARK-Remote: A Cost-Effective System for Remote Bimanual Robot Teleoperation." *3rd Workshop on Human-Centric Multilateral Teleoperation at ICRA 2025.*

W14. Carl Winge, Adam Imdieke, Bahaa Aldeeb, Dongyeop Kang, and **Karthik Desingh**. "Talk Through It: End User Directed Manipulation Learning." *First Workshop on Vision-Language Models for Navigation and Manipulation at ICRA 2024.*

W13. Chahyon Ku, Carl Winge, Ryan Diaz, Wentao Yuan, **Karthik Desingh**, "Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning," *Pretraining for Robotics Workshop - CoRL 2023*

W12. Bahaa Aldeeb, Sahith Chada, **Karthik Desingh**, "GANOCS: Domain Adaptation of Normalized Object Coordinate Prediction Using Generative Adversarial Training," *Out-of-Distribution Generalization in Robotics Workshop - CoRL 2023*

W11. Ian Gonsher, Yuxin Han, **Karthik Desingh**, Aaron Gokaslan, "Prototyping Mixed Reality Large Screen Mobile Telepresence Robots," *5th International Workshop on Virtual, Augmented, and Mixed Reality for HRI 2022*

W10. Wentao Yuan, Chris Paxton, **Karthik Desingh**, and Dieter Fox, "SORNet: Spatial Object-Centric Representations for Sequential Manipulation," *ICRA 2022 Workshop on Scaling Robot Learning* - Finalist best workshop paper.

W9. Anthony Opipari, Jana Pavlasek, Chao Chen, Shoutian Wang, **Karthik Desingh**, Odest Chadwicke Jenkins, "Differentiable Nonparametric Belief Propagation," *ICRA 2022 Workshop on Robotic Perception and Mapping: Emerging Techniques* - Oral presentation (2/46).

W8. Wentao Yuan, Chris Paxton, **Karthik Desingh**, and Dieter Fox, "SORNet: Spatial Object-Centric Representations for Sequential Manipulation," *RSS 2021 Workshop on Declarative and Neurosymbolic Representations in Robot Learning and Control.*

W7. Aaron T. Walsman, Muru Zhang, Adam Fishman, **Karthik Desingh**, Dieter Fox, and Ali Farhadi, "LegoTron: An Environment for Interactive Structural Understanding," *CVPR 2021 Embodied AI Workshop.*

W6. **Karthik Desingh**, Jana Pavlasek, Cigdem Kokenoz, and Odest Chadwicke Jenkins, "Tracking Large Scale Articulated Models with Belief Propagation for Task Informed Grasping and Manipulation," *RSS 2019 Workshop: Task-Informed Grasping (TIG-II): From Perception to Physical Interaction* - Best workshop paper.

W5. Jana Pavlasek , **Karthik Desingh**, Odest Chadwicke Jenkins, "Scene Understanding using Part-Based Object Affordances," *RSS 2019 Workshop: Women in Robotics.*

W4. Sina Masnadi, Joseph J. LaViola, Jana Pavlasek, Xiaofan Zhu, **Karthik Desingh**, and Odest Chadwicke Jenkins, "Sketching Affordances for Human-in-the-loop Robotic Manipulation Tasks," *ICRA 2019 Workshop: 2nd Robot Teammates Operating in Dynamic, Unstructured Environments (RT-DUNE).*

W3. **Karthik Desingh**, Anthony Opipari, and Odest Chadwicke Jenkins, "Analysis of Goal-directed Manipulation in Clutter using Scene Graph Belief Propagation," *ICRA 2018 Workshop: Multimodal Robot Perception - Perception, Inference and Learning for Joint Semantic, Geometric and Physical Understanding.*

W2. **Karthik Desingh**, Mehran Maghoumi, Joseph J. LaViola, and Odest Chadwicke Jenkins, "Object Manipulation in Cluttered Scenes Informed by Physics and Sketching," *RSS 2016 Workshop: Geometry and Beyond - Representations, Physics and Scene Understanding for Robotics.*

W1. Zhiqiang Sui, Odest Chadwicke Jenkins, and **Karthik Desingh**, "Axiomatic Scene Estimation for Robotic Manipulation," *ICRA 2015 Workshop: Robotic Hands, Grasping and Manipulation.*

Abstracts

A1. **Karthik Desingh**, "Perception for general-purpose robot manipulation," *Proceedings of the AAAI Conference on Artificial Intelligence 13th ed., vol. 37, 15435–15435, 2023.*

Preprints only

P4. Adam Imdieke, **Karthik Desingh**, "SPARK-Remote: A Cost-Effective System for Remote Bimanual Robot Teleoperation," *arXiv preprint arXiv:2504.05488, 2025.*

P3. Sina Masnadi, Joseph J. LaViola, Xiaofan Zhu, **Karthik Desingh**, Odest Chadwicke Jenkins, "A Sketch-Based System for Human-Guided Constrained Object Manipulation," *arXiv preprint arXiv:1911.07340, 2019.*

P2. **Karthik Desingh**, Anthony Opipari, and Odest Chadwicke Jenkins, "Pull Message Passing for Nonparametric Belief Propagation," *arXiv preprint arXiv:1807.10487, 2018.*

P1. Nediyana Daskalova, **Karthik Desingh**, Jin Young Kim, Lixiang Zhang, Alexandra Papoutsaki, and Jeff Huang, "A Cohort of Self-Experimenters: Lessons Learned from N=1 Personal Informatics Experiments," *Review available online, 2017.*

Invited Talks & Presentations

Jun 2025 **Invited research talk**, "Object Assembly: A Spatial-Geometric Reasoning Pathway to Physical Intelligence," 2025 Midwest Robotics Workshop (MWRW), Host: Ram Vasudevan (UMich) *TTIC - Chicago, IL*

May 2025 **Invited research briefing**, "Robotics: Perception and Manipulation Lab Research Showcase," MnRI Industrial Advisory Board meeting, Host: Tariq Samad *Minneapolis, MN*

Nov 2024 **Invited research briefing**, "Robotics: Perception and Manipulation Lab Research Showcase,"
Medtronic-UMN meeting, Host: Nikos Papanikolopoulos *Minneapolis, MN*

Nov 2024 **Guest lecture**, "Object Assembly: A Spatial-Geometric Reasoning Pathway to Physical Intelligence,"
Host: Yu Xiang *University of Texas - Dallas, TX (online)*

May 2024 **Invited research briefing**, "Robotics: Perception and Manipulation Lab Research Showcase,"
PAR Systems UMN campus visit, Host: Nikos Papanikolopoulos *Minneapolis, MN*

Nov 2023 **Invited research briefing**, "Robotics: Perception and Manipulation Lab Research Showcase,"
MnRI Research Showcase, Host: Nikos Papanikolopoulos *Minneapolis, MN*

Feb 2023 **New Faculty Highlights @ AAAI-23 Conference**, "Perception for General-purpose Robot Manipulation,"
Washington DC

Oct 2022 **Invited research talk**, "Explicit and Implicit Object Representations for Robust and Generalized Perception in Robotics,"
Minnesota Robotics Institute (MnRI) - Colloquium, Host: Nikos Papanikolopoulos, *Minneapolis, MN*

Aug 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
IIIT Hyderabad, Host: K Madhava Krishna, *Hyderabad, India*

Jun 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
ETH Zürich, Host: Suryansh Kumar, *Zürich, Switzerland*

Mar 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
Microsoft, Host: Sai Vemprala, *Seattle, WA (online)*

Feb 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
University of Minnesota, Host: Volkan Isler, *Minneapolis, MN (online)*

Feb 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
Worcester Polytechnic Institute, Host: Jing Xiao, *Worcester, MA (online)*

Jan 2022 **Invited research talk**, "Robust and Generalized Perception Towards Mainstreaming Domestic Robots,"
Simon Fraser University, Host: Steve Ko, *Vancouver, BC Canada (online)*

Nov 2021 **Invited research talk**, "Learning Object-centric Representations for Robot Manipulation,"
Cornell Robotics Seminar, Host: Tapo Bhattacharjee, *Ithaca, NY (online)*

Sept 2021 **Invited research talk**, "Learning Object-centric Representations for Robot Manipulation,"
IROS 2021, 5th Workshop on Semantic Policy and Action Representations for Autonomous Robots (SPAR), *Prague, Czech Republic (online)*

Aug 2021 **Research presentation**, "Object Pose Estimation and Tracking for Curiosity-Driven Object Exploration,"
Curious Minded Machines final project meeting, funded by Honda Research Institute *(online)*

Nov 2019 **Invited research talk**, "Efficient Belief Propagation for Robot Manipulation in Clutter,"
Host: Dieter Fox, *University of Washington, Seattle, WA*

Aug 2019 **Invited research talk**, "Efficient Belief Propagation for Robot Manipulation in Clutter,"
Hosts: Gaurav Sukhatme and Joseph Lim, *University of Southern California, Los Angeles, CA*

Aug 2019 **Invited research talk**, "Efficient Belief Propagation for Robot Manipulation in Clutter,"
Host: Aaron Dollar, *Yale University, New Haven, CT*

Apr 2019 **Invited research talk**, "Robots working in human environments,"
ML Conference, *East Michigan University, Ypsilanti, MI*

Jun 2019 **Poster presentation**, "Efficient nonparametric belief propagation for pose estimation and manipulation of articulated objects,"
New England Manipulation Symposium, *Columbia University, New York*

May 2019 **Paper presentation**, "Factored pose estimation of articulated objects using efficient nonparametric belief propagation,"
ICRA 2019, *Montreal, Canada*

Mar 2019 **Invited research poster**, "Factored pose estimation of articulated objects using efficient nonparametric belief propagation,"
Amazon Graduate Research Symposium, *Seattle, WA*

Nov 2018 **Poster presentation**, "Factored pose estimation of articulated objects using efficient nonparametric belief propagation,"
Michigan AI symposium, *Ann Arbor, MI*

Oct 2018 **Research talk**, "Factored pose estimation of articulated objects using efficient nonparametric belief propagation,"
Michigan AI honors competition, *Ann Arbor, MI*

Oct 2018 **Poster presentation**, "NRI: Collaborative Research: Sketching Geometry and Physics Informed Inference for Mobile Robot Manipulation in Cluttered Scenes,"
NSF-NRI PI meeting, *Arlington, VA*

May 2018 **Paper presentation**, "GemSketch: Interactive Image-Guided Geometry Extraction from Point Clouds,"
ICRA 2018, *Brisbane, Australia*

Nov 2017 **Poster presentation**, "A Nonparametric Approach to Scene Estimation with Inter-object Relations towards Goal-directed Manipulation,"
Engineering Graduate Symposium, *Ann Arbor, MI*

Jun 2017 **Poster presentation**, "A Nonparametric Approach to Scene Estimation with object-object interactions towards Goal-directed Manipulation,"
New England Manipulation Symposium, *North Eastern University, Boston, MA*

Nov 2016 **Paper presentation**, "Physically Plausible Scene Estimation for Manipulation in Clutter,"
IEEE Humanoids Conference, *Cancun, Mexico*

Jul 2016 **Poster presentation**, "Object Manipulation in Cluttered Scenes Informed by Physics and Sketching,"
RSS 2016 Workshop: Geometry and Beyond - Representations, Physics and Scene Understanding for Robotics, *Ann Arbor, MI*

May 2015 **Poster presentation**, "Axiomatic Scene Estimation for Robotic Manipulation,"
ICRA Ph.D. forum, *Seattle, WA*

May 2015 **Poster presentation**, "Axiomatic Scene Estimation for Robotic Manipulation,"
New England Manipulation Symposium, *North Eastern University, Boston, MA*

Student Advising

*Students who co-authored above listed publications/articles are indicated with *.*

PhD Students

2024-	Adam Imdieke* (*Ph.D. in CS &E*)	
2024-	Hanchen Cui (*Ph.D. in CS &E*)	
2023-	Xun Tu* (*Ph.D. in CS &E*)	
2023-2025	Guanang Su (*Ph.D. in CS &E*)	now Ph.D. student at UMN
2023-2024	Alireza Rezazadeh* (*ECE, co-advised by Prof. Choi*)	now AI research scientist at Accenture

MS Students

2025-	Andrew Liao (*thesis, MS in Robotics*)	
2024-	Pranay Junare (*thesis, MS in Robotics*)	
2024-	Tzu-Hsien Lee (*thesis, MS in Robotics*)	
2024-	Fidan Mahmudova (*thesis, MS in Robotics*)	
2024-	Raj Surya* (*capstone, MS in Robotics*)	
2024-	Mohit Yadav (*capstone, MS in Robotics*)	
2024-	Siddharth Senthilnathan (*capstone, MS in Robotics*)	
2024-	Nirshal Chandra Sekar (*thesis, MS in Robotics*)	
2023-2024	Amarachi Nzeukwu (*capstone, MS in Robotics*)	now data platform engineer, Voltaiq
2023-2024	Adam Imdieke* (*thesis, MS in Robotics*)	now Ph.D. student at UMN
2023-2024	Michael Andrev (*directed research, MS in CS&E*)	now SDE at Allianz
2023-2024	Sahith Reddy Chada* (*capstone, MS in Robotics*)	now research engineer at Honda Research Institute
2023-2024	Nirmal Raj (*capstone, MS in Robotics*)	now SDE at AWS
2022-2024	Carl Winge* (*thesis, MS in Robotics*)	now software & controls engineer, self-employed
2022-2024	Chahyon Ku* (*thesis, MS in Robotics*)	now Ph.D. student at UMichigan
2022-2024	Aaron Fernandes (*capstone, MS in Robotics*)	now engineer at newport news shipbuilding
2022-2023	Miles Priebe (*capstone, MS in Robotics*)	now software engineer at Merlin Labs
2022-2022	Roman Woolery (*capstone, MS in Robotics*)	

Undergraduate Students

2025-	Minghao Zou (*UG in CS&E*)	
2025-	Pearl Jain (*UG in CS&E*)	
2024-	Julian Byrne (*UG in CS&E*)	

2024-	Adit Kadepurkar (*UROP, UG in CS&E*)	
2024-2025	Mason Hawver (*UROP, UG in CS&E*)	now software engineer RTX
2024-2025	Ryan Roche (*honors thesis, UROP, UG in CS&E*)	now software engineer at US Bank
2023-2025	Ryan Diaz* (*honors thesis, UROP, UG in CS&E*)	now Ph.D. student at Rice Univ
2022-2024	Athreyi Badithela* (*honors thesis, UROP, UG in CS&E*)	now Ph.D. student at UMN
Sumr-2025	Salviya Balami (*REU from Caltech*)	
Sumr-2024	Josh Mansky (*Intern from Purdue Univ*)	
Sumr-2023	Thomas Kaminsky (*Visitor from Harvard Univ*)	now Ph.D. student at Harvard Univ
Sumr-2023	Revanth Krishna (*REU from Purdue Univ*)	
Sumr-2023	Duc Hoa Nguyen (*REU from UCLA*)	

Thesis Committee

Ph.D. in Computer Science & Engineering

2025	**Athanasios Bacharis**, *Final Defense* Thesis: Active Vision for Efficient 3D Reconstruction and Rendering	*Prof. Nikos Papanikolopoulos*
2025	**Jiacheng Yuan**, *Final Defense* Thesis: Robotic Perception and Manipulation in Unstructured Environments with Partial Observations	*Prof. Volkan Isler*
2023	**Nicolai Haeni**, *Final Defense* Thesis: Supervised and Unsupervised Methods for Vision-Based Object Detection, Counting and 3D Reconstruction	*Prof. Volkan Isler*
2025	**Oguzhan Goktug Poyrazoglu**, *Preliminary Exam*	*Prof. Volkan Isler*
2025	**Xun Tu**, *Preliminary Exam*	*Prof. Karthik Desingh*
2024	**David Widhalm**, *Preliminary Exam*	*Prof. Junaed Sattar*
2023	**Burak Mert Gonultas**, *Preliminary Exam*	*Prof. Volkan Isler*
2023	**Corey Knutson**, *Preliminary Exam*	*Prof. Junaed Sattar*
2023	**Yifeng Zhang**, *Preliminary Exam*	*Prof. Catherine Qi Zhao*

Ph.D. in Electrical Engineering

2025	**Darya Biparva**, *Final Defense* Thesis: Causal and System-Theoretic Approaches to Interpretable Machine Learning	*Prof. Donatello Materassi*
2024	**Alireza Rezazadeh**, *Final Defense* Thesis: Learning Graph-Structured Representations for Robotic Manipulation	*Prof. Choi & Desingh*
2023	**Xibai Lou**, *Final Defense* Thesis: Efficient Robotic Manipulation with Scene Knowledge	*Prof. Changhyun Choi*
2024	**Darya Biparva**, *Preliminary Exam*	*Prof. Donatello Materassi*
2023	**Alireza Rezazadeh**, *Preliminary Exam*	*Prof. Choi & Desingh*
2023	**Houjian Yu**, *Preliminary Exam*	*Prof. Changhyun Choi*

Masters Program

2024	**Chahyon Ku**, *Robotics*, *Thesis Defense* Title: Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning	*Prof. Karthik Desingh*
2024	**Carl Winge**, *Robotics*, *Thesis Defense* Title: Talk Through It: End User Directed Manipulation Learning	*Prof. Karthik Desingh*
2024	**Chase Anderson**, *Electrical & Computer Engineering*, *Thesis Defense* Title: AGGRO: Autonomous Gatherer with Guided Retrieval Operations	*Prof. Changhyun Choi*
2024	**Nikhilanj Venkata Pelluri**, *Robotics*, *Capstone Project* Title: Transformers for Image-Goal Navigation	*Prof. Changhyun Choi*
2024	**Amarachi Nzeukwu**, *Robotics*, *Capstone Project* Title: Imitation Learning Policy for Collision-free Grasping in Cluttered Shelf Scene	*Prof. Karthik Desingh*

2024 **Sahith Reddy Chada**, *Robotics*, *Capstone Project* — *Prof. Karthik Desingh*
Title: Generating Topological Map for Mobile Manipulation

2024 **Nirmal Raj**, *Robotics*, *Capstone Project* — *Prof. Karthik Desingh*
Title: Localization Using Neural Radiance Fields

2024 **Aaron Fernandes**, *Robotics*, *Capstone Project* — *Prof. Karthik Desingh*
Title: Soft-Bubble Grippers: Pose Estimation using Point Cloud Data

2023 **Miles Priebe**, *Robotics*, *Capstone Project* — *Prof. Karthik Desingh*
Title: Applications of the Soft Bubble Grippers: Visuotactile Sensing for Visuomotor Policy Learning via Action Diffusion

2023 **Roman Woolery**, *Robotics*, *Capstone Project* — *Prof. Karthik Desingh*
Title: Interactive Pose Demonstration

External Thesis Committee

2022 **Anurag Sahu**, *MS Robotics, IIIT Hyderabad*, *Thesis Defense* — *Prof. Madhava Krishna*
Title: Monocular Multilayer Layout Estimation for Warehouses

Teaching Experience

Spr 2025 **CSCI 5551: Introduction to Intelligent Robotic Systems**, Instructor — *Univ of Minnesota*
Faculty Instructor(s): Self, course page

Fall 2024 **CSCI 5980: Deep Learning for Robot Manipulation**, Instructor — *Univ of Minnesota*
Faculty Instructor(s): Self, course page

Spr 2024 **CSCI 5551: Introduction to Intelligent Robotic Systems**, Instructor — *Univ of Minnesota*
Faculty Instructor(s): Self, course page

Fall 2023 **CSCI 5551: Introduction to Intelligent Robotic Systems**, Instructor — *Univ of Minnesota*
Faculty Instructor(s): Self, course page

Spr 2023 **CSCI 5980: Deep Learning for Robot Perception and Manipulation**, Instructor — *Univ of Minnesota*
Faculty Instructor(s): Self, course page

Spr 2022 **CSE 571: Robotics**, Guest Lecturer — *Univ of Washington*
Faculty Instructor(s): Dieter Fox, course page

Win 2022 **TECHIN 516 Robotics Lab 1: Robotic Sensing And Mobility**, Guest Lecturer — *Univ of Washington*
Faculty Instructor(s): John Raiti

Spr 2021 **CSE 571: AI-Based Mobile Robotics**, Guest Lecturer & Course Staff — *Univ of Washington*
Faculty Instructor(s): Dieter Fox, course page, project videos

2020-2021 **CSE 590R: Robotics Seminar**, Co-instructor - Fall'20, Win'20, Spr'21, Fall'21 — *Univ of Washington*
Faculty Instructor(s): Dieter Fox, Maya Cakmak, course page

Win 2021 **TECHIN 516 Robotics Lab 1: Robotic Sensing And Mobility**, Guest Lecturer — *Univ of Washington*
Faculty Instructor(s): Maru Cabrera

F'19-Sp'20 **EECS 280: Programming and Intro Data Structures**, Graduate Student Instructor — *Univ of Michigan*
Faculty Instructor(s): Jonathan Beaumont, James Juett, Sofia Saleem, Nicole Hamilton, course page

Spr 2019 **EECS 467: Autonomous Robotics Laboratory**, Graduate Student Instructor — *Univ of Michigan*
Faculty Instructor(s): Chad Jenkins, project videos

Fall 2015 **CS 1951-C: Designing Humanity Centered Robots**, Teaching Assistant — *Brown University*
Faculty Instructor(s): Michael Littman, Ian Gonsher, course page

Fall 2014 **CS 2951-P: Human Robot Interaction Seminar course**, Teaching Assistant — *Brown University*
Faculty Instructor(s): Chad Jenkins, course page

Fall 2012 **CSE 478: Mobile Robotics**, Teaching Assistant — *IIIT - Hyderabad*
Faculty Instructor(s): K Madhava Krishna

Service, Outreach & Professional Development

Professional Memberships

- Senior Program Committee Member - AAAI, 2025.
- Program Committee Member - International Joint Conferences on Artificial Intelligence (IJCAI) 2020-2024.
- Program Committee Member - International Conference on Robot Learning (CoRL) 2020-2021.

Editorial Service

- Associate Editor - IEEE Robotics and Automation Letters (RA-L), 2024.
- Associate Editor - IEEE International Conference on Robotics and Automation (ICRA) – Workshops, 2024.
- Associate Editor - IEEE/RSJ International Conference on Robots and Systems (IROS) 2022, 2024.

Peer Reviewing

- Journal Reviewer - Science Robotics, 2025
- Journal Reviewer - IEEE Robotics and Automation Letters (RA-L) 2019 – 2021, 2023 - 2025.
- Journal Reviewer - Autonomous Robots Journal (AURO) 2017, 2018, 2025.
- Journal Reviewer - Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2022
- Conference Reviewer - IEEE International Conference on Robotics and Automation (ICRA) 2016, 2021 – 2025.
- Conference Reviewer - IEEE/RSJ International Conference on Robots and Systems (IROS) 2016, 2020 – 2022, 2025.
- Conference Reviewer - Robotics: Science and Systems (RSS)
- Conference Reviewer - IEEE-RAS International Conference on Humanoid Robotics (Humanoids) 2016.
- Conference Reviewer - AAAI Conference on Artificial Intelligence 2017.
- Conference Reviewer - International Joint Conferences on Artificial Intelligence (IJCAI) 2021 – 2022.
- Conference Reviewer - International Conference on Robot Learning (CoRL) 2020, 2021, 2023, 2025.
- Conference Reviewer - Robotics: Science and Systems (RSS) - 2025.
- Workshop Reviewer - CVPR 2021 Workshop on 3D Vision and Robotics
- Workshop Reviewer - Robotics: Science and Systems (RSS) Pioneers - 2018, 2021.

Session Chair

- IEEE International Conference on Robotics and Automation, Atlanta, 2025
- AAAI Conference on Artificial Intelligence - Washington DC, 2023.

Workshop/Symposium/Colloquium Organizer

- Minnesota Robotics Institute Research Showcase 2023, University of Minnesota, MN, Nov 2023.
- NeuRL-RMW: Workshop for Neural Representation Learning for Robot Manipulation as part of CoRL Conference, Atlanta, GA, Nov 2023.
- Chair, Minnesota Robotics Institute Fall 2023 Colloquium Series, University of Minnesota, MN, Fall 2023 -present.
- Organizer, University of Washington Robotics Colloquium, University of Washington, Fall 2020 - Fall 2021

Grant Reviewer/Panelist

- Army Research Office (ARO) Proposal Reviewer, 2023, 2025.
- NIFA Grant Review Panelist, 2025.
- Reviewer, RC Seed Grant Program, University of Minnesota, 2023.

Mentoring Activities

- Mentor, Inclusion@RSS - Robotics: Science and Systems, 2021, 2022.
- Mentor for applicants from historically marginalized groups, Pre-Application Review Service (PARS), University of Washington, Fall 2020.
- Alumni mentor, Graduate Rackham International (GRIN) Speed Mentoring Event, University of Michigan, Fall 2020.
- Staff mentor for freshmen, University Mentorship Program, University of Michigan, Fall 2018.

Robotics Lab Tours - Outreach

- Robot demonstration — AI Explorers Camp (2025)
- Robot demonstration — Summer Tech Camp (2025)
- Robot demonstration — MN 4-H STEM & Agriscience—LCCMR MnRI tour (2025)
- Robot demonstration — Potential Energy Robotics Group & FIRST Robotics Team (2025)
- Robot demonstration — Hiawatha Academies—MnRI tour (8th grade) (2024)
- Robot demonstration — Homeschool & Co-op Program of Minnesota (ages 3–11) (2024)
- Robot demonstration — Delegation from Shanghai University of Science & Engineering—MnRI tour (2024)
- Robotics lab tour — K–12 outreach (2024)
- Robotics lab tour — Cornerstone Montessori Elementary School (ages 10–12) (2023)
- Robotics lab tour — Undergraduate Lab Exploration Event (2023)
- Robot demonstration — UMN Vice President for Research—MnRI tour (2023)
- Robotics lab tour — Society of Women Engineers (SWE) (2022)
- Robotics lab tour organizer — Explore Graduate Studies (EGS) Workshop, University of Minnesota (Spring 2019)
- Robotics lab tour organizer — CS KickStart Program, University of Michigan (Fall 2018)
- Robotics lab tour organizer — GEECS (Girls in Electrical Engineering & Computer Science), University of Michigan (Spring 2018)
- Robotics lab tour organizer — CS Visit Day, University of Michigan (Spring 2017)

Service to the University/College/Department

- Faculty Member, **CS&E Ph.D. Admission Committee**, *University of Minnesota,* 2023-2025
- Invited Panelist, **Academic Job Market Panel**, *University of Minnesota,* Nov, 2022
- Invited Panelist, **Academic Careers Panel Discussion**, *University of Washington,* Oct, 2022
- Application reviewer, **Graduate Admission Committee**, *University of Washington,* Fall 2021
- Student committee member, **Graduate Admission Committee**, *University of Michigan,* Fall 2018
- Graduate student member, **Graduate Employee Organization (GEO)**, *University of Michigan,* 2016-2020

Professional Development

- Participated in NCFDD Faculty Success Program, Spring 2025.
- Participated in the Early Career Teaching & Learning Program organized by the University of Minnesota, Fall 2023.
- Participated in faculty development series organized by Dr. Ellen Longmire and Dr. Victor Barocas at the University of Minnesota, Fall 2022.
- Participated in workshop on Anti-Black Racism organized within Robotics Groups in Paul G. Allen School of Computer Science and Engineering, University of Washington, 2020-2021.
- Participated in Mentorship Training Workshop hosted by MolES DEI Committee and the Undergraduate Research Program at the University of Washington, Winter 2021.
- Completed “Cultivating a Culture of Respect” misconduct training facilitated by UM Robotics Institute, Fall 2019.
- Participated in RAS Women In Engineering (WIE) Breakfast as part of IEEE International Conference on Robotics and Automation (ICRA) 2019, at Montreal.

Press and Media Coverage

- **MnRI Newsletter at the University of Minnesota** - “Robust and Generalized Perception Towards Mainstreaming Domestic Robots” - link
- **MnRI News at the University of Minnesota** - “Desingh Lab Unpacks First Spot Robot from Boston Dynamics” - link
- **CS&E News at the University of Minnesota** - “Desingh Lab Unpacks First Spot Robot from Boston Dynamics” - link
- **Science Robotics Interview** - “Can computer vision teach robots to think before they act?” - link
- **Michigan News** - “A quicker eye for robotics to help in our cluttered, human environments” - link
- **EEWorld Online** - “A quicker eye for robotics to help in our cluttered, human environments” - link
- **Tech Explore** - “A quicker eye for robotics to help in our cluttered, human environments” - link
- **Futurity** - “A quicker eye for robotics to help in our cluttered, human environments” - link
- **Venture Beat** - “Before we put $100 billion into AI” - link
- **Michigan AI Blog** - “Personal Robots: Why is perception important?” - link