

Daniel Rakita

Curriculum Vitae — June 2026



Yale University, Department of Computer Science

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🌐 <https://dannyrakita.net>

🔗 <https://apollo-lab-yale.github.io/>

🎓 Google Scholar

Research Mission

My research primarily involves formulating planning, optimization, and learning algorithms that allow robot manipulation platforms to effectively complete tasks. The goal of my work is to enable people to intuitively control or work alongside robot manipulation platforms to perform critical tasks deemed unsuitable, undesirable, understaffed, or unsafe for people, such as full-time homecare, home assistance, telenursing, robot surgery, disaster relief, large-scale manufacturing, nuclear materials handling, and space robotics. I use interdisciplinary techniques across robotics and computer science, including motion planning, motion optimization, shared autonomy, human-robot interaction, and machine learning to formulate and validate generalizable, end-to-end solutions within these problem spaces.

Appointments

2022 - Current	Assistant Professor Yale University, Department of Computer Science
2015-2022	Graduate Researcher University of Wisconsin-Madison Visual Computing Lab and Human-Computer Interaction Lab
2018, 2019	NREIP Researcher Naval Research Lab, Washington, D.C.

Education

2015-2022	Ph.D. in Computer Science University of Wisconsin-Madison <i>Advisors: Michael Gleicher and Bilge Mutlu</i>
2015-2017	Masters of Computer Science University of Wisconsin-Madison
2013-2015	Undergraduate work in computer science University of Wisconsin-Madison

2008-2012 **Bachelor of Music in Performance**
Indiana University-Bloomington Jacobs School of Music

Honors Awards

2023 Best Paper Award Winner, *ACM/IEEE Conference on Human-Robot Interaction (HRI)*

2022 Outstanding Graduate-Student Research Award, *UW-Madison*

2021 Outstanding Reviewer Award, *Selected by IROS Conference Paper Review Board, Top 4 of 3,942*

2021 Cisco Graduate Student Fellowship Recipient, *UW-Madison*

2021 Three Minute Thesis Competition Finalist, *UW-Madison*

2020 Best Paper Award Finalist, *ACM/IEEE Conference on Human-Robot Interaction (HRI)*

2019 Microsoft PhD Fellowship Recipient

2018 Best Paper Award Winner, *ACM/IEEE Conference on Human-Robot Interaction (HRI), Top 4 of 206 papers*

2017 NSF Graduate Research Fellowship Program Honorable Mention

2017 HRI Pioneer, *accepted to the selective workshop held at HRI 2017*

2017 Best Paper Award Nominee, *IEEE Symposium on Robot and Human Interactive Communication (RO-MAN)*

2015 ACM SIGGRAPH Student Research Competition 1st Place

Research Grants and Funding

2025 - 2026 **Advanced AI-Based Manipulation for USV Diesel Engine Maintenance** (Office of Naval Research)
Role: Key Investigator, Amount: \$160,000
STTR Phase 1. Key Investigators: Brian Kononchik (Boston Engineering), Daniel Rakita (Yale), Brian Scassellati (Yale), John Steagall (Fairbanks Morse Defense).

2024 - 2027 **Robot Manipulation in Densely Cluttered Environments** (Office of Naval Research)
Role: Principal Investigator, Amount: \$1,212,027
Co-PI(s): Brian Scassellati.

2021-2022 **Cisco Graduate Student Fellowship** (Cisco)
Amount: one year PhD tuition and stipend


2019-2020 **Microsoft PhD Fellowship** (Microsoft)
Amount: \$84,000 for tuition, stipend, and travel funds

Publications

Journal

- 2026 Bader, J., Sun, X., Rosenfelt, T., Ramirez-Hardy, A., Vitchutripop, T., Pantel, H., Khanna, A., and **Rakita, D.** Deep learning approach for critical exposure during division of the inferior mesenteric artery in colorectal surgery. *Journal of Robotic Surgery*.[\[Link\]](#)
- 2021 Chamzas, C., Quintero-Pena, C., Kingston, Z., Orthey, A., **Rakita, D.**, Gleicher, M., Toussaint, M., and Kavragi, L. MotionBenchMaker: A Tool to Generate and Benchmark Motion Planning Datasets. *IEEE Robotics and Automation Letters*.[\[Link\]](#)
- Rakita, D.**, Mutlu, B., and Gleicher, M. Single Query Path Planning using Sample Efficient Probability Informed Trees. *RA-L/ICRA*.
- 2020 **Rakita, D.**, Mutlu, B., and Gleicher, M. An Analysis of RelaxedIK: An Optimization-Based Framework for Generating Accurate and Feasible Robot Arm Motions. *Autonomous Robotics (AURO)*.
- 2019 **Rakita, D.**, Mutlu, B., Gleicher, M., and Hiatt, L. Shared-Control-Based Bimanual Robot Manipulation. *Science Robotics*.
- 2018 Bodden, C., **Rakita, D.**, Mutlu, B., and Gleicher, M. A Flexible Optimization-Based Method for Synthesizing Intent-Expressive Robot Arm Motion. *The International Journal of Robotics Research (IJRR)*. SAGE.
- 2016 Pejisa, T., **Rakita, D.**, Mutlu, B., and Gleicher, M. Authoring directed gaze for full-body motion capture. *ACM Transactions on Graphics*, 35(6), 1–11. *Proceedings SIGGRAPH ASIA 2016*.

Conference

- 2026 Liang, C., Sun, X., Wang, Q., and **Rakita, D.** Turning Stale Gradients into Stable Gradients: Coherent Coordinate Descent with Implicit Landscape Smoothing for Lightweight Zeroth-Order Optimization. *ICML*.
- Sun, X., Wang, Y., Yang, S., Chen, Y., and **Rakita, D.** Hybrid Diffusion Policies with Projective Geometric Algebra for Efficient Robot Manipulation Learning. *ICRA*.[\[Link\]](#)
-  **Oral Presentation**
- Wang, Q., Abdellall, O., Gao, T., Sun, X., and **Rakita, D.** Subsecond 3D Mesh Generation for Robot Manipulation. *ICRA*.[\[Link\]](#)
- 2025 Liang, C., Wang, P., Xu, A., and **Rakita, D.** ad-trait: A Fast and Flexible Automatic Differentiation Library in Rust. *IROS*.[\[Link\]](#)
- Hoffmeister, L., Scassellati, B., and **Rakita, D.** Towards Zero-Knowledge Task Planning via a Language-based Approach. *IROS*.
- Rakita, D.**, Liang, C., and Wang, Q. Coherence-based Approximate Derivatives via Web of Affine Spaces Optimization. *RSS*.[\[Link\]](#)
- Sun, X., Yang, S., Chen, Y., Fan, F., Liang, Y., and **Rakita, D.** Dynamic Rank Adjustment in Diffusion Policies for Efficient and Flexible Training. *RSS*.[\[Link\]](#)

- 2024 Hoffmeister, L., Scassellati, B., and **Rakita, D.** Sequential Discrete Action Selection via Blocking Conditions and Resolutions. *IROS*.[\[Link\]](#)
- 2023 Patel, V., **Rakita, D.**, and Dollar, A. An Analysis of Unified Manipulation with Robot Arms and Dexterous Hands via Optimization-based Motion Synthesis. *ICRA*.[\[Link\]](#)
- Wang, Y., Praveena, P., **Rakita, D.**, and Gleicher, M. RangedIK: An Optimization-based Robot Motion Generation Method for Ranged-Goal Tasks. *ICRA*.[\[Link\]](#)
- Schoen, A., Sullivan, D., Zhang, Z., **Rakita, D.**, and Mutlu, B. Lively: Enabling Multimodal, Lifelike, and Extensible Real-time Robot Motion. *HRI*.[\[Link\]](#)
-  **Best Paper Award Winner**
- 2022 **Rakita, D.**, Mutlu, B., and Gleicher, M. PROXIMA: An Approach for Time or Accuracy Budgeted Collision Proximity Queries. *RSS*.[\[Link\]](#)
- 2021 **Rakita, D.**, Shi, H., Mutlu, B., and Gleicher, M. CollisionIK: A Per-Instant Pose Optimization Method for Generating Robot Motions. *ICRA*.
- Rakita, D.**, Mutlu, B., and Gleicher, M. Strobe: An Acceleration Meta-algorithm for Optimizing Robot Paths using Concurrent Interleaved Sub-Epoch Pods. *ICRA*.
- 2020 **Rakita, D.**, Mutlu, B., and Gleicher, M. Effects of Onset Latency and Robot Speed Delays on Mimicry-Control Teleoperation. *HRI*.
- Praveena, P., **Rakita, D.**, Mutlu, B., and Gleicher, M. Supporting Perception of Weight through Motion-induced Sensory Conflicts in Robot Teleoperation. *HRI*.
-  **Best Paper Award Nominee**
- 2019 **Rakita, D.**, Mutlu, B., and Gleicher, M. Remote Telemanipulation with Adapting Viewpoints in Visually Complex Environments. *RSS*.
- Rakita, D.**, Mutlu, B., and Gleicher, M. Stampede: A Discrete-Optimization Method for Solving Pathwise-Inverse Kinematics. *ICRA*.
- Praveena, P., **Rakita, D.**, Mutlu, B., and Gleicher, M. User-Guided Offline Synthesis of Robot Arm Motion from 6- DoF Paths. *ICRA*.
- 2018 **Rakita, D.**, Mutlu, B., and Gleicher, M. RelaxedIK: Real-time Synthesis of Accurate and Feasible Robot Arm Motion. *RSS*.
- Rakita, D.**, Mutlu, B., and Gleicher, M. An Autonomous Dynamic Camera Method for Effective Remote Teleoperation. *HRI*.
-  **Best Paper Award Winner**
- Rakita, D.**, Mutlu, B., Gleicher, M., and Hiatt, L. Shared Dynamic Curves: A Shared-Control Telemanipulation Method for Motor Task Training. *HRI*.
- 2017 **Rakita, D.**, Mutlu, B., and Gleicher, M. A Motion Retargeting Method for Effective Mimicry-based Teleoperation of Robot Arms. *HRI*.
- Liu, O., **Rakita, D.**, Mutlu, B., and Gleicher, M. Understanding Human-Robot Interaction in Virtual Reality. *RO-MAN*.
- Subramani, G., **Rakita, D.**, Wang H., Zinn, M., and Gleicher, M. Recognizing Actions during Tactile Manipulations through Force Sensing. *IROS*.
- 2016 **Rakita, D.**, Mutlu, B., and Gleicher, M. Motion Synopsis for Robot Arm Trajectories. *RO-MAN*.

Bodden, C., **Rakita, D.**, Mutlu, B., and Gleicher, M. Evaluating Intent-Expressive Robot Arm Motion. RO-MAN.

 **Best Paper Nominee**

Selected Invited Talks

- 2025 *The Applied Planning, Learning, and Optimization Toolbox: A Flexible Rust-Based Software Suite for Robotics Research.*
Rust for Robotics Workshop, ICRA
- 2022 *Intuitive Robot Shared-Control Interfaces via Real-time Motion Planning and Optimization.*
Cornell University
- 2022 *Generating Accurate, Feasible, and Coordinated Bimanual Robot Motions in Real-time.*
Workshop on Bimanual Manipulation, ICRA
- 2021 *Methods and Applications for Generating Accurate and Feasible Robot-arm Motions in Real-time.*
KavrakiLab, Rice University
- 2021 *Methods and Applications for Generating Accurate and Feasible Robot-arm Motions in Real-time.*
Talking-Robotics Series
- 2020 *Methods and Applications for Generating Accurate and Feasible Robot-arm Motions in Real-time.*
Northwestern University
- 2019 *Robust Human-Arm to Robot-Arm Motion Remapping in Real-time for Effective Shared-Control Telemanipulation Methods.*
AI and Its Alternatives for Shared Autonomy in Assistive and Collaborative Robotics Workshop, RSS
- 2019 *Effective Methods for Robot Telemanipulation.*
UW-Madison Computer Science Student Symposium
- 2017 *Effective Methods for Robot Teleoperation.*
Naval Research Lab

Teaching Curriculum Development

CPSC 487/587 3D Spatial Modeling and Computing, Yale University

course I designed

Several areas of computer science and related fields must model and compute how objects are situated in three-dimensional space over time... This course will teach students how to computationally model the spatial configuration of and spatial relationships between objects over time.

– Spring 2024. Course Rating: 4.5/5.0

CPSC 485/585 Applied Planning and Optimization, Yale University

course I designed

This course introduces students to concepts, algorithms, and programming techniques pertaining to planning and optimization...

– Spring 2023. Course Rating: 4.5/5.0

- Fall 2023. Course Rating: 4.5/5.0

CPSC 685 Topics on Robot Motion Generation, Yale University

course I designed

This course focuses on concepts, approaches, and algorithms related to robot motion generation. Students will read, summarize, present on, and discuss papers and textbook chapters related to search-based path planning, sampling-based path planning, inverse kinematics, and trajectory optimization.

- Fall 2022. Course Rating: 4.8/5.0

CPSC 472 Intelligent Robotics, Yale University

Guest Lecture

- Fall 2022

CS/ Psych 770 Human-Computer Interaction, University of Wisconsin-Madison

Guest Lecture

- Spring 2020

CS 559 Introduction to Computer Graphics, University of Wisconsin-Madison

Guest Lecture

- Spring 2019

Advising Student Mentoring

Ph.D. Students

2023 - current	Liam Merz Hoffmeister
2023 - current	Xiatao Sun
2024 - current	Chen Liang
2024 - current	TJ Vitchutripop
2024 - current	Peter Wang
2025 - current	Roshan Klein-Seetharaman

Masters Students

2024 - 2025	Alan Li
	Yinliang Chen

Undergraduate Students

Current and past undergraduate advisees: Sem Asmelash, Jack Chen, Braeden Cullen, Francis Fan, Andrew Fu, Derek Gao, Juliette Garcia, Blaze Goldstein, Ryan Jin, Roshan Klein-Seetharaman, Tim Li, Byron Li, Ian Lim, Haroon Mohamedali, Anand Srinivasan, Griffin Thompson, Ryan Tsai, Sophie Usherwood, Alex Wa, Andy Xu, Richard Xue, Jack Yin, Wenhe Zhang, Felicia Zheng

Senior Thesis Advising

Spring 2025	Anand Srinivasan , <i>Positioning a Stapler in 3D Space: Metric Generation for Robotic Surgery</i> Henry Berger , <i>Ergodic Footfall-Based Active Mapping with a Quadruped Robot (co-advised with Ian Abraham)</i> Michal Lewkowicz , <i>Towards Realistic Simulation and Benchmarking of Learning and Optimization Algorithms for Social Robot Navigation</i> Peter Messina , <i>Enhancing Robotics Visualization and Simulation in the APOLLO Toolbox</i>
Fall 2024	Griffin Thompson , <i>From Skeletal Motion to Conformal Geometric Algebra: A Novel Approach to Human Motion Modeling</i> Ryan Tsai , <i>Real-World Motion Planning and Optimization Using Markerless Localization</i> Anand Srinivasan , <i>3D Scene Reconstruction for IMA Division Surgery</i> Roshan Klein-Seetharaman , <i>Efficient Spatial Representations using Geometric Algebra for Robot Learning</i>
Spring 2024	Chris Ward , <i>Revitalizing Stained Glass: Improving the Profitability of Stained Glass by Applying Modern Manufacturing Techniques (co-advised with Ian Abraham)</i>

Service & Leadership

2025-Current	Associate Editor , Transactions on Human-Robot Interaction (THRI)
2024	Program Committee Member , HRI
2024	Associate Editor , ICRA
2021	Session Chair , ICRA session Optimization-Based Motion Planning
2021-Current	Review Editor , Frontiers in Robotics and AI
2017-Current	Reviewer (>200 papers) , ICRA, IROS, RSS, RA-L, TRO, HRI, CHI, SIGGRAPH, Transactions on Mechatronics, Frontiers, Humanoids

Yale News — *Grasping the future with a robotic arm-hand combo*

Techcrunch — *This robot learns its two-handed moves from human dexterity*

Tech Xplore — *Shared control allows a robot to use two hands working together to complete tasks*

Cosmos, The Science of Everything — *Breaking: robot makes breakfast*

Milwaukee Journal Sentinel — *UW team designs robot hands that work together*

Technical Skills

Programming Rust, Python, C++, C, C#, Java, OpenGL, ROS, MATLAB, JavaScript, HTML, CSS, WebGL

Software Blender, 3dsMax, Unity, MotionBuilder, Photoshop, Illustrator, Premier Pro, After Effects, Maya, MudBox, Office