# Daniel Nakhimovich

http://dance.offinto.space

dnahimov@gmail.com +1 551-795-5019

#### **EDUCATION**

Rutgers University  Doctor of Philosophy in Computer Science & Robotics; GPA: 3.97	New Brunswick, NJ
Doctor of Philosophy in Computer Science & Robotics; GPA: 3.97	$Sept \ 2019 - May \ 2026$
The Cooper Union	New York, NY
Bachelor of Engineering in Electrical Engineering; GPA: 3.55	$Sept \ 2015 - May \ 2019$
Machon Shlomo: The Heiden Institute	Jerusalem, Israel
Machon Shlomo: The Heiden Institute  Jewish Law, Ethics, Philosophy, and Leadership	$Sept\ 2021-June\ 2023$

## PEER-REVIEWED PUBLICATIONS

- Development of a Socially Cognizant Robotic Campus Guide, by Benjamin Greenberg, Daniel Nakhimovich, Richard Magnotti, Hriday Purohit, Sanskar Shah, Aniket Satish Kulkarni, Uriel Gonzalez-Bravo, and Noah R. Carver, in Companion of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2024.
- Resolution Complete In-Place Object Retrieval given Known Object Models, by Daniel Nakhimovich, Yinglong Miao, and Kostas E. Bekris, in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
- Persistent Homology for Effective Non-Prehensile Manipulation, by Ewerton R. Vieira, Daniel Nakhimovich, Kai Gao, Rui Wang, Jingjin Yu, and Kostas E. Bekris, in *IEEE International Conference on Robotics and Automation (ICRA)*, 2022.
- Uniform Object Rearrangement: From Complete Monotone Primitives to Efficient Non-Monotone Informed Search, by Rui Wang, Kai Gao, Daniel Nakhimovich, Jingjin Yu, and Kostas E. Bekris, in *IEEE International Conference on Robotics and Automation (ICRA)*, 2021.
- Robotics as an Enabler of Resiliency to Disasters: Promises and Pitfalls, by Rui Wang,
  Daniel Nakhimovich, Fred S. Roberts, and Kostas E. Bekris, in *Resilience in the Digital Age Lecture Notes*in Computer Science (LNCS), Springer Nature, 2021.
- Pushing the Boundaries of Asymptotic Optimality in Integrated Task and Motion Planning, by Rahul Shome, Daniel Nakhimovich, and Kostas E. Bekris, in *Algorithmic Foundations of Robotics XIV*, Springer International Publishing, 2021.
- Giga Graph Cities: Their Buckets, Buildings, Waves, and Fragments, by James Abello, Haoyang Zhang, Daniel Nakhimovich, Chengguizi Han, and Mridul Aanjaneya, in *IEEE Computer Graphics and Applications*, IEEE, 2022.
- Graph Cities: Their Buildings, Waves, and Fragments, by James Abello, Daniel Nakhimovich, Chengguizi Han, and Mridul Aanjaneya, in *The 4th International Workshop on Big Data Visual Exploration and Analytics with EDBT/ICDT (BigVis)*, 2021.
- **Graph Waves**, by James Abello and Daniel Nakhimovich, in *The 3rd International Workshop on Big Data Visual Exploration and Analytics with EDBT/ICDT (BigVis)*, 2020.

### Additional Research Projects

PRACSYS
PI: Kostas Bekris

New Brunswick, NJ Sept 2019 – May 2025

- Robot Nudging: A robot nudge is a robot behavious or ineherent design which alters a person's behaviour without significantly changing the incentive structure. I performed an extensive literature review of the subject in order to discover which ethical parameters are most urgent to consider for robot designers and policy makers.
- Object Rotation Task Descriptions for Robots in English: I performed an informal survey, collecting human descriptions in English of household objects being rotated in a simulated environment. The goal is to study how people naturally describe tasks to a robot without using "key words" or "wake phrases".

• Put That There: Human-Robot Interaction studies typically focus on robots understanding humans whereas this project studies how robots can be better understood by humans. I designed and performed expreriments to test human ability to interpret instructions given by a real robot.

**DIMACS**FI: James Abello

Piscataway, NJ

Summer 2018 - 2020

- **k-connectivity**: k-connectivity is a connectivity measure for graphs. I designed two algorithms for finding approximations of minimum seperating sets of a graph in order to perform efficient graph decomposition for data visualization.
- Graph Peeling: Graph Peeling is the iterative process of removing vertices from a graph. I explored properties of various graph peeling techniques and designed a new peeling algorithm (wave decomposition) in order to decompose very large graphs efficiently.

### One-off Projects

2019; OpenSesame: Open source cryptographic co-processor implemented on an FPGA

2018; pass2act: Passive to active sentence transformer built using spaCy's dependency tree parser

2017; biboch: Bitboard checkers implementation with an AI that performs a fast alpha/beta search on the game tree

2016; 8-bit processor: Custom 8-bit instruction set architecture written in verilog

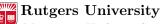
2015; 2048 Circuit: A recreation of the popular mobile game 2048 using various CMOS ICs, buttons, and LEDs

## TEACHING/MENTOR EXPERIENCE

2	Lumiere Education Research Mentor
Y	Research Mentor

Online

 $Summer\ 2023$ 



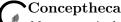
New Brunswick, NJ

Mentor to Undergraduate Students in Robotics

2020 - 2021

Teaching Assistant for Introduction to Data Structures and Algorithms

Fall 2019



Fair Lawn, NJ

Mentor to Android Developement Interns

2015 - 2016



Fair Lawn High School

Fair Lawn, NJ

Marching Band Woodwind Section Leader and Clarinet Tutor

2014 - 2015

### Industry Experience

PulsePoint
TechOps Intern

New York, NY

Summer 2017

- Reduced false positive QPS (queries per second) alerts by 92% by filtering out statistical outliers.
- Implemented automated backups and data verification of ten 100GB databases using Bash scripts and SQL queries executed inside temporary Docker containers.
- Physically diagnosed and reconfigured 2 servers, ensuring continuous uptime of critical application infrastructure.
- Developed 3 new dashboards used for monitoring application reliability.

Conceptheca

Fair Lawn, NJ

2015 - 2016

**►** Mobile Application Developer

- Identified key medical procedures, via collaborating with Doctors, that could use mobile applications to reduce a physician's workload 85%.
- Designed and implemented 2 applications (Android and iOS) to aid medical professionals to better monitor patients and administer medication.
- Incorporated generative/procedural algorithms in a mobile application to create artistic high resolution images (4k) in less than 1 second.
- Incorporated generative algorithms in a mobile app to create abstract art.

### SKILLS

Programming Languages: C/C++, C#, Python, Linux, Java, Rust, MATLAB, Verilog, Bash, PHP, SQL, Ruby

Software Libraries: OpenCV, PyTorch, ROS, MuJoCo, Ollama, Unity, Docker, Boost, spaCy, MongoDB

Robots and Hardware: Baxter, Yaskawa Motoman, Xilinx FPGAs, 3D Printers

Natural Languages: English (Native), Russian (Conversant), Hebrew (Read Only)

# AWARDS/CERTIFICATIONS

2023; Best Design Process Award at HRI: Development of a Socially Cognizant Robotic Campus Guide

2023; Certificate in Socially Cognizant Robotics: Upon completing 2 years in an NSF-funded National Research Traineeship focused on Socially Cognizant Robotics for a Technology Enhanced Society

2021; Best Paper Award at BigVis: Graph Cities: Their Buildings, Waves, and Fragments

2018; HackCooper;  $1^{st}$  prize: skEye Net - Wireless eye tracking / gaze estimation headset that works in realtime

2015 — 2019; Half-tuition scholarship: Merit scholarship from Cooper Union

2015 — 2019; Innovators Merit Scholarship: Merit scholarship from Cooper Union

2015; David Lee Memorial Scholarship: For academic achievment and community service

### Miscellaneous

Peer Reviewes: 2019 - ...

- ISER: International Symposium on Experimental Robotics
- IROS: Conference on Intelligent Robots and Systems
- RSS: Robotics: Science and Systems Conference
- CoRL: Conference on Robot Learning
- ICRA: International Conference on Robotics and Automation
- ICAR: International Conference on Advanced Robotics
- RA-L: IEEE Robotics and Automation Letters
- BigVis: Big Data Visual Exploration and Analytics Conference