

# Nandan Banerjee

## Résumé

Last updated : January 30, 2024

### OBJECTIVE

To work on state of the art robots, devise new algorithms related to SLAM, vision, perception, and other robotics problems.

### WORK EXPERIENCE

JUNE 2015 – PRESENT

iRobot Corporation  
Bedford, MA, USA

#### Principal Robotics Software Engineer

Leading a team focusing on innovation efforts for future products, and involved in mapping and navigation research (algorithms for occupancy grid mapping, landmark management, SLAM - graph optimization, map corruption prevention, anchoring strategies) in heavily constrained computational platforms for next generation Roombas and other consumer robots. Productized research on lifelong mapping and was the first to enable it on millions of robots around the world.

JUNE 2014 – AUGUST 2014

Vecna Technologies  
Cambridge, MA, USA

#### Robotics Research Intern

Model based tracking algorithm implementation to track the hand of a Kinova JACO arm. Implementation of a Calibration Helper tool to partially automate generating camera-robot transforms.

JULY 2012 – JULY 2013

Samsung Research India  
Bangalore, INDIA

#### Software Engineer

Interfaced parts of the Tracfone prepaid engine for a Samsung feature phone. Implemented AT commands for AT&T feature phones. Debugged file system, SD card, USB and other system layer issues related to ST Ericsson's ARM9 processor.

### SELECTED PUBLICATIONS

- 2018 **Fast Nonlinear Approximation of Pose Graph Node Marginalization**  
*ICRA 2018*
- 2019 **View management for lifelong visual maps**  
*IROS 2019*
- 2021 **Preventing and Correcting Mistakes in Lifelong Mapping**  
*ECMR 2021*
- 2023 **Lifelong Mapping in the Wild: Novel Strategies for Ensuring Map Stability and Accuracy over Time Evaluated on Thousands of Robots**  
*Elsevier RAS Journal 2023*

### SKILLS

LANGUAGES	C++, Python, (past - C, Java, Object Pascal)
LIBRARIES	ROS2, Boost, OpenCV, OpenGL, (past - ROS, Eigen, PCL, MoveIt, Android SDK, CUDA)
OS	Linux, Windows
SOFTWARE	Matlab, $\LaTeX$ , GDB, Git, JIRA
EMBEDDED	(past - AVR & ARM MCUs, Circuit design & simulation)

📍	<b>Principal Robotics Software Engineer</b> iRobot Corporation
☎	+1 (774) 420 8142
✉	banerjen [at] gmail [dot] com
🌐	www.nandanbanerjee.com

### EDUCATION

- 2013 – 2015 **Robotics Engineering**  
MASTER OF SCIENCE  
*Worcester Polytechnic Institute*
- 2008 – 2012 **Computer Science**  
BACHELOR OF TECHNOLOGY  
*National Institute of Technology, Durgapur*

### SIGNIFICANT PROJECTS

- 2018 **Persistent Maps on Roomba (SLAM, Computer Vision, Occupancy Mapping)**  
*Mapping and navigation research - algorithms for vision front end, occupancy mapping, SLAM-graph optimization and sparsification in heavily constrained computational platforms to enable lifelong mapping for next generation Roombas (i7) and other consumer robots.*
- 2014 **DARPA Robotics Challenge (Robot Dynamics, Robot Control, Perception)**  
*Programming perception and manipulation capabilities for the ATLAS robot. Simulating Inverse Kinematics for Atlas' arms, visual servoing, trajectory optimization, object segmentation, walking. Team lead for the door task, where the robot had to detect, walk to, open and walk through a generic door.*
- 2013 **Visibility Planning (Robot Kinematics, AI, Optimization)**  
*Plan for visibility of an object by the robot hand camera using Simulated Annealing on the Baxter research robot.*
- 2011 **Chess Playing Robot (Control Systems, Computer Vision)**  
*4 DOF manipulator capable of playing chess in real time. Used the GNU Chess Engine to determine the computer moves and a webcam to determine the moves made by the opponent.*

### EXTRA-CURRICULAR ACTIVITIES

- ROBOTICS Won prizes in Robotics & Embedded systems competitions
- QUIZZING Represented NIT Durgapur and Samsung at various competitions
- STEM STEM talk at schools and job shadows

### MORE INFORMATION

WEBSITE	<a href="https://www.nandanbanerjee.com">https://www.nandanbanerjee.com</a>
PUBLICATIONS	13 - <a href="#">Link</a>
CITATIONS	424 - <a href="#">Google Scholar</a>
ORGANIZATIONS	IEEE (Senior Member), IEEE-RAS (till 2023)
AWARDS	iRobot Chairman's Team Award 2018, IRNet Young Investigator Award 2012
LANGUAGES	English, Bengali, Hindi