

# Arjun Muralidharan

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## EDUCATION

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*Ph.D.*, Electrical and Computer Engineering  
**University of California Santa Barbara**  
Advisor: Prof. Yasamin Mostofi

Expected: August 2018

*M.S.*, Electrical and Computer Engineering  
**University of California Santa Barbara**      GPA: 4.0/4.0

June 2014

*B.Tech.*, Electronics and Communication Engineering  
**Indian Institute of Technology Guwahati**      GPA: 9.24/10.0

May 2012

## RESEARCH PROJECTS

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- **Path Planning on a Probabilistic Graph:** Path planning algorithms and analysis for an agent on a probabilistic graph to minimize the expected cost incurred. Potential applications include path planning for an exploring rover, path planning till connectivity for an unmanned vehicle, human robot collaboration and imaging of celestial objects.
- **Communication and Path Planning for Multi-Robot systems:**
  - **Path planning for connectivity:** Plan the path for an unmanned vehicle so as to minimize the expected energy expenditure till it gets connected to a remote station. Also involves an analysis of the statistics of the distance traveled by a robot till it gets connected.
  - **Energy-Aware Distributed Beamforming using Mobile Robots:** Path planning and communication strategies for robots to cooperatively transmit information to a remote station via distributed transmit beamforming in an energy-efficient manner.
  - **Impact of Stochastic Communication Links on Multi-agent Cooperation:** Analysis of the impact of stochastic communication links on the global objective of a distributed multi-agent system.
- **Counting Number of People Using WiFi:** A system to count the total number of people walking in an area based on their impact on surrounding WiFi links.
- **Cooperative Cognitive Radio Networks:** Bachelor thesis project which was aimed at introducing cooperation into cognitive radio networks, both at the spectrum sensing stage as well as at the stage of actual utilization (MAC protocol).

## WORK EXPERIENCE

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- **Summer intern, Qualcomm Corporate R&D, San Deigo**      June 2013 - Sept 2013  
Worked on a data validation web application for the AWARE context awareness project under the SI&T group.
- **Summer intern, Cisco, India**      June 2010 - Sept 2010  
Enhancement of the thc-ipv6 open source tool to support ICMPv6, DHCPv6 and other IPv6 Dos attacks.
- **Summer intern, DEAL, Defense Research Development Organization, India**      June 2009 - Sept 2009  
FPGA implementation of conventional amplitude modulation and demodulation.

## SELECTED COURSEWORK

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Convex Optimization, Dynamic Programming and Optimal Control, Stochastic Processes, Wireless Communication, Digital Communication, Information Theory, Game Theory, Estimation Theory, Error-Correcting Codes, Linear Systems, Matrix Analysis, Network Systems, Machine Learning, Pattern Recognition

## PUBLICATIONS

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### Journals:

- **A. Muralidharan** and Y. Mostofi, "Path Planning for Minimizing the Expected Cost till Success," submitted to IEEE Transactions on Robotics.
- **A. Muralidharan** and Y. Mostofi, "Energy Optimal Distributed Beamforming using Unmanned Vehicles," IEEE Transactions on Control of Network Systems, 2017.
- S. Depatla, **A. Muralidharan** and Y. Mostofi, "Occupancy Estimation using only WiFi Power Measurements," IEEE Journal on Selected Areas in Communications (JSAC), special issue on Location-Awareness for Radios and Networks, volume 33, issue 7, July 2015.

## Conferences:

- **A. Muralidharan** and Y. Mostofi, "Path Planning for a Connectivity Seeking Robot," IEEE Global Communications Conference Workshops, 2017.
- **A. Muralidharan** and Y. Mostofi, "First Passage Distance to Connectivity for Mobile Robots," **invited paper**, American Control Conference (ACC), 2017.
- **A. Muralidharan** and Y. Mostofi, "Distributed Beamforming using Mobile Robots," **invited paper**, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), March 2016.
- **A. Muralidharan**, Y. Yan and Y. Mostofi, "Binary Log-Linear Learning with Stochastic Communication Links," **invited paper**, IEEE Military Communications Conference (MILCOM), 2015.

## Patents:

- "System and method of occupancy estimation utilizing transmitted signals." U.S. Patent Application No. 15/087,554.

## COMPUTING SKILLS

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**Platforms:** Linux, Windows

**Languages:** Proficient in Python, Matlab, experience in C/C++

**Packages:** Tensorflow, Scikit-learn, Numpy, Git, Latex

## EXTRACURRICULAR

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- **Reviewer:** IEEE Journal on Selected Areas in Communication (JSAC), IEEE Transactions on Robotics (TRO), IEEE Transactions on Automatic Control (TAC), Journal of Selected Topics in Signal Processing, IEEE Journal of Aerospace Engineering, Automatica, IEEE Conference on Decision and Control (CDC), IEEE International Conference on Intelligent Robots and Systems (IROS), American Control Conference (ACC), IEEE Global Communications Conference (Globecom).
- **Teaching Assistant:** Undergraduate courses at UCSB on Digital Communication, Digital Logic, Digital Design Principles and Electromagnetics and Optics.
- **Awards:** Recipient of the prestigious **OPJEM Scholarship**, recipient of the prestigious **Dhirubhai Ambani Foundation Scholarship**, awarded the **Doctoral Student Travel Grant** by UCSB Academic Senate in 2016, awarded the **ECE PhD Dissertation Fellowship** in 2018.
- **Organizer:** - Together with Prof. Yorai Wardi of Georgia Tech and Prof. Yasamin Mostofi of UCSB, organized a full-day workshop on Communication-Aware Robotics at the 55th IEEE Conference on Decision and Control.  
- An organizer of Technoholon'10, a school level competition which witnessed over 200,000 participants.
- **Basketball team member** of IIT Guwahati which represented the institute in the 45th and 47th Inter IIT Sports Meet.