ANANT GUPTA

Senior Engineer, Qualcomm Inc.
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EDUCATION

University of California, Santa Barbara, USA G.P.A. 4.0/4.0 2014-2020
Department of Electrical and Computer Engineering (ECE)
PhD in ECE, Research Focus: Wireless Sensing 03/20/2020
MS in ECE, Major: Communications and Signal Processing 12/09/2016

IIT Kharagpur, India G.P.A. 8.45/10 2008-2013
Bachelor of Technology (Honors) in Electronics and Electrical Communication Engineering 07/27/2013
Master of Technology (Dual Degree) – Telecommunication Systems Engineering 07/27/2013

INDUSTRY EXPERIENCE

Qualcomm Inc., San Diego, USA: Senior Engineer, Modem Systems 2020-Present

- *Smart Transmit Project* (Jan 2023 - Current) Developed power control algorithms to improve efficiency of 5G Up-link transmission systems.
- *FMCW Radar Project* (June 2020 - Jan 2023) Designed radar detection algorithms in DSP for close proximity detection in mobile devices.

Interim engineering intern Summer 2017
Algorithm design for range detection & mutual coupling cancellation in 5G NR terminals.

***Stealth Startup*, San Francisco Bay Area, USA:** Engineering Intern Summer 2019
Perception for Autonomy
Explored state of the art signal processing algorithms for sensing and imaging applications in the RF domain. Benchmarking and proposing new system level solutions and features.

National Instruments R&D, Bangalore, India: RF Algorithm Software Engineer 2013-2014
Baseband signal processing algorithm design for OFDM-MIMO based 802.11n/ac WLAN.

Physical layer design for a NFC transmitter on FPGA. Intern Summer 2012
Developed RF interface for testing NFC tags using NI RIO hardware and tested TX signals using Agilent MXA.

FPGA-PC hybrid implementation of fractional re-sampler for NI GPS toolkit. Intern Summer 2011
Reduced the latency of generating composite GPS signals by resampling using polyphase filter banks on FPGA.

RESEARCH EXPERIENCE

University of California, Santa Barbara, USA: Doctoral Research 2015-2020
Sensing and Inference using low cost mm-wave systems. PhD Advisor: U. Madhow

- Geometry-Assisted data association for instantaneous localization with distributed millimeter wave sensors.
- Multi-objective optimization to construct large-effective aperture antennas using sparse array of subarrays.
- Enhanced accuracy and Super-Resolution algorithms for 2D FMCW radar systems.

IIT Kharagpur, India: Masters Research 2011-2013
Energy efficient MAC protocols for wireless sensor networks. Advisor: R Datta

- Designed energy efficient contention resolution protocols (SMAC) for centralized & ad-hoc sensor networks.
- Analyzed performance using a Discrete time Markov chain model and validated with simulations in NS2.

PUBLICATIONS

- **A. Gupta** and U. Madhow, "Multi-Sensor Spatial Association Using Joint Range-Doppler Features", IEEE Transactions on Signal Processing, 2021.
- **A. Gupta** (2020). Geometric Simplification of Optimization Problems in Millimeter-Wave Sensing. eScholarship, University of California.
- **A. Gupta**, U. Madhow, A. Arbabian and A. Sadri, "Design of Large Effective Apertures for Millimeter Wave Systems using a Sparse Array of Subarrays", IEEE Transactions on Signal Processing, 2019.
- **A. Gupta**, U. Madhow, A. Arbabian and A. Sadri, "On beam design for sparse arrays of subarrays using multi-objective optimization and estimation-theoretic criteria", 51st Asilomar Conference on Signals, Systems and Computers, 2017, Pacifc Grove, USA.
- **A. Gupta**, U. Madhow, and A. Arbabian, "Super-resolution in position and velocity estimation for short-range mm wave radar", 50th Asilomar Conference on Signals, Systems and Computers, 2016, Pacific Grove, USA.

REVIEW WORK

Expert Peer Reviewer	Reviewed 11 journal manuscripts for IEEE Transactions on Signal Processing (IF:5.4)	Feb 2019-Jan, 2024
	Reviewed 3 journal manuscripts for IEEE Transactions on Communications (IF:8.3)	Dec, 2022-April, 2023
	Reviewed 2 journal manuscripts for the IEEE Sensors Journal (IF:4.3)	July-October, 2022
Teaching Assistant	Digital Communication course & lab, UCSB	Oct, 2014-March 2015
	Basic Electronics Lab, IIT Kharagpur	Jan-April, 2013
	Basic Network theory lab, IIT Kharagpur	July-Nov, 2012
Technical Head, Anadigix	Circuit design competition at IIT Kharagpur	January, 2011
Science Project Advisor	Partners in Education, Santa Barbara	October, 2018

PATENTS

- E.Y. Imana, R. Rimini, U. Fernando, W.H. She, and **A. Gupta**, "Robust Motion-based Human Proximity Sensor using Short-Range Radar", U.S. Patent 11,394,417, issued July 19, 2022.
- R. Rimini, **A. Gupta**, "Proximity detection using adaptive mutual coupling cancellation", U.S. Patent 10,871,549, issued December 22, 2020.
- S.M. Taleie, C. Jiang, D. Seo, U. Fernando, S. Patel, R. Rimini, and **A. Gupta**, "Programmable multi-mode digital-to-analog converter (DAC) for wideband applications", U.S. Patent 10,663,572, issued May 26, 2020.
- **A. Gupta**, R. Rimini, S. Tu, A. Zoubi, and N. Ramalingam, "Noise estimation with signal ramps for Radar", U.S. Patent App. 17/649,259 .
- A. Zoubi, **A. Gupta**, S. Tu, R. Rimini, and N. Ramalingam, "FMCW radar detection in the presence of phase noise", U.S. Patent App. 17/649,759.
- S. Tu, R. Rimini, **A. Gupta**, A. Zoubi, and N. Ramalingam, "Interference and/or Clutter Cancellation Using Cross-Channel Equalization." U.S. Patent Application No. 18/348,628.
- R. Rimini, **A. Gupta**, U. Fernando, "Gesture control of a device", U.S. Patent Application No. 18/158,771.
- A. Zoubi, R. Rimini, and **A. Gupta**,"Jammer detection", US Patent App. 18/126,361, 2024.
- *Two additional inventions are pending patent application.*

RESEARCH FUNDING (for Doctoral research at UCSB)

- Center for Converged TeraHertz Communications and Sensing (ComSenTer), one of six centers in JUMP, a Semiconductor Research Corporation (SRC) program sponsored by DARPA.
- National Science Foundation under Grants CNS-1518812, CNS-1518632 and CNS-1725797.
- Systems on Nanoscale Information fabriCs (SONIC), one of the six SRC STARnet Centers, sponsored by MARCO and DARPA.

TECHNICAL SKILLS

Programming Languages:	MATLAB, Python (*fluent*), C/C++ (*past experience*)
Engineering Tools:	PyTorch, LabVIEW, QXDM, NS-2 (*past experience*)

ACADEMIC DISTINCTIONS

Secured All India Rank of 962 ($< 0.27\%$) in IIT-Joint Entrance Examination 2008.
Secured All India Rank of 217 ($< 0.1\%$) in Graduate Aptitude Test in Electrical Engineering 2013.

COURSE PROJECTS

Truth-telling in Non-Monetary Mechanisms Fall 2018

- Investigated non-monetary mechanisms which utilize repeated games to extract truth from agents.

Multi-Agent Reinforcement Learning Fall 2015

- Investigated algorithms for learning and sequential decision making using Markov Decision Processes.

Machine learning approaches for Natural Language Processing Spring 2015

- Investigated the most informative features for use in Named Entity Recognition task.
- Evaluated the accuracy on the Spanish news text classification task of CoNLL 2002.

Massive MIMO Detection Algorithms. Winter 2015

- Investigated low complexity detection algorithms for Massive MIMO systems.

GRADUATE COURSEWORK

Matrix Analysis & Computations
Digital Communication Theory
Optimal Estimation & Filtering
Stochastic Processes in Engineering
Adaptive Filter Theory
Machine Learning
Data Structures & Object Representation
Pattern Recognition
Game Theory
Error Correction Codes