

PRIYANKA RAINA

CONTACT INFORMATION	Paul G. Allen Building, Room 114 330 Serra Mall, Stanford, CA 94305 https://profiles.stanford.edu/priyanka-raina	praina@stanford.edu +1 617-899-3791
EDUCATION	MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) PhD in Electrical Engineering and Computer Science (EECS) Thesis: Circuits and Systems for Computational Imaging Committee: Anantha Chandrakasan (advisor), Vivienne Sze Minor: Cognitive Science	Jun 2013 - Feb 2018 GPA: 5.0/5.0
	MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) S.M. in Electrical Engineering and Computer Science Thesis: Architectures for Computational Photography Advisor: Anantha Chandrakasan	Sep 2011 - Jun 2013 GPA: 5.0/5.0
	INDIAN INSTITUTE OF TECHNOLOGY (IIT) DELHI B.Tech. in Electrical Engineering Thesis: Transactional Memory Architecture for Multi-core Processors Advisor: Anshul Kumar Department Rank: 1, Institute Rank: 2	Jul 2007 - May 2011 GPA: 9.65/10.0
RESEARCH INTERESTS	Digital Circuit Design, Embedded Systems, Computational Imaging, Computer Vision, Machine Learning, Autonomous Systems	
WORK EXPERIENCE	STANFORD UNIVERSITY, Stanford <i>Assistant Professor</i> , Electrical Engineering	Sep 2018 - Present
	NVIDIA CORPORATION, Santa Clara <i>Visiting Research Scientist</i> , Architecture Research Group, Nvidia Research	Jan 2018 - Aug 2018
	INTEL CORPORATION, Hillsboro <i>Graduate Research Intern</i> , Intel Labs	Jun 2013 - Aug 2013
	MCKINSEY & COMPANY, New Delhi <i>Business Analyst</i>	May 2011 - Aug 2011
	THE ROYAL BANK OF SCOTLAND, New Delhi <i>Summer Intern</i> , Structured Rates Group	May 2010 - Jul 2010
PUBLICATIONS	P. Raina, M. Tikekar, and A. P. Chandrakasan, "An energy-scalable accelerator for blind image deblurring," in <i>IEEE Journal of Solid-State Circuits (JSSC) - ESSCIRC Special Issue</i> , July 2017. (Invited)	
	P. Raina, M. Tikekar, and A. P. Chandrakasan, "An energy-scalable accelerator for blind image deblurring," in <i>IEEE European Solid-State Circuits Conference (ESSCIRC)</i> , Sep 2016, pp. 113-116.	

R. Rithe, P. Raina, N. Ickes, S. V. Tenneti, and A. P. Chandrakasan, "Reconfigurable processor for energy-scalable computational photography," in *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb 2013, pp. 164-165.

R. Rithe, P. Raina, N. Ickes, S. V. Tenneti, and A. P. Chandrakasan, "Reconfigurable processor for energy-efficient computational photography," *IEEE Journal of Solid-State Circuits (JSSC)*, vol. 48, no. 11, pp. 2908-2919, Nov 2013.

D. Jeon, N. Ickes, P. Raina, H. C. Wang, D. Rus, and A. P. Chandrakasan, "A 0.6V 8mW 3D vision processor for a navigation device for the visually impaired," in *IEEE International Solid-State Circuits Conference (ISSCC)*, Jan 2016, pp. 416-417.

RESEARCH
EXPERIENCE

Low-Power Processor for Real-Time Motion Magnification in Videos

PhD Thesis Project, MIT Sep 2015 - Present

- Designing a motion magnification processor for contact-less health monitoring
- Achieves real-time 1080p processing in simulation (130× faster than CPU)
- Proposed intermediate data compression, block skipping with dynamic voltage and frequency scaling and precision adjustment techniques for reducing system energy

Energy-Scalable Accelerator for Blind Image Deblurring

PhD Thesis Project, MIT Sep 2013 - Sep 2015

- Designed the first energy-scalable accelerator for image deblurring in 40nm CMOS
- Achieved 56× faster deblurring with 4400× lower energy compared to CPU
- Introduced 10× energy-scalability for operation in energy-constrained scenarios

Reconfigurable Processor for Energy-Scalable Computational Photography

Masters Thesis Project, MIT Sep 2011 - Sep 2013

- Co-designed a reconfigurable computational photography processor in 40nm CMOS
- Demonstrated speed-up for HDR imaging, low-light imaging and glare reduction
- Achieved 5.25× faster performance and 280× lower energy compared to mobile CPU

Real-Time Super Resolution (SR) Based Video Enhancement Accelerator

Internship, Intel Labs, Hillsboro; Advisor: Ram Krishnamurthy Jun 2013 - Aug 2013

- Designed an accelerator for bilateral total variation regularization (90% of SR time)
- Achieved real-time 1080p processing (18000× faster than CPU) in simulation
- Proposed circuits optimizations to reduce area by 42.4% and power by 46.5%

Transactional Memory Architecture for Multicore Processors

Undergraduate Thesis Project, IIT Delhi Aug 2010 - May 2011

- Designed a reliability protocol for a scalable transactional memory system
- Developed a network-on-chip simulator to measure its resiliency and overhead

Low Power Video Decoding

Internship, MIT; Advisor: Anantha Chandrakasan May 2009 - Jul 2009

- Designed a test setup for a low power H.264/AVC video decoder chip on an FPGA

MENTORING
EXPERIENCE

- Mentored and proposed research projects for 7 undergraduate and masters students
- Worked with the students to set specific goals, and held regular one-on-one meetings to ensure progress
- Provided technical communication feedback on posters, talks and reports

Real-time system demonstration of motion magnification accelerator

Natalie Mionis, *UROF* Feb 2017 - Present

Automatic quantification of vitiligo skin lesions using 3D imaging
 Jiarui Huang, *M.Eng. Student* Oct 2016 - Present

Real-time energy measurement system for a mobile CPU + GPU platform
 Shorya Consul, *Summer Research Student* Summer 2016

Accelerating video motion magnification through motion detection
 Cimran Virdi, *SuperUROP* Sep 2015 - May 2016

Hardware for feature extraction from depth maps for gesture recognition
 Kushaarga Goyal, *Summer Research Student* Summer 2014

Hardware implementation for HMM-based gesture recognition
 Pranav Kaundinya, *UROP* Spring 2014

Designing an accurate and real-time gesture recognition system
 Neena Parikh, *SuperUROP* Sep 2013 - May 2014

TEACHING
EXPERIENCE

Analysis and Design of Digital Integrated Circuits (6.374), MIT Fall 2017
Instructor Students: 7

Completed a semester-long **Teaching Certificate Program** at MIT Spring 2014

Preparation for Undergraduate Research (6.UAR), MIT Spring 2017
Head Teaching Assistant (Instructor: Anantha Chandrakasan) Students: 142

- Held monthly one-on-one check-ins with students to assess their progress on projects and address any advisor-advisee problems
- Constructed and graded homework assignments leading up to the key deliverables, the journal paper and oral presentation
- Provided students technical and stylistic feedback on the key deliverables

Preparation for Undergraduate Research (6.UAR), MIT Fall 2015
Teaching Assistant (Instructor: Anantha Chandrakasan) Students: 179

- Held monthly one-on-one check-ins with students to assess their progress on projects and address any advisor-advisee problems
- Constructed and graded homework assignments leading up to the key deliverables, the project proposal and the poster
- Provided students technical and stylistic feedback on the key deliverables
- Organized an elevator pitch practice session and a poster session
- Received high evaluation scores (6.8/7.0) and positive reviews from the students

Introduction to EECS (6.01), MIT Spring 2014
Teaching Assistant (Instructor: Leslie Kaelbling) Students: 491

- Had one-on-one interactions with students in design labs to aid and evaluate understanding of the concepts
- Held weekly office hours to help students with questions on the material
- Taught a one-hour review session before each exam and graded the exams

Analog Electronics (EEL204), IIT Delhi Spring 2011
Undergraduate Teaching Assistant (Instructor: Shouri Chatterjee) Students: 100

- Selected for the pilot UGTA program aimed at introducing undergraduates to teaching
- Taught weekly hour-long interactive-style recitations to 3 sections of 20 students each
- Awarded full tuition scholarship for the semester based on positive student reviews

SELECTED
COURSEWORK

Digital Integrated Circuits (6.374)	Computer Architecture (6.823)
Digital & Computational Photography (6.865)	Power Electronics (6.334)
Advances in Computer Vision (6.869)	Machine Learning (6.867)
Computational Theory of Intelligence (9.S915)	Introduction to Psychology (9.00)

AWARDS,
HONORS AND
SCHOLARSHIPS

Awarded the **Best Young Scientist Paper Award at ESSCIRC 2016** for the paper "Energy-Scalable Accelerator for Blind Image Deblurring" 2017

Awarded the **2016 ISSCC Student Research Preview Award** for "Energy-Scalable Accelerator for Blind Image Deblurring" 2017

Best Oral Presentation Award at the Microsystems Annual Research Conference (MARC) 2017

Invited to the **Rising Stars** workshop for women pursuing academic careers 2016

Best Oral Presentation Award in Circuits & Systems session at MARC 2016

Invited to the **Path of Professorship** workshop at MIT 2014

Institute Silver Medal for highest GPA in Electrical Engineering, IIT Delhi 2011

Kalpna Chawla Scholarship for undergraduate research, IIT Delhi 2011

Bimla Jain Medal for academic excellence, IIT Delhi 2011

Selected for a fully-funded semester-long **exchange program** at UBC, Canada 2009

Gold Medal at Indian National Chemistry Olympiad (InChO) 2007

KVPY (Young Scientists) Fellowship by Indian Institute of Science 2005

National Talent Search Scholarship by NCERT, India 2005

LEADERSHIP
ROLES

Conference Co-Chair, Microsystems Annual Research Conference (MARC) 2016
Omni Mount Washington, Bretton Woods, NH (175 attendees)

- Led a team of 12 to organize all aspects of the 2-day conference - abstract review, speaker selection, venue selection, transportation, lodging, advertising and publishing
- Reduced expenditure by 21% compared to the 2014 conference at the same venue

Co-President, Graduate Women's Group in EECS, MIT 2014

- Organized 15 professional development, networking and social events for 246 members
- Increased average event attendance by 95% compared to 2013

Session Chair (Circuits & Systems), MARC 2015

Social Chair and Webmaster, Indian Students Association, MIT 2012, 2013

CONFERENCE
TALKS, INVITED
TALKS AND
POSTER
PRESENTATIONS

Low-Power Processor for Real-Time Motion Magnification in Videos
Microsystems Annual Research Conference, Bretton Woods, NH Jan 2017

Circuits & Systems for Computational Imaging on Mobile Devices
Rising Stars Workshop, Carnegie Mellon University, Pittsburgh, PA Nov 2016

Energy-Scalable Accelerator for Blind Image Deblurring
ESSCIRC, Lausanne, Switzerland Sep 2016

ISSCC Student Research Preview, San Francisco, CA Feb 2016

Microsystems Annual Research Conference, Bretton Woods, NH Jan 2016

Center for Integrated Circuits and Systems (CICS) Research Review, MIT Nov 2015

Computer Science & Artificial Intelligence Lab Graphics Seminar, MIT Nov 2014

Hardware Architectures for Computational Photography
EECS Masterworks, MIT Apr 2013

Real-time Video Enhancement Accelerator Circuits
Intel Labs, Hillsboro, OR Aug 2013

**Reconfigurable Processor for Energy-Scalable Computational
Photography**

ISSCC Academic Demonstration Session, San Francisco, CA
Microsystems Annual Research Conference, Cambridge, MA

Feb 2013
Jan 2013