Kirmani, Ahmed

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RESEARCH INTERESTS	Computational imaging, time-of-flight cameras, statistical signal processing, convex optimization

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA USA

PhD Candidate in Electrical Engineering and Computer Science   June 2010 – December 2014
- Thesis topic: Computational time-resolved imaging
- Thesis committee: Prof. Vivek K Goyal (Advisor), Prof. Jeffrey H. Shapiro (Advisor), Prof. Pablo A. Parrilo

Master of Science at MIT Media Lab   June 2008 - May 2010
- Thesis topic: Look around corners using femtosecond transient imaging
- Thesis committee: Prof. Ramesh Raskar (Advisor), Prof. Vivek K Goyal, Prof. Pablo A. Parrilo

Indian Institute of Technology Delhi, New Delhi, India

Integrated M.Tech and B.Tech in Math and Computing   July 2003 - May 2008
- Thesis topic: Error correction using low density parity checking codes on factor graphs
- Thesis advisors: Prof. Niladri Chatterjee (IITD), Dr. Ben Vigoda (MIT Media Lab, Lyric Semi.)

SELECT AWARDS AND HONORS

Best paper award at IEEE International Conf. on Image Processing (ICIP) (1st/2800 papers)	2014
Microsoft Research PhD fellowship (top 12 EECS PhD students from across North America)	2013
Lemelson-MIT student prize finalist (one of the top 3 student inventors at MIT)	2013
$50K Gold prize winner at the MassChallenge accelerator (top 15/1200+ global startups)	2013
Grand prize winner of the MIT $100k Entrepreneurship competition (1st/350+ teams)	2013
ACM student research competition finalist held at SIGGRAPH (top 5/150 posters)	2012
Qualcomm innovation fellowship competition honorable mention (top 10/109 applicants)	2012
Qualcomm innovation fellowship competition winner (top 8/146 applicants)	2011
David Marr prize honorable mention awarded at ICCV for outstanding computer vision research	2009
Ranked within top 0.5% of 175,000 candidates at the IIT Joint Entrance Examination	2003

SELECT PUBLICATIONS

A Kirmani, D Venkatraman, D Shin, A Colaço, F N C Wong, J H Shapiro, V K Goyal, "First-Photon Imaging", *Science*, **343** (6166) pp. 58-61, AAAS, January 2014 [`Issue highlight`]

A Kirmani, H Jeelani, V Montazerhodjat, V K Goyal, "Diffuse imaging: Creating optical images with unfocused time-resolved illumination and sensing", *IEEE Sig. Process. Letters*, January 2012

A Kirmani, A Colaço, F N C Wong, V K Goyal, "Exploiting sparsity in time-of-flight range acquisition using a single time-resolved sensor", *OSA Optics express*, October 2011

D Shin, **A Kirmani**, V K Goyal, J H Shapiro, "Photon-Efficient Computational 3D and Reflectivity Imaging with Single-Photon Detectors", *IEEE Tran. Computational Imaging*, 2015

A Kirmani, A Colaço, V K Goyal, "SFTI: Space-from-Time Imaging" (book chapter), In *Emerging Tech. for 3D Video: Creation, Coding, Transmission and Rendering*, J. Wiley & Sons, March 2013

A Kirmani, T Hutchison, J Davis, R Raskar, "Looking around the corner using transient imaging", In Proc. of *IEEE International Conference on Computer Vision* (ICCV), September 2009
David Marr prize honorable mention (2nd/1400). [`Oral presentation acceptance rate: 2%`]

A Colaço, **A Kirmani**, H S Yang, N W Gong, C Schmandt, V K Goyal, "Mime: compact, low power 3D gesture sensing for interaction with head mounted displays", In Proc. of *ACM symposium on User Interface Software and Technology* (UIST), October 2013 [`acceptance rate: 19%`]

A Colaço, **A Kirmani**, G A Howland, J C Howell, V K Goyal, "Compressive depth map acquisition using a single photon-counting detector: Parametric signal processing meets sparsity", In Proc. of *IEEE Computer Vision and Pattern Recognition conference*, June 2012 [`acceptance rate: 23%`]

D Shin, **A Kirmani**, V K Goyal, J H Shapiro, "Computational 3D and Reflectivity Imaging with High Photon Efficiency", *IEEE International Conference of Image Processing* (ICIP), October 2014
Overall Best Paper Award (1st/2800 total papers)

Founder, 3dim Tech Inc., Cambridge, MA, USA   2013

Research intern, Microsoft Research, Redmond, WA, USA   May – August 2012
- Developed algorithms for the time-of-flight Kinect sensor to improve depth imaging.

Graduate research fellow, Research Laboratory of Electronics, MIT June 2010 – May 2014
- Developed three new imaging modalities based on computational time-resolved sensing — lensless optical cameras, single-pixel time-of-flight sensor, and 3D imaging using one detected photon/pixel
- Conducted proof-of-concept lab experiments to demonstrate the aforementioned imaging modalities

Graduate research assistant, MIT Media Lab   June 2008 – May 2010
- Developed an algorithm to image occluded objects around the corner using ultrafast imaging of diffusely scattered light
- Conducted proof-of-concept experiments requiring precise alignment and calibration of sensitive femtosecond lasers and picosecond-accurate streak cameras

Research intern, Lyric Semiconductor Inc., Cambridge, MA, USA   May – August 2007
- Developed iterative algorithms for communication receiver design based on factor graphs and analog probabilistic logic

Research intern, Mitsubishi Electric Research Lab, MA, USA   May – August 2006
- Analyzed the effect of transistor non-idealities on the performance of soft-iterative analog decoders

Research intern, Max Planck Institute for Biological Cybernetics   May – August 2005
- Worked on a rigid head motion and articulated facial expression tracking multi-camera system to study conversational human-computer interfaces

BBC, *Camera takes 3D photos in the dark*	2013
Scientific American, Nature News, *Stealth camera takes pictures virtually in the dark*	2013
Wall Street Journal, *3dim: Gesture Is the New Touch*	2013
New Scientist, *Gesture that smart phones can appreciate*	2013
WIRED, *Augmented Reality: MIT's Compressive Depth Acquisition Camera*	2012
The Economist, *Going round the bend: A camera that can see around corners*	2011
BBC, *Laser camera takes photos around corners*	2011