

Atul N. Ingle

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Department of Computer Science
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Research Interests

Computational imaging, statistical signal processing, inverse problems in medical imaging

Education

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| Ph.D., University of Wisconsin-Madison | 2015 |
| Department of Electrical and Computer Engineering
<i>Advisor:</i> Prof. Tomy Varghese | |
| M.S., University of Wisconsin-Madison | 2011 |
| Department of Electrical and Computer Engineering
<i>Advisor:</i> Prof. William Sethares | |
| B. Tech. Electronics Engineering, Veermata Jijabai Technological Institute | 2009 |
| University of Mumbai (Bombay), India
<i>Advisor:</i> Prof. Alice Cheeran | |

Work Experience

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| Assistant Professor, Portland State University, Portland OR.
Department of Computer Science | 2022– |
| Postdoctoral Research Associate, University of Wisconsin-Madison
Departments of Computer Science and Biostatistics
Advisors: Prof. Mohit Gupta and Prof. Andreas Velten | 2017–2021 |
| Research Scientist, Fitbit Inc., Boston, MA.
Supervisor: Eric Foxlin | 2015–2017 |

Visiting Researcher, Philips Healthcare, Andover, MA. Host: Dr. Abhay Patil	S'2013, F'2014
Research Assistant, University of Wisconsin-Madison Departments of Electrical and Computer Engineering, and Medical Physics	2011–2015
Project Assistant, University of Wisconsin-Madison UW-Madison Radio Frequency Identification Lab	2010–2011

Awards and Honors

Best Poster Presentation DoE/NNSA ETI University Consortium Meeting, Atlanta, GA.	September 2021
Best Blitz Talk (People's Choice) Award UW-Madison Postdoctoral Symposium.	September 2020
Best Paper (Marr Prize) Honorable Mention IEEE International Conference on Computer Vision (ICCV), Seoul, South Korea.	November 2019
Veerмата Jijabai Technological Institute Gold Medal Undergraduate class of 2009.	August 2009

Recent Publications

- Y. Liu, F. Gutierrez-Barragan, **A. Ingle**, M. Gupta, A. Velten, "Single-Photon Camera Guided Extreme Dynamic Range Imaging," Proc. WACV 2022.
- A. Ingle**, T. Seets, M. Buttafava, S. Gupta, A. Tosi, M. Gupta*, A. Velten*, "Passive Inter-Photon Imaging," IEEE Proc. CVPR, 2021 (* equal) ([oral presentation, 4.6% acceptance rate](#))
- T. Seets, **A. Ingle**, A. Velten, "Motion Adaptive Video Deblurring with Single-Photon Cameras," Proc. WACV 2021.
- A. Gupta*, **A. Ingle***, M. Gupta, "Asynchronous Single-Photon 3D Imaging," IEEE Proc. ICCV, 2019 (* equal) ([Marr Prize Honorable Mention](#)).
www.SinglePhoton3DImaging.com
- A. Ingle**, A. Velten, M. Gupta, "High Flux Imaging with Single-Photon Sensors," IEEE Proc. CVPR, 2019 ([oral presentation, 5.6% acceptance rate](#))
wisionlab.cs.wisc.edu/project/spad-hdr/
- A. Gupta, **A. Ingle**, M. Gupta, A. Velten, "Photon-Flooded Single-Photon 3D Cameras," IEEE Proc. CVPR, 2019 ([oral presentation, 5.6% acceptance rate](#))
wisionlab.cs.wisc.edu/project/spad-lidar/

Older Publications

Journals

- (J8) **A. Ingle**, T. Varghese, "A Kernel Smoothing Algorithm for Ablation Visualization in Ultrasound Elastography," *Ultrasonics*, vol. 96, pp. 267–275 (2019).
- (J7) **A. Ingle**, T. Varghese, W. Sethares, "Efficient 3D Reconstruction in Ultrasound Elastography via a Sparse Iteration based on Markov Random Fields," *IEEE Trans. Ultrason., Ferroelectr., Freq. Control*, vol. 64, no. 3, pp. 491–499 (2017).
- (J6) W. Yang, T. Ziemlewicz, T. Varghese, M. Alexander, N. Rubert, **A. Ingle**, M. Lubner, J. Hinshaw, F. Lee Jr., J.A. Zagzebski, "Post-Procedure Evaluation of Microwave Ablations of Hepatocellular Carcinomas using Electrode Displacement Elastography," *Ultrasound in Med. Biol.*, vol. 42, no. 12, pp. 2893–2902 (2016).
- (J5) W. Yang, **A. Ingle**, T. Varghese, "Comparison of Three Dimensional Strain Volume Reconstructions using SOUPR and Wobbler Based Acquisitions: A Phantom Study," *Med. Phys.*, vol. 43, no. 4, pp. 1615 (2016).
- (J4) **A. Ingle**, J. Bucklew, W. Sethares, T. Varghese, "Slope estimation in noisy piecewise linear functions," *Elsevier Sig. Proc.*, vol. 108, pp. 576–588 (2015).
- (J3) **A. Ingle**, C. Ma, T. Varghese, "Ultrasonic Tracking of Shear Waves using a Particle Filter," *Med. Phys.*, vol. 42, no. 11, pp. 6711–6725 (2015).
- (J2) **A. Ingle**, T. Varghese, "C-plane reconstruction of ablations in ultrasound shear wave elastography using a sheaf of planes," *IEEE Trans. Med. Imag.*, vol. 33, no. 8, pp. 1677–1688 (2014).
- (J1) **A. Ingle**, W. Sethares, "The least-squares invertible constant-Q spectrogram and its application to phase vocoding," *J. Acoust. Soc. Am.*, vol. 132, no. 2, pp. 894–903 (2012).

Conferences

- (C10) **A. Ingle**, T. Varghese, "3D Reconstruction of Ablations in Shear Wave Elastography Using the Matérn Kernel," *IEEE IUS 2017*.
- (C9) **A. Ingle**, T. Varghese, "C-plane Reconstructions from Sheaf Acquisition for Ultrasound Electrode Vibration Elastography," *IEEE Ultrasonics Symposium 2014*.
- (C8) **A. Ingle**, T. Varghese, "Three Dimensional Shear Wave Elastographic Reconstruction of Ablations," *IEEE EMBC 2014*.
- (C7) **A. Ingle**, T. Varghese, W. Sethares, J. Bucklew, "Stochastic Piecewise Linear Function Fitting with Application to Ultrasound Shear Wave Imaging," *IEEE EMBC 2014*.
- (C6) **A. Ingle**, William Sethares, Tomy Varghese, James Bucklew, "Piecewise Linear Slope Estimation," *Asilomar 2014*.

- (C5) William Sethares, **A. Ingle**, Tomas Krc, Sally Wood, "Eigentextures: An SVD Approach to Automated Paper Classification," Asilomar 2014.
- (C4) **A. Ingle**, T. Varghese, "A Huber-penalized Akaike-regularized broken-stick least squares regression algorithm for shear wave velocity reconstruction," AIUM Annual Convention 2013, Apr. 2013.
- (C3) **A. Ingle**, T. Varghese, "Stochastic hidden Markov model based filtering algorithm for tracking shear waves through disparate media in electrode vibration elastography," AIUM Annual Convention 2013, Apr. 2013.
- (C2) **A. Ingle**, T. Varghese, "A Comparison of Model Based and Direct Optimization Based Filtering Algorithms for Shear Wave Velocity Reconstruction for Electrode Vibration Elastography," in Proc. Int. Symp. Biomed. Imag., Apr. 2013.
- (C1) A. Gutierrez, C. Hohberger, F.D. Nicolalde, **A. Ingle**, W. Hochschild, R. Davis, and R. Veeramani, "High-Frequency RFID Tag Survivability in Harsh Environments," in Proc. IEEE Int RFID Conf, pp. 58–65, May 2013.

Intellectual Property

Systems, methods and media for asynchronous single-photon depth imaging with improved precision in ambient light (US patent application filed June 2019).

Systems, methods, and media for high dynamic range imaging using dead-time-limited single photon detectors (US Patent 10,616,512).

Evaluation of cardiac infarction by real-time ultrasonic strain imaging (US Patent App. 15/545,748, International Patent App. PCT/IB2016/050308).

Method and apparatus for rapid acquisition of elasticity data in three dimensions (US Patent 9,913,624).

Method and apparatus for rapid acquisition of elasticity data in three dimensions (US Patent 10,488,247).

Talks

"Computational Imaging with Single-Photon Cameras," **Invited Speaker**, Photonics North 2022 (May 2022)

"Navigating the Academic Job Market," University of Central Florida Postdocs Association <https://youtu.be/1UTJmkRSHWs> (October 2021)

"General-Purpose Single-Photon Cameras," Technion Pixel Club Symposium (November 2020)

"Single-Photon Computational Imaging," **Keynote Talk**, CVPR 2020 CCD Workshop (June 2020)

“General-Purpose Imaging with Single-Photon Cameras,” SPIE DCS (May 2020)

“Single-Photon Cameras,” Boston University ECE Department Seminar (December 2019)

“Single-Photon Cameras,” MIT-RLE DARPA Team Meeting, Cambridge, MA (December 2019)

“Single-Photon Cameras,” MIT Media Lab Camera Culture Group, Cambridge, MA (December 2019)

“Single-Photon 3D Imaging,” EPFL AQUA Lab, Neuchâtel, Switzerland (November 2019)

“General-Purpose Passive Imaging with Single-Photon Sensors,” Single-Photon Workshop, Milan, Italy (October 2019)

Posters

“Passive High Dynamic Range Imaging with Single-Photon Sensors,” ICCP 2020 (April 2020)

“Single-Photon 3D Cameras,” ICCP 2020 (April 2020)

“Single-Photon LiDAR in High Ambient Light,” Single-Photon Workshop, Milan, Italy (October 2019)

News/Media

“Holographic Camera Instantly Peeks around Obstacles,” Scientific American, February 1, 2022.

“How Signal Processing Counts your Steps,” IEEE Signal Processing Society Blog (Invited), June 7, 2017.

Professional Service

Reviewer (Journals)

IEEE Trans. Computational Imaging; IEEE Trans. Medical Imaging; IEEE Trans. on Ultrasonics, Ferroelectrics and Freq. Control; Elsevier Signal Processing; Medical Physics; J. Acoustical Society of America; PLoS ONE; ACM Trans. on Graphics (ToG)

Reviewer (Conferences)

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), European Conference on Computer Vision (ECCV), IEEE/CVF International Conference on Computer Vision (ICCV), IEEE International Conference on Computational Photography (ICCP), ACM SIGGRAPH

Conference organization

ICCP program committee: ICCP 2019, ICCP 2022

Session chair for computational imaging session: Photonics North 2022

Teaching

CS410/510 Unconventional Cameras (Portland State University) W'22
Senior undergraduate/graduate class in computational imaging

Guest Lecturer F'17, S'18, S'19 S'20
Undergraduate and graduate level classes in physics-based computer vision and computational imaging (Department of Computer Sciences, University of Wisconsin-Madison)

Undergraduate Engineering and Math Tutor Fall 2018, Fall 2019
Calculus, linear algebra, probability, signal processing (Greater University Tutoring Service, University of Wisconsin-Madison)

Teaching Assistant Fall 2011, Fall 2013
Undergraduate courses in probability and digital signal processing (Department of Electrical and Computer Engineering, University of Wisconsin-Madison)

Mentoring

Undergraduate Students

Trevor Seets Jan 2019–Dec 2019
Project: High Dynamic Range Imaging with Single-Photon Cameras
Yuhao Liu Jan 2020–
Project: Color Imaging with SPAD Cameras

Graduate Students

Trevor Seets Jan 2020–Dec 2022
Project: Motion Compensation using Single-Photon Cameras
NSF Graduate Fellowship Recipient (2020)
Anant Gupta Jun 2018–Dec 2019
Project: Single-Photon 3D Imaging
Talha Sultan Aug 2020–Dec 2020
Project: Passive CMOS-SPAD Imaging
Sacha Jungerman Jan 2020–
Project: Single-pixel SPAD Imaging
Yeganeh Jalalpour Jun 2021–
Project: Resource-constrained Passive SPAD Imaging

References

Prof. Andreas Velten
Asst. Professor, Dept. of Biostat. and ECE, UW-Madison, Madison, WI
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Prof. Mohit Gupta

Asst. Professor, Dept. of Computer Sciences, UW-Madison, Madison, WI
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Prof. William Sethares

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