

# VENKAIAH CHOWDARY KAVURI

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## EDUCATION

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**Postdoctoral Research** in Physics and Astronomy, **University of Pennsylvania**, 2016

**Ph.D** in Bioengineering, **University of Texas Arlington**, 2014

Dissertation - Development of Trans-rectal Ultrasound (TRUS) Coupled Diffuse Optical Tomography (DOT) for Prostate Cancer

**B.Tech** in Biomedical Engineering, Jawaharlal Nehru Technological University, India, 2007

First class with distinction.

**Specialization:** Near-infrared (NIR) technology, diffuse optics, optical tomography, inverse problems, image reconstruction, image processing, mathematical analysis, optimization, statistics.

**Skills:** Optics, lasers, opto-electronics, RF electronics, CAD, mechanical design, machining  
Matlab, LabVIEW, Python, C, SOLIDWORKS, Comsol.

**Certifications:** Coursera: Machine Learning Foundations, Regression.

## EXPERIENCE

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**University of Pennsylvania**, Philadelphia, PA.

October 2014 - Present

**Postdoctoral Researcher**, Yodh Biomedical Optics Lab, Philadelphia, PA

- Designed and engineered(hardware and software) a non-invasive blood flow measurement device prototype using NIR and dynamic light scattering technologies.
- Developed a clinical UI using Labview for controlling Lasers, single-photon counting detectors and acousto-optic tunable filters.
- Implemented RS232 communication protocol to send the real-time processed data to an existing multi-modal data collection device.
- Image processing and reconstruction of breast cancer images (using diode lasers and gain modulated, image intensified CCD camera) using Diffuse Optical Tomography (optical 3D mammogram).
- Supervised and trained graduate students, undergraduate students and research assistants.

**University of Texas Arlington**, Arlington, TX.

August 2010 - August 2014

**Graduate Research Assistant**, Biomedical Optics Lab, Arlington, TX

- Engineered Trans-rectal Ultrasound (TRUS)-compatible Diffuse Optical Tomography (DOT) Probe (using SolidWorks) for measuring prostate cancer.
- Developed algorithms(sparse recovery techniques and hierarchical clustering) to detect and image early stages of aggressive prostate cancer which increased sensitivity and specificity.
- Originated, designed and built multi-spectral, low-cost and portable DOT instrumentation (using basic electronic circuit design and signal processing).
- Research work resulted in 2 peer-reviewed, 1st-authored journal papers. This produced further external funding for continuous development in detection/diagnosis of prostate cancer.

## EQUIPMENT SKILLS

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Oscilloscopes	Spectrum Analyzers	RF Electronics (100-200MHz)	Lock-in Amplifiers	Spectrometers
Lasers & LEDs	Optoelectronics	Photon Counting	DAQ boards	Free Space Optics

## PATENTS

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- "TRUS-Integrated FD-DOI Multi-modal Imaging System for Prostate Cancer," US Provisional Patent Application Serial No. 61/985,905, April 2014.

## HONORS

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- STEM Full tuition assistantship, University of Texas Arlington.
- Outstanding Student Award - 2014, University of Texas Arlington.

## MEMBERSHIPS

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- Member, International Society for Optics and Photonics(SPIE).
- Member, Optical Society of America(OSA).
- Member, Institute of Electrical and Electronics Engineers(IEEE).

## PUBLICATIONS

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### Journal Publications

- [1] H. Y. Ban, M. Schweiger, **V. C. Kavuri**, J. M. Cochran, L. Xie, D. R. Busch, J. Katrasnik, S. Pathak, S. H. Chung, K. Lee, R. Choe, B. Czerniecki, S. R. Arridge, and A. G. Yodh, “Heterodyne frequency-domain multispectral diffuse optical tomography of breast cancer in the parallel-plane transmission geometry,” *Medical Physics*, vol. Under Review, **Equal Contribution** and Corresponding Author, 2016.
- [2] D. Wang, A. B. Parthasarathy, W. B. Baker, K. Gannon, **V. C. Kavuri**, T. Ko, S. Schenkel, Z. Li, Z. Li, M. T. Mullen, *et al.*, “Fast blood flow monitoring in deep tissues with real-time software correlators,” *Biomedical Optics Express*, vol. 7, no. 3, pp. 776–797, 2016.
- [3] **V. C. Kavuri** and H. Liu, “Hierarchical clustering method to improve transrectal ultrasound-guided diffuse optical tomography for prostate cancer imaging,” *Academic radiology*, vol. 21, no. 2, pp. 250–262, 2014.
- [4] R. H. Patel, A. S. Wadajkar, N. L. Patel, **V. C. Kavuri**, K. T. Nguyen, and H. Liu, “Multifunctionality of indocyanine green-loaded biodegradable nanoparticles for enhanced optical imaging and hyperthermia intervention of cancer,” *Journal of biomedical optics*, vol. 17, no. 4, pp. 0460031–04600310, 2012.
- [5] **V. C. Kavuri**, Z.-J. Lin, F. Tian, and H. Liu, “Sparsity enhanced spatial resolution and depth localization in diffuse optical tomography,” *Biomedical optics express*, vol. 3, no. 5, pp. 943–957, 2012.

### Conference Publications

- [1] A. B. Parthasarathy, K. Gannon, W. B. Baker, **V. C. Kavuri**, M. T. Mullen, J. A. Detre, and A. G. Yodh, “Functional monitoring of blood flow dynamics in brain with photon correlation techniques,” in *SPIE BiOS*, International Society for Optics and Photonics, 2016, 97070H–97070H.
- [2] C. Chen, **V. C. Kavuri**, X. Wang, R. Li, H. Liu, and J. Huang, “Multi-frequency diffuse optical tomography for cancer detection,” in *Biomedical Imaging (ISBI), 2015 IEEE 12th International Symposium on*, IEEE, 2015, pp. 67–70.
- [3] **V. C. Kavuri**, P. Kapur, M. Morgan, J. Cadeddu, C. Roehrborn, and H. Liu, “Optical properties of ex-vivo prostate tissues and the design of trans-rectal ultrasound coupled optical probe,” in *Biomedical Optics*, Optical Society of America, 2014, BM3A–28.
- [4] **V. C. Kavuri** and H. Liu, “Hierarchical clustering method for improved prostate cancer imaging in diffuse optical tomography,” in *SPIE BiOS*, International Society for Optics and Photonics, 2013, 85781K–85781K.
- [5] **V. C. Kavuri**, Z.-J. Lin, and H. Liu, “Heterogeneous hierarchical segmentation method for improved prostate cancer imaging in diffuse optical tomography: Simulation study,” in *Biomedical Optics*, Optical Society of America, 2012, BTu3A–37.
- [6] **V. C. Kavuri**, Z.-J. Lin, and H. Liu, “Comparison of l1 and l2 regularizations in diffuse optical tomography,” in *Biomedical Optics*, Optical Society of America, 2012, BTu3A–22.
- [7] V. Krishnamurthy, **V. C. Kavuri**, F. Tian, and H. Liu, “Detectability of hemodynamic response to thermal pain in pre-frontal cortex using diffuse optical tomography,” in *Biomedical Optics*, Optical Society of America, 2010, BTuD103.