

VENKAIAH CHOWDARY KAVURI

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SUMMARY OF QUALIFICATIONS

- Optical device designing(imaging/sensing) and characterization-Lasers, Optoelectronics and CCD cameras.
- Proficient in optical sensing techniques- Absorption(Spectroscopy), Scattering, Polarization, Coherence, Surface plasmon resonance and Surface-enhanced Raman scattering.
- Deep understanding of the fundamental physics of light-optical modeling/simulation/optimization.
- Instrument control and data processing- LabVIEW, MATLAB, Python, and SOLIDWORKS.
- Statistics- Design of Experiments, SAS and SPSS.
- Signal processing tools- Short time Fourier transform, Wavelet transform, Noise filtering and Parameter estimation.

EDUCATION

University of Pennsylvania, Philadelphia, PA October 2014 - Present

Postdoctoral Researcher in Department of Physics and Astronomy

- Projects (in progress): (1) Time-domain and Frequency-domain(100MHz) Optical instrumentation (stroke measurements) for Neural ICU. (2) Wearable optical flow measurement device design for muscle during exercise.
- Projects (completed): Optical 3D image reconstruction(inverse problem) of human breast cancer from 2D camera images.
- Advisor: Professor Arjun Yodh
- Areas of focus: Optical Instrument Design, Clinical Measurements, Diffuse Optical Tomography, Diffuse Coherence Spectroscopy and Image Reconstruction.

University of Texas Arlington, Arlington, TX January 2008 - August 2014

Doctor of Philosophy in Biomedical Engineering(Medical Imaging-Biomedical Optics)

- Dissertation - Development Of Trans-rectal Ultrasound (TRUS) Coupled Diffuse Optical Tomography (DOT) For Prostate Cancer Imaging.
- Advisor: Professor Hanli Liu
- Areas of focus: Optical Probe Design, Clinical Measurements, Image Reconstruction and Image Processing.

Jawaharlal Nehru Technological University, Hyderabad, India September 2003 - May 2007

Bachelor of Technology in Biomedical Engineering

- First class with distinction.

PROFESSIONAL EXPERIENCE

University of Pennsylvania, Philadelphia, PA . October 2014 - Present

Postdoctoral Researcher, Yodh Biomedical Optics Lab, Philadelphia, PA

- Designed a non-invasive cerebral blood flow instrument to be used in neural ICU for predicting recurrent stroke using single photon counting detectors and long coherence length lasers.
- Image processing and reconstruction of breast cancer images(using diode lasers and gain modulated, image intensified CCD camera) using Diffuse Optical Tomography(optical 3D mamogram).
- Supervised and trained new 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

- Developed a technique to detect and image early stages of aggressive prostate cancer by creating, engineering and building Transrectal Ultrasound (TRUS)-compatible Diffuse Optical Tomography (DOT) Probe (using SolidWorks), which increased sensitivity and specificity to detect prostate cancer.

- Originated, designed and built multi-spectral, low-cost and portable DOT instrumentation (using basic electronic circuit design and signal processing) then improved existing reconstruction methods (enhanced depth localization and images) by combining depth compensation algorithm and L1-regularized least squares method.
- 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.

COMPUTER SKILLS

Matlab	Labview	Python	C	Solidworks	Comsol
MS Office	Ubuntu	ImageJ	L ^A T _E X	SAS	SPSS

EQUIPMENT SKILLS

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

PATENTS

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

MEMBERSHIPS

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

HONORS

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

PUBLICATIONS

Articles

- [1] 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.
- [2] 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.
- [3] 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. 0 460 031–04 600 310, 2012.

Conference Publications

- [4] 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.
- [5] 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.
- [6] —, “Heterogeneous hierarchical segmentation method for improved prostate cancer imaging in diffuse optical tomography: Simulation study,” in *Biomedical Optics*, Optical Society of America, 2012, BTu3A37.
- [7] 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.

- [8] V. Krishnamurthy, V. 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.
- [9] K. T. Nguyen, R. H. Patel, N. L. Patel, V. C. Kavuri, and H. Liu, “Multifunctionality of indocyanine green-loaded biodegradable nanoparticles for enhanced optical imaging and hyperthermia intervention of cancer,” SPIE, 2012.

PhD Thesis

- [10] V. C. Kavuri, “Development of trans-rectal ultrasound (trus) coupled diffuse optical tomography (dot) for prostate cancer imaging,” 2014.