Venkaiah Chowdary Kavuri

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Summary of Qualifications

- Optical device instrumentation and characterization - Lasers, Optoelectronics and CCD cameras.
- 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.
- Electronic circuit design- PSpice.
- 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: Time-domain and Frequency-domain(100MHz) Optical instrumentation (stroke measurements) for Neural ICU.
- Completed projects: 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 mammogram).
- 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 Trans-rectal 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 | LaTeX | 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.