

Santhoshi N. Krishnan

Curriculum Vitae

Department of Electrical and Computer Engineering

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Education

- 2017–present **PhD, Electrical & Computer Engineering, Rice University, Houston, USA.**
Relevant Courses : Probability and Random Processes, R for Data Science, Network Science
- 2015–2016 **Master of Biengineering, Rice University, Houston, USA.**
Relevant Courses : Fundamentals of Medical Imaging 1 & 2, Imaging on a Nanoscale, Introduction to Neuro-engineering, Computational Science, Medical Device Development-1, 2, 3, 4.
CGPA : 3.73
- 2011–2015 **Bachelor of Technology, Biomedical Engineering, SRM University, Kattankulathur, India.**
Senior Design Project: Multi parameter Analysis of Human Emotional States
Relevant Courses: Medical Physics, Medical Image Processing, Bio-signal Processing, Biomedical Instrumentation, Neural Networks and Fuzzy Logic
CGPA : 8.23/10(First Class)

Publications

Journal Articles

- 2022 **Santhoshi Krishnan***, Shariq Mohammed*, Timothy Frankel, and Arvind Rao. Gawrdenmap: A quantitative framework to study the local variation in cell-cell interactions in pancreatic disease subtypes(Accepted). *Scientific Reports*, 2022.
- 2021 Mayank Baranwal, **Santhoshi Krishnan**, Morgan Oneka, Timothy Frankel, and Arvind Rao. Cgat: Cell graph attention network for grading of pancreatic disease histology images. *Frontiers in Immunology*, volume 12, 2021.
- 2020 Rossana Lazcano Segura, **Santhoshi Krishnan**, Morgan Oneka, Federico Netto, Xin Lu, Priya Rao, Renganayaki Pandurengan, Curtis Pickering, Curtis Pettaway, Jad Chahoud, and et al. Identification of the immune landscape in penile squamous cell carcinoma using multiplex immunofluorescence and spatial image analysis. *Journal for ImmunoTherapy of Cancer*, volume 8, 2020.
- 2020 Omar A. Saldarriaga, Benjamin Freiberg, **Santhoshi Krishnan**, Arvind Rao, Jared Burks, Adam L. Booth, Bradley Dye, Netanya Utay, Monique Ferguson, Abdellah Akil, and et al. Multispectral imaging enables characterization of intrahepatic macrophages in patients with chronic liver disease. *Hepatology Communications*, volume 4, page 708–723, 2020.
- 2019 Olivia D. Lara, **Santhoshi Krishnan**, Zhihui Wang, Sara Corvigno, Yanping Zhong, Yasmin Lyons, Robert Dood, Wei Hu, Lisha Qi, Jinsong Liu, and et al. Tumor core biopsies adequately represent immune microenvironment of high-grade serous carcinoma. *Scientific Reports*, volume 9, 2019.
- 2015 C.R. Parvathy*, Meghna Hukeri*, **Santhoshi Krishnan***, Anburajan Mariamicheal, and Oinam Robita Chanu. Study of changes in surface temperature of facial region due to mobile phone radiation. *2015 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*, 2015.

In Conference Proceedings

- 2021 Yan Li, Majid Farhadloo, **Santhoshi Krishnan**, Timothy L Frankel, Shashi Shekhar, and Arvind Rao. Srnet: A spatial-relationship aware point-set classification method for multiplexed pathology images. In *Proceedings of DeepSpatial '21: 2nd ACM SIGKDD Workshop on Deep Learning for Spatiotemporal Data, Applications, and Systems*, volume 10. ACM, KDD-organized virtual conference, 2021.
- 2018 Alejandro Francisco Cruz, Edwin Parra, M. Jiang, J. Fujimoto, **Santhoshi Krishnan**, Souptik Barua, Arvind Rao, C. Chow, C. Behrens, N. Kalhor, and et al. Characterization of the immunologic intra-tumor heterogeneity in early stages of non-small cell lung cancer by multiplex immunofluorescence. In *Proceedings of the IASLC 19th World Conference on Lung Cancer, Toronto, ON, Canada, 23–26 September 2018*, volume 13, 2018.
- 2017 **Santhoshi Krishnan**, Arthur Braat, Armeen Mahvash, Marnix Lam, and Srinivas Kappadath. Dosimetry model-dependent biases in absorbed dose calculations following 90y-microsphere therapy. volume 58, pages 428–428. Society of Nuclear Medicine, 2017.

Conference Presentations and Talks

- 2022 **Santhoshi Krishnan**. Methods for the characterization of tumor heterogeneity with a spatial context. Presented at the *2nd Annual MarketsandMarkets Advanced Genetic Sequencing Conference, 3rd-4th February, 2022*.

Poster Presentations

- 2020 **Santhoshi Krishnan**, Morgan Oneka, Emily Belille, Katie Zarins, Johnathan McHugh, Jeremy M.G. Taylor, Maureen Sartor, Laura Rozek, and Arvind Rao. A quantitative framework to characterize tumor immune cell spatial interactions in head and neck squamous cell carcinoma. In *Keystone eSymposia on Advances in Cancer Immunotherapy-2020, 17-19 August 2020*. Keystone Symposia, 2020.
- 2020 Laura Rozek, **Santhoshi Krishnan**, Katie Zarins, Jonathan McHugh, Jeremy M.G. Taylor, Emily Belille, Steven B Chinn, Gregory T Wolf, Arvind Rao, and Maureen Sartor. Synthesizing tumor infiltrating lymphocyte patterns with genomic measurements for head and neck cancer survival. In *2020 Precision Health Virtual Symposium, 23-24 September, 2020*.

Research Experience

Department of Electrical and Computer Engineering, Rice University, Houston, TX / Department of Computational Medicine and Bioinformatics, University of Michigan, Ann Arbor, MI

- July, 2018 – present ***Spatially informed Frameworks for the Characterisation of Disease Heterogeneity***.
Developed a semi-automated framework for segmenting and classifying classes of cells in histopathology slides for patients affected by melanoma and head & neck cancers. Determined spatial relationships between cell phenotypes of interest in fluorescence images using a multitude of developed framework for multiple cancer sub types, utilizing methods from spatial statistics and machine learning.

Advisor : **Dr. Arvind Rao**, Associate Professor, Department of Computational Medicine & Bioinformatics, University of Michigan ([Personal Web-page](#))

Department of Neuroscience, Baylor College of Medicine, Houston, TX

- January, 2017 – August, 2017 ***Measurement of Changes in Listening Effort of Hearing-impaired Mice through Pupil Tracking***.
Worked on developing a mouse model for determining the listening effort for different frequencies from a tone cloud in hearing impaired mice. Assisted in developing the experimental setup and synchronization virtual instrument for the experiments on LabVIEW, specifically on integrating the functioning of the reward delivery system, the video acquisition and the sound generation system. Worked on modifying an existing MATLAB code for detection of pupil diameter and whisker detection for determining optimum video quality for recording purposes.

Advisor : **Dr. Matthew McGinley**, Assistant Professor, Department of Neuroscience, Baylor College of Medicine

Department of Bioengineering, Rice University, Houston, TX/Imaging Physics, University of Texas MD Anderson Cancer Center, Houston, TX

January, 2016 – Dec, 2016 ***Dosimetry Model-dependent Biases in Absorbed Dose Calculations for Treatment Planning in Nuclear Medicine*** .

Identified the relationship between the dose given to the patient during Y-90 radioembolisation therapy and the outcomes observed after the completion of the treatment using SPECT/CT Brem imaging. Developed a simple workflow for image registration and extraction of voxel dose data from the images obtained and identified a correlation in the data obtained. Performed statistical analysis on an initial subset of patients and identified differences in dose delivery estimation among the different standard methods used for performing absorbed dose calculation.

Advisor : **Dr.S Cheenu Kappadath**, Associate Professor, Department of Imaging Physics, University of Texas MD Anderson Cancer Center ([Personal Web-page](#))

Internships and Work Experience

January-July 2017 **Research Assistant-1**, Department of Neuroscience, Baylor College of Medicine, Was involved in the set-up and clean up of experiments, attending departmental training and seminars, animal care duties in accordance with institute regulation, and mentoring of visiting undergraduate summer scholars, in addition to responsibilities as a research assistant.

Summer 2016: **Student Assistant, Welcome Center**, Rice Center for Career Development, Houston, Texas. Handled and directed student, faculty, employer and parental queries by answering incoming calls and e-mails with a professional outlook. Reviewed and approved employer job postings for Rice Link, Rice University's Career Portal

Summer 2016: **Research Assistant**, Department of History, Rice University. Worked on the 'New Orleans Mortality Project' as part of the team digitizing and building up the death records database by name and the associated parameters such as cause of death, marital status, address of residence, etc.

Winter 2013: **Intern**, Siemens Healthcare, Bengaluru, India. Completed two-week rotations with the Radiation Oncology and Particle Therapy teams. Design of optimal treatment plans for test patients and phantoms. Development on the extensible Imaging Platform of basic Medical Imaging Applications accompanied by a presentation for the RO team at the end of the rotation cycle.

Fellowships & Awards

2020 Recipient of the **Keystone Symposia scholarship** to participate in the **Keystone Symposia-Advances in Cancer Immunotherapy-2020** virtual meeting from 17th to 19th August 2020.

2019 Departmental nominee for the **Microsoft Research Fellowship** by Rice University

2017 **Electrical and Computer Engineering Departmental Fellowship** offered to first-years PhD scholars at Rice University.

Computer skills

Programming Languages R, MATLAB, Python

Position of Responsibility

2018-2019 **Program Coordinator, Indian Students at Rice**, Rice University.

2016-2018 **Orientation Organizer, Rice University Graduate Student Association**, Rice University.

Spring 2015 **Student Career Ambassador-BME, SRM Career Ambassador** , SRM University.

Fall 2014 **Organizing Committee, Bioantra-2014** , SRM University.

Fall 2012 **Organizing Co-ordinator, 'Biotroniks',AARUUSH**, SRM University.

Teaching Assistantship

Summer **High School Mentorship Program**, *Greenhills School,Ann Arbor*.

2020: Supervised 2 high school students over the summer while they were working on a small-scale project related to AI in healthcare Designed the projects,assessed and troubleshooted student progress, and provided recommendations for various competitions

Fall 2016: **ENGI 315/515: Leading Teams and Innovation**, *Rice Center for Engineering Leadership*, Rice University.

Assisted the class of 34 students in completing various leadership development and team building activities
Responsible for collection and grading of assignments and attendance for the class