SHRUTHI GOKUL

+91 89252 81510 | shruthigokul8@gmail.com | LinkedIn

EDUCATION

- **Bachelor of Engineering, Electronics and Communication Engineering** *Nov 2020 - Apr 2024*
  Anna University, Chennai, India
- **Central Board of Secondary Education, Class 12th Examination** *Apr 2019 - Mar 2020*
  Velammal Vidyalaya, Chennai, India

RESEARCH EXPERIENCE

- **Indian Institute of Technology Madras** *Oct 2024 – Jun 2025*
  Project Associate, Non-Invasive Imaging and Diagnostic Lab (NIID) Chennai, India
  - ***Project 1: Graph-Theoretic Characterization of Nuclear Spatial Organization in Renal Cell Carcinoma Images***
    - Extracted Betti numbers (β_0, β_1) and clustering coefficients to quantify nuclear connectivity in RCC histopathology.
    - Optimized segmentation thresholds using the elbow method and validated statistical significance in tumor vs. normal tissues.
  - ***Project 2: Analysis of Mechanics of Cellular Nucleus in Renal Carcinoma Using Fractal Dimensions***
    - Processed renal cell carcinoma histological images to compute fractal dimensions of nuclei for classification.
    - Developed segmentation and analysis pipeline using Detectron2 and box-counting methods.
  - ***Project 3: Development of an Intelligent System for Pervasive Sepsis Detection and Monitoring***
    - Contributed to the development of a real-time, non-invasive monitoring system for early-stage sepsis detection by integrating physiological, omics, and non-omics data.
    - Built and validated machine learning models for sepsis stage classification and progression prediction using clinical datasets.
    - Designed and implemented a hypergraph neural network to identify subtypes within sepsis stages, enabling personalized risk stratification.
    - Attempted to deploy a TinyML version of the AI model for energy-efficient, embedded real-time inference on low-power hardware.
  - ***Course Design for ISRO Human Space Flight Engineers Training***
    - Collaborated with a team to design and develop training modules on biomedical engineering tailored for ISRO engineers preparing for human space flight missions.
  - Reviewed and applied regulatory frameworks and international standards governing medical device development and compliance.

  Supervisor: Dr. Ramakrishnan Swaminathan *(sramki@zmail.iitm.ac.in)*

- **Centre for Sponsored Research and Consultancy, Anna University** *Mar 2022 - Feb 2023*
  Project Assistant - Government-Funded Innovation Grant Chennai, India
  - Developed a highly customizable chatbot that serves as a pedagogical tool for Natural Language Processing and Generation in an educational setting.
  - Researched and implemented pruning techniques for LLMs and HuggingFace BERT models.
  - Achieved 4× model compression by reducing weights from 32-bit to 8-bit with only 2% loss in accuracy.
  - Pruned up to 45% of the model structure while maintaining output fidelity.
  - Designed a frontend optimized for deployment on Raspberry Pi for edge inference.
  - Presented on National Science Day in front of various jury members and research scholars.

  Supervisor: Dr. V R Vijaykumar *(vrv@annauniv.edu)*

PUBLICATIONS

- Palanisamy, R., **Gokul, S.**, Manoj, G., Srinivasan, A., Sundaram, S., Swaminathan, R., *Graph-Theoretic Characterization of Nuclear Spatial Organization in Renal Cell Carcinoma*, ***Computer Methods and Programs in Biomedicine***. https://doi.org/10.1016/j.cmpb.2025.108930

Posters and Conferences

- **Gokul, S.**, Manoj, G., Srinivasan, A., Pugazhendhi, S., Sundaram, S., Swaminathan, R., *Multifractal Analysis of H&E Stained Nuclear Images for Differentiation of Early-Grade Renal Cell Carcinoma*
  (Accepted at EMBC 2025, Copenhagen)
- Manoj, G., Srinivasan, A., **Gokul, S.**, Pugazhendhi, S., Sundaram, S., Swaminathan, R., *Evaluation of Bending Energy as an Imaging Biomarker for Differentiation of Nuclei for the Detection and Classification of Renal Cell Carcinoma*
  (Accepted at ISBI 2025, Texas)
- Srinivasan, A., **Gokul, S.**, Manoj, G., Pugazhendhi, S., Sundaram, S., Swaminathan, R., *Analysis of Mechanics of Cellular Nucleus in Renal Carcinoma Using Fractal Dimensions*
  (Accepted at ESB 2025, Zurich)

Undergraduate Projects

Enhancing Ovarian Cancer Subtype Classification Using Modified FractalNet Architectures (Bachelors thesis work)

- Developed and trained a modified FractalNet architecture for ovarian cancer subtype classification, achieving 95% accuracy.
- Preprocessed ultra-high-resolution whole slide images (100K × 50K pixels) through strategic downsampling to enable efficient training while retaining diagnostic integrity.
- Applied Gaussian blur and bicubic interpolation techniques to preserve critical morphological features during resolution reduction.

CancerVision: Advanced Breast Cancer Prediction with Deep Learning

- Built a clinical decision support tool using neural networks and IBM Watson to assist in early detection, diagnosis, and classification of breast cancer from histogram images.
- Developed a web-based interface to demonstrate model outputs and usability in clinical settings.
- Leveraged IBM Watson's visual recognition and machine learning capabilities for robust performance.

IoT-based Smart Irrigation System

- Designed an IoT-based irrigation system utilizing a Soil Moisture Sensor and Arduino board.
- Automatically activates the motor pump to water crops when soil moisture levels fall below a threshold, eliminating the need for manual irrigation.
- Highly customizable to adapt to specific user requirements and environmental conditions.

Honors and Awards

- Secured a funding of 25,000 INR from the Centre for Sponsored Research and Consultancy (CSRC) at Anna University, Chennai for the project proposal "Alt GPT- Alternative Language Technology-driven Pedagogy Tool" (2022)
- Selected among 48 teams statewide for a government-funded innovation challenge to develop a Raspberry Pi–based AI educational tool (2022)

Additional Professional Development

- Participated in the **Latest Trends in VLSI Devices, Circuits and Tools** workshop organised by National Institute of Technology Delhi.
- Completed the **Machine Learning Specialisation** offered by DeepLearning.AI and Stanford through Coursera.
- Completed courses on C programming, Python programming, Data Science, Data Structures and Algorithms, Deep Learning
- Completed the course on **Introduction to the Biology of Cancer** offered by **Johns Hopkins University** through Coursera.

Leadership and Organisational Engagement

- **Social Media Lead – Anna University** *Jun 2022 – Jun 2024*
  Digital Governance and Technology Enhancement Cell
  - Led a cross-functional team of 5+ social media managers and designers to plan, schedule, and execute multi-platform social media campaigns.
  - Designed and maintained a monthly content calendar; increased audience engagement through targeted, platform-specific strategies.
  - Collaborated with university departments to coordinate content for events, academic programs, and student outreach.

- **Event Co-organiser** *Apr 2024*
  16th National Conference on Signal Processing, Communication and VLSI Design
  - Coordinated logistics, event and digital promotions for a national-level IEEE conference hosted at Anna University Regional Campus Coimbatore.
  - Managed communications with 100+ participants, speakers, and sponsors.