R. Sriprabha

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Holding a B1 US Visa valid till 2030
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Summary

- Over 19 years of experience in general and medical image processing, computer vision, machine learning, deep learning, digital signal processing firmware, and application development.
- More than 7 years of research experience in AI/ML for medical vision, with 20 publications in high-impact journals (Neurocomputing, Applied Soft Computing, CMIG, Neural Networks (Revised and resubmitted)) and top conference papers in medical imaging and computer vision (MIDL, ISBI, workshops at MICCAI, CVPR, ICCV). Three patent IDFs are currently in the filing process.
- Successfully managed multiple responsibilities, including project development, paper publications (R&D work), and mentoring younger researchers. Accomplished industry-tied project work and Ph.D. in parallel from 2019 to 2024.
- Held various roles in industry and research: Project Manager, Senior Researcher and Investigator, Senior Technical Lead, Lead Engineer, and Project Associate.
- Seeking a responsible technical leadership role in the industry to apply expertise in computer vision, machine learning, and neural networks to solve complex problems and drive innovation across diverse imaging applications.

Skillsets and Professional Expertise

- **General Image processing** – SVD, PCA, inverse filtering, morphological operations, biometric fingerprint image analysis, Gabor filters, Frangi vesselness
- Medical image analysis - 3D Medical image registration, segmentation, interactive mesh segmentation, inverse problems– image reconstruction and super-resolution, image to image mapping and synthesis
- Imaging tools - OpenCV, SimpleITK, VTK, Scikit-learn, IDE – VC++
- Imaging Frameworks – Slicer3D, MITK, Paraview, Philips Medical Workspot, and Oncology System

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- **Deep learning** - multi-task learning, meta-learning (model-based and optimization-based), dynamic weight prediction, domain adaptation and generalization, physics-driven self-supervised learning, knowledge distillation, neural structure, and texture transfer, diffusion models, Large language models (currently, pursuing in Coursera)
- Machine learning methods – SVM, GMM
- Deep learning tools – Pytorch, Jupyter Notebook, VS Code

- **Programming languages**: C, C++, Python, MATLAB, Scilab
- Configuration management tools: Clearcase, Github.
- Project management tools: XNAT, Atlassian tools – Jira, Confluence, Trello
- Hardware design and programming – Embedded C, Verilog for FPGA CPLD programming, VDSP++

Work Experience

1. **Working** as a **Senior Project Engineer** at **Healthcare Technology Innovation Center (HTIC), IIT, Chennai,** from **Sep 2013** - present date**.**
2. **Working** as a **Senior Project Engineer**, **Sudha Gopala Krishnan Brain Center, Industrial Consultancy, and Sponsored Research**, IITM from Jan 2023 – present date
    - (2021 to present) Recognized for proposing deep-learning-based clinical solutions, won the **GE-SERB** proposal 2022 (Rs. 44 Lakhs) as an investigator and project leader, mentoring a team of 10 project members. Involved in AI/ML-based innovative proposals for problems in the healthcare industry, Active research activities on Block Face Image registration-based stacking image segmentation with a team of scholars in the **Sudha Gopalakrishnan Brain Centre, IITM (Jan 2024 to till date)**.
    - (2017 to 2020) Team Leader and individual contributor in developing a suite of deep learning-based and conventional algorithms for medical image reconstruction and segmentation, won 3 research awards. Successfully integrated algorithm in the customer software workstation, leading a team of four project associates for **Eindhoven Medical Robotics** and **GE Healthcare**. Developed deep learning-based clamp detection software module for **GE Life Sciences**.

- (2013 to 2016) Active team player and individual contributor in design and development, from preparing requirement specifications to code implementation and testing. Mentored testing team and research scholars with team size 3 for algorithm development for **Stryker**, **Ottomed**, and **GE healthcare**. Successfully executed mandibular surgery planning software and algorithm development, clinically validated for 8 cancer patients in **Thallassery Cancer Center**. Initially worked for **Perfint** Healthcare and **Center for Biological Sciences, Bangalore**

3. **Senior Technical Specialist** in **HCL Technologies, Chennai, Jan 2011** to **Aug 2013.**

   2011 to 2013 - Algorithm design and development and proposals for multiple solutions in imaging problems for **Covedien**, **Therakos**, and **Terumo**, Japan. Individual contributor in implementing the core modules of the imaging software. Active interaction with team members for software integration and testing, delivering on time with quality. Involved in in-house project development as part of the imaging center of excellence (**HCL Imaging CoE**) and project recruitment drives.

4. **Technical Specialist** in **Philips Healthcare, Philips Innovation Campus, Bangalore** from **Sep '07** to **Dec 2010**
   - 2007 to 2010 - Imaging domain specialist, consistent in programming and algorithm module development for the proprietary software framework (Philips Medical Workspot). Won the "You did it" award twice for critical problem-solving and bug fixing during release. (Partner – **Philips Research**)

5. **Design Engineer** in **Vortex Engineering Pvt. Ltd, IIT Research Park Chennai** from **Sep '05** to **August '07**
   - 2005 to 2007 – proficient in C programming. Developed a standalone fingerprint authentication embedded system from hardware design, schematics, image acquisition firmware, and application programming for biometric fingerprint feature extraction for user registration and authentication. Involved in software integration and field testing for deployment of rural automatic teller machine in **ICICI Bank**, Abhiramapuram, Chennai.

6. **Project Associate**, Industrial Consultancy and Sponsored Research (ICSR), **IITM, April 2002** to **Aug 2005**

   Curious project member involved in hardware design, CPLD-FPGA, firmware programming (DSP assembly language and C), and lightweight Linux filesystem development

7. **ASIC Design trainee** - ASIC VLSI front- and back-end design (6-month industry-based training) Jan to May 2001

   Exposure to VLSI front and back-end design tools

Education

- **Ph.D** in Dept. of Electrical Engineering, **IIT, Madras**, July 2019 - July 2024, **CGPA - 9.29**
- M.S (Dept. of Electrical Engineering, GATE qualified - 91.6 percentile), **CGPA - 8.7**, **IIT, Madras** 2004-2007
- B.E (ECE): 75% St. Joseph's College of Engineering, Madras University, Chennai 1996-2000

Industry and Research Grants Obtained

1. **Funds of Rs.44 lakhs were raised from GE-SERB, DST, and Govt. Of India and GE Healthcare** for **Meta-learning framework for Imaging applications** for MRI
2. Received **Prof. Malathi Veeraraghavan Fellowship grant of Rs. 3 Lakhs for research excellence**
3. **Institute Research Award Grant Rs. 20,000 for excellence in Ph.D. work**.
4. **Travel grant of Rs. 4.48 lakhs for ICCV 2023 and CVPR 2024 conference paper presentation**

Awards and Achievements

- Won the **Institute Research Award 2023 - 24** (out of the 25 Awardees) at IITM, Nominee for **Keshav Ranganath Award** (topmost award for research in IITM, one among the 13 and a nominee) https://www.ee.iitm.ac.in/news/
- **Invited speaker** (half-day session) at the "**Winter School on Recent Trends in Machine Learning**" on Adaptive Deep learning techniques at Sri Ramachandra Institute of Higher Education and Research, Chennai
- **EE Department Symposium finalist** **at IITM** in **April 2024** (one of the 7 scholars of the department)
- **Won** the **all-time title** "**MV Scholar**" as part of the **Prof. Malathi Veeraraghavan Fellowship Award 2022.**
- **Runner up Best Paper Award** at the Medical Imaging with Deep Learning Conference (MIDL) 2020 (one of the 4 awarded papers chosen from 18 long oral papers)
- **Honorable mention Reviewer** for **MIDL 2021**
- **Magazine coverage at RSIP vision** for paper Award at MIDL 2020
- **Code Reproducibility Badge** in **CodeOcean** for **KM-MAML Journal paper** in **ASOC 2023**

- The **Virtual Plate Contouring tool for Mandibular Surgery** Planning developed at HTIC is installed at the Malabar Cancer Center, Thalassery, and was **successfully applied** to plan mandible surgery for over **8 cancer patients in 2014**.
- **"You did it"** award twice at **Philips Healthcare** for critical problem-solving during release and algorithm development, 2008 – 2009. Presented Tech Talks on on Surface Mesh Extraction and deformable model-based segmentation

Publications

1. **Sriprabha Ramanarayanan**, Balamurali M, et. al, MAC-ReconNet: A Multiple Acquisition Context based Convolutional Neural Network for MRI Reconstruction using Dynamic Weight Prediction, **MIDL 2020**, (**Paper Award**)

2. **Sriprabha Ramanarayanan**, Mohammed Al Fahim, et al, HyperCoil-Recon: A Hypernetwork-based Adaptive Coil Configuration Task Switching Network for MRI Reconstruction, **ICCV,** CVAMD **2023**

3. **Sriprabha Ramanarayanan**, Rahul. G. S., et al, SHFormer: Dynamic Spectral Filtering Convolutional Neural Network and High-pass Kernel Generation Transformer for Adaptive MRI Reconstruction, **Neural Networks** (Revised and Resubmitted)

4. **Sriprabha Ramanarayanan**, Balamurali Murugesan, et. al, MCI-HyperNet: A Multiple Contextual Information-based Adaptive Weight Learning Network for Controllable Image Reconstruction, **Neurocomputing, 2023**

5. **Sriprabha Ramanarayanan**, Arun Palla, et al. Generalizing supervised deep learning MRI reconstruction to multiple and unseen contrasts using meta-learning hypernetworks. **Applied Soft Computing**, page 110633, 2023

6. Tanvi Kulkarni, **Sriprabha Ramanarayanan**, et. al, Registration Quality Evaluation Metric with Self-Supervised Siamese Networks, **MIDL 2024**

7. Kishore Kumar, **Sriprabha Ramanarayanan**, et al, DCE-diff: Diffusion Model for Synthesis of Early and Late Dynamic Contrast-Enhanced MR Images from Non-Contrast Multimodal Inputs, **CVPRW 2024** DEF-AI-MIA

8. Sadhana S, **Sriprabha Ramanarayanan**, et al, DCE-FORMER: A Transformer-based Model with Mutual Information and Frequency-based Loss Functions for Early and Late Response Prediction in Prostate DCE-MRI. **IEEE ISBI 2024**

9. **Sriprabha Ramanarayanan**, Balamurali M et al, DC-WCNN: A deep cascade of wavelet-based convolutional neural networks for MR Image Reconstruction. **IEEE ISBI 2020**

10. Rahul G. S., **Sriprabha Ramanarayanan**, et. al, SDLFormer: A Sparse and Dense Locality-enhanced Transformer for Accelerated MR Image Reconstruction, **MICCAI** MILLanD **2023**

11. Matcha Naga Gayathri, **Sriprabha Ramanarayanan**, et. al, SFT-KD-Recon: Learning a Student-friendly Teacher for Knowledge Distillation in Magnetic Resonance Image Reconstruction, **MIDL 2023**

12. Balamurali Murugesan, **Sriprabha Ramanarayanan**, et. al, A Deep Cascade of Ensemble of Dual Domain Networks with Gradient-based T1 Assistance and Perceptual Refinement for Fast MRI Reconstruction, **Computerized Medical Imaging and Graphics, 2021**

Industry Training programs

- **OpenGL** programming and applications at **HCL** Technologies
- **Image Visualization on Philips Medical Workspot**, at Philips Healthcare
- Workshop on **Mathematical morphology** at **Indian Statistical Institute Bangalore**
- '**Digital Signal Processor and Applications**' at **Analog Devices-IIT Madras DSP Learning Center** at IITM

Academic Activities

- Mentoring over 10 MS scholars in IITM of which 5 are women scholars
- **Session chair for MIDL 2021 conference study group** to mentor a group of 6 younger researchers.
- Invited as a mentor in the Women in Computer Vision session at the ICCV 2023.
- Invited for a panel discussion by the Research Affairs Secretary Club IITM to mentor younger research scholars.
- Active participant at the MIDL 2021 Doctoral Symposium
- Reviewer for Medical Imaging with Deep Learning (MIDL) – 2021 to 2024, IEEE Transactions on Radiation and Plasma Medical Sciences, 2024, WACV – 2024, Medical Image Analysis (MeDIA) – 2021
- Conference attendee – IEEE ISBI 2020, IEEE EMBC 2020, MIDL 2020, 21, ICCV 2023, CVPR 2024 (to be held)