Chandrasekar Subramani Narayan

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Professional Summary

PhD Researcher and Data Scientist specialising in AI and quantitative microscopy with over four years of experience developing deep-learning pipelines (U-Net, transfer learning, domain adaptation) for biomedical image analysis. Proficient in Python, ImageJ/Fiji, and bioinformatics workflows applied to image and signal processing. Possesses strong interdisciplinary expertise bridging biophysics, data science, image analysis, and multimodal data integration. Committed to building reproducible, interpretable, and collaborative analytical frameworks for biomedical imaging and translational research.

Work Experience

Aix-Marseille University — Marseille, France
PhD Researcher – Biophysics & AI (4 years) — Dec 2021 – Sep 2025

- Developed deep learning models (U-Net variants, domain adaptation) for density map prediction and automated counting of bacteriophages in fluorescence microscopy datasets.
- Designed reproducible AI pipelines on HPC clusters, integrating data preprocessing, model training, and statistical validation using Poisson and Langmuir models.
- Collaborated with interdisciplinary teams and mentored Master's students in AI and imaging projects, contributing to publications and knowledge transfer.

Phoenix Medical Systems — Chennai, India
R&D Intern – Intelligent Systems Development (3 months) — Sep–Nov 2021

- Built cross-platform Qt GUIs for neonatal devices (ventilators, incubators) with seamless deployment across embedded and desktop systems.
- Engineered real-time hardware–software interfaces to synchronize communication between control systems and medical displays.
- Collaborated with R&D and QA teams to ensure system reliability and compliance with medical-grade safety protocols.

Grey Scientific Labs (Osure Care) — Bengaluru, India
R&D Intern – Computer Vision & Medical Imaging (6 months) — Jul–Dec 2020

- Developed Python-based image analysis pipelines using OpenCV for immunostained H&E pathology slides to detect follicles in lymphoma tissue.
- Implemented modular and scalable workflows, supporting iterative model refinement and integration with Git-based version control.

Department of Physics, SSSIHL — Bengaluru, India
Scientific Content Intern (2 months) — Apr–May 2019

- Developed physics experiments and digital learning content for the MHRD Virtual Lab platform to support e-learning in physics.
- Automated content workflows using Python, SQL, HTML, and JavaScript, streamlining Word-to-HTML conversion and backend deployment in collaboration with faculty.

Key Skills and Competencies

Programming & Scripting
Python (NumPy, Pandas, PyTorch, TensorFlow, sklearn), C++, QML, Scilab, R(basic)

Deep Learning & AI
CNNs, U-Net, Neural Architectures, domain adaptation, PINNs, foundation models, Segmentation, Classification and detection tasks.

Imaging & Multimodal
OpenCV, ImageJ/Fiji, Fluorescence Microscopy, Digital Pathology, Multi-modal Data Fusion, structured datasets

Signal & Spectral Analysis
Data Representations, FFT, spectral modelling, feature extraction, filtering, visualisations, pattern recognition, forecasting and clustering

Tools & Infrastructure
Git, Docker, SLURM, HPC clusters, IDEs, Jupyter, Qt, Linux, Arduino, MLOps (basics)

Web & Data Systems
HTML/CSS, SQL Server (basic), script-based content automation, ETL

Research Competencies
AI–physics integration, Data-Driven Decision making, reproducible workflows, scientific writing & communication, mentorship

Education

PhD in Biophysics Dec 2021 – Sep 2025
Aix-Marseille University, France
Thesis: *Deep Learning-Based Counting and Kinetic Analysis of Bacteriophages from Fluorescence Microscopy*

M.Sc. in Physics June 2019 – May 2021
Sri Sathya Sai Institute of Higher Learning, India
Thesis: *Deep Learning and Image Segmentation for Digital Pathology Applications*

B.Sc. in Physics June 2016 – May 2019
Sri Sathya Sai Institute of Higher Learning, India
Thesis: *Python-Based Frequency Band Analysis for Speaker Quality Optimization*

Selected Publications

- Chandrasekar, S. N., Rao, A., Venketesh, S., & Sarma, R. R. (2021). Detection of hotspots in fluorescence imaging of yeast cells for neurodegeneration studies. *IEEE ICAECT*, pp. 1–4.
- Nikhil, G., Udaya, K., **Chandrasekar, S. N.**, et al. (2024). Deep learning-based detection of urethral stricture: Segmentation & classification. *medRxiv*.
- (*under review*) Gupta, J., Shaw, A., Muthukumar, S. V., **Chandrasekar, S. N.**, et al. (2025). Raman/FTIR-PCA frameworks for oil quality monitoring, Food Chemistry journal
- (*under review*)Gupta, J., Shaw, A., Muthukumar, S. V., **Chandrasekar, S. N.**, et al. (2025).AI-based classification of edible oils in food matrix using Raman spectral signatures. Food Control
- (*under review*) **Chandrasekar, S. N.**, Kallepalli, D. L. N. (2025). Comparative analysis of CNN, VGG16, and ResNet-50 on spatial, FFT, and wavelet representations of MNIST and Fashion MNIST, IJCVSP ISSN: 2186-1390.