ABINAYA SRIDHARAN, M.Tech.,

PhD Scholar, Biological Sciences and Engineering, IIT Gandhinagar
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Research Summary

I am a PhD student working on developing a CRISPR/Cas-driven electrochemical biosensor for detecting drug-resistant genes using miniaturised lab-made electrodes. Motivated by a strong interest in interdisciplinary research, I integrate concepts from molecular biology, materials science, and analytical chemistry to advance biosensor technologies. I am seeking international collaboration to explore the integration of CRISPR/Cas systems with electrochemical biosensors for innovative healthcare and environmental applications.

Research Interests

- Development of CRISPR–Cas and aptamer-based point-of-care Electrochemical biosensors for molecular diagnostics
- Nanomaterial-engineered electrodes for enhanced electrochemical signal transduction
- Detection of bacteria and antimicrobial resistance for clinical and environmental applications

Education

- **PhD (Biological Sciences & Engineering)**, IIT Gandhinagar, July 2024 – Present
  Thesis Title: Development of CRISPR-Cas-driven Electrochemical biosensors for detecting drug-resistant genes using miniaturised lab-made electrodes.
  Thesis Supervisor: Prof. Biswajit Saha, Department of Chemical Engineering, IIT Gandhinagar

- **M.Tech (Biotechnology)**, Mepco Schlenk Engineering College (Anna University), 2022 - 2024
  Thesis: Enzymatic production of fenugreek-derived galactomannan oligosaccharides using Endo-1,4-β-mannanase from *Bacillus* sp., and evaluation of their prebiotic activities.
  Thesis Supervisor: Prof. A.P. Sasikumar, Department of Biotechnology, Mepco Schlenk Engineering College

- **B.Tech (Biotechnology)**, Vivekanandha College of Engineering for Women, 2016-2020
  Thesis: Surface-constructing of visible-light Bi_2WO_6/CeO_2 nanophotocatalyst grafted PVDF membrane for degradation of tetracycline and humic acid - NIT Trichy (March 2020)
  Thesis Supervisor: Prof. Arthanareeswaran Gangasalam, Department of Chemical Engineering, NIT-Trichy

Technical Skills

Laboratory & Experimental Skills

- **Electrochemical Techniques**: CV, DPV, EIS, Chronoamperometry
- **Biosensor Fabrication**: Electrode design, Surface modification, and Nanomaterial Fuunctionalisation

- **Material Characterisation**: FE-SEM, AFM, FTIR
- **Microbiology & Molecular Biology**: Bacterial culture, Nucleic acid Isolation, Gene-based detection assays and Electrophoresis
- **Research Skills**: Experimental design, Data Interpretation, and Scientific Writing & Documentation

Computational & Data Analysis Tools

- **Data Processing & Analysis**: OriginPro, ImageJ, JPK NanoWizard
- **Statistical Analysis**: MATLAB, R (basic proficiency)
- **Computational Biology**: BLAST, OligoAnalyzer, JalView, Cytoscape, InterPro
- **Writing tools**: Overleaf (LaTeX), EndNote, Mendeley

Research Publication

Krishnan, S. A. G., **Abinaya, S.**, Arthanareeswaran, G., Govindaraju, S., & Yun, K. (2022). *Surface-constructing of visible-light Bi_2WO_6/CeO_2 nanophotocatalyst grafted PVDF membrane for degradation of tetracycline and humic acid.* **Journal of Hazardous Materials, 421**, 126747. DOI:10.1016/j.jhazmat.2021.126747

Research Internships & Training

- **National Institute of Technology, Trichy** — B.Tech Thesis: Nanophotocatalyst membrane development (March 2020)
- **Shreedhar Bhat's Laboratory, Bangalore** — Basic immunological techniques including ELISA and serum assays (May 2018)
- **Jeeypee Biotech, Virudhunagar** — Biofertilizer and biopesticide production (December 2018)

Awards & Achievements

- **ASM Agar Art Competition (2024)** – Featured in Top 15 Entries (Professional Category), American Society for Microbiology
- **Rajya Puraskar (2014)** – National-level recognition from Bharat Scouts & Guides

Grants & Fellowships

- **Institute PhD Fellowship**: Indian Institute of Technology Gandhinagar
  Merit-based fellowship awarded for doctoral studies
- **TNSCST Student Project Scheme**: Tamil Nadu State Council for Science and Technology
  Supported by TNSCST Student Project Scheme for M.Tech thesis focused on enzymatic production and evaluation of prebiotic oligosaccharides
- **Academic Excellence Scholarship**: Mepco Schlenk Engineering College, Anna University

Professional Memberships

Global Outreach-Student Membership - American Society of Microbiology (ASM)