CURRICULUM VITAE

ARJUN B S, Ph.D.

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EDUCATION

Qualification	Department/Specialization	Institution	Score	Duration
M.Tech (Res), Doctor of Philosophy (Ph.D.)	Department of Electronic Systems Engineering (DESE), Division of EECS	Indian Institute of Science (IISc), Bangalore	9.1/10	August 2019 – June 2024
	Thesis Topic: Development of an Intraoperative Probe for Brain Tumour Delineation Combining Multimodal Tissue Characterization and Soft-Robotics **Supervisor:** Dr. Hardik J. Pandya			
Bachelor of Technology (B.Tech.)	Mechanical Engineering	Government Engineering College, Barton Hill, Trivandrum, India	8.64/10	August 2014 - June 2018
	Thesis Topic: Automated Brick Assembly Robot for LEGO House Construction			
Higher Secondary Education	Science Stream – Computer Science	VSSC Central School, Trivandrum, India	90.8%	April 2014

PROFESSIONAL POSITIONS HELD

- **CEO, Co-founder, Embedite Pvt. Ltd., Trivandrum** - March 2022 – Present
- **Co-founder and CTO, SciLogic Applied Research Pvt. Ltd., IISc Bangalore** - March 2022 - Present
- **Freelance Resource Person, NSE TalentSprint, Hyderabad** - March - June 2024
- **Co-founder and CTO, Scezmo Sensing Technologies Pvt. Ltd., Bangalore** - January 2023 - Present
- **Freelance Research Analyst (online), PreScouter, United States** - March 2019 - September 2022
- **Project Assistant, BEES LAB, Department of Electronic Systems Engineering, IISc Bangalore** - July 2018 - July 2019

SKILLS

- Grant Writing (NIH R01, DBT India Alliance, DST, ICMR, SERB, BIRAC, ICPH, Centre of Excellence (CoE), etc.), Research Methodology, and Project Planning and Execution
- Hands-on Experience in Microfabrication Technology in Clean Rooms (Class 1,000 and 10,000)
  - Material Deposition: E-beam and Thermal Evaporation, Sputtering, PECVD and Sol-gel
  - Patterning: Soft and Optical Lithography (KARL SUSS MJB4 and MIDAS-MDA-400M-6 Mask Aligners)
  - Micromachining: Wet-etch and Dry-etch Processes (DRIE, RIE and Plasma Cleaning)
  - Material Characterization: Optical Profilometry, SEM, XRD Thin Film, Dektak Surface Profilometry, Four-Probe Measurement, Nano-Indentation, and Electrical Impedance Spectroscopy
- Electronic and MEMS Packaging: Wire Bonding, Wafer Dicing, Laser Cutting, and MEMS Sensor Calibration
- Mechanical Product Design (SolidWorks and Fusion 360), Parametric Modelling (Rhinoceros 3D and Grasshopper Plugin), and Prototyping (3D Printing (FDM and SLA), Laser Cutting)
- Electronic Product Design ((PCB Designing - Altium) and Fabrication (Soldering and Testing)
- FEM, Mathematical Modelling and Data Analysis - COMSOL Multiphysics, MATLAB, OriginPro and Excel
- Graphical Rendering Tools - KeyShot

- Rapid Prototyping Platforms - Arduino IDE and IAR Workbench
- Graphical Programming Language - LabVIEW
- Scripting - MATLAB, Python, and C++
- Teaching Assistantship and Mentoring
- Website Design

SELECTED PROJECTS

- Samyojak: Realtime IoT-enabled real-time monitoring system for metal-cutting fluids (*Design, Research and Development, Validation and Commercialisation*)
- Development of an Intraoperative Probe for Brain Tumour Delineation Combining Multimodal Tissue Characterization and Soft-Robotics (*Ph.D. Thesis*)
- Design and Fabrication of Piezoelectric Micromachined Ultrasound Transducer Arrays for Intracranial Imaging (*Sensor Design, Fabrication and Characterization*)
- Flexible Electrode Array for Rodent ECoG Monitoring (*Sensor Design, Fabrication and Characterization, Animal Experimentation, Head Stage Design and Fabrication*)
- Development of a Chemiluminescence Detection and Quantification System (*System Design and Fabrication*)
- Industrial Sensor for Long-term Monitoring of Cutting Fluid Quality Monitoring (*Sensor Design, Fabrication and Characterization, User Interface Development, IoT Platform Development, Commercialization*)
- An Intubation Catheter Integrated with Flow Sensors and Smart Actuators for Characterizing Airflow Patterns and Tissue Stiffness in Stenosed Trachea (*MEMS-based Microforce Sensor Fabrication and Packaging, Test Bench Development for Sensor Calibration and Tissue Characterization*)
- Micro-engineered force Sensors for Cardiac Ablation Catheters (*MEMS-based Tri-axial Force Sensor Fabrication and Packaging, Test Bench Development for Sensor Calibration and Tissue Characterization*)
- EpiSHOT: A Reusable Epinephrine Autoinjector (*Mechanism Design, Fabrication and Testing*)
- Development of LED-based Time-domain Near-IR Spectroscopy System for Delineating Breast Cancer from Adjacent Normal Tissue (*Mechanical Design and Fabrication, and Experimentation*)

PUBLICATIONS

1. Chowdhury, A., Sharma, S.S., **Arjun B S**, Pandya, H.J., Rao, B.S. and Laxmi, T.R., “Risky decision-taking task: A novel paradigm to assess the risk-taking behavior in rats predisposed to early-life stress.” Journal of Neuroscience Methods, 2023. DOI: https://doi.org/10.1016/j.jneumeth.2023.109864.
2. **Arjun B S**, Alekya B, Hari R. S., Vikas V., Anita Mahadevan, and Hardik J. Pandya, “Electromechanical Characterization of Human Brain Tissues: A Biomarker for Tumor Delineation.” IEEE Transactions in Biomedical Engineering., 2022. DOI: https://doi.org/10.1109/tbme.2022.3171287.
3. **Arjun B S**, Anil Vishnu G. K., Shilpa Rao, Manish Beniwal, and Hardik J. Pandya, “Electrical Phenotyping of Human Brain Tissues: An Automated System for Tumor Delineation.” IEEE Access, 2022. DOI: https://doi.org/10.1109/ACCESS.2022.3149803.
4. Suman Chatterjee, Tushar Sakorikar[#], **Arjun B S**[#], Rathin K. Joshi, Abhay Sikaria, Mahesh Jayachandra, Vikas V, Hardik J. Pandya, “A flexible implantable microelectrode array for recording electrocorticography signals from rodents.” Biomedical Microdevices, 24(31), 2022. [[#] Equal contribution] DOI: https://doi.org/10.1007/s10544-022-00632-0.
5. V S N Sitaramgupta V, **Arjun B S**, Uttam M. Pal, and Hardik J. Pandya, “Design and Analysis of MEMS-based Force Sensors for Catheter Contact Force Measurements.” IEEE Sensors Journal, vol. 22, no. 13, pp. 13451-13461, 2022. DOI: https://doi.org/10.1109/JSEN.2022.3177166.
6. Alekya B, V S N Sitaramgupta V, **Arjun B S**, and Hardik J. Pandya, “Sensor for Meso-scale Tissue Stiffness Characterization.” IEEE Sensors Journal, 2022. DOI: https://doi.org/10.1109/JSEN.2022.3154533.
7. V S N Sitaramgupta V, **Arjun B S**, Bhagaban Behera, Deepak Padmanabhan, and Hardik J. Pandya, “A Ring-Shaped MEMS-based Piezoresistive Force Sensor for Cardiac Ablation Catheters.” IEEE Sensors, 2021. DOI: https://doi.org/10.1109/JSEN.2021.3118298.
8. Arif Mohd Kamal, Uttam M. Pal, Ashika Nayak, Tejaswi Medisetti, **Arjun B S**, and Hardik J. Pandya, “Towards Development of LED-based Time-Domain Near-IR Spectroscopy System for Delineating Breast Cancer from Adjacent Normal Tissue.” IEEE Sensors, 2021. DOI: https://doi.org/10.1109/JSEN.2021.3082850.
9. B Alekya, V S N Sitaramgupta V, **Arjun B S**, V Bhushan, Kevin Abishek, Sanjay Rao, Yeongjin Kim, and Hardik J Pandya. “An intubation catheter integrated with flow sensors and smart actuators for characterizing

airflow patterns in stenosed trachea: an objective guide for CAO management." Journal of Micromechanics and Microengineering, 2021. DOI: https://doi.org/10.1088/1361-6439/abf335.

PATENTS

1. **Arjun B S,** Ajay Krishnan A, Hari R S, Pushkraj Anil Janwadkar, and Hardik J. Pandya, "Method and system for real-time monitoring of fluids," **Indian:** 202321003674 (January 18, 2023)
2. **Arjun B S**, Anil Vishnu G K, Gokul A M, Arun Baby, Shilpa Rao, Manish Beniwal, Vikas V, Anita Mahadevan, and Hardik J. Pandya, "An in-vivo, intraoperative probe for brain tumor margin delineation and methods thereof," **Indian:** 202041022728 (June 09, 2020), **PCT:** PCT/IB2021/055027 (June 08, 2021)
3. **Arjun B S**, Ajay Krishnan A, Adithya Kumar, Paramesh H, and Hardik J. Pandya, "Reusable drug delivery device," **Indian:** 202241018326 (June 06, 2022), **PCT:** PCT/IN2022/050795 (September 06, 2022)
4. **Arjun B S**, Ajay Krishnan A, Pushkraj Anil Janwadkar, and Hardik J. Pandya, "A Reusable Multiangle Intradermal Drug Delivery Device," **Indian:** 202241033770 (June 27, 2022)
5. **Arjun B S,** Aswin S, Hari R S, Akhil M, and Hardik J. Pandya, "An apparatus for attaching a camera to a microscope," **Indian Design:** 367940-001 (Granted: July 19, 2022)
6. Arif Mohd. Kamal, **Arjun B S**, Uttam M. Pal, Manu K. S., Anil Vishnu G. K., and Hardik J. Pandya, "A multimodal intraoperative probe for breast cancer margin assessment and methods thereof," **Indian:** 202241012649 (March 15, 2022)
7. Alekya B, V S N Sitaramgupta, **Arjun B S**, Bhushan V, S Siddesh Shenoy, Sanjay Rao, Mayur Bhuva, Kevin Abhishek, and Hardik J. Pandya, "A handheld diagnostic tool for grading stenosis in pediatric upper airway and methods for characterizing the same," **Indian:** 202041027223 (May 22, 2021), **PCT:** PCT/IB2021/054690 (May 28, 2021)
8. Hardik J. Pandya, Jagannathan Gopalakrishnan, Sonal Asthana, Vishnu Kurpad, Anil Vishnu G. K., Midhun C. Kachappilly, **Arjun B S**, Sudarshan Jagannathan, "A smart wearable device for real-time and continuous monitoring of body temperature and blood oxygen saturation," **Indian:** 202041027011 (June 25, 2020)
9. Hardik J. Pandya, Anil Vishnu G. K., Bhagaban Behera, Alekya B., Arun Baby, Saeed Rila, **Arjun B S**, Midhun C. Kachappilly, Prathik B.H., Nagasuma Chandra, Dipshikha Chakravortty, "Apparatus for high-throughput rapid antibiotic susceptibility testing and methods thereof," **Indian:** 202041024394 (June 08, 2021)

CONFERENCE PROCEEDINGS AND PRESENTATIONS

1. Anuj Kumar Prajapathi, Apurva Dahake, **Arjun B S**, Himanshu Shekhar, and Hardik J. Pandya, "Design and Fabrication of a Piezoelectric Micromachined Ultrasound Transducer using Aluminum Nitride: Initial Characterization Results", *2024 IEEE South Asian Ultrasonics Symposium (SAUS), Gandhinagar, India, March 27-29, 2024.*
2. **Arjun B S**, Varun Canamedi, Sharmila Sree Vandrangi, and Hardik J. Pandya, "Brain Biopsy Imaging using Electrical Impedance Tomography (BBI-EIT)." *IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI'23)), Pittsburgh, Pennsylvania, USA, October 15 – 18, 2023*.
3. **Arjun B S**, Ajay Krishnan A, and Hardik J. Pandya, "MRI-Compatible Patient-specific Continuum Robots using Parametric Modelling." *IEEE-EMBS International Conference on Body Sensor Networks: Sensor and Systems for Digital Health (IEEE BSN 2023), Boston, Massachusetts, USA, October 9 – 11, 2023*. DOI: https://doi.org/10.1109/BSN58485.2023.10331197.
4. **Arjun B S**, Ajay Krishnan A, and Hardik J. Pandya, "Soft-Robotic Probe for Tissue Characterization using TinyML." *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023), Detroit, Michigan, USA, October 1 – 5, 2023*.
5. **Arjun B S**, Ajay Krishnan A, and Hardik J. Pandya, "3D Printable Application-Specific Continuum Robots using Parametric Modelling." *2023 International Conference on Robotics and Automation, London, UK, April 29 - June 2, 2023*.
6. **Arjun B S,** and Hardik J. Pandya, "Towards an Indigenous Smart Intraoperative Probe for Brain Tumour Delineation." *14th EECS Research Students Symposium 2023, Bangalore, India, April 3-4, 2023*.
7. **Arjun B S,** Anil Vishnu G K, Uttam Pal, Arif Mohd. Kamal, and Hardik J. Pandya, "Multimodal Technologies for Augmenting Breast Cancer Diagnosis." *IndoUK Breast Forum Annual Scientific Meeting, Windermere, Lake District, UK, March 26-27, 2023*.
8. **Arjun B S**, and Hardik J. Pandya, "Towards an Indigenous Intraoperative Probe Integrated with MEMS-based Sensors for Brain Tumour Delineation." *PMRF Annual National Research Symposium 2023, Chennai, India, February 17-18, 2023.*

9. **Arjun B S**, V S N Sitaramgupta V, Aswin S, Shilpa Rao, and Hardik J. Pandya, "A System-based Approach for the Evaluation of Electromechanical Properties of Brain Tumors." *44th IEEE EMBC International Engineering in Medicine and Biology Conference, Glasgow, Scotland, July 11-15, 2022.* DOI: https://doi.org/10.1109/embc48229.2022.9871879.
10. Hardik J. Pandya and **Arjun B S,** "Towards a MEMS-based mechano-acoustic probe for soft tissue characterization", *3rd International Conference on Materials Science & Engineering, Boston, USA, April 18-22, 2022.*
11. Ayush Tripathi, Atigadda Ramchandra Reddy, **Arjun B S,** and Hardik J. Pandya, "Low-Cost IoT Device for Chronic Medication Adherence", *9th IEEE R10 Humanitarian Conference 2021, Bangalore, October 1, 2021.* DOI: https://doi.org/10.1109/R10-HTC53172.2021.9641693.
12. Anil Vishnu G. K., Tamasa De, **Arjun B S**, Annapoorni Rangarajan, Hardik J. Pandya, "Towards the development of a table-top system for tumor delineation using electro-thermal characterization", *IEEE CONECCT 2021, July 9, 2021.* DOI: https://doi.org/10.1109/CONECCT52877.2021.9622646.
13. Anil Vishnu G K, Bhagaban Behera, Alekya B, **Arjun B S**, Suman Chatterjee, Arun Baby, Saeed Rila, Misaal Khan, Arpitha R, Prathik B H, and Hardik J. Pandya, "A Novel Microengineering-based Portable Platform for Rapid Real-time Antibiotic Susceptibility Testing," *International Conference on Nanoscience and Materials World, Barcelona, Spain, November 18-19, 2019.*
14. Anil Vishnu G K, Bhagaban Behera, **Arjun B S,** Arun Baby, Niranjana Sreekumar, Saeed Rila, Prathik B, and Hardik J. Pandya, "A point-of-care platform for rapid antibiotic susceptibility testing using electrical sensing," *Sensors in Medicine, London, the United Kingdom, September 22-23, 2019.*

PROFESSIONAL HONORS, AWARDS AND FELLOWSHIPS

- **Student Lead:** DBT/Wellcome Trust India Alliance (India Alliance) Team Science Grant for funding of **9.6 Cr (US $ 1.16 Million).**
- **Best-Poster Award** IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI'23).
- IEEE-EMBS International Conference on Body Sensor Networks: Sensor and Systems for Digital Health (IEEE BSN 2023) **Travel Award.**
- IEEE/RAS Member Support Program **Travel Award** for attending IROS 2023.
- Prime Minister's Research Fellowship Annual Review 2022, 2023 and 2024- "**Top Ten Commendable Research by PMRFs under the Electrical Engineering, Electronics Engineering domain**" listed on the PMRF website.
- **Best Poster Award**, Electrical and Electronics Engineering, Annual National PMRF Symposium 2023.
- **Sun Pharma Foundation Science Scholar Awards 2022 - Winner Biomedical Sciences**
- **James Dyson Design Award 2022, National Winner.**
- **Featured article** in the **IEEE Transactions on Biomedical Engineering (TBME)** November Issue, 2022, "Electromechanical Characterization of Human Brain Tissues: A Potential Biomarker for Tumor Delineation."
- **SERB International Travel Grant** for attending the 44th IEEE EMBC International Engineering in Medicine and Biology Conference, Glasgow, Scotland, July 11-15, 2022.
- **BIRAC SITARE (Students Innovations for Translation & Advancement of Research Explorations)-(Gandhian Young Technological Innovation) GYTI 2021**. Research funding support of INR 15 Lakhs.
- **Student Lead:** DST-BDTD Grant for funding of **40 Lakhs (US $ 48,000).**
- **Prime Minister's Research Fellowship**, May 2020.
- **Best Student Award**, ISTE Kerala Section 2018.
- **Best Outgoing Student**, Government Engineering College, Barton Hill 2018.
- **Pre-Finalist** National Team Selection for World Skills 2017 (Skill: Mobile Robotics).
- **Runner-up Robothon 4.0** and **2.0**, National Level Robotic Hackathon.
- **Finalist NIYantra 2016**, Annual Design Competition by National Instruments.

TEACHING ASSISTANTSHIP AND COURSES TAUGHT

Course	Faculty	Platform	Term
Biomedical Ultrasound: Fundamentals of Imaging and Micromachined Transducers	Prof. Himanshu Shekhar, Prof. Karla P. Mercado-Shekhar, Prof. Hardik J. Pandya	NPTEL	July-October 2024

Microsensors, Implantable Devices and Rodent Surgeries for Biomedical Applications	Dr. Shabari Girishan K V and Prof. Hardik J. Pandya	NPTEL	January-April 2024
Advanced Neural Science for Engineers	Prof. Vikas V and Prof. Hardik J. Pandya	NPTEL	January-April 2023
Advanced Manufacturing Technology	Prof. Santhosh Kumar	Government Engineering College, Barton Hill	2022-2023
Neural Science for Engineers	Prof. Vikas V and Prof. Hardik J. Pandya	NPTEL	January-April 2022
Microelectromechanical Systems (MEMS)	Prof. Santhosh Kumar	Government Engineering College, Barton Hill	2021-2022 and 2020-2021
Introductory Neuroscience & Neuro-Instrumentation	Prof. Hardik J. Pandya and Dr. Mahesh Jayachandra	NPTEL	July-October 2021
Op-Amp Practical Applications: Design, Simulation, and Implementation	Prof. Hardik J. Pandya	NPTEL	July-October 2021, July-October 2020
Process Technology and System Engineering for Advanced Microsensors and Devices	Prof. Hardik J. Pandya	Department of Electronic Systems Engineering, IISc Bangalore	January-April 2023, January-April 2022, January-April 2021
Integrated Circuits, MOSFETs, OP-Amps and Their Applications	Prof. Hardik J. Pandya	NPTEL	January-April 2021, January-April 2020
Sensors and Actuators	Prof. Hardik J. Pandya	NPTEL	July-October 2019, January-April 2019
Fabrication Techniques for MEMS-based Sensors: Clinical Perspective	Prof. Hardik J. Pandya	NPTEL	July-October 2019, January-April 2019

INVITED TALKS, SEMINARS AND WORKSHOPS

1. **Event:** Invited talk on “AI in Healthcare”
   - **Location:** Department of Life and Applied Sciences, Ramaiah University of Applied Sciences, Bangalore
   - **Date:** 20th November 2023
2. **Event:** Invited talk on “Towards Development of an Intraoperative Probe for Brain Tumour Delineation Combining Multimodal Tissue Characterization and Soft-Robotics”
   - **Location:** School of Physics, Engineering and Technology, University of York, UK
   - **Date:** 27th March 2023
3. **Event:** Two-day workshop on “Ideation to Market Readiness”
   - **Location:** Government Engineering College, Barton Hill
   - **Date:** 4th and 5th March 2023
4. **Event:** Invited talk on “EpiSHOT” at Health in a Changing Climate: Empowering Health Professionals
   - **Location:** Divecha Center for Climate Change Indian Institute of Science, IISc Bangalore
   - **Date:** 4th February 2023
5. **Event:** Invited talk on “Application of Mechanical Engineering in Biomedical Devices”
   - **Location:** Department of Mechanical Engineering, St. Thomas Institute for Science & Technology, Trivandrum
   - **Date:** 19th November 2022
6. **Event:** Faculty Development Program (FDP) on “Trends and Innovations in Healthcare”
   - **Location:** Department of Electronics & Telecommunication Engineering, VIIT, Pune
   - **Date:** 25th October 2021

7. **Event:** Invited talk on “Research Culture: How to Choose a Seminar Topic”
   - **Location:** Google meet, ASME Chapter, Government Engineering College, Barton Hill
   - **Date:** 17th October 2021
8. **Event:** Invited talk on “Introduction to Nanotechnology”
   - **Location:** Google meet, ASME Chapter, Government Engineering College, Barton Hill
   - **Date:** 20th September 2021
9. **Event:** Invited talk on “Research Opportunities after B.Tech.”
   - **Location:** Google meet, CSI Chapter, Government Engineering College, Barton Hill
   - **Date:** 25th October 2020
10. **Event:** Invited talk on “Introduction to Micro and Nanotechnology”
   - **Location:** Google meet, IEEE RAS Chapter, Government Engineering College, Barton Hill
   - **Date:** 27th June 2020

MEMBERSHIP AND ACTIVITIES IN PROFESSIONAL ASSOCIATIONS

- IEEE Young Professionals, IEEE Engineering in Medicine and Biology Society, Brain Community
- IEEE Robotics and Automation Society, IEEE Sensors Council
- IEEE Engineering in Medicine and Biology Society Technical Committee on (i) Biomedical & Health Informatics, (ii) Bionanotechnology & BioMEMS, (iii) BioRobotics, (iv) Cyborg and Bionic Systems, (v) Neuroengineering, (vi) Wearable Biomedical Sensors and Systems, (vii) Therapeutic Systems and Technologies, and (viii) Rehabilitation and Assistive Robotics
- IEEE Robotics and Automation Technical Committee on (i) Bio Robotics, (ii) Haptics, (iii) Mechanisms and Design, (iv) Micro/Nano Robotics and Automation, and (v) Neuro-Robotics Systems

COMMUNITY SERVICE

- Founder, Bartonoidz, Robotics Club, providing training for engineering students free of cost.
- Technical Lead (2017-18) and Member (Present), INSPIRE, an NGO for uplifting children from economically weaker communities.
- Active teaching and workshop organisation at government schools and colleges.

REFEREES

1. **Dr. Hardik J. Pandya**
   Associate Professor
   Department of Electronic Systems Engineering
   Division of EECS
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2. **Dr. Himanshu Shekhar**
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   Department of Electrical Engineering
   Indian Institute of Technology, Gandhinagar, India - 382 355
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3. **Dr. Karla P. Mercado-Shekhar**
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