

## ARJUN B S

Prime Minister's Research Fellow (PMRF), IISc Bangalore

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### EDUCATION

**Indian Institute of Science (IISc), Bangalore** - 2019 - Ongoing  
Ph.D. (Full Time), CGPA 9.1, Electronic Systems Engineering

**Government Engineering College, BartonHill, Trivandrum** - 2014 - 2018  
Graduation (Full Time), CGPA 8.64, Mechanical Engineering

**VSSC Central School, Trivandrum** - 2014  
Higher Secondary-CBSE-90.8%

**VSSC Central School, Trivandrum** - 2012  
Matriculation-CBSE -CGPA 10.0

### WORK EXPERIENCE -1 year

**BEES LAB, Dept. of Electronics Systems Engineering (DESE), IISc Bangalore**- July 2018-July 2019

#### Project Assistant

- Development of high-throughput rapid platform for antibiotic susceptibility testing.
- Modelling and prototyping of mechatronics systems for biomedical applications (Automated soil testing machine, Cytocentrifuges, Machine-learning integrated slide scanners for cytology, etc.)
- Mobile application development for biomedical devices.

### ACHIEVEMENTS (During Ph.D.)

- **Best Poster Award**, Electrical Engineering, Electronics Engineering, Annual National PMRF Symposium 2023.
- **Sunpharma Foundation Science Scholar Awards 2022 – Winner Biomedical Sciences**
- **James Dyson Design Award 2022, National Winner.**
- **Research article titled**, "Electromechanical Characterization of Human Brain Tissues: A Potential Biomarker for Tumor Delineation" was selected as a **featured article** in the **IEEE Transactions on Biomedical Engineering (TBME)** November Issue, 2022.
- **Prime Minister's Research Fellowship Annual Review 2022** – Recommended with Commendation and work displayed as "**Top Ten Commendable Research by PMRFs under the Electrical Engineering, Electronics Engineering domain**" in the PMRF website.
- **SERB International Travel Grant** for attending the 44<sup>th</sup> 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.
- **Prime Minister's Research Fellowship**, May 2020.

## PATENTS

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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 (May 30, 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:** Filing under progress.
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. Aswin S, Hari R S, Akhil M, **Arjun B S**, and Hardik J. Pandya, "An apparatus for attaching a camera to a microscope", **Indian:** 367940-001 (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 Chakravorty, "Apparatus for high-throughput rapid antibiotic susceptibility testing and methods thereof.", **Indian:** 202041024394 (June 08, 2021).

## PUBLICATIONS

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1. 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, 2022. [#Equal contribution] **Impact Factor:** 3.783
2. **Arjun B S**, Alekya B, Hari R S, Vikas V, Anita Mahadevan, and Hardik J. Pandya, "Electromechanical Characterization of Human Brain Tissues: A Potential Biomarker for Tumor Delineation." IEEE TBME, 2022. **Impact Factor:** 4.538
3. 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, 2022. **Impact Factor:** 3.076

4. **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. **Impact Factor:** 3.367
5. Alekya B, V S N Sitaramgupta V, **Arjun B S**, and Hardik J. Pandya. "Sensor for Meso-scale Tissue Stiffness Characterization." IEEE Sensors, 2022. **Impact Factor:** 3.076
6. 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. **Impact Factor:** 3.076
7. Arif Mohd Kamal, Uttam M. Pal, Ashika Nayak, Tejaswi Mediseti, **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. **Impact Factor:** 3.076
8. Alekya B, V S N Sitaramgupta V, **Arjun B S**, Bhushan V, 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. **Impact Factor:** 2.14

## CONFERENCE PROCEEDINGS

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1. **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." 44<sup>th</sup> IEEE EMBC International Engineering in Medicine and Biology Conference, Glasgow, Scotland, July 11-15, 2022.
2. Ayush Tripathi, Atigadda Ramchandra Reddy, **Arjun B S**, and Hardik J. Pandya, "Low-Cost IoT Device for Chronic Medication Adherence", 9<sup>th</sup> IEEE R10 Humanitarian Conference 2021, Bangalore, October 1, 2021.
3. Anil Vishnu G. K., Tamasa De, **Arjun B S**, Annapoorni Rangarajan, Hardik J. Pandya, "Towards the development of a table-top system for tumour delineation using electro-thermal characterization", IEEE CONECCT 2021, July 9, 2021.

## CONFERENCE PRESENTATIONS

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1. **Arjun B. S.**, and Hardik J. Pandya, "Towards an Indigenous Smart Intraoperative Probe for Brain Tumour Delineation." 14<sup>th</sup> EECS Research Students Symposium 2023, Bangalore, India, April 3-4, 2023.
2. **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. (Presentation)
3. **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.
4. Hardik J. Pandya and **Arjun B S**, "Towards a MEMS-based mechano-acoustic probe for soft tissue characterization", 3<sup>rd</sup> International Conference on Materials Science & Engineering, Boston, USA, April 18-22, 2022.
5. 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.

6. 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.

## INTERNSHIP EXPERIENCE

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### UST Global, Trivandrum – November 2017 - February 2018

- Ideated and realized Quadriplegia Cap - A wearable device to assist patients affected by Quadriplegia, a form of paralysis below neck. The device is linked to a computer wirelessly, and thereby helping the personal to communicate, move around in wheelchair as well as use the PC for work. It also monitors vital health information like heartbeat, blood pressure etc. The cap is a low-cost alternative to existing devices.

### Hindustan Machine tools, Kalamassery - September 2016

- Received exposure to various manufacturing process in mechanical industry.

## TECHNICAL SKILLS

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- Micro-fabrication, MEMS, Sensors, Flexible devices
- Product Design and Prototyping, Parametric Modelling, 3D printing
- Electronic and MEMS Packaging.
- Mechanical Modelling - SolidWorks, Autodesk Inventor, NXCAD.
- FEM and Analysis Tools - COMSOL Multiphysics, MATLAB.
- Graphical Rendering Tools - KeyShot, Blender.
- Rapid Prototyping Platforms - Arduino IDE.
- Graphical Programming Language - LabVIEW.
- Programming Languages - Embedded C, C++, Python.
- PCB Designing Software - Eagle, Altium.
- Website Design

## INVITED TALKS

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1. **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:** 27<sup>th</sup> March 2023
2. **Event:** Two-day workshop on "Ideation to Market Readiness"
  - **Location:** Government Engineering College, Bartonhill
  - **Date:** 4<sup>th</sup> and 5<sup>th</sup> March 2023
3. **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:** 4<sup>th</sup> February 2023
4. **Event:** Invited talk on "Application of Mechanical Engineering in Biomedical Devices"
  - **Location:** Department of Mechanical Engineering, St. Thomas Institute for Science & Technology, Trivandrum
  - **Date:** 19<sup>th</sup> November 2022
5. **Event:** Faculty Development Program (FDP) on "Trends and Innovations in Healthcare"
  - **Location:** Department of Electronics & Telecommunication Engineering, VIIT, Pune
  - **Date:** 25<sup>th</sup> October 2021

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

## TEACHING ASSISTANTSHIP

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1. **Course:** Advanced Manufacturing Technology
  - **Faculty:** Prof. Santhosh Kumar
  - **Platform:** Government engineering college, Bartonhill.
  - **Term:** 2022-2023
2. **Course:** Neural Science for Engineers
  - **Faculty:** Prof. Vikas V and Prof. Hardik J. Pandya
  - **Platform:** NPTEL
  - **Term:** January-April 2022
3. **Course:** Microelectromechanical systems (MEMS)
  - **Faculty:** Prof. Santhosh Kumar
  - **Platform:** Government engineering college, Bartonhill.
  - **Term:** 2021-2022 and 2020-2021
4. **Course:** Introductory Neuroscience & Neuro-Instrumentation
  - **Faculty:** Prof. Hardik J. Pandya and Dr. Mahesh Jayachandra
  - **Platform:** NPTEL
  - **Term:** July-October 2021
5. **Course:** Op-Amp Practical Applications: Design, Simulation, and Implementation
  - **Faculty:** Prof. Hardik J. Pandya
  - **Platform:** NPTEL
  - **Term:** July-October 2021, July-October 2020
6. **Course:** Process Technology and System Engineering for Advanced Microsensors and Devices (E3 276)
  - **Faculty:** Prof. Hardik J. Pandya
  - **Platform:** Department of Electronic Systems Engineering, IISc Bangalore
  - **Term:** January-April 2021
7. **Course:** Integrated Circuits, MOSFETs, OP-Amps and Their Applications
  - **Faculty:** Prof. Hardik J. Pandya
  - **Platform:** NPTEL
  - **Term:** January-April 2021, January-April 2020
8. **Course:** Sensors and Actuators
  - **Faculty:** Prof. Hardik J. Pandya
  - **Platform:** NPTEL
  - **Term:** July-October 2019, **Term:** January-April 2019
9. **Course:** Fabrication Techniques for MEMS-based Sensors: Clinical Perspective
  - **Faculty:** Prof. Hardik J. Pandya
  - **Platform:** NPTEL
  - **Term:** July-October 2019, January-April 2019

## **ACHIEVEMENTS (Prior to Ph.D.)**

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- Best Student Award, ISTE Kerala Section 2018
- Best Outgoing Student Government Engineering College, BartonHill 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