Sahil Sharma

Summary:

- Innovative R&D Engineer (PhD with 4 years' experience) in Instrumentation and Electronics, Collaborated with academic and industrial R&D projects to validate biosensor performance in biological fluids. Familiar with regulatory considerations for medical implants/devices.
- Proficiency in Python, C++/C#, and data acquisition DAQ card systems and microcontroller programming, sensor integration, and signal processing.
- Contributed to 2 patent filings in electrochemical diagnostics. Adept at working in multidisciplinary teams on complex R&D projects within biomedical, ultrasonic, and industrial domains.

• Contact Details

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Grenoble, France

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• Skills

R&D & Prototyping – Experimental Design, Development, Optimization

Acoustics Technology – Acoustic Waves, Ultrasonic Sensors, Acoustic Sensing

Electrochemical sensors data analysis

Data acquisition and analysis - Electrical characterization, Python, C++

Medical Device Data Communication

Micro-fabrication and Electro-mechanical ultrasonic sensors (pMUT)

Biosensors Integration & Signal Processing

Real-Time Data Acquisition & Analysis

Medical Device, Understanding of Medical Data Acquisition Systems

Electrochemical Mechanisms (Cyclic voltammetry (CV),

• Experience

2023 - 2025

Marie Curie Postdoctoral European Fellowship (European Commission)

Grenoble Institute of Neurosciences, INSERM U1216, Grenoble

Key Contributions & Achievements:

- Developed a wireless neural stimulator by coupling pMUT array and microelectrode arrays for retinal and neural applications.
- Demonstrated wireless stimulation with pulsed currents up to 10 µA in PBS, validating pMUT–microelectrode integration.
- Collaborated with ESIEE Paris and CEA Grenoble to design and test a single microdevice in a biological solution combining power and stimulation for improved biocompatibility and miniaturization.
- Identified key technical challenges and proposed design enhancements to advance next-generation wireless implantable neural stimulators.

2024 - 2024

Visiting Researcher

ESIEE PARIS (CLEANROOM) Laboratory ESYCOM UMR 9007 (CNRS), Île-de-France

- Cleanroom training for microdevice manufacturing and pMUT sensor integration.
- Training in photolithography and microelectrode array design.
- Flexible and rigid micro-fabrication of gold-pdot-pss electrodes

2021 - 2023

Postdoctoral Researcher

Grenoble Institute of Neurosciences, INSERM U1216, Grenoble

Technical Contributions:

• Designed and characterized graphene SG-FETs for variable impedance applications

• Developed ultrasound-based power and data transmission protocols

• Validated sensor performance in biological tissue models • Advanced miniaturized, battery-free implantable sensor technology

Micro-fabrication & Cleanroom – Lithography, Sputtering, Etching, Sensor Integration

Collaboration and technical writing

Communication and presentation skills

• Technical Tools

Potentiostat, KiCad PCB, Python, Oscilloscopes, NI/DAQ cards, VNA, LabVIEW, laser Vibrometer, Hydrophone, impedance analyzer, Transducer calibration, etc.

• languages

English - C1

Hindi - C2

French - A2

• Interests

MedTech, NeuroTech, Deep-Tech ideas, Hiking, Cooking

2015 - 2020

Research Fellow

CSIR-National Physical Laboratory, India

- Developed acoustic wave sensors for industrial applications.
- Led the design, development, and characterization of ultrasonic metrology systems.
- Experienced in real-time data acquisition, embedded software development, and interfacing sensors with MCU architectures

2013 - 2013

Intern- Industrial Training on Embedded System

RS Power Systems, Jaipur, India

Digital control systems- Basic exposure to driver electronics and circuits during instrumentation work

• Education

2015 - 2020

PhD in Physical Sciences (Instrumentation, Electronics)

CSIR-National Physical Laboratory, Academy of Scientific and Innovative Research, New Delhi

Theses title: Design, development and analysis of instrumentation for ultrasonic characterization of liquids.

- Specialized in ultrasonic metrology, and acoustic wave propagation.

2012 - 2014

Master's degree in electronics

University of Jammu, Jammu Tawi

Theses title: Impact of Chirality on Single-Walled CNT parameter for Device Application", Project Tittle: Embedded System and its Applications using MSP430.

• Additional Achievements

- 2 Patents in 1) Wireless Ultrasound Biosensor & 2) Ultrasonic device development.
- Marie Curie Seal of Excellence & European Research Grant.
- Session Chair, BIOSTEC 2025 (Biosensors & Sensor Technology).
- Diversity & Inclusion Chair, IEEE International Ultrasound Symposium 2022.
- International hackathon participation Grant 2022, American Society of Echocardiography,
- Junior Research Fellowship (UGC NET-JRF 2014, UGC NET 2013) in Electronics Science

Patents, Research publications and Industrial Contributions

Patents:

1. C Hebert, **S Sharma,** C A Lernoud and B Fain, *"Ultrasound-based wireless battery-free implantable sensors comprising a solution-gated field-effect transistor",* **European Patent, US,** Application No: ***EP22305631.8,*** 28th April 2022 (filed).

2. P K Dubey and **S Sharma,** *"Improved Ultrasonic Interferometer Excitation and Detection Device for Velocity and Attenuation Measurement",* **Indian Patent,** Application No: **201711036499**,14 June 2019 (Published).

INDUSTRIAL INNOVATION: Transferred to M/*s Physics Instruments Company (PICO),* Chennai, on 18th Feb 2019, https://www.pico.in

SCI PUBLICATIONS: (* corresponding author, #equal)

Published:

1. **S Sharma***, C A Lernoud, B Fain, R Othmen, V Bouchiat, B Yvert, and C Hébert* *"Flexible Graphene Solution-Gated Field-Effect Transistor for Ultrasound-Based Wireless and Battery-Free Biosensing",* **Advanced material technologies, Wiley VCH, 2023.** *https://doi.org/10.1002/admt.202300163*
2. N Dhiman; **S Sharma**, Piyush, B Kumar, S Yadav and P. K. Dubey, *Development of sweep frequency ultrasonic interferometer for high precision velocity measurement in liquids"* **Review of Scientific Instruments, American Institute of Physics, AIP, 2023**
3. S Golemati, S Shah, and **S Sharma#**, Triple SONOS: Continuous monitoring of cardiac output using capacitive/Piezo micromachined ultrasound transducer, **American Society of Echocardiography, Echo vol 11 Issue 9, 2022** *https://www.asecho.org/wp-content/uploads/2022/09/Echo-Magazine-September-2022-FINAL.pdf*
4. D Yadav, M Singh, **S Sharma**, S P Singh, and P K Dubey, Dual Wavelength based Approach with Partial Least Square Regression for the Prediction of Glucose Concentration, **Indian Journal of Pure & Applied Physics Vol. 60, 2022**,
5. **S Sharma***, U K Mishra, S Yadav, and P K Dubey*, Improved ultrasonic interferometer technique for propagation velocity and attenuation measurement in liquids,* **Review of Scientific Instruments, American Institute of Physics, AIP, 2019** https://doi.org/10.1063/1.5088762
6. **S Sharma***, U K Mishra, A K Saini, and P K Dubey*, Accuracy estimation of propagation velocity in variable path ultrasonic interferometer for liquids",* **MAPAN- J. Met. Soc. India, Springer, 2019** *DOI: 10.1007/s12647-019-00331-x*
7. **S Sharma***, S Yadav and P K Dubey*, Continuous-wave ultrasonic interferometers with relatively higher excitation power are inappropriate for liquid characterization",* **MAPAN- J. Met. Soc. India, Springer, 2020.** *DOI: 10.1007/s12647-020-00389-y*

Under process:

1. **S Sharma***, et all, "*Characterization of PMUTs Connected to Microelectrodes for Ultrasound-Driven Neural Stimulation,* ***IEEE Journal. (under-process****).*

INVITED SPEAKER

- National Workshop/Seminar " Role of ultrasound in Medical domain", Legal Metrology, Govt. of India, June 2024.
- Testimonials talk on International Postdoctoral Fellowships MSCA, INSERM, Institute for Advanced Biosciences, Grenoble, Feb 2024**.**

(Invited: 2, Oral: 3 & Poster: 5)

CONFERENCE PAPERS

1. ***S Sharma**, B Fain, and C Hébert, *Combination of pMUT and microelectrodes for the development of neural stimulators, 20-22 FEB* ***BIODEVICES 2025,*** *20-22 Feb, 2025, Porto, Portugal****.*** **(speaker and session chair: Biosensors)**
2. *C A Lernoud, **S Sharma**, L Rousseau, R Othmen, V Bouchiat, B Yvert, and C Hébert *Graphene/boron nitride liquid-gated field-effect transistors for biosensing,* ***Society for Neuroscience*** *12-16 Nov, 2022, San Diego, USA.* **(Poster)**
3. ***S Sharma**, K Yadav, S Yadav and P K Dubey, *"Advantages of direct digital synthesis-based technique for frequency sweep ultrasonic interferometry",* 6th National Conference on Advances in Metrology. **2020 (Oral Presentation)**
4. ***S Sharma**, A K Saini, U K Mishra, and P K Dubey, "*Effect of liquid sample holder structure on ultrasonic attenuation and velocity measurement*", 10th International Conference on Advances in Metrology. **2019 (Poster)**
5. ***S Sharma**, S Yadav, and P K Dubey, "*Optically coupled real-time heart rate measurement system with improved resolution and sensitivity*", 13th International Conference on Western Pacific Acoustics Conference (WESPAC). **2018** (**Oral Presentation)**
6. ***S Sharma**, U K Mishra, A K Saini, and P K Dubey, "*Comparative study of ultrasonic propagation velocity by using pulse-echo and interferometer technique*", National symposium on instrumentation (NSI-41), JSS Science and Technology University, India. **2018 (Oral Presentation)**
7. ***S Sharma** and P K Dubey, "*Issues in ultrasonic attenuation measurement with the pulse-echo method in liquids*", 5th National Conference on Advances in Metrology, The North Caps University, India **2017 (Poster)**
8. *K Yadav, **S Sharma**, S Yadav, and P K Dubey, *"Study and analysis of wide frequency ultrasonic time of flight measurement in reference rod", 6*th National Conference on Advances in Metrology **2020 (Poster)**
9. A K Saini, ***S Sharma**, U K Mishra, and P K Dubey, "*Improved software-based envelope detection method for ultrasonic C-scan system*", 10th International Conference on Advances in Metrology. **2019 (Poster)**

10. *K Yadav, **S Sharma**, Sanjay Yadav, and P K Dubey, "*Effect of temperature variations in ultrasonic dimensional Metrology*", 10th International Conference on "Advances in Metrology. **2019 (Poster)**
11. Ujjwal K Mishra, ***S Sharma**, A K Saini, and P K Dubey, "*Effect of rf burst excitation delay in pulsed electromagnet EMAT*", 10th International Conference on "Advances in Metrology, **2019**. **(Poster)**
12. *A K Saini, **S Sharma**, U K Mishra, and P K Dubey, "*Uncertainty estimation in thickness measurement using ultrasonic pulse-echo technique*", National Symposium on Instrumentation (NSI-41), JSS Science and Technology University India. **2018 (Oral Presentation)**
13. *N Dhiman, S Yadav, **S Sharma**, Piyush, and P K Dubey, *"Estimation of thermal conductivity of liquids using CSIR-NPL indigenously developed ultrasonic interferometer",* 6th National Conference on Advances in Metrology. **2020 (Poster)**
14. *Piyush, N Dhiman, S Yadav, **S Sharma**, B Kumar, Abhilasha, K Yadav and P K Dubey, *"Modern technologies for ultrasonic non-destructive evaluation of concrete structure"* 6th National Conference on Advances in Metrology. **2020 (Poster)**
15. *B Kumar, Piyush, N Dhiman, S Yadav, **S Sharma**, Abhilasha, K Yadav and P K Dubey, *"Polarized shear wave electromagnetic acoustic transducer (EMAT) for ultrasonic non-destructive",* 6th National Conference on Advances in Metrology. **2020 (Poster)**
16. *U K Mishra, A K Saini, **S Sharma,** and P K Dubey, "*Electromagnetic acoustic transducer-based thickness measurement and comparison with conventional piezoelectric contact method*", National Symposium on Instrumentation (NSI-41), JSS Science and Technology University India. **2018 (Oral Presentation)**
17. P K Dubey, S Singh, and ***S Sharma,** "*High-resolution transducer-target separation and measurement system with laser feedback*", 4th National Conference on Innovation in Indian Science, Engineering & Technology, **2017 (Poster).**