Souvik Dubey

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Four years of research experience in wirelessly-powered micro medical devices, non invasive remote sensor design, radio frequency circuit design and micro electro mechanical device design and fabrication.

Professional Experience

- **iMEMS Lab** — **Arlington, TX**
  Graduate Research Assistant — *August 2013–Present*
  Responsibilities: system design, simulation and device fabrication in clean room, bench top and animal testing, inventory and safety management, present research works in recognized technical conferences, prepare scientific documents, writing research proposals.

- **Electrical Engineering, The University of Texas at Arlington** — **Arlington, TX**
  Graduate Teaching Assistant — *January 2014–Present*
  Responsibilities: teaching electromagnetism laboratory, grading reports and exams, preparing course assessment reports, and mentoring undergrad and graduate students.

- **Infosys Ltd.** — **Bhubaneswar, India**
  System Engineer — *October 2010–June 2013*
  Responsibilities: software enhancement in Mainframe system for health care application, Java web service based zero downtime financial application development for American Express and DB2 query optimization for high volume financial transactions, JavaEAR deployment in Unix server.

Education

- **The University Texas at Arlington** — **Arlington, Texas**
  PhD Candidate in Electrical Engineering , GPA – 3.73/4 — *2013–2018*
- **West Bengal University of Technology** — **Kolkata, India**
  B–Tech in Electronics and Communication Engineering, GPA – 8.24/10 — *2006–2010*

- **Relevant Coursework:** Embedded System, Digital Communication, Silicon IC Fabrication, MEMS, Photonics, Wireless Communication, Analog CMOS IC Design, Laser, Advanced MEMS, Analysis of Materials.

Skills

- **Fabrication Skills:** Mask design, Photolithography, Sputtering, E–Beam deposition, Wet etching, Electroplating, Laser micro-machining, 3–D printing, UV curing, Ink-jet circuit printing.
- **Analysis Tools:** Scanning Electron Microscopy (SEM), X-Ray diffraction (XRD), Surface profilometry, Ellipsometry, Cyclic voltammetry.
- **Radio Frequency Skills:** Antenna design, modeling and simulation in Ansys HFSS, HF circuit design in ADS, Power Amplifier design, Network analysis using VNA, Impedance matching.
- **Programming Skills:** Matlab, Labview, C, Java, COBOL, SQL, DB2.
- **Computer Aided Design Tools:** Ansys, LASI, AutoCAD, Eagle, Cadence, MPLAB, Multisim.
- **Other Skills:** Animal Experiment, Microsoft office, Technical writing and presentation.

Research Projects

- **PhD Dissertation (Ongoing):** *'Batteryless Endoscopic Implantable Flexible Gastricstimulator'*
  In this project a flexible battery-less neuro-stimulator has been conceptualized for treating Gastroparesis, a severe digestive disease where patients loses their ability to transfer semi-digested food from stomach to intestine. The stimulator was designed to operate and communicate with an inductive wireless power transfer link in ISM band. The circuit and antenna were fabricated on flexible polyimide substrate in clean room using standard photolithography and wet processing and a

micro-controller was programmed to control the stimulation intensities. The full duplex communication was achieved by frequency and load modulation without using any dedicated communication channel. Several bench top and animal experiments were conducted to test the functionalities of the device. A part of the work was published in IEEE RWW 2016 conference and complete article was recommended for journal review.

- **Iridium Oxide Based Flexible pH Sensor:**

  In this project a low cost novel flexible pH sensor was fabricated and characterized. The working electrodes were fabricated by sol-gel deposition and thermal oxidation of iridium chloride on a flexible polyimide film patterned with gold and tested along with fabricated silver/silver-chloride reference electrodes to measure pH for biomedical and industrial applications. The fabricated sensors outperformed the commercial sensor in stabilization times and lower fluctuation voltages.

- **Dielectric Spectroscopy using Resonator for Security Applications:**

  A novel cost effective solenoid resonator was designed to identify explosive and flammable liquids based on signature extraction from scattering parameters. The work has been accepted in IEEE Sensor 2017 conference

- **Non-contact Self Resonant Soil Moisture Sensor:**

  A new method has been investigated for detection of soil moisture using a self resonant sensor. In comparison to traditional TDR sensors, this sensor produced accurate results when tested with various types of soil. The work has been recommended for publishing in journal and under review.

- **MEMS Micro Motor:**

  In this project a 200 micron motor has been designed using polyMUMPs process. The electrostatic comb drive was used for actuation and the device was optimized for lower pull-in voltage.

Research Publications

1. **S. Dubey**, K. Ta and J.-C. Chiao, "Liquid Interrogator for Security Application" in IEEE Sensor Conference, Glasgow, Oct. 2017.
2. X. Yang, M. Angeli, J. Fu, **S. Dubey** and J.-C. Chiao, "Miniature pH Sensors on Ultra-Flexible Substrates" in IEEE Sensor Conference, Glasgow, Oct. 2017.
3. **S. Dubey** and J.-C. Chiao, "Power Transfer for a Flexible Gastric Stimulator" in IEEE BioWireless Conference, Austin, Jan. 2016.
4. **S. Dubey**, Y. Tuladhar, A. Murad and J.-C. Chiao, "A Deformable Antenna for Stomach Implants" in National Radio Science Meeting, Boulder, January 2016.
5. C. M. Nguyen, P. K. Kota, M. Q. Nguyen, **S. Dubey**, S. Rao, J. Mays and J.-C. Chiao, "Wireless power transfer for autonomous wearable neurotransmitter sensors" in Sensors, Vol. 15, No. 9, pp. 24553-24572, 2015.
6. A. Vinca, **S. Dubey**, L. Lee, S. Rao, J.-C. Chiao, "Optimization of Transmitting Banks for Implantable Medical Devices" in BMES Annual Meeting, Tampa, FL, Oct. 7-15, 2015.
7. C.M. Nguyen, S. Rao, X. Yang, **S. Dubey**, J. Mays, H. Cao, J.-C. Chiao, "Sol-gel Deposition of Iridium Oxide for Biomedical Micro-Devices" in special issue for Sol-Gel Based Sensors and Devices,Sensors, Vol. 15, No. 2, pp. 4212-4228, 2015.
8. M. Q. Nguyen, **S. Dubey**, S. Rao, J.-C. Chiao, "Wireless Power Transfer via Air and Building Materials Using Multiple Repeaters" in Texas Symposium on Wireless and Microwave Circuits and Systems, TX, April 3-4 2014.
9. S. Rao, **S. Dubey**, S. Deb, Z. Hughes, Y.-S. Seo, M. Q. Nguyen, S.-J. Tang, T. Abell, C. Lahr, J.-C. Chiao, "Wireless Gastric Stimulators" Texas Symposium on Wireless and Microwave Circuits and Systems, TX, April 3-4 2014.

Patents

- Liquid Interrogator for Security Applications (Filed in 2016, patent pending).
- Non Contact Soil Moisture Sensing (Filed in 2017, patent pending).

Awards and Fellowships

- **IEEE MTT-S Graduate Fellowship for Medical Application** (In 2017 only 2 person got the award worldwide, Link: www.mtt.org/graduate-fellowship-recipients).
- DNE Janet & Mike Greene Scholarship (Texas, 2017).
- Electrical Engineering Scholarship (Texas, 2017).
- Electrical Engineering Flextronics Scholarship (Texas, 2016).
- STEM Doctoral Fellowship (Texas, 2014-2017).
- IEEE MTT PhD Student Sponsorship Initiative (Florida, 2014).