

Dr. Pramod K

Assistant Professor, School of Nanoscience & Nanotechnology

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SUMMARY

A highly motivated Physicist with a passion for teaching and research. Completed an M.Phil. and Ph.D. in Experimental Physics, with a focus on organic electronics and ferro-piezo polymer devices. Currently serving as an Assistant Professor, utilizing expertise to educate and inspire students in the field of Physics and Nanoscience. Prior experience includes working as a Postdoctoral Fellow in the MEMS Lab at the Department of Electrical Engineering at IIT Madras. Proven ability to lead and conduct research in the field of organic electronics, with notable achievements in memory, energy and sensing devices. Excels in collaborative environments and seeking new opportunities to leverage skills and expertise in teaching and research.

POST DOCTORAL RESEARCH

Department of Electrical Engineering, IITM, India

Institute Post Doctoral Fellow

📅 May 2018 – May 2021 (3 years)

- Development of piezoelectric polymer-based Surface Acoustic Wave devices for sensor applications
- Nano-scale studies of ferroelectric polymer composite thin films using Kelvin probe & Piezoresponse force microscopy techniques
- Development of ferroelectric polymer dielectric transistor for memory applications

Industrial Consultancy & Sponsored Research, IITM, India

Project Associate

📅 Jun 2021 (1 month)

- Development of organic ferroelectric phototransistor memory for neuro-morphic sensor applications

Post Doctoral Researcher

📅 Jul – Sep 2021 (3 months)

EDUCATION

PhD Physics, Pondicherry University

📅 2012 – 2018

📍 Puducherry, India

Thesis: "Study of electronic transport in PVDF thin films & nanodots for memory applications"

- Low voltage bipolar resistive switching in self-assembled polymer nanodots
- Local ferroelectric studies on PVDF nano-dots using piezo force microscopy
- Rectifying electronic transport & the role of Fowler-Nordheim tunneling
- High-voltage transition studies from rectification to resistive switching
- Crystallization of polymer thin films and their structural, microstructural correlation upon electronic transport

MPhil Physics (CGPA = 9), Pondicherry University

📅 2010 – 2011

📍 Puducherry, India

Thesis: "Strain induced ferroelectricity in Strontium titanate thin films"

- Deposition of ferroelectric SrTiO₃ thin films using pulsed laser deposition
- Study of inplane strain & lattice mismatch in SrTiO₃ thin films

TEACHING EXPERIENCE

MSc. Physics

– Quantum Mechanics, Mathematical Physics, Atomic and molecular physics

M.Tech.

– Advanced carbon-based nanomaterials, Advanced characterization techniques of nanomaterials, Design and fabrication of nanodevices

EXPERTISE

Microfabrication ●●●●●

Wet-bench, Clean room, Photolithography (Karl Suss MA6/BA6) & Glove box (MBRAUN)

Thin Films ●●●●●

Spin coating, Sputtering (DC & RF), Evaporation (Thermal & E-beam) & PLD

Nanoscale characterization ●●●●●

Advanced AFM modes: PFM, KPFM & CAFM (Park-NX10 & Bruker-MM8)

Electrical Characterization ●●●●●

Probe Stations : Cascade Microtech Lakeshore

Parametric Analyzers : Agilent B1500A Keithley 4200, 238 & 2400

Network Analyzer : Agilent PNA-X(N-5245A)

Structural ●●●●●

XRD, AFM, Raman Microscope & Confocal Microscope

Analysis skills ●●●●●

P-E loop tracer, PUND method, SEM, UV-VIS-NIR Spectrophotometer, FTIR Spectrophotometer & Impedance analysis

RESEARCH INTEREST

Organic electronics Polymer thin films

SAW devices Nonvolatile memories

Ferroelectricity Piezoelectricity PFM

Graphene composites RRAM FRAM

MEMS KPFM Photo-lithography

Hybrid perovskites Soft-lithography

MSc Physics (First Class), University of Calicut

2007 – 2009

Kerala, India

BSc Physics (First Class), University of Calicut

2004 – 2007

Kerala, India

AWARDS & HONORS

Best Poster Award

International Conference on Materials for Advanced Technologies

2017

Singapore

International Travel Support by Science & Engineering Research Board

Dept. of Science & Technology, Govt. of India

2017

India

Rajiv Gandhi National Fellowship (2 Yrs. JRF + 3 Yrs. SRF)

University Grants Commission, Govt. of India

2011

India

Indian Nanoelectronics Users Program (INUP)

Centre of Excellence in Nanoelectronics (CEN), IIT Bombay

2011

India

AFFILIATIONS

Centre for NEMS & Nanophotonics (CNNP)

IIT Madras

May 2018 - September 2021

Chennai, India

Centre of Excellence in Nanoelectronics (CEN)

IIT Bombay

2011 - 2012

Mumbai, India

Central Instrumentation Facility (CIF)

Pondicherry University

2010 - 2017

Puducherry, India

SOFT SKILLS

Executive Member

Recent Advances in Physics (RAP) - Symposium

2014

Pondicherry University, India

Organizing Assistance

International Conference on Magnetic Materials & Applications

2014

Pondicherry University, India

National Symposium on Plasma Science & technology

2012

Pondicherry University, India

PATENT

Advanced Electrostatic Force Microscopy (EFM) for transient measurements

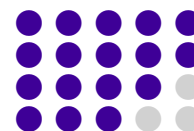
Preliminary filing no: IDF1999

2020

IIT Madras, India

LANGUAGES

English
Malayalam
Tamil
Hindi



SCIENTIFIC ACTIVITIES

International Conferences

Materials for Advanced Technologies

2017 – 2 Posters

Suntec, Singapore

2014 – Poster

PU, Puducherry, India

2013 – Poster

IIT Guwahati, India

Advanced Polymeric Materials

2013 – Invited

MG University, India

Workshops

School on Nanoscale Transport

2016 – Poster

HRI, Allahabad, India

Nanofabrication Technologies-INUP

2014 – Invited

IIT Bombay, India

LabVIEW

2015

PU, Puducherry, India

Spectroscopic Techniques

2014

PU, Puducherry, India

Symposiums

DAE Solid State Physics

2014 – Poster

VIT, Vellore, India

2013 – Poster

Thapar University, India

2011 – Poster

SRM University, India

Plasma Science & Technology

2012 – Oral & Poster

PU, Puducherry, India

National Conferences

Materials for Energy Conversion & Storage

2016 – Oral

PU, Puducherry, India

2015 – Oral

VIT, Chennai, India

Recent Advances in Physics

2016 – Poster

PU, Puducherry, India

2014 – Poster

PU, Puducherry, India

Seminars

Materials for Energy Conversion & Storage

2014

PU, Puducherry, India

Computational Material Science

2011

PU, Puducherry, India

Springer

2014

PU, Puducherry, India

PUBLICATIONS

- Ravisankar, M. S., **K. Pramod**, and R. B. Gangineni. "Effect of the top electrode on local piezoelectric and the ferroelectric response of PVDF thin films in PVDF/Au/Si and Ag/PVDF/Au/Si multilayers." *Applied Physics A* 129.2 (2023): 146
- M.S. Ravi Sankar, **K. Pramod**, R. B. Gangineni, (2019), "Local ferroelectric studies on interconnected PVDF nano-dot thin films using piezo force microscopy," *Journal of Materials Science: Materials in Electronics*, 30 (23), 20716-20724
- **K. Pramod**, R. B. Gangineni, (2018), "High-voltage transition studies from rectification to resistive switching in Ag/PVDF/Au capacitor-like structures," *Polymer Bulletin*, 75 (7), 2769-2778
- **K. Pramod**, R. B. Gangineni, (2017), "Rectifying electronic transport & the role of Fowler-Nordheim tunneling in Ag/PVDF/Au capacitor structures," *Current Applied Physics*, 17 (11), 1469-1475
- **K. Pramod**, R. B. Gangineni, (2017), "Low voltage bipolar resistive switching in self-assembled PVDF nanodot network in capacitor like structures on Au/Cr/Si with Hg as a top electrode," *Organic Electronics*, 42, 47-51
- **K. Pramod**, R. B. Gangineni, (2015), "Influence of solvent evaporation rate on crystallization of Poly(vinylidene fluoride) thin films," *Bulletin of Materials Science*, 38 (4), 1093-1098
- **K. Pramod**, Binaya Kumar Sahu, R. B. Gangineni, (2015), "Resistance switching in Polyvinylidene fluoride (PVDF) thin films," *AIP Conference Proceedings*, 1665 (1), 110051
- M.S. Ravi Sankar, **K. Pramod**, R. B. Gangineni, (2015), "Nano-patterning throughout of Poly(vinylidene fluoride) thin films & its dependence upon of solvent, annealing temperature & weight percentage," *Advanced Science, Engineering & Medicine*, 7 (3), 171-175
- **K. Pramod**, R. B. Gangineni, (2014), "Structural phase study in un-patterned & patterned PVDF semi-crystalline films," *AIP Conference Proceedings*, 1591 (1), 1039-1041
- **K. Pramod**, R. B. Gangineni, (2014), "Optimization of ferroelectric polymer to realize a multiferroic tunnel junction," *Physics Procedia*, 54, 101-106
- **K. Pramod**, R. B. Gangineni, (2012), "Electronic transport in Au/SrTiO₃/Au tunnel junctions grown using pulsed laser deposition," *AIP Conference Proceedings*, 1447 (1), 775-776

MANUSCRIPTS COMMUNICATED

- **K. Pramod**, S. Ragul, Soumya Dutta, "Influence of Graphene Oxide on Ferroelectric Properties of PVDF-TrFE Thin Films Investigated using Piezo & Kelvin Probe Force Microscopy"
- **K. Pramod**, S. Ragul, R. B. Gangineni, "An experimental observation & analytical modelling of trap dependent capacitance voltage characteristics in Ag/PVDF/Au structure"
- **K. Pramod**, R. B. Gangineni, "AFM based systematic microstructural characterization of PVDF thin films & self organized nanodots & microporous network structures"
- S. Ragul, **K. Pramod**, Debduitta Ray, Soumya Dutta, "Effect of electric field on the bandgap of bilayer graphyne heterojunctions - a DFT based study"
- **K. Pramod**, S. Ragul, Soumya Dutta, "Effect of frequency on the Piezoforce microscopic measurements on polymer ferroelectrics"
- S. Ragul, **K. Pramod**, M. Mandhakini, "Synthesis and characterization of multi-headed cauliflower-like sulfur doped zinc oxide microstructures by hydrothermal method"

DECLARATION

I, hereby, declare that the above furnished entries are true to the fullest in the best of my knowledge and belief.

Incandescent Science Series Talks

📅 2022 – Invited

📍 SIC, Kerala, India

PERSONAL DETAILS

First Name : Pramod
Last Name : K
Date of birth : April 08, 1986
Sex : Male
Marital Status : Single
Nationality : Indian
Address : Chirakkal Madu Purayi
Puthur Pallikkal
Malappuram – 673636
Kerala, India

REFEREES

(1) Dr. Gangineni Ramesh Babu

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Department of Physics
School of Physical, Chemical & Applied Sciences
Pondicherry University
Puducherry, India – 605 014
☎ +91 413 2654 785
✉ rameshcu@gmail.com
✉ rameshg.phy@pondiuni.edu.in

(2) Dr. Soumya Dutta

Associate Professor
Department of Electrical Engineering
Indian Institute of Technology Madras
Chennai, India – 600 036
☎ +91-44-2257-4472
✉ s.dutta@ee.iitm.ac.in