Aman **BAUNTHIYAL**

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Profile

Physicist and surface scientist nearing PhD completion in next-generation non-volatile resistive switching technology. Expertise in UHV systems, electron & X-ray microscopy, and growth of organic/inorganic materials via RF sputtering, MBE, and coating techniques, with focus on NVM applications. Proven record of leading research to publication (3 peer-reviewed papers, multiple international presentations and invited talks). Seeking a postdoc position in semiconductor devices and materials innovation.

Personal Information

DOB: **01.04.1998**
Citizenship: **Indian**
Family: **Single**
Languages: **German** (B1), **English** (Fluent), **Hindi** (Native)

Expertise

- **Experimental Techniques & Instrumentation:**
  - UHV systems operation & maintenance
  - PVD (Epitaxy, RF Sputtering)
  - Microscopy and spectroscopy (e.g., STM, XPS, AFM)
- **Materials & Processes:**
  - Wide bandgap oxides & polymers growth
  - Nanomaterial fabrication
  - Semiconductor device processing
- **Scientific Domains:**
  - Surface physics
  - Semiconductor physics
  - Resistive switching technology

Experience

RESEARCH ASSOCIATE at *University of Bremen (Germany).*

2019.10–pres.

◇ Led a research on oxide-based non-volatile memory (NVM), focusing on both thin-film growth and electrical characterization.

◇ Managed and maintained multi-chamber ultra-high vacuum (UHV) systems including microscopy and deposition techniques like MBE and RF sputtering.

◇ Performed interdisciplinary collaboration with national and international working groups to advance research objectives.

◇ supervised bachelor's and master's projects.

Education

Doctorate in Physics *University of Bremen, Germany.* **2019–pres.**
Supervisor: Prof. Dr. Jens Falta
◇ **Thesis title: *Growth and Electrical Characterization of RF Sputtered Ga_2O_3 on Ru(0001) for NVM Technology.***
◇ Developed and optimized RF sputtering processes for growing crystalline Ga_2O_3 films for ReRAM devices.
◇ Presented research findings through scientific publications and at various international conferences.

Masters of Science in Physics. *Indian Institute of Technology Jodhpur, India* (Grade: 8.89/10, German grade: 1.55) **2017–2019**
Supervisor: Dr. Satyajit Sahu
◇ **Thesis title: *Organic memory devices: a study on the impact of device fabrication processes and oxide surface morphology.***
◇ Growth study of organic films using spin coater and dip coating.
◇ Electrical characterization using two-probe station and STM of organic films for ReRAMs.

Bachelors of Science in Physics. *University of Delhi, India* (Grade: 8.89/10, German grade: 1.50) **2014–2017**
◇ Project title: *Investigation of polymer-based electrode for all-solid-state high-performance super capacitor.*

Publication

◇ **Baunthiyal, Aman,** et al. "Structural evolution and nucleation dynamics of RF sputtered Ga2O3 films on Ru (0001): The impact of deposition temperature and Ru surface morphology." APL Materials 13.4 (2025).
DOI: 10.1063/5.0270431

◇ Morales, Carlos, et al. "Stabilization of Ce3+ cations via U–Ce charge transfer in mixed oxides: consequences on the thermochemical water splitting to hydrogen." Journal of Physics: Energy 7.2 (2025): 025012.
DOI: 10.1088/2515-7655/adbad9

◇ **Baunthiyal, Aman,** et al. "Sputter-Deposited -GaO Films With Al Top Electrodes for Resistive Random Access Memory Technology." 2023 IEEE Nanotechnology Materials and Devices Conference (NMDC). IEEE, 2023.
DOI: 10.1109/NMDC57951.2023.10343972

◇ **Baunthiyal, Aman,** et al. "Growth and characterization of sputter-deposited Ga2O3-based memristive devices." Applied Physics Letters 123.21 (2023).
DOI: 10.1063/5.0170354

Software skills

- Origin Pro
- C++
- LabVIEW
- Python
- Casaxps
- LaTeX

Soft skills

- Good communication skills
- Analytical Thinking
- Problem-Solving
- Adaptability
- Teamwork
- Time Management
- Curiosity and Creativity
- Ethical Awareness

Technical Skills

◇ **Physical vapor deposition (PVD) techniques**
◇ **Grazing Incidence XRD at Petra III, Desy**
◇ **Scanning Tunneling Microscopy (STM)**
◇ **X-ray diffraction (XRD)**
◇ **Bruker Conductive Atomic Force Microscope (C/AFM)**
◇ **Scanning Electron Microscopy (SEM)**
◇ **X-ray Photo-electron Spectroscopy (XPS)**
◇ **Auger electron spectroscopy (AES)**
◇ **Low Energy Electron Microscopy/Diffraction (LEED)**

Talks and conferences

Presented research on structural and electrical properties of Ga_2O_3 films at various conferences and invited talks:

◇ **IEEE Nanotechnology Materials and Devices Conference**, *Italy* **2023**

◇ **36th European Conference on Surface Science**, *Poland* **2023**

◇ **International Union of Materials Research Society**, *IIT Jodhpur, India* **2022**

◇ **DPG-Frühjahrstagung**, *Regensburg, Germany* **2022**

◇ **Institute of Solid State Physics Workshop, University of Bremen**, *Riezlern, Austria* **2022**

◇ **Invited Talk in Prof. Subhashinsh Gangopadhyay group**, *BITS Pilani, Pilani, India* **2024**

◇ **Invited Talk in Prof. Jan Ingo Flege group** , *BTU Cottbus, Germany* **2025**

Internships and schools

Intern, IIT Jodhpur, India **October, 2019**
◇ Project title: *Morphological study of Organic thin films using low-temperature STM.*

Guest researcher, University of Bremen **March, 2019**
◇ Project title: *Morphological study of VO2 thin films on the different substrate using variable temperature STM.*
Aman Baunthiyal, MAPEX, University of Bremen

MATRAC1 School synchrotron visit, Helmholtz-Zentrum Hereon, Hamburg **March, 2019**
◇ Aim: *Practical training on various techniques at Petra III, Desy, Germany and MAX IV, Lund, Sweden.*

Awards and achievement

◇ **Indian Institute of Technology - Joint Admission test for Masters (IIT-JAM)**, Qualified with All India Rank (AIR) 426 out of app. 12000 candidates.

◇ **MAPEX Center for Materials and Processes internship grant, University of Bremen**, For carrying out an internship at University of Bremen.

◇ **Postgraduate International Program travel grant, University of Bremen**, For various all national and international conferences.