# Somaiah Nalla, Ph.D.

Indian Institute of Science, Bangalore, India
**Mobile:** +91 9346437850
**Email:** somuyadav.dhp@gmail.com

## PROFESSIONAL SUMMARY:

Materials researcher with experience in thin film deposition, device fabrication, class 100 clean room, electrical and microstructural characterization.
Research experience in Semiconductor devices and microelectronic device reliability problems.

## EDUCATION:

**Ph.D in Materials Engineering** 2018
Indian Institute of Science, Bangalore, India
**M.Tech in Materials Engineering** 2011
University of Hyderabad, Gachibowli, Hyderabad, India
**M.Sc in Physics** 2008
University College of Science, Osmania University, Hyderabad
**B.Sc. with Mathematics, Physics, and Statistics** 2005
P.G. College of Science, Saifabad, Osmania University, Hyderabad

## TECHNICAL SKILLS:

**Thin film deposition:** Magnetron sputtering, thermal evaporation
**Device Fabrication:** Photolithography, Rapid thermal annealing, Plasma etching, wet chemical etching, wet chemical benches
**Characterization:** SEM, TEM, XRD, AFM, optical microscope, electrical measurement
**Modeling and Software:** TCAD Sentaurus, COMSOL Multiphysics, Origin, Kaleida Graph

## RESEARCH EXPERIENCE:

### Indian Institute of Science, Center for Nano Science and Engineering

**Postdoctoral Research Associate:** April 2023 – present
**Research topic:** β-$Ga_2O_3$ based power electronic devices
**Senior Project Associate in Materials Engineering**: October 2022- March 2023
**Role and responsibilities:** Focused on electromigration in metallic thin film, Mentoring research scholars

### Rice University, Department of Electrical and Computer Engineering, Texas, US

**Postdoctoral Research Associate:** September 2021 - June 2022
**Research topics:** Tunable optical properties of 2D materials and 2D materials-based Quantum Emitters

### Indian Institute of Science, Department of Materials Engineering, Bangalore, India

**Research Associate:** December 2020 - March 2021

Studied Electromigration-thermomigration coupling on mass transport in width varied Cu thin film interconnects

**Project Associate:** July 2018 - January 2020

Studied the effect of thermomigration-electromigration coupling on mass transport in Cu film deposited on $W/SiO_2/Si$ and $Ta/SiO_2/Si$.

**Ph. D Scholar:** August 2011 - April 2018

**Thesis title:** ***"Mass Transport in Cu-Interlayer-Si Systems under Various Types of Thermo-Electro- Mechanical Excursions"***

Understanding mass transport in Cu thin film interconnects and related reliability issues arising from the thermomigration-electromigration coupling and thermal cycling effects

### University of Hyderabad, Department of Materials Engineering

**Master of Technology:** August 2009 – July 2011

**Thesis title:** ***"Investigation of Magnetic and Magneto elastic properties of Zn doped Cobalt ferrite"***

Investigated the effect of Zn substitution on the magnetic and magnetoelastic properties of cobalt ferrite.

## LABORATORY SETTING UP EXPERIENCE:

**Role and Responsibilities**:

- Involved in lab setup from scratch to designing and assembling of various electrical measurements setups (e.g., high precision solid electromigration and liquid electromigration set up)
- Thin film deposition systems
- Environmental chamber for thermal cycling (between -70 to 180 °C) and humidity control
- Vacuum sealing setup and other miscellaneous.

## TEACHING EXPERIENCE:

**Teaching Assistant ship (2014-2015):** Undergraduate program, Indian Institute of Science, Bangalore

**Physics Lecturer (Aug 2008 -April 2009)**: Siddhartha Postgraduate College, Hyderabad.

- Taught MSc Materials Science courses

## AWARDS AND ACHIEVEMENTS:

- Ministry of Human Resource Development Research Fellowship (Govt. of India), 2011-2016
- Won 3$^{rd}$ prize for SEM micrograph, Annual Dept. Student symposium, IISc-2017
- Qualified GATE 2009
- Qualified JEST 2008 National Level examination
- Stood 1$^{st}$ in 12$^{th}$ and 10$^{th}$ standards at Govt. Junior College and at ZP High School, Nalgonda, Telangana

## PUBLICATIONS:

1. T. Saquib, F. Akyol, H. Ozden, **N. Somaiah**, J. Sahoo, R. Muralidharan, D.N. Nath "*Carrier transport in LPCVD grown Ge-DOPED β-$Ga_2O_3$/4H-SiC isotype heterojunction*" **J. Appl. Phys.** 135, 065701 (2024)
2. **Nalla Somaiah,** Anwesha Kanjilal and Praveen Kumar "*Effects of Interfacial Layer on Stress Relaxation Mechanisms Active in Cu-Si Thin Film System during Thermal Cycling*" **MRS Communications** 10, 164 (2020)
3. **Nalla Somaiah** and Praveen Kumar "*Effect of Thermomigration-Electromigration Coupling on Mass Transport in Cu Thin Films*" **Journal of Electronic Materials** 49, 96 **(2020)**
4. **Nalla Somaiah** and Praveen Kumar "*Tuning Sample Length Effect on Mass Transport in Current Carrying Cu-Si Thin Film Systems via Interfacial Engineering*" **Nanotechnology** 30, 485704 (2019)
5. **Nalla Somaiah** and Praveen Kumar *"Tuning Electromigration-Thermomigration Coupling in Cu/W Blech Structures"* **J. Appl. Phys.** 124, 185102(2018)
6. Deepak Sharma, Aman Jain, **Nalla Somaiah**, Ramesh Narayan P. and Praveen Kumar "*Graphene Embedded 2- Phase In-Cu Solders: A Potential Next Generation Metallic Thermal Interface Material*" **J. Elec. Mater.** 47, 4177 (2018)
7. **Nalla Somaiah** and Praveen Kumar "*Inverse Blech Length Phenomenon in Thin-Film Stripes*" **Phys. Rev. Appl.** 10, 054052 (2018)
8. **Nalla Somaiah**, Deepak Sharma and Praveen Kumar "*Electric current induced forward and anomalous backward mass transport*" **J. Phys. D: Appl. Phys**. 49, 20LT01 (2016)
9. S Talukder, **N Somaiah,** P Kumar "*Effect of substrate surface roughness on electric current induced flow of liquid metals*" **Appl. Phys. Let.** 102 (5),054101(2013)
10. **N Somaiah**, TV Jayaraman, PA Joy, D Das "*Magnetic and Magnetoelastic Properties of Zn-doped Cobalt Ferrites- $CoFe_{2-x}Zn_xO_4$ (x = 0, 0.1, 0.2, and 0.3)*" **J. Magn. Magn. Mater.** 324, 2286 (2012)

## CONFERENCE PROCEEDINGS:

1. **Nalla Somaiah** and Praveen Kumar *"Observation of Inverse Blech effect during the electromigration"* **International Journal of Electronics and Communication Engineering** Vol:4, No:7, 2017, Proc. 19th International Conference on Microelectronics and Microsystems Technology (ICMMT), Zurich Switzerland 19 (7 - Part XVII) (2017) 2142 **(Abstract)**

## PRESENTATION AND TALKS:

1. "**Impact of Current Crowding on Mass Transport in Cu interconnect and Observation of Anomalous Backward Mass Transport**", 29th Annual Students symposium, 21-22 January 2016, Department of Materials Engineering, IISc, Bangalore

## EXTRA-CURRICULAR ACTIVITIES:

- Chess champion 2008, University College of Science, Osmania University
- Part of winning 2nd place in Cricket tournament at university college of science, Osmania University, 2008
- Part of winning team in Cricket tournament at university level, Osmania University, 2007 (Organized by ABVP – Osmania University)
- Student representative from ZP High School