

## National Institute of Technology, Tiruchirappalli: Performa for CV of Faculty Members

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### Brief CV of Dr. N.Gopalakrishnan



Dr.N.Gopalakrishnan completed his Ph.D in 1997 at Anna University, Chennai, in the Nucleation and Growth kinetics of III-V Semiconductor. After his Ph.D, he went to Royal Institute of Technology, Sweden for the Post Doctoral research. Later, he had been at Japan for 3 years for Post Doctoral Research at KIT and AIST, Japan. He had been offered prestigious STA (i.e JSPS) fellowship by Japan Science and Technology, Government of Japan for his stay at AIST, Tsukuba, Japan. After that, he had been also at South Korea for one and half years as a Post-Doctoral researcher in Dong-Eui University.

Since March 2018, he is working as Professor of Physics at National Institute of Technology - Tiruchirappalli (NIT-T). Earlier, he joined as an Assistant Professor in Sept. 2007 and subsequently promoted to Associate Professor in Sept. 2010. He had been also served as Associate Dean (Academic) in NIT-T from Oct.2012 to Nov.2015 and Head, Department of Physics from Jan.2015-Jan.2018. He bagged Best Professor award in NIT-T during 2020-21.

Dr.N.Gopalakrishnan published more than 100 research papers in the International journals and presented about 95 research papers in the National and International conferences. Under his supervision 11 scholars completed Ph.D degree and 57 students completed Master degree projects. Currently, 03 Ph.D scholars doing research under his supervision.

Dr.N.Gopalakrishnan has good experience in Growth of III-V and II-VI thin films by versatile techniques, VPE, MBE, PLD and Sputtering. Beside, his group is working in synthesis of oxide nanomaterials, Spintronics, Gas sensing and Water purification. Recently, his group successfully fabricated ZnO *p-n* junction and CuO, ZnO &  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> based IDE sensor devices.

Beside his Post Doctoral Research in Sweden, Japan and South Korea, he visited United States of America, Hong Kong, Australia, Germany and Singapore for conferences, scientific discussion, Lab visit and to deliver invited lectures. He has delivered several invited lectures in India as well as in abroad.

Recently (June -July 2023) also, he has been awarded most prestigious *JSPS invitation fellowship* to stay at Nagoya Institute of Technology, JAPAN for the collaborative work.

## CV of N.Gopalakrishnan

**Name** : N. GOPALAKRISHNAN  
**Date of Birth** : 9th May 1967  
**Nationality** : Indian  
**Sex** : Male  
**Martial Status** : Married  
**Address for Communication** : Dr. Nammalvar Gopalakrishnan  
Professor  
Department of Physics  
National Institute of Technology (NIT)  
Tiruchirapalli-620 015, INDIA.  
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### **Education:**

Ph.D (Physics) April 1997 Anna University, Chennai, India.  
M.Phil (Physics) Sept.1991 Anna University, Chennai, India.  
M.Sc (Physics) April.1990 M.K.University, Madurai, India.

### **Current Position and Administration detail:**

<b>Professor #</b> Department of Physics National Institute of Technology Tiruchirappalli-15	Since 12 March 2018	Teaching and Research
<b>Head</b> Department of Physics National Institute of Technology Tiruchirappalli-15	Jan.2015-Jan2018	Teaching, Research and Administration
<b>Associate Dean (Academic)</b> National Institute of Technology Tiruchirappalli-15	Oct. 2012 –Nov.2015	Teaching, Research and Administration

# Best Professor award during 2020-21

### **Teaching:**

*Under Graduate:* \* Engineering Physics-I \* Engineering Physics-II

*Post Graduate:* \* Physics and Technology of Thin Film  
\* Solid State Physics  
\* Electrical, Magnetic and Optoelectronic Materials  
\* Fabrication Technology

**Research:** Thin films growth (Sputtering / PLD / MBE / HVPE) / Synthesis of oxide nanostructures / Optoelectronics / Spintronics / Gas sensing / Polymer membranes for water filtration.

### **Research supervision:**

Ph.D Supervision - 11 (completed)  
03 (ongoing)  
Master degree projects - 57 completed (M.Sc-34 & M.Tech-23)  
02 (ongoing)  
Post-Doctoral Fellow - 01 (Nov. 2019- May 2022)

### **Sponsored Projects ongoing/completed:**

1. ***'Doping and Capping in ZnO thin films for spintronics applications'***.  
*Funding agency- CSIR, Govt. of India (July 2014 – July 2017).*
2. ***'Codoping and band gap engineering in ZnO thin films for optoelectronics applications'***.  
*Funding Agency- DRDO, Govt. of India (Jan. 2009 – Jan. 2012).*

### **No of Ph.D. Completed - (11)**

Sl.No	Thesis title	Student name	Year	Course
1.	Realization of <i>p</i> -ZnO thin films for the fabrication of homojunction by R.F. Magnetron sputtering.	Dr.L.Balakrishnan	Jan 2013	Ph D
2.	Codoping and bandgap engineering in ZnO thin films by R.F. Magnetron sputtering.	Dr.S.Gowrishankar	Feb 2014	Ph D
3.	Hydrothermal synthesis, characterization and fabrication of CuO gas sensors.	Dr.S.Bhuvaneshwari	July 2017	Ph.D
4.	Growth, doping, characterisation and fabrication of ZnO based gas sensors by R.F. magnetron sputtering	Dr.E.Vinoth	July 2020	Ph.D
5	Effect of Nanofillers (GO, ZnO, GO-ZnO, Ag and Ag-ZnO) incorporated PSF/PVP Membranes for Water Purification	Dr.P.Pramila	August 2020	Ph.D
6	Doping and Capping in ZnO thin films for spintronics applications by R.F.Magnetron sputtering	Dr.N.Sivanantham	December 2020	Ph.D
7.	Synthesis, Doping, Fabrication and Characterization of ZrO <sub>2</sub> nanostructures for gas sensing applications.	Dr.E.Hemalatha	January 2021	Ph.D
8.	Synthesis, Doping and Characterization of $\beta$ -Ga <sub>2</sub> O <sub>3</sub> for room temperature gas sensing and in-vitro anticancer activities	Dr. Rekha Pilliadugula	February 2022	Ph.D

9.	Experimental investigations on the Graphene-like 2D natural single crystals of Muscovite, Biotite and BaTiO <sub>3</sub> -muscovite composites	Dr. M. Kirubanithy	July 2023	Ph.D
10	Investigation on single and double atoms doping in Ge <sub>13</sub> and Pt <sub>13</sub> clusters by DFT	Dr. B. Arunachalam	May 2024	Ph.D
11	Defect induced ferromagnetism in Y,Nb and Gd doped ZnO thin films grown by magnetron sputtering for spintronics applications	Dr. Arya Sukumaran	May 2024	Ph.D

### **No of Post-Doctoral Fellows (01)**

Sl.No	Research Area	Scholar name	Year	Program
1	Phosphor converted white Light Emitting Diodes (WLEDs)	Dr.V.Vasanthi	Nov.2019-May 2022	Post-Doctoral

### **Membership in the Prestigious society:**

S.No.	Name of Society Membership	Type/Role
1	Fellow of Academy of Sciences-Chennai	Life member
2	Indian Society for Non Destructive Testing (ISNT)	Vice president and Life member
3	Indian Association for Crystallography (IAC)	Life member
4	Magnetic Society of India (MSI)	Member
5	Indian Association for Crystal Growth (IACG)	Life member

### Details of Professional Experiences:

Organisation	Designation	Period From - To	Nature of Job
<i>Dept. of Physics National Inst. of Technology Tiruchirapalli-620 015.</i>	<i>Professor</i>	<i>Since March 2018</i>	<i>Teaching &amp; Research</i>
Dept. of Physics National Inst. of Technology Tiruchirapalli-620 015.	Associate Professor	Sept.2010- March 2018	Teaching & Research
Dept. of Physics National Inst. of Technology Tiruchirapalli-620 015.	Assistant Professor	Sept.2007- Sept. 2010	Teaching & Research
Dept. of Physics National Institute of Physics Tiruchirapalli-620 015.	CSIR-Scientist	May 2006- Sept.2007	Research & Teaching
Electronic Ceramic Centre Dong-Eui University, KOREA	Post-Doctoral Fellow	June 2004- August 2005	Research
AIST Central-2, Tsukuba, JAPAN.	AIST Post-Doctoral Researcher	Nov.2002 - March 2003	Research
AIST Central-2, Tsukuba, JAPAN.	<b>STA (JSPS) Fellow</b>	October 2000 - October 2002	Research
Kyoto Inst. of Tech (KIT), JAPAN.	Post-Doctoral Researcher	Oct.1999 – Mar 2000	Research
Royal Inst. of Tech (KTH), SWEDEN.	Post-Doctoral Researcher	May.1997 – Jun.1998	Research

### Other Positions:

Organisation	Designation	Period
Dept of Electrical and Mechanical Engineering Nagoya Institute of Technology (NITech) Nagoya, JAPAN	JSPS Fellow	02 June 2023- 31 July 2023
Laboratory of Semiconductor Materials School of Engineering Sciences KTH-Royal Institute of Technology, SWEDEN	Visiting Fellow	25-31 March 2018
Department of Electronic Materials Engineering, Australian National University (ANU), Canberra, AUSTRALIA.	Visiting Fellow	20-28 Feb.2014
Institute of Nanotechnology (INT), Karlsruhe Institute of Technology (KIT), GERMANY.	Guest Researcher	24 May 2010 - 24 June 2010

### Present work at NIT-Tiruchirapalli, India:

- \* Teaching for Under Graduate (B.Tech) and Post Graduate (M.Sc/M.Tech) students
- \* Research Supervision for Doctoral & Master Students
- \* Responsible for Thin film laboratory (Group leader)
- \* Developed Thin film laboratory
- \* Growth of ZnO thin films by **RF Sputtering** for LED and Spintronics applications
- \* Successfully fabricated *p*-ZnO films.
- \* Successfully fabricated ZnO *p-n junction*.
- \* Successfully fabricated GMR
- \* Synthesis of metal oxide nanostructures (ZnO, CuO, ZrO<sub>2</sub> and  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>) for Gas sensing applications.
- \* Successfully fabricated ZnO- Ag IDE sensors, and  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>-Ag IDE Sensors
- \* Successfully fabricated flexible CuO IDE sensors on PET substrate
- \* Fabrication of nanofillers incorporated polymer membranes (PSF/PVP) for water purification.

### Research at Dong-Eui University, South Korea:

- \* Thin film growth of ZnO by **Pulsed Laser Deposition (PLD)** for LED application  
(GaN, B<sub>2</sub>O<sub>3</sub> and BN doped ZnO in N<sub>2</sub>O ambient by codoping and triple codoping approach)
- \* Characterisation of ZnO Thin films  
(Xrd, AFM, UV-VIS-NIR, PL, GDMS, Hall effect)
- \* ZnO Target Preparation for Ablation  
(Uniaxial press, Cold Isostatic Press, Ball Milling and Sintering)

### **Research at AIST- Japan:**

- \* Thin film growth of GaAs on Si by **MBE** for solar cells application (Growth of GaAs and AlGaAs, Solar cell structures, Thermal Cyclic Annealing, Growth rate check, Flux measurement etc.)
- \* Thickness measurement (DEKTAK profiler)
- \* Chemical Cleaning of GaAs and Si Substrates
- \* Photoluminescence studies (PL), Atomic Force Microscope (AFM)
- \* Xrd analysis, in situ RHEED measurement during MBE
- \* Optimization of new ULVAC MBE system (MBE system Baking, cell baking etc.)
- \* Growth of metals on GaAs

### **Research Experience at KTH - Sweden & others:**

- \* Epitaxial growth of InP:Fe by **HVPE** for Laser Fabrications
- \* Hall Measurements of epilayers.
- \* Reactive ion Etching (RIE), Photolithography
- \* Material processing, Fabrication of Mesas & Laser Characterisation
- \* Modelling on planar substrates for HVPE:
- \* Modelling on patterned substrates for HVPE:  
Anisotropy behaviour of InP, around [110] and [-110] directional etched Mesas (Effect of surface diffusion length and surface diffusion coefficient)

### **Publications in International Journals**

1. Study of doping effect of Cd on ZrO<sub>2</sub> nanostructures for gas sensing applications.  
E. Hemalatha and **N.Gopalakrishnan**  
*Physica Scripta* 99 (2024) 115923.
2. Donor defect induced ferromagnetism in Nb-doped ZnO thin films grown by RF magnetron sputtering.  
Arya Sukumaran and **N Gopalakrishnan**  
*Physics Status Solidi* 221 (2024) 2400219
3. Metal oxide charge transport materials for light emitting diodes-An overview  
V Vasanthi, N Sivanantham, L Saathvika and **N Gopalakrishnan**  
*Materials Science in Semiconductor Processing* 165 (2023) 107679
4. Theoretical Exploration of Cluster Nanoarchitectonics: Effects of Doping a Ge<sub>13</sub> Cluster with Ta, Fe, Pd, and Co through DFT  
B Arunachalam, R Manavalan and **N Gopalakrishnan**  
*Journal of Electronic Materials* 52(5) (2023) 3018-3028
5. Effects of adjacent and opposite doping in Pt<sub>11</sub>X<sub>2</sub> cluster using Ab initio method  
B Arunachalam, R Manavalan, **N Gopalakrishnan**  
*Indian Journal of Physics* 97 (2023) 2611-2619

6. Effect of Ar: O<sub>2</sub> ratio on magnetic properties of ZnO: Y thin films  
Arya Sukumaran, **N Gopalakrishnan**  
*Materials Today: Proceedings 2023 (In Press)*  
<https://doi.org/10.1016/j.matpr.2023.02.369>
  
7. ZnO/Graphene Composite from Solvent-Exfoliated Few-Layer Graphene Nanosheets for Photocatalytic Dye Degradation under Sunlight Irradiation  
Vasanthi Venkidusamy, Sivanantham Nallusamy, **Gopalakrishnan Nammalvar**, Ramakrishnan Veerabahu, Arun Thirumurugan, Chidhambaram Natarajan, Shanmuga Sundar Dhanabalan, Durga Prasad Pabba, Carolina Venegas Abarzúa, Sathish-Kumar Kamaraj  
*Micromachines 14(1) (2023) 189*
  
8. Effects of multi-atom doping into Pt<sub>13</sub> cluster using Ab initio method  
B Arunachalam, R Manavalan, **N Gopalakrishnan**  
*Theoretical Chemistry Accounts 14(10) (2022) 52*
  
9. Investigation of ferromagnetism and dual donor defects in Y-doped ZnO thin films  
Arya Sukumaran, N Sivanantham, E Vinoth, **N Gopalakrishnan**  
*Physica Scripta 97(10) (2022) 105804*
  
10. Preparation and characterization of BaTiO<sub>3</sub>–natural muscovite composites  
M. Kirubanithy, S. Divya, Tae Hwan Oh, **N. Gopalakrishnan** and K. Balamurugan  
*J. Material Science: Materials in Electronics 33 (2022) 20656*
  
11. Morphology dependent room temperature CO<sub>2</sub> sensing of β-Ga<sub>2</sub>O<sub>3</sub>  
Rekha Pilliadugula and **N Gopalakrishnan**  
*Materials Today: Proceedings 58 (2022) 959-969*
  
12. Effect of Cr on ZrO<sub>2</sub> nanostructures for gas sensing investigation  
E Hemalatha and **N Gopalakrishnan**  
*Bulletin of Materials Science 44 (2021), Article 292, pp 1-10*
  
13. Ferromagnetism in Gd-doped ZnO thin films mediated by defects  
A Sukumaran, N Sivanantham, E Vinoth and **N Gopalakrishnan**  
*Bulletin of Materials Science 44 (2021), Article 259, pp 1-11*



14. Room temperature ammonia sensing performances of pure and Sn doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>  
R Pilliadugula and **N Gopalakrishnan**  
*Materials Science in Semiconductor Processing* 135 (2021) 106086.
15. Effect of morphology and (Sn, Cr) doping on in vitro antiproliferation properties of hydrothermally synthesized 1D GaOOH nanostructures  
Rekha Pilliadugula, Jebiti Haribabu, Mohamed Kasim Mohamed Subarkhan, Cesar Echeverria, Ramasamy Karvembu and **N. Gopalakrishnan**  
*Journal of Science: Advanced Materials and Devices* 6 (2021) 351-363
16. Triggering of ferromagnetism by amine functionalization on ZnO:Mn films grown by RF magnetron sputtering.  
Sivanantham Nallusamy and **Gopalakrishnan Nammalvar**  
*Journal of Materials Science: Materials in Electronics* (2021) 32:1623-1630
17. Synthesis and characterization of pure and Cd doped ZrO<sub>2</sub> nano structures for ammonia sensing applications.  
E Hemalatha and **N. Gopalakrishnan**  
*Materials Today: Proceedings* 39(2020)1714-1718
18. Crystallite size and micro-strain investigations of hydrothermally synthesized  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by different analytical methods.  
Rekha P and **N. Gopalakrishnan**  
*Functional Material Letters* 13(2020)2051018.
19. Effect of pH dependent morphology on room temperature NH<sub>3</sub> sensing performances of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>.  
Rekha P and **N. Gopalakrishnan**  
*Materials Science in Semiconductor Processing* 112 (2020) 105007.
20. Influence of Ga<sub>2</sub>O<sub>3</sub>, CuGa<sub>2</sub>O<sub>4</sub> and Cu<sub>4</sub>O<sub>3</sub> phases on the Sodium-ion Storage behaviour of CuO and its Gallium composites  
Rekha Pilliadugula, Chandrasekaran Nithya and **N. Gopalakrishnan**  
*Nanoscale Advances* 2 (2020)1269.
21. Effect of heat treatment on the optical properties of layered muscovite single crystal sheets.  
M. Kirubanithy, N. Sivanantham, **N. Gopalakrishnan** and K. Balamurugan  
*Bulletin of Materials Science* 43(2020) 87.
22. Fabrication of interdigitated electrode (IDE) based ZnO sensors for room temperature ammonia detection  
E Vinoth and N Gopalakrishnan  
*Journal of Alloys and Compounds* 824 (2020) 153900
23. Synthesis of ZrO<sub>2</sub> nanostructure for gas sensing application  
E Hemalatha and **N Gopalakrishnan**  
*Bulletin of Materials Science* 43 (2020) 12

24. Enhanced performance of PSF/PVP polymer membrane by silver incorporation Pramila Ponnaiyan and **Gopalakrishnan Nammalvar**  
*Polymer Bulletin 77 (2020) 197-212*
25. Enhancement of the PSF/PVP membrane performance by Ag-ZnO incorporation  
P. Pramila and **N.Gopalakrishnan**  
*Materials Research Express 6 (2019)115006*
26. Enhancing the saturation magnetisation in Ni doped ZnO thin films by TOPO functionalization  
Sivanantham Nallusamy and **Gopalakrishnan Nammalvar**  
*Journal of Magnetism and Magnetic Materials 485 (2019) 297-303*
27. Gas sensing performances of pure and Cu-doped ZrO<sub>2</sub> nano structures  
E Hemalatha and **N Gopalakrishnan**  
*Applied Physics A 125 (2019) 493*
28. Effect of additives on graphene oxide incorporated polysulfone (PSF) membrane  
Pramila Ponnaiyan and **Gopalakrishnan Nammalvar**  
*Polymer Bulletin 76 (2019) 4003-4015*
29. Fabrication and characterization of pristine and GO incorporated pristine membranes for water purification  
P. Pramila and **N. Gopalakrishnan**  
*AIP Conference Proceedings 2115 (2019) 030273.*
30. Selective ammonia sensor based on copper oxide/reduced graphene oxide nanocomposite.  
Bhuvaneshwari, Sakthivel, and **N.Gopalakrishnan**  
*Journal of Alloys and Compounds 788 (2019) 422-428.*
31. Effect of Fe doping on the NH<sub>3</sub> sensing properties of CuO nanostructures  
S Bhuvaneshwari, **N Gopalakrishnan**  
*Journal of Materials Science: Materials in Electronics 30 (2019) 6920-6928.*
32. Gas sensing performance of GaOOH and  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> synthesized by hydrothermal method: a comparison.  
R Pilliadugula, **N.Gopalakrishnan**  
*Materials Research Express 6 (2019) 025027*
33. Magnetic vortex state in a layered muscovite sheet silicate single crystal  
M Kirubanithy, **N.Gopalakrishnan** and K Balamurugan  
*Materials Research Express 5 (2018) 096103*
34. Ammonia sensing Characteristics of Yttrium doped ZnO thin films by RF Magnetron sputtering  
E.Vinoth and **N.Gopalakrishnan**  
*Mater. Res. Express 5 (2018) 066413*

35. Printed flexible electrochemical pH sensors based on CuO nanorods L.Manjakkal, B.Sakthivel, **N.Gopalakrishnan**, R. Dahiya  
*Sensors and Actuators B: Chemical* 263,(2018) 50-58
36. Gas sensing performance of RF magnetron sputtered Mg doped ZnO thin films. E.Vinoth, S.Gowrishankar and **N.Gopalakrishnan**  
*Applied Physics A* 124 (2018) 433.
37. Enhancement of antibacterial activity in the nanofillers incorporated PSF/PVP membranes.  
P.Pramila and **N.Gopalakrishnan**  
*Materials Research Express* 5 (4), (2018) 045306
38. Effects of ZnO incorporation on PSF-PEG mixed matrix membrane P.Pramila and **N Gopalakrishnan**  
*AIP Conference Proceedings* 1942 (2018) 080005
39. Effect of temperature on NH<sub>3</sub> sensing by ZnO: Mg thin film grown by radio frequency magnetron sputtering technique  
E Vinoth and **N Gopalakrishnan**  
*AIP Conference Proceedings* 1942 (2018) 080058
40. CuO mesostructures as ammonia sensors S.Bhuvaneshwari and **N Gopalakrishnan**  
*American Institute of Physics Conference Series* 1942 (2018) 50114
41. Enhancement of ferromagnetism in Thiol functionalized Mn doped ZnO thin films Sivanantham Nallusamy and **N.Gopalakrishnan**  
*Materials Research Express* 5 (2018) 026418
42. Effect of additive on Graphene oxide incorporated polysulfone (PSF) membrane P Ponnaiyan, **N.Gopalakrishnan**  
*Polymer Bulletin* (2018)1-13.
43. High Performance CuO Nanorectangles based Room Temperature Flexible NH<sub>3</sub> Sensor.  
Bhuvaneshwari Sakthivel , Libu Manjakkal , **N.Gopalakrishnan**  
*IEEE Sensors Journal* 17 (20), (2017) 6529-6536
44. Free standing CuO-MnO<sub>2</sub> nanocomposite for room temperature ammonia sensing. S.Bhuvaneshwari, S.Papachan and **N.Gopalakrishnan**  
*AIP Conference Proceedings* 1832 (2017) 050126
45. RF magnetron sputtered Cd doped ZnO thin films for gas-sensing applications. E.Vinoth, S.Gowrishankar, and **N.Gopalakrishnan**  
*Materials and Manufacturing Processes* 32 (2017) 377-382

46. Fabrication of Thiol Functionalized Ni doped ZnO Thin Films for Room Temperature Ferromagnetism.  
Sivanantham Nallusamy and **N. Gopalakrishnan**  
*IEEE Magnetics Letters* 8, (2017) 2109304
47. Hydrothermally synthesized Copper Oxide (CuO) superstructures for ammonia sensing.  
Bhuvaneshwari, S., and **N. Gopalakrishnan**.  
*Journal of Colloid and Interface Science* 480 (2016) 76–84.
48. Room temperature ammonia and VOC sensing properties of CuO nanorods. Bhuvaneshwari, S., and **N. Gopalakrishnan**  
*AIP Conf. Proc.* 1731 (2016) 050112
49. Facile synthesis of low dimensional CuO nanostructures and their gas sensing applications.  
Bhuvaneshwari, S., and **N. Gopalakrishnan**.  
*Crystal Research and Technology* 51 (2016) 145–153.
50. Enhanced ammonia sensing characteristics of Cr doped CuO nanoboats. Bhuvaneshwari, S., and **N. Gopalakrishnan**.  
*Journal of Alloys and Compounds* 654 (2016) 202-208.
51. Optimization of CuO Ultra Thin Film for Gas Sensor Application by RF Magnetron Sputtering  
**N. Gopalakrishnan**, L. Balakrishnan, B. Arunkumar and S. Gowrishankar  
*Journal of Nanoelectronics and Optoelectronics* 9 (2014) 496-501.
52. A Comparative Study on *p*-ZnO:AlAs/*n*-ZnO:Al and *p*-ZnO:AlAsN/*n*-ZnO:Al Bilayer Homojunction Diodes Performance  
L. Balakrishnan, S. Gowrishankar, and **N. Gopalakrishnan**  
*ECS Solid State Letters* 3 (2014) Q20-Q23
53. Role of surface functionalization in ZnO:Fe nanostructures  
R.N. Lokesh, L. Balakrishnan, K. Jeganathan, Samar Layek, H.C. Verma,  
**N. Gopalakrishnan**  
*Materials Science and Engineering B* 183 (2014) 39– 46.
54. Bandgap engineering in  $Zn_{(1-x)}Cd_xO$  and  $Zn_{(1-x)}Mg_xO$  thin films by RF Sputtering.  
S. Gowrishankar, L. Balakrishnan and **N. Gopalakrishnan**  
*Ceramics International* 40 (2014) 2135-2142.
55. Hydrothermal Synthesis and Gas Sensing Properties of CuO Nanorods  
**N. Gopalakrishnan**, S. Bhuvaneshwari, L. Balakrishnan and S. Gowrishankar  
*Sensor letters* 11 (2013) 2233-2240.
56. Fabrication of *p*-ZnO:ZrN thin films by RF magnetron sputtering.  
S. Gowrishankar, L. Balakrishnan and **N. Gopalakrishnan**  
*Composite Interfaces* 20 (2013) 623-634.
57. *p*-type formation mechanism of codoped and tridoped ZnO thin films.  
L. Balakrishnan, S.R. Barman and **N. Gopalakrishnan**  
*Science of Advanced Materials* 5 (2013) 462-468.

58. Fabrication of  $n\text{-Zn}_{1-x}\text{Ga}_x\text{O}$  and  $p\text{-(ZnO)}_{1-x}\text{(GaP)}_x$  thin films and homojunction.  
S. Gowrishankar, L. Balakrishnan, T. Balasubramanian and **N. Gopalakrishnan**  
*Materials Science and Engineering B* 178 (2013) 31–38.
59. Activation of room temperature ferromagnetism in ZnO films by surface functionalization with thiol and amine  
G. Jayalakshmi, **N. Gopalakrishnan**, T. Balasubramanian  
*Journal of Alloys and Compounds* 551 (2013) 667-671.
60.  $\text{NH}_3$  sensing by  $p\text{-ZnO}$  thin films.  
L. Balakrishnan, S. Gowrishankar and **N. Gopalakrishnan**  
*IEEE Sensors Journal* 13 (2013) 2055-2060.
61. Influence of oxygen partial pressure on ferromagnetic switching characteristics of ZnO:Cr thin films.  
**N. Gopalakrishnan**, L. Balakrishnan, M. Suganya and S. Gowrishankar  
*Composite Interfaces* 20 (2013) 221-228.
62. Fabrication of tridoped  $p\text{-ZnO}$  thin film and homojunction by RF magnetron sputtering.  
L. Balakrishnan, S. Gowrishankar and **N. Gopalakrishnan**  
*Ceramics International* 38 (2012) 6221–6227.
63. Fabrication of  $\text{Al}^{3+}$  and large radii mismatch  $\text{As}^{5+}$  codoped  $p\text{-ZnO}$  thin film and homojunction.  
L. Balakrishnan and **N. Gopalakrishnan**  
*Thin Solid Films* 520 (2012) 5702–5705.
64. Dual codoping for the fabrication of low resistive  $p\text{-ZnO}$   
L. Balakrishnan, S. Gowrishankar, P. Premchander and **N. Gopalakrishnan**  
*Journal of Alloys and Compounds* 512 (2012) 235–240.
65. Thickness and substrate orientation dependence of ferromagnetism in Mn doped ZnO thin films  
**N. Gopalakrishnan**, L. Balakrishnan, A. Brindha and G. Jayalakshmi  
*Cryst. Res. Technol.*, 47 (2012) 45-52.
66. Optimization of Anodic Layer and Fabrication of Organic Light Emitting Diode.  
N. Gopalakrishnan, S. Gowrishankar, T. R. Devidas and **L. Balakrishnan**  
*Advanced Materials Research* 488-489 (2012) 1348-1352.
67. Influence of Al concentration on electrical, structural and optical properties of Al–As codoped  $p\text{-ZnO}$  thin films  
L. Balakrishnan, S. Gowrishankar, J. Elanchezhyan, **N. Gopalakrishnan**  
*Physica B* 406 (2011) 4447–4452.
68. Grain boundary defects induced room temperature ferromagnetism in V doped ZnO thin films  
G. Jayalakshmi, **N. Gopalakrishnan**, B.K. Panigrahi, T. Balasubramanian  
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**N. Gopalakrishnan**, R.S. Qhalid Fareed and R. Dhanasekaran  
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103. Evaluation of composition and growth rate of Ga<sub>x</sub>In<sub>1-x</sub>P vapour phase epitaxy  
**N. Gopalakrishnan** and R. Dhanasekaran  
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104. Investigations on the two dimensional nucleation and growth kinetics of InP vapour phase epitaxy.  
**N. Gopalakrishnan**, R. Dhanasekaran and P. Ramasamy  
*J. Crystal Growth* 137 (1994) 235-239.
105. Vibrational transition probability and dissociation energy data for AsN molecule  
N. Rajamanickam, R.N. Senthilkumar, S. Ganesan, **N. Gopalakrishnan**,  
J. Rajkumar, V. Jegadesan and C. Dhandapani.  
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<b>No. of Post Graduate (M.Sc) Projects Completed 34)</b>			
Sl. No	PG Project title	Name and year	Course
	Synthesis and characterization of CuO and ZrO <sub>2</sub> Nanoflakes for Antibacterial activity.	Pooja Badiger December 2024	M.Sc
1	Synthesis of GO-CuO nanocomposite for antibacterial activity	Kiran May 2024	M.Sc
	Synthesis of graphene oxide (GO) and copper oxide (CuO) nanofillers for water filtration applications	Kiran December 2023	M.Sc
2	Synthesis of pure and Cu doped ZnS nanomaterials for UV-light sensor applications	Aman Priyadarshi May 2024	M.Sc
	Synthesis of ZnS Nanomaterials for UV-light sensor applications	Aman Priyadarshi December 2023	M.Sc
3	Fabrication and Characterization of muscovite nanoparticle incorporated PSF/PVP membrane for water filtration	Jhulik Khan May 2023	M.Sc
4	Dielectric properties of Zinc oxide and natural Muscovite composite	Kamble Aishwarya Yashavant May 2023	M.Sc
5	Ag-doped ZnO thin films for spintronics application by RF sputtering	Richa Bharti April 2022	M.Sc

6	Defect related luminescence of Zn doped ZrO <sub>2</sub> nanostructures for phosphor converted WLED applications	Vaishnavi Verma April 2022	M.Sc
7	Effect of Cr Doping on Room Temperature Gas Sensing Properties of $\beta$ -Ga <sub>2</sub> O <sub>3</sub>	Shyam Narayan Sarkar May 2021	M.Sc
8	Fabrication of Metal Oxide Semiconductor/ Transition Metal Chalcogenides (MOS/TMC) Heterostructure CO <sub>2</sub> Sensor by R.F.Magnetron Sputtering.	Bikram Mondal June 2020	M.Sc
9	Synthesis and Characterization of SnO <sub>2</sub> Nanostructures for Phosphor Converted WLED	Prasad. M June 2020	M.Sc
10	Surface modification of R.F.sputtered NiO thin films by Ag and GO for NH <sub>3</sub> sensing	Kavyakala C May 2019	M.Sc
11	Fabrication of p-ZnO:Ag/n-ZnO homojunction by R.F. Magnetron sputtering.	A. Muhil May 2019	M.Sc
12	Synthesis and Characterization of n-Type ZnSe and conversion to p- type by doping	Aashna Praveen May 2018	M.Sc
13	Enhancement of Ferromagnetism in Vanadium doped ZnO thin films by Thiol functionalization	Shivam Kumar May 2018	M.Sc
14	Synthesis and Characterization of ZnSe by Hydrothermal and Solvothermal Methods.	Lakshmi Harikumar May 2017	M.Sc
15	Growth of Cr doped ZnO Thin films by R.F Sputtering and Surface functionalization for Spintronics Application	R.Varsha May 2017	M.Sc
16	Enhancement of room temperature ferromagnetism in Mn doped ZnO thin film by RF Magnetron sputtering	Shana C P May 2016.	M.Sc
17	Synthesis of CuO nanoparticles and CuO-MnO <sub>2</sub> Nanocomposite for gas sensing Applications	Seethal Pappachan May 2016	M.Sc
18	Effect of Buffer layer thickness for solar cell Applications	K.Vivekanandhan May 2015	M.Sc
19	Synthesis of ZnO, CuO Nanostructures and ZnO-CuO Nanocomposites for Gas sensing Applications	Naga Karthick K May 2015	M.Sc
20	Fabrication of thin film hetero-junction for solar cell applications	Seena Mathew May 2014	M.Sc
21	Magnesium doped Aluminum Nitride for spintronics application	Ranjith Kumar.P May 2014	M.Sc
22	Synthesis and characterization of perovskite type lafeo <sub>3</sub> multiferroics	R.Prasanna perumal May 2013	M.Sc
23	Synthesis of Al doped ZnO for solar cell Applications	R.Ramamoorthy May 2013	M.Sc
24	Synthesis of CuO nanorods for gas sensing Applications	S.Bhuvaneshwari May 2012	M.Sc

25	Substrate and thickness dependence of ferromagnetism in Mn doped ZnO films grown by RF magnetron sputtering	A.Brinda May 2011	M.Sc
26	Fabrication of <i>p</i> -CuO/ <i>n</i> -ZnO Hetrojunction for Gas Sensing Applications	Arunkumar.B May 2011	M.Sc
27	Role of oxygen vacancies on Zn <sub>1-x</sub> Cr <sub>x</sub> O thin films grown by RF sputtering	M.Suganya May 2010	M.Sc
28	Fabrication and Characterization of OLED	Devidas T.R May 2010	M.Sc
29	Effect of Substrate and Thickness on ZnO Thin Films Grown by RF Magnetron Sputtering	K.Latha May 2009	M.Sc
30	Fabrication of p-n Junction Using Zinc Oxide by RF Magnetron Sputtering	V.Senthamizh Pavai May 2009	M.Sc
31	Growth and characterization of Al doped ZnO (AZO) thin film by R.F. Magnetron sputtering	S.Gowrishankar May 2008	M.Sc
32	Structural and optical properties of Al doped ZnO thin films prepared by R.F magnetron Sputtering	J.Kabilan May 2008	M.Sc
33	Fabrication of Al doped ZnO (AZO) films by thermal evaporation	B.Chandrababu May 2007	M.Sc
34	Growth and characterization of Al doped ZnO (AZO) thin films by thermal evaporation	K.Ananth May 2007	M.Sc

**No. of Post Graduate (M.Tech) Projects Completed (23)**

Sl.No	Project title	Name and year	Course
1	Image analysis for detecting and segmenting weld defects in radiographic image	Raushan Kumar December 2023	M.Tech
	Development of X ray computed tomographic reconstruction algorithm for fan beam	Raushan Kumar May 2024	M.Tech
2	Paut in lieu of RT for weld inspection using conventional and FMC/TFM approach for improved detection and imaging of defects	Sachin December 2022	M.Tech
	Paut in lieu of RT for weld inspection using diverse modes of image reconstruction in FMC/TFM technology for enhanced defect detection and characterization	Sachin May 2023	M.Tech
3	Inspection of corrosion under insulation (CUI) using ultrasonic waveguide temperature measurement sensor	Akash Sahebrao Tathe May 2022	M.Tech
	Inspection of corrosion under insulation (CUI) using ultrasonic waveguide temperature measurement sensor	Akash Sahebrao Tathe December 2021	M.Tech
4	Development of novel ultrasonic waveguide sensor using non-leaky waves for skin temperature measurement	Athul Sharma May 2022	M.Tech
	Development of novel ultrasonic waveguide sensor with non-leaky waves for multipoint temperature measurement	Athul Sharma December 2021	M.Tech

5	Detection of defects in the fabricated tubular joint and their comparative study using RTR Image Intensifier vs Flat Panel Detector	Lenka Bhargavi December 2020	M.Tech
	Non-Destructive Evaluation of Induction Pressure welded joints using RT	Lenka Bhargavi May 2021	M.Tech
6	Reflection study of shear horizontal (sh1) wave modes with plate edge at different incident angles	Aravinth. R June 2020	M.Tech
	Refelection study of Shear Horizontal wave modes with Bevelled Plate Edges	Aravinth. R December 2019	M.Tech
7	Comparison between equipment generated DGS and theoretically drawn DGS.	Vignesh K May 2019	M.Tech
	Inspection of Longitudinal weld in Pipe and circumferential welds by time of flight diffraction technique (TOFD)	Vignesh K December 2018	M.Tech
8	Guided wave ultrasonic testing for the rods of coke oven battery	Joydwipkarmakar May 2018	M.Tech
	Guided wave ultrasonic testing for the rods of coke oven battery	Joydwipkarmakar December 2017	M.Tech
	Defect Analysis of Butt welded joint of structural Steel (IS-2062), Stainless Steel (SAE-304) and STBW T91 alloy using immersion Ultrasonic Testing.	Pramesh Vikram December 2016	M.Tech
10	Development and Validation of UT-RAY Tracing software for flat and curved surface.	Rohit Kumar Agrawal May 2017	M.Tech
	Effect of Radiographyc Parameters on image quality tools in digital Radiography.	Rohit Kumar Agrawal December 2016	M.Tech
11	Defect size measurement using Radiographic technique, A comparison with time of flight diffraction method.	Manas Mishra May 2016	M.Tech
	Advanced Ultasonic ray trace.	Manas Mishra December 2015	M.Tech
12	Electromagnetic Non-Destructive Evaluation of Residual Stress in Shot Peened Low Carbon Steel Subjected to fatigue.	Subhash Koner May 2015	M.Tech
	Evaluation of Residual Stress and High Cycle Fatigue in Low Carbon Steel through Electromagnetic Non-Destructive Techniques.	Subhash Koner December 2014	M.Tech
13	Multi frequency approach for accurate thickness measurement of steam generator tubes at grooves using remote field eddy current technique.	Manu Josheph May 2015	M.Tech

	Development and Sensitivity Assessment of Multi-frequency Remote field Eddy Current Technique.	Manu Josheph May 2014	M.Tech
14	Study of post weld heat treatment effect on magnetic and microstructural behavior of 9Cr-1Mo steel weldment	Shaik shahazad May 2014	M.Tech
	Modeling of magnetic surface probe using JMAG software and application of magnetic methods for characterization of boiler tubes	Shaik shahazad Dec. 2013	M.Tech
15	Characterization of thermal barrier coating specimen using thermography technique	Nidheeshkumar.B May 2013	M.Tech
	Characterization of thermal barrier coating specimen using thermography technique	Nidheeshkumar.B Dec. 2012	M.Tech
16	Detection and quantification of defects in concrete structures using digital x-ray radiography	Sajith S.G. May 2012	M.Tech
17	Detection and quantification of defects in concrete structures using digital x-ray radiography	Sajitha S.G. Dec. 2011	M.Tech
18	Defect detection in concrete blocks using impact –echo technique	Chandramouli Patoju May 2011	M.Tech
	Defect detection in concrete blocks using impact –echo technique	Chandramouli Patoju Dec.2010	M.Tech
19	Transmittance characteristics and amplification of acoustic emission signals during tensile deformation of mild steel	Shiva krishna L May 2010	M.Tech
	Transfer function characteristics of acoustic emission during tensile deformation of mild steel	Shiva krishan. L Dec.2009	M.Tech
20	Optimization of ground penetrating radar system parameters for nondestructive detection of rebars in concrete structures (Phase –I & phase II)	Shareef Shaik Dec. 2009 & May 2010	M.Tech
21	Characterisation of solution annealing behaviour of modified 9Cr-1Mo steel by magnetic nde techniques	Jagannadham Parikala May 2011	M.Tech
	Characterization of microstructure of mod.9Cr-1Mo steell using magnetic Barkhausen emission technique	Jagannadham Parikala Dec 2010	M.Tech
22	Higher order guided waves : an optimization study (Phase –I & phase II)	Venkatara Burri Dec. 2008 & May 2009	M.Tech

23	Magnetostrictive sensor for structural health monitoring of plate like structures	Jojarah Gundiga May 2009	M.Tech
	Generating and detecting guided waves in plate like structures using magnetostrictive sensor	Jojarah Gundiga Dec 2008	M.Tech

### Conference Publications

#### Papers Published /Presented/ Participated in the International Conferences

1. Morphology dependent room temperature CO<sub>2</sub> sensing of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>.  
P.Rekha and **N.Gopalakrishnan**  
*“International Conference on Novel Engineering Materials for Biomedical, Energy, Environment, Sensing and Other Applications (ICON-BEES 21)” held at NIT-Tiruchirappalli during 11-13 March 2021.*
2. Enhancement of Ferromagnetism in Amine functionalized Mn doped ZnO thinfilm Sivanantham Nallusamy and **Gopalakrishnan Nammalvar**  
*International Conference on MAGnetic Materials and Applications (ICMAGMA) held at NISER, Bhubaneswar, India during 09 -13 December 2018.*
3. Thiol functionalized V doped ZnO films for Magnetic storage device Application Sivanantham Nallusamy and **Gopalakrishnan Nammalvar**  
*International Conference on Sustainable Energy Technologies (i-SET 2018) held at Bharathidasan University, Tiruchirappalli , India during 27-28 June 2018.*
4. Y<sup>3+</sup> incorporated ZnO thin film grown by RF magnetron sputtering for optoelectronic applications.  
E. Vinoth and **N. Gopalakrishnan**  
*International Conference on Sustainable Energy Technologies (i-SET 2018) held at Bharathidasan University, Tiruchirappalli, India during 27-28 June 2018.*
5. Organic Ligands Induced Ferromagnetism in Ni doped ZnO films Sivanantham Nallusamy and **Gopalakrishnan Nammalvar**  
*Intermag 2018 held at Marina Bay Sands Convention Center, Singapore during April 23-27, 2018.*
6. Thiol Functionalied Cr doped ZnO films for enhanced ferromagnetism **Gopalakrishnan Nammalvar**, Sivanantham Nallusamy and Varsha Ravichandran *4th International Conference on Nano Science and Nanotechnology (ICONN 2017) held at SRM University, Chennai, during 9-11 August 2017.*

7. Fabrication of Thiol functionalized Ni doped ZnO thin films Sivanantham Nallusamy and **N. Gopalakrishnan**,  
*2017-IEEE Magnetics summer school, Santander, Spain, July19-23,2017*
8. Antibacterial Study on GO incorporated PSF/PVP Mixed matrix membrane for Water Purification,  
Pramila P and **N. Gopalakrishnan**  
*International Conference on Nano for Energy and Water 2017 and Indo-French Workshop on Water Networking, University of Petroleum and Energy Studies, Dehradun, India, Feb 22-24, 2017.*
9. Enhancement of ferromagnetism in Thiol functionalized Mn doped ZnO thin films,  
N. Sivanantham and **N. Gopalakrishnan**,  
*International Conference on Magnetic Materials and Applications, DMRL and Magnetic Society of India, Hyderabad, Feb 01-03, 2017*
10. Metal Oxide Semiconductors for Gas Sensing Application  
Vinoth RAJ, Bhuvaneshwari S, **Gopalakrishnan Nammalvar** *ICEM16-A-0916, Suntec Singapore, 04<sup>th</sup> to 08<sup>th</sup> July, 2016.*
11. Synthesis and Characterisation of ZnO Hierarchical Nanoflowers, Multi-linked and High Aspect Nanorods (ICMAT13-A-2150)  
R.N. Lokesh, L. Balakrishnan, K. Jeganathan and **N. Gopalakrishnan**  
*7<sup>th</sup>International Conference on Materials for Advanced Technologies, Suntec Singapore, 30 June -5 July 2013*
12. Synthesis and Gas Sensing Properties of CuO Nanorods (ICMAT13-A-2168 )  
**N. Gopalakrishnan**, S. Bhuvaneshwari and L. Balakrishnan.  
*7<sup>th</sup> International Conference on Materials for Advanced Technologies, Suntec Singapore, 30 June -5 July 2013*
13. Optimization of anodic layer and fabrication of organic light emitting diode.  
**N. Gopalakrishnan**, S. Gowrishankar, T.R. Devidas and L. Balakrishnan  
*2<sup>nd</sup> International Conference on Key Engineering Materials (ICKEM 2012), Singapore, February 2012.*  
*Advanced Materials Research, Vols. 488-489 (2012) 1348-1352*
14. Fabrication of *p*-ZnO thin films by ZrNcodoping.  
S. Gowrishankar, L. Balakrishnan and **N. Gopalakrishnan**  
*SPIE Optics+Photonics 2012, San Diego, USA, August 2012 Proceedings of SPIE, Vol. 8484(2012) 84840W-1-84840W-6.*
15. Fabrication of ZnO homojunction by Al-As-N tridoping.  
L. Balakrishnan, S. Gowrishankar and **N. Gopalakrishnan**  
*International Semiconductor Device Research Symposium 2011 (ISDRS 2011), University of Maryland, Maryland, USA, December 2011(IEEE Xplore).*  
*DOI: 10.1109/ISDRS.2011.6135234*

16. Realization of  $n$ -ZnO:Ga/ $p$ -ZnO:Ga Phomojunction by RF magnetron sputtering.  
S. Gowrishankar, L. Balakrishnan, T. Balasubramanian and **N. Gopalakrishnan**  
*International Semiconductor Device Research Symposium 2011 (ISDRS 2011), University of Maryland, Maryland, USA, December 2011(IEEE Xplore).*  
DOI: 10.1109/ISDRS.2011.6135308.
17. Effects of oxygen partial pressure on Zn<sub>0.95</sub>Cr<sub>0.05</sub>O thin films grown by RF sputtering.  
**N. Gopalakrishnan**, L. Balakrishnan, M. Suganya, S. Gowrishankar and G. Jayalakshmi  
*International Conference on Nanoscience and Nanotechnology (ICNN 2011), Coimbatore Institute of Technology, Coimbatore, India, July 2011.*
18. Dual codoping for the fabrication of low resistive  $p$ -ZnO.  
L. Balakrishnan, S. Gowrishankar, J. Elanchezhian, B.C. Shin, T. Balasubramanian and **N. Gopalakrishnan**  
*The 16th International Conference on Crystal Growth (ICCG-16), Chinese Academy of Sciences, Beijing, China, August 2010.*
19. Fabrication of  $p$ - $n$  junction with ZnO nanostructures by a novel approach.  
L. Balakrishnan, S. Gowrishankar, T. Balasubramanian and **N. Gopalakrishnan**  
*International Conference on "Synthesis, Characterization Consolidation and Modelling of Nanomaterials" (ICON-2010), PSG College of Technology, Coimbatore, March 2010.*
20. Vacancy mediated ferromagnetism in Zn<sub>0.85</sub>Mn<sub>0.15</sub>O nanostructures.  
L. Balakrishnan, G. Jayalakshmi, B. Srimathy, M. Senthilkumar, T. Balasubramanian and **N. Gopalakrishnan**  
*International Conference on "Synthesis, Characterization Consolidation and Modelling of Nanomaterials" (ICON-2010), PSG College of Technology, Coimbatore, March 2010.*
21. Dual codoping for the fabrication of low resistive  $p$ -ZnO  
L. Balakrishnan, S. Gowrishankar, J. Elanchezhian, B.C. Shin, T. Balasubramanian and  
**N. Gopalakrishnan**  
*The 16th International Conference on Crystal Growth (ICCG-16) held at Beijing, China during Aug. 8-13, 2010.*
22. Fabrication of  $p$ - $n$  junction with ZnO nanostructures by a novel approach  
L. Balakrishnan, S. Gowrishankar, T. Balasubramanian and  
**N. Gopalakrishnan** *International Conference on "Synthesis, Characterization Consolidation and Modelling of Nanomaterials" (ICON-2010) held at PSG College of Technology, Coimbatore during Mar. 5-6, 2010.*
23. Vacancy mediated ferromagnetism in Zn<sub>0.85</sub>Mn<sub>0.15</sub>O nanostructures  
L. Balakrishnan, G. Jayalakshmi, B. Srimathy, M. Senthilkumar, T. Balasubramanian and **N. Gopalakrishnan**  
*International Conference on "Synthesis, Characterization Consolidation and*



*Modelling of Nanomaterials” (ICON-2010) held at PSG College of Technology, Coimbatore during Mar. 5-6, 2010.*

24. Participated in “International Conference on Experimental Condensed Matter Physics”, IIT- Bombay, Mumbai, India, Jan. 8-10, 2007.
25. ZnO based diluted magnetic semiconductor thin films by RF magnetron sputtering for spin photonic devices  
J. Elanchezhian, K. P. Bhuvana, **N. Gopalakrishnan** and T. Balasubramanian  
*Proc. SPIE. 6674 (2007) 66740C-66746C.*  
SPIE Conference on Optics+Photonics: SPIE Optical Engineering + Applications : San Diego, California, August 26-30, 2007
26. A novel approach for development of co-doped ZnO semiconductor film by pulsed laser deposition and R.F.Sputtering.  
**N.Gopalakrishnan**, B.C.Shin, K.P.Bhuvana, J.Elanchezhiyan and T.Balasubramanian  
*Proceeding of 5th International conference on ‘Trends in Industrial measurements and Automation -TIMA-2007’ Jan.2007,NIT, Tiruchirapalli, India. pp.97-101.*
27. ZnO films grown by pulsed laser deposition.  
**N.Gopalakrishnan**, B.C.Shin, H.S.Lim, G.Y.Kim, J.Kumar, T.Balasubramanian and Y.S.Yu  
*Proceedings of the “International workshop on Crystal Growth and Characterization of Advanced Materials”, Anna University, Chennai, Jan. 2006, pp.336-344.*
28. (Ga+N) Codoping in ZnO by Laser ablation  
**N.Gopalakrishnan**, K.P.Bhuvana, J.Elanchezhiyan, B.C.Shin, H.S.Lim, T.Balasubramanian, J.Kumar and Y.S.Yu.  
*International Conference on Nanoscience and Technology held at University of Madras, Chennai, during 26 – 28 Aug 2006.*
29. Fabrication of GaN doped ZnO nanocrystallines by Laser ablation  
**N.Gopalakrishnan**, B.C.Shin, K.P.Bhuvana, J.Elanchezhiyan and T.Balasubramanian  
*International conference on Advanced Nanomaterials 2007 to be held at Indian Institute of Technology Bombay, Mumbai during 8-10 Jan.2006.*
30. Red Shift of NBE in Triple Codoped ZnO by Pulsed Laser Deposition  
**N.Gopalakrishnan**, H.S.Lim, J.Y.Sohn, Sun Yoon, Taeheo Lee, Beomee Kim and Y.S.Yu  
*Korean Physical Society Meetings, Seoul, April 21-23, 2005*
31. Growth of ZnO:Ga, In, N by Pulsed Laser Deposition  
J.Y.Sohn, **N.Gopalakrishnan**, H.S.Lim, B.I. Kim, Seunghwan Lee, Yeunkju Lee and Y.S.Yu  
*Korean Physical Society Meetings, Seoul, April 21-23, 2005*
32. Comparison of ZnO:GaN films on Si(111) and Si(100) substrates by pulsed laser

deposition

**N.Gopalakrishnan**, B.C.Shin, H.S.Lim, G.Y.Kim and Y.S.Yu  
*ICDS-23, Awaji Island, Hyogo, Japan, July 24-29, 2005*

33. Growth of ZnO:BN by Pulsed Laser Deposition  
**N.Gopalakrishnan**, H.S.Lim and Y.S.Yu  
*11<sup>th</sup> International Meetings on Ferroelectricity, Foz do Iguacu, Brazil, Sept.5-9, 2005.*
34. Improvement of ZnO Properties by Triple Codoping in Pulsed Laser Deposition  
**N.Gopalakrishnan**, H.S.Lim and Y.S.Yu  
*11<sup>th</sup> International Meetings on Ferroelectricity, Foz do Iguacu, Brazil, Sept.5-9, 2005.*
35. A Novel approach to ZnO by PLD  
**N.Gopalakrishnan**, J.Y.Sohn, H.S.Lim, B.I. Kim and Y.S.Yu  
*3rd International Workshop on ZnO and Related Materials. Sendai, Japan, October 6-8, 2004*
36. Optical Characterisation of GaAs:Si/Si Grown by Molecular Beam Epitaxy(MBE)  
**N.Gopalakrishnan**  
*14th International Conference on Crystal Growth, 9-13 August 2004, Grenoble, France.*
37. Tri-doped (Ga, In, n) ZnO by Pulsed Laser Deposition  
J.Y.Sohn, **N.Gopalakrishnan**, H.S.Lim, B.I. Kim  
and Y.S.Yu  
*3rd International Workshop on ZnO and Related Materials. Sendai, Japan, October 6-8, 2004*
38. Band gap engineering of ZnO thin films prepared by pulsed Laser deposition  
B.I.Kim, **N.Gopalakrishnan**, H.S.Lim, J.Y.Sohn and Y.S.Yu  
*3rd International Workshop on ZnO and Related Materials. Sendai, Japan, October 6-8, 2004.*
39. Anisotropy behaviour in InP Selective Regrowth by Hydride Vapour Phase Epitaxy  
**N.Gopalakrishnan**, E.R.Messmer and S.Lourdudoss.  
*18<sup>th</sup> Nordic Semiconductor Meeting, Linkoping University, Linkoping, Sweden.*
40. Effect of Buffer layer thickness on morphology and optical property of GaAs/Si by MBE.  
**N.Gopalakrishnan**, K.Baskar, H.Kawanami and I.Sakata  
*14<sup>th</sup> American Conference on Crystal Growth and Epitaxy to be held at Seattle USA during 4-9 August 2002.*
41. Rapid Epitaxial Growth of Conducting and Insulating III-V Compounds on (001), (110), (111)A, (311)A and (311)B Surfaces by HVPE.  
S.Lourdudoss, **N.Gopalakrishnan**, H.Holtz, M.Deschler and R.Beccaed  
*TMS International Symposium on Value-Addition Metallurgy, San Antonio, Texas, USA, Feb.1998.*

42. Nucleation mechanism in Vapour Phase Epitaxial Growth of binary, ternary and quaternary semiconductors  
**N.Gopalakrishnan** and R.Dhanasekaran  
*Proceedings of 14<sup>th</sup> International Conference on Nucleation and Atmospheric Aerosols, Helsinki, 26 - 30 August 1996.*  
*Nucleation and Atmospheric Aerosols 1996, pp.149-152.*
43. Growth kinetics of vapour phase epitaxial growth of  $Ga_{1-y}In_yAs_{1-x}P_x$  compounds  
**N.Gopalakrishnan** R.Dhanasekaran and P.Ramasamy  
*Eighth International Conference on Vapour Growth and Epitaxy (ICVGE-8), Albert Ludwigs Universitat, Germany. July 24-29, 1994.*
44. Investigations on the Nucleation and growth kinetics of  $InAs_{1-x}P_x$  vapour Phase epitaxy  
**N.Gopalakrishnan**, R.Dhanasekaran and P.Ramasamy  
*IUMRS International Conference on Electronic Materials, Hsinchu, Taiwan, Dec.19- 21, 1994*
45. Growth Kinetics of  $Ga_{1-y}In_yAs_{1-x}P_x$  quaternary compound semiconductor thin film by vapour phase epitaxial growth.  
**N.Gopalakrishnan** and R.Dhanasekaran  
*Seventh international conference on solid films and surfaces, Hsinchu, Taiwan, Dec.12-16, 1994.*
46. Investigations on the epitaxial growth of compound semiconductors  
**N.Gopalakrishnan**, R.S.Q.Fareed, R.Jothilingam, S.Moorthy Babu, R.Dhanasekaran and P.Ramasamy  
*Faraday Society, "General Discussion 95 Crystal Growth", Univ. of Strathclyde, U.K, April 14-16, 1993.*
47. Investigations on the two dimensional nucleation and growth kinetics of InP Vapour Phase epitaxy  
**N.Gopalakrishnan**, R.Dhanasekaran and P.Ramasamy  
*Ninth American Conference on Crystal Growth (ACCG-9), Baltimore, Maryland, U.S.A, Aug.1-6, 1993.*
48. On the Nucleation, Growth and Characterisation of KDP-ADP mixed crystal  
K.Srinivasan, G.Ravi, **N.Gopalakrishnan**, S.Anbukumar R.Dhanasekaran and P.Ramasamy  
*Eighth international meeting on Ferroelectricity, NIST, Gaithersburg, Maryland, U.S.A, Aug.8-13, 1993.*

**Papers Published (Proceedings) /Presented/Participated in the National Conferences**

1. Development of Nove Ultrasonic wave guide sensor with non-leaky waves for multipoint temperature measurements.  
Atul Sharma, N.Gopalakrishnan, Mitra gupta, Krishnan Balasubramanian and Nishanth Raja.

*Virtual Conference and Exhibition on Non-Destructive Evaluation (NDE-2021) held during 9-11 December 2021.*

2. Inspection of Corrosion Under Insulation (CUI) using ultrasonic guided waves Temperature sensors.  
Akash Thathe, **N.Gopalakrishnan**, A.Hankare, N.Raja and Krishnan Balasubramanian  
*Virtual Conference and Exhibition on Non-Destructive Evaluation (NDE-2021) held during 9-11 December 2021.*
3. Integrated Problem Solving Environment for HPC and Cloud Computing Platforms  
Arunachalam B, Manavalan and **N. Gopalakrishnan**  
*Third International Conference on Smart Systems and Inventive Technology (ICSSIT 2020), Tirunelveli, India, August 20-22, 2020*
4. Y doped ZnO Interdigitated Electrode (IDE) ammonia sensor fabricated by sputtering  
E. Vinoth and **N. Gopalakrishnan**,  
*64<sup>th</sup> DAE Solid State Physics Symposium, IITJ, Jodhpur, December 18-22, 2019.*
5. Reflection study of shear horizontal wave modes with beveled plate edges  
R. Aravinth, Nived Suresh, **N. Gopalakrishnan** and Krishnan Balasubramanian  
*National Conference and Exhibition on Non-Destructive Evaluation (NDE-2019), Bangalore, December 05-07, 2019.*
6. Effect of Temperature on NH<sub>3</sub> Sensing by ZnO: Mg Thin Film Grown by Radio Frequency Magnetron Sputtering Technique,  
E. Vinoth and **N. Gopalakrishnan**,  
*62nd DAE Solid State Physics Symposium, DAE Convention Centre, Bhabha Atomic Research Centre, Mumbai, December 26-30, 2017.*
7. Effects of ZnO incorporation on PSF-PEG mixed matrix membrane ,  
P. Pramila and **N. Gopalakrishnan**,  
*62nd DAE Solid State Physics Symposium, DAE Convention Centre, Bhabha Atomic Research Centre, Mumbai, December 26-30, 2017.*
8. CuO Mesostructures as Ammonia Sensors  
S.Bhuvaneshwari and **N. Gopalakrishnan**,  
*62nd DAE Solid State Physics Symposium, DAE Convention Centre, Bhabha Atomic Research Centre, Mumbai, December 26-30, 2017.*
9. Effect of Bufferlayer thickness for Solar Cell Application, Chennai Nano gathering – 2017,  
Vinoth E, Vivekanandhan K and **Gopalakrishnan N**  
*National Conference on Nanomaterials and Nanobiotechnology NCNSNT, University of Madras, Feb 07 -08, 2017*
10. Free Standing CuO-MnO<sub>2</sub> Nanocomposite for Room Temperature Ammonia Sensing  
Bhuvaneshwari, S., Seethal Papachan, **N. Gopalakrishnan**  
*61th DAE Solid State Physics Symposium. DAE-KIIT, Bhuvaneshwar, Odisha, India. Dec 26 - 30, 2016*

11. Diffusion Kinetics and Methanol Sensing of ZnO:Thin Film Fabricated by RF Magnetron Sputtering  
Vinoth, and N.Gopalakrishnan  
*6th Interdisciplinary Symposium on Material Chemistry held at DAE- BARC, Mumbai, India during Dec 6 to 10, 2016*
12. Effect of radiographic parameters on image quality of the X-ray system in digital Radiography  
Rohik K.Agrawal, Sheri George and **N.Gopalakrishnan**  
*26<sup>th</sup> National Seminar & International Exhibition on Non-Destructive Evaluation. Thiruvananthapuram, December 15-17 2016.*
13. Analysis of defect in butt weld of T91 alloy using ultrasonic C-scan testing and Thermography.  
Pramesh Vikram and **N.Gopalakrishnan**  
*26<sup>th</sup> National Seminar & International Exhibition on Non-Destructive Evaluation, Thiruvananthapuram, December 15-17 2016.*
14. Room temperature ammonia and VOC sensing properties of CuO nanorods. Bhuvaneshwari, S., and **Gopalakrishnan, N.**  
*60th DAE Solid State Physics Symposium. Amity University Noida, UP December 25-29, 2015.*
15. Study of Defects in Friction Stir Welded Dissimilar Aluminium Sample by Using Ultrasonic C Scan.  
Angad Acharya, M. Ashok and **N. Gopalakrishnan**  
*National Seminar and exhibition on Non-Destructive Evaluation: 26-28 Nov.2015, Hyderabad, India.*
16. Defect Detection and Quantification with Advanced Ultrasonic Aniket Kumar Tiwary, M. Ashok and **N. Gopalakrishnan**  
*National Seminar and exhibition on Non-Destructive Evaluation: 26-28 Nov.2015, Hyderabad, India.*
17. Multi-Frequency Approach for Accurate Thickness Measurement Of Steam Generator Tubes At Grooves Using Remote Field Eddy Current Technique  
Manu Joseph, S. Thirunavukkarasu and **N. Gopalakrishnan**  
*National Seminar and exhibition on Non-Destructive Evaluation: 26-28 Nov.2015, Hyderabad, India.*
18. Evaluation of Residual Stress and High Cycle Fatigue in Low Carbon Steel through Electromagnetic Non-Destructive Techniques  
Subash Koner, Ashis Kumar Panda, **N. Gopalakrishnan**, Amitava Mitra  
*National Seminar and exhibition on Non-Destructive Evaluation: 4-6 Dec.2014, Pune, India.*
19. Multi-Frequency Approach for Accurate Thickness Measurement Of Steam Generator Tubes using Remote Field Eddy Current Technique  
Manu Joseph, S. Thirunavukkarasu and **N. Gopalakrishnan**, B.P.C. Rao, C.K. Mukhopadhyay and T. Jayakumar  
*National Seminar and exhibition on Non-Destructive Evaluation: 4-6 Dec.2014, Pune, India.*

20. Realization of low resistive  $p$ -ZnO thin film by Al-As codoping.  
L. Balakrishnan, S. Gowrishankar and **N. Gopalakrishnan**  
*Department of Atomic Energy- Solid State Physics Symposium (DAE - SSPS 2011), SRM University, Chennai, India, December 2011(AIP Conference Proceedings).*  
*AIP Conf. Proc. 1447 (2012) 763-764*
21. Structural, electrical and optical properties of GaPcodopedZnO thin films.  
S. Gowrishankar, L. Balakrishnan and **N. Gopalakrishnan**  
*Department of Atomic Energy- Solid State Physics Symposium (DAE - SSPS 2011), SRM University, Chennai, India December 2011(AIP Conference Proceedings).*  
*AIP Conf. Proc. 1447(2012) 771-772*
22. AlN doped (Codoped) ZnO films for the fabrication of  $p$ -ZnO.  
L. Balakrishnan, J. Elanchezhian, K.P. Bhuvana, T. Balasubramanian and **N.Gopalakrishnan**  
*38<sup>th</sup>National Seminar on Crystallography (NSC-38), University of Mysore, Karnataka, India, February 2009.*
23. Effect of thickness and substrate on ZnO thin films by RF sputtering.  
K. Latha, L. Balakrishnan, T. Balasubramanian and **N. Gopalakrishnan**  
*38<sup>th</sup> National Seminar on Crystallography, Mysore University, Karnataka, India, February 2009.*
24. Influence of oxygen pressure on  $Zn_{1-x}Mn_xO$  thin films by RF sputtering.  
B. Srimathy, L. Balakrishnan, J. Elanchezhian, T. Balasubramanian and N.Gopalakrishnan  
*38<sup>th</sup> National Seminar on Crystallography, Mysore University, Karnataka, India, February 2009.*
25. Effect of thickness and substrate on ZnO thin films by RF sputtering  
K. Latha, L. Balakrishnan, T. Balasubramanian and **N. Gopalakrishnan**  
*38<sup>th</sup> National Seminar on Crystallography, Mysore University, Mysore, India, Feb. 11-13, 2009.*
26. Influence of oxygen pressure on  $Zn_{1-x}Mn_xO$  thin films by RF sputtering  
Srimathy, L. Balakrishnan, J. Elanchezhian, T. Balasubramanian and N. Gopalakrishnan  
*38<sup>th</sup> National Seminar on Crystallography, Mysore University, Mysore, India, Feb. 11-13, 2009.*
27. AlN doped (Codoped) ZnO films for the fabrication of  $p$ -ZnO  
L.Balakrishnan, J.Elanchezhian, K.P.Bhuvana, T.Balasubramanian and **N.Gopalakrishnan**  
*National Seminar on Crystallography (NSC-38) held at University of Mysore, Karnataka during Feb. 11-13, 2009.*

28. Participated in “Intellectual Property Rights Seminar” Tiruchirappalli, India, Jan. 9, 2009.
29. Participated in “Traditional and Emerging NDE methods for Managers and Engineers”, IIT-Madras, Chennai, India, Feb. 20-21, 2009.
30. Participated in “National seminar & Exhibition on Non Destructive Evaluation-NDE 2009”, BHEL & NIT, Tiruchirappalli, India, Dec.10-12,2009.
31. Participated in “Indo-US workshop on Visible and Ultraviolet sources for Solid state Lighting and Water Purification”, Crystal Growth Center, Anna University, Chennai, India, Jan. 5-7, 2009.
32. Participated in “Non Destructive Evaluation-NDE 2008”, Lonavala, India, Dec. 1-3, 2008.
33. Substrates effects on GaN doped ZnO films grown by Pulsed Laser Deposition.  
**N.Gopalakrishnan**, B.C.Shin, H.S.Lim, G.Y.Kim ,J.Kumar and Y.S.Yu  
*National Symposium on Crystal Growth and Characterisation, Loyola College, Chennai, Sept.29-30, 2005.*
34. Growth of ZnO using codoping and triple codopingmethod by Pulsed laser deposition.  
**N.Gopalakrishnan**, B.C.Shin, H.S.Lim, J.Kumar, T.Balasubramanian and Y.S.Yu  
*Second National Symposium on Crystal Growth of Laser related materials SSN college of Engineering, Kalavakam, India, December 19-20, 2005.*
35. Vapour Phase Epitaxial Growth of  $Ga_xIn_{1-x}As$   
**N.Gopalakrishnan** and R.Dhanasekaran  
*National Conference on fundamentals of Crystal Growth, Crystal Growth Centre, AnnaUniversity, Chennai, India, Jan.29-30, 1996.*
36. Investigation on the Nucleation and Growth Kinetics of Vapour Phase EpitaxialGrowth of III-V Binary, Ternary and Quaternary Compound Semiconducors-Thesis Presentation.  
**N.Gopalakrishnan** and R.Dhanasekaran  
*DAE Solid State Physics Symposium, BARC, Bombay, Dec.27-31, 1996.*
37. Thermodynamic analysis of  $Ga_xIn_{1-x}P$  Vapour Phase Epitaxy  
**N.Gopalakrishnan** and R.Dhanasekaran  
*Sixth National seminar on Crystal Growth, Anna Univeristy, Chennai, Feb.2-4, 1995*
38. Vapour Phase Epitaxial Growth of  $Ga_xIn_{1-x}Sb$   
**N.Gopalakrishnan** and R.Dhanasekaran  
*National Conference on Recent Advances in Semiconductor, Indian Institute of Technology, New Delhi, June 20-22, 1995.*
39. Vapour Phase Epitaxial Growth of  $Al_xGa_{1-x}As$

- N.Gopalakrishnan** and R.Dhanasekaran  
*National seminar on emerging trends thin film technology and device fabrication, Cochin University of Science and Technology, Cochin, India, Nov.27-29, 1995.*
40. Investigations on the initial stages of the Vapour Phase Epitaxial Growth of  $Ga_xIn_{1-x}P$  compound semiconductors  
**N.Gopalakrishnan**, R.Dhanasekaran and P.Ramasamy  
*Material Research Society of India, Hyderabad, Feb.1994.*
41. Nucleation and Growth kinetics of  $Ga_{1-y}In_yAs_{1-x}P_x$  by VPE and oxide precipitates in CZ silicon  
**N.Gopalakrishnan**, H.R.Dizasi, R.Dhanasekaran and P.Ramasamy  
*INDO-US workshop on Nucleation and Growth, Indian Institute of Sciences, Bangalore, March 14-16, 1994.*
42. Growth Kinetics of  $GaAs_{1-x}P_x$  Vapour Phase Epitaxy  
**N.Gopalakrishnan** and R.Dhanasekaran  
*Proc. of Fifth National Seminar on Crystal Growth, Anna University, Chennai, Nov.18-20, 1993.*
43. Nucleation and Growth Kinetics of  $InAs_{1-x}P_x$  Vapour Phase Epitaxy  
**N.Gopalakrishnan** and R.Dhanasekaran  
*XXV National seminar on Crystallography, Dept. of Bio-physics and Crystallography, Univ. of Madras, Dec.15-17, 1993.*
44. Nucleation Kinetics of  $Ga_xIn_{1-x}As$  compound during Vapour Phase Epitaxial Growth  
**N.Gopalakrishnan**, R.Dhanasekaran and P.Ramasamy.  
*XXIII National Seminar on Crystallography, MREC, Jaipur, March 23-25, 1992.*
45. Development of Growth Kinetics of InP thin films during Vapour Phase Epitaxy  
**N.Gopalakrishnan**, R.Dhanasekaran and P.Ramasamy  
*XXIV National Seminar on Crystallography, Univ. Jammu, Oct.20-22, 1992.*

#### **Details of the Conferences organized (4)**

1. Certificate Course on NDE Techniques during 01 - 05 June 2015 - **Coordinator**
2. Workshop on Magnetic and Semiconductor Nanomaterials during 31 October to 01 November 2014 - **Secretary**



3. Conducted Workshop on '**Advanced Coating Technologies and their Applications**' on 24 Jan. 2008. – *Convener*
4. Conducted '**Workshop on Advances in Nanomaterials and Thin films (WANT-2013)**' during 08-09 March 2013. – *Convener*