


## Brief Biodata

**Name: Dr. Dilip Dhondiram Shivagan**

<b>Designation:</b>	Principal Scientist	
<b>DP No. and Name:</b>	D1.03 Temperature and Humidity Metrology	
<b>DU No. and Name:</b>	DU1 Physico-Mechanical Metrology	
<b>Email:</b>	shivagand@nplindia.org	
<b>Date of Joining CSIR-NPL:</b>	19-11-2009	
<b>Phone (office)</b>	011-4709-1379/1693	
<b>Mobile (optional)</b>	-	

### Research Area/ Interest

Temperature and Humidity Metrology: Developing Acoustic Gas Thermometry for the realization of Boltzmann Constant based new kelvin, Metal-Carbon eutectic fixed points (Co-C and Fe-C, Ni-C) for thermocouples and blackbodies for high temperature radiation thermometry upto 3000 °C. ITS-90 fixed points for SPRTs, Thermocouples and IR Thermometers. Humidity, dew/frost and Moisture measurements. International comparisons. Blackbody facility for IR Clinical Thermometer Testing for screening in Covid-19. Thin films for IR and Humidity sensing.

### Education Qualifications

Degree	Subject	University/ Institute	Year
Ph. D. (Physics)	“Studies on Metal/Hg-Based Superconductor/Semiconductor Hetero-structures”	Shivaji University, Kolhapur M.S.	2004
M. Sc. (Physics)	Physics (Materials Science)	University of Pune, Pune	1997
B. Sc. (Physics)	Physics (Chem, Maths, Stats)	Shivaji University	1995

**Academic / Research Experience**

<b>Grade / Post</b>	<b>Institute</b>	<b>Duration</b>		<b>Research Field</b>
		<b>From</b>	<b>To</b>	
Principal Scientist	CSIR-National Physical Laboratory	19-11-2016	Till date	R&D in Temperature and Humidity Metrology
Senior Scientist	CSIR-NPL	19-11-2013	18-11-20016	R&D in Temperature and Humidity Metrology
Scientist	CSIR-NPL	19-11-2009	18-11-2013	R&D in Temperature and Humidity Metrology
Scientist-SD	ITER-India, Institute for Plasma Research (IPR), Gandhinagar	2008/09	2009/11	Cryogenics : Cryo-lines and Cryo-distribution for ITER
Visiting Fellow	DCMP&MS, TIFR, Colaba, Mumbai 400 008	2008/07	2008/09	Vortex dynamics in multiband superconductors
JSPS Post-Doctoral Fellow	AIST, Tsukuba, Japan	2006/07	2008/07	Vortex dynamics and i-soliton studies in multilayered cuprate superconductors
Royal Society Post-doctoral Fellow	University of Bath, BATH, U.K	2005/06	2006/06	Novel Electrochemical Routes for Semiconducting Thin Films
Project Scientist	Department of Physics, IIT Delhi	2004/06	2005/05	Development of electrodeposited GMR multilayers (Co/Cu)
CSIR-SRF (Direct Selection)	Department of Physics, Shivaji University, Kolhapur	2002/02	2004/05	Studies on fabrication and photoinduced properties of superconductor/semiconductor hetero-structures
Project Assistant	=do=	1997/11	2002/01	Ph.D. work (UGC Superconductivity R&D Projects)

## No. of Publications

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings	Books	Total
57	02	08	07 Chapters	73

## Selected Publications

- (i) Pant, U., Gupta, G., Meena, H. et al. "Realization of ITS-90 Radiance Temperature Scale from 961.78 °C to 3000 °C at CSIR-NPL" MAPAN (2021). <https://doi.org/10.1007/s12647-021-00507-4>
- (ii) Babita, Pant, U., Meena, H. et al. "Improved Realization of Ensemble of Triple Point of Water Cells at CSIR-NPL", MAPAN 36, 615–628 (2021). <https://doi.org/10.1007/s12647-021-00488-4>
- (iii) Pant, U., Meena, H., Gupta, G. et al. "Development and Realization of Fe–C and Co–C Eutectic Fixed-Point Blackbodies for Radiation Thermometry at CSIR-NPL", Int J Thermophys 41, 101 (2020). <https://doi.org/10.1007/s10765-020-02682-z>
- (iv) Umesh Pant, Hansraj Meena, Gaurav Gupta & D. D. Shivagan, "Development and Long-Term Stability Assessment of Co–C Eutectic Fixed Point for Thermocouple Thermometry", Thermometry. Int J Thermophys 40, 80 (2019). <https://doi.org/10.1007/s10765-019-2546-9>
- (v) Pant, U., Meena, H. & Shivagan, D.D. "Development and Realization of Iron–Carbon Eutectic Fixed Point at NPLI", MAPAN 33, 201–208 (2018). <https://doi.org/10.1007/s12647-018-0251-y>
- (vi) Shivagan, DD; Shirage, PM; (...); Terada, N, "AC-Susceptibility study on vortex-molecule lattice in supermultilayer cuprate  $\text{HgBa}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+2+\delta}$  ( $n = 14$ )", Physica C: Superconductivity, 468,15–20 (2008) 1281. <https://doi.org/10.1016/j.physc.2008.05.213>
- (vii) Crisan, A; Iyo, A; (...); Abell, JS, "Magnetically coupled pancake vortex molecules in  $\text{HgBa}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_y$  ( $n \geq 6$ )", Phys. Rev. B 77 (2008) 144518.
- (viii) Tanaka, Y; Crisan, A; (...); Watanabe, T, "Interpretation of abnormal AC loss peak based on vortex-molecule model for a multicomponent cuprate superconductor", 2007 Jpn. J. Appl. Phys. 46 134. <https://doi.org/10.1143/JJAP.46.134>
- (ix) D.D.Shivagan, P.J.Dale, A.P.Samantilleke, L.M.Peter, "Electrodeposition of chalcopyrite films from ionic liquid electrolytes", Thin Solid Films 515, (15)(2007) 5899. <https://doi.org/10.1016/j.tsf.2006.12.092>
- (x) PRIYANKA GUPTA, D. D. SHIVAGAN, DINESH K. PANDYA, SUBHASH C. KASHYAP and SUJEET CHAUDHARY, "Studies on electrodeposited nanometric Co/Cu multilayers", International Journal of Nanoscience, 05, No. 04n05,(2006)505-510, <https://doi.org/10.1142/S0219581X0600470X>
- (xi) D D Shivagan, P M Shirage and S H Pawar, Studies on the fabrication of  $\text{Ag}/\text{Hg}_1\text{Ba}_2\text{Ca}_1\text{Cu}_2\text{O}_{6+\delta}/\text{CdSe}$  heterostructures using the pulse electrodeposition technique", *Semicond. Sci. Technol.* **19** (2004) 323. <https://doi.org/10.1088/0268-1242/19/3/006>
- (xii) D D Shivagan, P M Shirage, L A Ekal and S H Pawar, "Synthesis of single-phase  $\text{HgBa}_2\text{Ca}_2\text{Cu}_3\text{O}_{8+\delta}$  high-Tc superconducting films using the multistep electrolytic process", *Supercond. Sci. Technol.* **17**(2004) 194. <https://doi.org/10.1088/0953-2048/17/1/034>

## **Patents**

02 Japanese Patents

## **Current Activities**

*(Not more than 100 words)*

Presently we are working on the following projects :

- (i) Boltzmann Constant Project for realization of redefined kelvin
- (ii) Development of metal-carbon eutectic fixed points for high temperature thermometry and dissemination of thermodynamic temperatures
- (iii) Development of testing facility for Clinical Thermal Imager/IR Scanners
- (iv) Moisture measurements in solids and liquids
- (v) Development of IR and Humidity sensing materials
- (vi) Calibration, Testing of Temperature and Humidity measuring devices from -200 °C to 3000 °C, 10 to 95 % RH @ 10 to 70 °C. International Inter-comparisons
- (vii)** Technical Services and Consultancy Projects for Govt. Institutes and Industry

## **Honour(s)/Award(s)/ Fellowship(s)**

- ❖ 02/2017 – 07/2017 CSIR-Raman Research Fellowship, NPL, Teddington, UK
- ❖ 07/2006 – 07/2008 JSPS Post-Doctoral Fellowship, AIST, Tsukuba, Japan
- ❖ 06/2005 – 05/ 2006 Royal Society Post-doc Fellowship, University of Bath, U.K.
- ❖ 02/2002 – 05/2004 CSIR-SRF, Shivaji University, Kolhapur – 416 004.
- ❖ Best Paper Awards-05; (i) MRSI 2000, (ii) AdMet-2014, (iii) AdMet -2015 (iv) DAE-SSPS 2018 and (v) Advances in Metrology (AdMet-2020).

## **Contributions to AcSIR**

- ⊗ Contributing to the Teaching: Ph.D. Course work in “Materials Metrology”
- ⊗ Contributing to the Teaching: PGD in PMQC “Temperature and Humidity part”
- ⊗ Ph.D. Supervision : 01 Awarded, 04 Working, 02 working-Co-Guide

## **Membership of Professional Societies/ Institutions**

- ⊕ Life Member Metrology Society of India (LM- 900 )
- ⊕ Life Member Materials Research Society of India (MRSI) (LMB-2353)
- ⊕ Life Member Instrument Society of India (LM- 2408 ) in 2016.
- ⊕ Member- APMP TCT Working Group on TPW, SPRT and Fixed Points, for the evaluation of protocols and CMCs.
- ⊕ Member India JSPS Alumni Association
- ⊕ TIFR Mumbai Alumni Association.
- ⊕ Life Member (SSM'D-564) of Swadeshi Science Movement of India, Delhi.
- ⊕ Life Member Indian Physics Association (DEL/LM/13058)
- ⊕ Life Member Indian Cryogenics Council (LM-767)

## **Any other Information**

*(Not more than 100 words)*

NABL Assessor: Technical Assessor and Expert- Temperature & Humidity Calibrations  
BIS Committees : on Moisture Meters and Thermal Imager.