

**Curriculum Vitae of Prof. B.S. Murty**

1. **Name:** Dr. B.S. MURTY, FNAE, FNA, FASc, FNASc, FTWAS, FASM, FAPAM, FIIM, FAPAS
2. **Designation:** Professor, Dept. of Metallurgical and Materials Engineering  
Institute Professor, Girija & R. Muralidharan Chair Professor  
Head, Deakin-IITM Centre of Excellence on Advanced Materials & Manufacturing  
Professor-in-Charge, MHRD Centre for Nanotechnology  
Head, Nanotechnology Laboratory, Dept. MME  
Indian Institute of Technology, Madras, Chennai 600 036, India  
E-mail: [murty@iitm.ac.in](mailto:murty@iitm.ac.in); [murty.iitm@gmail.com](mailto:murty.iitm@gmail.com); URL: [www.mme.iitm.ac.in/murty](http://www.mme.iitm.ac.in/murty)  
Phone: +91-44-22574754; Fax: +91-44-22574752
3. **Date & Place of Birth:** February 13, 1964, Vijayawada (A.P.), India

**4. Educational Qualifications:**

Degree	University	Year	Subject	Class and Rank
DMetE	Government Polytechnic, Vijayawada	1983	Metallurgy	First Class with Distinction and State Second Rank
BE	Visweswaraya Regional College of Engineering, Nagpur	1986	Metallurgy	First Class with Distinction and University First Rank
ME	Indian Institute of Science, Bangalore	1988	Metallurgy	First Class with Distinction and Second Rank
PhD	Indian Institute of Science, Bangalore	1992	Metallurgy	-

*PhD Thesis Title:* Study of Amorphous Phase Formation by Mechanical Alloying in Ti Based Systems

**5a. Professional Experience (in India):**

Position	Period	Institution	Nature of Work
Institute Professor	Since 25.04.2016	IIT, Madras	Teaching and Research
Girija& R. Muralidharan Chair Professor	Since 01.04.2016	IIT, Madras	Teaching and Research
Head of Dept., MME, IITM	07.09.2015 - 01.01.2018	IIT, Madras	Administration
Professor, HAG	Since March 1, 2012	IIT, Madras	Teaching and Research
Professor	11.05.2004 – 28.02.2012	IIT, Madras	Teaching and Research
Professor	21.07.2003 – 10.05.2004	IIT, Kharagpur	Teaching and Research
Vice Chairman, GATE	01.07.2001 – 30.06.2002	IIT, Kharagpur	Administration
Associate Professor	07.06.1999 – 20.07.2003	IIT, Kharagpur	Teaching and Research
Vice Chairman, CRF	01.01.1997 – 01.01.1999	IIT, Kharagpur	Administration
Assistant Professor	01.09.1995 – 06.06.1999	IIT, Kharagpur	Teaching and Research
Visiting Lecturer	09.12.1992 – 31.08.1995	IIT, Kharagpur	Teaching and Research

**5b. Professional Experience (assignments abroad):**

Position	Period	Institution	Nature of Work
Associate Faculty	Since April 2016	Univ. of British Columbia, Kelowna, Canada	Teaching and Research
Adjunct Professor	2011 - 2014, 2014 – 2017,	Ryerson Univ., Toronto, Canada	Teaching and Research
Visiting Professor	15.05.2014 – 15.06.2014, 01.07.2011 – 31.07.2011, 01.06.2009 – 30.06.2009	Ryerson Univ., Toronto, Canada	Teaching and Research
Visiting Professor	16.06.2014 – 15.07.2014, 01.12.2005 – 28.02.2006	IMR, Sendai, Japan	Research
Visiting Scientist	10.06.2011 – 25.06.2011, 22.05.2006 – 20.07.2006, 01.05.2005 – 30.05.2005	HZB (HMI), Berlin, Germany	Research
DAAD-DST project	11.06.2008 – 09.07.2008	Magdeburg Uni., Germany	Research
Visiting Scientist/ STA Fellow	01.05.2003 – 18.07.2003, 04.01.1999 – 03.01.2001	NIMS (NRIM), Tsukuba, Japan	Research
Visiting Scientist	18.06.1996 – 17.12.1996	IFAM, Bremen, Germany	Research

## 6. Fields of Specialization:

High entropy alloys, Nanocrystalline materials and nanocomposites, bulk metallic glasses, grain refinement and modification of Al alloys, Al based composites, in-situ composites, non-equilibrium processing, particulate technologies, thermodynamics and kinetics of phase transformations, transmission electron microscopy, atom probe tomography.

## 7. Main research contributions:

- He has pioneered the field of non-equilibrium processing of materials by mechanical alloying. He has not only developed advanced materials using this route, but also has made key contributions to the development of theoretical frame work in this field.
- He has developed a wide variety of nano materials with exceptional structural and functional properties and demonstrated their technological viability.
- He has also pioneered the field of high entropy alloys from India, which are exciting new class of materials with immense application potential.
- He has made significant contributions to the field of bulk metallic glasses including developing thermodynamic models for predicting glass forming ability.
- His group is the first in India to successfully develop a technology for the production grain refiners for Aluminium and demonstrate their superiority over the imported ones.

## 8. Contributions to Teaching and Research Community/Leadership Qualities:

- His NPTEL courses are among the most popular ones in metallurgy with large number of viewers.
- Under his leadership a National Facility for Atom Probe Tomography (has been set up at IIT Madras with a remotely operable Local Electrode Atom Probe (LEAP) (<https://nfapt.iitm.ac.in/>) first such facility globally) that can characterize materials in 3D at the atomic scale. This facility is being run in 3 shifts daily on a 24 x 7 basis.
- He is a pioneer in the field of high entropy alloys (HEAs) from India and his group has been maintaining a website ([www.mme.iitm.ac.in/hea](http://www.mme.iitm.ac.in/hea)) for the benefit of researchers in this field, which brings out all the research activities in this field every corner of India and also the global publications in this field, with the site being updated on a monthly basis.
- He has set up Deakin-IITM Centre of Excellence for Advanced Materials and Manufacturing in (<https://deakin.iitmcoe.iitm.ac.in/>) collaboration with Deakin University, Australia.
- He has been responsible for several MOUs of IITM with various overseas universities such as Deakin University, Swinburne University, Australia, Ryerson University, Canada, RWTH Aachen, NTHU, Taiwan, University of Bradford, UK.
- He has also been successful in bringing one of the most popular conferences in his field “International Symposium of Metastable, Amorphous and Nanocrystalline Materials (ISMANAM)” to India. The 26<sup>th</sup> symposium in this series which was organized in July 2019 in Chennai under his Chairmanship, where in 350 researchers, including 150 overseas participants presented their work.
- As a research scholar at IISc Bangalore, he initiated an annual symposium of research scholars in 1989, which has now completed 30 years successfully.
- At IIT Kharagpur, he initiated an annual student in 1994, COMPOSIT, which is regularly being organized for the past 25 years.
- International Symposium of Research Scholars in Metallurgy and Materials Engineering (ISRS), a biennial symposium has been initiated by Prof. Murty at IIT Madras in 2004, which has become very popular event among the research scholars.
- He motivated students at IITM to start Etch, a half-yearly magazine of the MME department.
- In order to train students on sophisticated facilities, he initiated a course on “Practical Transmission Electron Microscopy” at IITM, which has helped many research scholars.
- He has been the main pillar in the triennial International Conference on Solidification science and Processing (ICSSP) series which is being organized very successfully since 2001.

## 9. Awards and Honors:

### International Awards/Honors:

- Fellow of The World Academy of Sciences (TWAS) (2018)
- Fellow of Asia Pacific Academy of Materials (2013)
- Fellow of ASM International (2010)
- Honorary Doctorate of Deakin University, Melbourne, Australia (2017)
- Associate Faculty, Univ. of British Columbia, Canada (2016-2022)
- Adjunct Professor, Ryerson University, Toronto, Canada (2011-2020)

- Member, Nominating Committee, ASM International (2017)
- ASM-IIM North America Lectureship Award (2014)
- Member, International Advisory Committee, Rapidly Quenched Metals (2008-2017, 2017-2026)
- Member, Adjudication Committee of Shastri Foundation, Canada (2014, 2015, 2017)
- Key Reader, Metallurgical and Materials Transactions (since 2001)

#### **National Awards:**

- INAE Outstanding Teacher Award (2019)
- JC Bose Fellowship Award (2018-2023)
- Shanti Swarup Bhatnagar Award (2007)
- Lifetime Achievement Research Award of IIT Madras (2016)
- Roddam Narasimha Distinguished Lecture Award, IITGN (2018)
- AK Seal Memorial Lecture Award (2017)
- GD Birla Gold Medal of Indian Institute of Metals (2015)
- Prof. Rodriguez Memorial Lecture Award (2012)
- Eminent Materials Engineer Award by Institute of Engineers (2011)
- Distinguished Alumnus Award, VNIT Nagpur (2010)
- Platinum Jubilee Award of Indian Science Congress (2009)
- Metallurgist of the Year Award by Ministry of Steel and Mines (2004)
- Binani Gold Medal for the best Paper published in Trans. Indian Inst. Metals (2004, 2013)
- MRSI Gold Medal by Materials Research Society of India (2004)
- Young Engineer Award by the Indian National Academy of Engineering (INAE) (1997)
- Young Scientist Award by the Indian National Science Academy (INSA) (1995)
- Young Metallurgist Award by the Ministry of Steel and Mines, Govt. of India (1994)
- Young Scientist Award by the Indian Science Congress Association (ISCA) (1992)
- Career Award for Young Teachers by AICTE (1997-2000)
- Professor A.A. Krishnan Gold Medal for Best Thesis in ME (1988)

#### **National Honors:**

- Fellow of Andhra Pradesh Academy of Sciences (2016), Indian Institute of Metals (2015), Indian National Science Academy (2013), Indian Academy of Sciences (2008), National Academy of Sciences (2008), Indian National Academy of Engineering (2007)
- Co-Chairman, DRDO Recruitment & Assessment Board (since 2019)
- Member, Board of Governors, NIFFT Ranchi (2019-2013)
- Visitor's nominee to NITs.
- Visitor's nominee to IIT Kharagpur, IIT Jodhpur.
- Member, National Advisory Committee of ARCI's Technical Research Centre (since 2019)
- Chief Editor, Transaction of Indian Institute of Metals (since 2017)
- Member, PAC on Materials, Mining and Minerals, DST-SERB, Government of India (2004-2011, 2015-2018, 2018-2021).
- Member, Mater. and Eng. PAC of International Bilateral Cooperation Division, DST (2018-2021)
- Member, SERB Distinguished Investigator Award (DIA) committee (2019-2022)
- Coordinator, Committee for AICTE-INAE Travel Grant Scheme for Eng. Students (since 2013)
- Head, Materials Panel, Naval Research Board (2008-2009, 2012-2016)
- Sectional President, Materials Science Section, Indian Science Congress (2012)
- Member, INAE Governing Council (2016-2019)
- Council Member, The Indian Institute of Metals (since 2006)
- Member, SJF Award Committee for Engineering Sciences of DST (2017,2018)
- Member, Sectional Committee (Mining, Metallurgical and Materials Eng.), INSA (2015-2018)
- Member, Sectional Committee (Engineering Sciences), IAS (2016-2019)
- Member, SERB Expert Committee for Young Scientists in Engineering Sciences (2015-2018)
- Member, Research Council, DMRL, Hyderabad (2017-2020)
- Member, UGC Review Committee of IISc (2017)
- Member, Research Council, AMPRI, CSIR (2010-2013, 2013-2016)
- Trustee, Swarna Jayanti Endowment Trust, IIM (since 2015)
- Member, INAE Forum on Engineering Education (since 2015)
- Member, AICTE-INAE Programmes Committee (since 2015)
- Member, INAE Selection Committee for Young Engineers & Innovative Student Projects (since 2013)
- PSG Distinguished Visiting Professor at PSG Institute of Advanced Studies (since 2012)

- Chairman, Publications Committee, Indian Institute of Metals (since 2017)
- Convener, Publications Committee, IIM (since 2005)
- Editor, Transaction of Indian Institute of Metals (since 2003)
- Chairman, Swarna Jayanti Endowment Committee, IIM (2012-2015)
- Member, Sectional Committee (Mining, Metallurgical and Materials Eng.), INAE (2009-2015)
- Member, SSB Sectional Committee on Engineering Sciences (2014)
- Member, Research Council, IICT, CSIR (2010-2013)
- Convener, Swarna Jayanti Endowment Committee, IIM (2007-2012)

10. **Teaching Experience:** 26 years of teaching experience in various UG and PG level courses.

**UG level:** 1. Phase equilibria and phase transformations, 2. Materials characterization, 3. X-ray diffraction and electron microscopy, 4. Physical metallurgy, 5. Introduction to aerospace materials, 6. Physics of metals, 7. Science and engineering of materials, 8. Solidification processing, 9. Phase transformations, 10. Introduction to materials engineering

**PG Level:** 1. Advanced Phase transformations, 2. Advanced thermodynamics, 3. Heat treatment technology, 4. X-ray diffraction and electron metallography, 5. Advanced materials and processes, 6. Topics in nanomaterials, 7. Electron diffraction, 8. Role of microstructure in materials selection and design

**NPTEL/Video Courses:** "Advanced materials and processes", "Advanced Thermodynamics" and "Materials Characterization". His NPTEL courses are some of the most popular ones.

11. **Research Supervision:**

Degree	Thesis Completed	Ongoing Thesis	Total
Ph.D.	39	20	59
M.S.	7	1	8
M.Tech.	44	2	46
B.Tech.	43	0	43

12. **Publications:**

Category	Publications			
	1990-2000	2001-2010	Since 2011	Total
In National & International Journals	46	175	181	402
In Refereed Conference Proceedings	15	34	04	53
Total	61	209	183	455

**Edited volumes:**

1. **Editor** of Proc. of Int. Conf. on Solidification Science and Processing, (Eds. B.K. Dhindaw, B.S. Murty and S. Sen), Oxford & IBH, New Delhi, 2001.
2. **Editor** of Proc. of Second Int. Conf. on Solidification Science and Processing, (Eds. B.K. Dhindaw and B.S. Murty), Trans. IIM, 2005.
3. **Editor** of Proc. of Third Int. Conf. on Solidification Science and Processing, (Eds. B.S. Murty, D. Stefanescu and S. Sen), Trans. IIM, 2007.
4. **Editor** of Proc. of Fourth Int. Conf. on Solidification Science and Processing, (Eds. B.S. Murty, L. Ratke and G. Phani Kumar), Trans. IIM, 2009.
5. **Editor** of Proc. Trans. PMAI 2008 (Eds. B.S. Murty, N. Gopinath, P. Ramakrishnan)
6. **Editor** of Special issue of Int. J. Adv. Eng. Sci. Appl. Mathematics on *Microstructure Engineering of Materials* (Ed. B.S. Murty, G. Phanikumar) Vol. 2(4), 2010.
7. **Editor** of Proc. of Fourth Int. Symp. of Research Scholars in Metallurgical and Materials Engineering (ISRS-2010) (Eds. B.S. Murty, V. Subrahmanya Sarma, S. Ganesh Sundararaman, M. Balasubramanian), Trans IIM 2011.
8. **Editor** of Proc. of Fifth Int. Conf. on Solidification Science and Processing, (Eds. B.S. Murty, L. Ratke, M. Chakraborty and Animesh Mandal), Trans. IIM, 2012.
9. **Editor** of Proc. of the Nat. Conf. on Advances in Naval Materials, 2013.
10. **Editor** of Proc. of Int. Conf on Heat Treatment and Surface Engineering, 2013, (Eds. U. Kamachi Mudali, Srinivasa Rao Bakshi, B.S. Murty, M. Kamaraj, T.S. Sudarshan and Baldev Raj)
11. **Editor** of Proc. of Sixth Int. Conf. on Solidification Science and Processing, (Eds. Lars Arnberg, Amol A. Gokhale, B.S. Murty, Bhaskar Majumdar and R. Sankarasubramanian), Trans. IIM, 2015.
12. **Editor** of Proc. of Seventh Int. Conf. on Solidification Science and Processing, (Eds. John Banhart, U.T.S. Pillai, T.P.D. Rajan and B.S. Murty), Trans. IIM, 2018.

**Books:**

1. "Text book on Nanoscience and Nanotechnology" (2011): B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath and J. Murday, Universities Press. (ISBN: 978-3-642-28029-0)
2. "High Entropy Alloys" (2014), B.S. Murty. J.W. Yeh and S. Ranganathan, Elsevier (ISBN: 978-0-12-800251-3)
3. "High Entropy Alloys" (2019) 2nd Edition, B.S. Murty. P.P. Bhattacharjee, J.W. Yeh and S. Ranganathan, Elsevier (978-0-12-816067-1)
4. "An Overview of High-energy Ball Milled Nanocrystalline Aluminium Alloys" (2017) R.K. Gupta, B.S. Murty, N. Birbilis, Springer (ISBN: 978-3-319-57029-7).

**Book Chapters:**

1. B.S. Murty, "Nanocrystalline materials by mechanical alloying and rapid solidification processing", Frontiers in the design of Materials, Universities Press, 2007, pp. 299-311.
2. T. Venugopal and B.S. Murty, "Nanostructured materials by high energy ball milling", Encyclopedia of Nanoscience and Nanotechnology, Vol. 19 (2011) pp. 1-41.
3. B.S. Murty, and S. Kumar "Aluminium based in-situ composites for automotive and other light-weight high strength applications", Advances in Manufacturing Technology, Universities Press, pp. 348-359.

**13. Citation Index of Publications:**

(Scopus: h-Index-49, Citations-9906, Publications-386; i10-209;

Scopus Citations	10-20	21-30	31-50	51-100	101-300	>300	>500	≥10 (Total)
No. of Publications	70	50	42	32	12	1	2	209

Google Scholar: H Index-57, Citations-13070, i10-241)

**14. Patents:**

1. A Process for the Preparation of Master Alloys for the Grain Refinement of Al and its alloys (Indian patent No. 193566 (1996), jointly with Prof. M. Chakraborty, Dr. A. Arjuna Rao, IITKGP)
2. Modifier, a master alloy for Grain refinement and modification of Al-Si alloys (Indian patent No. 222043 (2004), Jointly with Prof. M. Chakraborty, A.K. Prasada Rao, IITKGP)
3. Procedure for manufacturing metal foams (German patent DE 10.2006.031.213 B3 (2006), jointly with Dr. G.S. Vinod Kumar, Dr. N. Bobcsan, Prof. J. Banhart, HMI, Berlin)
4. Method for the production of metal foams (International patent application WO 2008.003290 A2 (2008), jointly with Dr. G.S. Vinod Kumar, Dr. N. Bobcsan, Prof. J. Banhart, HMI, Berlin)
5. Functionally graded, aluminum alloy based in-situ metal matrix composites (FG-AMC) (Indian Patent No. 283467 (2017), jointly with Dr. S. Kumar, Dr. V.S. Sarma, IITM)
6. Procedure for manufacturing metal foams (European patent EP 2.044.230 B1 (2010), jointly with Dr. G.S. Vinod Kumar, Dr. N. Bobcsan, Prof. J. Banhart, HMI, Berlin)
7. Nano Copper Powder (Indian Patent publication No. IN200900264-I4, 2010 (jointly with Dr. A.B.S. Sastry, SRIVT and Dr. K. Balasubramanian, Dr. M. Palaniappan, Dr. B.R.V. Narasimhan, NFTDC)
8. A new cost effective material for the emitting wire of electrostatic precipitator (Indian Patent application filed) (jointly with Dr. S. Sankaran, IITM & P. Jayakanth and C. Ganesh, BHEL)
9. Procedure for improvement in Zn coatibility of hot rolled steel sheets (jointly with A. Chattopadhyay, V. Subramanya Sarma and D. Bhattacharjee) Indian Patent Publication No. IN200701591-I2, (2009)
10. Process window for the production of hot rolled galvanised steel sheets (patent application filed) (jointly with A. Chattopadhyay, V. Subramanya Sarma and D. Bhattacharjee)
11. A novel sample preparation technique for evaluation of sub-surface morphology of hot rolled steel sheets under transmission electron microscopy (patent application filed) (jointly with A. Chattopadhyay, V. Subramanya Sarma and D. Bhattacharjee).
12. A novel process for the preparation of nanocrystalline single phase lithium metatitanate at room temperature (patent application filed: 1260/KOL/2011) (jointly with Dr. S.K.S. Parashar, Dr. K. Parashar, Mr. P. Chaudhuri)
13. Process for manufacture of nano copper in a green way, (patent application filed: 2423/CHE/2012) (jointly with Dr. A.B.S. Sastry, R.B. Karthik Aamanchi, Ch. Sree Rama Linga Prasad, Dr. B.L.V. Prasad, Dr. K. Sridhar)
14. A process for coating refractories in steel plant, (patent application filed: 60/CHE/2013) (jointly with A.K. Rama Rao, A. Shyamasundar, A.S. Gandhi and T. Prakash)
15. A method for fabrication of textured ultra high temperature ceramics by open die forging using Spark Plasma Sintering (Patent application filed) (jointly with Srinivasa Rao Bakshi, N.S. Karthiselva)
16. High entropy alloys with exceptionally good high temperature dry air oxidation properties (Patent application filed: 201641011314) (Jointly with Daniel Fabijanic, Rahul Bhattacharya, Peter Hodgson and M. Kamaraj)

17. A two-step method, for preparation of micron sized, nano-porous powder particles (Jointly with Bharat Bhushan, K. Mondal, IIT Kanpur) (Patent application No. 201711004877)
18. Process for preparing ZnO nanorod flowerets supported by Ni substrate and free-standing pure ZnO nanorods (Jointly with Bharat Bhushan, K. Mondal, Animesh Dutta, IIT Kanpur) (Patent application No. 201811008439)
19. Ni-VN Hydrophobic Alloy Powder (Jointly with Bharat Bhushan, Pranav Kumar Katiyar, K. Mondal, IIT Kanpur) (Patent application No. 201811045364)
20. Metallic glass based protective decorative thin film coating and method of producing the same (Jointly with M.S. Ramachandra Rao, P. Priyesh, Ritu Das, R. Seshadri, G. Srivazhagan, H. Raghottaman and S. Loganathan) (Patent Application No. 201941025401)

#### 15. Sponsored Research Projects:

##### **On-going** (13 projects, Rs. 51.72 Crores $\approx$ USD 7.5M @ Rs. 69 = 1 USD)

1. *Principal Investigator*: JC Bose Fellowship (SERB, 2018-2023) (Rs. 95 lakhs)
2. *Principal Investigator*: Development of self-cleaning coatings on glass using TiO<sub>2</sub> nano particles developed at Indian Rare Earth Ltd. (Jointly with Dr. K. Murugan, ARCI, Hyderabad) (IRELTDC, 2018-2021) (Rs. 79 lakhs)
3. *Principal Investigator*: High Entropy Alloys for high temperature Aircraft components (Imprint Project Jointly with Prof. V.S. Sarma, IITM, Dr. S. Srinivasan, GE, Bangalore) (SERB & GE, 2018-2021) (Rs. 61 lakhs)
4. *Principal Investigator*: Support to National facility for Atom Probe Tomography (Jointly with Prof. S. Sankaran, IITM; Dr. Raghavendra Tiwari and J.B. Singh, BARC, Mumbai) (BRNS, 2018-2023) (Rs. 334 lakhs)
5. *Principal Investigator*: Development of Oxide Dispersion Strengthened Steels for Super Critical Thermal Boilers and Fusion Reactors (UAY, 2018-2021) (Rs. 383 Lakhs, 50% from MHRD and 50% from Innomet Powders)
6. *Principal Investigator*: Support for the Nanocrystallite Materials Research (IITM, 2018-2019) (Rs. 10 lakhs)
7. *Principal Investigator*: Oxide Strengthened High Entropy Alloys for High Temperature Applications (IITM, 2018-2019) (Rs. 10 lakhs)
8. *Principal Investigator*: Institute R&D Senior Level Award (IITM, 2017-2020) (Rs. 40 lakhs)
9. *Principal Investigator*: Spark Plasma Sintered Metal-Metal and Metal-Polymer Materials for Lightweight Thermal/Electrical Applications (Shastri Research Grant, 2018-2019) (Jointly with Abdallah Elsayed, University of Guelph & Lukas Bichler, University of British Columbia, Canada) (CAN 6500, funding provided to the Canadian Investigator)
10. *Coordinator*: Deakin-IITM Centre of Excellence in Advanced Materials and Manufacturing, (Deakin & IITM, 2017-2020) (Rs. 100 lakhs)
11. *Principal Investigator*: National facility for atomic scale materials characterization using remotely operated atom probe tomography (Jointly with Dr. S. Sankaran, Dr. Ravi Sankar Kottada) (DST Nano Mission, 2016-2019) (Rs. 2584 lakhs from DST and Rs. 1400 lakhs from 7 other Institutions, A total of Rs. 3984 lakhs)
12. *Principal Investigator*: Advanced manufacturing of new high entropy alloys (Australia-India Strategic Research Fund, 2017-2020) (Jointly with Dr. G.D. Janaki Ram, IIT Madras, Prof. Satyam Suwas, IISc Bangalore, Dr. K. Anand, GE Bangalore, Prof. Matthew Barnett, Prof. Peter Hodgson, Prof. Svetha Venkatesh, Dr. Daniel Fabijanic, Deakin University, Prof. Xinhua Wu, Monash University and Prof. Ma Qian, RMIT, Australia) (Rs. 41 Lakhs)
13. *Principal Investigator*: Refractory HEAs for high temperature applications (US Air Force Office of Scientific Research, 2018-2020) (Rs. 35 lakhs)

##### **Completed** (55 projects, Rs. 18.72 Crores $\approx$ USD 2.7M @ Rs. 69 = 1 USD)

1. *Principal Investigator*: Bulk Metallic Glasses (Titan, 2016-2018) ((Rs. 28 lakhs) (Jointly with Prof. M.S.R. Rao, Phys.)
2. *Principal Investigator*: Design & Development of High Entropy Alloy in the form of MMAW Electrode exhibiting Wear & Corrosion Resistance at Elevated Temperatures (L&T, 2017-2018) (Rs. 10 lakhs) (Jointly with Dr. A. Murugaiyan)
3. *Principal Investigator*: Development of W-Cu functionally graded nanocrystalline material for the first wall component in nuclear fusion power reactor (BRNS, 2016-2018) (Rs. 52 lakhs)
4. *Principal Investigator*: Austenitic ODS alloys (IGCAR, 2015-2017), (Rs. 28 lakhs)
5. *Principal Investigator*: Processing and Characterization of advanced thermal protection materials for reusable launch vehicle applications (ISRO, 2014-2016) (Rs. 24 lakhs)
6. *Principal Investigator*: Microstructural studies on super alloys (GE, 2013-2016), (Rs. 16 lakhs)
7. *Principal Investigator*: Development of Aluminium and Magnesium borides (DRDO, 2015), (Rs. 10 lakhs)

8. *Principal Investigator*: Development of nanocrystalline PZT powder (ARDE, 2013-2015) (Rs. 25 lakhs)
9. *Principal Investigator*: Synthesis of Fe based bulk metallic glasses (NMRL, 2011-2013) (Rs. 25 lakhs)
10. *Coordinator*: Centre on Nano Science and Technology, (MHRD, 2009-2013) (Rs. 200 lakhs)
11. *Principal Investigator*: Mechanically activated leaching of chromite concentrates (CSIR, 2008-2011) (in Collaboration with Dr. S. Srikanth, NML, Chennai) (Rs. 28 lakhs)
12. *Principal Investigator*: Development of Bulk Nanocrystalline Materials: Nano Particle Synthesis and Consolidation (DST Nano Mission, 2008-2011) (jointly with Dr. S.S. Bhattacharya, Dr. A.S. Gandhi and Dr. V.S. Sarma) (Rs. 220 lakhs)
13. *Principal Investigator*: Synthesis of Copper and copper alloy nano powders through herbal route and study of their corrosion behavior (NRB, 2010-2012) (Jointly with Dr. A.B.S. Sastry, SRIVT, Guntur, Dr. B.L.V. Prasad, NCL Pune) (Rs. 8 lakhs)
14. *Principal Investigator*: Development of alternate materials for electrostatic precipitator emitting electrodes (BHEL, 2008-2009) (jointly with Dr. S. Sankaran) (Rs. 8 lakhs)
15. *Principal Investigator*: Protective Coatings on Refractories Based on Nanomaterials (Vizag Steel, 2008-2009) (jointly with Dr. A.S. Gandhi) (Rs. 57 lakhs)
16. *Principal Investigator*: Large Scale production of W based nanocomposites by mechanical alloying (DMRL, 2008-2010) (Rs. 92 lakhs)
17. *Principal Investigator*: Improvement in Notch Creep Rupture life of 718 superalloy (ARDB, 2006-2009) (Rs. 16 lakhs)
18. *Principal Investigator*: Improvement in the Strength of Al-Si alloys by Grain Refinement and Modification (Ashok Leyland, 2008-2009) (Rs. 3 lakhs)
19. *Principal Investigator*: Studies on microstructure and creep properties of Fe-based nanostructured Oxide Dispersion Strengthened (ODS) alloys (DST-DAAD) (in collaboration with Prof. Martin Heilmaier, Otto-Von-Guericke University Magdeburg, Germany) (2007-2009) (Rs. 4 lakhs)
20. *Principal Investigator*: Investigations on some Copper alloys: Preparation as described in the Vedic texts and their Characterization (PSA) (2008-2009) (in Collaboration with Dr. K. Balasubramanian, NFTDC, Hyderabad, Dr. ABS Sastry, SRIVT, Guntur) (Rs. 8 lakhs)
21. *Principal Investigator*: Development of lead free nano ferroelectric and dielectric materials by mechanically activated synthesis (DST, 2006-2009) (Rs. 86 lakhs)
22. *Principal Investigator*: Microstructure studies of advanced steels using TEM (Tata Steel, 2008) (Rs. 100 lakhs)
23. *Principal Investigator*: Wear behavior of Al-TiB<sub>2</sub> and Al-TiC in-situ reinforced composites (NRB, 2006-2008) (Rs. 24 lakhs)
24. *Principal Investigator*: Corrosion behavior of nanocrystalline materials (Australian Research Council) (in collaboration with Dr. Raman Singh, Monash University, Australia; Prof. R. Newman, University of Manchester, Australia; Prof. R. Desai, University of Central Florida) (2006-2008)
25. *Principal Investigator*: Development of Al based superalloys containing nanocrystalline L<sub>12</sub> Al<sub>3</sub>Ti particles by mechanical alloying (ARDB, 2002-2005) (Rs. 14 lakhs)
26. *Principal Investigator*: Development of Zr, Ti and Hf based bulk metallic glasses and bulk nanocrystalline alloys (In collaboration with PIs: Prof. S. Ranganathan, IISc Bangalore; Dr. G.K. Dey, BARC, Bombay) (BRNS, 2002-2005) (Rs. 40 lakhs)
27. *Principal Investigator*: Synthesis and characterization of nanocrystalline materials by mechanical alloying (Career Award for Young Teachers by AICTE, 1997-1998) (Rs. 6 lakhs)
28. *Principal Investigator*: Synthesis of intermetallic compounds by mechanical alloying route (ARDB, 1995-98) (Rs. 6 lakhs)
29. *Principal Investigator*: Development of Composites by Mechanical Alloying (INSA, 1995-98) (Rs. 2 lakhs)
30. *Principal Investigator*: Synthesis of aluminides by mechanical alloying of pure metal powders (ISIRD, IIT Kharagpur, 1994-96) (Rs. 0.5 lakhs)
31. *Co-Investigator*: Development of high entropy alloy coatings as potential bond coat materials for high temperature turbine engine applications (GTMAP, 2016-2018), (ARDB, Rs. 272 lakhs) (PI: Dr. Ravi Sankar Kottada)
32. *Co-Investigator*: Semisolid processing of Al-TiB<sub>2</sub> and Al-TiC in-situ composite foams (NRB, 2008-2010) (Rs. 31 lakhs) (PI: Dr. S. Sankaran)
33. *Co-Investigator*: High temperature mechanical behavior of high strength high entropy alloys (NRB, 2009-2013) (Rs. 48 lakhs) (PI: Dr. K. Ravi Sankar)
34. *Co-Investigator*: Optimization of Process Parameters for the Production of Nano Materials by wire Explosion Technique (DST, 2008-2011) (Rs. 25 lakhs) (PI: Dr. R. Sarathi)
35. *Co-Investigator*: Retention of nanocrystallinity in bulk ferroelectrics and metals with development of single mode microwave cavity sintering furnace (NRB, 2008-2010) (Rs. 28 lakhs) (PI: Prof. V.R.K. Murthy)
36. *Co-Investigator*: Fast Track Scheme under DGFS on ODS Steels (DAE, 2009-2010) (Rs. 4 lakhs) (PI: Dr. S. Sankaran)

37. *Co-Investigator*: Solidification in Al alloys and the effect of grain refiners, modifiers and other alloying elements (GM, 2008-2010) (Rs. 19 lakhs) (PI: Dr. G. Phani Kumar)
38. *Co-Investigator*: Development of PZT and PZN Ferroelectrics with Improved Properties by High Energy Ball Milling for Sensor Applications (NRB, 2006-2008) (Rs. 29 lakhs) (PI: Prof. V.R.K. Murthy)
39. *Co-Investigator*: Development of High Strength ultrafine grained alloys through cryorolling (DST, 2005-2008) (Rs. 24 lakhs) (PI: Dr. V.S. Sarma)
40. *Co-Investigator*: Development of High Strength Al alloys (ISRO, 2005-2008) (Rs. 6 lakhs) (PI: Dr. V.S. Sarma)
41. *Co-Investigator*: Development of ultrafine grained Al alloys (NRB, 2005-2007) (Rs. 24 lakhs) (PI: Dr. V.S. Sarma)
42. *Co-Investigator*: Friction Stir Welding of Ti to 304L stainless steel (IGCAR, 2005-2006) (Rs. 8 lakhs) (PI: Prof. K. Prasad Rao)
43. *Co-Investigator*: Development of Al-TiC in-situ composites (PI: Prof. M. Chakraborty) (DRDO, 2004-2005) (Rs. 19 lakhs)
44. *Co-Investigator*: Development and characterization of biocompatible low modulus Ti alloys for total joint replacement (PI: Dr. S.B. Singh) (CSIR, 2003-2005) (Rs. 12 lakhs)
45. *Co-Investigator*: Development of strong Al-Si alloys by grain refinement and modification (PI: Prof. M. Chakraborty) (NSTL, 2003-2004) (Rs. 3 lakhs)
46. *Co-Investigator*: Development of Mg based composites by Infiltration Technique (PI: Prof. B.K. Dhindaw) (ARDB, 2002-2005) (Rs. 3 lakhs)
47. *Co-Investigator*: Nanocrystalline Intermetallic Compounds and Intermetallic Matrix Nanocomposites (PI: Prof. S.K. Pabi) (DST, 2002-2005) (Rs. 84 lakhs)
48. *Co-Investigator*: Development of Nanocrystalline Intermetallics and Nanocomposites (PI: Prof. S.K. Pabi) (DRDO, 2002-2005) (Rs. 38 lakhs)
49. *Co-Investigator*: Poisoning and fading phenomena in the grain refinement of Al and its alloys (PI: Prof. M. Chakraborty) (DRDO, 2001-2004) (Rs. 18 lakhs)
50. *Co-Investigator*: Development of Al-TiB<sub>2</sub>/TiB in-situ composites (PI: Prof. M. Chakraborty) (ARDB, 2000-2002) (Rs. 6 lakhs)
51. *Co-investigator*: Grain refinement of Al alloys containing poisoning elements (PI: Prof. M. Chakraborty) (DRDO, 1998-2001) (Rs. 8 lakhs)
52. *Co-investigator*: Theoretical design and development of cast infiltrated Al-2024 and SiC continuous fibre composites for vehicular applications (PI: Prof. B.K. Dhindaw) (DRDO, 1997-98) (Rs. 1 lakh)
53. *Co-Investigator*: Phase transformations and nanoparticle formation in high energy ball milled ceramic oxides - borides (PIs: Dr. B.K. Sarkar (CGCRI, Kolkata) and Prof. P.G. Mukunda) (DST, 1995-98) (Rs. 2 lakhs)
54. *Co-investigator*: Study of surfaces and interfaces in Al-SiC composites (PI: Prof. M. Chakraborty) (CSIR, 1995-98) (Rs. 14 lakhs)
55. *Co-Investigator*: Roles of Al-Ti and Al-Ti-B master alloys in the grain refinement of Al and its alloys (PI: Prof. M. Chakraborty) (DRDO, 1993-96) (Rs. 6 lakhs)

#### 16. Organization of Conferences/Seminars/Workshops/Courses:

- Chairman, 26<sup>th</sup> International Symposium of Metastable, Amorphous and nanocrystalline Materials (ISMANAM-2019), Chennai, July 2019 (first time being organized in India)
- Convener, International Conference on Future of Advanced Manufacturing, Chennai, March 2019
- Convener, Workshop on Atom Probe Tomography, Chennai, March 2019
- Convener, Workshop on Nanotechnology, Chennai December 2018
- Co-Convener, 7<sup>th</sup> Int. Conf. on Solidification Sci. and Processing, Trivandrum, November 2018
- Coordinator, Workshop on Recent advances in thermal analysis techniques, Chennai, September 2018
- Coordinator, Certificate Course on Materials Characterization, Chennai, July 2018
- Coordinator, workshop on Indo-Australian Workshop on Advances in Materials and Additive Manufacturing (AM<sup>2</sup>), Chennai, March 2018
- Chairman, International Workshop on High Entropy Materials, Hyderabad, March 2017
- Chairman, 7<sup>th</sup> Int. Symp. for Research Scholars on Mater. Sci. and Eng., Chennai, December 2016
- Host, GIAN Course on Non-equilibrium processing, (Guest: Prof. C. Suryanarayana, Univ. Central Florida, USA), December 2016
- Host, GIAN Course on Advanced casting and solidification of light alloys for transportation (Guest: Prof. Ravi C. Ravindran, Ryerson University, Canada), IIT Madras, July 2016
- Convener, Certificate Course on Materials Characterization, Chennai July 2016
- Convener, Certificate Course on Practical Metallography, Chennai, July 2016
- Convener, International Conference on Metals & Materials Research (ICMR-2016), Bangalore, June 2016



- Host, GIAN Course on Advanced steels for the automotive industry and other sectors (Guest: Prof. Peter D. Hodgson, Deakin University, Australia), IIT Madras, June 2016
- Co-Host, GIAN Course on Tailored and Tunable Properties of Nanomaterials (Host: S.S. Bhattacharya, Guest: Horst Hahn, INT, Karlsruhe, Germany), IIT Madras, March 2016
- Co-Convener, NMD-ATM, Coimbatore, November 2015
- Convener, National Workshop on High Entropy Alloys: Prospects and Challenges, Chennai, March 2015
- Chairman, Conference on Advances in Light Metals and Composites, Chennai, December 2014
- Convener, Symposium on Casting and Solidification, NMD-ATM, Pune, November 2014
- Chairman, Innovation in Processing of Light Metals for Transportation Industries, MS&T, Pittsburgh, October 2014
- Convener, Certificate Course on Practical Metallography, Chennai, July 2014
- Convener, Two-day workshop on Nano Science and Technology, Chennai, April 2014
- Convener, One-day course on Refractory Metals, Chennai, February 2014
- Convener, Certificate Course on Materials Characterization, Chennai December 2013
- Convener, Two-day workshop on Quantitative Microscopy, Chennai December 2013
- Convener, Two-Day workshop on Metallurgy and Materials for Practicing Engineers & Researchers, Chennai, September 2013
- Co-Convener, Int. Conference on Heat Treatment and Surface Engineering, Chennai May 2013
- Convener, National Conference on Advances in Naval Materials, Chennai, February 2013
- Convener, 5<sup>th</sup> Int. Symp. for Research Scholars on Mater. Sci. and Eng., Chennai, December 2012
- Co-Convener, 5<sup>th</sup> Int. Conf. on Solidification Sci. and Processing, Bhubaneswar, November 2012
- Convener, Certificate Course on Practical Metallography, Chennai, September 2012
- Convener, Certificate Course on Practical Metallography, Chennai, July 2012
- Convener, one-day workshop on Atom Probe Tomography, Chennai, January 2012
- Convener, Short term course on Characterization of Mater. and failure Analysis, Chennai, March 2011
- Convener, Short term course on Nano Science and Technology, Chennai, April 2010
- Chairman, Advanced Engineering Mater. Theme, Indo-US Frontiers in Eng., Kolkata, March 2010
- Convener, Short term course on Testing and Characterization of Materials, Chennai, December 2009
- Convener, 4<sup>th</sup> Int. Conf. on Solidification Science and Processing, Chennai, November 2009
- Chairman, National Conference on Frontiers in Engineering, Chennai, October 2008
- Convener, Short term course on Sci. and technol. of heat treatment, Chennai, September 2008
- Co-Convener, PM-08, Chennai, February 2008
- Convener, Short term course on Metallography, Mechanical testing and failure analysis, Sept. 2007
- Convener, 3<sup>rd</sup> Int. Conf. on Solidification Science and Processing, Jaipur, November 2006
- Convener, Short term course on Al and Mg alloys for automobiles, December 2006
- Convener, Short term course on Metallurgy for non-metallurgists, December 2006
- Convener, Int. Symp. of Research Students on Mater. Sci. and Eng., Chennai, December 2004.
- Co-Convener, 2<sup>nd</sup> Int. Conf. on Solidification Sci. and Processing, Bangalore, November 2004
- Co-Convener, Int. Conf. on Adv. Mater. and Proc., Kharagpur, February 2002.
- Co-Convener, Int. Conf. on Solidification Science and Processing, Bangalore, November 2001.

#### 17. Other Academic Activities:

- Reviewer for Nature Mater. Nature Commun., Sci. Rep., Appl. Phys. Lett., Acta Mater., Scripta Mater., Nanotechnology, Metall. Mater. Trans., Phil. Mag., J. Mater. Res., Intermetallics, J. Mater. Proc. Technol., J. Alloys. Comp., J. Mater. Sci., Mater. Sci. Eng. A, Mater. Trans. JIM.
- Chairman, IIM Chennai Chapter 2013-2014
- Chairman, ASM International Chennai Chapter (2014-2015)
- Secretary, INAE Chennai Chapter (since 2016)
- Convener, INSA Chennai Chapter (since 2015)

#### 18. Membership of Academic Bodies:

- Life Member, Indian Institute of Metals
- Life Member, Materials Research Society of India
- Life Member, Indian Science Congress Association
- Life Member, Magnetism Society of India
- Life Member, Powder Metallurgy Association of India
- Life Member, Electron Microscopy Society of India
- Member, ASM International
- Member, Materials Research Society
- Member, Japan Institute of Metals

#### 19. International Collaborations:

- **Prof. J.W. Yeh**, National Tsing Hua University, Taiwan (High entropy alloys)
- **Prof. B. Guenther**, Fraunhofer Institute for Applied Materials, Germany (Nanocrystalline materials)
- **Prof. John Banhart**, Helmholtz Centre for Materials and Technical University, Berlin, Germany (Al based metallic glasses; stabilization of metallic foams; APT of high entropy alloys)
- **Prof. Sergiy Divinski**, Institute of Materials Physics, University of Münster (Tracer diffusion studies on high entropy alloys)
- **Prof. Jürgen Eckert**, Montanuniversitaet, Leoben, Austria (BMG based Nanocomposites)
- **Prof. Horst Hahn**, Institute of Nanotechnology, Karlsruhe, Germany (Magnetic nanocomposites)
- **Prof. Martin Heilmaier**, Institute of Materials, University of Magdeburg (Nano ODS Alloys)
- **Prof. Dierk Raabe**, Max Plank Institute, Dusseldorf, Germany (APT of High entropy alloys)
- **Prof. Hans Fecht**, University of Ulm (nanocomposites)
- **Prof. Chris Berndt**, Swinburne University, Melbourne, Australia (High entropy alloy coatings)
- **Prof. Peter Hodgson, and Dr. Daniel Fabijanic**, Institute for Frontier Materials, Deakin University, Melbourne, Australia (Oxidation studies and additive manufacturing of high entropy alloys)
- **Dr. R.K. Raman Singh**, Monash University, Australia (Corrosion of nanocrystalline materials)
- **Prof. C. Ravi Ravindran**, Ryerson University, Toronto, Canada (High strength Al and Mg alloys)
- **Dr. Lukas Bichler**, University of British Columbia, Kelowna, Canada (SPS of advanced materials)
- **Prof. Chuang Dong**, Dalian University, China (Bulk metallic glasses)
- **Prof. Akihisa Inoue**, Institute for Materials Research, Tohoku University, Sendai, Japan (Bulk Metallic Glasses)
- **Prof. Kazuhiro Hono**, National Institute of Materials Science, Tsukuba, Japan (Nanoquasicrystallization of metallic glasses; nanocomposites)
- **Prof. Do Hyang Kim**, Yonsei University, South Korea (Al based nanocomposites by Rapid Solidification Processing)
- **Dr. Eun Soo Park**, Seoul National University, South Korea (HEA BMGs)
- **Dr. Dan Miracle**, US Airforce Laboratory (Refractory HEAs)
- **Prof. Krishna Rajan**, Iowa State University, USA (Atom probe tomography of ODS steels)
- **Vilupanur A. Ravi**, California Polytechnic Pomona, USA (Hot Corrosion of HEAs)
- **Rajasekhara Shabadi**, University of Lille, France (Thermoelectric Materials)