Academic Profile of

Gandham Phanikumar

as on
08-07-2015
Date of Joining as Assistant Professor: **24-02-2005**
Date of Joining as Associate Professor: **01-06-2010**

Overview

Section	Aspects covered	summary	Page
(a) Teaching Plan	Total number of courses taught (such as *Transport Phenomena, Metallurgical Thermodynamics and Solidification)*	**32** Theory + **16** Lab	#2
	Course feedback scores during last 4 years	16 of 22 scores are above **0.9**	
(b) Research and Industrial Consultancy Plan	Solidification and Welding – experimental and computational studies		#6
(c) Details of Publications	Publications in International peer-reviewed Journals indexed by Scopus®	**55**	#10
	# Citations & h-index from Google Scholar	**525** & **13**	
(d) Awards, Patents, Prizes etc.,	Young Metallurgist of the Year 2005 Humboldt Research Fellowship		#21
(e) Research guidance	Completed (sole) research guidance at doctoral level	**9** (3)	#22
	Ongoing research guidance at doctoral level	6	
	Completed guidance at masters level (MS+MTech+DD)	23	
(f) Role in and details of externally funded projects	Total number of externally funded projects	**11**	#26
	Total amount of external funding in Lacs of INR	**327.36**	
(g) Other activities	Continuing education	BHEL, HAL, BEML, Tata Steel	#28
(h) Institution building and student-centric roles	Core-Faculty of Teaching & Learning Center	Since inception	#30
	Warden of Mahanadhi Hostel	2010 – 2013	
	In-charge of Institute Website & Nodal officer for IITSystem portal	Since 3 Years	
	Faculty i/c of e-services	Since 3 Years	
(i) Other relevant information	Guest editorship of special volumes of international journals	2	#31

(a) Teaching Profile

(a1) List of theory courses taught:

Reverse chronological order of semester

SEM	Year	No.	Name	Type	TCF absolute	Institute mean	Sharing of course
JAN-MAY	2015	MM2040	Introduction to Transport Phenomena	UG Core	**(awaited)**		Alone
JUL-NOV	2014	MM2030	Metallurgical Thermodynamics	UG Core	**0.96**	0.833	Alone
JAN-MAY	2014	MM538	Transport Phenomena in Metallurgical Processes	PG Elec	**0.96**	0.838	Alone
JAN-MAY	2014	MM307	Solidification Processing	UG Core	**0.927**	0.838	Alone
JUL-NOV	2013	MM2030	Metallurgical Thermodynamics	UG Core	**0.921**	0.843	Alone
JAN-MAY	2013	MT576	Advanced Topics in Welding	PG Elec	**0.929**	0.842	Shared with G.D. Janaki Ram and S. Sundaresan
JAN-MAY	2013	MM307	Solidification Processing	UG Core	**0.914**	0.842	Alone
JUL-NOV	2012	MM2030	Metallurgical Thermodynamics	UG Core	**0.965**	0.844	Alone
JAN-MAY	2012	MT576	Advanced Topics in Welding	PG Elec			Shared with G.D. Janaki Ram and S. Sundaresan
JAN-MAY	2012	MM204	Introduction to Transport Phenomena	UG Core			Alone
JAN-MAY	2011	MT576	Advanced Topics in Welding	PG Elec	**0.92**	0.839	Shared with K. Prasad Rao and G.D. Janaki Ram
JAN-MAY	2011	MM204	Introduction to Transport Phenomena	UG Core	**0.969**	0.839	Alone
JUL-NOV	2010	MT334	Materials Processing Techniques	Minor			Shared with S.D. Pathak and U. Chakkingal
JUL-NOV	2010	MM307	Solidification Processing	UG Core	**0.872**	0.846	Alone
JAN-MAY	2010	MT576	Advanced Topics in Welding	PG Elec	**0.967**	0.848	Shared with K. Prasad Rao and G.D. Janaki Ram
JAN-MAY	2010	MM204	Introduction to Transport Phenomena	UG Core	**0.947**	0.848	Alone
JUL-NOV	2009	MM303	Materials Characterization	UG Core	**0.837**	0.853	Alone
JAN-MAY	2009	MT576	Advanced Topics in Welding	PG Elec			Shared with D.R.G. Achar and G.D. Janaki Ram
JAN-MAY	2009	MM204	Introduction to Transport Phenomena	UG Core	**0.922**	0.846	Alone
JUL-NOV	2008	MM307	Solidification Processing	UG Core	**0.788**	0.84	Shared with B.S. Murty
JAN-MAY	2008	MT576	Advanced Topics in Welding	PG Elec			Shared with D.R.G. Achar and K. Prasad Rao
JAN-MAY	2008	MM204	Introduction to Transport Phenomena	UG Core	**0.87**	0.85	Alone

JUL-NOV	2007	MM307	Solidification Processing	UG Core	**0.939**	0.844	Shared with B.S. Murty
JUL-NOV	2007	MM303	Materials Characterization	UG Core	**0.872**	0.844	Shared with T.S. Sampath Kumar
JAN-MAY	2007	MT576	Advanced Topics in Welding	PG Elec			Shared with D.R.G. Achar and K. Prasad Rao
JAN-MAY	2007	MM204	Introduction to Transport Phenomena	UG Core	**0.88**	0.84	Alone
JUL-NOV	2006	MT538	Transport Phenomena in Metallurgical Processes	PG Elec	**0.931**	0.841	Alone
JUL-NOV	2006	MM303	Materials Characterization	UG Core			Shared with T.S. Sampath Kumar
JAN-MAY	2006	MT576	Advanced Topics in Welding	PG Elec			Shared with D.R.G. Achar and K. Prasad Rao
JAN-MAY	2006	MM204	Introduction to Transport Phenomena	UG Core	**0.956**	0.85	Alone
JUL-NOV	2005	MT334	Materials Processing Techniques	Minor	**0.955**	0.842	Alone
JUL-NOV	2005	MT538	Transport Phenomena in Metallurgical Processes	PG Elec			Alone

(a2) List of laboratory courses taught:
Reverse chronological order of semester

Semester	Year	Course No.	Course Title	Type
JAN-MAY	2015	MM5770	Welding Lab I	PG
JUL-NOV	2014	MM2011	Optical Micrography Lab	UG
JAN-APR	2014	MM3013	Forming & Casting Lab	UG
JUL-NOV	2013	MM2011	Optical Micrography Lab	UG
JAN-APR	2013	MM3013	Forming & Casting Lab	UG
JUL-NOV	2012	MM2011	Optical Micrography Lab	UG
JUL-NOV	2010	MM3110	Metal Casting Lab	UG
JAN-MAY	2010	MM3100	Materials Characterization Lab	UG
JUL-NOV	2009	MM5710	Welding Lab – I	PG
JAN-MAY	2009	MM578	Welding Lab – II	PG
JUL-NOV	2008	MM311	Metal Casting Lab	UG
JAN-MAY	2008	MM310	Materials Characterization Lab	UG
JAN-MAY	2008	MT578	Welding Lab – II	PG
JUL-NOV	2007	MM311	Metal Casting Lab	UG
JAN-MAY	2007	MT578	Welding Lab – II	PG
JAN-MAY	2006	MT578	Welding Lab – II	PG

(a3) Profile of 3 best courses taught in last five years:

1. I have been teaching basic concepts of heat transfer, fluid flow and mass transfer as part of the introduction to transport phenomena. The examples chosen in this course are from both metallurgical industry as well as from daily life. The course was dealt with a bias towards mathematical aspects to encourage analytical and quantitative learning among the students.

2. In the course on solidification, the actual videos of in-situ visualization of solidification that I took during my post-doc have been useful. Application to manufacturing processes was balanced with an in-depth discussion on the basic concepts, particularly the mathematical aspects. This course marks a significant shift from a traditional equivalent one on Foundry Metallurgy that was often seen as descriptive in nature.

3. In the course on metallurgical thermodynamics I have conveyed the basic concepts with a balance between process and physical metallurgy applications of the subjects. The perception of students about this course has significantly altered from “hard, dry and descriptive” to “analytical and accessible”.

In the masters electives on advanced welding processes and transport phenomena in metallurgical processes, I have conveyed the excitement in research by bringing the latest developments in the subject to the classroom. Discussions were around contemporary literature, open problems in research and learning by case studies.

In all these courses, I have used the following aspects I picked up from the faculty development programme.

1. E-learning : Extensive use of the content management system Moodle was made to connect with the students beyond the classroom. Online content included notes, derivations, collection of important papers, links to resources on the web, soft copies of relevant books, videos etc.

2. Formative assessment : This is to enable students to check where they are with respect to their learning objectives of the course. This was done as group activities and tutorials during the class hours. Often students are asked to come over to the board to solve a problem and the process clarified many doubts for the rest of them too.

3. Concept maps: Students are grouped in four-per-team and are asked to write down various concepts they came across in the last few classes and connect them to show the relationship between the concepts. These mind maps expose the gaps in the comprehension of the students while encouraging group processing that makes the exercise fun. The connections between various concepts are later made explicit to the learners by neatly type-set concept maps from my side.

4. Catering to the variety in learning abilities: Inspired by the multiple intelligences theory of Howard E. Gardner, I have designed my classroom session and question papers to allow the students expose their learning by different modes such as analytical derivations, schematic illustrations, numerical solutions, reasoning and logic, assignments / term papers / seminars etc., I believe there is a lot more to do in this aspect before we can say no student was left behind.

5. Scaffolding: I was inspired by Prof. Jeff Froyd on the role of scaffolding in learning. I believe that derivations if performed only by the teacher on the black board, they are not going to help the student – it is often the teacher alone who gets better each time. I have made derivations with gaps that students are expected to fill by working out small steps. A scaffolding approach seems to convey the strategy behind the derivation more effectively to

the students.

6. Peer-assessment: I have found a positive impact of peer-assessment in the assignments. A moodle plugin was used to get assignments allocated to two other students in a random manner. The students incentive is limited to 20% of the assignment mark for assessing their peers. Students were found to be as fair and rigorous as the instructor in assessing their peers. In the process, each student is exposed to more topics than what he/she worked on for his/her assignment.

As a natural extension of my excitement about teaching, I have been an active resource person in several programmes of the teaching and learning center (TLC) from its inception. I have contributed to several faculty development programmes organized for the benefit of teachers from other colleges as part of TLC.

I have not floated any new course yet as I am busy with teaching existing core courses in the Department. I intend to float a course on problem-based learning for the benefit of research scholars sometime soon.

(a4) Summary of teaching profile:

1. My overall teaching load is an average of more than **4 per year** without taking sharing into account.
2. I have taught a UG core course almost every semester.
3. The TCF scores reported here are from the reports on theory courses I could readily pull out. Of the 22 TCF scores, 16 are above **0.9,** i.e., most of my evaluations are well above institute average.
4. I have employed techniques I learned in faculty development programme to improve my teaching.

(b) Research and Industrial Consultancy Plan

(b1) Research interests :

- Solidification processing and modeling of material processing techniques.
- Understanding heat transfer and fluid flow during materials processing using numerical computation.
- Understanding different welding processes – using both physical (Gleeble®) and computer (SYSWELD® / own CFD code) simulations.
- Simulation of solidification microstructure evolution using **phase-field** technique.
- Microstructure characterization using optical microscopy, SEM and TEM

(b2) Research experience:

March-2002 to May-2003	Prof. Dieter Herlach's group, Institute of Space Simulation (currently, Institute for Materials Physics in Space), German Aerospace Center, Cologne, Germany.	BMBF Fellowship for post-doctoral study: Solidification of undercooled melts using Electromagnetic Levitation Technique.
Two experimental slots (one at beamline ID15A during 2002 and one at beamline 19 during 2004) - each of one week duration.	European Synchrotron Radiation Facility, Grenoble, France.	In-situ X-ray diffraction during solidification of undercooled melts using synchrotron radiation. In-situ X-ray tomography of directionally solidified alloys using synchrotron radiation.
Jun-2003 to Jul-2003	Prof. Won Tae Kim's group, Cheungju University, South Korea.	Two month post-doctoral scholarship to work on Simulation of solidification microstructure using phase field technique.
Aug-2003 to Oct-2003	Prof. K. Chattopadhyay's group, Department of Metallurgy (Now, Materials Engineering), Indian Institute of Science, Bangalore.	Research Associateship.
Nov-2003 to Jan-2005	Prof. Dieter Herlach's group, Institute of Space Simulation (currently, Institute for Materials Physics in Space), German Aerospace Center, Cologne, Germany.	One year research fellowship from Alexander von Humboldt Foundation.
May-2008 to Sep-2008	Prof. Bernard Billia's group, IM2NP, Marseille, France.	Four month research fellowship from French Embassy as special prize from SAFRAN Award 2007.
Feb-2005 to May-2010	Department of Metallurgical and Materials Engineering, IIT Madras	Assistant Professor
Jun-2010 till date	Department of Metallurgical and Materials Engineering, IIT Madras	Associate Professor

(b3) Research collaborations with other organizations:

Defence Metallurgical Research Laboratory, DRDO, Hyderabad: I have collaborated with Dr. Bhaskar Majumdar and Dr. M. Manivel Raja (Advanced Magnetics Group) on rapid solidification processing and magnetic property measurement. I have joint publications with both the scientists from the advanced magnetics group. I have also guided an M.Tech student (M. Srinivas) from the same group. I am collaborating with Dr. R. Sankarasubramanian on

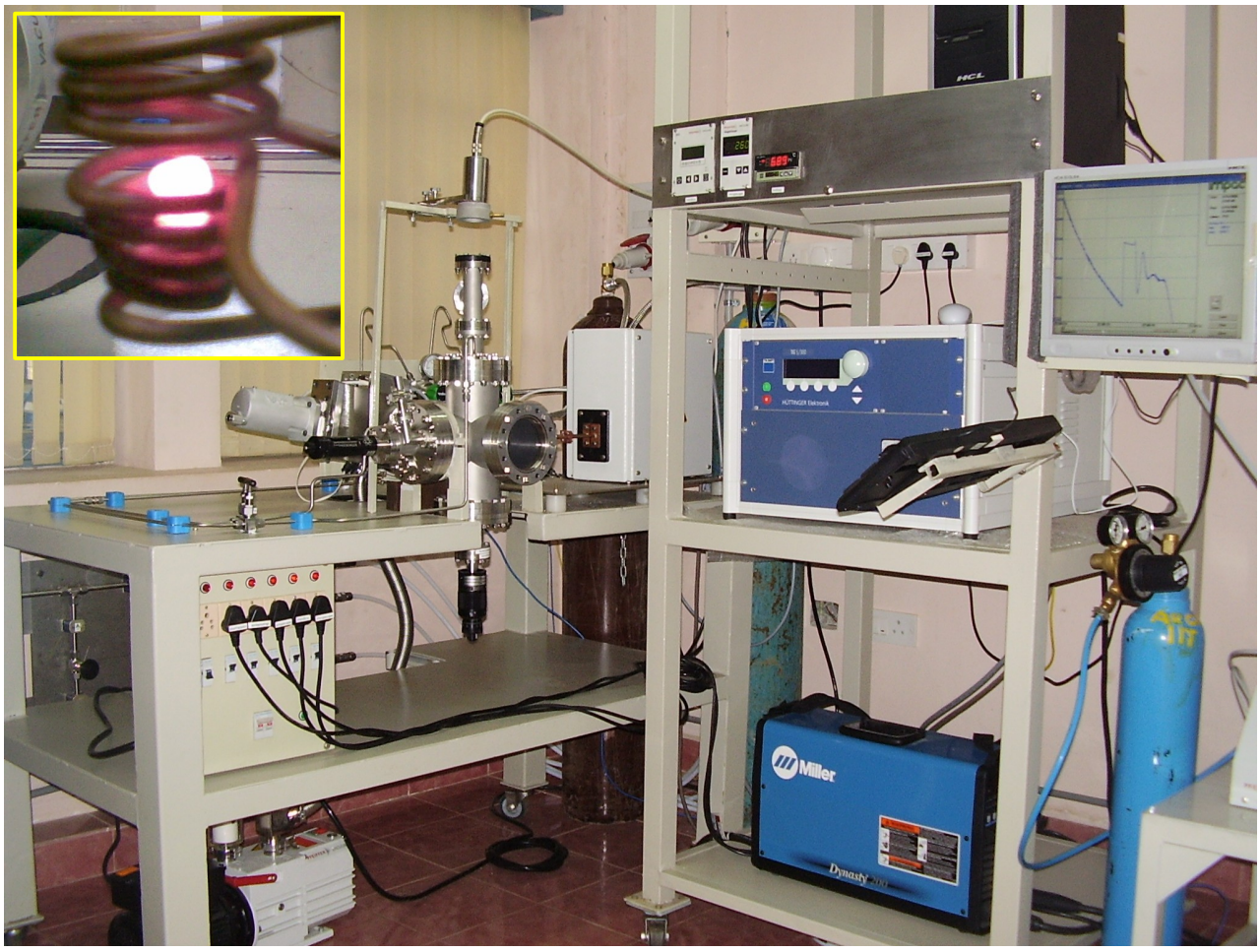
multiscale modelling of microstructure. Currently I am guiding two external Ph.D. students from DMRL – Mr. R. Ramakrishnan from the computational group and Mr. M. Sankar from the alloy melting group.

GE Power & Water, Bangalore: I am collaborating with Dr. Dheepa Srinivasan on repair welding of high temperature alloys.

GE R & D, Bangalore: I have ongoing projects with Dr. Sanjay Sondhi, on microstructure simulation in multicomponent alloys and Dr. D. Kesavan on deposition of surface layers using friction processing.

RWTH, Aachen; Simufact GmbH, Germany and TCS, Pune (TRDDC): This four party collaboration is a part of DP-Forge project from IGSTC, Delhi.

(b4) Design and Development of Research Infrastructure



Electromagnetic Levitation Setup for undercooling of metallic melts. Inset shows a levitated nickel droplet.

The setup includes the following features:

- Ultrahigh vacuum chamber with CF connections, Gate Valve, Turbomolecular pump backed up by a two stage rotary vacuum pump.
- Inert gas setup for Argon as refill gas and Helium as cooling gas.

- A 300 kHz, 5 kW induction unit for levitation and induction heating of metallic samples
- A two color pyrometer for non-contact temperature measurement at 100 Hz sampling frequency between 700 C to 1800 C and data acquisition using a computer.
- Leak-free Swagelok connections for cooling water from chiller to levitation coil and the inductor.
- Metallic alloy samples of suitable coupling and about 1 gram in size / 1 cc in volume could be processed for melting, undercooling and rapid solidification. *Bulk undercooling could be measured from the thermal profile measured in-situ.*

The setup was designed, assembled, commissioned, tested and used for research by me and two of my students (P. Gerald Tennyson as a project staff and R.V.S. Prasad as a research scholar). This facility has been used by several other students such as Hrusikesh Nath, Harsha, Reshma, Mathew Joseph and Ahmad Omar for their respective project work. The inherent uncertainty in obtaining a processed sample from levitation experiments has not encouraged many students to take up this challenging topic for their research. However, the outcomes from undercooling experiments are very important in calibrating unknown parameters in the solidification theory and also providing crucial inputs to modeling techniques such as cellular automata and phase-field. This topic will be guarded and grown in the future.

Vacuum arc melting unit for sample preparation

The setup includes the following features:

- A high vacuum chamber with ISO connections and two large view ports for ease of operation.
- A compact portable turbomolecular pumping unit backed up by a diaphragm pump.
- A compact portable welding source for power supply, with a foot pedal for single user operation.
- Argon gas connections for inert atmosphere.
- Cooling water supply from the Chiller of the above mentioned levitation setup for the copper hearth.
- Alloy samples of few grams in weight and few cc in volume could be made without any contamination.

The setup was designed in collaboration with Mr. Subash Pai of M/S Excel Instruments, Mumbai and has been assembled, commissioned, tested by me and my students.

Currently a large room in the Department (MSB108) is being remodeled to act as a central computational lab. It is intended that this space will grow to be a well equipped training space for computational techniques for all interested research scholars in our Department.

(b5) Best papers

Enclosed along are four of the papers that I consider the best from my research. The Intermetallics paper with R.V.S. Prasad was on samples that we prepared in the lab using a facility that we assembled ourselves (vacuum arc melting unit, described above), processed using a facility that we build ourselves (electromagnetic levitation facility, described above) and characterized using facilities in the Department. The paper in Computer Physics Communications with P. Gerald Tennyson was using a code that we wrote ourselves and executed on the supercomputing facility in our Institute. The simulation shows the first ever hybrid implementation using MPI + OpenCL in the open literature and perhaps the only 3D multiple dendrite simulation from any research group in the country. These two are fully “home- grown” research outcomes and are of significance in demonstrating the experimental and computational capability.

These works are important in the context of ICME (Integrated Computation in Materials Engineering) applied to solidification processing. ICME is an effort currently being undertaken across the world to reduce the cycle time for development of new materials and faster realization of engineering materials. Careful experimentation and detailed simulations are part of the framework.

(b6) Pride in guiding:

Among the research scholars I have (co-)guided, several are from Govt. labs and have returned to continue their research there. K. Balachandar is a professor in SASTRA university, Tanjore. R.V.S. Prasad is a staff scientist with GE Power & Water, Bangalore. P. Gerald Tennyson is leading a group on computation at TRDDC (TCS), Pune. Md. Rafi is on his way to be a faculty member at King Fahd University. Hrusikesh Nath is doing his post-doc at Samara State University, Russia.

(b7) Industrial consultancy plan

I have recently started visiting industries and labs to explore options of collaboration and consultancy. Apart from GE, Bangalore, Tata Steel has shown interest in working together. These studies are on the multiscale modeling of processes involving solidification.

(b8) Future Plans:

- Careful solidification experiments with in-situ measurement of growth velocity. This will be possible as the Department has recently ordered a high speed camera. This data is an important input to the microstructure simulations.
- Extensive characterization of microstructure and properties to understand materials processing. Recently added facilities such as Titan and dual beam FIB will help in this.
- Develop the framework of phase field technique for microstructure simulation and bridge length scales by coupling with heat transfer and (fluid / material) flow simulations at system scale. Collaborate with CALPHAD/MD researchers for input data.
- Work towards a predictive capability in microstructure evolution using Integrated Computation in Materials Engineering (**ICME**) approach.

(c) Details of Publications

(c1) Publications in peer-reviewed international journals:

Total number : **55**
Papers are listed in reverse chronological order (latest at the top).
Impact factors of journals where I have published is listed at the end of this section.
Citation report taken from Scopus® is given in a separate table below.

1. M.R. Rahul and Gandham Phanikumar, "Correlation of microstructure with HAZ welding cycles simulated in Ti-15-3 alloy using Gleeble 3800 and SYSWELD", *ASTM Journal of Materials Performance and Characterization", accepted (2015)*
2. Hrusikesh Nath and Gandham Phanikumar, "Premartensite transition in Ni2FeGa Heusler alloy", *Materials Characterization*, vol. 102, pp. 24-28 (2015)
3. P. Gerald Tennyson, G. M. Karthik, G. Phanikumar, "MPI + OpenCL implementation of a phase-field method incorporating CALPHAD description of Gibbs energies on heterogeneous computing platforms", *Computer Physics Communications,* vol. 186, pp. 48-64 (2015)
4. Hrusikesh Nath and Gandham Phanikumar, "Microstructure and Phase Evolution of Ni2FeGa Heusler Alloy Extended to Different Degrees of Undercooling", *Materials Science Forum*, 790-791, 199 (2014)
5. Prasad, R.V.S., Srinivas, M., Manivel Raja, M., Phanikumar, G., "Microstructure and magnetic properties of Ni2(Mn,Fe)Ga heusler alloys rapidly solidified by melt spinning", *Metallurgical and Materials Transactions A,* (4) PP. 2161 - 2170 (2014)
6. Shirish R. Kala, N. Siva Prasad and G. Phanikumar, "Numerical Study of Welding with Trailing Heat Sink Considering Phase Transformation Effects", *Advanced Materials Research*, Vols. 875-877, pp 2118-2122, (2014)
7. Kala, S.R., Siva Prasad, N., Phanikumar, G., "Studies on multipass welding with trailing heat sink considering phase transformation", *Journal of Materials Processing Technology,* 214 (6) PP. 1228 – 1235, (2014)
8. Shailesh Singh, K. Chattopadhyay, G. Phanikumar, P. Dutta, "Experimental and numerical studies on friction welding of thixocast A356 aluminum alloy", *Acta Materialia*, vol. 73, July, pp. 177-185 (2014)
9. S. Sandhya, R. Mahemaa, G. Phanikumar, "Microstructure Evolution During Fusion Welding of Rheocast AA7075 Alloy", *Procedia Materials Science*, 408-415, vol. 5 (2014)
10. Khalid Rafi, H., Phanikumar, G., Prasad Rao, K., "Corrosion resistance of friction surfaced AISI 304 stainless steel coating", *Journal of Materials Engineering and Performance,* 22 (2) PP. 366 - 370 (2013)
11. Khalid Rafi, H., Kishore Babu, N., Phanikumar, G., Prasad Rao, K., "Microstructural evolution during friction surfacing of austenitic stainless steel AISI 304 on low carbon steel", *Metallurgical and Materials Transactions A*, vol. 44, issue 1, pp. 345-350 (2013)
12. Kala, S.R., Prasad, N.S., Phanikumar, G., "Numerical studies on effect of interpass time on distortion and residual stresses in multipass welding", *Advanced Materials Research*, vol. 601, pp. 31-36, (2013)

13. S. Sandhya and G. Phanikumar, “Investigation of fusion weldments of semi-solid aluminium A356 alloy: pool geometry and microstructure”, *Materials Science Forum*, vol. 756, pp. 751-755 (2013)
14. R.V.S. Prasad, M. Manivel Raja, G. Phanikumar, “Structure and magnetic properties of Ni2(Mn,Co)Ga Heusler alloys rapidly solidified by melt-spinning”, *Intermetallics*, vol. 25, pp. 42-47 (2012)
15. Rafi, H.K., Ram, G.D.J., Phanikumar, G., Rao, K.P, “Microstructural evolution during friction surfacing of tool steel H13”, *Materials and Design*, vol. 32(1), pp. 82-87 (2011)
16. M. Srinivas, B. Majumdar, G. Phanikumar and D. Akhtar, “Effect of Planar Flow Melt Spinning Parameters on Ribbon Formation in Soft Magnetic Fe68.5Si18.5B9Nb3Cu1 Alloy”, *Metallurgical and Materials Transactions B*, vol 42 (2), pp. 370-379 (2011)
17. H. Khalid Rafi, G. Phanikumar and K. Prasad Rao, “Material Flow Visualization during Friction Surfacing”, *Metallurgical and Materials Transactions A*, Vol. 42, No. 4, Pages 937-939 (2011)
18. G. Phanikumar, K. Chattopadhyay and P. Dutta, “Joining of Dissimilar Metals: Issues and Modeling Challenges”, *Science and Technology of Welding and Joining*, Vol. 16, No. 4, pp. 313-317(5) (2011)
19. K. R. Ravi, S. Manivannan, G. Phanikumar, B. S. Murty and Suresh Sundarraj, “Influence of Mg on Grain Refinement of Near Eutectic Al-Si Alloys”, *Metallurgical and Materials Transactions A*, Vol. 42, No. 7, pp.2028-2039, (2011)
20. H. Khalid Rafi, Krishnan Balasubramaniam, G. Phanikumar and K. Prasad Rao, “Thermal Profiling Using Infrared Thermography in Friction Surfacing”, *Metallurgical and Materials Transactions A*, OnLine First, 09-June-2011 (2011)
21. P. Gerald Tennyson and G. Phanikumar, “Computational modelling of dendritic to globular transition using an isothermal binary phase-field model”, *Transactions of Indian Institute of Metals*, Vol. 64, No.1-2, pp. 251-254, (2011)
22. R.V.S. Prasad and G. Phanikumar, “Phase evolution and properties of Ni50Co23Fe2Ga25 Heusler alloy undercooled by electromagnetic levitation”, *Intermetallics*, vol. 19, issue. 11, pp. 1705-1710 (2011)
23. Khalid Rafi, H., Janaki Ram, G.D., Phanikumar, G., Prasad Rao, K., “Microstructure and properties of friction surfaced stainless steel and tool steel coatings”, *Materials Science Forum*, 638-642, pp. 864-869 (2010)
24. Rafi, H.K., Ram, G.D.J., Phanikumar, G., Rao, K.P., “Friction surfaced tool steel (H13) coatings on low carbon steel: A study on the effects of process parameters on coating characteristics and integrity”, *Surface and Coatings Technology*, 205 (1), pp. 232-242 (2010)
25. H. Khalid Rafi, G.D. Janaki Ram, G. Phanikumar and K. Prasad Rao, “Microstructure and tensile properties of friction welded aluminum alloy AA7075-T6”, *Materials & Design*, 31 (5), pp. 2375-2380 (2010)
26. Nair, B.S., Rakesh, S., Phanikumar, G., Rao, K.P., Sinha, P.P., “Fracture toughness (J1C) of electron beam welded AA2219 alloy”, *Materials & Design*, 31 (10), pp. 4943-4950 (2010)
27. R.V.S. Prasad, G. Phanikumar, “Martensite and nanocrystalline phase formation in rapidly solidified Ni2MnGa alloy by meltspinning”, *Materials Science Forum*, vol. 649, pp.35-40 (2010)
28. P. Gerald Tennyson, P. Kumar, H. Lakshmi, G. Phanikumar, P. Dutta, “Experimental studies and phase field modeling of microstructure evolution during solidification with electromagnetic stirring”, *Transactions of the Non-ferrous Metals Society of China*, vol. 20, supplement 3, pp. s774-s780 (2010)

29. H. Khalid Rafi, G.D. Janaki Ram, G. Phanikumar and K. Prasad Rao, "Microstructure and tensile properties of friction welded aluminum alloy AA7075-T6", Materials & Design, vol. 31, pp. 2375-2380 (2010)

30. H. Khalid Rafi, G.D. Janaki Ram, G. Phanikumar and K. Prasad Rao, "Microstructures and properties of friction surfaced stainless steel and tool steel coatings", *Materials Science Forum*, Vols. 638-642, pp.864-869, (2010)

31. R.V.S. Prasad, G. Phanikumar, "Martensite and nanocrystalline phase formation in rapidly solidified Ni_2MnGa alloy by meltspinning", *Materials Science Forum*, vol. 649, pp. 35-40, (2010)

32. K. Balachandar, V.S. Sarma, Bhanu Pant, G. Phanikumar, "Microstructure and mechanical properties of GTA welded Ti-15-3 beta titanium alloy", *Metallurgical and Materials Transactions A*, vol. 40, pp. 2685-2693, (2009)

33. R.V.S. Prasad and G. Phanikumar, "Amorphous and nanocrystalline phase formation in Ni2MnGa ferromagnetic shape memory alloy synthesized by melt spinning", *Journal of Materials Science*, vol. 44, iss. 10, pp.2553 (2009)

34. R.V.S. Prasad, Manivel Raja, G. Phanikumar, "Microstructure and Magnetic Properties of Rapidly Solidified Ni2(Mn,Fe)Ga Heusler alloys", *Advanced Materials Research*, vol. 74, pp. 215-218 (2009)

35. Biju S. Nair, G. Phanikumar, K. Prasad Rao and P.P. Sinha, "Improvement of mechanical properties of gas tungsten arc and electron beam welded AA2219 (Al-6wt%Cu) alloy", *Science and Technology of Welding and Joining*, Vol. 7, pp.579-585, (2007)

36. K. Biswas, G. Phanikumar, D. Holland-Moritz, Dieter M. Herlach and K. Chattopadhyay, "Disorder trapping and grain refinement during solidification of undercooled Fe-18%Ge melts", *Philosophical Magazine*, vol.87, iss.25, pp.3817-3837, (2007)

37. Amresh K. Gupta, Rolf Galun and G. Phanikumar, "Microstructure evolution during laser surface cladding and remelting of Al-10wt%Bi-10wt%Cu", *Transactions of Indian Inst. Met.*, Vol. 60, Nos. 2-3, April-June, pp.299-302, (2007)

38. T. Lierfeld, P. Gandham, M. Kolbe, T. Schenk, H.M. Singer, G. Eggeler and D.M. Herlach, "Particle incorporation in metallic melts during dendritic solidification - undercooling experiments under reduced gravity", *Materials Science and Engineering A*, Volumes 449-451, pp. 689-692 (2007)

39. P.K. Galenko, G. Phanikumar, O. Funke, L. Chernova, S. Reutzel, M. Kolbe and D M. Herlach, " Dendritic solidification and fragmentation in undercooled Ni-Zr alloys", *Materials Science and Engineering A*, Volumes 449-451, pp.649-653 (2007)

40. Krishanu Biswas, Gandham Phanikumar, Dieter M. Herlach and Kamanio Chattopadhyay, "Non-equilibrium solidification of concentrated Fe-Ge alloys", *Materials Science and Engineering A*, Volumes 449-451, pp. 12-17 (2007)

41. O. Funke, G. Phanikumar, P.K. Galenko, L. Chernova, S. Reutzel, M. Kolbe, and D.M. Herlach, "Dendrite growth velocity in levitated undercooled nickel melts", *Journal of Crystal Growth*, vol.297, iss. 1, p.211-222 (2006)

42. P.K. Galenko, D.M. Herlach, G. Phanikumar and O. Funke, "Phase-field modeling of dendritic solidification in undercooled droplets processed by electromagnetic levitation", *Materials Science Forum*, Vol. 508, February, pp. 431-436 (2006)

43. Gandham Phanikumar, Krishanu Biswas, Oliver Funke, Dirk Holland-Moritz, Dieter M. Herlach and K. Chattopadhyay, "Solidification of undercooled peritectic Fe-Ge alloy", *Acta Materialia*, Vol 53,

Iss 13, pp 3591-3600 (2005)

44. Gandham Phanikumar, Sambandam Manjini, Pradip Dutta, Jyotirmoy Mazumder and Kamanio Chattopadhyay, "Characterization of continuous CO_2 laser welded Fe-Cu dissimilar couple", *Metallurgical and Materials Transactions*, Vol. 36A, August, pp.2137-2147 (2005)

45. G. Phanikumar, P. Dutta and K. Chattopadhyay, "Continuous welding of Cu-Ni dissimilar couple", *Science and Technology of Welding and Joining*, Vol. 10, No. 2, pp. 158-166(9) (2005)

46. Gandham Phanikumar, Pradip Dutta and Kamanio Chattopadhyay, "Computational modelling of laser welding of Cu-Ni dissimilar couple", *Metallurgical and Materials Transactions B*, Vol. 35B, Iss. April, pp. 339-350 (2004)

47. K. Biswas, G. Phanikumar, K. Chattopadhyay, O. Funke, T. Volkmann, D. Holland-Moritz and D.M. Herlach, "Rapid solidification behaviour of undercooled levitated FeGe alloy droplets", *Materials Science and Engineering A*, Vol. 375-377C, pp.464-467 (2004)

48. Gandham Phanikumar, Pradip Dutta, Rolf Galun and Kamanio Chattopadhyay, "Microstructural evolution during remelting of laser clad hyper monotectic Al-Bi alloy", *Materials Science and Engineering A*, Vol. 371, Iss. 1-2, pp. 91-102 (2004)

49. S. Bysakh, S.K. Mitra, G. Phanikumar, J. Majumder, P. Dutta and K. Chattopadhyay, "Characterization of microstructure in laser surface alloyed layers of aluminium on nickel", *Metallurgical and Materials Transactions A*, Vol. 34A, No. 11, pp.2621-2631 (2003)

50. S. Sarkar, P. Mohan Raj, S. Chakraborty, G. Phanikumar, K. Chattopadhyay and P. Dutta, "Transport phenomena in laser surface alloying", *Journal of Materials Science*, Vol. 38, No. 1, pp. 155-164 (2002)

51. S. Kumar, G. Phanikumar, P. Dutta and K. Chattopadhyay, "Microstructural development of dissimilar weldments: case of MIG welding of Cu with Fe filler", *Journal of Materials Science*, Vol. 37, No. 11, pp. 2345-2349 (2002)

52. P. Mohanraj, S. Sarkar, S. Chakraborty, G. Phanikumar, P. Dutta and K. Chattopadhyay, "Modelling of transport phenomena in laser surface alloying with distributed species mass source", *International Journal of Heat and Fluid Flow*, Vol. 23, No. 3, pp. 298-307 (2002)

53. G. Phanikumar, K. Chattopadhyay, "Solidification microstructure development", *Sadhana*, Vol 26, pp 25-34 (2001)

54. G. Phanikumar, K. Chattopadhyay and P. Dutta, "Modelling of transport phenomena in laser welding of dissimilar metals", *International Journal of Numerical Methods in Heat and Fluid Flow*, Vol. 11, No. 2, pp. 156-171 (2001)

55. G. Phanikumar, Pradip Dutta and K. Chattopadhyay, "Supercomputing Applications in Materials Engineering", *Current Science*, Vol. 78, No. 7(April 10), pp. 847-849 (2000)

(c2) Collaborative Internal Reports /

1. K.R. Ravi, S. Manivannan, G. Phanikumar, B.S. Murty and S. Sundarraj, "Influence of Mg on grain refinement of near eutectic Al-Si alloys". Approved for *GM Internal Publication* (2010). Also appeared in *Metallurgical and Materials Transactions*.

2. G. Phanikumar, Abhik Choudhury and Suresh Sundarraj, "Eutectic microstructure modeling using phase field and enthalpy based front tracking methods". Approved for *GM Internal Publication* (2010).

(c3) Publications in proceedings of International Conferences

Reverse chronological order

1. R.V.S. Prasad, M. Raja and G. Phanikumar, Microstructure and Magnetic Properties of Rapidly Solidified Ni2(Mn,Fe)Ga Heusler Alloys, International Conference on Materials for Advanced Technologies (ICMAT – 2009), Singapore (2009)
2. R.V.S. Prasad, G. Phanikumar, Martensite and Nanocrystalline phase formation in rapidly solidified Ni2MnGa alloy by melt spinning, Proceedings of the 5th International Conference on Solidification and Gravity, Miskolc-Lillafüred, Hungary (2008)
3. Rao, KVS; Kumar, SA; Phanikumar, G; Kumar, TSP, "Effect of boundary heat flux transients on the solidification behavior and microstructure of Al-Cu alloy", EPD Congress 2008 held at the 2008 Annual TMS Meeting and Exhibition New Orleans, LA, MAR 09-13, 2008 Ed: Howard SM, EPD CONGRESS 2008, pp. 271-280, (2008)
4. K.V. Sreenivas Rao, G. Phanikumar, T.S. Prasanna Kumar, "Effect of mold material on boundary heat flux transients, macro segregation and microstructure evolution during gravity die casting", The 10th Asian Foundry Congress (AFC-10), 21-24 May, Nagoya, Japan, (2008)
5. Biju S. Nair, G. Phanikumar, K. Prasad Rao, S. Rakesh and P.P. Sinha, "Solidification of electron beam welded Al-6wt%Cu alloy", International Welding Congress, Chennai, January (2008)
6. K.V. Sreenivas Rao, G. Phanikumar, T.S. Prasanna Kumar, "Numerical simulation of boundary heat flux during alloy solidification and its effect on natural convection, macro segregation and microstructure evolution", Multiphysics, 12-14 December, Machester, U.K., (2007)
7. K.V. Sreenivas Rao, G. Phanikumar, T.S. Prasanna Kumar, "Quantification of transient boundary heat flux during casting", Diamond Jubilee Symposium on Advances in Materials Engineering, 4-6 July, IISc Bangalore, India, (2007)
8. R.V.S. Prasad, G. Phanikumar, Rapid solidification behaviour of melt spun Ni2MnGa ferromagnetic shape memory alloys, ISRS-2006, IITM, Chennai, India, (2006)
9. P.K. Galenko, D.M. Herlach, Phanikumar, G. and O. Funke, "Phase-Field Modeling of Dendritic Solidification in undercooled droplets", 3rd International conference on Computational Modelling and Simulation of Materials: Part B, Ed: P. Vincenzini and A. Lami, Pub: Techna Group, Faenza, pg. 565-572, (2004)
10. Dieter M. Herlach, Oliver Funke, Phanikumar Gandham, Peter Galenko, "Free dendrite growth in undercooled melts: Experiments and Modelling", Solidification Processes and Microstructures - A symposium in Honor of Wilfried Kurz, Ed., Michel Rappaz, Christoph Beckermann and Rohit Trivedi, TMS, pp. 277-288, (2004)
11. Galenko, P.K., Funke, O., Phanikumar, G. , Kolbe, M., Herlach, D.M., "Phase-Field Modeling of Dendritic Solidification: Verification for the Theoretical Models with Latest Experimental Data", EUROMAT 2003, Lausanne, 01.-05.09.2003, DGM, FEMS, pp. 52-60, (2003)
12. T. Maiwald, R. Galun, B. L. Mordike, K. Chattopadhayay, G. Phanikumar, "Laser Cladding with Alloy Systems with a Miscibility Gap in the Liquid State", Proceedings of the International Conference on Advances in Materials and Materials Processing ICAMMP, Kharagpur, India, Ed., N. Chakrabarty and U.K. Chatterjee, Tata McGraw Hill Publishers, Delhi, p. 831-835 (2002)
13. K. Chattopadhyay, S. Sanyal, P. Gandham, R. Galun and B-L. Mordike, "Microstructural study of laser surface cladding of bearing materials", Materials Week 2001 - Proceedings, Ed. Werkstoffwoche-Partnerschaft bR, Werkstoff- Informationsgesellschaft mbH Frankfurt, Paper No. 388 (2002)
14. G. Phanikumar, P. Dutta and K. Chattopadhyay, "Solidification microstructures in laser welding of

dissimilar metals", International conference on solidification science and processing, Ed., B.K. Dhindaw, B.S. Murthy, S. Sen, Science Publishers, Inc., Enfield, USA, pp 155-162 (2001)

15. K. Chattopadhyay, K. Biswas, S.Bysakh, G. Phanikumar, A.Weisheit, R.Galun, B.Mordike, "Quasicrystalline coatings through laser processing: A study on process optimization and microstructure evolution", MRS Symposium Proceedings, Vol 643, K15.3.1-K15.3.12 (2001)
16. G. Phanikumar, P. Dutta and K. Chattopadhyay, "Laser processing of dissimilar metals", Proc. Int. Symposium on Materials Ageing and Life Management (ISOMALM), Oct. 3-6, 2000, IGCAR, Kalpakkam, (Eds.) Baldev Raj, K.Bhanu Sankara Rao, T.Jayakumar, and R.K.Dayal, Allied Publishers Ltd., Chennai, India, (2000)
17. G. Phanikumar, K. Chattopadhyay, and P. Dutta, "Numerical Simulation of Laser Welding of Dissimilar Metals", Mathematical Modelling of Weld Phenomena V, Institute of Materials, London, pp 885-896 (2000)
18. G. Phanikumar, B. Basu, S. Chakraborty, K. Chattopadhyay, P. Dutta and J. Majumder, "Laser Surface Alloying of Aluminium on Iron Substrate: Experiments and Numerical Simulation", Proceedings of the EUROMAT 99, Wiley-VCH, Berlin, Vol. 11, pp.425-430 (2000)
19. Dutta, P., Phanikumar, G., Pardeshi, R., Mazumder, J., and Chattopadhayay, K., "Dissimilar Metal Welding of Copper-Nickel Couple by Continuous Wave CO_2 Laser", Trends in Welding Research, ASM International, Ohio, USA, pp 461-466 (1999)

(c4) Invited Presentations / Lectures

(reverse chronological order)

1. 2nd Symposium on Materials Behavior and Modeling, GE Bangalore, 16-19 March, 2015. Talk titled “Opportunities and challenges in modeling solidification of multi-component alloys”
2. TMS-IIM Symposium on Industrial Realization of ICME: Challenges and Opportunities, 68th Annual Technical Meet of the Indian Institute of Metals held at College of Engineering, Pune. Talk titled “Integrating ICME toolset in the emerging landscape of computing infrastructure”, 13-November-2014.
3. Annual Technical Meet of the Indian Institute of Metals held at IIT (BHU), Varanasi. Talk titled “Phase field simulation of microstructures”, 13-November-2013.
4. Indo-German workshop on Integrate Computing in Materials Engineering (ICME) held at TCS, Pune (TRDDC). Organized by Indo-German Science and Technology Center (IGSTC) and TCS. Talk titled “3D simulation of solidification microstructures”, 28-11-2012.
5. Fifth International Conference on Solidification Science and Processing (ICSSP-5) held at Bhubaneshwar; organized by IIT Bhubaneshwar.
6. Materials Science Section, Indian Science Congress, 2012 held at Bhubaneshwar. Talk titled “Solidification of undercooled Heusler Alloys”. January 04-06, 2012.
7. One day symposium on Solidification of Aluminium Alloys held at R & D Centre, Aditya Birla Science and Technology Center, Mumbai. November 09, 2011.
8. NRC-M workshop on Joining of Materials, organized by Department of Materials Engineering, Indian Institute of Science, Bangalore and NIT, Trichy, held at NIT, Trichy on December 13-17, 2010.

9. One day discussion meeting on “Rapidly Solidified Materials: Present and Future Trends in India”, organized by Defence Metallurgical Research Laboratory on 28-09-2010.
10. International Summer school organized by Prof. Heike Emmerich under SPP1296 (Heterogenous nucleation and initial microstructure) at University of Bayreuth, Germany; July 19-23, 2010.
11. DST-SERC sponsored school on Texture and Microstructure, October 25-29, 2010 at IIT Madras.
12. Annual Technical Meeting (2010) organized by the Indian Institute of Metals, Kolkata and Indian Institute of Science, Bangalore. Talk titled “Phase-field simulation of solidification microstructure evolution”, 16-11-2010.
13. Workshop on Materials Modelling and Simulation organized by Centre for Modelling, Simulation and Design (CMSD), University of Hyderabad; Defense Metallurgical Research Laboratory and Indian Institute of Metals - Hyderabad Chapter; during December 27-31, 2010.
14. Indian Academy of Sciences (2010) meeting at Orange County. Talk titled “Microstructures during materials processing”, February 21-24, 2010.
15. Structure and Thermodynamics of Emerging Materials (STEM-2009): Thematic workshop on Thermodynamic and Kinetic Modeling of Phase and Microstructural Stability of Alloys. Talk titled “Elements of phase field simulation of microstructure evolution”. Held at Convention Center, Anupuram, Kalpakkam, September 24-26, 2009.

(c5) Impact factors of Journals where I have published

The impact factors were picked up from websites of respective journals where available and from internet for the rest.

Journal	**Publisher**	**Impact Factor**	**No. of Papers**
Acta Materialia	Elsevier	3.940	2
Materials and Design	Elsevier	3.171	3
Computer Physics Communications	Elsevier	2.407	1
Materials Science and Engineering A	Elsevier	2.409	5
Journal of Materials Processing Technology	Elsevier	2.328	1
Surface and Coatings Technology	Elsevier	2.199	1
Intermetallics	Elsevier	2.126	2
Materials Characterization	Elsevier	1.925	1
Metallurgical and Material Transactions A	TMS / Springer	1.730	8
Journal of Crystal Growth	Elsevier	1.693	1
Philosophical Magazine	Taylor & Francis	1.427	1
Science and Technology of Welding and Joining	Maney	1.38	3
Metallurgical and Material Transactions B	TMS / Springer	1.323	2
International Journal of Heat and Fluid Flow	Elsevier	1.26	1
Journal of Materials Science	Springer	1.01	3
Transactions of Nonferrous Metals Society of China	NMSC / Elsevier	1.001	1
Journal of Materials Engineering and Performance	Springer	0.981	1
International J. of Numerical Methods in Heat and Fluid Flow	Emerald	0.919	1

Current Science	IAS / Springer	0.833	1
Sadhana	IAS / Springer	0.587	1
Transactions of IIM	IIM / Springer	0.427	2
Materials Science Forum	TTP	0.24	5
Advanced Materials Research	TTP	0.14	3

(c6) Citation report

Total number of citations : 525 (Google Scholar) / 409 (from Scopus®)
H-Index : **13** (Google Scholar) / **12** (Scopus®). Citations as per Scopus® are listed below.

Authors	Title	Year	Source title	Vol	Pg	Cited by
Mohan Raj, P., Sarkar, S., Chakraborty, S., Phanikumar, G., Dutta, P., Chattopadhyay, K.	Modelling of transport phenomena in laser surface alloying with distributed species mass source	2002	International Journal of Heat and Fluid Flow	23	298	**31**
Phanikumar, G., Chattopadhyay, K., Dutta, P.	Modelling of transport phenomena in laser welding of dissimilar metals	2001	International Journal of Numerical Methods for Heat and Fluid Flow	11	156	**31**
Funke, O., Phanikumar, G., Galenko, P.K., Chernova, L., Reutzel, S., Kolbe, M., Herlach, D.M.	Dendrite growth velocity in levitated undercooled nickel melts	2006	Journal of Crystal Growth	297	211	**29**
Rafi, H.K., Ram, G.D.J., Phanikumar, G., Rao, K.P.	Microstructure and tensile properties of friction welded aluminum alloy AA7075-T6	2010	Materials and Design	31	2375	**28**
Phanikumar, G., Biswas, K., Funke, O., Holland-Moritz, D., Herlach, D.M., Chattopadhyay, K.	Solidification of undercooled peritectic Fe-Ge alloy	2005	Acta Materialia	53	3591	**23**
Phanikumar, G., Dutta, P., Chattopadhyay, K.	Computational modeling of laser welding of Cu-Ni dissimilar couple	2004	Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science	35	339	**21**
Rafi, H.K., Ram, G.D.J., Phanikumar, G., Rao, K.P.	Microstructural evolution during friction surfacing of tool steel H13	2011	Materials and Design	32	82	**18**
Phanikumar, G., Manjini, S., Dutta, P., Mazumder, J., Chattopadhyay, K.	Characterization of a continuous CO2 laser-welded Fe-Cu dissimilar couple	2005	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	36	2137	**19**
Rafi, H.K., Ram, G.D.J., Phanikumar, G., Rao, K.P.	Friction surfaced tool steel (H13) coatings on low carbon steel: A study on the effects of process parameters on coating characteristics and integrity	2010	Surface and Coatings Technology	205	232	**16**
Phanikumar, G., Dutta, P., Galun, R., Chattopadhyay, K.	Microstructural evolution during remelting of laser surface alloyed hyper-monotectic Al-Bi alloy	2004	Materials Science and Engineering A	371	91	**15**
Khalid Rafi, H., Balasubramaniam, K., Phanikumar, G., Prasad Rao, K.	Thermal profiling using infrared thermography in friction surfacing	2011	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	42	3425	**14**

Sarkar, S., Raj, P.M., Chakraborty, S., Phanikumar, G., Chattopadhyay, K., Dutta, P.	Transport phenomena in laser surface alloying	2003	Journal of Materials Science	38	155	**12**
Galenko, P.K., Phanikumar, G., Funke, O., Chernova, L., Reutzel, S., Kolbe, M., Herlach, D.M.	Dendritic solidification and fragmentation in undercooled Ni-Zr alloys	2007	Materials Science and Engineering A	448-451	649	**11**
Bysakh, S., Mitra, S.K., Phanikumar, G., Mazumder, J., Dutta, P., Chattopadhyay, K.	Characterization of microstructure in laser-surface-alloyed layers of aluminum on nickel	2003	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	34 A	2621	**11**
Prasad, R.V.S., Phanikumar, G.	Amorphous and nano crystalline phase formation in Ni2MnGa ferromagnetic shape memory alloy synthesized by melt spinning	2009	Journal of Materials Science	44	2553	**9**
Phanikumar, G., Dutta, P., Chattopadhyay, K.	Continuous welding of Cu-Ni dissimilar couple using CO 2 laser	2005	Science and Technology of Welding and Joining	10	158	**9**
Khalid Rafi, H., Phanikumar, G., Prasad Rao, K.	Material flow visualization during friction surfacing	2011	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	42	937	**8**
Nair, B.S., Phanikumar, G., Prasad Rao, K., Sinha, P.P.	Improvement of mechanical properties of gas tungsten arc and electron beam welded AA2219 (Al-6 wt-%Cu) alloy	2007	Science and Technology of Welding and Joining	12	579	**8**
Biswas, K., Phanikumar, G., Chattopadhyay, K., Volkmann, T., Funke, O., Holland-Moritz, D., Herlach, D.M.	Rapid solidification behaviour of undercooled levitated Fe-Ge alloy droplets	2004	Materials Science and Engineering A	375-377	464	**7**
Phanikumar, G., Chattopadhyay, K.	Solidification microstructure development	2001	Sadhana - Academy Proceedings in Engineering Sciences	26	25	**7**
Prasad, R.V.S., Phanikumar, G.	Phase evolution and properties of Ni50Co23Fe 2Ga25 Heusler alloy undercooled by electromagnetic levitation	2011	Intermetallics	19	1705	**6**
Biswas, K., Phanikumar, G., Holland-Moritz, D., Herlach, D.M., Chattopadhyay, K.	Disorder trapping and grain refinement during solidification of undercooled Fe-18 at% Ge melts	2007	Philosophical Magazine	87	3817	**6**
Khalid Rafi, H., Phanikumar, G., Prasad Rao, K.	Corrosion resistance of friction surfaced AISI 304 stainless steel coatings	2013	Journal of Materials Engineering and Performance	22	366	**5**
Phanikumar, G., Chattopadhyay, K., Dutta, P.	Joining of dissimilar metals: Issues and modelling techniques	2011	Science and Technology of Welding and Joining	16	313	**5**
Gerald Tennyson, P., Kumar, P., Lakshmi, H., Phanikumar, G., Dutta, P.	Experimental studies and phase field modeling of microstructure evolution during solidification with electromagnetic stirring	2010	Transactions of Nonferrous Metals Society of China (English Edition)	20	s774	**5**
Biswas, K., Phanikumar, G., Herlach, D.M.,	Non-equilibrium solidification of concentrated Fe-Ge alloys	2007	Materials Science and Engineering A	448-451	12	**5**

Chattopadhyay, K.						
Srinivas, M., Majumdar, B., Phanikumar, G., Akhtar, D.	Effect of planar flow melt spinning parameters on ribbon formation in soft magnetic Fe68.5Si18.5B9Nb3Cu 1 alloy	2011	Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science	42	370	**4**
Nair, B.S., Rakesh, S., Phanikumar, G., Rao, K.P., Sinha, P.P.	Fracture toughness (J1C) of electron beam welded AA2219 alloy	2010	Materials and Design	31	4943	**4**
Khalid Rafi, H., Janaki Ram, G.D., Phanikumar, G., Prasad Rao, K.	Microstructure and properties of friction surfaced stainless steel and tool steel coatings	2010	Materials Science Forum	638-642	864	**4**
Kumar, K.S., Phanikumar, G., Dutta, P., Chattopadhyay, K.	Microstructural development of dissimilar weldments: Case of MiG welding of Cu with Fe filler	2002	Journal of Materials Science	37	2345	**4**
Prasad, R.V.S., Phanikumar, G.	Martensite and nanocrystalline phase formation in rapidly solidified Ni2MnGa alloy by melt-spinning	2010	Materials Science Forum	649	35	**3**
Prasad, R.V.S., Manivel Raja, M., Phanikumar, G.	Microstructure and magnetic properties of rapidly solidified Ni 2(Mn,Fe)Ga Heusler alloys	2009	Advanced Materials Research	74	215	**3**
Galenko, P.K., Herlach, D.M., Phanikumar, G., Funke, O.	Phase-field modeling of dendritic solidification in undercooled droplets processed by electromagnetic levitation	2006	Materials Science Forum	508	431	**3**
Herlach, D.M., Funke, O., Gandham, P., Galenko, P.	Free dendrite growth in undercooled melts: Experiments and modeling	2004	Solidification Processes and Microstructures: A Symposium in Honor of Wilfried Kurz		277	**3**
Chattopadhyay, K., Biswas, K., Bysakh, S., Phanikumar, G., Weisheit, A., Galun, R., Mordike, B.	Quasicrystalline coatings through laser processing: A study on process optimisation and microstructure evolution	2001	Materials Research Society Symposium - Proceedings	643	K1531	**3**
Prasad, R.V.S., Srinivas, M., Manivel Raja, M., Phanikumar, G.	Microstructure and magnetic properties of Ni2(Mn,Fe)Ga heusler alloys rapidly solidified by melt spinning	2014	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	45	2161	**2**
Khalid Rafi, H., Kishore Babu, N., Phanikumar, G., Prasad Rao, K.	Microstructural evolution during friction surfacing of austenitic stainless steel AISI 304 on low carbon steel	2013	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	44	345	**2**
Ravi, K.R., Manivannan, S., Phanikumar, G., Murty, B.S., Sundarraj, S.	Influence of Mg on grain refinement of near eutectic Al-Si alloys	2011	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	42	2028	**2**
Khalid Rafi, H., Janaki Ram, G.D., Phanikumar, G., Prasad Rao, K.	Friction surfacing of austenitic stainless steel on low carbon steel: Studies on the effects of traverse speed	2010	WCE 2010 - World Congress on Engineering 2010	2	1356	**2**
Balachandar, K., Sarma, V.S., Pant, B., Phanikumar, G.	Microstructure and mechanical properties of gas-tungsten-arc-welded Ti-15-3 beta titanium alloy	2009	Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science	40	2685	**2**
Lierfeld, T., Gandham, P., Kolbe, M., Schenk, T., Singer, H.M., Eggeler, G., Herlach,	Particle incorporation in metallic melts during dendritic solidification-undercooling experiments under reduced	2007	Materials Science and Engineering A	448-451	689	**2**

D.M.	gravity					
Nath, H., Phanikumar, G.	Microstructure and phase evolution of Ni2FeGa heusler alloy extended to different degrees of undercooling	2014	Materials Science Forum	790-791	199	**1**
Sandhya, S., Phanikumar, G.	Investigation of fusion weldments of semi-solid aluminium A356 alloy: Pool geometry and microstructure	2013	Materials Science Forum	765	751	**1**

(d) Awards and Prizes

1. Research Fellowship from the Alexander von Humboldt Foundation for the duration Nov-2003 to Jan-2005 to work with Prof. Dieter Herlach, German Aerospace Center, Cologne, Germany.

2. Young Metallurgist of the Year award from the Ministry of Steel and Mines conferred during the National Metallurgists Day of the Indian Institute of Metals on November 14, 2005. The award included a cash prize and a citation.

3. SAFRAN - French Embassy Special Prize 2007 conferred on October 23, 2007 at the French Embassy, New Delhi. The award included a citation, a one week sponsored visit to SAFRAN group of companies and ONERA, the French Aerospace Lab during March 2008 and a post-doctoral fellowship for four months at any French laboratory of choice during 2008. The fellowship was availed between May-Sept-2008 to work with Prof. Bernard Billia of IM2NP, Marseille, France on directional solidification of transparent systems.

(e) Research Guidance

(e1) Completed Ph.D. Guidance: 9

Sl. No.	Student Roll No.	Thesis Title	Graduation Year	Co-guide
1*	N. Sreedhar MT04D007	Studies on improvement of corrosion and wear resistance of aluminum alloys by micro arc oxidation	2007	Prof. K. Prasad Rao
2	Biju S. Nair MM05D012	Studies on gas tungsten arc and electron beam welded Al-6wt%Cu (AA2219) alloy	2009	Prof. K. Prasad Rao
3*	K.V. Sreenivasa Rao MM05D014	Spatial and temporal variation of metal-mold interface heat flux during gravity die-casting	2009	Prof. T.S. Prasanna Kumar
4	K. Balachandar MM05D007	Studies on GTA and EB welded metastable beta-titanium (Ti-15-3) alloy	2010	(Sole guidance)
5	R.V.S. Prasad MM06D001	Microstructure and properties of non-equilibrium solidified Ni_2MnGa and similar / doped alloys	2011	(Sole guidance)
6	H. Khalid Rafi MM08D002	Friction processing of dissimilar materials	2012	Prof. K. Prasad Rao
7	Kala Shirish R. ME09D021	Distortion control during welding using a trailing cryogenic heat sink	2014	Prof. N. Siva Prasad (ME)
8	P. Gerald Tennyson MM06D012	Microstructure simulation using Phase field and coupling thermodynamic data using CALPHAD approach.	2014	Prof. K.C. Hari Kumar
9*	Hrushikesh Nath MM10D005	Solidification of Heusler alloys	2015	(Sole guidance)

*Comments :

[1] My role as advisor for Mr. N. Sreedhar's thesis was limited to microstructure characterization and only since 06.07.2006.
[3] My role as advisor for Mr. K.V. Sreenivasa Rao was only since 10.03.2006.
[9] Reports of Mr. Hrusikesh Nath's thesis are received. Thesis viva on 27th March, 2015.

(e2) On-going Ph.D. Guidance: 6

Sl. No.	Name Roll No.	Area of research	Since	Co-guide
1	K. Lakshminarayanan ME11D006	Distortion in welding using CMT process	Feb-2011	Prof. N. Siva Prasad (ME, retired)
2	Dasari Mohan MM12D017	Phase field simulation of microstructure evolution in multi-component systems	August 2012	-
3	R. Ramakrishnan MM13D013 (ext)	Coupling phase-field with Molecular Dynamics	August 2013	-

4	M. Sankar MM13D015 (ext)	Experimental studies on Nb-Si-X system	August 2013	-
5	K. Rangan MM15D300 (ID/Staff)	Virtual Manufacturing	January 2015	Dr. G. L. Samuel (ME)
6	B. Nithin MM15D005	Studies on Co-based super alloys	January 2015	Prof. M. Sundararaman

(e3) Completed M.S. Guidance: 2

Sl. No.	Name Roll No.	Area of research	Graduation Year	Co-guide
1	S. Sandhya MM11S015	Simulation and Experimental Studies on Fusion Weldments of Rheocast Aluminium Alloys	2014	-
2	M. R. Rahul MM13S003	Microstructure evolution in HAZ of beta-Ti alloys using thermo-mechanical simulation and weld simulation	2015	-

(e4) Ongoing M.S. Guidance: 1

Sl. No.	Name Roll No.	Area of research	Since	Co-guide
2	Deepu Mathew John MM14S009	Homogenization to couple microstructures with mechanical behavior	August 2014	-

(e5) Completed M.Tech Guidance (including dual degree projects): 21

Chronological order of year of graduation

Sl. No.	Student Roll No.	Thesis Title	Gradu-ation Year	Co-guide
1	Amresh Kumar Gupta MT01B030	Microstructural evolution during remelting of LSA hypermonotectic Al+10wt%Bi+10wt%Cu alloy	2006	-
2	Prabhakar Choudhury MM05M008	Effect of welding parameter on microstructure and mechanical property of Al-Zn-Mg alloy weldment and in-situ temperature measurement	2007	-
3	David Vijayanand MM05M003	Friction welding of aluminum alloys	2007	-
4	Abhik N. Choudhury MT03B035	Phase field modeling of eutectic solidification	2008	-
5	Meduri Srinivas MM06M007	Processing and characterization of nanocrystalline Fe-Si-B-Nb-Cu alloys for ultrasoft magnetic applications	2008	Dr. B. Majumdar, Scientist E, DMRL, Hyderabad

6	R. Muthu Pandi MM07M010	Joining of alumina with austenitic stainless steel by active brazing	2009	-
7	Ramesh Gokul MM04B038	Friction stir welding of dissimilar aluminum alloys	2009	-
8	N. Sri Vishnu Rao MM08M015	Microstructure evolution of heat treated semi-solid Al-Si based alloys	2010	-
9	Mathew Joseph MM05B031	Solidification of undercooled Heusler alloys	2010	-
10	Sudhir Pawaskar MM09M021	Studies on inert gas furnace brazing of metastable beta Ti (15-3-3-3) to 316Ti SS	2011	
11	Ahmad Omar MM06B032	Studies on Non-equilibrium solidified Co-Fe-Sn system	2011	-
12	V. Santhanagopalan MM10M017	Joining of semi-solid processed aluminium alloy A 356	2012	
13	Sanket Navale MM07B030	Phase field simulation of snow metamorphism	2012	-
14	Annabattula V.V. Santosh Kumar CE10M195	Welding distortion analysis of high manganese steel	2012	
15	V.S. Sankar (Anna University)	Thermal analysis of friction stir spot welding process using finite element method	2012	Dr. Latha Nagendran (Anna University)
16	J. Dhananjeyan CE11M170	Thermal modeling of A-TIG welding and experimental validation	2013	-
17	Suryanaman Chaube MM08B024	Theoretical studies on modelling microstructural evolution using diffuse interface methods	2013	-
18	K. Venkata Muralidhar MM12M026	Simulation of vacuum arc remelting process using SYSWELD.	2014	-
19	Allu Naga Lakshmi Siva Sai MM09B002	Phase field simulation of polycrystalline solidification	2014	-
20	Mohammed Ashik V MM13M015	Repair welding of Ni-based superalloys	2015	Dr. Dheepa Srinivasan (GE Power & Water, Bangalore)
21	Manish Kumar Gupta MM10B024	Phase-field simulation of additive manufacturing	2015	-

(e6) Ongoing M.Tech Guidance (including dual degree projects): 1

Sl. No.	Student Roll No.	Thesis Title	Graduation Year	Co-guide
1	Ramani Agharkar MM11B036	Computational studies in manufacturing	2016	-

(e7) Completed B.Tech Project Guidance: 13

Chronological order of year of graduation

Sl. No.	Name Roll No.	Title of the Project Report	Graduation Year
1	Srikanth Sundararajan MT03B029	Phase-field computation for faceted growth for anisotropy of kinetic coefficient	2007
2	Anitha Tammineni MM04B003	Friction welding of copper and stainless steel 304	2008
3	Apoorva MM04B006	Non-equilibrium solidification of $Ni_{50}Mn_{37}Sn_{13}$ alloy	2008
4	Sunil Kumar MM05B023	Non-equilibrium solidification of $Ni_{50}Mn_{37}Sn_{13}$ alloy	2009
5	B.G. Chirranjeevi MM05B003	Phase field modeling of anisotropic solidification microstructures	2009
6	Aravind Krishnamurty MM06B004	Phase field simulation of microstructure evolution	2010
7	Priyank V. Kumar MM06B015	Modeling electron beam welding process	2010
8	A. Ravi Kant MM06B020	Friction processing of Magnesium and Aluminium Alloys	2010
9	Reshma Saira Mathew MM07B016	Studies on Non-equilibrium solidified Ni-Si eutectic alloy.	2011
10	R. Sivaraman MM07B018	Phase field simulation of microstructure evolution	2011
11	G.N. Sri Harsha MM08B009	Studies on Non-equilibrium solidified Ni-Si eutectic alloy.	2012
12	Arun B. MM10B007	Phase field simulation of microstructure evolution	2014
13	Harish Donthula MM10B017	Vacuum brazing of high temperature alloys to composites	2014

(f) Role in and details of externally funded projects

(f1) Sponsored Projects : 7

Total amount: (approx) **Rs. 281.36 Lacs**

Funding Agency	Title of the project	Amount Rs. (Lacs)	Duration	Remarks
ISRO	Setting up National Electromagnetic Levitation Facility at IIT Madras MET/05-06/071/ISRO/GPHA	**53.81**	12.04.2006 to 11.04.2009	My role is sole principal investigator.
ISRO-IITM Cell	Investigation of microstructure and mechanical properties of beta titanium alloy (15-3) weldments MET/05-06/099/ISRO/GPHA	**9.9**	12.09.2005 to 11.06.2009	My role is principal investigator. Dr. V. Subramanya Sarma, Prof. S.D. Pathak are co-investigators and Dr. Bhanu Pant is the ISRO counterpart. Dr. M. Nageswara Rao was co-investigator in the beginning but has left the institute shortly after the project started due to the closure of his visiting appointment.
NRB	Studies on friction surfaced coatings for wear and corrosion resistance MET/06-07/083/NRBX/KPRA	**37.51**	18.12.2006 to 31.12.2009	My role is co-investigator. Prof. Prasad Rao is principal investigator and Dr. G.D. Janaki Ram joined as co-investigator after June 2008.
DST	Residual stress and distortion control in welds using a trailing cryogenic heat sink MEE/09-10/256/DSTX/NSIV	**30.26**	14.09.2009 to 13.09.2012	My role is co-investigator and mainly on experimental aspects. This project helped me get into distortion simulations. Prof. N. Siva Prasad (ME) was the principal investigator.
DRDO	Development and implementation of a phase field model for snow metamorphism MET/10-11/118/DRDO/GPHA	**4.1**	27.01.2011 to 31.12.2012	My role is co-investigator. Project is actually in collaboration with IITB where Dr. M. P. Gururajan was the principal investigator.
TDB	Adhesive Joining Technologies MET/12-13/128/TDBX/GDJA	146	16.10.2012 to 31.03.2015	My role is negligible - only towards SYSWELD simulations. This project is not counted towards total number or funds.
ISRO – IITM Cell	Synthesis and thermo-mechanical processing effects on the microstructure and mechanical properties of Ti-Al-Ni-Cr-Co-Fe based multi-component/high-entropy alloys MET/13-14/148/ISRO/SRRB	**28.28**	31.10.2013 to 30.10.2016	My role is co-investigator and limited to undercooling studies on solidification of these alloys. Dr. Srinivasa Rao Bakshi is the principal investigator.
IGSTC	Combined process and alloy design of a micro-alloyed DP forging steel based in integrative computational material engineering (DP-Forge) MET/14-15/137/IGSTC/GPHA	**117.4**	16.02.2015 to 15.02.2018	My role is principal coordinator. Prof. S.S. Bhattacharya and Prof. K.C. Hari Kumar are co-investigators.

(f2) RBIC Projects : 4

Total amount: Rs. **44.86** Lacs.

Funding Agency	Title of the project	Amount Rs. (Lacs)	Duration	Remarks
General Motors	Solidification in aluminum alloys and the effect of grain refiners, modifiers, and other alloying additions.	**19.18**	01.01.2008 to 31.03.2010	My role is Principal Investigator. Prof. B.S. Murty and Dr. K.C. Hari Kumar are co-investigators.
General Electric	Microstructure simulation of multicomponent alloys	**22.5**	01.11.2013 to 31.01.2016	My role is Principal Investigator. Counterpart for collaboration from GE is Dr. Sanjay Sondhi.
General Electric	Preparation and testing of friction surfaced layers on steel substrates	**1.59**	01.05.2015 to 31.10.2015	My role is Principal Investigator. Counterpart from collaboration from GE is Dr. D. Kesavan.
IP Rings	Friction welding of dissimilar parts	**1.59**	01.05.2015 to 31.10.2015	My role is Principal Investigator. Prof. M. Kamaraj is co-investigator. Counterpart from collaboration from IP Rings is Dr. N. Gowrishankar.

(f3) Industrial Consultancy Projects: 1

Funding Agency	Title of the project	Amount Rs. (Lacs)	Duration	Remarks
Tata Steel	Course on Solidification	**1.64**	12.01.2015 to 14.03.2015	Processed through CCE

(g) Other Activities

(g1) Continuing Education:

1. Delivered lectures on Welding for BEML Management Trainees (August 2014)
2. Delivered lectures on Casting and Welding for HAL Management Trainees Jan-Apr-2006, Jul-Nov-2006 and Jan-Apr-2007.
3. Delivered lectures on Welding Metallurgy for SAEIT certificate programme under IITM-BHEL MoU during Jul-Nov-2006 and Jul-Nov-2007.
4. A number of invited lectures at workshops conducted by ASM Chennai Chapter, IIM Chennai Chapter, IIM Kalpakkam Chapter, IIM HRDC Kalpakkam-Chennai and NRC-M, IISc Bangalore.

(g2) Conference organization:

Name of the event	Duration	Role
International Symposium on Frontiers in Design of Materials, 43rd National Metallurgists' Day & 59th Annual Technical Meeting	12.11.2005 to 16.11.2005	Convener, Web Committee; Member, Registration Committee, LOC
International Symposium of Research Scholars: ISRS 2006	18.12.2006 to 20.12.2006	Convener of Web Committee & Treasurer
First in-house symposium for research scholars	01.04.2007	Co-ordinator along with Dr. V.S. Sarma
3rd Symposium on National Frontiers of Engineering, Indian National Academy of Engineering	25.08.2008	Member, Organizing Committee. Prof. B.S. Murty was convener and Prof. M.S. Ananth was Chairman.
International Symposium of Research Scholars: ISRS 2008	10.12.2008 to 12.12.2008	Convener, Web Committee
Fourth International Conference on Solidification Science and Processing: ICSSP4	19.11.2009 to 23.11.2009	Co-convener of the conference. Prof. B.S. Murty is the convener. Guest editor for ICSSP4 proceedings in Trans. IIM along with Prof. B.S. Murty and Prof. Lorenz Ratke.
International Symposium of Research Scholars: ISRS 2010	20.12.2010 to 22.12.2010	Co-convener for the symposium. Dr. S. Sankaran is the convener.
Indo-US workshop on ICME for integrated realization of engineered materials and products	18.12.2013 to 20.12.2013	Convener from Indian academic side. Prof.M. Chakraborty, Director of IIT Bhubaneswar was Chairman, Prof. Farrokh Mistry, University of Oklahama was Co-chairman. Dr. B. P. Gautham from TCS, Pune was Convener from Indian Industry side and Prof. Surya Kalidindi, Georgia Tech University was convener from US academic side.

(g3) Membership and involvement with professional bodies:

Membership:

1. Life member, Indian Institute of Metals (IIM)
2. Life member, Indian Welding Society (IWS)
3. Member, The Minerals, Metals and Materials Society (TMS)
4. e-Member, American Society of Metals (ASM)

Involvement:

1. Treasurer, IIM Chennai Chapter, 2005-2007
2. Treasurer and Faculty advisor, METSA, 2005-2007
3. Treasurer, IWS Chennai Centre, 2005-2007
4. Secretary, IIM Chennai Chapter, 2007-2008
5. Conducted Chennai round of Brahm Prakash Memorial Materials Quiz, 2007
6. Currently Member, EC of IIM Chennai Chapter and IWS Chennai Center.

Invitation:

1. Invited to be a participant for the "Indo-Americal Frontiers of Engineering Symposium (IAFOE)" by the Indo-US Science and Technology Forum to be held during March 10-13, 2010 at Agra.
2. Invited for a presentation and discussion on "Future directions of the science of microstructure" by the Indian Academy of Science, Bangalore to be held during February 21-24, 2010 at Coorg.

(g4) Interaction with other universities:

Evaluated and served as examiner for Ph.D. theses for Indian Institute of Science, Bangalore, IIT Kanpur, IIT Bombay and J.N.T. U. Hyderabad.

(g5) Journal reviewer assignments

I have been reviewing manuscripts in the areas of solidification, microstructure characterization, welding, computational modeling etc., for several journals from Elsevier, Springer and Nature Publishing group. I have received certificates of appreciation for excellence in reviewing from the editors of Metallurgical and Materials Transactions A and Journal of Crystal Growth.

(h) Institution building and student-centric roles

(h1) Institution building:

1. Wrote a software module to computerize the Departmental processes (workflow) related to stores and purchase: (http://mme.iitm.ac.in/MMEStores). The software is a module on drupal platform and written in php. This has been extended by Mr. Dhanabalan for use by Departments of EE and PH.

2. I setup an online system to collect and organize information for monthly and annual reports: (http://mme.iitm.ac.in/activities). The software is on drupal platform. In-charge for web-related initiatives in the Department from 2006 to 2011.

3. Institute representative for JEE and GATE as well as other confidential duties of GATE.

4. I have setup the following portals for the general utility of the institute.

https://www.iitm.ac.in/	Setup a bilingual website to serve as institute's main website as in-charge of IIT main website.
https://courses.iitm.ac.in/	to serve as central course management portal for all faculty and students, using Moodle.
https://facapp.iitm.ac.in/	for faculty application process to be completely online.
https://ccw.iitm.ac.in/	for hostel management to have online data availability.
http://photos.iitm.ac.in/	to serve as a photo archive for all employees and students used by workflow, hostel management and gymkhana
http://tenders.iitm.ac.in/	for employees to post their tenders
https://eservices.iitm.ac.in/fsportal/	for employees for aggregate statistics, surveys, documents, rate contracts, etc.

5. I am currently in-charge of e-services, P.G. Senapathy Centre for Computing Resources. In this role, I have ushered in virtualization in a big way. We now host more than 80 virtual machines for the institute saving physical space and power. Many new services have been launched and are listed in the eservices portal. Currently the central email system is being renewed into a virtualized mode. I have also been acting as nodal officer for data from IIT Madras for IIT Council website.

(h2) Student-centric role

I have served as Warden, Mahanadhi Hostel from 2010 to 2013. During this period, I have been helping the hostel administration in computerization of their processes. This task is continuing as on date.

(i) Any other information

Guest Editor along with Prof. Lorenz Ratke and Prof. B.S. Murty for the volume 62, Issue 4-5, August-October 2009 of the **Transactions of the Indian Institute of Metals**, a Springer international journal of minerals, metals and materials engineering - A technical publication of the Indian Institute of Metals viz., Proceedings of 4th International Conference on Solidification Science & Processing.

Guest Editor along with Prof. B.S. Murty for a thematic issue in the IITM's journal "**Internal Journal of Advances in Engineering Sciences and Applied Mathematics**" - a Springer international journal. The theme of the issue was "Microstructure Engineering of Materials"which was Issue 4 of Volume 2 dated December 2010.