



## **Dr. G.D. Janaki Ram**

Professor

Department of Materials Science and Metallurgical Engineering

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### **1. Education**

- Ph.D., Metallurgical and Materials Engineering, IIT Madras, Chennai, Mar. 2005
- M.Tech., Metallurgical Engineering, IIT Madras, Chennai, Dec. 1997
- Associate Membership Examination of Indian Institute of Metals (AMIIM), Indian Institute of Metals, Kolkata, Dec. 1995
- Diploma in Metallurgical Engineering, Govt. Polytechnic, Vijayawada, Jan. 1993

### **2. Employment**

- February 2020 – Present: Professor, Dept. of Materials Science and Metallurgical Engineering, IIT Hyderabad, Kandi, Telangana.
- July 2018 – January 2020: Professor, Dept. of Metallurgical and Materials Engineering, IIT Madras, Chennai.
- July 2013 – June 2018: Associate Professor, Dept. of Metallurgical and Materials Engineering, IIT Madras, Chennai.
- June 2008 – June 2013: Assistant Professor, Dept. of Metallurgical and Materials Engineering, IIT Madras, Chennai.
- July 2005 – May 2008: Post-Doctoral Researcher/Adjunct Assistant Professor, Dept. of Mechanical and Aerospace Engineering, Utah State University, Logan, USA.
- Sept. 1998 – July 2005: Scientist, Regional Centre for Military Airworthiness (Materials), Defence Research and Development Organisation, Hyderabad.
- Feb. 1998 – Sept. 1998: Senior Project Officer Gr. II, Dept. of Metallurgical Engineering, IIT Madras, Chennai.
- Dec. 1993 – Oct. 1995: Asst. Shift Metallurgist, Nava Bharat Ferro Alloys Limited, Paloncha.

### **3. Visiting Assignments**

- Nov. 2018 – Jan. 2019: Harrison McCain Visiting Professor, Dept. of Mechanical Engineering, University of New Brunswick, Fredericton, Canada.
- Aug. 2015 – Mar. 2016 (on sabbatical leave): Visiting Professor, Dept. of Industrial Engineering, University of Louisville, Kentucky, USA.

### **4. Expertise and Research Interests**

- Welding and Materials Joining, Additive manufacturing, Metallurgical failure analysis

## 5. Teaching

*IIT Madras (from 2008 to 2019)*

- Additive Manufacturing (MM5250)
- Welding Processes (MM5012)
- Welding Metallurgy (MM5740)
- Welding Application Technology (MM5750)
- Advanced Topics in Materials Joining (MM5760)
- Metal Joining Technology (MM3060)
- Welding Laboratory (MM5770)

*IIT Hyderabad*

- Metal Joining (MS3240)

## 6. Sponsored Research Projects

*Ongoing research projects at IIT Madras (Role, Title, Sponsor, Grant, Start Date)*

1. Co-Investigator (PI: K. Ravi Sankar), Characterization of selective laser melted Inconel 718 and Ti-6Al-4V (MET/17-18/165/DRDO/GDJA), DRDO, Rs. 161.52 lakhs, Jun. 2017.
2. Co-Investigator (PI: A. Murugaiyan), Welding of advanced high strength steels (under Centre of Excellence in Steel Technology, MET/16-17/148/MSTE/HODX), Rs. 600 lakhs, Ministry of Steel, May 2016.
3. Co-Investigator (PI: K. Ravi Sankar), Creep behavior of P91/Super304H steel dissimilar welds (under Centre of Excellence in Steel Technology, MET/16-17/148/MSTE/HODX), Rs. 150 lakhs, Ministry of Steel, May 2016.
4. Co-Investigator (PI: A. Murugaiyan), Engineering safe weld microstructures against hydrogen embrittlement (MET/16-17/159/DSTX/MURG), DST, Rs. 96 lakhs, Mar. 2017.
5. Co-Investigator (PI: B.S. Murty), Advanced manufacturing of new high entropy alloys (MET/17-18/176/DSTX/BSMT), DST-AISRF, Rs. 68 lakhs, Oct. 2017.
6. Co-Investigator (PI: A. Murugaiyan), Alloy development for additive manufacturing of prostheses and reconstructive implants, DST-RCN, Rs. 48.97 lakhs, 2020 (Norwegian counterpart: University of Stavanger).

*Completed research projects (Role, Title, Sponsor, Grant, End Date)*

7. Principal Investigator, Friction stir spot welding of aluminum alloy 2014 (MET/08-09/125/ISRO/GDJA), ISRO, Rs. 15.46 lakhs, Aug. 2011.
8. Principal Investigator, Aluminum structures for deep-sea mining crawlers (RB/10-11/MET/001/NIOT/GDJA), NIOT, Rs. 33.56 lakhs, Jun. 2012.
9. Principal Investigator, Studies on creep behavior of P91 and P92 steel welds (RB/11-12/MET/004/BHEL/GDJA), BHEL, Rs. 20.92 lakhs, Dec. 2012.
10. Principal Investigator, Joining of stainless steel pipes to titanium pipes (MET/09-10/107/IGCA/GDJA), IGCAR, Rs. 21.45 lakhs, Sept. 2013.
11. Principal Investigator, A new route to produce titanium matrix composites (MET/09-10/108/NRBX/GDJA), NRB, Rs. 34.45 lakhs, Aug. 2013.

12. Principal Investigator, Enhancing ballistic performance of armor welds using carbide-free bainite fillers (MET/09-10/113/DRDO/GDJA), ARMREB, Rs. 9.48 lakhs, Apr. 2013.
13. Principal Investigator, Use of friction surfacing for surface protection and repair (MET/11-12/120/NRBX/KPRA), NRB, Rs. 49.52 lakhs, Jul. 2014.
14. Principal Investigator (Multi-Join consortium project, ARCI), Adhesive bonding of automotive materials (MET/12-13/128/TDBX/GDJA), DST-TDB, Rs. 168 lakhs, Mar. 2017.
15. Principal Investigator, Weld repair of XH43 and XH67 superalloy castings (MET/16-17/169/ISRO/GDJA), ISRO, Rs. 27.68 lakhs, Oct. 2018.
16. Co-Investigator (PI: K. Ravi Sankar), Development of high-entropy alloy bond coats for gas turbine applications, ARDB, DRDO (under GTMAP program), Rs. 24 lakhs, Feb. 2020.
17. Co-Investigator (PI: S.K. Panigrahi), Development of aluminum-stainless steel transition joints (MEE/12-13/142/ISRO/SUSH), ISRO, Rs. 25.03 lakhs, May 2016.
18. Co-Investigator (PI: M. Kamaraj), Use of cold metal transfer MIG welding process for surfacing applications (MET/11-12/124/NRBX/MKAM), NRB, Rs. 34.56 lakhs, May 2014.
19. Co-Investigator (PI: Ranjit Bauri), Development of high strength and ductile aluminum alloy composites using friction stir processing (MET/11-12/121/NRBX/RANJ), NRB, Rs. 27.26 lakhs, Aug. 2014.
20. Co-Investigator (PI: K. Prasad Rao), Cutting and machining of borated stainless steels (MET/10-11/115/BRFS/KPRA), BRFS, Rs. 60 lakhs, Feb. 2012.
21. Co-Investigator (PI: K. Prasad Rao), Studies on friction surfaced stellite coatings (RB/11-12/MET/002/BHEL/KPRA), BHEL, Rs. 19.85 lakhs, Aug. 2012.

## 7. Industrial Consultancy

### *Completed consultancy projects (Role, Title, Industry, Value, End Date)*

1. Principal Investigator, Metallurgical design basis for construction of Chhatrapati Shivaji Maharaj Memorial (RC/18-19/MET/770/L&TN/GDJA), L&T Construction, Buildings & Factories, Rs. 5 lakhs, Jan. 2020.
2. Principal Investigator, Construction of airport at Port Blair (RC/18-19/MET/766/SPCL/GDJA), Shapoorji Pallonji and Company Private Limited, Rs. 3.54 lakhs, Mar. 2019.
3. Principal Investigator, Microstructural analysis of brazed aluminum components (IC/18-19/MET/005/HASI/GDJA), Hanon Automotive Systems India Pvt. Ltd., Rs. 4.86 lakhs, Aug. 2019.
4. Principal Investigator, Weldability testing of power plant steels (IC/18-19/MET/003/LTSS/GDJA), L&T Special Steels and Heavy Forgings, Rs. 2.12 lakhs, Jul. 2018.
5. Principal Investigator, Construction of Statue of Unity (RC/17-18/MET/731/L&TN/GDJA), L&T Construction, Buildings & Factories, Rs. 3.45 lakhs, May 2018.
6. Principal Investigator, Failure analysis of coke-cutting pump impellers (IC/18-19/MET/001/CPCL/GDJA), Chennai Petroleum Corporation Limited, Rs. 4.72 lakhs, Nov. 2018.
7. Principal Investigator, Analysis of compressor shaft failures (IC/17-18/MET/002/HASI/GDJA), Hanon Automotive Systems India Pvt. Ltd., Rs. 3.89 lakhs, Sept. 2017.
8. Principal Investigator, Bainitic hardening of bearing steels (IC/16-17/MET/003/NATR/GDJA), National Engineering Industries Ltd., Rs. 6.72 lakhs, Sept. 2017.
9. Principal Investigator, Hot ductility testing of borated stainless steels (IC/15-16/MET/008/IGCA/GDJA), IGCAR, Rs. 4.08 lakhs, Jan. 2016.
10. Principal Investigator, Failure analysis of evaporator core assemblies (IC/11-12/MET/017/WISE/GDJA), Visteon Automotive Systems, Rs. 2.53 lakhs, Jul. 2011.

11. Principal Investigator, Failure analysis of sour gas compressor (204K03B) suction and discharge volume bottle components (IC/10-11/MET/051/CPCL/GDJA), Chennai Petroleum Corporation Limited, Rs. 1.65 lakhs, Apr. 2011.
12. Principal Investigator, Analysis of solenoid failures (IC/10-11/MET/044/COMA/GDJA), Comstar Automotive Technologies Pvt. Ltd., Chennai, Rs. 0.83 lakhs, Mar. 2011.
13. Principal Investigator, Failure analysis of RTB assembly (IC/10-11/MET/021/CAPA/GDJA), Caparo Engineering India Ltd., Rs. 0.44 lakhs, Aug. 2010.
14. Principal Investigator, Characterization of submerged arc welding fluxes (IC/10-11/MET/018/CORE/GDJA), Corewire Surface Technologies Pvt. Ltd., Rs. 0.99 lakhs, Aug. 2010.
15. Principal Investigator, Microstructural analysis of duplex stainless steel weld overlay coatings (IC/10-11/MET/013/GALR/GDJA), Galfar Engineering, Muscat, Rs. 1.93 lakhs, Jun. 2010.
16. Principal Investigator, Failure analysis of crude tank 20-D-105 bottom plate (IC/10-11/MET/001/CPCL/GDJA), Chennai Petroleum Corporation Limited, Rs. 1.37 lakhs, Apr. 2010.
17. Principal Investigator, Through-thickness tensile testing of steel plates (IC/09-10/MET/057/SAIL/GDJA and IC/10-11/MET/030/SAIL/GDJA), Steel Authority of India Limited, Rs. 3.10 lakhs, Sept. 2010.
18. Principal Investigator, Soldering of aluminum to copper wires (IC/09-10/MET/046/V-GU/GDJA, V-Guard Industries, Rs. 0.55 lakhs, Feb. 2010.
19. Principal Investigator, Failure analysis of 5Cr-0.5Mo elbow to flange weld (13-C-03 Reactor Inlet Spool) (IC/09-10/MET/022/CPCL/GDJA), Chennai Petroleum Corporation Limited, Rs. 0.77 lakhs, Aug. 2009.
20. Principal Investigator, Failure analysis of stainless steel cooking vessels (IC/09-10/MET/011/SHIP/GDJA), Shilpa Stainless, Rs. 0.22 lakhs, Jun. 2009.
21. Co-Investigator (PI: M. Amirthalingam), Weldability testing of AUSC power plant materials (RB/17-18/MET/004/IGCA/MURG), IGCAR, Rs. 13.07 lakhs, Dec. 2018.
22. Co-Investigator (PI: V.S. Sarma), Investigation of aluminium press ring failures, Grid Solutions (GE-Alstom), 0.82 lakhs, Mar. 2016.
23. Co-Investigator (PI: S.R. Bakshi), Characterization of advanced steels and their weldments (RB/14-15/MET/005/JSWS/SRRB), JSW Limited, Rs. 4.77 lakhs, May 2015.
24. Co-Investigator (PI: V.S. Sarma), Investigation of UT indications in ERW pipes, Welspun Corp. Ltd., Versamedi, Rs. 1.78 lakhs, Mar. 2012.
25. Co-Investigator (PI: V.S. Sarma), Analysis of a hydro test pipe failure, Welspun Corp. Ltd., Rs. 1.65 lakhs, Feb. 2012.

## 8. Patents

1. Laser Based Metal Deposition (LBMD) of Implant Structures, D.F. Justin, B.E. Stucker, T.W. Fallin, G.D. Janaki Ram, U.S. Patent 7,666,522, Feb., 2010.
2. Laser Based Metal Deposition (LBMD) of Antimicrobials to Implant Surfaces, D.F. Justin, B.E. Stucker, G.D. Janaki Ram, D.W. Britt, U.S. Patent 7,951,412, May, 2011.
3. Surface Roughness Reduction for Improving Bonding in Ultrasonic Consolidation Rapid Manufacturing, B.E. Stucker and G.D. Janaki Ram, US20070295440 A1, published Dec. 2007, patent pending.
4. Cellulosic Particles Based One-Component Polyurethane Adhesive and Method of Preparing the Same, L.R. Bhagavathi, A.P. Deshpande, G.D. Janaki Ram, S.K. Panigrahi, Indian Patent Application # 201941040087, 03.10.2019, Patent pending.

## 9. Publications

### *Refereed Journals*

1. S. Sundaresan and G.D. Janaki Ram, Use of magnetic arc oscillation for grain refinement of gas tungsten arc welds in  $\alpha$ - $\beta$  titanium alloys, *Science and Technology of Welding and Joining*, 4, 1999, 151-160.
2. S. Sundaresan, G.D. Janaki Ram, and G. Madhusudhan Reddy, Microstructural refinement of weld fusion zones in  $\alpha$ - $\beta$  titanium alloys using pulsed current welding, *Materials Science and Engineering A*, A262, 1999, 88-100.
3. G.D. Janaki Ram, R. Murugesan, and S. Sundaresan, Fusion zone grain refinement in aluminium alloy welds through magnetic arc oscillation and its effect on tensile behavior, *Journal of Materials Engineering and Performance*, 8 (5), 1999, 513-520.
4. G.D. Janaki Ram, T.K. Mitra, M.K. Raju, and S. Sundaresan, Use of inoculants to refine weld solidification structure and improve weldability in type 2090 Al-Li alloy, *Materials Science and Engineering A*, A276, 2000, 48-57.
5. S. Sundaresan, G.D. Janaki Ram, R. Murugesan, and N. Viswanathan, Combined effect of inoculation and magnetic arc oscillation on microstructure and tensile behaviour of type 2090 Al-Li alloy weld fusion zones, *Science and Technology of Welding and Joining*, 5 (4), 2000, 257-264.
6. G.D. Janaki Ram, G.M. Reddy, and S. Sundaresan, Effect of pulsed welding current on the solidification structures in Al-Li-Cu and Al-Zn-Mg alloy welds, *Practical Metallography*, 37 (5), 2000, 276-288.
7. G.D. Janaki Ram, T.K. Mitra, V. Shankar, and S. Sundaresan, Microstructural refinement through inoculation of 7020 Al-Zn-Mg alloy welds and its effect on hot cracking and tensile properties, *Journal of Material Processing Technology*, 142, 2003, 174-181.
8. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, and G. Madhusudhan Reddy, Control of Laves phase in Inconel 718 GTA welds with current pulsing, *Science and Technology of Welding and Joining*, 9 (5), 2004, 390-398.
9. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, and G. Madhusudhan Reddy, Improvement in stress rupture properties of Inconel 718 GTA welds using current pulsing, *Journal of Materials Science*, 40 (6), 2005, 1497-1500.
10. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, G. Madhusudhan Reddy, and J.K.S. Sundar, Microstructure and tensile properties of Inconel 718 pulsed Nd-YAG laser welds, *Journal of Material Processing Technology*, 167 (1), 2005, 73-82.
11. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, and G. Madhusudhan Reddy, Microstructural characterization of Inconel 718 gas tungsten arc welds, *Practical Metallography*, 42 (10), 2005, 481-498.
12. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, and G. Madhusudhan Reddy, Microstructure and mechanical properties of Inconel 718 electron beam welds, *Materials Science and Technology*, 21 (10), 2005, 1132-1138.
13. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, and G. Madhusudhan Reddy, High temperature mechanical properties of Inconel 718 pulsed Nd-YAG laser welds, *Materials at High Temperatures*, 23 (1), 2006, 29-37.
14. G.D. Janaki Ram, A. Venugopal Reddy, K. Prasad Rao, G. Madhusudhan Reddy, and A. Sambasiva Rao, Effect of magnetic arc oscillation on microstructure and properties of Inconel 718 GTA welds, *Transactions of The Indian Institute of Metals*, 59 (1), 2006, 87-95.

15. G.D. Janaki Ram, Y. Yang, and B.E. Stucker, Effect of process parameters on bond formation during ultrasonic consolidation of aluminum alloy 3003, *Journal of Manufacturing Systems*, 25 (3), 2006, 221-238.
16. B. Vamsi Krishna and G.D. Janaki Ram, Tailoring the precipitation in Al alloys through local plastic deformation, *Materials & Design*, 28, 2007, 2239-2243.
17. G.D. Janaki Ram, C. Robinson, Y. Yang, and B.E. Stucker, Use of ultrasonic consolidation for fabrication of multi-material structures, *Rapid Prototyping Journal*, 13 (4), 2007, 226-235.
18. Y. Yang, G.D. Janaki Ram, and B.E. Stucker, An experimental determination of optimum process parameters for fabrication of fiber reinforced aluminum matrix composites using ultrasonic consolidation, *Journal of Engineering Materials and Technology – Transactions of the ASME*, 129, 2007, 538-549.
19. V. Gopala Krishna, G.D. Janaki Ram, Ch.V.S. Murty, M. Srinivas, and A. Venugopal Reddy, Metallurgical investigation of defects in superalloy 718 mill forms intended for aerogine applications, *Practical Metallography*, 45 (10), 2008, 495-504.
20. G.D. Janaki Ram, C.K. Esplin, and B.E. Stucker, Microstructure and wear properties of LENS deposited medical grade CoCrMo, *Journal of Materials Science: Materials in Medicine*, 9 (5), 2008, 2105-2111.
21. B.L. Adams, C. Nylander, B. Aydelotte, S. Ahmadi, C. Landon, B.E. Stucker, and G.D. Janaki Ram, Accessing the elastic-plastic properties closure by rotation and lamination, *Acta Materialia*, 56 (1), 2008, 128-139.
22. G.D. Janaki Ram and B.E. Stucker, A feasibility study of LENS deposition of CoCrMo coatings on titanium implant structures, *Trans. ASME: Journal of Manufacturing Science and Engineering*, 130 (2), 2008, 0245031-0245035.
23. K. Prasad Rao, G.D. Janaki Ram, and B.E. Stucker, Improvement in corrosion resistance of friction stir welded aluminum alloys with micro arc oxidation coatings, *Scripta Materialia*, 58 (11), 2008, 998-1001.
24. S. Salmon, M. Swank, G.D. Janaki Ram, B.E. Stucker, and J.A. Palmer, Effectiveness of epoxy staking of fasteners in aerospace applications, *Assembly Automation*, 29 (4), 2009, 341-347.
25. Y. Yang, G.D. Janaki Ram, and B.E. Stucker, Bond formation and fiber embedment during ultrasonic consolidation, *Journal of Materials Processing Technology*, 209 (10), 2009, 4915-4924.
26. J. Obelodan, G.D. Janaki Ram, B.E. Stucker, and D. Taggart, Minimizing defects between adjacent foils in ultrasonically consolidated parts, *Journal of Engineering Materials and Technology*, 132 (1), 2010, 1-8.
27. Y. Yang, G.D. Janaki Ram, and B.E. Stucker, An analytical energy model for metal foil deposition in ultrasonic consolidation, *Rapid Prototyping Journal*, 16 (1), 2010, 20-28.
28. Y. Yang, B.E. Stucker, and G.D. Janaki Ram, Mechanical properties and microstructures of SiC fiber-reinforced metal matrix composites made using ultrasonic consolidation, *Journal of Composite Materials*, 44 (26), 2010, 3179-3194.
29. J.J.S. Dilip, M. Koilraj, V. Sundareswaran, G.D. Janaki Ram, and S.R.K. Rao, Microstructural characterization of dissimilar friction stir welds between AA2219 and AA5083, *Transactions of The Indian Institute of Metals*, 63 (4), 2010, 757-764.
30. K. Prasad Rao, G.D. Janaki Ram, and B.E. Stucker, Effect of friction stir processing on corrosion resistance of aluminum–copper alloy gas tungsten arc welds, *Materials & Design*, 31 (3), 2010, 1576-1580.
31. K.L. Harikrishna, J.J.S. Dilip, K.R. Choudary, V.V.S. Rao, S.R.K. Rao, G.D. Janaki Ram, N. Sridhar, and G.M. Reddy, Friction stir welding of magnesium alloy ZM21, *Transactions of The Indian Institute of Metals*, 63 (5), 2010, 807-811.

32. H.K. Rafi, G.D. Janaki Ram, G. Phanikumar, and K. Prasad Rao, 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), 2010, 232-242.
33. H.K. 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), 2010, 2375-2380.
34. H.K. Rafi, G.D. Janaki Ram, G. Phanikumar, and K. Prasad Rao, Microstructure and properties of friction surfaced stainless steel and tool steel coatings, *Materials Science Forum*, 638-642, 2010, 864-869.
35. H.K. Rafi, G.D. Janaki Ram, G. Phanikumar, and K. Prasad Rao, Microstructural evolution during friction surfacing of tool steel H13, *Materials & Design*, 32 (1), 2011, 82-87.
36. R. Puli, E. Nandha Kumar, and G.D. Janaki Ram, Characterization of friction surfaced martensitic stainless steel AISI 410 coatings, *Transactions of The Indian Institute of Metals*, 64 (1-2), 2011, 41-45.
37. J.J.S. Dilip, H.K. Rafi, and G.D. Janaki Ram, A new additive manufacturing process based on friction deposition, *Transactions of The Indian Institute of Metals*, 64, 2011, 27-30.
38. C.J. Robinson, G.D. Janaki Ram, and B.E. Stucker, Role of substrate stiffness in ultrasonic consolidation, *International Journal of Rapid Manufacturing*, 2 (3), 2011, 162-177.
39. S. Babu, G.D. Janaki Ram, P.V. Venkitakrishnan, G. Madhusudhan Reddy, and K. Prasad Rao, Friction stir lap welding of aluminum alloy AA2014, *Journal of Materials Science and Technology*, 28 (5), 2012, 414-426.
40. J.J.S. Dilip, G.D. Janaki Ram, and B.E. Stucker, Additive manufacturing with friction welding and friction deposition processes, *International Journal of Rapid Manufacturing*, 3 (1), 2012, 56-69.
41. R. Puli and G.D. Janaki Ram, Corrosion performance of AISI 316L friction surfaced coatings, *Corrosion Science*, 62, 2012, 95-103.
42. K. Prasad Rao, R. Damodaram, H. Khalid Rafi, G.D. Janaki Ram, G. Madhusudhan Reddy, and R. Nagalakshmi, Friction surfaced Stellite 6 coatings, *Materials Characterization*, 70, 2012, 111-116.
43. R. Puli and G.D. Janaki Ram, Microstructures and properties of friction surfaced coatings in AISI 440C martensitic stainless steel, *Surface and Coatings Technology*, 207, 2012, 310-318.
44. R. Puli and G.D. Janaki Ram, Wear and corrosion performance of AISI 410 martensitic stainless steel coatings produced using friction surfacing and manual metal arc welding, *Surface and Coatings Technology*, 209, 2012, 1-7.
45. R. Puli and G.D. Janaki Ram, Dynamic recrystallization in friction surfaced austenitic stainless steel coatings, *Materials Characterization*, 74, 2012, 49-54.
46. K. Prasad Rao, Arun Sankar, H. Khalid Rafi, G. D. Janaki Ram, and G. Madhusudhan Reddy, Friction surfacing on nonferrous substrates: A feasibility study, *International Journal of Advanced Manufacturing Technology*, 65 (5-8), 2013, 755-762.
47. S. Babu, V.S. Sankar, G.D. Janaki Ram, P.V. Venkitakrishnan, G. Madhusudhan Reddy, and K. Prasad Rao, Microstructures and mechanical properties of friction stir spot welded aluminum alloy AA2014, *Journal of Materials Engineering and Performance*, 22 (1), 2013, 71-84.
48. J.J.S. Dilip, S. Babu, S. Varadha Rajan, K.H. Rafi, G.D. Janaki Ram, and B.E. Stucker, Use of friction surfacing for additive manufacturing, *Materials and Manufacturing Processes*, 28 (2), 2013, 189-194.
49. J.J.S. Dilip and G.D. Janaki Ram, Microstructures and properties of friction freeform fabricated borated stainless steel, *Journal of Materials Engineering and Performance*, 22, 2013, 3034-3042.

50. Vamsi Krishna Balla, Mitun Das, Sreyashree Bose, G.D. Janaki Ram, and Indranil Manna, Laser surface modification of 316 L stainless steel with bioactive hydroxyapatite, *Materials Science and Engineering C*, 33, 2013, 4594-4598.
51. J.J.S. Dilip and G.D. Janaki Ram, Microstructure evolution in aluminum alloy AA 2014 during multi-layer friction deposition, *Materials Characterization*, 86, 2013, 146-151.
52. J.J.S. Dilip and G.D. Janaki Ram, Friction freeform fabrication of superalloy Inconel 718 – Prospects and problems, *Metallurgical and Materials Transactions B*, 45, 2014, 182-192.
53. N. Krishna Murthy, G.D. Janaki Ram, B.S. Murty, G.M. Reddy, and T.J.P. Rao, Carbide-free bainitic weld metal: A new concept in welding of armor steels, *Metallurgical and Materials Transactions B*, 45 (6), 2014, 2327-2337.
54. N. Naveen Kumar, G.D. Janaki Ram, S.S. Bhattacharya, H.C. Dey, and S.K. Albert, Spark plasma welding of austenitic stainless steel AISI 304L to commercially pure titanium, *Trans. Indian Inst. Met.* 68 (2), 2015, 289-297.
55. T.N. Prasanthi, C. Sudha, Ravikiran, S. Saroja, N. Naveen Kumar, and G.D. Janaki Ram, Friction welding of mild steel and titanium: Optimization of process parameters and evolution of interface microstructure, *Materials and Design*, 88, 2015, 58-68.
56. C.N. Shyam Kumar, Devinder Yadav, Ranjit Bauri, G.D. Janaki Ram, Effects of ball milling and particle size on microstructure and properties of 5083 Al-Ni composites fabricated by friction stir processing, *Materials Science and Engineering: A*, 645, 2015, 205-212.
57. Ranjit Bauri, G.D. Janaki Ram, Devinder Yadav, C.N. Shyam Kumar, Effect of process parameters and tool geometry on fabrication of Ni particles reinforced 5083 Al composite by friction stir processing, *Materials Today: Proceedings*, 2 (4-5), 2015, 3203-3211.
58. Ranjit Bauri, Devinder Yadav, C.N. Shyam Kumar, G.D. Janaki Ram, Optimized process parameters for fabricating metal particles reinforced 5083 Al composite by friction stir processing. *Data in Brief*, 2015, 309-313.
59. P.R. Guru, F. Khan MD, S.K. Panigrahi, G.D. Janaki Ram, Enhancing strength, ductility and machinability of a Al-Si cast alloy by friction stir processing, *Journal of Manufacturing Processes*, 18, 2015, 67-74.
60. G. Raja Kumar, G.D. Janaki Ram, and S.R. Koteswara Rao, Microstructure and mechanical properties of borated stainless steel GTA and SMA welds, *La Metallurgia Italiana*, 5, 2015, 47-52.
61. G. Raja Kumar, G.D. Janaki Ram, and S.R. Koteswara Rao, Effect of beam oscillation on borated stainless steel electron beam welds, *Materials Testing*, 57 (6), 2015, 489-494.
62. H. Gong, K. Rafi, H. Gu, G.D. Janaki Ram, T. Starr, B. Stucker, Influence of defects on mechanical properties of Ti-6Al-4V components produced by selective laser melting and electron beam melting, *Materials & Design*, 86, 2015, 545-554.
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  31. G.M. Karthik, B. Lakshmana Rao, E. Nandha Kumar, G.D. Janaki Ram, Ravi Sankar Kottada, Effect of friction stir processing on heat-affected zone liquation cracking resistance of aluminum-copper alloy AA2219, 53<sup>rd</sup> National Metallurgists' Day & 69<sup>th</sup> Annual Technical Meeting of the Indian Institute of Metals (NMD-ATM 2015), Nov. 13-16, 2015, Hotel Le Meridien, Coimbatore, India.
  32. R.S. Panikar, G.M. Karthik, G.D. Janaki Ram, Ravi Sankar Kottada, Friction deposition of novel metal-metal composite, 53<sup>rd</sup> National Metallurgists' Day & 69<sup>th</sup> Annual Technical Meeting of the Indian Institute of Metals (NMD-ATM 2015), Nov. 13-16, 2015, Hotel Le Meridien, Coimbatore, India.
  33. S. Shankar, G.N.D.P. Praveen, G.M. Karthik, G.D. Janaki Ram, R. Vijay, A.V. Reddy, G. Sundararajan, Microstructure and mechanical properties of friction welded 9Cr ferritic-martensitic and 18Cr ferritic ODS steels, 53<sup>rd</sup> National Metallurgists' Day & 69<sup>th</sup> Annual Technical Meeting of the Indian Institute of Metals (NMD-ATM 2015), Nov. 13-16, 2015, Hotel Le Meridien, Coimbatore, India (*awarded best poster*).
  34. G.M. Karthik, G.D. Janaki Ram, Ravi Sankar Kottada, Improving heat-affected zone liquation cracking resistance of magnesium alloy AZ91E by friction stir processing, 144<sup>th</sup> Annual Meeting & Exhibition of The Minerals, Metals & Materials Society (TMS 2015), Mar. 15-19, 2015, Orlando, FL, USA.
  35. G.M. Karthik and G.D. Janaki Ram, Friction welding of aluminum to magnesium: A novel approach, 144<sup>th</sup> Annual Meeting & Exhibition of The Minerals, Metals & Materials Society (TMS 2015), Mar. 15-19, 2015, Orlando, FL, USA.
  36. N.T.B.N. Koundinya, G.M. Karthik, G.D. Janaki Ram, Ravi Sankar Kottada, Deformation behavior of friction stir processed magnesium alloy, 10<sup>th</sup> International Conference on Magnesium Alloys and Their Applications (Mg 2015), Oct. 11-16, 2015, Jeju, Korea.

37. R. Sivaraman, G.D. Janaki Ram and M. Kamaraj, Microstructure control during resistance spot welding of a dual phase steel, National Welding Seminar, Jan 22-24, 2015, The Indian Institute of Welding, Jamshedpur, India.
38. P. Jojibabu, G.D. Janaki Ram, Srinivasa Rao Bakshi, Abhijit P Deshpande, Hygrothermal Aging effects on the nano-carbon reinforced epoxy adhesive joints, International symposium Polymer Science and Technology (Macro 2015), 23-26 January, 2015, Kolkata.
39. G.M. Karthik, G.D. Janaki Ram, Ravi Sankar Kottada, Use of friction deposition for improved heat-affected zone liquation cracking resistance in nickel-base superalloys, In-House Symposium (IHS 2015), Dept. of Metallurgical & Materials Engineering, Jan. 27-28, 2016, IIT Madras, Chennai, India (*awarded best oral presentation*).
40. P. Jojibabu, G.D. Janaki Ram, Srinivasa Rao Bakshi, Abhijit P Deshpande, Effect of carbon nano-filler addition on the durability of epoxy adhesive joints subjected to hygrothermal aging, In-House Symposium (IHS 2015), Dept. of Metallurgical & Materials Engineering, Jan. 27-28, 2016, IIT Madras, Chennai, India (*awarded best oral presentation*).
41. G.M. Karthik, G.D. Janaki Ram, Ravi Sankar Kottada, Friction stir processing as a technique for improving HAZ liquation cracking resistance in magnesium alloys, International Conference and Expo on Magnesium (IMagCon 2016), Indian Institute of Metals & VIT University, Feb. 4-6, 2016, VIT University, Chennai, India (*awarded best oral presentation*).
42. R. Sivaraman, G.V. Sarathkumar, G.D. Janaki Ram, and M. Kamaraj, Joining of dual phase steel DP 600 – Benefits of weld bonding, THERMEC 2016 – 9<sup>th</sup> International Conference on Processing and Manufacturing of Advanced Materials, May 29-June 3, 2016, Graz, Austria.
43. Amit A. Kuril, G. D. Janaki Ram and Srinivasa R. Bakshi, Microstructure and mechanical properties of keyhole plasma arc welded dual phase steel DP600, IWS-2k16, 5-7 Oct. 2016, Mumbai.
44. Lakshmana Rao Bhagavathi, G.D. Janaki Ram, Srinivasa Rao Bakshi, P. Abhijit Deshpande, A new method to reduce curing time of polyurethane adhesives, International Symposium for Research Scholars on Metallurgy, Materials Science and Engineering (ISRS 2016), Dept. of Metallurgical & Materials Engineering, Dec. 21-23, 2016, IIT Madras, Chennai, India.
45. Amit A. Kuril, G.D. Janaki Ram, Srinivasa Rao Bakshi, Microstructure and mechanical properties of plasma arc welded dual phase steel DP600, International Symposium for Research Scholars on Metallurgy, Materials Science and Engineering (ISRS 2016), Dept. of Metallurgical & Materials Engineering, Dec. 21-23, 2016, IIT Madras, Chennai, India (*awarded best poster*).
46. Amit A. Kuril, G. D. Janaki Ram and Srinivasa R. Bakshi. “Effect of heat treatment on microstructure and mechanical properties of keyhole plasma arc butt welded DP-600 steel”, NWS-2016, 15-17 Dec., Kolkata.
47. P. Venkatesh, G.M. Karthik, S. Sudharsanan, G.D. Janaki Ram, M. Amirthalingam, Govind, Hot cracking behavior of a cast nickel-base superalloy XH43, Commission IX, 70<sup>th</sup> IIW Annual Assembly and International Conference, 25-30 June, 2017, Shanghai.
48. Venkat A.N. Ch., D.P. Mondal, G.D. Janaki Ram and M. Mukherjee, Foam filled steel tubes processed through powder metallurgy route, Research Scholars Symposium, Dept. of Metallurgical and Materials Engineering, IIT Madras, 29-30 July 2017.
49. A.A. Kuril, G.D. Janaki Ram, S.R. Bakshi, Hot cracking behavior of dual phase steel DP600, 3<sup>rd</sup> Young Welding Professionals International Conference (YPIC 2017), 16-18 Aug., 2017, Halle, Germany.
50. S. Babu, S.K. Panigrahi, G.D. Janaki Ram, P.V. Venkitakrishnan and R. Sureshkumar, Cold metal transfer welding of aluminum to stainless steel, International Congress of the International Institute of Welding (IC-2017), 07-09 Dec. 2017, Chennai, India (*awarded second prize in poster session*).



51. E. Nandha Kumar, G.D. Janaki Ram, Ravi Sankar Kottada, Microstructural characteristics and creep behavior of T92/Super304H dissimilar welds subjected to 1000 hours of aging at 650°C, International Congress of the International Institute of Welding (IC-2017), 07-09 Dec. 2017, Chennai, India (*awarded consolation prize in poster session*).
52. G.S. Sankar, G.M. Karthik, Ashfaq Mohammad, N.V. Ravi Kumar, G.D. Janaki Ram, Microstructure and properties of friction welds in electron beam melted gamma titanium aluminide, International Congress of the International Institute of Welding (IC 2017), 07-09 Dec. 2017, Chennai, India.
53. B. Lakshmana Rao, G. D. Janaki Ram, Srinivasa Rao Bakshi, Abhijit Deshpande, Accelerated curing of polyurethane bonded joints, International conference on Aluminium & Magnesium – Sustainable light weight solutions for transport sector (LWT 2018), 23-24 February 2018, Hotel Sheraton Grand, Pune.
54. E. Nandha Kumar, G.D. Janaki Ram, Ravi Sankar Kottada, K. Devakumaran, Formation of Fe<sub>2</sub>(W, Mo) Laves Phase in T92/Super304H Dissimilar Welds, 71<sup>st</sup> IIW Annual Assembly and International Conference, Bali, Indonesia, July 2018.
55. S. Sudharsanan, P. Siva, A. Murugaiyan, G.D. Janaki Ram, Development of shielded metal arc welding electrodes for producing carbide-free bainitic weld metals, International Conference on Advanced Materials and Manufacturing Processes for Strategic Sectors (ICAMPS 2018), 25-27 Oct. 2018, Trivandrum.
56. D.B.A. Sagar, B. Vikas, B. Saha, N. Narasaiah, P. Jayapal, G.D. Janaki Ram, M.S.K. Rao, Study of microstructure and mechanical properties of friction welded metastable beta titanium alloy Titan 1023, Materials Today: Proceedings, 2018, 5, 20760-20768.
57. T. Srinivasa Rao, B. Ramesh, B.K. Nagesha, Jivan Kumar, R.S. Kottada, G.D. Janaki Ram, Microstructure and room temperature tensile properties of laser powder-bed fused Inconel 718, Symposium C5: Additive Manufacturing of Composites and Complex Materials IV, EUROMAT 2019, 1-5 September 2019, Stockholm, Sweden.
58. C. Dharmendra, K. Chadha, G.D. Janaki Ram, M. Mohammadi, Effect of heat treatments on microstructural transformations and properties of wire-arc additively manufactured nickel aluminum bronze, MS&T19, Portland, USA, Sept. 29 – Oct. 3, 2019.

#### **10. Selected Invited Talks (last five years)**

1. Prospects of nickel aluminum bronze for additive manufacturing, International Conference on Advanced Materials and Processes for Defence Applications (ADMAT 2019), 23-25 Sept. 2019, Hyderabad.
2. Metal additive manufacturing: Powder-bed fusion and direction energy deposition, University of Hyderabad, 09 Sept. 2019.
3. New materials and manufacturing technologies for Indian Air Force, Nodal Technology Center Symposium, 3 BRD, Air Force Station, Avadi, 04 Sept. 2019.
4. Solid-state metal additive manufacturing, International Conference on “Future of Advanced Manufacturing”, Deakin-IITM Center of Excellence in Advanced Materials and Manufacturing, IIT Madras Research Park, Chennai, 15 Mar. 2019.
5. Status and Prospects of solid-state metal additive manufacturing, IGSTC workshop on “Additive Manufacturing of Metals: Current status and way forward”, National Metallurgical Laboratory, Jamshedpur, 04-06 February, 2019.
6. Large scale metal additive manufacturing, National workshop on “Advanced welding methodologies for automotive and power industries”, IIW Chennai Branch, 15-16 Feb. 2019.

7. Overview of additive manufacturing, Dept. of Mechanical Engineering, IIT Jodhpur, 25 Jan. 2019.
8. Harrison McCain lecture: Metal additive manufacturing: Developments, challenges, and opportunities, Dept. of Mechanical Engineering, University of New Brunswick, Fredericton, Canada, 11 Dec. 2018.
9. Welding metallurgy of austenitic stainless steels, IIW Workshop on “Advances in Welding Technology”, Sri City, Andhra Pradesh, 25 Oct. 2018.
10. Overview of direct metal additive manufacturing, Indo-Australian Workshop on “Advances in Materials and Additive Manufacturing”, Deakin-IITM Center of Excellence in Advanced Materials and Manufacturing, IIT Madras Research Park, Chennai, 21-22 March 2018.
11. Additive manufacturing using friction deposition, TEQIP III short-term course on “Advances in Materials and Manufacturing”, 18-22 Dec. 2017, PSG College of Technology, Coimbatore.
12. Repair welding of nickel-base superalloy XH43 castings, International Congress of the International Institute of Welding (IC 2017), 07-09 December 2017, Chennai.
13. Welding of magnesium alloys, National Seminar on “Failure Analysis and Advances in Welding Technology for Aeroengines”, HAL Koraput, 15 Sept. 2017.
14. Additive manufacturing of skin panels for large statues, L&T Construction, Buildings & Factories, Chennai, 25 July 2017.
15. Transient liquid phase bonding of Cu-Cr-Zr-Ti alloy using Ni and Mn Coatings, National workshop on “Challenges in Joining of Advanced Materials”, IIW Hyderabad Branch, 26 May 2017, Hyderabad.
16. Some new approaches for dissimilar welding, 6<sup>th</sup> IIW Research and Collaboration Colloquium, IIW India, 06-09 April 2016, Hyderabad.
17. Friction stir welding and processing, Kalyani Centre for Technology & Innovation, Bharat Forge Limited, Pune, 02 Apr. 2016.
18. New possibilities with friction deposition and friction stir processing, Dept. of Materials Science and Metallurgical Engineering, IIT Hyderabad, 03 Nov. 2016.
19. Additive manufacturing of gas turbine components, Committee 7: Manufacturing, Materials & Metallurgy, ASME Gas Turbine India Conference (GTIndia 2015), 01-03 Dec. 2015, Hyderabad.
20. Materials challenges in laser additive manufacturing, First International Conference on Application of Lasers in Manufacturing (CALM 2015), 09-11 September 2015, Pragati Maidan, New Delhi.
21. Friction Freeform Fabrication, Advanced Manufacturing Institute, King Saud University, Riyadh, Saudi Arabia, 11 Aug. 2015.
22. Additive manufacturing with aluminium alloys, Symposium on “Innovation in Processing of Light Metals for Transportation Industries”, MS&T 2014, 13-15 Oct. 2014, Pittsburgh, USA.

## 10. Research Guidance

### *Ph.D., Completed (IIT Madras)*

1. P. Ramesh, MM09D010, Microstructures and Properties of Friction Surfaced Stainless Steel Coatings, Dec. 2012
2. J.J.S. Dilip, MM09D001, Friction Freeform Fabrication: A New Solid-State Additive Manufacturing Process, Oct. 2013

3. N. Krishna Murthy, MM09D002, Welding of Armor Steels with Carbide-Free Bainitic Fillers, Jul. 2014
4. Abhishek Mitra, ME11D017, Modeling of Residual Stresses in Narrow-Gap Submerged Arc Welds, Feb. 2017 (jointly with Prof. N. Siva Prasad)
5. G.M. Karthik, MM11D021, New Possibilities with Friction Deposition and Friction Stir Processing, Jun. 2017 (jointly with Dr. Ravi Sankar Kottada) (*awarded Sudharshan Bhat Memorial Prize by IIT Madras and Weldwell Specialty Award by Indian Institute of Welding for best Ph.D thesis*)
6. A. Muthuchamy, MM11D005, Spark Plasma Consolidation of Continuous Fiber Reinforced Titanium Matrix Composites, Mar. 2018
7. T. Venkateswaran, MM11D002, Brazing of Similar and Dissimilar Materials for Fabrication of Semi-Cryogenic Engines, May 2018
8. N. Naveen Kumar, MM11D010, Fabrication of Pipe Joining Inserts for Dissimilar Welding of Austenitic Stainless Steel to Commercially-Pure Titanium (jointly with Prof. S.S. Bhattacharya), Jun. 2018
9. S. Babu, ME13D023, Dissimilar welding of stainless steel to aluminum (jointly with Dr. S.K. Panigrahi), May 2019
10. Amit A. Kuril, MM14D002, Plasma arc welding of dual phase steels (jointly with Dr. S.R. Bakshi), thesis submitted in June 2019

***Ph.D, Ongoing (IIT Madras)***

1. E. Nandha Kumar, MM14D003, Creep behavior of T92/Super304H dissimilar welds (*jointly with Dr. K. Ravi Sankar*)
2. Ch. Venkat Appala Narasayya, MM14D014, In-situ aluminum foam filling of steel tubes (*jointly with Dr. Manas Mukherjee*)
3. S. Sudharsanan, MM15D025, Welding of carbide-free bainitic steels (*jointly with Dr. A. Murugaiyan*)
4. S.G.S. Karthiheyam, MM15D022, Laser welding of advanced high strength steels (*jointly with Prof. Ganesh Sundararaman*)
5. S. Abhijith, MM19D020, MIAB welding of power plant steels (*jointly with Dr. Ravi Sankar Kottada*)

***M.S., Completed (IIT Madras)***

1. S. Babu, MM09S019, Friction Stir Spot and Seam Welding Al-Cu Alloy AA 2014, Mar. 2012
2. R. Sivaraman, MM13S022, Resistance Spot Welding and Weld Bonding of Dual Phase Steel DP 600, Mar. 2017 (jointly with Prof. M. Kamaraj)
3. G.S. Sankar, MM14S004, Friction welding of electron beam melted gamma titanium aluminide, 2019 (jointly with Dr. N.V. Ravikumar)

***M.Tech./Dual Degree, Completed (IIT Madras)***

1. S. Venkata Subramanian, MM08M016, Bulk ultra fine grained aluminium alloys using friction stir processing, May 2010 (*awarded best M.Tech thesis by Indian Institute of Welding*)

2. I. Hariprasad, MM08M005, Effects of process parameters in friction stir spot welding of Al alloys, May 2010
3. S. Varadharajan, MM09M022, Use of friction surfacing for additive manufacturing, May 2011
4. S. Sudharsanan, MM09M020, Friction welding of commercially pure titanium to AISI 304L austenitic stainless steel, May 2011
5. B. Keerthana, CE09M153, MIG welding of Al-Mg alloy 5083, May 2011
6. P. Karthik, CE09M153, MIG welding of Al-Mg-Si alloy AA6082-T6, May 2011
7. Apuraj Borgohain, CE09M144, Microstructure and mechanical properties of 9Cr-0.5Mo-1.7W (P92) steel welds, May 2011
8. S. Arun Brakash, MM10M001, Microstructural studies on P1 and P92 steel welds, May 2012
9. S. Ramakrishna, MM10M015, Impression creep studies on P91 and P92 steel welds, May 2012
10. Ameet Bira Rupner, MM07B034, Gleeble simulation of weld heat affected zones in P92 steel, May 2012
11. M. Elakkia, MM11M009, TIG and friction welding of borated stainless steels, May 2013
12. G. Vrushabendra, CE11M189, Microstructural studies and impression creep testing of P92 steel welds, May 2013
13. Tarun Kumar Mishra, MM08B034, Joining of titanium pipes to stainless steel pipes, May 2013
14. R. Vineesh, CE11M188, Friction stir weld bonding of aluminium alloys, Jun. 2013
15. V. Siva Surya Teja, MM09B037, Use of friction buttering for improved heat-affected zone liquation cracking resistance, May 2014
16. S. Nagi Reddy, CE12M194, Use of friction deposition for buttering, May 2014
17. R. Jayamurugan, AT12M005, Durability of structural adhesive joints, May 2014
18. S. Samy Raj, AT12M009, Resistance spot welding of aluminum alloys, May 2014
19. B.L.K. Sai Prasanth, MM10B047, Joining of aluminum and stainless steel using exothermic nano bilayers, May 2015 (jointly with Dr. Parasuraman Swaminathan)
20. Sunil Choudhary, MM11B046, Friction welding of beta titanium alloy Ti-10-2-3, Jun. 2017
21. Milind Thoke, MM17M022, Characterization of selective laser melted Ti-6Al-4V, May 2019
22. B. Ramesh, MM17M030, Characterization of selective laser melted Inconel 718, May 2019

## 11. Selected Courses/Workshops Conducted (IIT Madras)

1. National workshop: Magnetically impelled arc butt welding, 13 April 2019, IIT Madras.
2. GIAN course: Welding Metallurgy and Weldability of Steels and Stainless Steels, 11-15 Dec. 2017, IIT Madras (*with Prof. Leijun Li, University of Alberta, Canada*).
3. GIAN course: Welding Metallurgy and Weldability of Non-Ferrous Alloys, 11-15 Dec. 2017, IIT Madras (*with Prof. S. Suresh Babu, University of Tennessee, Knoxville, USA*).
4. Continuing education program: Use of Gleeble in Materials Processing, 15-16 Jul. 2015, IIT Madras.
5. NRB research dissemination workshop: Titanium Matrix Composites, 30 Aug. 2013, IIT Madras.
6. National workshop: Welding Research Today: Challenges and Opportunities, 23-24 Nov. 2012, IIT Madras.

## **12. Selected Awards/Honors**

- Harrison McCain Visiting Professor, Dept. of Mechanical Engineering, University of New Brunswick, Fredericton, Canada, Nov. 2018 – Jan. 2019.
- Prof. Placid Rodriguez Memorial Lecture, National Welding Seminar (NWS-2011), Bhilai, 15 Dec. 2011, IIW India.
- Outstanding Research Paper Award (for a paper titled “Multi-material ultrasonic consolidation”): 17th Solid Freeform Fabrication Symposium, University of Texas at Austin, TX, USA, 14-16 Aug. 2006.
- Appreciation Certificate: Development and type certification of wrought nickel-base superalloys for Kaveri aeroengine applications, CEMILAC, DRDO, 2001.

## **13. Professional Affiliations**

- Life member of ASM International, Indian Institute of Metals, Indian Institute of Welding, Indian Welding Society, and Society for Failure Analysis