

Curriculum Vitae - Dr. Murugaiyan Amirthalingam

Personal Information

Date of Birth 23rd July, 1978
Sex Male
Nationality Indian
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Education

- 2010 **PhD: disputation date:** 25th October, 2010.
Joining and Additive Manufacturing, Faculty of 3mE, Department of Materials Science and Engineering, Delft University of Technology, Delft, The Netherlands
- 2003 **Master of science by research**
Department of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT) Madras, Chennai, India.
- 1999 **Bachelor of engineering**
Department of Metallurgical Engineering, Government College of Engineering, Salem, University of Madras.

Current and previous positions

- Nov.2022 till date **Associate professor**
Department of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT) Madras, Chennai, India
- 2016-Oct.2022 **Assistant professor**
Department of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT) Madras, Chennai, India
- 2014-2015 **Post doctoral research fellow**
Foundation for Fundamental Research on Matter (FOM), The Netherlands.
- 2012-2014 **Research fellow**
Department of Materials Science and Engineering, Delft University of Technology, The Netherlands.
- 2009-2012 **Post doctoral research fellow**
Materials innovation institute (M2i) in the Department of Materials Science and Engineering, The Netherlands.
- 2005-2009 **PhD Researcher**
Materials innovation institute (M2i) in the Department of Materials Science and Engineering, The Netherlands.
- 2003-2005 **Researcher**
R&D and Scientific Services, Tata Steel, Jamshedpur, India..

Fellowships and awards

- 2020 **Placid Rodriguez memorial lecture award from India Institute of Welding**
- 2020 **I T Mirchandani Research Award from India Institute of Welding**
- 2015 **Kenneth Easterling award from International Institute of Welding**
- 2015 **Welding Torch of Honour**
Delft University of Technology, The Netherlands.

Supervision of graduate students and research fellows

From 2016 in IIT-Madras **Post doctoral fellows - 3** (2 completed and 1 on-going)
PhDs - 12 (on-going)
MS by Research - 5 (1 completed and 4 on-going)
M. Techs - 8 (2 on-going and 6 completed)

Teaching activities

From 2016 in IIT-Madras **Taught courses for Masters (12 weeks)** – Topics: Welding Metallurgy (MM5740), Welding Processes (MM5012), Advanced topics in metal joining (MM5760), Introduction to Research (MM6021) and Additive Manufacturing (MM5250)

From 2016 **Massive Open Online Courses (MOOC) in NPTEL and SWAYAM** – Topics: Welding of advanced high strength steels for automotive applications (4 weeks) and Welding processes (12 weeks)

Organisation of scientific meetings

2019 **Treasurer**
26th International symposium on metastable, amorphous and nanostructured materials (ISMANAM), July 2019, Chennai, India, number of participants – 600.

2017 **Organising committee member**
International congress – 2017, The Indian Institute of welding and post conference tutorial, December 2017, Chennai, India.

2016 **Organiser and Treasurer**
International Research Scholars Symposium (ISRS-2016), IIT Madras, number of participants – 400.

From 2016 **Conducted 8 Welding and Additive Manufacturing workshops**

Institutional responsibilities

From 2019 **Head**, Joining and Additive Manufacturing Lab, Dept. MME, IIT Madras.
From 2019 **Lab in-charge** – Physical Metallurgy lab, Dept. MME, IIT Madras.
From 2018 **Member** - MS/PhD admission committee – Dept. MME, IIT Madras.
From 2018 **Member** – Institute grievances committee – IIT Madras.
From 2017 **Member** – Faculty Search committee - Dept. MME, IIT Madras.
From 2016 **Lab in-charge** – Gleeble Thermo-mechanical simulation Lab.

Commissions of trust

From 2021 **Chairman**, Technical committee of Indian Institute of Welding (IIW-India).
From 2019 **Member**, Technological Management Board of International Institute of Welding (IIW).
From 2018 **Council member** – Indian Institute of Welding.
From 2018 **Deputy Chairman** - Technical Committee, Indian Institute of Welding.
From 2017 **Editor** – Transactions of Indian Institute of Metals, Springer.
From 2017 **Editor** – Welding in the World, Springer - IIW.
From 2016 **Deputy Chairman and Treasurer** – Indian Institute of Metals (IIM) Chennai Chapter.
From 2010 **Reviewer** for major Springer and Elsevier Materials Science Journals.

Memberships in scientific and professional societies

From 2016 **Member**, Indian Institute of Welding,
Life member, Indian Institute of Metals,
Life member, Indian Welding Society,
Expert member and delegate, International Institute of Welding, Commissions II, IX, XII and Study group 212.

Track record

Total number of publications International refereed journals – 38, Book chapters – 3, Full papers in refereed conference proceedings – 11, Patents granted – 1

List of research projects as principal investigator

- Additive Manufacturing research – Institute of Eminence, Ministry of HRD – Rs. 5,00,00,000 (from March 2021 – December 2022)
- Alloy development for additive manufacturing of prostheses and reconstructive implants (Short name: MetAMeT Metal Additive Medical Technology) – Dept, of Science and Technology (DST), India-Norway joint research call – Rs. 43,57,260 (from Jan. 2021 – Feb. 2024)
- Characterization of nano-dispersive austenite containing ferritic steels with resistance to hydrogen embrittlement – Tata Steel – Rs. 17,04,000 (from May. 2021 – Sept. 2022)
- Resistance spot welding process development for fuel tanks – Greaves Cotton – Rs. 3,91,667 (from Jan. 2020 – April. 2020)
- Hot ductility and stress relaxation cracking by thermomechanical simulator – IGCAR – Rs. 36,88,680 (from March. 2019 – Dec.. 2021)
- Production of thermit portions for aluminothermic welding of high strength steel welds – Indian Railways – Rs. 15,00,000 (from March 2019 – September 2019)
- Engineering safe weld microstructure against hydrogen embrittlement, Sponsoring agency - SERB, Department of Science and Technology, Government of India, Project Value - Rs. - 96,00,000, Duration - 3 years, (from 2017)
- Weldability studies of Advanced Ultra Super Critical Power Plant Materials, Sponsoring agency - Indira Gandhi Centre for Atomic Research, DAE, Government of India, Project Value - Rs. - 13,96,000, Duration - 01-02-2018 to 31-12-2018.
- Metallurgical evaluation of centrifugally cast Inconel tubes, Sponsoring agency - IGP Industries, Chennai, India Project Value - Rs. - 3,00,000, Duration - 11-10-2017 to 30-06-2018
- Fume reduction in Flux Cored Arc Welding electrodes for hard-facing applications, Sponsoring agency - EWAC alloys - Larson and Toubro (L&D), Project Value - Rs. - 1,75,000, Duration - 3 months, (from Feb. 2017)
- Wire arc additive manufacturing of self healing materials, Sponsoring agency - IIT Madras, (Exploratory Research Project), Project Value - Rs. - 7,00,000, Duration - 03-03-2017 to 02-03- 2018
- Implicit microstructural modelling of solid state phase transformations during welding, Sponsoring agency - IIT-Madras Project Value - Rs. - 5,00,000 Duration - 2 years, (from Feb. 2016)

List of research projects as co principal investigator

- Electroplastic Deformation for Enhanced Formability, Sponsoring agency - DST, Project Value - Rs. 5,581,400 (from March 2020 – March 2023)
- National Centre for Clean Coal Research and Development, Sponsoring agency - DST, Project Value - Rs. 80,15,131 (from September 2018 – September 2023)
- Development of hot stamping process with low spring back for advanced high strength steels, Sponsoring agency - DST, Project Value - Rs. 34,23,204 (from May 2017 – May 2020)
- Centre of excellence in Iron and Steel Technology (COEXIST), Sponsoring agency - Ministry of Steels, Project Value - Rs. 35,55,00,000 (from May 2017 – May 2022)
- Weld repair of XH43 and XH67 superalloy castings , Sponsoring agency - ISRO, Project Value - Rs. 27,68,640 (from June 2016 – September 2018)

- Design & Development of High Entropy Alloy in the form of MMAW Electrode exhibiting wear & Corrosion Resistance at Elevated Temperatures , Sponsoring agency - EWAC Alloys, Project Value - Rs. 10,00,000 (from April 2017 – June 2018)
- Bainite transformation kinetics of bearing steels, Sponsoring agency - National Engineering Industries, Project Value - Rs. 5,75,000 (from September 2016 – September 2017)

Publications

Refereed Journal Publications	48
Refereed conference proceedings	11
Book chapters	3
Conference presentations	More than 50
Indian patent	1

Appendix - List of Journal Publications

1. M. Sajan, M. Amirthalingam, and U. Chakkingal. Influence of boron on the flow behavior of hot stamping steel under various warm working conditions. *Journal of Materials Engineering and Performance*, 2022
2. N. Pradeep, P. Sadasivam, G. Saravana Kumar, Gurunathan, and M. Amirthalingam. Data-driven modelling of complex current–voltage waveform controlled gas metal arc-wire ded processes. *Metals and Materials International*, 2022
3. J. Tiwari, V. Balaji, H. Krishnaswamy, and M. Amirthalingam. Dislocation density based modelling of electrically assisted deformation process by finite element approach. *International Journal of Mechanical Sciences*, 227, 2022
4. D. Nalajala, R.K. Mookara, and M. Amirthalingam. Analysis of metal transfer characteristics in low-heat input gas metal arc welding of aluminum using aluminum–silicon alloy fillers. *Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science*, 53(5):2914–2924, 2022
5. P. Sadasivam and M. Amirthalingam. Design and fabrication of micro-plasma transferred wire arc additive manufacturing system. *CIRP Journal of Manufacturing Science and Technology*, 37:185–195, 2022
6. D. Nalajala, R.K. Mookara, and M. Amirthalingam. Gas metal arc brazing behaviour of a galvanised advanced high strength steel in short circuiting and short circuiting with pulsing modes. *Welding in the World*, 66(1):69–80, 2022
7. N. Maheswari, M. Amirthalingam, A. Schwedt, H.G. Brokmeier, N. Schell, J. Mayer, K.C.H. Kumar, and S. Sankaran. Temperature dependent partitioning mechanisms and its associated microstructural evolution in a cmnsial quenching and partitioning (qp) steel. *Materials Today Communications*, 29, 2021
8. S. Chandrasekaran, S. Hari, and M. Amirthalingam. Functionally graded materials for marine risers by additive manufacturing for high-temperature applications: Experimental investigations. *Structures*, 35:931–938, 2022
9. R.K. Mookara, S. Seman, R. Jayaganthan, and M. Amirthalingam. Influence of droplet transfer behaviour on the microstructure, mechanical properties and corrosion resistance of wire arc additively manufactured inconel (in) 625 components. *Welding in the World*, 65(4):573–588, 2021
10. C.R. Borra, T.J. Vlugt, Y. Yang, J. Spooren, P. Nielsen, M. Amirthalingam, and S.E. Offerman. Recovery of rare earths from glass polishing waste for the production of aluminium-rare earth alloys. *Resources, Conservation and Recycling*, 174, 2021
11. Shakti Swaroop Choudhury, Surendar K. Marya, and Murugaiyan Amirthalingam. Improving arc stability during wire arc additive manufacturing of thin-walled titanium components. *Journal of Manufacturing Processes*, 66:53–69, June 2021
12. Jai Tiwari, Padma Pratheesh, O.B. Bembalge, Hariharan Krishnaswamy, Murugaiyan Amirthalingam, and S.K. Panigrahi. Microstructure dependent electroplastic effect in AA 6063 alloy and its nanocomposites. *Journal of Materials Research and Technology*, 12:2185–2204, may 2021
13. R. Raghavendran, A. Meena, and M. Amirthalingam. Microstructure evolution during strain-induced transformation of austenite in an austempered ductile iron (adi). *Materials Science Forum*, 1016 MSF:1199–1204, 2021
14. M. Sajan, M. Amirthalingam, and U. Chakkingal. A novel method for the spring-back analysis of a hot stamping steel. *Journal of Materials Research and Technology*, 11:227–234, 2021
15. M. Amirthalingam, Rama Kishore Mookara, Saravanan Seman, R. Jayaganthan, and Murugaiyan Amirthalingam. Influence of droplet transfer behaviour on the microstructure, mechanical properties and corrosion resistance of wire arc additively manufactured inconel (in) 625 components. *Welding in the World*, 2021

16. Sudharsanan Sundaram, G. D. Janaki Ram, and Murugaiyan Amirthalingam. Development of shielded metal arc welding electrodes to achieve carbide-free bainitic weld microstructures. *Welding in the World*, oct 2020
17. S. Chandrasekaran, S. Hari, and M. Amirthalingam. Wire arc additive manufacturing of functionally graded material for marine risers. *Materials Science and Engineering A*, 792, 2020
18. J. Baby and M. Amirthalingam. Correction to: Microstructural development during wire arc additive manufacturing of copper-based components (welding in the world, (2020), 64, 2, (395-405), 10.1007/s40194-019-00840-y). *Welding in the World*, 64(4):753, 2020
19. Justin Baby and Murugaiyan Amirthalingam. Microstructural development during wire arc additive manufacturing of copper-based components. *Welding in the World*, 64(2):395–405, jan 2020
20. G. Agarwal, H. Gao, M. Amirthalingam, and M. Hermans. Study of solidification cracking susceptibility during laser welding in an advanced high strength automotive steel. *Metals*, 8(9), 2018
21. G. Agarwal, M. Amirthalingam, S.C. Moon, R.J. Dippenaar, I.M. Richardson, and M.J.M. Hermans. Experimental evidence of liquid feeding during solidification of a steel. *Scripta Materialia*, 146:105–109, 2018
22. H. Gao, G. Agarwal, M. Amirthalingam, M.J.M. Hermans, and I.M. Richardson. Investigation on hot cracking during laser welding by means of experimental and numerical methods. *Welding in the World*, 62(1):71–78, 2018
23. G. Agarwal, A. Kumar, H. Gao, M. Amirthalingam, S.C. Moon, R.J. Dippenaar, I.M. Richardson, and M.J.M. Hermans. Study of solidification cracking in a transformation-induced plasticity-aided steel. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 49(4):1015–1020, 2018
24. H. Gao, G. Agarwal, M. Amirthalingam, and M. J. M. Hermans. Hot cracking investigation during laser welding of high-strength steels with multi-scale modelling approach. *Science and Technology of Welding and Joining*, pages 1–8, oct 2017
25. G. Agarwal, H. Gao, M. Amirthalingam, and M.J.M. Hermans. In situ strain investigation during laser welding using digital image correlation and finite-element-based numerical simulation. *Science and Technology of Welding and Joining*, 23(2):134–139, jun 2017
26. M. Amirthalingam, E.M. van der Aa, C. Kwakernaak, M.J. M. Hermans, and I.M. Richardson. Elemental segregation during resistance spot welding of boron containing advanced high strength steels. *Welding in the World*, 59(5):743–755, 2015
27. H. Gao, R.K. Dutta, R.M. Huizenga, M. Amirthalingam, M.J.M. Hermans, T. Buslaps, and I.M. Richardson. Stress relaxation due to ultrasonic impact treatment on multi-pass welds. *Science and Technology of Welding and Joining*, 19(6):505–513, 2014
28. R.K. Dutta, R.M. Huizenga, M. Amirthalingam, H. Gao, A. King, M.J.M. Hermans, and I.M. Richardson. Synchrotron diffraction studies on the transformation strain in a high strength quenched and tempered structural steel. *Materials Science Forum*, 777:231–236, 2014
29. R.K. Dutta, R.M. Huizenga, M. Amirthalingam, H. Gao, A. King, M.J.M. Hermans, and I.M. Richardson. In-situ synchrotron diffraction studies on hot deformation of austenite in a high strength quenched and tempered structural steel. *Advanced Materials Research*, 922:126–131, 2014
30. R.K. Dutta, R.M. Huizenga, M. Amirthalingam, A. King, H. Gao, M.J.M. Hermans, J. Sietsma, and I.M. Richardson. In-situ synchrotron diffraction studies on transformation strain development in a high strength quenched and tempered structural steel - part i. bainitic transformation. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 45(1):218–229, 2014
31. R.K. Dutta, R.M. Huizenga, R.H. Petrov, M. Amirthalingam, A. King, H. Gao, M.J.M. Hermans, and I.M. Richardson. In-situ synchrotron diffraction studies on transformation strain development in a high-strength quenched and tempered structural steel - part ii. martensitic transformation. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 45(1):230–238, 2014
32. H. Gao, R.K. Dutta, R.M. Huizenga, M. Amirthalingam, M.J.M. Hermans, T. Buslaps, and I.M. Richardson. Pass-by-pass stress evolution in multipass welds. *Science and Technology of Welding and Joining*, 19(3):256–264, 2014
33. H. Gao, R.M. Huizenga, R.K. Dutta, M. Amirthalingam, M.J.M. Hermans, T. Buslaps, and I.M. Richardson. Residual stress measurements in multi-pass welded high strength steel using energy dispersive synchrotron x-ray diffraction. *Advanced Materials Research*, 922:177–182, 2014
34. R.K. Dutta, R.M. Huizenga, H. Gao, M. Amirthalingam, A. King, M.J.M. Hermans, and I.M. Richardson. Anisotropy in thermal expansion of bainitic ferrite. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 45(12):5281–5285, 2014
35. R.K. Dutta, R.M. Huizenga, M. Amirthalingam, M.J.M. Hermans, A. King, and I.M. Richardson. Transformation-induced diffraction peak broadening during bainitic and martensitic transformations under small external loads in a quenched and tempered high strength steel. *Metallurgical and Materials Transactions A: Physical Metallurgy and*

- Materials Science*, 44(9):4011–4014, 2013
36. R.K. Dutta, R.M. Huizenga, M. Amirthalingam, A. King, H. Gao, M.J.M. Hermans, and I.M. Richardson. In situ synchrotron diffraction studies on the temperature-dependent plane-specific elastic constants in a high-strength quenched and tempered structural steel. *Scripta Materialia*, 69(2):187–190, 2013
 37. R.K. Dutta, M. Amirthalingam, M.J.M. Hermans, and I.M. Richardson. Kinetics of bainitic transformation and transformation plasticity in a high strength quenched and tempered structural steel. *Materials Science and Engineering A*, 559:86–95, 2013
 38. M. Amirthalingam, E.M. Van Der Aa, N. Den Uijl, M.J.M. Hermans, and I.M. Richardson. Phosphorous and boron segregation during resistance spot welding of advanced high strength steels. *ASM Proceedings of the International Conference: Trends in Welding Research*, pages 217–226, 2013
 39. M. Amirthalingam, M.J.M. Hermans, R.M. Huizenga, S.E. Offerman, I.M. Richardson, and C. Gundlach. Synchrotron diffraction analysis of retained austenite in welded transformation induced plasticity (trip) steels. *Science and Technology of Welding and Joining*, 17(2):146–154, 2012
 40. M. Amirthalingam, M.J.M. Hermans, L. Zhao, and I.M. Richardson. Quantitative analysis of microstructural constituents in welded transformation-induced-plasticity steels. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 41(2):431–439, 2010
 41. M. Amirthalingam, M.J.M. Hermans, R.M. Huizenga, S.E. Offerman, J. Sietsma, and I.M. Richardson. In situ phase transformation studies on a transformation induced plasticity steel under simulated weld thermal cycles using synchrotron diffraction. *In-situ Studies with Photons, Neutrons and Electrons Scattering*, pages 133–148, 2010
 42. M. Amirthalingam, M.J.M. Hermans, and I.M. Richardson. Microstructural evolution during gas tungsten arc, laser and resistance spot welding of al- containing transformation induced plasticity (trip) steel. *Advanced Materials Research*, 89-91:23–28, 2010
 43. H. Sharma, A.C. Wattjes, M. Amirthalingam, T. Zuidwijk, N. Geerlofs, and S.E. Offerman. Multipurpose furnace for in situ studies of polycrystalline materials using synchrotron radiation. *Review of Scientific Instruments*, 80(12), 2009
 44. M. Amirthalingam, M. Hermans, and I. Richardson. Microstructural development during welding of silicon and aluminum-based transformation-induced plasticity steels-inclusion and elemental partitioning analysis. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 40(4):901–909, 2009
 45. A. Saha Podder, A.S. Pandit, A. Murugaiyan, D. Bhattacharjee, and R.K. Ray. Phase transformation behaviour in two c-mn-si based steels under different cooling rates. *Ironmaking and Steelmaking*, 34(1):83–88, 2007
 46. A. Murugaiyan, A. Saha Podder, A. Pandit, S. Chandra, D. Bhattacharjee, and R.K. Ray. Phase transformations in two c-mn-si-cr dual phase steels. *ISIJ International*, 46(10):1489–1494, 2006
 47. A. Pandit, A. Murugaiyan, A.S. Podder, A. Haldar, D. Bhattacharjee, S. Chandra, and R.K. Ray. Strain induced precipitation of complex carbonitrides in nb-v and ti-v microalloyed steels. *Scripta Materialia*, 53(11):1309–1314, 2005
 48. V. Sampath, A. Murugaiyan, and M.S. Sivakumar. Metallurgical and shape memory characteristics of grain-refined cu-zn-al shape memory alloys. *Proceedings of SPIE - The International Society for Optical Engineering*, 5062(2):899–905, 2002