

Full List of Publications - Amit Arora

IIT Gandhinagar

Published in refereed international journal

1. VP Mahesh, **A. Arora**. "Effect of Tool Shoulder Diameter on the Surface Hardness of Aluminum-Molybdenum Surface Composites Developed by Single and Double Groove Friction Stir Processing". *Metallurgical and Materials Transactions A*, (2019), 1-11.
2. A. K. Singh, P. Sahlot, M. Paliwal, **Amit Arora**. "Heat transfer modeling of dissimilar FSW of Al 6061/AZ31 using experimentally measured thermo-physical properties". *The International Journal of Advanced Manufacturing Technology*, (2019), 1-13.
3. R. Sharma, A. K. Singh, **A. Arora**, S. Pati, PS De. "Effect of friction stir processing on corrosion of Al-TiB₂ based composite in 3.5 wt.% sodium chloride solution". *Transactions of Nonferrous Metals Society of China*, 29(7) (2019):1383-1392.
4. S. Pandya, R. S. Mishra, **A. Arora**. "Channel formation during friction stir channeling process—A material flow study using X-Ray micro-computed tomography and optical microscopy". *Journal of Manufacturing Processes* 41 (2019), 48-55.
5. P. Sahlot, A. K. Singh, V. J. Badheka, **A. Arora**. "Friction Stir Welding of Copper: Numerical Modeling and Validation". *Transactions of the Indian Institute of Metals*, 72 (5) (2019), 1339–1347.
6. A. Rout, P. Pandey, E. F. Oliveira, P. A. da Silva Autreto, A. Gumaste, A. Singh, D. S. Galvão, **A. Arora**, and C. S. Tiwary. "Atomically locked interfaces of metal (Aluminum) and polymer (Polypropylene) using mechanical friction". *Polymer*, 169(2019), 148-153.
7. A. D Oza, A. Kumar, V. Badheka, **A. Arora**. "Traveling Wire Electrochemical Discharge Machining (TW-ECDM) of Quartz Using Zinc Coated Brass Wire: Investigations on Material Removal Rate and Kerf Width Characteristics". *Silicon*, (2019), 1-12
8. P. Sahlot, S. S. Nene, M. Frank, R. S. Mishra, and **A. Arora**. "Towards attaining dissimilar lap joint of CuCrZr alloy and 316L stainless steel using friction stir welding". *Science and Technology of Welding and Joining*, 23(8) (2018): 715-720.
9. P. Sahlot, and **A. Arora**. "Numerical model for prediction of tool wear and worn-out pin profile during friction stir welding." *Wear* 408(2018): 96-107.
10. P. Sahlot, K. Jha, G.K. Dey, and **A. Arora**. "Wear-induced changes in FSW tool pin profile: effect of process parameters." *Metallurgical and Materials Transactions A* 49(6) (2018): 2139-2150.
11. V Tungala, **A Arora**, B Gwalani, RS Mishra, RE Brennan, KC Cho. "Microstructure and mechanical properties of friction stir processed cast Eglin steel (ES-1)." *Materials Science and Engineering: A* 709(2018): 105-114.
12. P Sahlot, K Jha, GK Dey, **A Arora**. "Quantitative wear analysis of H13 steel tool during friction stir welding of Cu-0.8% Cr-0.1% Zr alloy." *Wear* 378(2017): 82-89.
13. P.N. Banjare, P. Sahlot, and **A. Arora**. "An assisted heating tool design for FSW of thermoplastics." *Journal of Materials Processing Technology* 239 (2017): 83-91.
14. A. Arora, A. Astarita, L. Boccardo, and Mahesh V. P.. "Experimental characterization

of metal matrix composite with aluminium matrix and Molybdenum powders as reinforcement." *Procedia engineering* 167 (2016): 245-251.

15. S. Palanivel, **A. Arora**, K.J. Doherty, R.S. Mishra. "A framework for shear driven dissolution of thermally stable particles during friction stir welding and processing." *Materials Science and Engineering: A* 678 (2016): 308-314.
16. V.D. Manvatkar, **A. Arora**, A. De, T. DebRoy, 2012. Neural network models of peak temperature, torque, traverse force, bending stress and maximum shear stress during friction stir welding. *Science and Technology of Welding and Joining*, 17(6): 460-466.
17. T. DebRoy, A. De, H.K.D.H. Bhadeshia, V. D. Manvatkar and **A. Arora**, 2012. Tool durability maps for friction stir welding of an aluminium alloy. *Proceedings of the Royal Society A*, 468(2147): 3552-3570.
18. **A. Arora**, M. Mehta, A. De and T. DebRoy, 2012. Load Bearing Capacity of Tool Pin during Friction Stir Welding. *The International Journal of Advanced Manufacturing Technology*, 61(9-12): 911-920.
19. M. Mehta, **A. Arora**, A. De and T. DebRoy, 2011. Tool geometry for friction stir welding – optimum shoulder diameter. *Metallurgical and Materials Transactions A*, 42A: 2716-2722.
20. **A. Arora**, T. DebRoy and H. K. D. H. Bhadeshia, 2011. Back of the envelope calculations in friction stir welding – velocities, peak temperature, torque, and hardness, *Acta Materialia*, 59(5): 2020-2028.
21. **A. Arora**, A. De and T. DebRoy, 2011. Toward Optimum Friction Stir Welding Tool Geometry. *Scripta Materialia*. 64: 9-12.
22. **A. Arora**, G. G. Roy and T. DebRoy, 2010. Cooling rate in the 800°C to 500°C range from dimensional analysis. *Science and Technology of Welding and Joining*. 15(5): 423-427.
23. **A. Arora**, G. G. Roy and T. DebRoy, 2009. Unusual Wavy Weld Pool Boundary. *Scripta Materialia*, 60: 68-71.
24. **A. Arora**, Z. Zhang, A. De and T. DebRoy, 2009. Strains and strain rates during friction stir welding. *Scripta Materialia*, 61: 863-866.
25. **A. Arora**, R. Nandan, A.P. Reynolds and T. DebRoy, 2009. Torque, Power Requirement and Stir Zone Geometry in Friction Stir Welding through Modeling and Experiments. *Scripta Materialia*, 60: 13-16.

Published in peer reviewed conference proceedings

1. Pankaj Sahlot, RS Mishra, **Amit Arora**. "Wear Mechanism for H13 Steel Tool During Friction Stir Welding of CuCrZr Alloy". *Friction Stir Welding and Processing X*, (2019) 59-64
 2. **A Arora**, A Astarita, L Boccarusso, VP Mahesh. "Experimental Characterization of Metal Matrix Composite with Aluminium Matrix and Molybdenum Powders as Reinforcement." *Procedia Engineering* 167(2016): 245-251.
 3. T. DebRoy, **A. Arora**, G. G. Roy and A. De, *Advances and Promises of Weld Pool Convective Heat Transfer Calculations, Mathematical Modeling of Weld Phenomena* 9
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Talks and Presentations

Plenary Talks

1. **A. Arora**, Heat transfer and material flow modeling of welding and joining, Welding, Joining and Additive Manufacturing WJAM - International Conference, Jan 19, 2015, Dan Panorama Hotel, Tel-Aviv, Israel.
2. 4th International Conference on Multidisciplinary Research & Practice (4ICMRP-2017) 22nd December 2017 at AMA, Ahmedabad, Gujarat, India

Conference Presentations

3. Amit Kumar Singh, Pankaj Sahlot, **Amit Arora**. “Effect of actual thermo-physical properties on heat transfer and material flow for dissimilar weld– Al 6061-T6 and AZ31”
 4. Mahesh V.P., **Amit Arora**. “Microstructural analysis of Aluminum-Molybdenum surface composites by friction stir processing”
 5. Pankaj Sahlot, Saurabh Nene, Michael Frank, Rajiv Mishra, **Amit Arora**. “Microstructural and mechanical properties of friction stir welding of dissimilar lap joint of metallurgically immiscible CuCrZr and SS 316L”
 6. Pankaj Sahlot, Rajiv Mishra, **Amit Arora**. “Wear mechanism for H13 steel tool during friction stir welding of CuCrZr alloy”
 7. Pankaj Sahlot, **Amit Arora**. “Numerical model to estimate tool wear and worn-out pin shape during friction stir welding of CuCrZr alloy”
 8. Mahesh V. P., **Amit Arora**. “Surface property enhancement in Aluminium metal matrix surface composites by FSP”. International Conference on Advanced Materials - ICAM 2019, 12-14 June 2019, Nirmalagiri College, Kerala, India.
 9. Mahesh V. P., **Amit Arora**. “Effect of friction stir processing on the surface hardness of aluminum-molybdenum surface composites”, SMT33 - 33rd International Conference on Surface Modification Technologies, June 26 - 28, 2019, Napoli (Italy), School of Polytechnic and Basic Sciences, College of Engineering
 10. Ronit Dey, **A. Arora**, Jyoti Mukhopadhyay, formability of Tailor welded blanks made by friction stir welding : effect of heat input and flow profile, Materials Science & Technology 2017
 11. V. Tungala, M. Carl, **A. Arora**, M. Young, R. Mishra, K. Cho, R. Brennan, Effect of friction stir processing on microstructure and mechanical properties of cast Eglin steel (ES-1), in the Friction Stir Welding and Processing IX symposium at 2017 TMS Annual Meeting & Exhibition, San Diego, CA USA, 26 Feb – 2 Mar 2017.
 12. A.K. Singh, P. Sahlot, **A. Arora**, Heat transfer and material flow modeling of dissimilar friction stir welding of AA 6061-T6 and AZ31 Mg alloy, National Welding Seminar (NWS 2016), Science City, Kolkata, 15-17 December 2016.
 13. Mahesh V.P., **A. Arora**, Aluminium-Molybdenum System by Friction Stir Surface Alloying Process, Prof. S.K. Roy symposium on 'Surface Engineering and Corrosion', The 4th International Conference on Advances in Materials and Materials Processing.
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5th-7th November 2016.

14. A.K. Singh, P. Sahlot, **A. Arora**, Heat transfer and material flow modeling of dissimilar friction stir welding of AA 6061-T6 and AZ31 Mg alloy, Prof. M. Chakraborty symposium on 'Advanced Techniques in Materials Processing', The 4th International Conference on Advances in Materials and Materials Processing. 5th-7th November 2016.
15. A. Astarita, **A. Arora**, Experimental Characterization of Metal Matrix Composite with Aluminium Matrix and Molybdenum Powders as Reinforcement, International Symposium on Dynamic Response and Failure of Composite Materials, Island of Ischia, Italy September 6-9, 2016.
16. P. Sahlot, and **A. Arora**, Estimation of tool wear during friction stir welding of CuCrZr alloy, in the 11th International symposium on Friction Stir Welding, TWI Ltd, Cambridge, GB, May 17-19, 2016.
17. P. Sahlot, K. Jha and **A. Arora**, Tool wear during friction stir welding of CuCrZr alloy: a quantitative experimental study, in the 11th International symposium on Friction Stir Welding, TWI Ltd, Cambridge, GB, May 17-19, 2016.
18. V. Tungala, **A. Arora**, R. Mishra, K. Cho, R. Brennan, Microstructure and mechanical properties of friction stir processed cast Eglin steel (ES-1), in the Advanced Steel Metallurgy: Products and Processing symposium at Materials Science & Technology 2015, Columbus Ohio USA, 4-8 Oct 2015.
19. **A. Arora**, P. Sahlot, P.N. Banjare, "Adding a resistance heat source during Friction Stir Welding", VIII Friction Stir Welding and Processing Symposium at TMS 2015 144th Annual Meeting, March 15-19th 2015, Walt Disney World, Orlando, Florida, USA.
20. P. Sahlot, and **A. Arora**, "Tool Wear During Friction Stir Welding: State of the Art and the Challenges", in International Conference for Friction based Process- 2014 on 3-5th Sept 2014, IISc Bangalore, India.
21. P. Sahlot, V.J. Badheka, and **A. Arora**, "Numerical Modelling of Temperature Distribution During Friction Stir Welding of Copper", in IIW International Congress 2014, New Delhi, IN, Apr. 09-11th, 2014.

Invited Talks

22. **A. Arora**, "Material Science for modern Automotive". Expert Lecture :Quality Month, Tata Motors Ltd. Sanand, November 29th 2018.
 23. **A. Arora**, "Methods for Making metal stronger – Heat treatment strengthening/mechanism", 3 days course on Metallurgy for Non Metallurgist, Centre of Excellence-Welding, LD College of Engineering, July 5th 2018.
 24. **A. Arora**, "Welding Metallurgy", "Train the trainers – Short term course on Welding", by ASM Gujarat Chapter & Department of Technical Education, Centre of Excellence-Welding, LD College of Engineering, June 1st 2018.
 25. **A. Arora**, "Marine Corrosion", Training Program – Gujarat Maritime Board, IIT Gandhinagar, May 17th 2018
 26. **A. Arora**, "Metal Joining/Metal Cutting", Training Program – Gujarat Maritime Board, IIT Gandhinagar, May 18th 2018
 27. **A. Arora**, "Anti-corrosion techniques", Training Program – Gujarat Maritime Board, IIT Gandhinagar, May 25th 2018
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28. **A. Arora**, “Friction stir welding: Modeling and Simulation”, Expert Lecture, TEQIP III sponsored STTP on “Manufacturing Process Modeling & Simulation” (MPMS-2018), June 5th 2018.
 29. **A. Arora**, “Friction stir welding and processing”, National Seminar on “Development of Aluminium Alloys & Downstream products for Defence, Aerospace & other strategic applications” 23-24 February, at JNARDDC, Nagpur.
 30. **A. Arora**, “Waste management in High Altitude”, Session II : Army’s Indigenization and Technology Infusion Plans, Army Technology Seminar - ARTECH 2018, January 8th 2018.
 31. **A. Arora**, “Waste Management in High Altitude”, Army Technology Seminar – ARTECH 2018, Jan 8th 2018, Manekshaw Centre, New Delhi.
 32. **A. Arora**, “Heat transfer and material flow modeling of friction stir welding”, International Conference on Advanced Materials and Processes: Challenges and Opportunities (AMPCO-2017), November 30 – December 02, 2017 at IIT Roorkee, Uttarakhand, India.
 33. **A. Arora**, “Heat transfer and material flow modeling of friction stir welding”, International Conference on Advanced Materials and Processes (“ADMAT 2017” SkyMat), 14th to 16th December 2017, Kovalam, Thiruvananthapuram, India.
 34. **A. Arora**, “Heat transfer and material flow modeling of friction stir welding”, Honorary Symposium for Prof. T. DebRoy - Session B, AWS Professional Program 2017 in Chicago, Illinois, November 6-9, 2017.
 35. **A. Arora**, “Disruptive Innovation – Materials”, International Seminar on Building India’s Future Navy: Technology Imperatives, May 31 – June 1, 2017, Taj Palace, New Delhi.
 36. **A. Arora**, “Numerical modeling of welding” Recent Advances in Materials Joining and Processing (RAMJP)" during 22nd - 24th of August, 2017 at Department of Mechanical Engineering, School of Technology, Pandit Deendayal Petroleum University (PDPU), Gandhinagar, Gujarat
 37. **A. Arora**, “Heat transfer and material flow modelling of friction stir welding”, Invited talk at School of Minerals, Materials & Metallurgical Engineering, IIT Bhubaneswar, March 3, 2017.
 38. **A. Arora**, “IIT Gandhinagar and Indian Army - A sea of opportunities”, Invited talk at Infantry Seminar, Infantry School, Mhow (MP, India), March 22, 2017
 39. **A. Arora**, Friction Stir Welding, TEQIP II Short Term Training Program on “Welding Practice for Engineers”, Govt Engineering College, Gandhinagar, 28th Nov – 2nd December, 2016.
 40. A.K. Singh, P. Sahlot, **A. Arora**, Heat transfer and material flow modeling of dissimilar friction stir welding of AA 6061-T6 and AZ31 Mg alloy, 70th Annual Technical Meeting – Indian Institute of Metals, IIT Kanpur, November 11-14, 2016.
 41. **A. Arora**, Challenges during numerical modeling of dissimilar materials, National Welding Meet, Baroda, August 2013
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42. **A. Arora**, Heat transfer and material flow modeling during welding processes, Texture and OIM facility, IIT Bombay, August 2013
 43. **A. Arora**, Joining of Airship Envelope Materials, Workshop on Envelope Materials for High Altitude Airship, IIT Delhi, March 2013
 44. **A. Arora**, Welding Defects, Workshop on Metallurgy & Welding for Engineers, Ahmedabad, Jan 2013
 45. **A. Arora**, Solid state joining – Friction Stir Welding, Faculty Seminar Series, IIT Gandhinagar, October 2012
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