

Curriculum Vitae

Behzad Niroumand



• Personal Details

Contact Address	Department of Materials Engineering, Isfahan University of Technology (IUT), Isfahan, Iran, 84156-83111
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• Academic Qualifications

✓ Doctor of Philosophy, 1998
Department of Mechanical and Manufacturing Engineering, University of Melbourne, Australia. <i>Thesis: Study of Solidification Behaviour and Microstructure of Primary Particles in Rheocast Al-Cu Alloys</i>
✓ Master of Engineering (Honour), 1993
Department of Materials Science and Engineering, University of Wollongong, Australia <i>Thesis: Study of Flow Pattern and Mixing Time in a Gas Injected Vessel</i>
✓ Bachelor of Engineering, 1990
Department of Materials Engineering, Isfahan University of Technology (IUT), Isfahan, Iran <i>Thesis: Study of Industrial Slags</i>

• Employment history and positions held

✓ International affairs representative of department of materials engineering, IUT, since 2021
✓ Director of the merging plan for Golpayegan college of engineering, IUT, 2021
✓ Deputy of academic affairs, Department of materials engineering, IUT, 2018-2020
✓ Director of casting and pattern making workshops, Department of materials engineering, IUT, since 2017
✓ Professor, Department of materials engineering, IUT, since 2014 (29/11/2014)
✓ Editor in chief, Journal of Advanced Materials in Engineering (JAME) published in Persian (Farsi), 2012-2016
✓ Head, Department of materials engineering, IUT, 2013
✓ Visiting associate professor, University of Wisconsin, Milwaukee (UWM), 2012
✓ Deputy of research affairs, Department of materials engineering, IUT, 2010-2011
✓ Member of IUT alumni association board of trustees, 2010-2014
✓ Member of IUT internship committee, 2008-2013
✓ Associate professor, Department of materials engineering, IUT, 2008-2015
✓ Deputy of academic affairs, Department of materials engineering, IUT, 2004-2008
✓ Director of casting and pattern making workshops, Department of materials engineering, IUT, 1999-2012
✓ Assistant professor, Department of materials engineering, IUT, 1999-2008
✓ Teaching assistant, Department of mechanical and manufacturing engineering, University of Melbourne, Australia, 1994-1998

• Awards and honors

✓ Distinguished undergraduate advisor of IUT, 2017
✓ Distinguished postgraduate supervisor of IUT, 2013
✓ Sabbatical leave at University of Wisconsin, Milwaukee (UWM), 2012
✓ Distinguished researcher of IUT and Isfahan province, 2011
✓ Distinguished lecturer of IUT, 2009
✓ Writing-up Award from University of Melbourne, 1998
✓ Four months Postgraduate Research Experience Abroad Scholarship from the University of Melbourne to work at Pohang University of Science and Technology (POSTECH), South Korea, 1996
✓ Full Ph.D. Scholarship from Ministry of Culture and Higher Education of Iran, 1993
✓ Full Master Scholarship from Ministry of Culture and Higher Education of Iran, 1989

- **Courses taught**

Undergraduate	<ul style="list-style-type: none"> ✓ Solidification of metals ✓ Solidification of materials ✓ Casting 1 (Metal casting fundamentals and technologies) ✓ Casting 2 (Ferrous foundry metallurgy and technologies) ✓ Metal casting ✓ Fundamentals of materials science ✓ Manufacturing processes ✓ Introduction to materials engineering ✓ Casting and sand analysis laboratory ✓ Solidification laboratory
Postgraduate	<ul style="list-style-type: none"> ✓ Advanced casting processes ✓ Engineering design of castings ✓ Advanced solidification processing ✓ Special topics in solidification and casting ✓ Cast metal matrix composites ✓ Composite materials
Industrial training short courses	<ul style="list-style-type: none"> ✓ Molding, core making and casting technology held jointly by the Department of materials engineering at IUT and Iran-Zob Casting Co. for Syrian engineers (in English), IUT, Iran, 2001 ✓ Slab defects, Mobarekeh steel complex, Iran, 2006 ✓ Casting and rapid prototyping processes, Borna Danesh Gostar Co., Iran, 2007 ✓ Advanced solidification processing, Education Centre of Iranians House of Industry and Mine, Iran, 2010 ✓ Ingot casting, Isfahan Alloy Steel Company (IASC), 2017

- **Publications**

- ✓ **Publication citations, H-index and ranking (Jun 06, 2022)**

• Scopus	<ul style="list-style-type: none"> ✓ H-index: 30 ✓ Citations: 2509
• Google scholar	<ul style="list-style-type: none"> ✓ H-index: 31 ✓ Citations: 3190
• Exaly.com ranking	✓ https://exaly.com/author/4783579/behzad-niroumand/rankings
Citations in review papers	<ol style="list-style-type: none"> 1. Z. Fan, "Semisolid metal processing", International Materials Reviews, Vol. 47, 2002, pp. 49-85. 2. S. Nafisi and R. Ghomashchi, "The microstructural characterization of semi-solid slurries", The Journal of The Minerals, Metals & Materials Society (JOM), Vol. 58, 2006, pp 24–30. 3. M.S. Salleh, M.Z. Omar, J. Syarif, and M.N. Mohammed, "An overview of semisolid processing of aluminium alloys", ISRN Materials Science, Vol. 2013, pp. 1-9. 4. Pola, M. Tocci and P. Kapranos, "Microstructure and properties of semi-solid aluminum alloys: A literature review", Metals, Vol. 181, 2018, pp. 1-18. 5. Aakash Kumar, Prabhutosh Kumar, A review on the mechanical properties, tribological behavior and the microstructural characterization of Aluminium metal matrix composites (AMMCs), International Journal of Scientific & Engineering Research, Vol. 6, Issue 6, 2015, 1234-1245. 6. Suneesh Eacherath and Sivapragash Murugesan, Synthesis and characterization of magnesium-based hybrid composites – A review, International Journal of Materials Research, Vol. 109, No. 7, (2018) pp. 661-672. 7. C. Kannan, R. Ramanujam, Advanced liquid state processing techniques for ex-situ discontinuous particle reinforced nanocomposites: A review, Science and Technology of Materials, Vol. 30, Issue 2, August 2018, Pages 109-119. 8. Ashish Sharma, Sachin Mohal, Narender Panwar, Wear and Mechanical behavior of Aluminum matrix composites- A Review, International Journal of Management, Technology And Engineering, Vol. 8, Issue XI, 2018, pp/ 36-42. 9. Ramanathan, Arunachalam, Pradeep Kumar Krishnan, Rajaraman Muraliraja, A review on the production of metal matrix composites through stir casting – Furnace design, properties, challenges, and research opportunities, Journal of Manufacturing Processes, Vol. 42, June 2019, Pages 213-245. 10. Swarndeeep Singh, Rupinder Singh, Simranpreet Singh Gill, Development of Aluminium MMC with Hybrid Reinforcement - A Review", Materials Science Forum, Vol. 808, pp. 109-119, 2015.

11. Narender Panwar and Amit Chauhan, Development of aluminum composites using Red mud as reinforcement- A review, Recent Advances in Engineering and Computational Sciences (RAECS), 2014, India.
12. Satish Kumar Thandalam, Subramanian Ramanathan, Shalini Sundarajan, Synthesis, microstructural and mechanical properties of ex situ zircon particles ($ZrSiO_4$) reinforced Metal Matrix Composites (MMCs): a review, Journal of Materials Research and Technology, Vol. 4, Issue 3, 2015, pp. 333-347.
13. Bala G Narasimha , Vamsi M Krishna , and Anthony M Xavier, A Review on Processing of Particulate Metal Matrix Composites and its Properties, International Journal of Applied Engineering Research, Volume 8, Number 6 (2013) pp. 647-666.
14. Ervina Efzan, Mohd Noor, Siti Syazwani N., Al Bakri Abdullah, Mohd Mustafa, "Fabrication Method of Aluminum Matrix Composite (AMCs): A Review", Key Engineering Materials, Vol. 700, pp. 102-110, 2016
15. Genlian Fan, Ziyun Yu, Zhanqiu Tan, Zhiqiang Li, Di Zhang, Evolution, Control, and Effects of Interface in CNT/Al Composites: A review, Acta Metallurgica Sinica (English Letters), Vol. 27, Issue 5, 2014, pp 839–843.
16. Miranda, N. Barekar, B.J. McKay, MWCNTs and their use in Al-MMCs for ultra-high thermal conductivity applications: A review, Journal of Alloys and Compounds, Vol. 774, 5 2019, pp. 820-840.
17. Mudasar B. A. Pasha, Mohammed Kaleemulla, Processing and Characterization of Aluminum Metal Matrix Composites: An overview, Rev. Adv. Mater. Sci., Vol. 56, 2018, pp. 79-90.
18. Seun Samuel Owoeye, Davies Oladayo Folorunso, Babatunde Oji, Sunday Gbenga Borisade, Zinc-aluminum (ZA-27)-based metal matrix composites: A review article of synthesis, reinforcement, microstructural, mechanical, and corrosion characteristics, The International Journal of Advanced Manufacturing Technology, 2019, Vol. 100, pp 373-380.
19. C.Kannan, R.Ramanujam, Advanced liquid state processing techniques for ex-situ discontinuous particle reinforced nanocomposites: A review, Science and Technology of Materials, Volume 30, Issue 2, 2018, Pages 109-119.
20. KGajalakshmi, N. Senthilkumar, A Critical Review of Wear and Machinability Studies of Aluminium Metal Matrix Composite, Journal of Advanced Engineering Research, Vol. 5, Issue 1, 2018, pp. 31-40.
21. Kawaljit Singh Randhawa, Metal Matrix Composites Fabrication Difficulties and Remedies - Research and Review, JASC: Journal of Applied Science and Computations , Vol. 5, 2018, pp. 158-164.
22. Sajjad Amir Khanlou & Shouxun Ji, A review on high stiffness aluminum based composites and bimetals, Critical Reviews in Solid State and Materials Sciences, (2019).
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24. Jaswinder Singh, Amit Chauhan, A review of microstructure, mechanical properties and wear behavior of hybrid aluminium matrix composites fabricated via stir casting route, Sādhanā, 2019, 44:16.
25. S. Deepak Kumar, A. Mandal, M. Chakraborty, Cooling Slope Casting Process of Semi-solid Aluminum Alloys: A Review, International Journal of Engineering Research & Technology (IJERT), Vol. 3 Issue 7, 2014, pp. 269- 283.
26. Himanshu Kala, K.K.S.Mer, Sandeep Kumar, A Review on Mechanical and Tribological Behaviors of Stir Cast Aluminum Matrix Composites, Procedia Materials Science, Vol. 6, 2014, pp. 1951-1960.
27. Yashpal, Sumankant, C.S. Jawalkar, Ajay Singh, Verma, N.M. Suri, Fabrication of Aluminium Metal Matrix Composites with Particulate Reinforcement: A Review, Materials Today: Proceedings, Vol. 4, Issue 2, Part A, 2017, pp. 2927-2936
28. Ajay Singh Verma, Sumankant, Narender Mohan Suri, Yashpal, Corrosion Behavior of Aluminum Base Particulate Metal Matrix Composites: A Review, Materials Today: Proceedings, Vol. 2, Issues 4–5, 2015, Pages 2840-2851.
29. J. Joel, M. Anthony Xavier, Aluminium Alloy Composites and its Machinability studies; A Review, Materials Today: Proceedings, Vol. 5, Issue 5, Part 2, 2018, Pages 13556-13562.
30. Alaa Mohammed Razzaq, Dayang Laila Abang Abdul Majid, M.R. Ishak and Uday M. B, A Brief Research Review for Improvement Methods the Wettability between Ceramic Reinforcement Particulate and Aluminium Matrix Composites, IOP Conference Series: Materials Science and

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33. J.A. Sekhar, Tunable coefficient of friction with surface texturing in materials engineering and biological systems, *Current Opinion in Chemical Engineering*, Vol. 19, 2018, pp. 94-106.
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37. H. Nath, "A Review on In Situ Synthesis of Al/TiC and Al/SiC-Composites", *Key Engineering Materials*, Vol. 684, pp. 287-292, 2016.
38. H. Nath, A. P. Amosov, SHS amidst other new processes for in-situ synthesis of Al-matrix composites: A review, *International Journal of Self-Propagating High-Temperature Synthesis*, 2016, Volume 25, Issue 1, pp 50-58.
39. Williams S. Ebhota, Akhil S. Karun, Freddie L. Inambao, "Principles and Baseline Knowledge of Functionally Graded Aluminium Matrix Materials (FGAMMs): Fabrication Techniques and Applications", *International Journal of Engineering Research in Africa*, Vol. 26, pp. 47-67, 2016.
40. Roohollah Jamaati, Mohammad Reza Toroghinejad, Hossein Edris, Mohammad Reza Salmani, Fabrication of Nano/Ultra-Fine Grained IF Steel via SPD Processes: a Review, *Transactions of the Indian Institute of Metals*, 2014, Vol. 67, pp 787–802.
41. Chang-Soo Kim, Kyu Cho, Mohsen H. Manjili, Marjan Nezafati, Mechanical performance of particulate-reinforced Al metal-matrix composites (MMCs) and Al metal-matrix nano-composites (MMNCs), *Journal of Materials Science*, Volume 52, Issue 23, pp 13319–13349, 2017.
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48. A Prasad Reddy, P Vamsi Krishna, R Narasimha Rao, N V Murthy, Silicon Carbide Reinforced Aluminium Metal Matrix Nano Composites-A Review, *Materials Today: Proceedings* 4 (2017) 3959–3971.
49. A Prasad Reddy, P Vamsi Krishna, R Narasimha Rao, Al/SiCNP and Al/SiCNP/X nanocomposites fabrication and properties: A review, *Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanomaterials, Nanoengineering and Nanosystems*, 2017, Vol. 231, pp. 155-172.
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51. Ajay Kumar Yadav, Krishna Murari Pandey, Abhijit Dey, Aluminium Metal Matrix Composite with Rice Husk as Reinforcement: A Review, *Materials Today: Proceedings*, Vol. 5, Issue 9, Part 3, 2018,

	pp. 20130-20137. 52. Malaki, M., Xu, W.; Kasar, A.K.; Menezes, P.L.; Dieringa, H.; Varma, R.S.; Gupta, M. Advanced Metal Matrix Nanocomposites, Metals 2019, 9, 330. 53. Jarfors, A.E.W., “A Comparison Between Semisolid Casting Methods for Aluminium Alloys”, Metals, 2020, 10, 1368. https://doi.org/10.3390/met10101368
Book citations	1. D.H. Kirkwood, M. Suéry, P. Kapranos, H.V. Atkinson, K.P. Young, “Semi-solid Processing of Alloys”, Springer, 2010. 2. “Comprehensive Materials Processing”, Vol. 10, Ed. S. Masood, Elsevier Science Ltd, 2014. 3. S. Jayalakshmi and M. Gupta, “Metallic Amorphous Alloy Reinforcements in Light Metal Matrices”, Springer Int. Pub., 2015. 4. S. Nafisi and R. Ghomashchi, “Semi-Solid Processing of Aluminum Alloys”, Springer Int. Pub., 2016. 5. L. Ceschini, A. Dahle, M. Gupta, A.E.W. Jarfors, S. Jayalakshmi, A. Morri, F. Rotundo, S. Toschi, R.A. Singh, “Aluminum and Magnesium Metal Matrix Nanocomposites”, Springer, 2017. 6. New trends in alloy development, characterization and application, Edited by Zaki Ahmad, InTech publisher, 2015. 7. An overview of heat transfer phenomena, Edited by Salim Newaz Kazi, In Tech publisher, 2012.

✓ *International journal papers*

1. Niroumand, B., Xia, K. “3D Study of the Structure of Primary Crystals in a Rheocast Al-Cu Alloy”, Journal of Materials Science and Engineering, A283 (2000) 70-75.
2. Ahmadi, J., Monirvaghefi, M., Salehi, M., Niroumand, B. “Effect of Pearlite Interlamellar Spacing on Predominant Abrasive Wear Mechanism of Fully Pearlitic Steel”, Transactions of Materials and Heat Treatment, 25, (2004) 1207-1213.
3. Falak, P., Niroumand, B. “Rheocasting of an Al-Si alloy”, Scripta Materialia, Vol.53/1, (2005) 53-57.
4. Maleki, A., Niroumand, B. Shafeai, A. “Effects of Squeeze Casting Parameters on Density, Macrostructure and Hardness of LM13 Alloy”, Journal of Materials Science and Engineering A, 428, (2006) 135-140.
5. Mirzadeh, H., Niroumand, B., “ Semi-Solid Casting of Al-7wt%Si Alloy in Expendable Molds” Solid State Phenomena, 116-117 (2006) 497-500.
6. Reisi, M., Niroumand, B., “Evolution of Primary Particles Morphology during Secondary Cooling in SSR® Process” Solid State Phenomena, 116-117 (2006) 493-496.
7. Tahamtan S., Golozar M.A., Karimzadeh F., Niroumand B., “Microstructure and Tensile Properties of Thixoformed A356 Alloy”, Journal of Materials Characterization, (2008) 223-228.
8. Ghahremanian, M., Niroumand, B., “Compocasting of an Al-Si-SiC _p Composite Using Powder Injection Method” Solid State Phenomena, 141-143 (2008) 175-180.
9. Reisi, M., Niroumand, B., “Effects of Stirring Parameters on Rheocast Structure of Al-7.1wt%Si Alloy” Journal of Alloys and Compounds, 470 (2009) 413-419.
10. Mirzadeh, H., Niroumand, B., “ Effects of Rheocasting Parameters on the Microstructure of Rheo-Centrifuged Cast Al-7.1wt%Si Alloy” Journal of Alloys and Compounds, 474 (2009) 257-263.
11. Ashiri, R., Niroumand, B., Karimzadeh, F., Hamani, M., Pouranvari, M., “Effect of Casting Process on Microstructure and Tribological Behavior of LM13 Alloy” Journal of Alloys and Compounds, 475 (2009) 321-327.
12. Reisi, M., Niroumand, B., “Growth of Primary Particles during Secondary Cooling of a Rheocast Alloy” Journal of Alloys and Compounds, 475 (2009) 643-647.
13. Maleki, A., Shafyei, A., Niroumand, B. “Effects of Squeeze Casting Parameters on the Microstructure of LM13 Alloy” Journal of Materials Processing Technology, 209 (2009) 3790-3797.
14. Maleki, A., Meratian, M., Niroumand, B., Gupta, M., “Synthesis of In-situ Aluminum Matrix Composite Using a New Activated Powder Injection Method” Metallurgical and Materials Transactions A, 39, (2008) 3034-3039.
15. Mirzadeh, H., Niroumand, B., “Fluidity of Al-Si Semisolid Slurries during Rheocasting by a Novel Process” Journal of Materials Processing Technology, 209, (2009) 4977-4982.
16. Nasr Esfahani, M., Niroumand, B., “Design of Hot Tearing Test Apparatus for Cast Alloys” Casting Technologies, ๑๑, (2009) 42-45.
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Operation” Journal of Metals and Materials International, 16 (2010) 35-38.
19. Nasr Esfahani, M., Niroumand, B., “Study of Hot Tearing of A206 Aluminum Alloy using Instrumented Constrained T-shaped Casting Method” Journal of Materials characterization, 61 (2010) 318-324.
20. Abasipour, B., Niroumand, B., Monir-Vaghefi, M., “Compcasting of A356-CNT Composite”, Transactions of Nonferrous Metals Society of China, 20, (2010) 1561-1566.
21. Amirkhanlou, S., Niroumand, B., “Synthesis and Characterization of 356-SiC _p Composites by Stir Casting and Compcasting Methods”, Transactions of Nonferrous Metals Society of China, 20, (2010) s788-s793.
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35. Ghahremanian, M., Niroumand, B., Panjepour, M., “Production of Al-Si-SiC _p Cast Composites by Injection of Low Energy Ball-Milled Al-SiC _p Powder into the Melt”, Journal of Metals and Materials International, 18, (2012) 149-156.
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37. Reisi, M., Niroumand, B., “Modeling of Shear Induced Dendrite Coarsening During Semisolid Processing”, Journal of Materials and Technology, 28 (2012) 1241-1245.
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44. Kaskani, M., Niroumand, B., "On Non-Dendritic Microstructure Formation During Sand Casting of A356 Alloy", <i>Solid State Phenomena A</i> , 192-193 (2013) 433-440.
45. Jamshidi-Alashti R., Mohammadi Zahrani M., Niroumand B., "Use of Artificial Neural Networks to Predict the Properties of Replicated Open-Cell Aluminum Alloy Foam via Processing Parameters of Melt Squeezing Procedure", <i>Materials & Design</i> , 51 (2013) 1035-1044.
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✓ **National journal and conference papers**

More than 120 papers published in national scientific journals and conferences in Persian (Farsi).

• **Contribution to scientific journals**

✓ Editor in chief of journal of Advanced Materials in Engineering published in Persian (Farsi), 2013 -2017
✓ Review Editor, Mechanical Properties of Metals, Frontiers in Metals and Alloys (https://loop.frontiersin.org/people/1085514/overview)
✓ Member of editorial board of journal of Journal of Advanced Materials and Processing, Since 2022
✓ Member of editorial board of journal of Advanced Materials in Engineering published in Persian (Farsi), Since 2013
✓ Member of editorial board of journal of Welding Science and Technology of Iran published in Persian (Farsi), Since 2015
✓ Member of editorial board of journal of Material Engineering of Majlesi university published in Persian (Farsi), Since 2005
✓ Reviewer of journals of Metallurgical and Materials Transactions A, Acta Materialia, Alloys and Compounds, Materials Processing and Technology, Materials Science and Engineering A, Materials and Design, Transactions of Nonferrous Metals Society of China, Journal of Materials Science and Technology, Journal of Materials Research, International Journal of Manufacturing Engineering, Acta Sinica, Acta Metallurgica Sinica (English Letters), Materialia, International Journal of Minerals, Metallurgy and Materials, Science and Engineering of Composite Materials, Journal of Visualized Experiments (JoVE), Ultrasounds, Physica B: Condensed Matter, Results in Physics, Solid State Phenomena, Materials Engineering, International Journal of casting, Acta Biomaterialia, Metals, Defence Technology, Advances in Materials Science and Engineering, Ultrasonics, International Journal of Advanced Manufacturing Technology, Journal of Metallurgy, International Journal of ISSI, Journal of Advanced Materials and Processing, and several national scientific journals published in Persian (Farsi).

• **Contribution to international and national conferences**

• Scientific committee chairman of the 2nd international conference on Steelmaking and Continuous Casting (ISCC2022), Hormozgan Steel Company (HOSCO), Bandar Abbas, Iran, 2022.
• Scientific committee chairman of the 3 rd international conference on "Welding and Non Destructive Testing (ICWNDT 2021)", Isfahan University of Technology, Isfahan, Iran, 2021
• Scientific committee chairman of the 1st conference on Continuous Casting (ICCC 2019), Hormozgan Steel Company (HOSCO), Bandar Abbas, Iran, 2019.
• Scientific committee chairman of the 5th joint conference of Iranian Metallurgical Engineers Society and Iranian Foundry men's Society, Isfahan University of Technology, Isfahan, Iran, 2011
• Chairman of Steel Symposium 84, Isfahan University of Technology, Isfahan, Iran, 2005
• Member of the international scientific committee of: <ul style="list-style-type: none"> ✓ 4th International Forum on Engineering Materials and Manufacturing Technology (IFEMMT-AS 2018), 2018, China ✓ 2nd International Conference on Green Composite Materials and Nanotechnology (GCMN 2018), 2018, China ✓ 11th-17th international conferences on Semi-Solid Processing of Alloys and Composites (S2P2010-S2P2023), held in 2010-2023 in China, South Africa, Oman, USA, China, Austria and Italy. ✓ 1st-10th International joint conferences of Iranian metallurgical engineering society and Iranian foundry men's society (IMat2012-IMat2021) held in 2012-2021 in different cities in Iran.
• Member of referee committee of: <ul style="list-style-type: none"> ✓ 2nd international conference on Civil Engineering, Architecture and Building Materials (CEABM 2012), China, 2012. ✓ International conference on Materials and Products Manufacturing Technology (MPMT 2011), China, 2011 ✓ 6th international conference on Mechatronics and its Applications 2009 (ISMA'09), United Arab Emirate, 2009 ✓ 7th international conference on Composite Science & Technology (ICCST/7), United Arab Emirate, 2009 ✓ 10th international conference on Semi-Solid Processing of Alloys and Composites (S2P 2008) · jointly in Germany and Belgium, 2008 ✓ 2nd international conference on manufacturing Engineering, Tehran, 2007
• Member of scientific and referee committees of several national conferences

- **Contribution to student competitions**

- ✓ Chair of the 1st National Student Foundry Competition (NSFC), IUT, 2011 (NSFC.ir)
- ✓ Chair of the 4th National Student Foundry Competition (NSFC), IUT, 2016 (NSFC2016.ir)

- **Scientific research projects**

- | |
|---|
| <ul style="list-style-type: none"> • Additive Manufacturing (AM) <ul style="list-style-type: none"> ✓ In-situ alloying of Ti-Cu alloys through AM methods ✓ Selected Laser Melting (SLM) and Electron Beam Melting (EBM) of titanium, steel and aluminum base alloys (ongoing) ✓ Simulation of microstructural formation in AM parts (ongoing) ✓ EBM of 316L stainless steel and 316L reinforced with nano-ceramic particles (ongoing) ✓ Transient Liquid Phase (TLP) bonding of AM parts (ongoing) ✓ Heat treatment and surface modification of AM parts (ongoing) |
| <ul style="list-style-type: none"> • High Entropy Alloys (LWHEA) <ul style="list-style-type: none"> ✓ Development of a new Low Melting point Light Weight HEA (LMLW-HEA) (ongoing) |
| <ul style="list-style-type: none"> • Phase Change Materials (PCMs) <ul style="list-style-type: none"> ✓ Tailoring solidification structure of some aluminum and brass alloys using PCMs (ongoing) ✓ Computer simulation and physical modelling of the effects of PCMs on solidification path, macrostructure and Columnar-Equiaxed Transition (CET) of a transparent model material (ongoing) |
| <ul style="list-style-type: none"> • Semisolid processing <ul style="list-style-type: none"> ✓ Semisolid ingot and shape casting of Al, Mg, Zn, Cu and grey cast iron alloys by mechanical stirring, SSR processing, gas injection, cooling slope, rheo-centrifuged casting, thermo-mechanical and other novel techniques ✓ Semisolid casting of Al and cast iron in expendable molds under gravitational and centrifugal forces ✓ Corrosion behavior of semisolid A356 alloy produced by casting and thermo mechanical methods ✓ In-situ study of evolution of primary solid particles in semisolid processing of a transparent model material (SCN) ✓ Welding of 6061 Aluminum plates using a hybrid semisolid-FSW (friction stir welding) method |
| <ul style="list-style-type: none"> ✓ Metal matrix composites ✓ Ex-situ fabrication of Al-SiC, Al-C_f, Al-CNT and Mg-CNT micro and nano-composites by vortex, compocasting, powder injection and gas pressure infiltration methods ✓ In-situ fabrication of Al-Al₂O₃, Al-SiO₂, Al-SiOC and Mg-Metal oxides micro and nano-composites ✓ In-situ fabrication of cast Al matrix composites by in-situ pyrolysis of organic materials in the melt ✓ Fabrication and characterization of Sn-Cu-SiO_{2(m)} lead free solders ✓ Macro-composite (compound) casting of Al-Al bimetals ✓ Ingot and shape casting of cast Al-CNT and Mg-CNT nano-composites ✓ Additive manufacturing of metal matrix composites |
| <ul style="list-style-type: none"> • Metal foams <ul style="list-style-type: none"> ✓ Production of Al and Al matrix composite foams by melt squeezing, semisolid melt squeezing and gas pressure infiltration processes using NaCl and ceramic sphere space-holders ✓ Fabrication of syntactic Al and Mg foams by gas pressure infiltration techniques using low cost minerals |
| <ul style="list-style-type: none"> • Hydrophobicity of materials <ul style="list-style-type: none"> ✓ Development of polymer and polymer matrix nano-composite hydrophobic coatings for ceramic substrates ✓ Effects of solidification structure on water contact angle of Al and grey cast iron |
| <ul style="list-style-type: none"> • Surface alloying and compositing <ul style="list-style-type: none"> ✓ In-mould surface alloying of grey cast iron with Al and Cu ✓ Friction Stir Processing (FSP) of Mg alloy with CNTs and other nano-particles ✓ Laser surface alloying of steel plates |
| <ul style="list-style-type: none"> • Squeeze casting <ul style="list-style-type: none"> ✓ Squeeze ingot and shape casting of Al alloys, Mg alloys, grey and ductile cast irons ✓ Squeeze casting of Al-Al₂O₃, Al-C_f and Al-Al bimetal composites |
| <ul style="list-style-type: none"> • Hot tearing <ul style="list-style-type: none"> ✓ Hot tearing susceptibility of A206 alloy and Al-SiC cast composite ✓ Effects of running and gating system design on hot tearing susceptibility of A206 alloy ✓ Designing an ICTC device and proposing a new criterion for evaluation of hot tearing susceptibility of cast alloys |
| <ul style="list-style-type: none"> • Other research areas |

- ✓ Fabrication of lead free solders
- ✓ Ultrasonic melt treatment of AZ91 magnesium alloy
- ✓ In-situ study of the effects of electric field on dendritic growth morphology using a transparent model material
- ✓ In-mould eutectic modification of Al-Si alloys
- ✓ Effects of nano-ceramic coatings on microstructure, mechanical properties and casting fluidity of thin walled aluminum castings
- ✓ Casting optimization of HiSi cast iron for corrosive environments
- ✓ Study of heat transfer in a scaled-down continuous casting copper mold

• **Main industry funded research projects**

- ✓ Improving the casting yield of an aluminium high pressure die cast auto-part, Iran Godakht Co. in collaboration with Supply of Automobile Parts Co. (SAPCO), Iran
- ✓ Improving the microstructure and properties of high pressure die cast oil pump housing of Pegout 206, Atlas Pump Co. in collaboration with SAPCO, Iran
- ✓ Reducing the under-surface micro-porosity of XU7 auto-pistons, Pouya Neiestanak Co. in collaboration with SAPCO, Iran
- ✓ Production of a defect free A356 component by squeeze casting, Sponsored by the ministry of science, research and technology, Iran
- ✓ Improving the strap-lug joint quality of lead-acid auto-batteries, Tavan Battery Co. in collaboration with SAPCO, Iran
- ✓ Squeeze casting of a piston-like component sponsored by the ministry of industries and mines and the ministry of science, research and technology of Iran, Iran
- ✓ Fabrication of Aluminium metal matrix nanocomposite by BS290 pyrolysis, Isfahan Industrial Estates Company (Isfahan IEC), Iran

• **Other external research funding**

- ✓ Semisolid ingot casting of an Al alloy by mechanical stirring, Office of research and technology affairs, IUT
- ✓ Squeeze casting of LM13 Al alloy, Office of research and technology affairs, IUT
- ✓ Study of heat transfer in a scaled-down continuous casting copper mold, Center of excellence for steel, Iran
- Production of a defect free A356 component by squeeze casting, Ministry of science, research and technology of Iran, Iran
- ✓ Fabrication and characterization of an aluminum-aluminum macrocomposite bimetal by compound squeeze casting process, Iran National Science Foundation (INSF), Iran
- ✓ Synthesis and characterization of lead-free Sn-Cu nano composite solder through severe plastic deformation, Entrepreneurship center of IUT, Iran
- ✓ In-situ alloying of NiTi shape memory alloy from the elemental powders by additive manufacturing method, Iran National Science Foundation (INSF), Iran.

• **Other industry related activities**

- ✓ Member of the managing board of Iranian institute of welding and nondestructive testing, Since 2018
- ✓ Member of the project supervision committee for manufacturing of the first domestically made turbine runner for power plant of Dez dam in Khuzestan province, Owner: Tavanir Co., Contractor: Saya Steel Co.
- ✓ Member of the project supervision committee for manufacturing of Qom monorail switch bridge, Owner: Qom Urban Railway Organization, Iran, Contractor: Mapna Group, Iran
- ✓ Member of project team for study of "Self-cleaning materials for the water industry" at University of Wisconsin-Milwaukee (UWM), sponsored by National Science Foundation (NSF) and center for Water Equipment & Policy (WEP) IAB, USA

• **Workshops attended**

- ✓ Several workshops on "effective teaching practice", "emotional intelligence", "research conduct", "entrepreneurship", "team work", "Scientometrics", "workplace safety", ..., IUT, 2000-2017.
- ✓ 10 hours workshop on "Responsible conduct of research", UWM Graduate School, Wisconsin, 2012.
- ✓ Two days workshop on "From micro to nano-lithography" by Prof. F. Yaghmaie, IUT, 2010.
- ✓ One day workshop on "Production of high performance aluminium castings" by Prof. J. Capmbell, Iran Aluminium Research Center, Tehran, 2009.
- ✓ Two days workshop on "Introduction to XRD" by Prof. M.H. Enayati and H. Edris, IUT, 2003.
- ✓ One day workshop on "Steel melting in induction furnaces" by Prof. A. Changizove, Centre for Education

and Research of Iranian Industries, Tehran, Iran, 1999.

- ✓ Two days workshop on "Financial and general management for manufacturers" by Prof. E.J. Colville, University of Melbourne, Australia, 1997.
- ✓ One day workshop on "Semi-solid processing of materials" by Prof. K. Xia, Advanced Materials Center, University of Melbourne, Australia, 1994.

- **Patents**

- About 30 nationally registered patents

- **Main research interests**

- Anything related to solidification and casting of alloys and composites including but not limited to:
 - ✓ Additive manufacturing of alloys and metal matrix composites
 - ✓ Semi-solid processing of alloys and composites
 - ✓ Macro, micro and nano-metal matrix composites
 - ✓ Fabrication of metallic foams
 - ✓ Hydrophobicity of solid surfaces
 - ✓ Lead free solders
 - ✓ In-situ study of solidification using transparent model materials
 - ✓ Squeeze casting of automotive parts
 - ✓ Hot tearing of cast alloys
 - ✓ Ultrasonic treatment of the melt
 - ✓ Fabrication of thin walled parts
 - ✓ Improvement of casting yield
 - ✓ ...