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### Academic Positions

Assistant professor: Tarbiat Modares University (2020- )

Post-doctoral Research Associate: University of Sheffield (2019-2020)

Research project: Fabrication and characterization of high entropy alloys for advanced nuclear systems.

Under supervision of Dr. Amy Gandy.

Post-doctoral Researcher: University of Tehran (2017-2019)

Research project: Severe plastic deformation of high-entropy alloys.

Under supervision of Prof. Mahmoud Nili-Ahmadabadi and Prof. Terence G. Langdon.

Post-doctoral Research Fellow: University of Southampton (2015-2017)

Research project: Severe plastic deformation of CP-Ti, Ti-6Al-4V and CoCrFeNiMn high-entropy alloys.

Under supervision of Prof. Terence G. Langdon.

## **Academic Qualifications**

□ Ph.D.: University of Tehran (2010-2015)

Metallurgical and Materials Engineering, University of Tehran, Iran. GPA (3.66/4.00)

Research project: Nanostructured NiTi-based shape memory alloys processed by severe plastic deformation.

Under supervision of Prof. Mahmoud Nili-Ahmadabadi and Prof. Terence G. Langdon.

**Study leave for 6 months under supervision of Prof. Hyoung Seop Kim at POSTECH University in South Korea.**

□ M.Sc.: University of Tehran (2006-2008)

Metallurgical and Materials Engineering, University of Tehran, Iran, GPA (3.46/4.00)

Research project: Wire drawing know how and the effect of the thermomechanical treatment on transformation behavior of Ni-Ti shape memory alloy.

Under supervision of Prof. Mahmoud Nili-Ahmadabadi.

□ B.Sc.: University of Imam Khomeini (2002-2006)

Metallurgical and Materials Engineering, University of Imam Khomeini, Iran, GPA (3.06/4.00)

Research project: Investigation of mechanical property of Al/SiCp composite.

Under supervision of Dr. Ahmad Razaghian and Prof. Masoud Emami.

## **Research Interests:**

- Microstructure Engineering in Materials
- Alloy design
- Phase transformations
- Severe plastic deformation
- Ultrafine Grained and Nanostructured Materials
- High entropy alloys
- Shape memory alloys

## **Publications in ISI journals:**

1. H. Lashgari, S. Zangeneh, **H. Shahmir**, M. Emamy, M. Saghafi, Heat treatment effect on the microstructure, tensile properties and dry sliding wear behavior of A356-10%B4C cast composites, *Mater. Des.* 31 (2010) 4414-4422.
2. **H. Shahmir**, M. Nili-Ahmadabadi, F. Naghdi, Superelastic behavior of aged and thermomechanical treated NiTi alloy at  $A_f + 10\text{ }^\circ\text{C}$ , *Mater. Des.* 32 (2011) 365-370.
3. M. Seyyed Aghamiri, M. Nili Ahmadabadi, **H. Shahmir**, F. Naghdi, Sh. Raygan, Study of thermomechanical treatment on mechanical-induced phase transformation of NiTi and TiNiCu wires, *J. Mech. Behav. Bio. Mater.* 21 (2013) 32-36.
4. **H. Shahmir**, M. Nili-Ahmadabadi, M. Mansouri-Arani, T.G. Langdon, The processing of NiTi shape memory alloys by equal-channel angular pressing at room temperature, *Mater. Sci. Eng. A* 576 (2013) 178-184.
5. **H. Shahmir**, M. Nili-Ahmadabadi, Y. Huang, T.G. Langdon, Evolution of microstructure and hardness in NiTi shape memory alloys processed by high-pressure torsion, *J. Mater. Sci.* 49 (2014) 2998-3009.
6. **H. Shahmir**, M. Nili-Ahmadabadi, F. Naghdi, M. Habibi-Parsa, I. Haririan, Control of superelastic behavior of NiTi wires aided by with reference thermomechanical treatment to three-point bending, *J. Mater. Eng. Perform.* 23 (2014) 1386-1391.
7. **H. Shahmir**, M. Nili-Ahmadabadi, M. Mansouri-Arani, A. Khajezade, T.G. Langdon, Evaluating a new core-sheath procedure for processing hard metals by equal-channel angular pressing, *Adv. Eng. Mater.* 16 (2014) 918-926.
8. **H. Shahmir**, M. Nili-Ahmadabadi, T.G. Langdon, Shape memory effect of NiTi alloy processed by equal-channel angular pressing followed by post deformation annealing, *IOP Conf. Series: Mater. Sci. Eng.* 63 (2014) 012111.

9. **H. Shahmir**, M. Nili-Ahmadabadi, M. Mansouri-Arani, A. Khajezade, T.G. Langdon, Evaluating the room temperature ECAP processing of a NiTi alloy via simulation and experiments, *Adv. Eng. Mater.* 17 (2015) 532-538.
10. **H. Shahmir**, M. Nili-Ahmadabadi, Y. Huang, J.M. Jung, H.S. Kim, T.G. Langdon, Shape memory effect in nanocrystalline NiTi alloy processed by high-pressure torsion, *Mater. Sci. Eng. A* 626 (2015) 203-206.
11. **H. Shahmir**, M. Nili-Ahmadabadi, C.T. Wang, J.M. Jung, H.S. Kim, T.G. Langdon, Annealing behavior and shape memory effect in NiTi alloy processed by Equal-Channel Angular Pressing at room temperature, *Mater. Sci. Eng. A* 629 (2015) 16-22.
12. **H. Shahmir**, M. Nili-Ahmadabadi, A. Razzaghi, M. Mohammadi, C.T. Wang, J.M. Jung, H.S. Kim, T.G. Langdon, Using dilatometry to study martensitic stabilization and recrystallization kinetics in a severely deformed NiTi alloy, *J. Mater. Sci.* 50 (2015) 4003-4011.
13. **H. Shahmir**, T.G. Langdon, Characteristics of the allotropic phase transformation in titanium processed by high-pressure torsion using different rotation speeds, *Mater. Sci. Eng. A* 667 (2016) 293-299.
14. **H. Shahmir**, P.H.R. Pereira, Y. Huang, T.G. Langdon, Mechanical properties and microstructural evolution of nanocrystalline titanium at elevated temperatures, *Mater. Sci. Eng. A* 669 (2016) 358-366.
15. **H. Shahmir**, J. He, Z. Lu, M. Kawasaki, T.G. Langdon, Effect of annealing on mechanical properties of a nanocrystalline CoCrFeNiMn high-entropy alloy processed by high-pressure torsion, *Mater. Sci. Eng. A*, 676 (2016) 294-303.
16. A. Derakhshandeh, M. Nili-Ahmadabadi, A. Khajezade, **H. Shahmir**, Room temperature flow behavior of Ti deformed by equal-channel angular pressing using core–sheath method, *Adv. Eng. Mater.* 19, No. 2 (2017) 1-9.

17. **H. Shahmir**, M. Nili-Ahmadabadi, A. Shafie, T.G. Langdon, Hardening and thermal stability of a nanocrystalline CoCrFeNiMnTiO. 1 high-entropy alloy processed by high-pressure torsion, IOP Conference Series: Mater. Sci. Eng. 194 (1) (2017) 012017.
18. **H. Shahmir**, M. Kawasaki, T.G. Langdon, The potential for achieving superplasticity in high-entropy alloys processed by severe plastic deformation, IOP Conference Series: Mater. Sci. Eng. 194 (1) (2017) 012040.
19. **H. Shahmir**, J. He, Z. Lu, M. Kawasaki, T.G. Langdon, Evidence for superplasticity in a CoCrFeNiMn high-entropy alloy processed by high-pressure torsion, Mater. Sci. Eng. (2017) 685 (2017) 342–348.
20. **H. Shahmir**, T.G. Langdon, An evaluation of the hexagonal close-packed to face-centered cubic phase transformation in a Ti-6Al-4V alloy during high-pressure torsion, Mater. Sci. Eng. A 704 (2017) 212-217.
21. **H. Shahmir**, T. Mousavi, J. He, Z. Lu, M. Kawasaki, T.G. Langdon, Microstructure and properties of a CoCrFeNiMn high-entropy alloy processed by equal-channel angular pressing, Mater. Sci. Eng. A 705 (2017) 411-419.
22. **H. Shahmir**, T.G. Langdon, Using heat treatments, high-pressure torsion and post-deformation annealing to optimize the properties of Ti-6Al-4V alloys, **Acta Mater.** 141 (2017) 419-426.
23. **H. Shahmir**, M. Nili-Ahmadabadi, A. Shafiee, T.G. Langdon, Effect of a minor titanium addition on the superplastic properties of a CoCrFeNiMn high-entropy alloy processed by high-pressure torsion, Mater. Sci. Eng. A 718 (2018) 198-206.
24. **H. Shahmir**, F. Naghdi, P.H.R. Pereira, Y. Huang, T.G. Langdon, Factors influencing superplasticity in the Ti-6Al-4V alloy processed by high-pressure torsion, Mater. Sci. Eng. A 718 (2018) 198-206.

25. **H. Shahmir**, M. Nili-Ahmadabadi, A. Shafiee, M. Andrzejczuk, M. Lewandowska, T.G. Langdon, Effect of Ti on phase stability and strengthening mechanisms of a nanocrystalline CoCrFeMnNi high-entropy alloy, *Mater. Sci. Eng. A* 725 (2018) 196-206.
26. **H. Shahmir**, E. Tabachnikova, A. Podolskiy, M. Tikhonovsky, T.G. Langdon, Effect of carbon content and annealing on structure and hardness of CrFe<sub>2</sub>NiMnV<sub>0.25</sub> high entropy alloys processed by high-pressure torsion, *J. Mater. Sci.* 53 (2018) 11813-11822.
27. **H. Shahmir**, M. Nili-Ahmadabadi, Yi Huang, J.M. Jung, H.S. Kim, T.G. Langdon, Shape memory characteristics of a nanocrystalline TiNi alloy processed by HPT followed by post-deformation annealing, *Mater. Sci. Eng. A* 734 (2018) 445-452.
28. P. Asghari-Rad, P. Sathiyamoorthi, J.W. Bae, **H. Shahmir**, A. Zargaran, H.S. Kim, Effect of Initial Grain Size on Deformation Mechanism during High-Pressure Torsion in V<sub>10</sub>Cr<sub>15</sub>Mn<sub>5</sub>Fe<sub>35</sub>Co<sub>10</sub>Ni<sub>25</sub> High-Entropy Alloy, *Adv. Eng. Mater.* 22 (1) (2020) 1900587.
29. **H. Shahmir**, M. Nili-Ahmadabadi, M. Mohammadi, Y. Huang, M. Andrzejczuk, M. Lewandowska, T.G. Langdon, Effect of Cu on Amorphization of a TiNi Alloy during HPT and Shape Memory Effect after Post-Deformation Annealing, *Adv. Eng. Mater.* 22 (1) (2020) 1900387.
30. M.S. Mehranpour, **H. Shahmir**, M. Nili-ahmadabadi, CoCrFeNiMn high entropy alloy microstructure and mechanical properties after severe cold shape rolling and annealing, *Mater. Sci. Eng. A* 793 (2020) 139884.
31. M.S. Mehranpour, **H. Shahmir**, M. Nili-ahmadabadi, Microstructure and excess free volume of severely cold shape rolled CoCrFeNiMn high entropy alloy, *J. Alloy. Compd.* 840 (2020) 155672.
32. **H. Shahmir**, P. Asghari-Rad, MS. Mehranpour, F. Forghani, HS. Kim, M. Nili-Ahmadabadi, Evidence of FCC to HCP and BCC-martensitic transformations in a CoCrFeNiMn high-entropy alloy by severe plastic deformation, *Mater. Sci. Eng. A* 807 (2021) 140875.

33. M.S. Mehranpour, **H. Shahmir**, A. Derakhshandeh, M. Nili-Ahmadabadi, Significance of Ti addition on precipitation in CoCrFeNiMn high-entropy alloy, *J. Alloy. Compd.* 888 (2021) 161530.
34. **H. Shahmir**, MS Mehranpour, A. Derakhshandeh, M. Nili-Ahmadabadi, Microstructure tailoring to enhance mechanical properties in CoCrFeNiMn high-entropy alloy by Ti addition and thermomechanical treatment, *Mater. Character.* 182 (2021) 111513.
35. M.S. Mehranpour, **H. Shahmir**, M. Nili-ahmadabadi, Precipitation kinetics in heavily deformed CoCrFeNiMn high entropy alloy, *Mater. Lett.* 288 (2021) 129359.
36. **H. Shahmir**, A. Derakhshandeh, B. Hallstedt, M. Nili-Ahmadabadi, Microstructural evolution and mechanical properties of CoCrFeNiMnTix high-entropy alloys, *Materialwissenschaft und Werkstofftechnik* 52 (4) (2021) 441-451.
37. A.W. Carruthers, **H. Shahmir**, L. Hardwick, R. Goodall, A.S. Gandy, E.J. Pickering, An assessment of the high-entropy alloy system VCrMnFeAlx, *J. Alloy. Compd.* 888 (2021) 161525.
38. M.S. Mehranpour, **H. Shahmir**, P. Asghari-Rad, M. Hosseinzadeh, N. Rasooli, H.S. Kim, M. Nili-ahmadabadi, Upgrading of superior strength–ductility trade-off of CoCrFeNiMn high-entropy alloy by microstructural engineering, *Materialia* 22 (2022) 101394.
39. L. Tan, K. Ali, P.S. Ghosh, A. Arya, Y. Zhou, R. Smith, P. Goddard, D. Patel, **H. Shahmir**, A. Gandy, Design principles of low-activation high entropy alloys, *J. Alloy. Compd.* 907 (2022) 164526.
40. **H. Shahmir**, M.S. Mehranpour, S.A.A. Shams, C.S. Lee, T.G. Langdon, Grain Size Tailoring to Control Strain Hardening and Improve the Mechanical Properties of a CoCrFeNiMn, *High Entropy Alloys & Materials*, 1-12 (2022).
41. **H. Shahmir**, M.S. Mehranpour, S.A.A. Shams, T.G. Langdon, Twenty years of the CoCrFeNiMn high-entropy alloy: Achieving exceptional mechanical properties through microstructure engineering, *J. Mater. Res. Tech.* (2023)

42. **H. Shahmir**, M.S. Mehranpour, H.S. Kim, Microstructure tailoring by manipulating chemical composition in novel CoNiMnCrAl high-entropy, *J. Alloy. Compd.* 944 (2023) 169207.

### **Publications in non-ISI journals:**

1. **H. Shahmir**, M. Nili Ahmadabadi, F. Naghdi, Transformation Behaviour of NiTi Shape Memory Alloys Treated by Thermomechanical Processing using DSC, *Iranian J. Mater. Sci. Eng.* 5 (2008) 25-31.

2. F. Naghdi, **H. Shahmir**, M. Nili AhmadAbadi, Y. Motemanni Sharbiani, T. Shahoseini, Effect of aging treatment on the transformation behavior and superelastic properties of Ni-rich NiTi shape memory alloy, *Journal of metallurgy engineering*, 2008, Iran [in Persian].

3. H. Lashgari, M. Emami, A. Razaghian, **H. Shahmir**, Effect of Al-Ti-B on mechanical property of A356/SiCp, *Journal of Casting* 86, 2008, Iran [in Persian].

4. **H. Shahmir**, M. Nili-Ahmadabadi, F. Naghdi, S. Raigan, Effect of thermomechanical and aging treatment on the transformation behavior of NiTi shape memory alloy, *New Materials Conference*, 2009, Iran [in Persian].

5. H. Mazaheri, **H. Shahmir**, F. Naghdi, M. Habibi Parsa, M. Nili Ahmadabadi, Numerical and experimental investigation on rolling and aximetric drawing of NiTi shape memory alloy, *New Materials Conference*, 2009, Iran [in Persian].

6. F. Naghdi, M. Nili-AhmadAbadi, **H. Shahmir**, I. Haririan, Control of transformation behavior and superelastic property of Ti-50.3 at.%Ni of shape memory alloy via aging treatment, *IMES*, 2009, Iran [in Persian].

7. **H. Shahmir**, M. Nili-AhmadAbadi, F. Naghdi, M. Habibi-Pasa, Control the phase transformation behavior of NiTi wire after thermomechanical treatment for orthodontic application, *IMES*, 2010, Iran [in Persian].

## **Grants**

- Severe plastic deformation of high-entropy alloys, National Elites Foundation of Islamic Republic of Iran (2017-2019).
- Fabrication and characterization of advanced materials for hydrogen storage, Iranian Nation Science Foundation (INSF) No. 4006067 (2022-2023).

## **Teaching Experiences**

- Physical Metallurgy, Teacher Assistant, University of Tehran (2013)
- Phase transformation in metals and alloys, Teacher Assistant, University of Tehran (2014)
- Strengthening mechanisms in metals and alloys, Tarbiat Modares University (2020-)
- Ultrafine grained and nanostructured materials, Tarbiat Modares University (2020-)
- Measurement uncertainty and error in materials engineering, Tarbiat Modares University (2021-)
- Plastic deformation in metallic materials, Tarbiat Modares University (2021-)

## **Industrial experiences and projects**

- Research and Development Manager and Founder of Arziz Sanat Co. (2020-)
- Fabrication of NiTi orthodontic wires (2008-2010)
- Part time researcher in Razi Metallurgical Research Center working on “Case study of Failure Analyses of industrial parts” (2014-2015).
- Part time researcher in Niroo research Institute working on “On-line monitoring of steam power plants” (2017-2018).
- Rejuvenation of a Ni-based gas turbine blade (2020-2023)
- Fabrication and characterization of solder alloys (2021-2023)
- Development of lead-based anodes for copper electrowinning application (2021-2023)
- Fabrication of solder pastes (2021-)
- Fabrication and characterization of NiTi rotary files (2022-)