



# CURRICULUM VITAE

## ALIREZA KARIMI



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### EDUCATION

- 2017-2020 | *Iran University of Science and Technology (IUST)* TEHRAN, IRAN  
**M.Sc. in Materials Engineering**
- **GPA:** 81 / 100
  - **Thesis Title:** Investigating the parameters affecting the joining of tungsten carbide to low-alloy steel using combustion synthesis reactions of Ni-Ti powder mixture.
  - **Supervisors:** Prof. M. Adeli ([adelim@iust.ac.ir](mailto:adelim@iust.ac.ir)) and Prof. M. Soltanieh ([mansour\\_soltanieh@iust.ac.ir](mailto:mansour_soltanieh@iust.ac.ir))
- 2013-2017 | *Golpayegan College, Isfahan University of Technology (IUT)* ISFAHAN, IRAN  
**B.Sc. in Metallurgy and Materials Engineering**
- **GPA:** 73 / 100 (via 142 credits), last two years = 90 / 100
  - **Thesis Title:** Production of amorphous Fe-Ni-Cr coatings by electric deposition process
  - **Supervisor:** Prof. S. M. Rafiaei ([rafiaei@gut.ac.ir](mailto:rafiaei@gut.ac.ir))

### RESEARCH INTERESTS

- Advanced Materials (Shape Memory Alloys, Metal Matrix Composites (MMCs), Refractory Metals, Catalysts, Metal Foams, Energy Storage Materials) Synthesis, Welding, Processing and Characterization.
- Enthusiastic about Computational Materials Engineering (CME) with a focus on Machine learning and FEM simulation, leveraging data-driven insights for transformative advancements in materials engineering.

### RESEARCH EXPERIENCES

#### Investigating the effect of Mechanical Activation Duration (MAD) on microstructure and corrosion behavior of TiAl intermetallic compounds

- 2021 - Now | *Supervisors: Prof. M. Adeli*  
**School of Materials and Metallurgy Engineering, IUST**
- Fabricated **TiAl Intermetallic compounds** with various MADs using SHS process.
  - Investigated the effect of MAD on corrosion behavior (**EIS**) and microstructure (**SEM**) of TiAl samples
  - **Employed a constructed ANN architecture** for investigating the effect of MAD on the corrosion behavior of synthesized TiAl intermetallic.

#### Study on the wear behavior of NiAl-TiC-TiB<sub>2</sub> composite produced by the combustion synthesis process

- 2020 - Now | *Supervisors: Prof. M. Adeli, Prof. M. Soltanieh, Prof. H. Saghaian*  
**School of Materials and Metallurgy Engineering, IUST**
- **Fabricated NiAl / TiC-TiB<sub>2</sub> composites** using combustion synthesis process
  - An **enhanced composite hardness profile** was observed, attributed to the **even distribution** of TiC-TiB<sub>2</sub> performing XRD and SEM analysis.

- **Demonstrated** superior wear resistance in composites with higher TiC-TiB<sub>2</sub> using **Sliding wear** tests
- **Trained** an ANN model to **predict** the properties of composite with various TiC-TiB<sub>2</sub> content.

## Exploring the potential of forming steel-steel joints through combustion synthesis reactions and utilizing this approach to bond tungsten carbide to low carbon steel.

2018-2020 | *Supervisors: Prof. M. Adeli, Prof. M. Soltanieh*  
**School of Materials and Metallurgy Engineering, IUST**

- Fabricated VCN-150 steel **joints** and then WC-Co / VCN-150 **dissimilar joints** via **combustion synthesis** in **Ni-Ti** compound
- **Designed** and **fabricated** a novel **set-up** for exerting an **axial force** on the welding components in the **Argon** atmosphere and **decreasing** the interlayer **porosity**
- Performed **microstructural** (SEM) and **mechanical** (Shear strength, Micro hardness) **characterization of joints** and phase analysis of interlayer (**XRD**)

## Effect of space holder materials on the porosity of synthesized Ni-Ti products

2018-2019 | *Supervisors: Prof. M. Adeli*  
**School of Materials and Metallurgy Engineering, IUST**

- Evaluation of the effect of **space holder** material on the **distribution** and **size** of the porosities
- Performed **microstructural characterization** (SEM) and **Phase analysis** via **XRD techniques**

## Fabrication of amorphous Fe-Ni-Cr coatings by electric deposition process

2015-2017 | *Supervisors: Prof. M. S. Rafiaei*  
**Department of Materials Engineering, IUT**

- Investigated **current density's** impact on coating **thickness** and **structure** (amorphous/crystalline)

## PUBLICATIONS

### JOURNAL ARTICLES

- F. Soleimani, M. Adeli, M. Soltanieh, H. Saghaian, A. Karimi, **Fabrication and wear behavior of TiC/TiB<sub>2</sub>-reinforced NiAl intermetallic matrix composites**, Ceramics International, (Under Review)
- A. Karimi, M. Adeli, M. Soltanieh, **Dissimilar joining of cemented carbide to low-carbon steel via combustion welding: Effect of process parameters on the interfacial microstructure and joint strength**, Journal of Manufacturing Process, Vol. 77, Pages 551-560, <https://doi.org/10.1016/j.jmapro.2022.03.043>
- A. Karimi, M. Adeli, M. Soltanieh, **The application of combustion synthesis reactions in Ni-Ti system in the joining of steel to tungsten carbide**, Journal of New Materials, Vol. 11, pages 103-114, [20.1001.1.22285946.1399.11.41.8.2](https://doi.org/10.1001.1.22285946.1399.11.41.8.2)

### CONFERENCE PAPER

- A. Karimi, M. Adeli, M. Soltanieh, **Investigating the possibility of establishing steel-steel joints using combustion synthesis reactions**, 8th International Conference and Exhibition on Materials Engineering and Metallurgy Oct. 2019, <https://civilica.com/doc/963690/>

# CURRICULUM VITAE

## HONORS AND AWARDS

**In-Process Patent: Design, Manufacture, and Implement an intelligent atmosphere supply system for sinter furnaces.**

- Working on the filing of a patent for furnace atmosphere control facilitation in pyro metallurgy laboratory
- Demonstrating proactive **problem-solving** skills, **innovation**, and dedication to advancing laboratory equipment

**Awarded governmental full scholarship (Tuition Waiver) and governmental fund (Research Grant) from IUST**

- Issued by Ministry of Science, Research and Technology due to national entrance exam for 2 years of M.Sc. (2017)

**Awarded governmental full scholarship (Tuition Waiver) and governmental fund (Research Grant) from IUT**

- Issued by Ministry of Science, Research and Technology due to national entrance exam for 4 years of B.Sc. (2013)

## TEACHING EXPERIENCES

**Graduate Teaching Assistant** (Metallurgical Processes Laboratory)

2018(Aug– Dec) | • School of Materials and Metallurgy Engineering (IUST), Prof. M. Adeli ([adelim@iust.ac.ir](mailto:adelim@iust.ac.ir))

**Tutor** (English - Math)

2022(Feb-now) | • High-school students

## WORK EXPERIENCES

**Research Assistant**

Sep2018-Now | *IRAN UNIVERSITY OF SCIENCE AND TECHNOLOGY* *ISFAHAN, IRAN*  
• Contribution in **data analysis** and interpretation as a **diligent** research assistant.  
• Assisting in **literature reviews**, experiment **design**, and research documentation.  
• **Detail-oriented** and **proactive**, I thrive in a **collaborative** research environment.

**Metallurgical Laboratory Manager**

Sep2021-Now | *SEPAHAN FOOLAD ATASHGAH (STEEL CASTING)* *ISFAHAN, IRAN*  
• **Teamwork leadership** in the **research and technological** development group.  
• **Performed workshops** for laboratory members to **improve** their laboratory **skills**.  
• **Supervision** of equipment's **calibration**.  
• **Standard compliance** for various test results (**OES, SEM, XRD, EIS, Wear (G99), ...**)

**Metallurgical Laboratory Expert**

2021(Feb-Sep) | *HAMIRAN STEEL (REFERENCE LABORATORY)* *TEHRAN, IRAN*  
• Acquired **Hands-on** experience with **microstructural characterization equipment** (SEM, FESEM, EBSD, OM), **Optical Emission Spectroscopy** (Foundry Master), Universal **tensile testing** (Gotech), **Universal Hardness Tester**, **Non-Destructive test equipment** (UT, PT, MT)  
• Customer **Scientific consultation** to make the best decision in **choosing a metallurgical analysis**.

**Patent Engineer (USPTO)**

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2020(Jan-Oct)	IDI COMPANY	TEHRAN, IRAN
	<ul style="list-style-type: none"><li>• <b>Drafting</b> and <b>filing</b> patent applications, <b>conducting research</b> to ensure the inventions are unique, and navigating legal and technical aspects to <b>protect intellectual property</b>.</li></ul>	

## Scientific Student Administrator (Volunteer)

2015-2017	SCHOOL OF MATERIALS AND METALLURGY ENGINEERING, IUT	ISFAHAN, IRAN
	<ul style="list-style-type: none"><li>• <b>Organized</b> extracurricular activities and <b>administrated</b> industrial visits for students.</li></ul>	

## Engineering Internship

2016(Apr-Sep)	ESFAHAN STEEL COMPANY	ISFAHAN, IRAN
	<ul style="list-style-type: none"><li>• Performed <b>standardized mechanical and microstructural QA tests</b> (ASTM, ISO, DIN)</li></ul>	

## TECHNICAL SKILLS AND CERTIFICATES

### Laboratory Skills

- **Hands-on experience** working with **microstructural characterization equipment** (Field Emission Scanning Electron Microscope, Scanning Electron Microscope, Optical Microscope, Laser Microscope), **Optical Emission Spectroscopy** (Foundry Master), **Universal tensile testing** (Gotech), **Universal Hardness Tester**, **Non-Destructive test equipment** (UT, PT, MT), and **pyrometallurgy lab equipment** (e.g., tube furnace & induction furnace).

### Certificates

- **TEM** (EPFL)
- **Python** (University of Michigan)
- **Conference Presentation** (International **Imat** Conference)
- Data science (IBM)
- Materials Data science (Georgia Institute of Technology)
- **HSE** certificate (IUST)

## COMPUTER SKILLS

### Engineering Software

- ANSYS, Tecplot
- HighScore (plus)
- Microsoft Office
- EC-Lab
- SOLIDWORKS
- Origin
- Minitab
- Zsim

**Programming Language:** Python

## LANGUAGE SKILLS

**Persian:** Native Language

**English:** Fluent, **TOEFL (iBT):** On September 2023

## REFERENCES

- Dr. Mansour Soltanieh, Professor of Materials and Metallurgical Engineering, IUST, [mansour\\_soltanieh@iust.ac.ir](mailto:mansour_soltanieh@iust.ac.ir)
- Dr. Mandana Adeli, Assistant Professor of Materials and Metallurgical Engineering, IUST, [adelim@iust.ac.ir](mailto:adelim@iust.ac.ir)
- Dr. S. M. Rafiaei, Assistant Professor of Materials and Metallurgical Engineering, IUT, [rafiaei@gut.ac.ir](mailto:rafiaei@gut.ac.ir)