

## PERSONAL INFORMATION



## CAREER OBJECTIVE

**MUHAMMAD ARIF MAHMOOD**

📍 Camin G5, Strada Fizicienilor Nr. 09, Magurele-Ilfov, 077125, Romania.

☎ (+40) 726950912

✉ muhammad.arif\_mahmood@outlook.com

🌐 [LinkedIn](#); [ResearchGate](#)

To acquire a distinct position, breadth in the discipline, identify research problems, develop the capabilities for innovative ideas, present and publish the results and become a competent employee.

## RESEARCH INTERESTS

- 3D Printing
- Laser-matter interaction
- Artificial Neural Networking
- Micro/Nano Tribology
- Non-destructive Testing

## WORK EXPERIENCE

03 JUNE, 2019 – PRESENT

**Scientific Research Assistant**

Marie Skłodowska-Curie Fellow at [National Institute for Laser, Plasma and Radiation Physics, Romania](#)

**Research and Development sector**

- Working on the [DOC-3D printing project](#)
- Designing and performing 3D printing experimentation using selective laser melting and laser-melting deposition
- Characterizing the 3D printed parts using x-ray diffractometry, scanning electron microscopy and x-ray computed tomography
- Developing and validating simulation models for 3D printing
- Dealing with pulsed laser-material interaction phenomenon via modelling techniques
- Implementing Artificial Neural Networking in 3D printing processes

20 FEB. 2017 – 07 JAN. 2019

**Scientific Research Assistant**

[Micro/Nano Tribology Laboratory, National Cheng Kung University, Taiwan](#)

**Research and Development sector**

- Completed a research project on the cold rolling process with [China Steel Corporation, Taiwan](#)
- Developed a three-dimensional fractal model to simulate cold-rolled specimen and work-roll topographies for observing the optical behaviour on simulated topographies
- Identified the correlations between the fractal and optical parameters to define the optimum cold-rolling operating conditions
- Evaluated the hardness of the cold-rolled specimen using Rockwell and Micro/Nano-indentation tests
- Performed the Finite Element simulations of the cold-rolling process

17 SEP. 2015 – 17 AUG. 2016

**Internee**

[Interwood Mobil PVT. LTD., Pakistan](#)

**Furniture manufacturing sector**

- Completed Bachelor degree final year project
- Implemented the Lean manufacturing tools such as 5S, Kaizen, Just-in-time, Root cause analysis, Bottleneck analysis and Layout analysis
- Improved quality and reduced production cost through waste elimination
- Applied Ergonomics principles such as REBA, RULA, OWAS for posture analyses
- Executed workers safety to develop a safe, healthy and comfortable working environment

01 AUG. 2015 – 30 AUG. 2015

**Internee**

[Pak Elektron Limited \(PEL\), Lahore, Pakistan](#)

**Home appliances manufacturing sector**

- Completed a project in deep freezer department
- Gained the entire manufacturing and assembly line for a deep freezer
- Modified the cabinet foaming jig design for single and double doors deep freezers

- 01 JUL. 2015 – 31 JUL. 2015 [Internee](#)  
[Transfab, Lahore, Pakistan](#)
- [Transformer manufacturing sector](#)
- Detailed analyses of transformers manufacturing process ranging from 10 KVA to 1250 KVA
  - Investigated the methods to control and maintain quality of transformers
- 17 JULY 2014 – 20 AUG. 2014 [Internee](#)  
[Multan Spinning Mills, Multan, Pakistan](#)
- [Textile sector](#)
- Carried out the detailed analyses of the yarn manufacturing process
  - Examined the manufacturing machine components
  - Analysed the working and maintenance of machines
  - Evaluated the methods to control the production rate and quality of yarn
- 14 JUNE 2013 – 26 AUG. 2013 [Internee](#)  
[Suncrop Pesticides, Multan, Pakistan](#)
- [Fertilizer sector](#)
- Analysed the manufacturing processes of various fertilizers in liquid and solid states
  - Studied the operations and maintenance of the whole manufacturing plant
  - Investigated the quality control in the fertilizer sector

## EDUCATION AND TRAINING

- OCT. 2019 – SEP. 2021 [Ph.D. in Applied Physics \(Optics, Spectroscopy, Plasma and Lasers \(Score 9.2/10.0\) Specialization\)](#)  
[University of Bucharest, Romania](#)
- PRINCIPAL SUBJECTS Theoretical and Experimental Physics (1 & 2) | Fundamental Physical Processes (1 & 2) | Ethics and Academics Integrity | Scientific Research Methodology | Statistical Data Processing
- OCCUPATIONAL SKILLS COVERED
- Studied Non-linear optics and the Fourier transformation
  - Identified various lasers modes
  - Studied theories behind plasma generation, hot- and cold-plasma formation and various applications of plasma
  - Familiarized with the pulsed-laser deposition and matrix assisted pulsed laser evaporation techniques, and their applications in various fields of life
- FEB. 2017 – JAN. 2019 [Master's in Mechanical Engineering](#) (CGPA 4.20/4.30)  
[National Cheng Kung University, Tainan, Taiwan](#)
- PRINCIPAL SUBJECTS Micro/Nano Tribology Issues| Polymer Processing (1 & 2) | IC Packaging & Experiment | Semiconductor & Advance Nanotechnology Process Introduction (1 & 2) | Special Topic in Metallic and Semiconducting Polymers
- OCCUPATIONAL SKILLS COVERED
- Carried out the master's research project on the cold rolling process with the China Steel Corporation, Taiwan.
  - Developed three-dimensional fractal model to simulate the cold-rolled topographies using MATLAB software for ray-tracing simulations
  - Used Surfcoorder ET4000 machine to measure three-dimensional cold-rolled specimens' profiles
  - Utilized the Rockwell, and micro and nano-indentation tests to measure mechanical properties of the cold-rolled specimens.
  - Used micro-/nano-tensile tester to measure the Young's modulus of the cold-rolled specimens
  - Conducted the cold-rolling simulations using Abaqus CAE software.
  - Accomplished the injection moulding simulations via the Moldex3D software
  - Practiced ANSYS software for the structural analysis.
- SEP. 2012 – AUG. 2016 [B.Sc. in Industrial and Manufacturing Engineering](#) (CGPA 3.82/4.00)  
[University of Engineering and Technology, Lahore, Pakistan](#)
- PRINCIPAL SUBJECTS Manufacturing Processes (1 & 2) | Machining Processes (1 & 2) | Mechanics of Materials (1 & 2) | Machine Design and CAD (1 & 2) | Industrial Materials (1 & 2) | Engineering Mechanics (1 & 2) | Finite Element Analysis | Computer Integrated Manufacturing | Thermodynamics and Thermal Sciences (1 & 2) | Operations Management and Quality Control | Production Tooling and Design | Electrical Engineering and Industrial Electronics | Instrumentation and Control

## OCCUPATIONAL SKILLS COVERED

- Completed a final year project on “Ergonomics & Lean Manufacturing Strategies Recommendations - A case study of wooden chair assembly line” with “Interwood Mobil Pvt. Ltd., Pakistan”
- Studied the detailed manufacturing processes of motorcycle and washing machine
- Manufactured a novel power Hexa machine using a gear mechanism with high efficiency
- Designed different parts of the motorcycle, and jigs and fixtures using SolidWorks
- Studied the manual and computerized numerical control Lathe, Shaper, Grinding, Drilling, turning, and milling machines
- Carried out a detailed analysis of the University of Engineering & Technology power plant for operation and maintenance

## PERSONAL SKILLS

## LANGUAGES

Urdu (Mother tongue) | English (IELTS: B2)

## SOFTWARE SKILLS

AutoCAD | SolidWorks | Adobe Photoshop | TORA | ANSYS | COMSOL | TracePro | Abaqus CAE | Moldex3D | Origin | Primavera P6 | MATLAB

## MACHINE SKILLS

Enavision 120 | TruLaser Robot 5020 | Surfcoorder ET4000 | Scanning Electron Microscope | Micro/Nano tensile tester | Nano-Indenter | Rockwell indenter Tester | Micro-indenter Tester | CNC milling and turning | Electrical Discharge Machining | G- and M-Coding

## UTILITY SOFTWARE

MS Office (Word, Excel, PowerPoint)

## PROGRAMMING AND SKILLS

C++ | Python

## OTHER INTERESTS

Books reading | Cricket | Badminton

## ADDITIONAL SKILLS

## JOURNAL PUBLICATIONS

- **Muhammad Arif Mahmood**, Andrei C. Popescu. 3D printing at micro-level: laser-induced forward transfer and two-photon polymerization. *Polymers* (IF = 4.329), Volume 13(13), 2021, 2034. DOI: [10.3390/polym13132034](https://doi.org/10.3390/polym13132034).
- **Muhammad Arif Mahmood**, Andrei C. Popescu, Mihai Oane, Asma Channa, Sabin Mihai, Carmen Ristoscu, Ion N. Mihailescu. Bridging the analytical and artificial neural network models for keyhole formation with experimental verification in laser melting deposition. *Results in Physics* (IF = 4.476), Volume 26, 2021, 104440. DOI: [10.1016/j.rinp.2021.104440](https://doi.org/10.1016/j.rinp.2021.104440).
- Chang-Shuo Chang, **Muhammad Arif Mahmood**, Tsung-Wen Tsai, Chang-Fu Han, Chen-Kuei Chung, Jen-Fin Lin. Fractal parameters developed to evaluate the effects of laser textured surface on oil contact angle and tribological parameters. *Journal of Laser Applications* (IF = 1.636), Volume 33, 2021, 022021. DOI: [10.2351/7.0000247](https://doi.org/10.2351/7.0000247).
- **Muhammad Arif Mahmood**, Alexandra Bănică, Carmen Ristoscu, Nicu Becherescu, Ion N. Mihailescu. Laser coatings via state-of-the-art additive manufacturing: a review. *Coatings* (IF = 2.881), Volume 11(3), 2021, 296. DOI: [10.3390/coatings11030296](https://doi.org/10.3390/coatings11030296).
- Mihai Oane, **Muhammad Arif Mahmood**, Andrei C. Popescu, Alexandra Bănică, Carmen Ristoscu, Ion N. Mihailescu. Thermal nonlinear klein-gordon equation for nano-micro-sized metallic particle-attosecond laser pulse interaction. *Materials* (IF = 3.623), Volume 14, 2021, 857. DOI: [10.3390/ma14040857](https://doi.org/10.3390/ma14040857).
- **Muhammad Arif Mahmood**, Andrei C. Popescu, Mihai Oane, Diana Chioibas, Gianina Popescu-Pelin, Carmen Ristoscu, Ion N. Mihailescu. Grain refinement and mechanical properties for AISI304 stainless steel single-tracks by laser melting deposition: mathematical modelling versus experimental results. *Results in Physics* (IF = 4.476), Volume 22, 2021, 103880. DOI: [10.1016/j.rinp.2021.103880](https://doi.org/10.1016/j.rinp.2021.103880).
- **Muhammad Arif Mahmood**, Anita Ioana Visan, Carmen Ristoscu, Ion N. Mihailescu. Artificial neural network algorithms for 3D printing. *Materials* (IF = 3.623), Volume 14(1), 2021, Page 163. DOI: [10.3390/ma14010163](https://doi.org/10.3390/ma14010163).

- **Muhammad Arif Mahmood**, Chang-Fu Han, Hsiao-Yeh Chu, Ching-Cherng Sun, Wen-Hsuan Wu, Wei-Jr Lin, Lee-Cheng Liu, Jiing-Yih Lai, Ion N. Mihailescu, Jen-Fin Lin. Effects of roll pattern and reduction ratio on optical characteristic of A1008 cold-rolled steel specimens: analytical approach and experimental correlations. The international journal of advanced manufacturing technology (IF = 2.633), Volume 111, 2020, Page 2001-2020. DOI: [10.1007/s00170-020-06191-Z](https://doi.org/10.1007/s00170-020-06191-Z).
- Diana Chioibasu, Sabin Mihai, **Muhammad Arif Mahmood**, Mihail Lungu, Ioana Porosnicu, Adrian Sima, Cosmin Dobre, Ion Tiseanu, Andrei C. Popescu. Use of x-ray computed tomography for assessing defects in Ti grade 5 parts produced by laser melting deposition. Metals (IF = 2.117), Volume 10(11), 2020, Page 1408. DOI: [10.3390/met10111408](https://doi.org/10.3390/met10111408).
- **Muhammad Arif Mahmood**, Andrei C. Popescu, Claudiu Liviu Hapenciuc, Carmen Ristoscu, Anita Ioana Visan, Mihai Oane, Ion N. Mihailescu. Estimation of clad geometry and corresponding residual stress distribution in laser melting deposition: analytical modelling and experimental correlations. The international journal of advanced manufacturing technology (IF = 2.633), Volume 111, 2020, Page 77-91. DOI: [10.1007/s00170-020-06047-6](https://doi.org/10.1007/s00170-020-06047-6).
- **Muhammad Arif Mahmood**, Andrei C. Popescu, Mihai Oane, Carmen Ristoscu, Diana Chioibasu, Sabin Mihai, Ion N. Mihailescu. Three-jet powder flow and laser-powder interaction in laser melting deposition: modelling versus experimental correlations. Metals (IF = 2.117), Volume 10(9), 2020, Page 1113. DOI: [10.3390/met10091113](https://doi.org/10.3390/met10091113).
- M. Bucă, Mihai Oane, Ion N. Mihailescu, **Muhammad Arif Mahmood**, Bogdan A. Sava, Carmen Ristoscu. An analytical multiple-temperature model for flash laser irradiation on single-layer graphene. Nanomaterials (IF = 4.234), Volume 10(7), 2020, Page 1319. DOI: [10.3390/nano10071319](https://doi.org/10.3390/nano10071319).
- **Muhammad Arif Mahmood**, Andrei C. Popescu, Ion N. Mihailescu. Metal matrix composites synthesized by laser-melting deposition: a review. Materials (IF = 3.257), Volume 13(11), 2020, Page 2593. DOI: [10.3390/ma13112593](https://doi.org/10.3390/ma13112593).
- Anca M. Bucă, Mihai Oane, **Muhammad Arif Mahmood**, Ion N. Mihailescu, Andrei C. Popescu, Bogdan A. Sava, Carmen Ristoscu. Non-Fourier estimate of electron temperature in case of femtosecond laser pulses interaction with metals. Metals (IF = 2.117), Volume 10(5), 2020, Page 606. DOI: [10.3390/met10050606](https://doi.org/10.3390/met10050606).
- **Muhammad Arif Mahmood**, Tsung-Ying Tsai, Yhu-Jen Hwu, Wei-Jr Lin, Lee-Cheng Liu, Jiing-Yih Lai, Jui-Wen Pan, Wang-Long Li, Jen-Fin Lin. Effect of fractal parameters on optical properties of cold rolled aluminum alloy strips with induced surface deflection: Simulations and experimental correlations. Journal of Materials Processing Technology (IF = 4.669), Volume 279, 2019, Page 116554. DOI: [10.1016/j.jmatprotec.2019.116554](https://doi.org/10.1016/j.jmatprotec.2019.116554).
- Yashvir Singh, Abid Farooq, Aamir Raza, **Muhammad Arif Mahmood**, Surbhi Jain. Sustainability of a non-edible vegetable oil-based bio-lubricant for automotive applications: A review. Process Safety and Environment Protection (IF = 2.905), Volume 111, 2017, 701 -713. DOI: [10.1016/j.psep.2017.08.041](https://doi.org/10.1016/j.psep.2017.08.041).

## BOOKS

- **Muhammad Arif Mahmood**, Mihai Oane, Jen-Fin Lin (2021). Topographies and Optical Properties of Cold-rolled Metals Materials. Lambert Academic Publishing (LAP), 2021, ISBN-10: 6202007656, ISBN-13: 978-6202007658.

## JOURNAL REVIEWER

- Journal of Taibah University for Science (Taylor & Francis Online) | Processes (MDPI) | Coatings (MDPI) | Journal of Facta Universitatis, Series: Mechanical Engineering | International Journal of Healthcare Systems Engineering (VIBGYOR ePress).

- CONFERENCES
- Oral Presentation in “online [Workshop CETAL 2020](#) at National Institute for Laser, Plasma and Radiation Physics, Romania, 17-18 December, 2020” on “Effect of fractal parameters on optical properties of cold-rolled aluminum alloy strips with induced surface deflection: Analytical simulations and experimental correlations.”
  - Poster presentation in “online 3rd International Conference on [Emerging Technologies in Materials Engineering](#), Bucharest, Romania, 28-30 October, 2020” on “porosity characterization of samples 3D printed by laser melting deposition using X-ray computer tomography.”
  - Poster presentation in “online 3rd International Conference on [Emerging Technologies in Materials Engineering](#), Bucharest, Romania, 28-30 October, 2020” on “3-jet powder flow and laser-powder interaction in laser melting deposition: modelling versus experimental correlations.”
  - Poster presentation in “online [ECerS-yCAM 2020](#), Toulouse, France, 28-30 October, 2020” on “estimation of clad geometry and corresponding residual stress distribution in laser melting deposition: analytical modelling and experimental correlations.”
  - Oral presentation in “online [Scifed Group & i3DPrinting](#) webinar, 20 June, 2020” on “metal matrix composites synthesized by laser-melting deposition: a review.”
- SEMINARS
- Attended a seminar on the Small and Medium Enterprises Development Authority, Pakistan at Chemical Engineering department, University of Engineering and Technology, Lahore, Pakistan
  - Completed a seminar on Entrepreneurship at Industrial and Manufacturing Engineering department, University of Engineering and Technology, Lahore, Pakistan
- HONORS AND AWARDS
- Received merit scholarship from KIPS College, Multan, Pakistan in higher secondary school.
  - Acknowledged a merit-based laptop from Chief Minister, Punjab, Pakistan, in 2013.
  - Served as a director technical section mechanical wing in The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) from September 2015 to July 2016.
  - Gained the dean's honour roll award up to 7 times during bachelor studies.
  - Received an international distinguished scholarship from the National Cheng Kung University, Taiwan during 2017-2019.
  - Obtained an outstanding talented student scholarship award from the National Cheng Kung University and SinoPac bank (Atelier future) in 2017.
  - Won an excellent paper award at Allring Tech. Co., Ltd, Taiwan, for “Effect of Lubricants and Rolling Conditions on the Fractal Surfaces and Optical Properties of Cold Rolled Aluminum Alloy Strips.”

## REFERENCES

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- [Prof. Dr. Ion N. Mihailescu](#) | ion.mihailescu@infldr.ro | +40-21-457-45570 | PhD supervisor | National Institute for Laser, Plasma and Radiation Physics (INFLPR), Magurele-Ilfov 077125, Romania
- [Dr. Andrei Popescu](#) | andrei.popescu@infldr.ro | +40-21-457-45570 | PhD Co-supervisor | National Institute for Laser, Plasma and Radiation Physics (INFLPR), Magurele-Ilfov 077125, Romania
- [Dr. Mihai Oane](#) | mihai.oane@infldr.ro | +40-21-457-45570 | PhD Co-supervisor | National Institute for Laser, Plasma and Radiation Physics (INFLPR), Magurele-Ilfov 077125, Romania