

Valentina Furlan

Personal

Citizenship Italian
Gender Female

Work experience

- 07/2022 – on going *Assistant Professor (RTDb)*
Università degli Studi di Pavia – Department of Electrical, Computer and Biomedical Engineering
Research field: Additive Manufacturing of polymers, composite and natural fiber composite materials. Micro and Macro laser processes. Laser safety. Robotized surface finishing of complex shapes.

Member of Doctorial Board in Electronic, Computer Science and Electrical Engineering

Member of Scientific Technical Committee for post-graduate master
- 12/2018 – 06/2022 *Assistant Professor (RTDa)*
Politecnico di Milano – Department of Mechanical Engineering
Research project: Lavorazioni Additive Laser per applicazioni su materiali metallici
Research field: Direct Energy Deposition and laser micromachining
- 2/2018 – 12/2018 *Post-Doc Research fellow*
Politecnico di Milano - Department of Mechanical Engineering
Research project: Lavorazioni laser DED – nell’ambito del progetto – Made4LO Metal Additive for Lombardy (Call accordi per la ricerca e l’innovazione cofinanziata dal POR FESR 2014)
Research field: Direct Energy Deposition and laser micromachining
- 2/2017 – 3/2018 *Research fellow*
Politecnico di Milano - Department of Mechanical Engineering
Research project: Monitoraggio dei processi laser per applicazioni siderurgiche
Research field: Direct Energy Deposition and laser micromachining
- 3/2017 – 4/2017 *Collaboration with Department of Mechanical Engineering*
Politecnico di Milano – Department of Mechanical Engineering

Research project: Studio lavorazioni direct writing per laser texturing

- 11/2016 – 1/2017 *Collaboration with Department of Mechanical Engineering Politecnico di Milano – Department of Mechanical Engineering*
Research project: Studio dei principi di interferometria per laser texturing
- 4/2009 – 8/2009 Bonetti Aircraft Support S.p.A. (Trainee) – Material management and logistic analysis fields, Gallarate (Varese), Italy

Education

- 11/2013 – 3/2018 Politecnico di Milano
Ph.D. in Mechanical Engineering “cum Laude”
Milan / Italy
Thesis topic: “Direct Laser Interference Patterning: a novel approach with scanner optics”
- 9/2011 – 10/2013 Politecnico di Milano
M.Sc. in Mechanical Engineering
Milan / Italy
Final thesis: “Laser surface texturing of AZ31 magnesium alloy to improve biomedical coating adhesion”
- 9/2005 - 7/2010 Politecnico di Milano
B.Sc. in Aerospace Engineering
Milan / Italy

Abroad training

- 03/2015-04/2015 Visiting researcher – Laboratory for Biomaterials and Bioengineering, Department Mining, Metallurgy and Materials, Laval University, Quebec, Canada

Teaching

- From A.Y. 2022-2023 to 2023-2024 Teaching– Laser Safety
MSc course in Industrial Automation Engineering, Bioingegneria and Electronic Engineering– Università di Pavia
- From A.Y. 2022-2023 to 2023-2024 Teaching– Tecnologia Meccanica
BSc course in Industrial Engineering – Università di Pavia
- From A.Y. 2018-2019 to 2021-2022 Teaching Assistant – Tecnologia Meccanica 1
BSc course in Mechanical Engineering - Politecnico di Milano
- From A.Y. 2016-2017 to 2020-2021 Teaching Assistant – Advanced Manufacturing Processes
MSc course in Mechanical Engineering- Politecnico di Milano
- From A.Y. 2013-2014 to 2016-2017 Tutor – Tecnologia Meccanica e Qualità
BSc course in Industrial Engineering- Politecnico di Milano

Co-supervisor of 4 PhD theses

Supervisor and Co-supervisor of 15 MSc theses

Supervisor of over 20 BSc. Thesis

Projects

2019- 2022	SIADD - Soluzioni Innovative per la qualità e la sostenibilità dei processi di ADDitive manufacturing Working on LMD processes and monitoring under PoliMi unit
2017-2022	AMATHO - A.dditive MA.nufacturing T.iltrotor HO.using. EU H2020. Working on LMD processes under PoliMi unit
2018-2019	MADE4LO- Metal ADditivE for LOmbardy. Funded by Regione Lombardia. Working on LMD processes under PoliMi unit
2015-2017	INFINITE – Innovative laser machine for INdustrIal Engraving and Texturing. EU H2020 SME Tool. Working on LST processes under PoliMi unit
2013-2015	Development of Biodegradable Hybrid Stents in Magnesium with Polymeric coating for Biomedical Applications. Funded by CARITRO. Working on LST processes under PoliMi unit

Collaboration with Research groups

- Università di Pavia, in Pavia (PV). Working on Laser Metal Deposition process and on the particle flow simulation under PoliMi unit inside Made4Lo project.
- Osservatorio Astronomico di Brera, in Merate (LC). Working on optical setup design and simulation under PoliMi unit.
- Laval University, in Québec (Canada). Working on laser treatment for biomedical application under PoliMi unit.

Collaboration with private Companies

- Nuovo Pignone S.P.A. Working on laser metal deposition under PoliMi unit
- Ansaldo Energia Working on laser metal deposition under PoliMi unit
- Piazza Rosa S.r.l. Working on laser micromachining and deposition under Polimi unit
- Tenova e CSM-Rina Working on laser micromachining and recycled powders under Polimi unit
- Givi Misure S.r.l. Working on laser micromachining under PoliMi unit
- BLM Group S.p.A. Working on optics in laser processes under PoliMi unit

Conference committee

2015 Member of organizing committee of Alta Brillanza - Italian Workshop on High Brilliance Laser Applications

Publications on International Journals

PhD Thesis

- [1] Furlan, V. (2018). Direct Laser Interference Patterning: a novel approach with scanner optics. PhD Thesis in Mechanical Engineering – Politecnico di Milano - Relatori: B. Previtali, A. Bianco.

International Journal

- [2] Insero, F., Furlan, V. & Giberti, H. (2023). Non-planar slicing for filled free-form geometries in robot-based FDM. *Journal of Intelligent Manufacturing*.
<https://doi.org/10.1007/s10845-023-02250-w>
- [3] Maffia, S., Furlan, V. & Previtali, B. (2023). Molten pool temperature monitoring in laser metal deposition: comparison between single wavelength and ratio pyrometry techniques. *International Journal of Mechatronics and Manufacturing Systems*, 16/1, pp. 96-111.
[10.1504/IJMMS.2023.10056875](https://doi.org/10.1504/IJMMS.2023.10056875)
- [4] Furlan, V., Castelli, K., Scaburri, L. & Giberti, H. (2023). Convolutional Neural Network of Part Orientation in Additive Manufacturing. In: Daimi, K., Alsadoon, A., Coelho, L. (eds). *Cutting Edge Applications of Computational Intelligence Tools and Techniques*. *Studies in computational Intelligence*, 1118, pp. 165-181, Springer.
https://doi.org/10.1007/978-3-031-44127-1_8
- [5] Maffia, S., Chiappini, F., Maggiani, G., Furlan, V., Guerrini, M. & Previtali, B. (2023). Comparison between Eight-Axis Articulated Robot and Five-Axis CNC Gantry Laser Metal Deposition Machines for Fabricating Large Components. *Applied Science*, 13/9, 5259
<https://doi.org/10.3390/app13095259>
- [6] Furlan, V., Kurtay, T., Grande, A.M. & Previtali, B. (2023). A comprehensive study of A375 alloy printability via laser metal deposition. *Journal of Manufacturing Processes*, 95, pp. 421-433.
<https://doi.org/10.1016/j.jmapro.2023.03.070>
- [7] Maffia, S., Furlan, V. & Previtali, B. (2023). Coaxial and synchronous monitoring of molten pool height, area and temperature in laser metal deposition. *Optics and Laser Technology*, 163, 109395.
<https://doi.org/10.1016/j.optlastec.2023.109395>
- [8] Maffia, S., Chiappini, F., Maggiani, G., Furlan, V., Guerrini, M. & Previtali, B. (2023). Enhancing Productivity and efficiency in conventional laser metal deposition process for Inconel 718 – Part I: the effect of the process parameters, 128/11-12, pp. 5353-5372.
<https://doi.org/10.1007/s00170-023-12196-1>
- [9] Maffia, S., Chiappini, F., Maggiani, G., Furlan, V., Guerrini, M. & Previtali, B. (2023). Enhancing Productivity and efficiency in conventional laser metal deposition process for Inconel 718 – Part II: advancing the process performance. *International Journal of Advanced Manufacturing Technology*, 129/1-2, pp. 279-298.
<https://doi.org/10.1007/s00170-023-12197-0>
- [10] Furlan, V., Bianco A & Demir, A.G. (2022). Direct laser Interference patterning via scanning optics using Michelson-Morley configuration. *Applied Surface Science*, 606, 154536
<https://doi.org/10.1016/j.apsusc.2022.154536>
- [11] Donadello, S., Furlan, V., Demir, A. G., & Previtali, B. (2022). Interplay between powder catchment efficiency and layer height in self-stabilized laser metal

- deposition. *Optics and Lasers in Engineering*, 149, 106817.
<https://doi.org/10.1016/j.optlaseng.2021.106817>
- [12] Murer, M., Furlan, V., Formica, G., Morganti, S., Previtali, B., & Auricchio, F. (2021). Numerical simulation of particles flow in Laser Metal Deposition technology comparing Eulerian-Eulerian and Lagrangian-Eulerian approaches. *Journal of Manufacturing Processes*, 68, 186-197.
<https://doi.org/10.1016/j.jmapro.2021.05.027>
- [13] Cacace, S., Furlan, V., Sorci, R., Semeraro, Q., & Boccadoro, M. (2020). Using recycled material to produce gas-atomized metal powders for additive manufacturing processes. *Journal of Cleaner Production*, 268, 122218.
<https://doi.org/10.1016/j.jclepro.2020.122218>
- [14] Ripamonti, F., Furlan, V., Savio, A., Demir, A. G., Cheli, F., Ossi, P., & Previtali, B. (2020). Dynamic behaviour of miniature laser textured skis. *Surface Engineering*, 36(12), 1250-1260. <https://doi.org/10.1080/02670844.2018.1512730>
- [15] Purnama, A., Furlan, V., Dessi, D., Demir, A. G., Tolouei, R., Paternoster, C., ... & Mantovani, D. (2020). Laser surface texturing of SS316L for enhanced adhesion of HUVECs. *Surface Engineering*, 36(12), 1240-1249.
<https://doi.org/10.1080/02670844.2018.1495408>
- [16] Kotsedi, L., Furlan, V., Bharadwaj, V., Kaviyarasu, K., Sotillo, B., Mtshali, C. B., ... & Maaza, M. (2019). Chromium oxide formation on nanosecond and femtosecond laser irradiated thin chromium films. *Optical Materials*, 95, 109206.
<https://doi.org/10.1016/j.optmat.2019.109206>
- [17] Catalano, G., Demir, A. G., Furlan, V., & Previtali, B. (2018). Prototyping of biodegradable flat stents in pure zinc by laser microcutting and chemical etching. *Journal of Micromechanics and Microengineering*, 28(9), 095016.
<https://iopscience.iop.org/article/10.1088/1361-6439/aac83d/pdf>
- [18] Ripamonti, F., Furlan, V., Demir, A. G., Previtali, B., Derai, M., Cheli, F., & Ossi, P. M. (2018). Innovative metallic solutions for alpine ski bases. *Journal of Vacuum Science & Technology B, Nanotechnology and Microelectronics: Materials, Processing, Measurement, and Phenomena*, 36(1), 01A108.
<https://doi.org/10.1116/1.5002542>
- [19] Furlan, V., Biondi, M., Demir, A. G., Previtali, B., Pariani, G., & Bianco, A. (2018). Two-beam interference patterning of biodegradable magnesium alloy: Influence of number of passes and spots overlap. *Journal of Vacuum Science & Technology B, Nanotechnology and Microelectronics: Materials, Processing, Measurement, and Phenomena*, 36(1), 01A102. <https://doi.org/10.1116/1.4996504>
- [20] Furlan, V., Biondi, M., Demir, A. G., Pariani, G., Previtali, B., & Bianco, A. (2017). Sub-micrometric surface texturing of AZ31 Mg-alloy through two-beam direct laser interference patterning with a ns-pulsed green fiber laser. *Applied Surface Science*, 423, 619-629. <https://doi.org/10.1016/j.apsusc.2017.06.138>
- [21] De Giorgi, C., Furlan, V., Demir, A. G., Tallarita, E., Candiani, G., & Previtali, B. (2017). Laser micropolishing of AISI 304 stainless steel surfaces for cleanability and bacteria removal capability. *Applied surface science*, 406, 199-211.
<https://doi.org/10.1016/j.apsusc.2017.02.083>
- [22] Demir, A. G., Taketa, T. B., Tolouei, R., Furlan, V., Paternoster, C., Beppu, M. M., ... & Previtali, B. (2015). Laser surface structuring affects polymer deposition, coating homogeneity, and degradation rate of Mg alloys. *Materials Letters*, 160, 359-362.
<https://doi.org/10.1016/j.matlet.2015.07.159>

- [23] Furlan, V., Demir, A. G., & Previtali, B. (2015). Micro and sub-micron surface structuring of AZ31 by laser re-melting and dimpling. *Optics & Laser Technology*, 75, 164-172. <https://doi.org/10.1016/j.optlastec.2015.06.030>
- [24] Demir, A. G., Furlan, V., Lecis, N., & Previtali, B. (2014). Laser surface structuring of AZ31 Mg alloy for controlled wettability. *Biointerphases*, 9(2), 029009. <https://doi.org/10.1116/1.4868240>

International Conference

- [25] Insero F., Furlan V. & Giberti, H. (2022). A Novel Infill Strategy to Approach Non-Planar 3D-printing in 6-Axis Robotized FDM. 18th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications, MESA 2022.
- [26] Furlan V., Demir A. G., Pariani G., Bianco A. & Previtali B. (2018). A new approach to Direct Laser Interference Patterning with scanner optics for high productivity. *Euspen's 18th International Conference & Exhibition, Venice, IT, 2018* (accepted with oral presentation).
- [27] Catalano G., Demir A. G., Furlan V. & Previtali B. (2017). Laser microcutting of sheet metal for prototyping expandable stent-like structures in permanent and biodegradable alloys. *IEEE-RTSI 2017-3^o International Forum on Research and Technologies for Society and Industry*.
- [28] Catalano G., Demir A. G., Furlan V. & Previtali B. (2017). Use of sheet material for rapid prototyping of cardiovascular stents". *Procedia Engineering. 17th International Conference on Sheet Metal, SHEMET17*.
- [29] Furlan V., Demir A. G., Paternoster C., Tolouei R., Mantovani D. & Previtali B. (2016). Surface oxidation by laser soft-melting treatment to change degradation behaviour of a magnesium alloy. *XXX International Conference on Surface Modification Technologies (SMT30)*.
- [30] De Giorgi C., Furlan V., Demir A. G., Tallarita E., Candiani G. & Previtali B. (2016). Laser micro-polished stainless steel surfaces with improved bacteria removal capability. *10th World Biomaterials Congress*
- [31] De Giorgi C., Furlan V., Demir A. G., Tallarita E., Candiani G. & Previtali B. (2015). Laser micro-polishing of stainless steel for antibacterial surface applications. *Procedia CIRP*.
- [32] Demir A. G., Taketa T. B., Tolouei R., Furlan V., Paternoster C., Beppu M. M., Mantovani D. & Previtali B. (2015). Laser surface structuring: a method to change topography, promote coating deposition and reduce corrosion rate. *European Cells and Materials, 7th Symposium on Biodegradable Metal, 30 Suppl. 3, pp. 59*
- [33] Demir A. G., Takeda T. B., Tolouei R., Furlan V., Paternoster C., Beppu M. M., Mantovani D. & Previtali B. (2014). Effect of laser treatment for surface structuring on AZ31 Mg alloy degradation. *European Cells and Materials, 6th Symposium on Biodegradable Metals, 28 Suppl. 3, pp. 46*
- [34] Demir A. G., Furlan V. & Previtali B. (2013). Surface structuring of AZ31 Mg alloy with a laser beam for biodegradable stent applications. *European Cells and Materials - 5th Symposium on Biodegradable Metals, 26 Suppl. 5, pp. 13*
- [35] Demir A. G., Furlan V., Lecis N. & Previtali B. (2013). Controlling wetting properties of AZ31 Mg alloy via laser surface structuring. *European Cells and Materials - 4th International Symposium on Surfaces and Interfaces for Biomaterials, 26 Suppl. 6, pp. 149*

National conference

- [36] Ripamonti, F., Furlan, V., Demir, A. G., Previtali, B., Derai, M., Cheli, F., & Ossi, P. M. (2018). Innovative metallic solutions for alpine ski bases. *AIV XXIII 2017 Conference of Italian Association of Science and Technology*.
- [37] Furlan, V., Biondi, M., Demir, A. G., Previtali, B., Pariani, G., & Bianco, A. (2018). Two-beam interference patterning of biodegradable magnesium alloy: Influence of number of passes and spots overlap. *AIV XXIII 2017 Conference of Italian Association of Science and Technology*.
- [38] Furlan, V., Demir, A. G., & Previtali B. (2015). Funzionalizzazione laser di superfici per applicazioni biomedicali. *XII Convegno dell'Associazione Italiana di Tecnologia Meccanica*.

Patent

Tamborini D., Furlan V., Previtali B., Penasa M., Crosato A. 2019 "Ugello per apparecchiatura per deposizione locale diretta di materiale in forma di polvere sotto fascio laser". Brevetto italiano n° IT 201900018863. Ufficio Italiano Brevetti e Marchi.

Awards

- Heidenhain Scholarship for euspen's 18th

Language Skills

Italian	Mother tongue
English	Independent user (TOEIC - B2 level)

Computer Skills

SolidEdge, Inventor, Matlab, Minitab, Zemax, Microsoft Office Applications, Adobe Illustrator, Photoshop

Interests

Drawing, painting, arts, music, musical instruments, traveling, collections, cooking

Driving licence

B