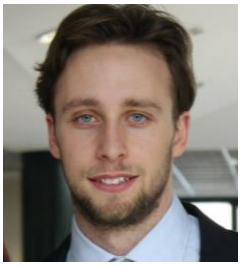

University Academic Curriculum Vitae Lorenzo Maccioni

Personal information

Name: Lorenzo Maccioni
E-Mail: lorenzo.maccioni@unibz.it

Education since leaving school

- 2014, Bachelor in Mechanical Engineering, Università degli studi di Firenze, Scuola di Ingegneria, Florence (Italy). Title of the Thesis: “Progettazione della parte prodiera di un veicolo sottomarino autonomo - Design of the bow of an autonomus underwater veichle”. Mark 99/110
- 2016, Master of Science in Mechanical Engineering, Università degli studi di Firenze, Scuola di Ingegneria, Florence (Italy). Title of the Thesis: “Progettazione di un Sistema di riduzione cicloidale per mescolatori da cantiere – Design of a cycloidal gear reduction system for construction site mixer”. Mark 110/110 cum laude
- 2016, (8 months) Internship at the Laboratory of Methods & Techniques for Innovation, Università degli studi di Firenze, Scuola di Ingegneria, Department of Industrial Engineering, Florence (Italy)
- 2019, (5 months) Visiting PhD student at the Technical University of Denmark (DTU), Department of Mechanical Engineering, Lyngby (Denmark)
- 2016-2020, PhD student in Sustainable Energy and Technologies, Free University of Bozen|Bolzano, Bolzano (Italy). Title of the Thesis: “Enhancing Product Value by Sustainability-Oriented Choices in the Early Design Processes”. Judgment Excellent.

Present appointment

- Title of appointment: Assistant Professor RTD Junior
- Start of appointment: 01/10/2020
- Level of appointment: international context
- The project “Cfd simUlations of BEaring” (“CUBE”) is funded by Schaeffler Technologies AG & Co. KG. (PI F. Concli). The position has been created by the Free University of Bozen|Bolzano (hereinafter UNIBZ), Faculty of Science and Technology (hereinafter FaST). It is in the Academic Discipline (SSD) ING-IND/14 “(Mechanical Design and Machine Construction” – Academic Field 09/A3.
- Brief description of responsibilities: Development and fine-tuning of numerical methods to study roller bearings lubrication. Design and development of experimental campaign and test-rigs to validate the numerical results.

Research Interests

- Computational Fluid Dynamics of lubricated mechanical parts through open access software e.g. OpenFOAM®
- Mesh handling techniques to manage the topological changes of the computational domain and/or to reduce the computational effort for numerical simulation of lubricated mechanical systems.
- Material characterization through experimental and numerical tests
- Design methods and techniques
- Innovation, conceptual design and inventive problem solving (TRIZ)
- Additive manufacturing
- Biometric measures and devices in experimental design research
- New value proposition, Human/User-Centered Design

- Eco-design, eco-innovation and design for sustainability

Professional experience

From / to	Job title	Name of academic Institution	Academic level	Responsibilities
October 2020/ Present	Cfd simUlations of Bearing (CUBE)	UNIBZ	Assistant Professor (RTD Junior)	Development and fine-tuning of numerical methods to study roller bearings lubrication. Design and development of experimental campaign to validate the numerical results.
August 2019/ July 2020	Industrial applicability of Eye-Tracking for production and design in SMEs (EYE-TRACK)	UNIBZ	Research Assistant	Acquisition and numerical processing of biometric data in order to support the (re)design of industrial products by studying the applicability of biometric devices in SMEs. Planning and carrying out experiments.
July 2019/ July 2020	fine-tuning new and smart ECO-design guidelines (few sECOnds)	UNIBZ	Member of the Research Team	Developing and testing eco-design methods to favor the acceptance of eco-designed solutions.

During the period that can be referred to the appointment at UNIBZ (November 2016 – July 2020), the applicant has provided his research contribution in some funded projects, see below.

From / to	Name of the Project	Scientific Responsibility	Activities carried out during the collaboration
March 2018/ July 2020	Additive Manufacturing FDM: Dimensional Accuracy and Product Acceptability (AMDAPA)	Dr. Pasquale Russo Spena (until 31/12/2018); Dr. Guido Orzes (since 01/01/2019)	Design and manufacturing of products using additive technologies. Planning and carrying out experiments to measure the perception of products printed through FDM 3D printer.
November 2019/ April 2020	Additive manufacturing for advanced functional Design (M,AM.De)	Dr. Franco Concli	Data Analysis of low and high cycle fatigue tests carried out on 17-4 PH Stainless Steel Manufactured via Selective Laser Melting
November 2019/ July 2020	Cfd simUlations of Bearing (CUBE)	Dr. Franco Concli	Carrying out a systematic and critical analysis of the state of the art regarding the CFD techniques for studying the lubricant behavior in mechanical components. Meshing a tapered roller bearing through BlockMesh in OpenFOAM®. Design of a vertical test rig for performing PIV tests on a tapered roller bearing.

Experience in academic teaching

Role of the Candidate	Course Name	Language and hours	University and Faculty	Program	Appointee	Academic Year
Teaching Assistant	Reverse Engineering and Rapid Prototyping	English, 12 hours	UNIBZ, FaST	M.Sc. in Industrial and Mechanical Engineering	Dr. Yuri Borgianni	2020/ 2021
Teaching Assistant	Reverse Engineering and Rapid Prototyping	English, 12 hours	UNIBZ, FaST	M.Sc. in Industrial and Mechanical Engineering	Dr. Yuri Borgianni	2019/ 2020

Contract Lecturer	Technical Drawing and CAD / CAD Fundamentals	English, 18 hours	UNIBZ, FaST	B.Sc. in Industrial and Mechanical Engineering	Dr. Yuri Borgianni	2019/ 2020

Membership

The applicant is member of:

- Società Scientifica Italiana di Progettazione Meccanica e Costruzione di Macchine – AIAS
- Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale – ADM

The applicant is reviewer for the following scientific Journals:

- Journal of Cleaner Production
- Lubricants
- Sustainability
- Applied Science
- Journal of Engineering Design
- Design Science
- Tribology International

The applicant is/has been member of the scientific committee, reviewers' board or program committee of the following international conferences and events:

- International Conference on Sustainable Design and Manufacturing (SDM):
  - 7th edition, Split, Croatia, 24-26 June 2020
- ETRIA world conference TRIZ future (TFC):
  - 21st edition, Bozen-Bolzano, Italy, 22-24 September 2021

Publications

International Journals

1. *Maccioni, L.*, Borgianni, Y. & Basso, D. (2019). Value perception of green products: an exploratory study combining conscious answers and unconscious behavioral aspects. Sustainability, 11(5), 1226. https://doi.org/10.3390/su11051226

2. Borgianni, Y., Maccioni, L., & Basso, D. (2019). Exploratory study on the perception of additively manufactured end-use products with specific questionnaires and eye-tracking. International Journal on Interactive Design and Manufacturing (IJIDeM), 13(2), 743-759. https://doi.org/10.1007/s12008-019-00563-w

3. Del Fatto, V., Dignös, A., Raimato, G., *Maccioni, L.*, Borgianni, Y., & Gamper, J. (2019). Visual time period analysis: a multimedia analytics application for summarizing and analyzing eye-tracking experiments. Multimedia Tools and Applications, 1-26. https://doi.org/10.1007/s11042-019-07950-1

4. *Maccioni, L.*, Borgianni, Y., & Pigosso, D. (2019). Can the choice of eco-design principles affect products' success? Design Science, 5, E25. https://doi.org/10.1017/dsj.2019.24

5. Borgianni, Y., & *Maccioni, L.* (2020). Review of the use of neurophysiological and biometric measures in experimental design research. Artificial Intelligence for Engineering Design, Analysis and Manufacturing (AI EDAM), 34(2), 248-285. https://doi.org/10.1017/S0890060420000062

6. Berni, A., *Maccioni, L.*, & Borgianni, Y. (2020). Observing Pictures and Videos of Creative Products: An Eye Tracking Study. Applied Science, 10, 1480. https://doi.org/10.3390/app10041480

7. Borgianni, Y., *Maccioni, L*., Fiorineschi, L., & Rotini, F. (2020). Forms of stimuli and their effects on idea generation in terms of creativity metrics and non-obviousness. International Journal of Design Creativity and Innovation, 1-18. https://doi.org/10.1080/21650349.2020.1766379

8. *Maccioni, L***.**, Bietresato, M., & Borgianni, Y. (2020). From the Extraction of Currently Fulfilled Requirements to Value Curves: A Case Study in the Field of Harvesting Machines for Shell Fruits and Lessons Learnt in Engineering Design. Applied Science, 10, 3809. https://doi.org/10.3390/app10113809

9. Concli, F., Maccioni, L., & Gorla, C. (2020). Development of a computational fluid dynamics simulation tool for lubrication studies on cycloidal gear sets. International Journal of Computational Methods and Experimental Measurements, 8(3), 220-232. https://doi.org/10.2495/CMEM-V8-N3-220-232

10. Concli, F., & Maccioni, L. (2020). Fracture locus of a Cor-Ten weathering steel: Experimental–numerical calibration. International Journal of Computational Methods and Experimental Measurements, 8(3), 243-251. https://doi.org/10.2495/CMEM-V8-N3-243-251

11. Maccioni, L., & Concli, F. (2020). Computational Fluid Dynamics Applied to Lubricated Mechanical Components: Review of the Approaches to Simulate Gears, Bearings, and Pumps. *Applied Sciences*, *10*(24), 8810. https://doi.org/10.3390/app10248810

12. Pieroni, M. P., McAloone, T. C., Borgianni, Y., Maccioni, L., & Pigosso, D. C. (2021). An expert system for circular economy business modelling: advising manufacturing companies in decoupling value creation from resource consumption. *Sustainable Production and Consumption*. https://doi.org/10.1016/j.spc.2021.01.023

13. Maccioni, L., Borgianni, Y., & Pigosso, D. C. (2021). Creativity in successful eco-design supported by ten original guidelines. International Journal of Design Creativity and Innovation, 1-24. https://doi.org/10.1080/21650349.2021.1965033

14. Concli, F., Fraccaroli, L., & Maccioni, L. (2021). Gear Root Bending Strength: A New Multiaxial Approach to Translate the Results of Single Tooth Bending Fatigue Tests to Meshing Gears. *Metals*, 11(6), 863. https://doi.org/10.3390/met11060863

15. Maccioni, L., Chernoray, V. G., Mastrone, M. N., Bohnert, C., & Concli,

F. (2021). Study of the impact of aeration on the lubricant behavior in a tapered roller bearing: innovative numerical modelling and validation via particle image velocimetry. *Tribology International*, 107301. https://doi.org/10.1016/j.triboint.2021.107301

International Conferences

1. *Maccioni, L.*, Borgianni, Y., & Rotini, F. (2017). Sustainability as a value-adding concept in the early design phases? Insights from stimulated ideation sessions. In International Conference on Sustainable Design and Manufacturing (pp. 888-897). Springer, Cham. Bologna, Italy. https://doi.org/10.1007/978-3-319-57078-5_83

2. Wallisch, A., *Maccioni, L.*, Trautmann, L., Ostermeyer, E., Borgianni, Y., & Borg, J. C. (2018). Lessons learnt in designing transportation solutions for elderly people following a participatory approach. In International Design Conference. Design Society. Dubrovnik, Croatia. https://doi.org/10.21278/idc.2018.0361

3. *Maccioni, L.*, & Borgianni, Y. (2018). A product success scale for supporting research in engineering design. In International Design Conference. Design Society. Dubrovnik, Croatia. https://doi.org/10.21278/idc.2018.0494

4. Borgianni, Y., Rauch, E., *Maccioni, L.*, & Mark, B. G. (2018). User Experience Analysis in Industry 4.0-The Use of Biometric Devices in Engineering Design and Manufacturing. In 2018 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM) (pp. 192-196). IEEE. Bangkok, Thailand. https://doi.org/10.1109/ieem.2018.8607367

5. Borgianni, Y., *Maccioni, L.*, & Rauch, E. (2019). Using Virtual Reality to match the appearance of technical installations with landscapes. In Human Behaviour in Design. Tutzing, Germany.

6. Borgianni, Y., *Maccioni, L.,* & Pigosso, D. (2019). Environmental Lifecycle Hotspots and the Implementation of Eco-design Principles: Does Consistency Pay off?. In International Conference on Sustainable Design and Manufacturing (pp. 165-176). Springer, Singapore. Budapest, Hungary. https://doi.org/10.1007/978-981-13-9271-9_16

7. *Maccioni, L.*, & Borgianni, Y. (2019). Eco-Design and Sustainable Development: A Speculation About the Need for New Tools and Knowledge. In International Conference on Sustainable Design and Manufacturing (pp. 155-164). Springer, Singapore. Budapest, Hungary. https://doi.org/10.1007/978-981-13-9271-9_15

8. Concli, F., & *Maccioni, L.* (2019). Experimental–numerical calibration of the fracture locus of weathering steel. In Materials and Contact Characterisation IX. Wit transactions on engineering sciences, 124, 219-227. Lisbon, Portugal. https://doi.org/10.2495/mc19021

9. *Maccioni, L.*, & Concli, F. (2019). Fracture locus of a CORTEN steel: Finite Element calibration based on experimental results. Procedia Structural Integrity, 24, 738-745.

https://doi.org/10.1016/j.prostr.2020.02.065

10. Concli, F., *Maccioni, L.,* & Gorla, C. (2019). Lubrication of gearboxes: CFD analysis of cycloidal gear set. In Computational & Experimental Methods in Multiphase and Complex Flow X. WIT Transactions on Engineering Sciences. WIT Press. Lisbon, Portugal. https://doi.org/10.2495/MPF190101

11. Concli, F., *Maccioni, L.,* & Gorla, C. (2019). Power loss analysis of different high-power density gearbox typologies: CFD analysis and experimental measurements on a cycloidal gear set. Munich, Germany

12. Borgianni, Y., *Maccioni, L.*, Russo Spena, P., & Shunmugavel, M. K. (2019). University education in Additive Manufacturing and the need to boost design aspects. In Proceedings of the Design Society: International Conference on Engineering Design (Vol. 1, No. 1, pp. 629-638). Cambridge University Press. Delft, Nederland. https://doi.org/10.1017/dsi.2019.6

13. Borgianni, Y., *Maccioni, L.*, Orzes, G., & Basso, D. (2019). How Do Design Changes and the Perception of Product Creativity Affect Value?. In International Conference on Design, Simulation, Manufacturing: The Innovation Exchange (pp. 601-611). Springer, Cham. Modena, Italy. https://doi.org/10.1007/978-3-030-31154-4_51

14. *Maccioni, L*., & Borgianni, Y. (2019). Investigating the Value Perception of Specific TRIZ Solutions Aimed to Reduce Product's Environmental Impact. In International TRIZ Future Conference (pp. 282-294). Springer, Cham. Marrakech, Morocco. https://doi.org/10.1007/978-3-030-32497-1_23

15. *Maccioni, L.*, Borgianni, Y., Pigosso, D.C., & McAloone, T. (2020). Are eco-design strategies implemented in products? A study on the agreement level of independent observers. Proceedings of the Design Society: DESIGN Conference, 1, 2039-2048. https://doi.org/10.1017/dsd.2020.272

16. Berni, A., *Maccioni, L.*, & Borgianni, Y. (2020). An eye-tracking supported investigation into the role of forms of representation on design evaluations and affordances of original product features. Proceedings of the Design Society: DESIGN Conference, 1, 1607-1616. https://doi.org/10.1017/dsd.2020.296

17. *Maccioni, L.*, Rampazzo, E., Nalli, F., Borgianni, Y., & Concli, F. (2021). Low-Cycle-Fatigue Properties of a 17-4 PH Stainless Steel Manufactured via Selective Laser Melting. In *Key Engineering Materials* (Vol. 877, pp. 55-60). Trans Tech Publications Ltd. https://doi.org/10.4028/www.scientific.net/KEM.877.55

18. *Maccioni, L.*, Fraccaroli, L., Borgianni, Y., & Concli, F. (2021). High-Cycle-Fatigue Characterization of an Additive Manufacturing 17-4 PH Stainless Steel. In *Key Engineering Materials* (Vol. 877, pp. 49-54). Trans Tech Publications Ltd. https://doi.org/10.4028/www.scientific.net/KEM.877.49

19. Maccioni, L., & Borgianni, Y. (2020). Bringing Success and Value in Sustainable Product Development: The Eco-design Guidelines. In Sustainable Design and Manufacturing 2020 (pp. 1-11). Springer, Singapore. https://doi.org/10.1007/978-981-15-8131-1_1

20. Maccioni, L., & Borgianni, Y. (2020). Success-oriented eco-ideation sessions: lessons learnt from the use of ten eco-design guidelines. In Proceedings of the Sixth International Conference on Design Creativity (ICDC 2020) (pp. 125-132). https://doi.org/10.35199/ICDC.2020.16

21. Maccioni, L., Borgianni, Y., & Concli, F. (2020). High Power Density Speed Reducers: A TRIZ Based Classification of Mechanical Solutions. In *International TRIZ Future Conference* (pp. 243-253). Springer, Cham. https://doi.org/10.1007/978-3-030-61295-5_20

22. Maccioni, L., Mastrone, M. N., & Concli, F. (2021). Computational studies on cycloidal gearboxes: a systematic literature review. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1038, No. 1, p. 012006). IOP Publishing. https://doi.org/10.1088/1757-899X/1038/1/012006

23. Concli, F., & Maccioni, L. (2021). Critical Planes Criteria Applied To Gear Teeth: Which One Is The Most Appropriate To Characterize Crack Propagation?. Wit Transactions On Engineering Sciences, 133, 15-25. https://doi.org/10.2495/MC210021

24. Concli, F., Maccioni, L., & Bonaiti, L. (2021). Reliable Gear Design: Translation Of The Results Of Single Tooth Bending Fatigue Tests Through The Combination Of Numerical Simulations And Fatigue Criteria. *Wit Transactions On Engineering Sciences*, *130*, 111-122. https://doi.org/10.2495/CMEM210101

25. Maccioni, L., & Borgianni, Y. (2021). An Ideality-Based Map to Describe Sustainable Design Initiatives. In *International TRIZ Future Conference* (pp. 3-13). Springer, Cham. https://doi.org/10.1007/978-3-030-86614-3_1

National Conferences

1. *Maccioni, L.*, & Borgianni, Y. (2017). La sostenibilità come elemento fondamentale di valore nelle fasi preliminari della progettazione. National Workshop of Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale, Milan, Italy.

2. Borgianni, Y., & *Maccioni, L.* (2018). Le attività del gruppo ING-IND/15 alla Libera Università di Bolzano. Campi di ricerca oggi e nel futuro prevedibile. National Workshop of Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale, Torino, Italy

3. *Maccioni, L.*, & Borgianni, Y. (2018). Il successo della progettazione sostenibile: una questione di principio? Indagine empirica della relazione tra i principi di sostenibilità ed il valore percepito. National Workshop of Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale, Torino, Italy

4. Scuttari, A., Borgianni, Y., Kofler, I., & *Maccioni, L*. (2019). Mobile Eye Tracking (MET) in real-world setting: exploring visual attention of visitors in accommodation facilities. In Consumer Behavior in Tourism Symposium (CBTS 2019), Emotions in Tourism Research: Reflecting on Methodological Approaches. Brunico/Brunek, December 11th -14th 2019.

Poster Presentation

1. Borgianni, Y., *Maccioni, L.*, & Rauch, E. (2018). How does product design benefit from eye tracking and biometric systems? An overview on use objectives. Poster in Design Computing Cognition (DCC18), Milan, Italy.

Further data

Presentations at the following conferences

- National Workshop of Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale, Milano (Italy), February 14th to 15th, 2017
- International Conference on Sustainable Design and Manufacturing, Bologna (Italy), April 26th to 28th, 2017
- National Workshop of Associazione Nazionale Disegno e Metodi dell'Ingegneria Industriale, Torino (Italy), February 1st to 2nd, 2018
- International Design Conference, Dubrovnik (Croatia), May 21st to 24th, 2018
- International Conference on Sustainable Design and Manufacturing, Budapest (Hungary), July 04th to 05th, 2019
- International Conference on Stress Analysis (AIAS), Assisi (Italy), September 4th to 6th, 2019
- TRIZ Future Conference (TFC19), Marrakesh (Morocco), October 9th to 11th, 2019
- National conference on Tecnologie open source per industria 4.0, Confindustria Firenze (Italy), February 14th, 2020
- International Conference on Materials and Manufacturing Technologies (ICMMT20), Bangkok (Thailand), April 24th to 26th, 2020.
- International Conference on Stress Analysis (AIAS), Online Event, September 2nd to 4th, 2020
- International Conference on Materials Characterization, Online Event, July 7th to 9th, 2021
- International Conference on Computational Methods and Experimental Measurements, May 25th to 27th, 2021
- TRIZ Future Conference (TFC21), Bolzano (Italy), September 22nd to 24th, 2021

Other academic achievements and awards

The article "Maccioni, L., & Borgianni, Y. (2019). Investigating the value perception of specific TRIZ solutions aimed to reduce product's environmental impact, 19th ETRIA TRIZ Future Conference, Marrakesh, Morocco, October 9th-11th, 2019" has received the best paper award by the conference scientific committee

Other third-

The applicant has held the 4-hour seminar "Introduzione agli strumenti

mission activities (disseminations, technology transfer)	biometrici nell'ingegneria e nella progettazione" ("Introduction to biometric devices in engineering and design", in Italian) for PhD students, UNIFI, June 21st 2018, in cooperation with dr. Yuri Borgianni. The applicant has held the 2-hour seminar "(breve) viaggio alla scoperta dell'eye-tracking" ("a short journey to discover eye-tracking", in Italian), for Technical High School students, TFO Max Valier Bolzano, January 18th 2019, in cooperation with dr. Yuri Borgianni The applicant participated at the event Long Night of Research (LUNA), held in Bolzano in September 2019. The applicant presented of the equipment available at the Mechanical Lab.
Language competence	Italian, mother tongue; English, B2
Driving license	Driving license type B

Place Bolzano 01/10/2021 Signature