

Agnese Brunzini

Role: Biomedical Engineer with PhD in Industrial Engineering

WORK EXPERIENCE

November 2020- Present Post-doc Research Fellow in Industrial Engineering

At: Design Tools and Methods Group, Department of Industrial Engineering and Mathematical Sciences, Università Politecnica delle Marche, Via Brecce Bianche 12, Ancona

Main activities:

- **Human-Centred Design:** products research, design and development
- Study of **Human Factors**, **Human-Machine Interaction** and **Ergonomics**
- Study of **User Experience** and Product **Usability**
- Development of **Augmented** and **Mixed Reality** applications
- **Project management of industrial projects**
 - Management of academic and industrial **stakeholders**
 - Management of **gantt**
 - Writing of **deliverables** and **technical reports**

Team working in National and Regional Projects:

- Smart Village – Integrated system for the prevention of falls in pre-frail elderly subjects [POR MARCHE FESR 2014/2020]
- I.Con – Net: Innovazione, Connessione on the Network [Programma di Sviluppo Rurale 2014/2020]
- MOSAICO – Modelli, prodotti e Servizi per rendere socialmente Attiva ed Inclusiva e la vita di persone “fragili” in Comunità diffuse sul territorio [MiSE – Accordi per l’innovazione 2017]
- FOCAAL - FOg Computing in Ambient Assisted Living [MiSE – Accordi per l’innovazione 2018]

Participation in National and International Conferences:

- **Lecturer** at: **ADM 2021** International Conference, September 9-10, 2021, Roma, Italy.
- **Lecturer** at: 12th International Conference on Applied Human Factors and Ergonomics, **AHFE 2021**, July 25-29, 2021, New York, USA (virtual).
- **Lecturer** at: 23rd International Conference on Engineering Design, **ICED 2021**, August 16-20, 2021, Chalmers University of Technology, Gothenburg, Sweden (virtual).

November 2017 - PhD in Industrial Engineering October 2020

At: Design Tools and Methods Group, Department of Industrial Engineering and Mathematical Sciences, Università Politecnica delle Marche, Via Brecce Bianche 12, Ancona

Main activities:

- **Virtual Prototyping**
- Development of **Mixed Reality** simulator for **medical training**
- Data analysis of signals from wearable devices
- **Clinical Trials** and **statistical data analysis**

Project Management of:

- Dc-Pressure - Integrated System for the Prevention and Management of Pressure Ulcers [POR MARCHE FESR 2014-2020];
- STAR Lab - Simulation Training and Advanced-Research Lab [Athenaeum Strategic Project];
- Development of the optimal touchscreen interface for patients with scleroderma [WSF&ASF Grant in Quality of Life 2018-2019].

Direct Collaboration with:

- **Industries** belonging to different sectors: orthopaedic footwear, ICT and software, telecommunications, technical assistance, quality and test systems
- **Practitioners** of private and public Italian Hospitals
- **Other Faculties** (such as Medicine, Economics, Engineering, ...)

Followed Courses:

- Tools and Methods for **Process Representation and Management**
- **Project Management Techniques**

Participation in National and International Conferences:

- **Lecturer** at: 11th International Conference on Applied Human Factors and Ergonomics, **AHFE 2020**, July 16-20, 2020, **San Diego**, USA.
- **Co-Chair and Lecturer** at: 10th International Conference on Applied Human Factors and Ergonomics, **AHFE 2019**, July 24-28, 2019, **Washington D.C.**, USA.
- **Lecturer** at: 15th International Design Conference - **Design 2018**, May 21-24, 2018, **Dubrovnik**, Croatia.
- **Lecturer** at: 15th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, **CMBBE 2018**, March 26-29, 2018, **Lisbon**, Portugal.
- 2nd Congresso Nazionale IDBN: '3D Printing and Biomechanics', 5-7 Settembre 2018, Pavia.

January 2020 – March
2020

Research Period Abroad

At: Phasya s.a., Seraing (Belgium)

Main activities:

- **Planning and Design of data acquisition in and outside laboratory** for the study of drowsiness, stress and cognitive load in driving situations
- **Statistical analysis** of physiological signals and subjective parameters for the study of stress and cognitive load
- **Cognitive ergonomics analysis** of high fidelity and low fidelity medical simulations

January 2016 – October
2017

Research Fellow in Biomedical Engineering

At: Design Tools and Methods Group, Department of Industrial Engineering and Mathematical Sciences, Università Politecnica delle Marche, Via Brecce Bianche 12, Ancona

Main activities:

- **Design and development** of custom-made **medical prototypes**
 - **Requirements analysis**
 - **CAD design** and **3D printing** of patient-specific implants
 - Application of **Reverse Engineering** techniques
- **Drafting of research projects and deliverables**

Project Management of: Dc-Pressure: Integrated System for the Prevention and Management of Pressure Ulcers. (POR MARCHE FESR 2014-2020).

Additional experience and interest in: **Design Process, Product Design, Computer Aided Design, 3D printing**, Additive Manufacturing, Finite Elements Simulations.

Participation in International Conference:

- **Co-Chair and Lecturer** at: 13th IASTED International Conference on Biomedical Engineering (**BioMed 2017**) February 20 - 21 2017, **Innsbruck**, Austria.
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EDUCATION AND TRAINING

Second session 2015	State Certification Exam (Certified)	
	Certification for the exercise of the profession of Engineer. Association of Engineers - Industrial field, Turin (Italy).	
October 2012 – October 2015	Master's Degree in Biomedical Engineering	106/110
	From Polytechnic of Turin – Turin (Italy)	
	Research Thesis Wearable device for the biometric monitoring of heart failure.	
March 2015 – October 2015	Internship during studies	
	At Mtm-Tech s.r.l., Turin (Italy)	
	Design and development of dry conductive textile electrodes for the measurement of lung impedance. Non-invasive home monitoring system for the early diagnosis of heart failure acute events. 'SmarToWear' project, supported by Regione Piemonte.	
October 2008 – July 2012	Bachelor's Degree in Biomedical Engineering	101/110
	From Università Politecnica delle Marche – Ancona (Italy)	
	Research Thesis Non contact measuring techniques of respiratory rate through the measurement of thoracic surface motions.	
March 2012 – July 2012	Internship during studies	
	At Università Politecnica delle Marche – Ancona (Italy)	
	KINECT device calibration and data processing.	
September 2003 – June 2008	School- leaving Certificate	100/100
	From Classical high school Vittorio Emanuele II – Jesi (AN), Italy	

LANGUAGES

Italian	Mother tongue			
	LISTENING	READING	SPEAKING	WRITING
English	B2	B2	B2	B2
French	B1	B1	A1	A1
	FIRST CERTIFICATE IN ENGLISH, University of Cambridge ESOL Examinations, 2008,B2.			

PERSONAL SKILLS

Personal and Organisational Skills

- Ability to accomplish work within **strict deadlines**.
- **Reliable, autonomous** and **flexible** person.
- High **problem solving** skills.
- Strong **attention to details**.
- Strong ability to communicate and **work in a team**.
- **Leadership** (responsible for research projects).

Job-Related Skills

- Ability to pursue **industrial research** within an interdisciplinary consortium.

- Ability to **manage project's milestones and draft deliverables**.
- Ability to directly **work with industrial partners**.
- Ability to directly **work with practitioners** and patients in hospital.
- Ability to **write technical reports**.
- Ability to draft and write **research projects and scientific papers**.
- Basic skills in economic/business aspects of industrial projects.

Digital Competence

- Very good knowledge of Windows and **Microsoft Office**.
- Very good knowledge of **Rhinoceros, Geomagic Design X, Geomagic Qualify**, Unity.
- Knowledge of **Ansys, Solidworks**, Comsol, **Matlab/Simulink**, **Mimics**.

Other Skills

- Significant **ability to adapt**.
- Mobility Availability.
- **Driving license**: category **B**.

OTHER INFORMATION

Scientific Publications

- Brunzini, A., Papetti, A., Messi, D. Germani, M. 2022. *A comprehensive method to design and assess mixed reality simulations*. Virtual Reality. <https://doi.org/10.1007/s10055-022-00632-8>
- Ciccarelli, M., Papetti, A., Cappelletti, F., Brunzini, A., Germani, M. 2022. *Combining World Class Manufacturing system and Industry 4.0 technologies to design ergonomic manufacturing equipment*. International Journal of Interactive Design and Manufacturing. <https://doi.org/10.1007/s12008-021-00832-7>
- Facco, G., Greco, L., Mandolini, M., Mari, A., Brunzini, A., Manzotti, S., Setaro, N., Pieralisi, M., Simoncini, M., Gigante, A.P. 2022. *Assessing 3-D Printing in Hip Replacement Surgical Planning*. Radiologic Technology, 93(3):246-254. PMID: 35017268.
- Brunzini, A., Papetti, A., Grassetti, F., Moroncini, G., Germani, M. 2022. *The effect of systemic sclerosis on use of mobile touchscreen interfaces: Design guidelines and physio-rehabilitation*, International Journal of Industrial Ergonomics, Vol.87, 103256, <https://doi.org/10.1016/j.ergon.2021.103256>.
- Brunzini, A., Peruzzini, M., Grandi, F., Khamaisi, R.K., Pellicciari, M. 2021. *A Preliminary Experimental Study on the Workers' Workload Assessment to Design Industrial Products and Processes*, Applied Sciences, 11, 12066, <https://doi.org/10.3390/app112412066>
- Papetti A., Ciccarelli M., Brunzini A., Germani M., 2021. *Design of ergonomic manufacturing equipment by a human-centered methodology*, International Journal on Interactive Design and Manufacturing, 15(1), 107–111, <https://doi.org/10.1007/s12008-020-00734-0>.
- Zalunardo F., Bruno G., Caragiuli M., Mandolini M., Brunzini A., Gracco A., De Stefani A., 2021. *Periodontal effects of two Somnodent oral devices for the treatment of OSA: A finite element study*, CRANIO® - The Journal of Craniomandibular & Sleep Practice, DOI: 10.1080/08869634.2021.1985209.
- Mandolini M., Caragiuli M., Brunzini A., Mazzoli A., Pagnoni M., 2020. *A Procedure for Designing Custom-Made Implants for Forehead Augmentation in People Suffering from Apert Syndrome*, Journal of Medical Systems, 44:146, <https://doi.org/10.1007/s10916-020-01611-9>.
- Moroncini G., Brunzini A., Papetti A., Filippini E., Maurizi V., Cesaretti G., Gesuita R., Gabrielli A., Germani M., 2020. *Development of the optimal touchscreen interface for patients with scleroderma*, Journal of Scleroderma and Related Disorders, 6(2):170-177. doi:10.1177/2397198320965382
- Landi D., Rossi M., Favi C., Brunzini A., Germani M., 2020. *A Virtual Design Approach to Simulate the Hob Energy Performance*, Computer-Aided Design & Applications, 17(5), 1101-1115, DOI: <https://doi.org/10.14733/cadaps.2020.1101-1115>.
- Mandolini M., Brunzini A., Germani M., Manieri S., Mazzoli A., Pagnoni M., 2019. *Selective laser sintered mould for orbital cavity reconstruction*, Rapid Prototyping Journal, 25(1), 95-103, <https://doi.org/10.1108/RPJ-05-2017-0098>.
- Brunzini A., Gracco A., Mazzoli A., Mandolini M., Manieri S., Germani M., 2018. *Preliminary simulation model toward the study of the effects caused by different mandibular advancement devices in OSAS treatment*, Computer Methods in Biomechanics and Biomedical Engineering Journal, 21:13, 693-702, DOI:10.1080/10255842.2018.1511776
- Crivellin G., Bruno G., De Stefani A., Mazzoli A., Mandolini M., Brunzini A., Gracco A., 2018. *Strength distribution on TMJ using mandibular advancement device for OSAS treatment: A finite element study*, Dental Cadmos, 86(9), 757-764, DOI: 10.19256/d.cadmos.09.2018.04

- Mandolini M., Brunzini A., Germani M., 2017. *A collaborative web-based platform for the prescription of Custom-Made Insoles*, Advanced Engineering Informatics, 33, 360-373. <http://dx.doi.org/10.1016/j.aei.2016.10.004>
- Brunzini A., Mandolini M., Caragiuli M., Germani M., Mazzoli A., Pagnoni M., 2022. *HoloLens 2 for Maxillofacial Surgery: A Preliminary Study*, Design Tools and Methods in Industrial Engineering II. ADM 2021. Lecture Notes in Mechanical Engineering, 133-140, https://doi.org/10.1007/978-3-030-91234-5_13.
- Papetti A., Ciccarelli M., Brunzini A., Germani M., 2022. *Investigating the Application of Augmented Reality to Support Wire Harness Activities*, Design Tools and Methods in Industrial Engineering II. ADM 2021. Lecture Notes in Mechanical Engineering, 116-124, https://doi.org/10.1007/978-3-030-91234-5_11.
- Mandolini M., Caragiuli M., Bruno G., De Stefani A., Gracco A., Mazzoli A., Brunzini A., 2022. *Evaluation of Mandibular Advancement Devices in patients suffering from Obstructive Sleep Apnea and Periodontitis*, Design Tools and Methods in Industrial Engineering II. ADM 2021. Lecture Notes in Mechanical Engineering, 793-800, https://doi.org/10.1007/978-3-030-91234-5_80.
- Brunzini A., Grandi F., Peruzzini M., Pellicciari M., 2021. *Virtual training for assembly tasks: a framework for the analysis of the cognitive impact on operators*, Procedia Manufacturing, (FAIM2021), 55, 527–534, <https://doi.org/10.1016/j.promfg.2021.10.072>.
- Brunzini A., Peruzzini M., Germani M., Messi D., Barbadoro P., 2021. *A Transdisciplinary Approach for the Design Optimization of Medical Simulations*, Advances in Transdisciplinary Engineering, (TE 2021), 1, 53-62. doi:10.3233/ATDE210082.
- Brunzini A., Papetti A., Germani M., Adrario E., 2021. *Mixed reality in medical simulation: a comprehensive design methodology*, Proceedings of the Design Society, (ICED 2021), 1, 2107-2116. DOI:10.1017/pds.2021.472.
- Brunzini A., Papetti A., Germani M., Barbadoro P., Messi D., Adrario E., 2021. *Mixed Reality Simulation for Medical Training: How It Affects Learners' Cognitive State*, Lecture Notes in Networks and Systems, (AHFE 2021), 264, 339 – 347. https://doi.org/10.1007/978-3-030-79763-8_41.
- Mazzoli A., Mandolini M., Brunzini A., Caragiuli M., Germani M., 2022. *Preliminary Considerations on the Design of Multi-layered Bone Scaffold for Laser-Based Printing*, Lecture Notes in Electrical Engineering, (MICAD 2021), 784, 195-204. https://doi.org/10.1007/978-981-16-3880-0_21
- Brunzini A., Papetti A., Formenti L., Luciani A., Messi D., Adrario E., Barbadoro P., 2021. *Cognitive Load and Stress Assessment of Medical High-Fidelity Simulations for Emergency Management*. Advances in Intelligent Systems and Computing (AHFE 2020) 1206, pp. 343-350. DOI: 10.1007/978-3-030-51064-0_44.
- Leone, A., Rescio, G., Siciliano, P., Papetti, A., Brunzini, A., Germani, M., 2020. *Multi sensors platform for stress monitoring of workers in smart manufacturing context*. I2MTC 2020 - International Instrumentation and Measurement Technology Conference, Proceedings, pp. 1-5. DOI: 10.1109/I2MTC43012.2020.9129288.
- Scafà, M., Serrani, E.B., Papetti, A., Brunzini, A., Germani, M., 2020. *Assessment of Students' cognitive conditions in medical simulation training: A review study*. Advances in Intelligent Systems and Computing, (AHFE 2019), 958, pp. 224-233. DOI: 10.1007/978-3-030-20148-7_21.
- Brunzini, A., Papetti, A., Serrani, E.B., Scafà, M., Germani, M., 2020. *How to Improve Medical Simulation Training: A New Methodology Based on Ergonomic Evaluation*. Advances in Intelligent Systems and Computing, (AHFE 2019), 963, pp. 145-155. DOI: 10.1007/978-3-030-20135-7_14.
- Papetti, A., Scafà, M., Brunzini, A., Mandolini, M., 2020. *Multiperspective Ergonomic Assessment Approach for Human Centered Workplace Design*. Lecture Notes in Mechanical Engineering, (ADM 2019). DOI: 10.1007/978-3-030-31154-4_57.
- Scafà, M., Papetti, A., Brunzini, A., Germani, M., 2019. *How to improve worker's well-being and company performance: A method to identify effective corrective actions*. Procedia CIRP, (CIRP CMS 2019), 81, pp. 162-167. DOI: 10.1016/j.procir.2019.03.029.
- Gullà, F., Brunzini, A.M., Papetti, A., Germani, M., 2019. *Re-design of the Household Appliance UI to make it an Adaptive System*. 2019 IEEE 23rd International Symposium on Consumer Technologies, ISCT 2019 8901020, pp. 63-67. DOI: 10.1109/ISCT.2019.8901020.
- Mandolini M., Brunzini A., Brandoni Serrani E., Pagnoni M., Mazzoli A., Germani M., 2019. *Design of a custom-made cranial implant in patients suffering from Apert Syndrome*, In: Proceedings of the 22nd International Conference on Engineering Design (ICED19), 709-718. DOI:10.1017/dsi.2019.75.

- Brunzini A., Mandolini M., Manieri S., Germani M., Mazzoli A., 2018. *Finite Elements Analysis of The Stress Distribution on Temporomandibular Joint Due to the Use of Mandibular Advancement Devices*, In: Proceedings of the 15th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, (CMBBE 2018).
- Brunzini A., Mandolini M., Germani M., Nester C.J., Williams A.E., 2018. A *Knowledge-Based and Multi-User Platform for Prescribing Custom-Made Insoles*, in: Proceedings of International Design Conference, (DESIGN 2018), 2597-2608. <https://doi.org/10.21278/idc.2018.0166>.
- Brunzini A., Mandolini M., Manieri S., Germani M., Mazzoli A., Pagnoni M., Iannetti G., Modugno A., 2017. *Orbital wall reconstruction by selective laser sintered mould*, in: Proceedings of the 13th IASTED International Conference on Biomedical Engineering, BioMed 2017. DOI: 10.2316IP.20J7.852-045.
- Mandolini M., Brunzini A., Manieri S., Germani M., 2017. *Foot Plantar Pressure Offloading: How to Select the Right Material for A Custom-Made Insole*, In: Proceedings of the International Conference on Engineering Design, (ICED17), 1, 469-478.

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