



Name **FORESTI RUBEN**

Address

Cell Phone

E-mail

Country

Date of birth

Language

Driving licence

01/03/1988

Italian (mother tongue), English and French

B

**Postdoctoral Researcher in applied medical technical sciences, Department of Medicine and Surgery, University of Parma**

Representative of PhD students of the Department of Industrial Engineering at the University of Parma (2015-2016).

Representative of Post-Doc of the Department of Medicine and Surgery at the University of Parma (starting from 2020).

Management of educational workshops, 18 projects in 3 years, 180 students in teams of 5 to 10 people.

Technological team specialist for the development of the Academic FabLab and SIM-LAB for training in surgery

Innovation Manager and Ambassador (Albo MISE starting from 2019)

- **Research Topic** "Design and realization of 3D-Printing Systems for Biomedical Devices"
- **Teaching Activity** Teacher assistant and project manager in the course of Industrial Automation.  
Boolean algebra, SCADA / PLC programming and design for industrial machines.

### Patents

“Dispositivo medicale per dispensare farmaci con aerosol e relativo metodo” Domanda numero: 812021000047309

Data di presentazione: 26/03/2021

### Publications

ELENCO PUBBLICAZIONI – Ruben Foresti Ph.D.

**IF MEDIO 5,390, H-INDEX 9**

1. Smart Society and Artificial Intelligence: Big Data Scheduling and the Global Standard Method Applied to Smart Maintenance. ENGINEERING, vol. 6, p. 835-846, ISSN: 2095-8099, doi: 10.1016/j.eng.2019.11.014 - Articolo in rivista

**Foresti R., et al. IF 7.553**

2. 3D Printed Masks for Powders and Viruses Safety Protection Using Food Grade Polymers: Empirical Tests POLYMERS 2021, 13, 617. <https://doi.org/10.3390/polym13040617> Articolo in rivista

**Foresti R., et al. IF 4.329**

3. In-vivo vascular application via ultra-fast bioprinting for future 5D personalised nanomedicine. SCIENTIFIC REPORTS, vol. 10, ISSN: 2045-2322, doi: 10.1038/s41598-020-60196-y - Articolo in rivista

**Foresti R., et al. IF 4.379**

4. Highly-defined bioprinting of long-term vascularized scaffolds with Bio-Trap: Complex geometry functionalization and process parameters with computer aided tissue engineering. MATERIALIA, ISSN: 2589-1529, doi: 10.1016/j.mtla.2019.100560 - Articolo in rivista

**Foresti R., et al. SNIP 1.201**

5. The geek and the chemist: Antioxidant capacity measurements by DPPH assay in beverages using open source tools, consumer electronics and 3D printing. SENSORS AND ACTUATORS. B, CHEMICAL, vol. 282, p. 559-566, ISSN: 0925-4005, doi: 10.1016/j.snb.2018.11.019 - Articolo in rivista

**Tonelli A., et al. IF 7.460 SNIP 1.395**

6. Design of an instrumentation for the automated damage detection in ceilings. NDT & E INTERNATIONAL, vol. 94, p. 31-37, ISSN: 0963-8695, doi: 10.1016/j.ndteint.2017.11.004 - Articolo in rivista

Belletti B., et al. **IF 3.739 SNIP 2.110**

7. Highly defined 3D printed chitosan scaffolds featuring improved cell growth. BIOMEDICAL MATERIALS, vol. 12, ISSN: 0955-7717, doi: 10.1088/1748-605X/aa7692 - Articolo in rivista

Elviri L., **Foresti R.**, et al. **IF 3.715 SNIP 0.872**

8. 3D-Printed Polylactic Acid Supports for Enhanced Ionization Efficiency in Desorption Electrospray Mass Spectrometry Analysis of Liquid and Gel Samples. TALANTA, vol. 155, p. 321-328, ISSN: 0039-9140, doi: 10.1016/j.talanta.2016.05.010 - Articolo in rivista

Elviri L., **Foresti R.**, et al. **IF 6.057 SNIP 1.262**

9. Alginate Formulations: Current Developments in the Race for Hydrogel-Based Cardiac Regeneration. FRONTIERS IN BIOENGINEERING AND BIOTECHNOLOGY, vol. 8, ISSN: 2296-4185, doi: 10.3389/fbioe.2020.00414 - Articolo in rivista

Cattelan G., et al. **IF 5.890 SNIP 1.339**

10. **Foresti, R.** Avventuroso, G. Silvestri. M. *Stampa in cioccolato in due colori*. ElettronicaIn, Marzo 2016 ISBN 977-11-24854-00-8

11. **Foresti, R.** et al. M. *Main processes and empirical tests in 3D bio-printing*. Research Activity Report 2016 ISBN 978-88-98237-21-0

12. **Foresti, R.** et al. M. *A learning factory based on additive manufacturing system*. Research Activity Report 2015 ISBN 978-88-98237-17-3

## CONFERENCE PROCEEDINGS and ORAL PRESENTATION

1. **Foresti R.** et al. *Bionics-based surgical training using 3D printed photopolymers and smart devices* Proceedings Volume 11786, Optical Methods for Inspection, Characterization, and Imaging of Biomaterials V; 117861K (2021) <https://doi.org/10.1117/12.2592379>

2. **Foresti R.** et al. *3D Reconstruction Cutting and Smart Devices for Personalized Medicine*. In: Proceedings of 2020 Italian Conference on Optics and Photonics, ICOP 2020. p. 1-3, Institute of Electrical and Electronics Engineers Inc., ISBN: 978-1-7281-6239-3, ita, 2020, doi: 10.1109/ICOP49690.2020.9300331

3. **Foresti R.** et al. Bio composite materials: Nano functionalization of 4D bio engineered scaffold. In: 2019 IEEE International Conference on BioPhotonics, BioPhotonics 2019. vol. 2019, p. 1-2, IEEE, Taiwan, 2019, doi: 10.1109/ICB47650.2019.8945042 - Contributo in Atti di convegno

4. Avventuroso G., **Foresti R.**, et al. *Production paradigms for additive manufacturing systems: A simulation-based analysis*. In: 2017 International Conference on Engineering, Technology and Innovation (ICE/ITMC). p. 973-981, IEEE, ISBN: 978-1-5386-0774-9, Funchal, Portugal, 27-29 June 2017, doi: 10.1109/ICE.2017.8279987 - Contributo in Atti di convegno

5. Collini L., **Foresti R.**, Garziera R. *Automated diagnosis of damages in ceilings by a portable device* Materials Today: Proceedings Volume 4, Issue 5, Pages 5767-5772, 2017 DOI 10.1016/j.matpr.

## ABSTRACT

1. **Foresti R**, et al. *5D BIOPRINTING AND DIGITAL BIO-LIBRARY*, n°577 Termis Maastricht, 15 October 2021,
2. **Foresti R**, Rossi S. *5D printing of nano-laden fibre aerogel*. 3<sup>rd</sup> International conference on 3D Printing and Additive manufacturing. Parigi, May 18-19 2020
3. **Ruben Foresti** et al. *5D printing nano-laden scaffold for personalized medicine*. NanoDay IV, Milano Bicocca 2019.
4. Cristina Caffarra et al. *A 3D bioprinted model for in vitro nanotoxicological investigation: preliminary studies*. NanoDay IV, Milano Bicocca 2019.
5. Stefano Rossi et al. *Direct effects of diesel exhaust particles on different cell lines as well as on in vivo rat heart: Euro III vs. Euro IV engines*. NanoDay IV, Milano Bicocca 2019.
6. Avventuroso, G. Frazzon, EM. **Foresti, R.** Silvestri, M. *Simulation based analysis of flexible manufacturing system*. International CAE Conference 2016: Abstract book.
7. Collini, L., **Foresti, R.**, Garziera, R. *Automated diagnosis of damage in ceilings by a portable device*. 2016. 33<sup>rd</sup> Danubia Adria Symposium on Advances in Experimental Mechanics; Abstract book: 76-77.
8. Elviri, L. Bergonzi, C. Bianchera, A. **Foresti, R.** Silvestri, M. Bettini, R. *Drug release from 3D printed chitosan hydrogels for soft tissue regeneration*. Congress on Innovation in drug Delivery, 2016; Abstract book.
9. Bergonzi, C. Elviri, L. Bianchera, A. **Foresti, R.** Silvestri, M. Bettini, R. *Optimization of the 3D printed processes for the preparation of chitosan-based hydrogels*. Annual Meeting\_Non traditional emerging technologies in drug product manufacturing, 2016: Abstract book.

## Peer Review Activities

Applied sciences IF 2.679

Materials IF 3.623

Journal of manufacturing and materials processing SNIP 0.941

Micromachines IF 2.891

Polymers IF 4.329

Topics Board Editor in Micromachines: Frontiers in 3D printing and bioprinting 3D printing; bioprinting; smart maintenance; innovative education; artificial intelligence

## Educational Workshop

- IMEM-CNR, 3D bioprinting material processing, 06/02/2020
- 3D printing for SME: From problem to digital idea; From digital to prototyping; Information management; Functional prototyping; Photopolymerization; Prototype characterization; Selective laser sintering; Project writing and user requirements.
- Industries 5.0: The world is changing. Creative modelling for additive manufacturing processes and comparison approaches for the mechanics applied to the rapid prototyping machines (09/11/2017); 3D bioprinting and molecular cuisine for food and drug industrial scale-up (10/28/2017); Social and economic impact of industries 4.0 implementation with additive manufacturing and advanced diagnostic technologies (11/08/2017).
- Programmable logic devices
- 3D printer and mechanical components, electrical parts, firmware and tools for Print Process Management.
- Tools for 3D model design, parameters analysis of three axis robots and conversion of 3D models in machine language (G-code).
- Realisation of 3D printers for out scale objects, multi-extruder, fluids and foods extrusion.
- Design and realisation of Android/Arduino-based systems and of mechanical components for 3D printed prototypes.

## Professional experiences

2021	Master Pegaso CT and Artificial Intelligence
2020-2021	MED/50 Subject expert Applied Medical Technology in Radiology applications
03/2017–06/2019	DESIGN AND TECHNOLOGY TEACHER Technical institute “Rondani”, Parma -Building design and drawing, safety and technical report
2018	INNOVATION MANAGER ACTIVITIES University of Parma -Technical table constitution and coordination -Drafting of the vademecum for specialization schools Realization of the book of specialization schools in: >Chirurgia plastica >Medicina del lavoro >Neuroscienze Technology SIM-LAB up-grade >IoT in the safety systems for surgical training
2018	INDUSTRIAL TEACHING FOR ECIPAR (National Confederation of Crafts) >3D printing technology and processes >Project management >Draft writing, models design and prototyping
06/10/2017–31/10/2017	INFORMATICS TEACHER Technical institute “Leonardo Da Vinci”, Parma -Network, security, cryptography and coding
01/05/2017–30/09/2017	EUROPEAN PON FOR SCHOLAR INSTITUTE DIRECTORS -Technical institute “San Giovanni Bosco”, Parma -Innovation management and administration, integration of digital teaching.
18/03/2017–30/04/2017	INFORMATICS TEACHER -Technical institute “Melloni”, Parma -Network, security, cryptography and coding
09/01/2017–17/03/2017	ADDITIVE MANUFACTURING PROCESSES FOR GMP PRODUCTIONS. -SITEIA, Parma -Design and planning for GMP innovative project
01/08/2016–31/12/2016	PROCESS ENGINEERING -Glaxo Smith Kline, Parma -Criticality control analysis
01/03/2015–31/07/2017	Co-founder and COO M3datek -University of Parma -Scaffold 3D printed for tissue regeneration
01/10/2014–01/03/2015	TECHNOLOGY INNOVATION MANAGER -Gebo Packaging, Parma -Advanced diagnostic for industry 4.0
01/03/2014–28/02/2015	DESIGNER - Dynamic Analysis of Ceiling Defects -University of Parma -Design of a portable device for the automated damage detection in ceilings

## Education and Training

• Qualification	Ph.D. in Industrial Engineering at University of Parma in cooperation with SUPSI, University of Applied Sciences and Arts of Southern Switzerland	03/2017
• Thesis title	Development and implementation of 3D printing systems for biomedical applications	
• Qualification	MSc. in Management Engineering at University of Parma	12/2013
• Thesis title	Design of an Industrial Demonstrator for Plug and Produce Technologies Studying	
• Qualification	BSc. in Electronics Engineering at University of Parma	10/2010
• Thesis title	Experimental verification of an I/V converter realized with a current feedback amplifier.	
• Qualification	Qualified technologist in industrial electronics at ITIS P.Paleocapa Bergamo	07/2005
• Thesis title	Design and Implementation of an Automated System Managed and Controlled by PC	
• Qualification	Karate black belt, professional sport activity from 1995 to 2005 Shotokan Karate Do style, Kata e Kumite. Summon in National Rapp. 2003 e 2004	10/2003
• Qualification	1° Euphonium, "Religio et patria" band.	03/1999

## Organisational / managerial skills

- High flexibility and ability to manage multiple priorities simultaneously, driven by the constant need to progress.
- Strong propensity to develop activities in energetic environments characterized by high performance.
- Capacity for coordination and management through careful preventive work planning, fully responsible and resilient.
- Known to be able to motivate, mobilize and train colleagues in order to meet high standards.
- Working with great pleasure in a team, in order to achieve a common goal.
- Sociable person who has a natural ability to talk and build relationships with all kinds of people.
- Professional friendly, whose strengths include cultural sensitivity and the ability to build relationships with a different workforce in multicultural environments.
- Self-motivation, which allows to accomplish every goal, under pressure and against aggressive deadlines, in any work environment.
- High analytical thinker with the ability to quickly identify, analyse, improve and simplify complex work processes.

## Professional activities

- Project editor: UIMEI (Customizzazione di massa dell'automazione per il controllo e la sicurezza in remoto, EDISON Pulse); Food project (Dissemination of 3D food printing technology; Academic Food Project); FabLab Genius (Laboratori didattici interdisciplinari); GSK Manutenction Assistance (Manutenzione e analisi in tempo reale per la zero faillure); WRAP project (Academic spin-off); GEBO Advance Diagnostic (Sistemi di assistenza per la riduzione dei down time e il big data analysis)
- Design and development of 3D printers and scaffold for biomedical applications.
- Design and development, through FDM (Fused Deposition Modelling) technology, of custom slides-labels for mass spectrometer.
- Design and development of food 3D printers.
- Design of 3D printer extruders for high viscosity fluids.
- Prototyping and customisation of hybrid 3D printers.
- Design and development of 3D printed mechanical systems.
- Customisation of raspberry-based control systems for 3D printers.
- Design and development of advanced diagnostic systems for Arduino/Android-based devices in the automated control of industrial systems and home automation.
- Design and development of devices for the percussion and analysis of the floors in order to assess defects.

## Digital skills

Expert user in: Office, MatLab, SolidWorks, AutoCAD, LabView, Arduino, PSpice. Simatic STEP7, LogixPro, iFix, Slic3r, Cura, Pronterface, Repetier-host, Windows, Linux, C++, Python, Html, Java, Ladder.

## Spin-Off and competition (M3datek)

- Marzotto Prize 2016. From Idea to Enterprise (50000 Euros)

“The jury awards WRAP because of its presentation of a project with a strong potential impact, in terms of scalability and analysed issues, with a high degree of medical device innovation, of a business model very solid, scalable and also differentiable in the future 3D printing market and of a structured proponent team”.

StartUp Business

BioUpper Prize, WRAP Project, Ruben Foresti, Carlo Bergonzi, Annalisa Bianchera, Marco Silvestri, Ruggero Bettini, Lisa Elviri.

April 2016, Milan, Italy. (50000 euros)

- The Wound Repair Active Print Project (WRAP), result of research on tissue regeneration of the Centre BioPharmaNet-Tec of the University of Parma, received the award of BioUpper competition, held in Milan last April 1st. WRAP was selected for the final phase in a pool of 118 projects in the field of life sciences. BioUpper is the first Italian training and acceleration platform, born from the partnership between Novartis and Cariplo Foundation in collaboration with PoliHub to finance new ideas in the field of life sciences, able to actively participate in the economic development of the Country. A jury of experts in the biomedical and financial sector selected WRAP. The project is based on the use of a patented material and a 3D printing technology specifically developed to produce biopolymer-based active patches for the treatment of chronic wounds.



- Start Cup Emilia-Romagna(Aster)2016 WRAP Project (4000 euros)

## Spin-Off and competition (UIMEI srls)

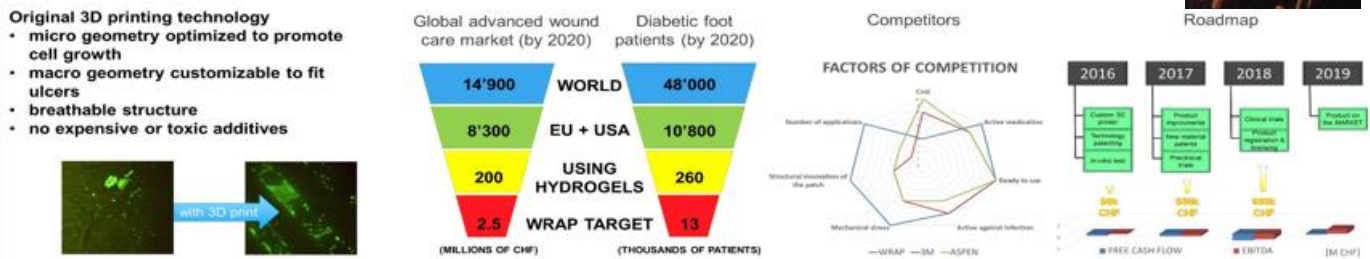
- ReActor Fondazione Golinelli (12000 euros)
- ThinkBig Cariparma – Human Machine Interface for Healthcare

## Competitions and Exhibitions

- Giovani ricercatori: GR-2019-12369941 Use of Three-Dimensional Printed Models for Endovascular Planning and Follow-up in Patients Affected by Aorto-Iliac-Femoral-Popliteal Arterial Disease Undergoing Balloon Angioplasty: Applicability, Effectiveness in Technical Success and on Mid-Term Outcomes, Cost-Analysis, and Exploration of New Technologies. A single-center, single-blind randomized controlled trial  
Importo: 449'504€  
Compagine progetto: PI Dott. Paolo Perini (Scopus H-index 2021: 10), Martini Chiara (Scopus H-index 2021: 20), Bianchini Massoni Claudio (Scopus H-index 2021: 13), Caffarra Malvezzi Cristina (Scopus H-index 2021: 10), Ruben Foresti (Scopus H-index 2021: 8)
- CSEIA: Bando Interdipartimentale Open-Up – Outgoing Publications, Essays and Networks, Università di Parma, October 11<sup>th</sup> 2018; funding grant of 1500 Euros.
- Seal of excellence, 9 November 2017: Certificate delivered by the European Commission, as the institution managing Horizon 2020, the EU Framework Programme for Research and Innovation 2014-2020; ADHERE – an innovative 3D printed tissue repair material, conceived to drive healing of hard to heal chronic wounds by a bio-resorbable chitosan-based dressing; SME instrument phase 1, call H2020-SMEInst-2016-2017 (H2020-SMEINST-1-2016-2017) of the project proposal 807759, M3DATEK.
- AAID Foundation, Chicago 2017. BONEDAMAT: bioactive printed substitute for bone regeneration –preclinical study; position in projects: Collaborator; fund grant: 24700(euros); Collaborator name: Macaluso Guido Maria.



- G.I.A. NETWORKING: "REVOLUTION OF 3D-PRINTING" Can we really talk about third industrial revolution? Application areas and evolutionary scenarios for a technology that will offer new opportunities for crafts and SMEs.



Ruben Foresti, Stefano Selleri (Director of the Department of Information Engineering) February 2015, Parma, Italy

In Parma, it was held the first meeting of 3D printing based on the new opportunities for crafts and SMEs. The Association of Handicraft Enterprises Parma (GIA) sponsored this event. Printed objects, 3D printers, materials such as plastic polymers and since few months even chocolate are designed, experimented and developed at the University of Parma. The opportunity arises from the innovation of these technologies that can lead to a more streamlined production and without waste. The world of 3D printing is very versatile: from food to pharmaceutical, from cosmetics to mechanics, 3D printing for hypoallergenic jewellery and for the preservation of cultural heritage with marble powders obtained from the restoration scrap.



- SPS IPC DRIVES – KNOW HOW 4.0 (May 2015, Parma)

The SUPSI Swiss University contributes in the development of an advanced cultural territory, characterised by companies, organisations and experts able to deal with the complexity of socio-economic, technological, environmental and cultural phenomena according to sustainable development principles.

In a society marked by profound changes, knowledge and skills are the motivations necessary to support the economic, social, technological and artistic progress of the territory in question and to contribute to the cultural and ethical growth of society as a whole and of the people that compose it.

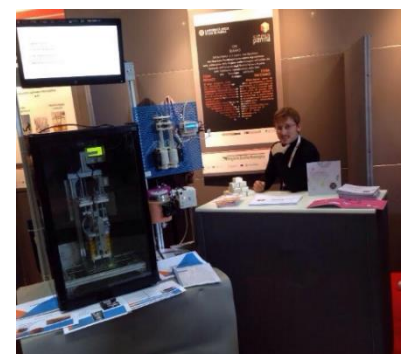
To achieve this objective, SUPSI operates in: basic and continuous education, applied research, advisory and support services offered to companies and institutions through a collaboration and co-operation with main interlocutors, acting as a cultural and relational bridge connecting the Italian Switzerland with the rest of Switzerland and northern Italy.



- SMAU 2015 (October, Fieramilanocity)

SMAU (International Exhibition of Information & Communications Technology) focuses on the high relevance of the cooperation between universities and enterprises, in terms of industrial research and technology transfer in the agri-food and mechanical-food sectors. It pays specific attention to quality and safety of raw materials, processes, industrial machines and plants and finished products, health aspects, functional food, relationship between alimentation and health and promotion of local products.

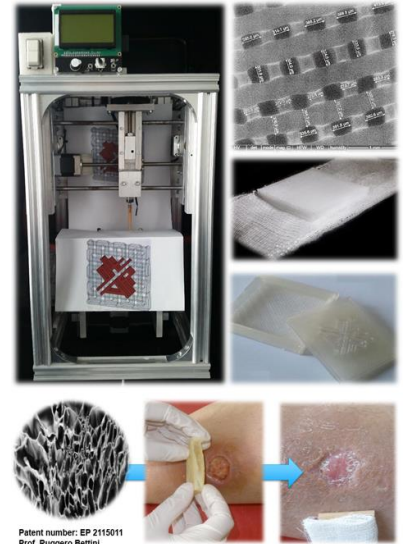
The SITEIA.PARMA Tecnopolo activities aim at the search for companies (industrial research), at the diffusion of basic research results and innovations (technology transfer) and at training activities in its fields of competence. These activities are strongly oriented to understand the needs of innovation from companies and to develop specific technological solutions.



## Related Activities

- 3D Printer for Biomaterials: Design, Development, Machine Programming and Design of 3D Models (The corresponding document is under evaluation in order to be able to patent the technology)

Many researchers have attempted to use computer-aided design (CAD) and computer-aided manufacturing (CAM) to create a structure that provides a three-dimensional environment (3D) for the regeneration of tissues and organs, without reaching the expected results. Several 3D printing technologies have been developed, including stereo lithography, deposition modelling, inkjet-based printing and selective laser sintering. The development of tissues and organs requires the presence of appropriate growth factors, exploring the 3D manufacturing systems of the scaffolds, which release the biomolecules in a controlled manner. The objective is to obtain a drug delivery system (DDS) that administers a pharmaceutical compound to obtain a therapeutic effect without side effects to the cells. At the University of Parma, it has been implemented a technology able to achieve this purpose, through an ad-hoc 3D printer that achieves the optimal 3D environment for tissue regeneration. If the interaction between cells and scaffold system with bio-molecules will be fully understood and controlled, 3D printing technology will become an important aspect in the tissue engineering research in the near future.

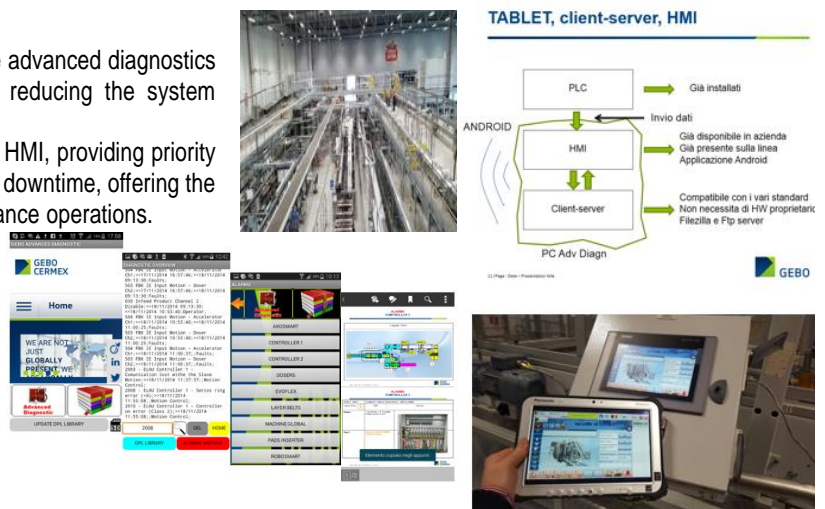


- Advanced Diagnostic Gebo Cermex: Analysis, Study and Development of Android System and Application for Assistance and Immediate Maintenance for Failure Deviation

Efficient operations require efficient end-line operators. The advanced diagnostics is able to optimise the working environment, drastically reducing the system downtime costs.

This technology gives a complete vision of the line through HMI, providing priority functions, in terms of problem solving, focusing on reducing downtime, offering the procedures to solve the breakdown and managing maintenance operations.

Advanced diagnostics has already been implemented on different Gebo Cermex palletisers as field-testing, and the feedback from customers has been very good. The service is designed for all palletisers and depalletisers produced in the Gebo establishment of Parma. In addition, new diagnostic functions are also available remotely, on smartphones and tablets, thanks to an ad-hoc developed app.

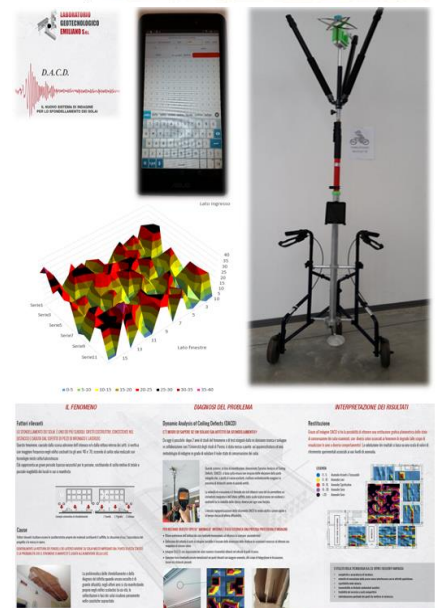


- Dacd Dynamic Analysis of Ceiling Defects: Design, Realisation and Programming of DACD Device, for the Non-invasive Analysis of Problems in Attics

Hollow brick deterioration of attics consists in the removal and drop of pieces of plaster and brick from the ceiling. This phenomenon, caused by the poor adhesion of plaster and/or internal breakage of partition walls, occurs more frequently in buildings built between the 40s and 70s usually with floors realised through mixed terracotta/concrete technologies. This represents a serious danger (often hidden) for people, constituting the total reason or partial unavailability of the premises in which it occurs (e.g. School buildings).

After numerous studies of the phenomenon and tests carried out by the Department of Industrial Engineering at the University of Parma, in collaboration with the Research and Development Division of the Emilian Geotechnology Laboratory, it has been developed an apparatus and a method of investigation able to assess the real state of conservation of the examined floors. This system shows its planimetric graphical illustration using different colours associated with the degradation phenomena (in order to display the different behaviour areas). The assessment of the results is based on a scale of experimental reference values associated with the various levels of abnormality. This system, in the process of patenting, called Dynamic Analysis of Ceiling Defects (DACD), is based on non-invasive measurement of the vibrations of the investigated part that, like their stressing causes, are obviously more in the presence of delamination also of small entity.

The speed of execution and the format of the data obtained are such as to allow an immediate mapping of the entire ceiling. The high engineering design of the DACD tool makes it reliable and suitable for rapid tests.





- Design and Development of Compact Systems for Chocolate Tempering and Chocolate 3D Printer, Assessment of Conditions and Technologies Suitable for Food Modelling.

Developed in collaboration with SUPSI, this robot can print different types of chocolate, from the classic dark one to the milk or white ones, up to two types of chocolate at the same time.

This technology combines engineering with culinary art, for this reason several mechanisms have been implemented for a printing hygienic and free of contaminative factors in the laboratory with students of Food Engineering at the University of Parma.

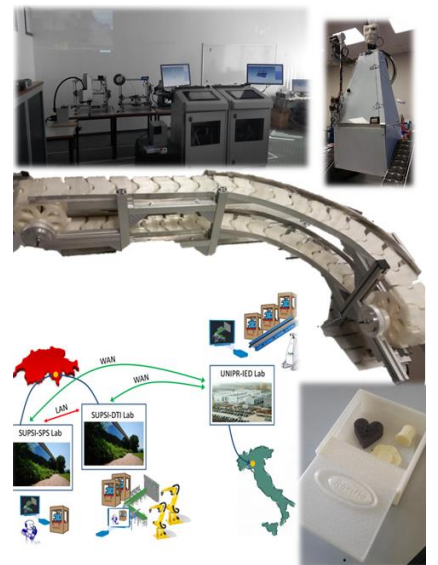
In order to allow the machine to print chocolate objects, a special extruder has been created as a special mechanism for the tempering of chocolate to make it easy to be machined and polished at the end of the shaping.



- Automatic Line for Outsourced Production: Design of Robots for Remote Maintenance, 3D Printed Modular Systems.  
Idea presented to Barilla Group for the relocation of production in low-consumption areas, 2014 and for the UNIPR "Food" project, organized by the Rector, 2015.

Nowadays, competitive production, especially from new emerging countries, is creating serious challenges in SME European manufacturing systems, which are forced to cultivate niche markets, where products are often changed, and it has to do with a low production.

In order to be competitive in such a situation, besides being in connection with product innovation, companies need to leverage on reconfigurable and automated manufacturing systems, so that a high productivity can be achieved in order to offset the higher personnel costs, and by doing so, the final cost of production is maintained at a low level. Therefore, it is required, in terms of flexibility and self-configurability, an easy integration of machines, created by different suppliers, in the same project. This type of layout allows to reuse equipment already in possession of the companies or to add new components, bringing it to configure itself automatically. In this condition, it is no more necessary specialised personnel with the consequent decrease of costs.



- DNA Phone: Development of the 3D Printed First Modular Structure for Testing and Prototyping.

They are tools addressed to SME belonging to the sector and to all the realities related to the production and trade of agricultural foods, in which analysis for quality control are necessary. DNAPhone designs, implements and commercialises innovative solutions for the measurement of chemical and biological parameters with the use of integrated optical devices through smart and mobile technologies.

The devices for food&beverage products allow to realise biochemical analysis for the quality control of the main food industries in a fast, reliable and independent way.

The innovative platform allows to build the own analysis laboratory (do it yourself, DIY) and to create scientific projects in a simple and interactive way using technologies, such as mobile phones or home tablet.



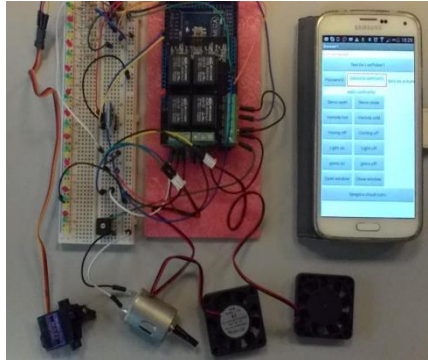
➤ **Arduino-Android Based Automation Systems: Mechanical, Electrical, Electronic and Software Design and Realisation**

The spread of compact microcontrollers, open source software and of the more and more intuitive learning is contributing to a revolution in the way of fabricating objects favouring the realisation of the Internet of things and giving an impulse to the third industrial revolution, which will be facilitated by the spread of open source hardware and makers. The new digital artisans want to revolutionise the current way of producing, also thanks to 3D printers. This is, among other things, one of the Arduino areas of use: thanks to the availability on the web of open logic projects, thousands of 3D printers were produced throughout the world that have a version of Arduino. The flexibility of this microcontroller is limited only by imagination. The following pictures show how it can be used.

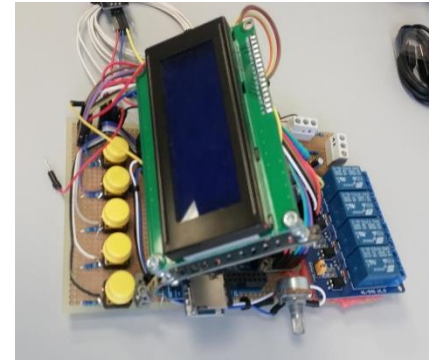
**3D PRINTED BEARINGS  
CONTROL, ANALYSIS AND HEATING**



**HOME AUTOMATION SYSTEM CONTROLLED  
BY MOBILE PHONE**

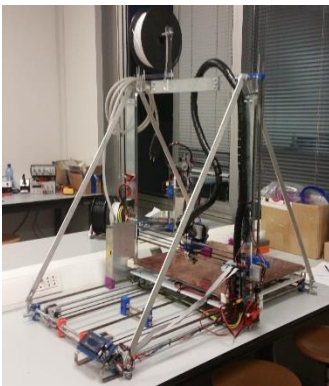


**REMOTE-CONTROLLED  
AND PLC –SD CARD**

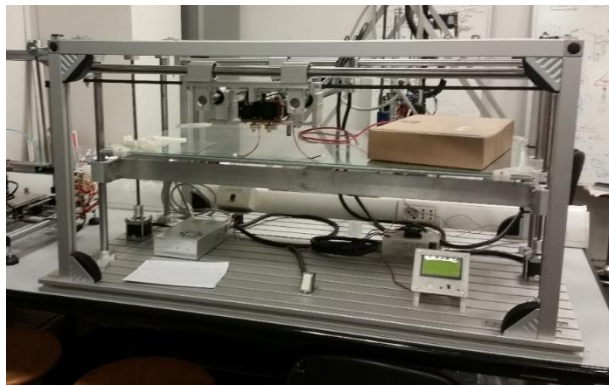


Printers oversized and remote-controlled via Bluetooth or via Raspberry with Cam for the realisation of architectural and off-scale models generating development processes considerably long lasting for monitoring.

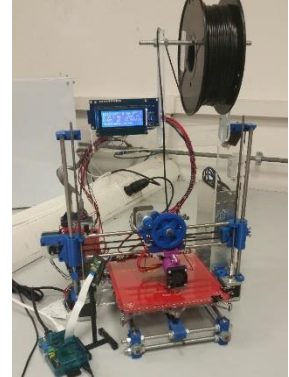
**500X500 PRINTING BED**



**900X500 P. BED AND BLUETOOTH REMOTE CONTROL**



**CONTROL RASPBERRY  
BASED AND REAL TIME CAM**



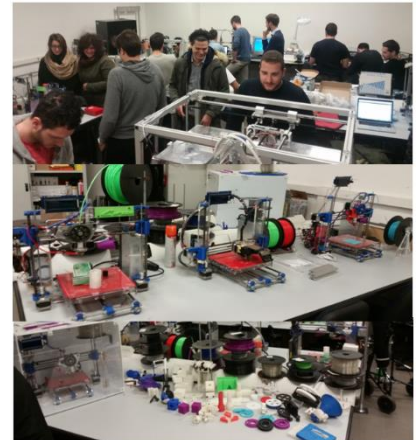
## Educational and Research Activities

### Research Topic

- Brief Concept

### Educational Workshops.

Automation currently plays an important role in industries, where there have been evolutions, from simple sequential control to sophisticated electronic systems, and teachers have the task of organising learning situations adjusting strategies, educational goals, operating times, testing modalities and alternating periods of lessons with those of laboratory activities. The goal of educational workshops is to study and analyse processes that can be automated and to propose a concrete and innovative solution, considering the learning gaps of students and filling them; giving the opportunity to future engineers of having a first experience with some activities that will accompany them during their career.



- Related Activities

- Work

Teacher assistant in the course of Industrial Automation

Educational assistance to students of Engineering Management and Food Industry in the implementation of Ladder programs for PLC, on the processes simulated by LogixPro. Exercises on Boolean algebra and assistance to students in the realisation of SCADA projects of thermal machines through iFix. 3D printing educational workshop explains: what the mechanical components of the machine are, how electrical supply and control work, how to modify the firmware and to install it on the microcontroller, what the best tools for the management of the printing process are, what kind of instruments can be used to realise the solid in 3D, how to generate the optimum G-code for printing and for the subsequent construction of 5 printers with different aptitudes (double colour, high-definition, large flat, houses, food).

- Activity

- Work

Educational workshops in 2014 University of Parma and SUPSI University of Applied Sciences and Arts of Southern Switzerland, study and implementation of special devices for additive manufacturing

Realisation of a 3D printer using a kit of components, analysis and implementation of the structure characteristic of a 3-axis robot and of the various firmware for its management, study of the most used plastic materials and their extrusion mechanisms, research and comparison of the different machines already on the market and subsequent assessment of compatibility among the various components common to all printers and their potential adaptation hardware and firmware.

Analysis of the tools for the management of printing processes and of programs for the conversion of the STL image into G-Code with related fast functions. Design of custom printers with specific functions and through them the realisation of all the necessary gadgets (angle brackets, supports, bearings, gears...)

Design and implementation of a food printer for chocolate.

- Related Activities

- Work

Educational workshops in 2015 (6 projects with students of Engineering Management, 4 with those of Food Engineering and 1 with those of Mechanical Engineering)

Realisation and development of the software for the control from the Internet of automated systems via web server. Analysis and development of a model for the evaluation of the loads on a printing platform for FDM technologies. Realisation in the workshop. Realisation of software for dimensioning and customisation of modular pieces via LabView. Subsequent realisation through 3D printers. Design of the Android based software framework for controlling automated systems via Bluetooth. Design and FDM implementation of gear wheels and bearings for the handling of materials.

Analysis, dimensioning and simulation of modular lines with SolidWorks. Design and implementation of 3D printers for chocolate with two extruders. Dimensioning of liquid cooling systems for processes based on Peltier cells and realisation of the machinery.

Study and implementation of magnetic systems for the prevention of contamination of 3D printed food and construction of the prototype. Analysis and parameterisation of processes for 3D printing of more fluids simultaneously. Design and development of a customized, Arduino based, 3D printed system, for compact chocolate tempering.

• <b>Related activities</b>	Educational workshops in 2016 (7 projects with students of Engineering Management, Food and Mechanical Engineering)
• <b>Work</b>	Realisation and development of 3D printers for food, software modification and configuration of the optimal model for the printing of homogenised food containing different types of thickeners. Design and development of printers for the Rapid Freeze Prototyping in order to print edible fluids. Development and realisation using 3D printing of systems for chocolate tempering customised and managed by Arduino-based systems. Design and realisation, through 3D printing, of scale demonstrative models of rooms of a typical apartment and realisation through Android application of remote control of a free home automation system controlled by mobile phone. Design and realisation of Wi-Fi control systems via Fishino UNO board.
• <b>Activity</b>	From March 2014 to February 2016: realisation of the DACD 1.0 - 2.0 (Dynamic Analysis of Defects Ceiling) device for the Professor Garziera (Director of the Industrial Engineering Department)
• <b>Work</b>	Design and development through SolidWorks and direct assistance in the workshop for the realisation of: anchoring tripod of the machine, bearing carbon-aluminium bar and handgrip equipped with button. Planning, design and realisation, using 3D printers, of: the electronics box, its flexible support with the relative anchorage for the bar, the bearing containing the accelerometer. Design, development and realisation of the electronic part for the management of the remote control (LCD, buttons, connections with network cables...), of the electricity, related to the data transmission, and of the power for servo drives. Design, development and realisation of the control software installed on Arduino Mega, the central core of the device. Design of the bar lifting mechanism, design and realisation of the software for the remote control via tablet. Realisation of the firmware for the communication interface and design of the communication system.
• <b>Activity</b>	From October 2014 to March 2015: Advanced Diagnostic System for Gebo Packaging
• <b>Work</b>	Design of the software structure and realisation on industrial PLC of flexible structures for the problems automatic recognition on a fully automated machine. Design and realisation of Android application for assistance in maintenance operations and for the reduction of downtime.
• <b>Related Activities</b>	Since January 2015: 3D printed scaffolds for tissue regeneration in chronic wounds
• <b>Work</b>	Study, design and realisation of the plant engineering and software machine that hydrogel printing needs for the construction of the scaffold. Design and development of 3D model and configuration system for the machine language dedicated to the printer handling. Study of correlation among processes and optimisation of the production process.
• <b>Related Activities</b>	Since April 2015: 3D printed slides for mass spectrometer
• <b>Work</b>	Study, design and construction of slides for uniform distribution of the fluids to be analysed through mass spectrometer, in order to increase the efficiency of the instrument and to reduce the variation of concentration of the analysed product.
• <b>Related Activities</b>	Since September 2015: multi-material scaffold 3D printed
• <b>Work</b>	Study, design and construction of the plant engineering and software machine that the printing of materials needs for the realisation of the scaffold. Design and development of 3D model and system configuration for the machine language dedicated to the printer handling
• <b>Related Activities</b>	Since January 2016: characterisation of compact systems for anthropomorphic robots
• <b>Work</b>	Realisation with the Professor of industrial robotics Guarino Lo Bianco of an ultra-compact anthropomorphic robot. Analysis and dimensioning of the loads and of the structure for the engines support. Development and realisation of the 3D model through FDM technology

• **Related Activities**

• Work

Since January 2016: WRAP project

Development of a new technological approach for the realisation of scaffolds with high mechanical performances.

The corresponding document is under evaluation in order to be able to patent the technology.

Analysis of the characteristics necessary for the product to obtain flexibility and breathability.

Development of customised 3D models to increase performances in terms of cell growth.

Realisation of prototypes and gadget packaging, through new printers made ad hoc

Development and realisation of the Logo Design.

Implementation of two different business approaches and writing of the related financial documents in detail.

• **Related Activities**

• Work

Since July 2016: Internship at GSK S.p.A.

Intensive training at the PROCESS ENGINEERING role. Drafting of user requirements with the customer.

Management and coordination of technical, economical and security relations with related suppliers.

Management and coordination of construction activities. Issuing of validation documents and process analyst.

### **Further Information**

I am an outspoken and determined person with a particular predisposition for human resources management and for the organisation of work activities. For years, I have the passion for vintage Vespa 50 that I restore and customise; I cherish reading and science fiction films, particularly those based on texts by Isaac Asimov.

I am dynamic, I love playing sports, group activities or tent trips.

I donate blood for AVIS (Italian blood system).

In this curriculum, I tried to give a quick and full description of my person trusting in the possibility of making your acquaintance.

*I authorise the processing of my personal data for personnel research and selection purposes under D.Lgs. n.196 of 30/06/2003.*

*Signature*