



UNIVERSITÀ
DEGLI STUDI
DI BRESCIA



INTERNATIONAL
SUMMER SCHOOL
2017

**Materials for
industry**

Summer School Programme

18th September 2017 – location: Centro Pastorale Paolo VI

FROM RESEARCH TO STANDARDS

9:00-9:30

Welcome

Prof. Laura E. Depero, University of Brescia, Italy

9:30-10:30

Standardization and Innovation

Standardization of products and trial methods is necessary to introduce new products and techniques into the market. The role of standardization in the innovation process is presented with case studies.

Dr. Toshiyuki Fujimoto, National Metrology Institute, Japan

10:30-11:30

Research and Pre-Normative Research: The VAMAS Example

The Versailles Project on Advanced Materials and Standards (VAMAS) is an institution dedicated to pre-normative research. VAMAS supports world trade in products dependent on advanced materials technologies, through International collaborative projects aimed at providing the technical basis for harmonized measurements, testing, specifications, and standards. Its role in the development of new ISO standard is presented.

Prof. Laura E. Depero, University of Brescia, Italy

11:30-12:30

Ten years results of UNICHIM Proficiency Tests in environmental matrices

UNICHIM is the Italian National Institution devoted to the development of Proficiency tests, valid for laboratory compliance to the norm ISO 17025. The experience gained during the last ten years is presented.

Dr. Maurizio Bettinelli, UNICHIM, Italy

12:30-13:30

How to write a standard

The writing of standard documents requires to respect several rules, necessary to obtain a clear, concise and effective tool. The main items required and their role in the standard structure are presented and explained.

Dr. David Reid, ISO Central Secretariat, Switzerland



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FROM RESEARCH TO STANDARDS

14:00-15:00

Case Study: the standard of Water Analysis by TXRF

The case study of how TXRF analysis of water is becoming an ISO standard is presented. The necessary pre-normative steps faced during this work are critically reviewed.

Dr. Laura Borgese, University of Brescia, Italy

15:00-17:00

Structural integrity of plastics: from the test method to the ISO standard

The lecture, on the basis of real examples, will focus on the steps behind the preparation of standards for the mechanical testing of plastics, starting from the design of the test methodology to the development of the ISO standard.

Dr. Leonardo Castellani, Versalis SpA, Italy

18:00

Social event: La chimica invisibile



Summer School Programme

19th September 2017 – location: University of Brescia, Room “Aula Consiliare”, via Branze 38

PRINTING NEW MATERIALS: POLYMERS

9:00-10:00

Additive Manufacturing technologies and Polymer processing

The lecture will describe the general aspects of Additive Manufacturing technologies including principles, methodology, advantages and limits with a particular focus on polymers processing.

Dr.-Ing. Antonio Fiorentino, University of Brescia, Italy

10:00-12:00

Additive manufacturing of plastics from the material point of view

The lecture will cover aspects concerning the key-features of polymeric materials suitable for being processed by additive manufacturing. The correlation between the properties of the polymer melt, the process parameters and the mechanical properties of the final product will be examined.

Dr. Andrea Castiglioni, Versalis SpA, Italy

13:30-15:30

Additive Manufacturing of Polymers – Case Studies

The lecture will present some case studies on the use of Additive Manufacturing technology for realizing parts and tools using polymers.

Dr. Joaquim de Ciurana Gay, University of Girona, Spain

15:30-17:30

Mechanical testing of 3D printed polymers

The lecture will focus on the applicability of existing standards for mechanical testing of polymeric materials to objects produced by additive manufacturing processes, on the inherent limitations, and on future trends of development of specific guidelines for testing AM materials.

Dr.-Ing. Silvia Agnelli, University of Brescia, Italy

19:00

Social event: Discovering Brescia



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20th September 2017 – location: University of Brescia, Room “Aula Consiliare”, via Branze 38

PRINTING NEW MATERIALS: METALS

9:00-10:00

Additive Manufacturing technologies and Metals processing

The lecture will describe the general aspects of Additive Manufacturing technologies including principles, methodology, advantages and limits with a particular focus on metal powder processing.

Dr.-Ing. Antonio Fiorentino, University of Brescia, Italy

10:00-12:00

Metallic powders: production and properties

The production of high performance AM component requires input materials with known and repeatable characteristics. A review of the characterization techniques for powders, in both virgin and recycled states, will be presented.

Prof. Annalisa Pola, University of Brescia, Italy

13:30-15:30

Rheological characterization of metallic powders

The rheological properties of metallic powders strongly depend on the forces the powder is exposed. There are different devices available which allow to investigate these properties, either quantitatively or qualitatively. An analysis of these techniques will be performed, showing the different fields of application.

Prof. Dr.-Ing. Michael Modigell, German University of Technology, Oman

15:30-17:30

Performances of AM products and case studies

A survey of some of the most used metallic alloys for additive manufacturing will be made considering for instance 316L and managing steels, Al and Ti alloys. Mechanical properties and typical microstructural features induced by the peculiar solidification conditions will be discussed. Case studies will be finally listed, highlighting the opportunities offered by additive manufacturing, and particularly selective laser melting, for the design for geometrically complex structural parts.

Dr.-Ing. Riccardo Casati, Politecnico di Milano, Italy



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Materials for industry

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21st September 2017 – location: University of Brescia, Room “BLAB1” via Branze 38

MATERIALS DISCOVERY

9:00-13:00

Database: Total Materia and Exercise session

Total Materia is the largest material properties database and knowledge source worldwide. The purpose of this lesson is to show how to familiarize with the Total Materia database through metallic materials, plastics, composites and ceramics and advanced properties for FEA/CAE calculations.

Prof. Annalisa Pola, University of Brescia, Italy

Ing. Mariagrazia Vottari, Key to Metals AG, Switzerland

Location: University of Brescia, Room “B2.6” via Branze 38

14:00-18:00

Database: CES and Case Studies

CES provides a comprehensive database of materials and process information. The purpose of this lesson is to show how to use the CES software to select a material best suited for a specific application or project. It should also familiarize with the software and included database for continued materials research and selection.

Prof. Claes Fredriksson, Granta Design, Cambridge, UK

Prof. Elza Bontempi and Nicola Sacconi, University of Brescia, Italy



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Summer School Programme

22nd September 2017 – location: MO.CA Sala Alberi, Via Moretto 78 and Centro Pastorale Paolo VI

MATERIALS STORYTELLING

9:00-11:00

European funds distribution for materials: an analysis of collaboration between companies and private and public organizations

In order to develop break through innovative solutions, in the last years collaborations between companies and Private and Public Organizations are becoming more and more common, as European Framework Projects data clearly depict. The lesson means to explain relations among the most active agents of the European research network for the Material sector, adding the economical weight of the European contributions as further dimension to the analysis.

According to literature, Network Analysis (NA) of the funded projects has been chosen as instrument to implement the investigation. NA has been performed at two different levels: considering all the actors of the Material sector (i.e. the partners of all the funded projects) as a whole, and analyzing the performances of non-entrepreneurial organizations. For both the scenarios, analysis has been developed on two parallel rails: from one side more emphasis has been given to socio-economical attitudes of each partner, looking at the number of connections and so at the involvement level of the individual in the net, and on the other more attention has been paid to the efficiency level of each partner, as his ability to gather more contributions (e.g. patent).

Dr.-Ing. Mariasole Bannò, University of Brescia, Italy

11:00-13:00

The chemical theatre or the chemistry of the theatre

Theatre has a divining and prodigious capability. Since its function is to show the infinite possible variations of feelings, intentions, places, material, theatre is the precise instrument for the staging of any discovery, even scientific. A systematic and scientific play on the proscenium, inside the infinite world of possibilities, like inside the infinite stage of a Chemist mind. Niels Bohr, from 1929, organized every year in his physic school, many plays. He considers theatre a place where time can stop in order to produce a location in which scientific creation and discussion can increase and develop. Through improvisational theatre we will try to help students of the summer school in the creation of a symbolic representation in all their chemistry issues.

Dr.-Ing. Mariasole Bannò, University of Brescia, Italy; Theatre Director Andrea Albertini

14:00-18:00

Tutorial Course: introduction to chemometrics

The students will be introduced to the theory of chemometrics and to the management of complex data set.

Prof. Riccardo Leardi, University of Genova, Italy