ADMISSION AND ACCOMMODATION

The registration fee is 600.00 Euro + VAT*, where applicable (bank charges are not included). The registration fee includes a complimentary bag, four fixed menu buffet lunches (on Friday upon request), hot beverages, downloadable lecture notes and wi-fi internet access.

Applicants must apply at least one month before the beginning of the course. Application forms should be sent on-line through the following web site: http://www.cism.it. A message of confirmation will be sent to accepted participants. Applicants requiring assistance with the registration should contact the secretariat at the following email address cism@cism.it.

Applicants may cancel their course registration and receive a full refund by notifying CISM Secretariat in writing (by email to cism@cism.it) no later than two weeks prior to the start of the course.

Cancellation requests received during the two weeks prior to the start of the course will be charged a 50.00 Euro handling fee. Incorrect payments are also subject to a 50.00 Euro handling fee.

A limited number of participants from universities and research centres who are not supported by their own institutions can be offered lodging and/or board, if available, in a reasonably priced hotel or student guest house.

Requests should be sent to CISM Secretariat by May 9, 2018 along with the applicant’s curriculum and a letter of recommendation by the head of the department or a supervisor confirming that the institute cannot provide funding. Preference will be given to applicants from countries that sponsor CISM.

Information about travel and accommodation is available on the web site www.cism.it, or can be mailed upon request.

* Italian VAT is 22%.

For further information please contact:
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fax +39 0432 248550
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Fibrous media are present in a large variety of systems and applications due to their high mechanical performances at low weight. Such systems include composite yarns used as reinforcement for rubber tires, 3D woven structures used in cutting-edge areas such as aeronautics, composite engineering for transportation (aerospace, maritime, automotive industry), biological tissues, scaffolds for tissue growth and some biomaterials, such as ligament biosubstitutes or vascular endoprostheses. Some manufactured fibrous structures have a regular, periodic architecture, e.g., woven networks for composite applications, while others have random microstructure, such as in paper or various types of insulation materials. Rubber and gels are random molecular networks. Many biological materials have a random complex fibrous structure that plays a central role in their mechanics. Examples include soft connective tissue, such as tendons and ligaments, the arterial walls, and the cellular cytoskeleton. Damage accumulation, fracture and the related non-linear behavior under large deformations are important considerations in all these materials.

The scientific problems raised by the complexity of fibrous media include the following aspects:
- The development of methods to characterize the multiscale structure, including imaging techniques and image-to-model conversion;
- The identification of the relation between the fiber properties and network architecture, and the overall mechanical behavior of the fibrous assembly;
- The description and prediction of the onset of damage and overall structural failure, including occurrence of global scale instabilities;
- Accounting for time-dependent behavior under small and large deformations, including the rheology of wet fibrous structures and fibrous structures embedded in matrix;
- Understanding the mechanical behavior of active networks such as the cellular cytoskeleton;
- The development of homogenization methods for constructing an equivalent homogeneous medium;
- The consideration of scale effects, which may require the consideration of generalized continua (Cosserat, second gradient, micromorph or micromorphic media);
- The design of experimental procedures for identifying specific mechanical properties and in particular non-conventional properties of networks;
- The design of metamaterials with a fibrous architecture for acoustic or other applications;
- The development of efficient numerical methods to handle fibrous microstructures incorporating multiscale aspects (discrete elements, multi-domain approaches, finite element techniques).

The aim of the course is to bring together researchers in the field of fibrous media, to foster interactions between experts with different background and to educate the next generation of researchers. The course is mainly intended for Master students, PhD students, post-doctoral researchers, industrial researchers and engineers and scientists interested in the more practical use of such materials. More established researchers interested in an overview of the field are also welcome.

PRELIMINARY SUGGESTED READINGS


LECTURES

All lectures will be given in English. Lecture notes can be downloaded from the CISM web site. Instructions will be sent to accepted participants.

MECHANICS OF FIBROUS MATERIALS AND APPLICATIONS: PHYSICAL AND MODELLING ASPECTS

- The description and prediction of the onset of damage and overall structural failure, including occurrence of global scale instabilities;
- Accounting for time-dependent behavior under small and large deformations, including the rheology of wet fibrous structures and fibrous structures embedded in matrix;
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