

## Scientific scope

The objective of the Colloquium is to bring together researchers amongst the computational and experimental mechanics and biomechanics community to exchange the latest achievements as well as recent research work in the field of bone mechanical research. The Colloquium shall provide state-of-the-art information in the domain of bone mechanics, focusing on bone remodeling and bone adaptation as a core topic.

A bone has the ability to adapt its external shape and internal structure to variations in its mechanical environment. The adaptive response of bones to changes in load history is called bone remodeling since the pioneering work of Wolff (1892): adaptation of bone to functional demands such as mechanical loadings may result in bone loss in situations of reduced loading, and bone mass increase in situations when functional mechanical loadings exceed a certain magnitude.

Despite the many studies devoted to the mechanisms controlling the process of bone

formation and renewal, a clear understanding of the underlying mechanisms across the scales and the role of mechanical loading is still not available. Bone is multiscale in nature and the tissue integrity is maintained across large length and time scales by complex multiscale multiphysical homeostatic processes regulated by specialized cells. Since these are difficult to identify based purely on experiments, it is important to develop multiscale computational approaches in combination with the acquisition of new experimental data obtained by efficient imaging techniques to integrate and investigate these processes.

Optimization theories envisage bone as a mechanical structure undergoing an evolutionary adaptation, and will be one important topic of the Colloquium.

Application of the computational models to predict the impact of medical treatments and implants in a patient-specific based approach is another important topic covered by the Colloquium.

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## Topics of the Colloquium

- Multiscale and multiphysical computational models of bone remodeling.
- Interactions between bone damage and remodeling.
- Topology and shape optimization approaches for functional adaptation.
- Models based on high resolution imaging techniques.
- Phenomena at the interface between bone and bone implants.
- Cellular aspects: mechano-transduction of bone remodeling.
- Measurement of bone properties at different scales.
- Osteoporosis: prediction, advanced imaging techniques, fracture repair.
- Development of patient-specific predictive models and treatments.

## International advisory committee

R. Hambli, University of Orléans, France

P. Kowalczyk IPPT PAN, Warsaw, Poland

T. Lemaire, University Paris-Est, France

D. Pioletti, EPFL, Lausanne, Suisse

D. Mitton, IFSTTAR, Lyon, France

B. Van Rietbergen, Eindhoven, Holland

## Registration fee

EUROMECH members:	275 €
Non EUROMECH members:	300 €
PhD Students:	200 €

Subscription for the EUROMECH membership is required to the following link: <http://www.euromech.org/structure/become-member>

## Call for papers

Authors are invited to submit a one page abstract, to be included in the Colloquium Proceedings. The possibility of publishing contributed papers will be investigated. A poster session will take place during the Colloquium.

## Language

The official language of the Colloquium is English.

## Deadlines

Receipt of abstract up to February 15, 2018  
Notification of acceptance: March 1, 2018  
Payment of reg. fees: February 15, 2018

## Web site

[594.euromech.org/](http://594.euromech.org/)

## Place of the Colloquium

The place of the Colloquium is Nancy:

- \* Located in the North East of France
- \* Easy international connections
- \* World Heritage buildings at Place Stanislas

## Venue and accommodation

A list of hotels will be available on the web site of the Colloquium:  
<http://594.euromech.org/>

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## EUROMECH Colloquium 594

### Bone remodeling: multiscale mechanical models and multiphysical aspects

May 15-17, 2018, Nancy, France

## Call for papers

### Conference Chairmen

Jean-François Ganghoffer. Nancy, France

Michal Nowak, Poznan, Poland

### Local organizing committee:

Adrien Baldit, Anne-Sophie Bonnet, Emilie de Brosse, Jean-François Ganghoffer, Cédric Laurent, Paul Lipinski, Rachid Rahouadj

