MODELING AND COMPUTATION OF INELASTICITY IN SOFT MATERIALS

JU LIU* , HONGYAN YUAN* AND CHENNAKESAVA KADAPA†

* Southern University of Science and Technology
1088 Xueyuan Avenue, Shenzhen, Guangdong, 518055, China
liuj36@sustech.edu.cn, https://ju-liu.github.io/
yuanhy3@sustech.edu.cn, https://yuan.mae.sustech.edu.cn/

† Edinburgh Napier University
Edinburgh, EH10 5dDT, United Kingdom
C.Kadapa@napier.ac.uk, https://www.napier.ac.uk/people/chennakesava-kadapa

ABSTRACT

Soft materials are a class of materials that are highly deformable and sensitive to external stimuli. Many of them possess additional desirable features, such as biocompatibility, energy absorption, and tuneable mechanical properties. These make them suitable in emerging applications like biomedical engineering, flexible electronics, soft robotics, and energy harvesting. Understanding and predicting their mechanical behavior is critical in the design of novel devices. Soft materials exhibit complex nonlinear and inelastic mechanical behaviors which differ from traditional engineering materials like metal or ceramics. This necessitates the development of novel modeling and computation approaches. This symposium aims to gather experts in computational mechanics with a focus on soft materials, promoting advancements in the understanding and numerical methodologies for these materials. Topics of interest include:

- **Inelasticity of soft materials**: nonlinear elasticity, rate-dependent behavior, plasticity and permanent set, Mullins effect, anisotropy, etc.

- **Computational methods**: novel variational formulations, higher-order schemes, constitutive integration methods, multiphysics coupling strategies, etc.

- **Applications**: soft robotics, biomedical devices, tissue engineering, drug delivery systems, actuators, adhesives, etc.

REFERENCES

[1] P.G. De Gennes., *Soft Matter*, Science, Vol. 256(5056), PP.495-497, 1992.

[2] J.C. Simo and T.J.R. Hughes, *Computational Inelasticity*, Springer, 2006.