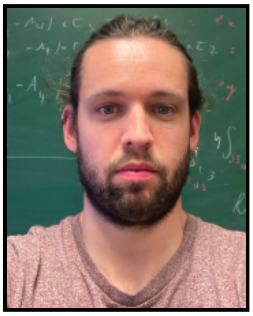

Computational Mathematics Seminar Series

Homogenized Origami Surfaces

Frederic Marazzato, Advisor for Undergraduate Research

Louisiana State University

Digital Media Center 1034
September 27, 2022 - 03:30 pm

Abstract:
Origami folds have found a large range of applications in Engineering as, for instance, solar panels for satellites, or the folding of airbags for optimal deployment or metamaterials. A homogenization process turning origami folds into smooth surfaces, developed in [Nassar et al, 2017], is first discussed. Then, its application to two specific folds is presented alongside the PDEs characterizing the associated smooth surfaces. The talk will then focus on the PDEs describing Miura surfaces by studying existence and uniqueness of solutions and by proposing a numerical method to approximate them. Finally, some numerical examples are presented.

Speaker's Bio:
Frederic Marazzato has been a PostDoc at LSU since August 2020. He was previously a PhD student under the supervision of A. Ern (ENPC, France) and worked on discrete element methods and their applications to dynamic elasto-plasticity and fracture. He graduated with a MS in mathematics from UPMC, France and a MEng from ENPC, France. His research focuses on the analysis of partial differential equations (PDEs) as well as the numerical methods to solve them. More specifically, he collaborates with B. Bourdin (McMaster University) on dG methods to approximate phase-field fracture problems. More recently, he started working with H. Nassar (University of Missouri) on the homogenization of origami folds and received some funding from NSF and NASA to boost his research efforts in that area.

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