Civil and Environmental Engineering

Structures and Applied Mechanics Seminar Series

Present

"Design of 3D printed Architected Structures and Materials for Engineering and Biomedical Applications Using Topology Optimization"

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Additive manufacturing has added a new dimension to fabrication which provides outstanding flexibility to engineering designers. Additional structural features in the internal architectures or complex geometries can be easily implemented and manipulated which could potentially enhance the performance of the final structure. Effective and systematic optimized design methodologies that can fully utilize the potential of additive manufacturing printing are still in its early stages. Topology optimization provides engineers an efficient way to realize innovative designs at an early design stage. It provides the optimum material distribution that achieves prescribed performance objectives simultaneously satisfying a set of design constraints; making it an attractive tool for obtaining the non-intuitive mechanical design of complex systems in the area of automotive, aerospace and biomedical industries. This seminar will focus on novel topology optimization methods which expand the potential by incorporating multi-material concepts, multi-resolution schemes, and architected design in engineering and biomedical applications.

Wednesday, June 26, 2019

11:00 AM – 12:00 PM

Castleman (CAST) - Room 306

Bio: Alok Sutradhar is an assistant professor in the Department of Mechanical and Aerospace Engineering at Ohio State University. Dr. Sutradhar obtained his Ph.D. in civil engineering from the University of Illinois at Urbana-Champaign in the area of computational mechanics and computational methods. His current research interests are in the areas of topology optimization, additive manufacturing, bio-inspired designs, computer-aided design, tissue transplantation and biomedical modeling. His research employs computer modeling and simulation for design, analysis, and synthesis of mechanical and biological structures. His research has been funded by the National Science Foundation and the U.S. Department of Veteran Affairs. He has a patent for the additive manufacturing of implants and implant components. He has authored a graduate-level textbook titled 'Symmetric Galerkin Boundary Element Method,' which was published by Springer-Verlag. Using his novel topology optimization approach, Sutradhar has designed craniofacial bone replacements of intricate facial bones. His research has been featured in *The Economist*, *De Spiegel* and *NSF Discoveries*. Previously, he was an assistant professor in the Department of Plastic Surgery at The Ohio State University.