Computational Design for Physical Reproduction of Material Properties

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Advanced fabrication techniques have grown in sophistication over the last decade, vastly extending the scope of structures and materials that can be fabricated. While new opportunities have emerged for the manufacturing of customized shapes, architected materials with novel functionalities, and active composites that can sense and respond to their environment, their potential impact is limited by the lack of efficient computational approaches for design. In this talk, I will describe the recent progress in computational fabrication toward novel concepts for modeling, designing, and reproducing objects with nontrivial material properties and functionalities. I will reflect on the successes and challenges of computational fabrication and discuss opportunities for further work in this area.

Reference:

Computational Design of Nanostructural Color for Additive Manufacturing.
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Geometry-Aware Scattering Compensation.
D. Sumin, T. Rittig, V. Babaei, K. Myszkowski, B. Bickel, A. Wilkie, J. Křivánek, T. Weyrich. ACM Transactions on Graphics (Proc. SIGGRAPH 2019)

Biography:
Bernd Bickel is an assistant professor heading the Computer Graphics and Digital Fabrication Group at the Institute of Science and Technology Austria (IST Austria). He is a computer scientist interested in computer graphics and its overlap with animation, robotics, materials science, and digital fabrication. His main objective is to develop new techniques for efficient design, simulation, and physical reproduction of digital content. Bernd obtained his master's degree in computer science from ETH Zurich in 2006 and graduated with a PhD from ETH Zurich in 2010 where he worked in the computer graphics laboratory with Markus Gross. From 2011 to 2012, Bernd was a visiting professor at the Technical University of Berlin, and in 2012, he became a research scientist and research group leader at Disney Research. In early 2015, he joined IST Austria. He received the ETH Medal for Outstanding Doctoral Thesis in 2011, the Eurographics Best PhD Award in 2012, the Microsoft Visual Computing Award in 2015, an ERC Starting Grant in 2016, the ACM SIGGRAPH Significant New Researcher Award in 2017, and a technical achievement award from the Academy of Motion Picture Arts and Sciences in 2019.
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