



**Technion-Israel Institute of Technology**  
**Computer Science Department**  
**Center for Graphics and Geometric Computing**



## **CGGC Seminar**

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### **Two Modeling Primitives for Computer Aided Geometric Design**

Computer Aided Geometric Design concerns development of algorithms and accompanying software, towards design of parts and structures with a high degree of numerical precision. Target application domains include design of automobiles, aircrafts and buildings, among others. In this talk we discuss two kernel level modeling primitives.

First, we propose a comprehensive algorithmic framework for computation of solid sweeps. This involves computing the boundary of the swept volume generated by moving the input solid along the input one-parameter-family of rigid motions in three dimensional space. In particular, we discuss local issues such as the parametrization of the boundary surface, detection and elimination of self-intersections, as well as global issues such as body-check and the topological data associated with the swept volume. Several examples from a prototype implementation in the ACIS modeling kernel will be shown. Applications include CNC machining verification, product handling and collision detection.

Second, we demonstrate a robust computational interface for precise modeling of microstructures towards 3D printing. This is achieved through functional composition of B-spline functions and allows separate design of the micro and the macro structures of an object. In particular, we demonstrate construction of recursive, fractal-like microstructures which are composed of trivariate tiles with  $C^0$ -discontinuities. Applications include design of porous and composite materials.

This is joint work with Gershon Elber, Milind Sohoni and Bharat Adsul.

**The lecture will be held on Monday, 01.01.2018, at 14:00, Taub 401**

**הזמנה זו מהווה אישור כניסה עם רכב לטכניון**