



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



## **CGGC Seminar**

**Prof. Erkan Gunpinar**

School of Mechanical Engineering, Istanbul Technical University

### **Adjective-based Yacht Hull Design and Model Sampling CAD Products**

A novel yacht hull design framework and a generative design technique for CAD products will be explained in this talk. A new design framework for the parametric design and shape modification of a yacht hull will be outlined first. In this framework, the hull is divided into three regions (entrance, middle and run) and each region is represented separately using Coons patches. Shape operators helps designers to modify the given hull shape while considering some quality criteria such as hull fairness. Next, an *adjective-based design* concept for yacht hulls will be introduced. Several user surveys were conducted to learn hull adjectives (such as strong, speedy) and their relations with the hull geometry. GMDH-type neural network was employed to learn these relationships, which provides nonlinear mathematical models or equations for adjectives consisting of geometric parameters with their coefficients.

Finally, a technique for sampling CAD models in the predetermined design space will be introduced. Sampling CAD models in the design space can be useful for both designers and customers during the design stage. A good sampling technique should generate CAD models uniformly distributed in the entire design space so that designers or customers can well understand possible design options. The technique is an extension of Teaching-Learning-Based Optimization (TLBO) algorithm of Rao et al.

#### **Short Bio**

Erkan Gunpinar is currently full-time assistant professor in School of Mechanical Engineering at Istanbul Technical University and he earned his PhD at The University of Tokyo in September 2013. His research interests are Generative Design Reverse Engineering, Geometric Modeling, CAD/CAM, PDM and data exchange standards. Erkan worked for Samsung Heavy Industries as a research engineer in Mechatronics Center between 2006 and 2010 and had involved several projects to increase the speed and accuracy of manufacturing processes in shipbuilding.

**The lecture will be held on Sunday, 31.12.2017, at 13:30, Taub 337**

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