

Special PHYSICAL MATHEMATICS SEMINAR

FLUIDS, FORM, AND FUNCTION: THE ROLE OF FLUID DYNAMICS IN THE EVOLUTION OF STALACTITES, ICICLES, AND AQUATIC MICRO-ORGANISMS

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ABSTRACT:

Engineers designing such diverse objects as bicycle helmets, automobile bodies, and ship hulls must carefully consider how their product will interact with the fluids around it. In fact, this unavoidable interaction often dictates the object's form and how it will eventually function. Of course, Mother Nature is not immune to this selective effect, and the shapes and actions of many natural, everyday objects are similarly determined by fluid dynamics. In this talk, I will explore this phenomenon through the offbeat examples of stalactites, icicles, and the family of Volvocalean green algae. We shall discover how, through a synthesis of thin-film fluid dynamics and calcium carbonate chemistry, stalactites are all drawn toward a universal shape; how, because of thermally buoyant boundary layers, icicles are drawn toward this same shape; and how, through the use of their flagella, species of Volvocalean algae were able to evolve to ever larger sizes.

TUESDAY, JANUARY 30, 2007

2:30 PM

Building 2, Room 105

*Reception at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)*

