



THE UNIVERSITY OF CHICAGO

Departments of Computer Science, Mathematics, Statistics and the Computation Institute
SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR

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From Distance to Diversity: Extending the Concept of a Metric Space

FRIDAY, May 5, 2017 at 12:00 PM
226 Jones Laboratory, 5747 S. Ellis Avenue
Host: Lek-Heng Lim

ABSTRACT

One important construction in the theory of metric spaces is the tight span. The tight span of a metric space can be thought of as a generalization of the idea of a convex hull in linear spaces and is the basis for much work in the study and visualization of finite metric spaces. Motivated by problems in phylogenetics, we have developed a generalization of the concept of metric spaces, which we call diversities. In a diversity, every subset of points in the space corresponds to a number, not just pairs, and there is a more general version of the triangle inequality. Besides encompassing a number of interesting examples as special cases, diversities have a natural tight span construction with corresponding theory. I will give an introduction to tight span theory for metric spaces and then show how it extends to our theory of diversities. I will conclude by demonstrating the relation between diversities and Steiner tree packing in graphs.

This is joint work with David Bryant (University of Otago, New Zealand).

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