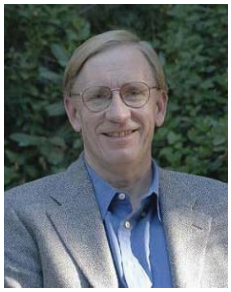
PROGRAM ABSTRACTS

MICHAEL MCGINNIS, Santa Rosa Junior College, *Journey of Perplexus*

Abstract: Michael McGinnis, creator of the award-winning Perplexus games – often called "the world's smartest toys" – will speak about his remarkable journey from an artistic idea to Game of The Year. Michael's work is a metaphor for itself, where tenacity, a desire to learn, and a sense of adventure pay off with a lifetime of passion. His talk will discuss the successes, failures, and influences that have shaped this 35-year odyssey.

GUNNAR CARLSSON, Stanford University, *The Shape of Data*



Abstract: There has been a lot of attention paid to the idea of "Big Data," but often the problem isn't so much the size as the complexity of the data. In order to make best use of data, one needs useful ways of representing the complexity within the data. It turns out that the mathematical notion of shape, as defined in the subfield called topology, gives a useful way to organize and understand complex data sets. We will discuss these ideas with examples.

DAN MEYER, Stanford University, *Beyond Relevance & Real World: Stronger Strategies for Student Engagement in Challenging Mathematics*

Abstract: Highlighting relevance and connections to the real world are often seen as the most effective strategies for engaging students in difficult mathematics, but both strategies are limited and can fail in crucial ways. We'll locate some stronger strategies, based in research and experience.

KAREN SAXE, Macalester College, *On Function Approximations*

Abstract: Function approximation pervades much of mathematics and applied mathematics. In our first calculus course we discuss Taylor polynomial approximations; in our first statistics course we talk about least squares approximations. These are just two examples from a long list of approximation methods. This talk will give an overview of various types of approximations, how and when they can be constructed and used, with reference to historical origins.

ANGELA HICKS, Stanford University, *Formidable Symmetries: Combinatorial Challenges from the q,t Catalan and Beyond*

Abstract: A frequent problem in combinatorics is to demonstrate the equidistribution of two or more statistics on a set of combinatorial objects. We consider combinatorial sets S with two statistics, call them a and b, that are known (or sometimes conjectured) to together form a symmetric polynomial in t and q, where $\sum_{s\in S} t^{a(s)}q^{b(s)} = \sum_{s\in S} q^{a(s)}t^{b(s)}$ but for which there is no known combinatorial proof. Examples include statistics on Dyck paths, parking functions, and (as more recently discovered) stable configurations on sandpile models. For the unfamiliar, we'll define some of these objects and discuss why they are known (or thought) to be symmetric.