

**Misconceptions in Science and Math:
Two Views of What They Really Are, and Implications for Teaching**
Jose P. Mestre

I will begin with a brief background of misconceptions, tracing the definition and origins of misconceptions, and providing examples from the sciences and math. I then present two different theoretical views about what misconceptions are (i.e., how are they are formed, stored in memory, accessed, and applied to situations), and discuss the instructional implications of each view. I will also draw on two specific examples from my own research to illustrate how misconceptions interfere with learning and understanding, and end with some final thoughts on misconceptions. There should be at least 1/2 hour at the end of the session for questions and comments from the audience.

Intelligence and Complex Reasoning
Michael E. Martinez

Human intelligence can be modeled as a collection of cognitive abilities that make people more effective learners and workers. Seen this way, intelligence can be modified. In fact, intelligence is malleable over the lifespan and from one generation to the next. The cognitive abilities that compose intelligence, especially fluid intelligence, bear a strong resemblance to problem solving ability. Such abilities can be cultivated by teachers in all subject areas, but perhaps especially in the sciences, in mathematics, and in related fields.