

Creativity in the Sciences and the Role of Expertise

Presenter: Emanuel Istrate

Date and Time: Friday, 13 January, 2023 at 2:00 pm

Location: Pfaffenwaldring 57, room 4.319

Abstract:

We all agree that creativity is important in the work of scientists, but what exactly do we mean by creativity? This seminar will summarize some of the work of researchers who have taken a scientific approach to understanding creativity. I will start by considering the definition of creativity, and will then discuss how we could measure creative abilities. Creativity was traditionally regarded as a psychological characteristic of an individual. More recently, however, researchers have also considered group aspects of creativity. For example, many ideas appear during research group meetings, where it is difficult to determine the one person who had a given idea. I will consider the timing of scientific discoveries, looking at “ideas whose time has come,” to discuss whether creative discoveries happen at random, or if they occur at predictable times. For creativity in the sciences, one particularly important question is that of expertise. Almost all major discoveries were made by scientists who had accumulated significant expertise in their field. How can this expertise be acquired in a way that doesn't just involve memorization, and what kind of creativity can we expect from junior scientists, who do not yet have many years of expertise? I will conclude by looking at how the organization of research programs for doctoral students facilitates the production of creative ideas.

Biography:

Emanuel Istrate is a visiting researcher at the Institute of Applied Optics (Institut für Technische Optik, ITO) at the University of Stuttgart, and an Associate Professor, Teaching Stream, at Victoria College, University of Toronto. He received his Ph.D. in Photonics from the University of Toronto in 2005. After a post-doctoral fellowship working on the nonlinear optical properties of quantum dots, he joined the Institute for Optical Sciences at the University of Toronto where he set up a number of courses and training programs for students studying optics at all levels of the University, including a popular holography course. He has delivered a number of projects for industrial collaborators. His teaching also includes the social aspects of the work of scientists, the responsibilities of scientists to the rest of society, entrepreneurship, and creativity in science.