

STATISTICS COLLOQUIUM

MONDAY, SEPTEMBER 9, 2013

TALK: 4:15 PM — SCIENCE CENTER RM. 705

RECEPTION: 3:50 PM — SCIENCE CENTER, 7TH FLOOR

“Essential Concepts for Causal Inference in Experiments and Observational Studies”

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ABSTRACT

There are several essential concepts for causal inference in randomized experiments and observational studies that evolved in the 20th century, concepts that grew from fields of research that focused on actual experiments that were controlled by researchers. These essential concepts differed from contributions by researchers in fields that focused on prediction in a steady-state world, where active intervention was generally impossible. Nevertheless, techniques that were designed for non-causal problems often were applied to causal problems, and remarkably they sometimes worked in the sense of providing sensible answers. In fact, in some situations sloppier thinking lead to better outcomes than more careful thinking that was not fully developed – the “hunter's paradox” illustrates this point. The result was tremendous confusion, even among outstanding researchers. This confusion is evidenced today by a loss of focus on the essential ideas of causal inference that were clearly formulated in the 20th century by individuals with ties to scientific fields where “cause and effect” were based on actual or hypothetical interventions. This presentation will develop this theme and provide some historical milestones. The implications for correct problem formulation in complex problems in biostatistics can be relatively dramatic.