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Degree Education

Ph.D., History and Philosophy of Science, Expected May 2013
Dissertation: *Causal Content in Physical Theory, in Virtue of Ties to Experiment*
Committee: Sandra Mitchell (Advisor, University of Pittsburgh, HPS)
John Norton (University of Pittsburgh, HPS)
James Woodward (University of Pittsburgh, HPS)
Mark Wilson (University of Pittsburgh, Philosophy)
Robert Batterman (University of Pittsburgh, Philosophy)

M.A., Philosophy, University of Pittsburgh, 2011

B.S., Computer Engineering, University of Illinois at Urbana-Champaign, 2006

B.A., Philosophy, University of Illinois at Urbana-Champaign, 2006

Non-Degree Education

Facoltà di Filosofia, Pontificia Università Lateranense, Rome, Italy, 2003-2005

Areas of Interest

Philosophy of Science, Philosophy of Causation, History and Philosophy of Chemistry, Science and Religion,
Aristotle's Science and Logic

Publications

- Forthcoming. "The Status of Laws of Nature in the Philosophy of Leibniz." In *Proceedings of the American Catholic Philosophical Association*.
2011. "Dalton's Chemical Atoms versus Duhem's Chemical Equivalents." *Philosophy of Science* 78(5): 842-853.
2011. "John Dalton's Puzzles: From Meteorology to Chemistry." *Studies in History and Philosophy of Science* 42(1): 58-66.

Presentations

- "The Status of Laws of Nature in the Philosophy of Leibniz." *Eighty-Fifth Annual Meeting of the American Catholic Philosophical Association*: St. Louis University, St Louis, Missouri, 27-30 October 2011.
- "Experiment as Source and Test of Causal Content in Science." *PSX2 (2nd International Workshop on the Philosophy of Scientific Experimentation)*: University of Konstanz, Konstanz, Germany, 21-22 October 2011.
- "Dalton's Chemical Atoms vs. Duhem's Chemical Equivalents." *Twenty-Second Biennial Meeting of the Philosophy of Science Association*: Montréal, Quebec, 4-6 November 2010.

"Aristotle on Spontaneous Generation." *Understanding the Methodology at Work in Generation of Animals: Fifth Pittsburgh/London Workshop on Aristotle's Generation of Animals*: University of Western Ontario, London, Ontario, 25-27 May 2010.

"Aristotle's Practical Syllogism: Putting Human Deliberation into Action." *Thought and Action in Aristotle and the Aristotelian Tradition*: Marquette University, Milwaukee, Wisconsin, 16-18 June 2009.

"Aristotle's Syllogism on the Basis of a Hypothesis." 105th Annual Meeting of the *American Philosophical Association, Eastern Division*: Philadelphia, Pennsylvania, 27-30 December 2008.

"John Dalton: From Puzzles to Chemistry by Way of Meteorology." *2008 History of Science Society Conference*: Pittsburgh, Pennsylvania, 6-9 November 2008.

"Aristotle on Spontaneous Generation." *Aristotle, Ethics, and Science: A Conference and Graduate Student Workshop*: St. Joseph's University, Philadelphia, Pennsylvania, 4-5 October 2008.

"The Causal Markov Condition: Should You Choose to Accept It?" *Causality and Probability in the Sciences (CAPITS 2008)*: University of Kent, Canterbury, UK, 10-12 September 2008.

Academic Employment & Teaching Experience

University of Pittsburgh

HPS 0610: "Causal Reasoning", Independent Instructor, Spring 2012

HPS 0621: "Problem Solving: How Science Works", Independent Instructor, Fall 2011

HPS 0610: "Causal Reasoning", Independent Instructor, Spring 2011

HPS 0621: "Problem Solving: How Science Works", Independent Instructor, Fall 2010

HPS 0515: "Magic, Medicine, and Science", Teaching Assistant for Paolo Palmieri, Spring 2008

HPS 0437: "Darwinism and Its Critics", Teaching Assistant for James Lennox, Fall 2007

University of Illinois

Civil & Environmental Engineering Department, Database Programming for Tami Bond, Summer 2006

Honors and Awards

University of Pittsburgh

Arts & Sciences Graduate Fellowship (2006-07, 2008-09, 2009-10)

NSF-Funded Travel Grant for the 2010 HSS/PSA Meeting (November 2010)

Wesley Salmon Fund Grant (May 2008)

APA Eastern Division Graduate Student Travel Stipend (December 2008)

University of Illinois

Jules D. Falzer Scholarship (2005-2006)

United Conveyor Foundation Scholarship (2001-2003, 2005-2006)

Illinois General Assembly Scholarship (2000-2001, 2005-2006)

UIUC College of Engineering Dean's List (All semesters of enrollment, 2000-2003, 2005-2006)

Mary Chow Scholarship (2001-2002)

Eta Kappa Nu Honor Society Membership (Inducted 2002)

Alpha Lambda Delta Honor Society Membership (Inducted 2001)

National Honor Society Alumni Scholarship (2000-01)

Women in Engineering Distinguished Scholar Award (2000)

Professional Service

TA/TF Mentor for the Department of History and Philosophy of Science, University of Pittsburgh (2011 – present)
Webmaster, Department of History and Philosophy of Science, University of Pittsburgh (2010 – present)
Workshop Presenter, “Teaching Independently”, New Teaching Assistant Orientation, University of Pittsburgh
(Fall 2011)

Language Proficiency

English – Native Language
Italian – Fluent
Ancient Greek (Attic) – Intermediate Reading Knowledge

Professional Memberships

American Catholic Philosophical Association
American Philosophical Association
Ancient Philosophy Society
History of Science Society
International Society for History of Philosophy of Science
Philosophy of Science Association

Dissertation Abstract

Causal Content in Physical Theory, in Virtue of Ties to Experiment

Causal statements and the concept of “cause” are an important—if not essential—part of our language and our everyday activities. Yet several philosophers have claimed that causation is not to be found in our best physical theories. If this is true, and if, as many would like to assume, physics gives us reliable and privileged knowledge about our world (*i.e.*, information about its most basic objects and relations), then we seem to have a problem: are we to accept that all of us are under a delusion when we talk about causes?

My project argues against such a conclusion in two steps. First, I examine the relationship between scientific experimentation and causal theorizing. That there is a close link between experimentation and theorizing about causes is not a new idea; it dates back to the beginnings of the scientific revolution. In its most basic form, the idea is the following one: in order to investigate the cause of a particular result, a scientific researcher must intentionally set up various scenarios, all of which differ in only one respect; if the result differs in each scenario, then the cause of that difference can only be that which differed in the original setup. I examine the history of the idea as a methodological principle in the thought of some of the major “founding fathers” of experiment: Galileo Galilei, Francis Bacon, and John Stuart Mill. I also discuss various refinements of the principle that were suggested as advancements were made in experimental methods. In addition to a historical analysis of the origins of the claim that experiment and causal theorizing are linked, I also provide a philosophical discussion of so-called “manipulationist” accounts of causation that are prevalent in contemporary philosophy of science. The basic tenet of these accounts is that a causal relationship is one such that, under at least some circumstances, one thing (*i.e.*, the effect) can be varied or changed by manipulation of another thing (*i.e.*, the cause). Under this understanding of a causal relationship, scientific experimentation is a straightforward method for testing and discovering causes. Manipulationist accounts are simply a more developed and sophisticated version of the basic idea that was born during the scientific revolution: that causes can (and should) be tested through experiments.

The second step of my argument is to show that the theories of physics have causal content in virtue of their ties to experiment. In their origins, in their continuing development, and in their confirmation

and continued justification, physical theories must be continually in contact with experiments. There is no point at which experiment becomes irrelevant to a theory; the agreement of a theory with experimental results must be continually assessed. Therefore, inasmuch as causal theorizing is central to scientific experimentation, I claim that it is also an extremely important part of physical theory. I examine the multifaceted relationship between experiment and theory—one which involves discovery, iterative modification, testing of novel predictions, and continued justificatory support—and the causal content in the passing of information back and forth. In discussing the process by which physical theories are developed from experiments and tested by experiments, I show that causal concepts are inextricable from the scientific process. After laying out my argument that causation is present in physical theory, I give my own positive answer to the problem of how to understand the way in which our everyday causal claims and statements relate to physical theory. I examine the range of positions that philosophers have taken on the issue and sort them into three categories. After explaining why each of the three presently available types of positions is unsatisfactory, I give my own solution that builds on my argument about the connection between experiment and theory and the causal reasoning that occurs in their interrelationship.