Lawrence M. Principe
Drew Professor of the Humanities; Director, Singleton Center for the Study of Premodern Europe at the Johns Hopkins University, Baltimore

Rausing Fellow, February - March 2016

I am broadly interested in early modern (1500-1750) science and technology. I am currently at work on a long-term project studying the intellectual and institutional developments in chemistry at the Parisian Académie Royale des Sciences, 1666-1730, especially in the work its chief chymist Wilhelm Homberg. This project requires a broader examination of 17th and 18th century France, on which I am currently teaching graduate seminars. I also teach classes on Ancient & Medieval Science, the Scientific Revolution, and Science and Religion, as well as specialized graduate seminars such as "Wretched Subjects" (alchemy, astrology, and magic). I also hold an appointment in Chemistry where I teach Organic Chemistry.

My research specialization lies in exploring and understanding the history of chemistry/alchemy. While I am especially active in the study of early modern (1500-1750) *chymistry* (a term intended to include both what we call "chemistry" and "alchemy" in a time before there existed any clear distinction between the two), I also have a keen interest in the alchemy of the Greek, Islamic, and Medieval periods, and even its revival in the modern era. My broad research goals include resituating alchemy in its due context--intellectual, social, philosophical, technological, religious, and experimental--and displaying its importance and influence in the history of science and in European culture more broadly. I want to understand both how alchemists *thought* about the world and their work and what they actually *did* practically on a daily basis. Consequently, my approaches include both the traditional historical methods of textual analysis/contextualization and archival research as well as the more innovative method of replicating alchemical processes in a modern laboratory (using historical apparatus and materials that try to approximate the impure substances ordinarily used in the past) in order more fully to understand the historical texts and their authors' motivations as well as the practical aims, abilities, and observations of the original practitioners. This dual approach allows for a richer exploration of the interactions between theory and practice, between mind and hand--a feature that characterizes not only alchemy throughout its history but also its descendant, modern chemistry.

I am also committed to bringing the latest and most reliable historical discoveries and understanding to wider audiences outside the academy. Thus, in addition to several scholarly monographs, I have written two books for a general audience, both of which can be used as textbooks: *The Scientific Revolution: A Very Short Introduction* published by Oxford University Press in 2011 (now available also in Spanish, Chinese, Swedish, Japanese, and soon in Arabic), and *The Secrets of Alchemy* published by the University of Chicago Press in 2013.

Selected Book Publications:

The Secrets of Alchemy (Chicago: University of Chicago Press, 2013).
The Scientific Revolution: A Very Short Introduction (Oxford: Oxford University Press, 2011)
New Narratives in Eighteenth-Century Chemistry, ed. (Dordrecht: Springer, 2007).
Alchemy Tried in the Fire: Starkey, Boyle, and the Fate of Helmontian Chymistry. With William R. Newman. (Chicago: University of Chicago Press, 2002).
The Aspiring Adept: Robert Boyle and His Alchemical Quest. (Princeton: Princeton University Press, 1998).

Selected Articles:
"Sir Kenelm Digby and His Alchemical Circle in 1650s Paris: Newly Discovered Manuscripts," *Ambix* 60 (2013):3-24.

"John Locke and the Case of Anthony Ashley Cooper," with Peter Anstey, *Early Science and Medicine* 16, (2011):379-503.
"Alchemy Restored," *Isis* 102 (2011):305-312.
"Wilhelm Homberg et la chimie de la lumière," *Methodos: Savoirs et textes* 8, (2008); http://methodos.revues.org/
"Revealing Analogies: The Descriptive and Deceptive Roles of Sexuality and Gender in Latin Alchemy," pp. 209-229 in *Hidden Intercourse: Eros and Sexuality in Western Esotericism*, eds. Wouter Hanegraaff and Jeffrey J. Kripal, (Leiden: Brill, 2008).
"A Revolution Nobody Noticed? Changes in Early Eighteenth Century Chymistry," pp. 1-22 in *New Narratives in Eighteenth-Century Chemistry*, ed. Lawrence M. Principe (Dordrecht: Springer, 2007)
"Reflections on Newton's Alchemy in Light of the New Historiography of Alchemy," pp. 205-19 in *Newton and Newtonianism: New Studies*, eds. James E. Force and Sarah Hutton, (Dordrecht: Kluwer, 2004).
"Georges Pierre des Clozets, Robert Boyle, the Alchemical Patriarch of Antioch, and the Reunion of Christendom," *Early Science and Medicine* 9, (2004):307-20
"Wilhelm Homberg: Chymical Corpuscularianism and Chrysopoeia in the Early Eighteenth Century." Pp. 535-56 in: *Late Medieval and Early Modern Corpuscular Matter Theories*, eds. C. Luthy, J. E. Murdoch, and W. R. Newman (Leiden: Brill, 2001).
"Some Problems in the Historiography of Alchemy." With William R. Newman. Pp. 385-434 in: *Secrets of Nature: Astrology and Alchemy in Early Modern Europe*, ed. William Newman and Anthony Grafton, (Cambridge, MA: MIT Press, 2001).
"Alchemy vs. Chemistry: The Etymological Origins of a Historiographic Mistake." With William R. Newman. *Early Science and Medicine*, 1998, 3:32-65.

Staffan Müller-Wille Professor in History and Philosophy of the Life Sciences, Exeter University and Honorary Chair at the University of Lübeck, Institute for Medical History and Science Studies

Rausing Fellow, September – December 2016

I have always pursued my research in interdisciplinary contexts, both during my postgraduate education at the Institute for Science and Technology Studies of the University of Bielefeld, and during my career as research fellow at the Max-Planck-Institute for the History of Science (Berlin) and the University of Exeter, where I have been associated with the ESRC Centre for Genomics and Society, and the Centre for Medical Studies. On the most general level, my research interests can be characterized as lying at the intersection of conceptual and cultural history of science. Scientific knowledge, I am convinced, is empirically and rationally underdetermined (as philosophers of science are well aware), and depends on geographically, socially, and culturally distributed processes of knowledge production and transmission. Under this perspective, two aspects of scientific knowledge production stand out for me:
1) The reliance of science on induction and thus on methods of inference which depend on institutions and technologies of collecting, exchanging and ordering specimens and data;
2) The reliance of science on experiment and thus on the conjunction of technologies that constitute objects of research often far removed from the objects encountered in everyday life.
I have been studying the first aspect since my dissertation project on Carl Linnaeus (1707–1778) and what he already called the "natural system" of plants. During my graduate studies of geology, palaeontology, and zoology, I had become interested in problems of classification, and Linnaeus seemed to provide an interesting historical case study. For 2016, I am planning to complete a book manuscript that summarises results from my research on Linnaeus's manuscripts and annotation practices in the form of a

"working life" biography of Linnaeus.
I consider the project on Linnaeus's paper technologies as a pilot project for a much broader, comparative study of literary, cartographic, and statistical techniques of data. Many disciplines, from astronomy to medicine to history itself, rely on the collection and processing of large amounts of data. A better understanding of these technologies will be of significance for understanding the development of the life sciences in the long nineteenth century in two respects. First, it can reveal the impact that traditional natural history disciplines like botany and zoology continued to have on the life sciences during this period by providing the means to visualize and analyze complex phenomena, for example in biogeography, ecology, or research into reproduction and heredity. Second, it will cast a light on the information infrastructures that allowed scientists working in a wide array of applied sciences – agricultural science, forestry, organic chemistry, parasitology, medical physiology – to share results with each other.
Alongside my research on Linnaeus and the history of natural history, I have been engaged in a long-term collaborative research project on the cultural history of heredity in the past, culminating in the publication of *A Cultural History of Heredity* (University of Chicago Press; co-authored with Hans-Jörg Rheinberger). The basic idea of this project was to regard the knowledge of heredity as more than the discipline of genetics, namely as a knowledge regime that stretches over all areas of society, including medical, juridical, political, and theological discourses. This project touches on the second aspect of scientific knowledge production outlined above. When metaphors of inheritance began to be used widely by naturalists and scientists such as Charles Darwin or Francis Galton in the mid-nineteenth century, this was not, it turned out, to address the age-old observation that "like engenders like." Heredity was rather used to refer to the highly specific and overtly oxymoronic phenomenon of hereditary deviations. The discourse of heredity therefore had its roots in technologies, practices and institutions that were imported from such widely disparate fields as animal breeding, psychiatry, or academic botany, and it was only through the eventual consolidation of links between these fields in the context of industrialisation, that this discourse crystallized around a well-defined research object, the gene, that was amenable to the analytical methods of physics and chemistry.

Selected Book Publications:

with Isabelle Charmantier, *A Naturalist at Work: Carl Linnaeus and His Information Processing Technologies*; under contract with Springer; forthcoming

with Hans-Jörg Rheinberger, *The Gene in the Postgenomic Era*; forthcoming with University of Chicago Press.

with Hans-Jörg Rheinberger, *A Cultural History of Heredity*, Chicago: University of Chicago Press, 2012

with Hans-Jörg Rheinberger, *Das Gen im Zeitalter der Postgenomik. Eine wissenschaftshistorische Bestandsaufnahme*, Frankfurt/M.: Suhrkamp (edition unseld), 2009, 155 pp

with Hans-Jörg Rheinberger, *Vererbung: Geschichte und Kultur eines biologischen Konzepts*, Frankfurt/M.: S. Fischer Verlag, 2009, 348 pp.

Botanik und weltweiter Handel.Zur Begründung eines Natürlichen Systems der Pflanzen durch Carl von Linné (1707-1778), Berlin: Verlag für Wissenschaft und Bildung (= Vol. 3; Studien zur Theorie der Biologie, edited by O. Breidbach & M. Weingarten), 1999, 351 pp

Selected Articles:

"How the Great Chain of Being Fell Apart: Diversity in Natural History, 1758–1859 / La rupture de la « grande chaîne des êtres » : la diversité en histoire naturelle, de 1758 à 1859," Thema: La revue des Musées de la civilisation, 4 [26], 2015, vol. 2, pp. 85–95, 96–107.

with Isabelle Charmantier, "Worlds of Paper: An Introduction," *Early Science and Medicine* 19(5), 2014, pp. 379 – 397

with Isabelle Charmantier, "Carl Linnaeus's Botanical Paper Slips (1767 – 1773)," *Intellectual History Review* vol. 24 (2), 2014, pp. 21– 238.

"Race and History: Comments from an Epistemological Point of View," *Science, Technology and Human Values*, vol. 39 (4), 2014, pp. 597– 606.

"Systems and How Linnaeus Looked at Them in Retrospect," *Annals of Science*, vol. 70 (3), 2013, pp. 305 –317.

with Katrin Böhme, "In der Jungfernheide hinterm Pulvermagazin *frequens*. Das Handexemplar des *Florae Berolinensis Prodromus* (1787) von Karl Ludwig Willdenow," *NTM – Journal of the History of Science, Technology, and Medicine*, New Series, vol.21 (1), 2013, pp. 93 – 106. *

with James Delbourgo, "Introduction to Isis Focus Section 'Listmania'," *Isis*, vol. 103 (4), 2012. pp. 710 – 715.

with Isabelle Charmantier, "Lists as Research Technologies," *Isis*, vol. 103 (4), 2012, pp. 743 –752.

"The Economy of Nature in Classical Natural History," *Историко-биологические исследования/Studies in the History of Biology*, vol. 4 (4), 2012, pp. 38 – 49.

with Sara Scharf, "Indexing Nature: Carl Linnaeus and His Fact Gathering Strategies," *Svenska Linnesällskapets Årsskrift*, vol. 2011, pp. 31 – 60.

with Isabelle Charmantier, "Natural history and information overload: The case of Linnaeus," *Studies in History and Philosophy of the Biological and Biomedical Sciences* 43 (1= Special Issue "Data-driven Science," Guest editor: Sabina Leonelli), 2012, pp. 4-15.