**As author and educator, my passion is sharing my love of chemistry with students at all levels, from high school to post-graduate. If you are interested in having a presentation on one of the topics described below, please contact me.**

**The Art of Fire: The Chemistry of Alchemy (history of chemistry)**

By the time of the European Renaissance the writings of the alchemists read like the ravings of brain-addled addicts, and their contemporaries judged them charlatans and fools. So why waste more words on this weird deviation in the evolution of chemistry? Because there is more to the story than that. While artisans kept close to their kilns and ken, the freewheeling alchemists saw the future in their fires. By trial, by error, by design, and by persistence, they discovered acids, alkalis, alcohols, and salts, and their techniques would become standards in the chemical lab.

In this presentation I display videos of alchemical practices, show examples of products, and demonstrate a bit of chicanery in the manner of the alchemical charlatan. I tell stories of alchemists from all walks of life—priests, pirates, mothers, and politicians—and relate how their chemical insight and systematic approach produced results tantalizing enough to keep them at their fires. Moreover, I honor alchemists for the spirit they represent. The lives of the alchemists are tales of courage, resourcefulness, and perseverance—and this spirit is with us still. We are believers, dreamers, and philosophers of fire. Alchemist and chemist, one and the same: Seekers after the golden dream.

**Unsung Heroes of the Quantum Weird (history of chemistry)**

Every student of AP chemistry knows the names of Bohr, de Broglie, Heisenberg, Hund, Pauli, and Planck and learns the power of quantum mechanics. They are told of quantum’s peculiarities—leaps, duality, tunneling, uncertainty, and perhaps Schrödinger’s cat in a box—but there it generally stops. It is possible, in fact, for a physical chemist to survive graduate school without hearing of Bell, Bohm, and the weirdest of all quantum effects: entanglement.

Yet interest in quantum weirdness remains alive, even in the face of “shut up and calculate.” Therefore there is value in examining the lives and works of the quixotic grapplers with quantum weirdness and their creative theories, too. Accordingly, in this talk we take a few moments to admire the twentieth-century approaches to the quantum weird and then look at newer approaches, including probability models that say quantum weirdness may not be that weird after all.

But Einstein said the gods don’t play dice, and action at a distance is spooky, so other approaches may be needed, too. In this case the lives of the quantum misfits may still have much to teach us: There’s more than one way to skin a cat and room to think outside Schrödinger’s box.

**The Chemistry of Lucrezia Borgia, et al. (history of chemistry)**

According to legend, poison was a tool of statecraft for women in power during the European Renaissance. The purpose of this talk is to examine the fascinating lives of some of these women, look at possible poisons and techniques that might have been available to them, and ways in which these poisons may have been deployed. It is concluded that there is no irrefutable evidence that the poisonings discussed herein actually occurred, but if they did, arsenic was probably the most reliable and flexible poison available to them, and that techniques existed at the time to engineer arsenic poisons for all their various political needs.

**Crime Scene Chemistry as a Teaching Tool (educational)**

Let’s face it: Crime is fascinating. It’s fascinating for educators, it’s fascinating for chemists, and it’s fascinating for students—which plays right into our hands. What better way to sneak chemical education into the minds of youngsters than mixing it up with a little crime? In this talk I begin with a dreadful mystery and then discuss and demonstrate some chemical methods employed in today’s crime labs that will help us solve the crime. There may be twists, turns, and dead ends, but by the time we’re done, we’ll have the criminal in cuffs.

**Measures of the Spread: The Influence of J. Willard Gibbs (history of chemistry)**

As chemists, we claim J. Willard Gibbs as our own. Is he not, after all, the progenitor of physical chemistry? It seems, however, that several disciplines can trace their linage through Willard Gibbs. This presentation will offer a brief history of the field of statistics up to the time of J. Willard Gibbs, explore Gibbs’s masterful use of statistics to establish the theoretical foundations of chemical thermodynamics, and then investigate how fields as diverse as economics, evolutionary biology, and literature have adapted and profited from the mathematics of J. Willard Gibbs. We then explore the impact of statistical analyses on quantum mechanics, which includes the Copenhagen interpretation of Schrodinger’s equation and the significance of Bell’s inequality on our interpretation of reality, and conclude with a projection into the future of statistics in science.

**Those Marvelous Ladies of Science (history of science)**

Women are never far from the action in science; in fact, they often form the front lines. In this hour-long survey I begin with En Hudu’ Anna, mathematician and astronomer, whose name was carved in stone ca. 2300 BCE and then highlight the contributions of ancient Greek, African, and Asian female artisans, scholars, and healers. I move rapidly to the female proto-scientists of the European Middle Ages – the witches and alchemists – and then dwell a bit on these fascinating, indomitable souls before I bring women of technical talent out of the shadows of history – Kepler’s mother; Galileo’s daughter; Lavoisier’s, Galvani’s, and Maxwell’s wives – and even Voltaire’s lover.

I end with a summary of modern European, American, and Asian Nobel-prize winning women and women who perhaps should have won. I conclude that – recognized or not – women of dedication and perseverance always were, and always will be, present in science. These women pursue science – even at social and physical peril – not for gain or glory, but because they can do no other.

**Alchemy in the Americas**

In this talk, I explore the history of alchemy in Colonial America, a little known, and poorly understood, but important, page in America history. I myself only discovered this fascinating history in the process of conducting research for my latest book, The Chemistry of Alchemy, a collection of reenactments of alchemical practices accompanied by biographies of the western-European alchemists who performed them. In my research I learned, to my delight and surprise, that these alchemical skills and traditions were not restricted to the Western Europeans but had been carried to the early American colonies and practiced by respectable early Colonial leaders, such as John Winthrop, who proudly and unabashedly pursued the art. In the Americas I found alchemy linked to economic experiments, government policy, educational initiatives, and (of course) the practice of magic and witchcraft.

In this discussion I will briefly explore the origins of alchemy as practiced in Western Europe and then focus on how the custom translated to the Americas. I will then trace the influence of alchemy in America and explore its ramifications in the United States of today. I particularly look forward to presenting this talk because it allows me to share the appreciation I now feel for my unique and proud chemical heritage.