# The Scientific Genealogy *of* David I. Schuster

*presented on June 3rd, 2005*
*by his current and former students*
*at*
*New York University*


**Nicolo da Lonigo**
**M.D./Ph.D. Padua 1453**
Lived 1428-1524. One of the most famous scholars of his time and largely responsible for the reformation in medicine in the 16th century; professor of mathematics, Greek philosophy, and medicine; pioneer in the accurate translation of ancient Greek medical texts into Latin, esp. those of Galen and Hippocrates; published first scholarly work on syphilis.

**Antonio Musa Brasavola**
**M.D./Ph.D. Ferrara 1520**
Lived 1500-1555. Physician to Francis I of France, Kaiser Charles V of Germany, King Henry VIII of England, and four popes; introduced the use of many plants for medical purposes; organized the famous botanical gardens of Belvedere.

**Gabriele Fallopio**
**M.D. Ferrara 1548**
Lived 1523-1562. Professor of botany, surgery, and anatomy; discovered Fallopian tubes; described the anatomy of the kidneys; described the structure of the skull with its muscles and nerves; studied the ossification of bones and dentition of the teeth during growth; first to describe the cochlea, the vestibules, and the semicircular canals of the ear; colleague and supporter of Vesalius.

**Girolamo Fabrici**
**M.D. Padua 1559**
Lived 1533-1619. Professor of anatomy and surgery; first to detail the valves in veins; wrote treatises on the anatomy of the larynx, the lens of the eye, the mechanics of respiration, and the actions of muscles; published exhaustive study of the development of the chick embryo and thereby founded the fields of comparative and developmental embryology.

**Giulio Cesare Casseri**
**M.D. Padua 1580**
Lived 1552-1616. Professor of surgery and anatomy; gave first detailed descriptions of the organs of speech and hearing; published anatomical tables.

**Adriaan van den Spieghel**
**M.D. Padua 1603**
Lived 1578-1625. Professor of anatomy, surgery, and botany; published works on malaria and tapeworms, and one of the first texts on plant anatomy; wrote an influential anatomical text, *De humani corporis fabrica*.

**Werner Rolfinck**
**M.D. Padua 1625**
Lived 1599-1673. First professor of chemistry in Jena; also taught anatomy, surgery, and botany; aroused controversy by giving lectures that involved the dissection of executed criminals; first to demonstrate the location of cataracts in the lens of the eye; wrote texts on pharmaceutical chemistry; opposed alchemical and superstitious thinking, and wrote book on chemical impossibilities such as the transmutation of metals to gold, the resuscitation of a plant from its ashes, and obtaining oils from precious stones.

**Georg Wolfgang Wedel**
**M.D. Jena 1669**
Lived 1645-1721. Professor of surgery, botany, theoretical medicine, practical medicine, and chemistry; prolific author, esp. on alchemy and pharmaceutical chemistry; studied plating of copper onto iron from copper sulfate solutions; studied volatile salts obtained from plants; invented new medicines; drew up a new and accurate edition of the Greek Bible translated into German.

**Johann Adolph Wedel**
**M.D. Jena 1697**
Lived 1675-1747. Professor of medicine; published texts on fermentation, camphor, magnesium carbonate, the combustion of sulfur, and medicine.

**Georg Erhardt Hamberger**
**Ph.D. Jena 1721**
Lived 1697-1755. Professor of medicine, surgery, and botany; studied the physiology of respiration, esp. the mechanism of breathing; wrote important textbook on physiology and described the function of the thorax muscles, intercostal muscles, and pleural sac; studied reaction of camphor with nitric acid.

**Christoph Andreas Mangold**
**M.D. Erfurt 1751**
Lived 1719-1767. Professor of anatomy, chemistry, and philosophy; investigated the chemistry of gunpowder; analyzed cinnabar; proposed a new system of medical thought based on the ideas that a medical diagnosis can only be made after careful comparison to the patient's symptoms and medical tests with those of many other previously studied patients; recognized the importance of distinguishing the underlying illness and the overlying complications.

**Ernst Gottfried Baldinger**
**M.D. Jena 1760**
Lived 1738-1804. Professor of medicine; founded a chemical laboratory at Marburg; established the first specialized scientific journal published in any language, *Magazine fur Ärzte*; wrote text on medical ailments of soldiers based on his experiences as a surgeon in the Seven Years' War.

**Johann Christian Wiegleb**
**Apothecary Langensalza 1765**
Lived 1732-1800. Phlogistonist; apothecary; founded the first pharmaceutical institute in Germany; investigated fermentation, alkaline salts in plants, and the combustion of chalk; disputed the possibility of transmutation of elements.

**Johann Friedrich August Göttling**
**Apothecary Langensalza 1775**
Lived 1753-1809. Developed and sold chemical assay kits and studied process for extracting sugar from beets; studied the chemistry of sulfur, arsenic, phosphorus, and mercury; wrote texts on analytical chemistry; studied oxidation of organic compounds by nitric acid; one of first in Germany to take a stand against the phlogiston hypothesis and for the new "French" chemistry of Lavoisier.

**Karl Friedrich Wilhelm Gottlob**
**Ph.D. Jena 1805**
Lived 1783-1857. Pharmacist; chemist; teacher; wrote textbooks on chemistry, German industry, and meteorology; studied triboluminescence induced by sublimation or dissolution, catalytic effect of Pt on hydrogen combustion, chlorination of starch and sugar, medical applications of bisulfates and calcium salts, and preparation of various inorganic compounds; analyzed mineral waters and developed water purification methods; invented a galvanometer.

**Justus von Liebig**
**Ph.D. Erlangen 1822**
Lived 1803-1873. One of the greatest chemistry teachers of all time - he was the intellectual father/grandfather of most chemists of his time; promoted the view that metabolism involved oxidation of food; discovered structural isomers, and concept of functional groups (old compound-radical theory); first to experiment with artificial fertilizers; pioneer in agricultural and food chemistry; devised combustion analysis; systemized organic acids.

**August Wilhelm von Hofmann**
**Ph.D. Giessen 1841**
Lived 1818-1892. Investigated chemistry of coal tar and dyes; converted phenol into aniline by action of ammonia and showed that successive chlorination of aniline weakened its basicity; synthesized amines from alkyl iodides and ammonia; discovered quaternary ammonium salts, ethylenediamine, and diethylenetriamine; discovered the first unsaturated alcohol, allyl alcohol; co-discovered isonitriles by action of alkalinated chloroform on primary amines; discovered formaldehyde; synthesized aniline dyes; suggested the word "valence".

**Johann C. W. F. Tiemann**
**Ph.D. Berlin 1870**
Lived 1848-1899. Studied chemistry of plant products, esp. essential oils and glucosides; synthesized and established the configuration of vanillin; developed general method for synthesizing phenolic anhydrides; discovered the class of compounds responsible for the odor of violets; investigated chemistry of terpenes, camphors, hydroxyaldehydes, amino acids, amidoximes, and nitriles.

**Julius Oscar Stieglitz**
**Ph.D. Berlin 1889**
Lived 1867-1937. Synthesized urethanes and isocyanates; proposed nitrenes as intermediates in the decomposition of organic azides; studied rearrangements of triphenylmethyl amines; established composition of chlorine water as mixture of HCl and HOCl; champion of modern views of catalytic reactions, catalytic intermediates, dyes, and indicators; made first example of imine stereoisomers with simple substituents; perfected commercial preparation of phenobarbitol and salvarsan; wrote influential textbook on quantitative chemical analysis.

**Christophle Glaser**
**M.D. Basel 1640**
Lived 1615-1678. Professor at Jardin du Roi; described preparation of arsenic trichloride, bismuth oxynitrate, and potassium sulfate (glaserite); imprisoned in the Bastille for supplying arsenic to Sainte-Croix, who poisoned the Marchioness de Brinvilliers.

**Nicolas Lémery**
**Apothecary Paris 1667**
Lived 1645-1715. First to distinguish between vegetable (organic) and mineral (inorganic) chemistry; published influential textbook on chemistry; adopted an atomic theory assuming that fundamental particles have characteristic shapes; discovered a commercial process for the production of sulfuric acid; obtained boric acid from borax; investigated chemistry of antimony sulfide; analyzed camphor and honey.

**J. G. Spitzley**
**Apothecary Paris**

**Guillaume François Rouelle**
**Apothecary Paris 1725**
Lived 1703-1770. Founder of French school of chemistry; geologist; phlogistonist; proposed first modern definition of salts and first to distinguish neutral, acid, and basic salts; explained dehydrating action of sulfuric acid; proposed a theory of distillation; studied the reaction of essential oils with nitric acid; studied the chemical components of plants; analyzed mineral waters; established that the Egyptians used chemicals for mummification.

**Jean Baptiste Michel Bucquet**
**M.D. Paris 1770**
Lived 1746-1780. Analyzed zeolite; first to teach Lavoisier's theories in France; collaborator with Lavoisier from 1777; first detailed accounts on plant chemistry; showed $CO_2$ was acidic; analyzed opium; discovered morphine; studied chemistry of $NH_4Cl$ and arsenic salts; analyzed blood and isolated fibrin.

**Pierre Joseph Macquer**
**M.D. Paris 1742**
Lived 1718-1784. First to notice that water is produced by a hydrogen flame; analyzed gypsum and discovered first arsenate salts; showed Prussian Blue contains Fe and devised a method to use it to dye wool and silk; re-introduced the term "gas"; wrote first modern chemical dictionary; used burning lenses to study effect of high temperatures on platinum (with Baume) and diamonds (with Lavoisier).

**Antoine François de Fourcroy**
**M.D. Paris 1780**
Lived 1755-1809. Important advocate of Lavoisier's views; co-discovered iridium (with Vauquelin); investigated chemistry of urea and chlorine; co-founded modern chemical nomenclature; carried out quantitative analyses of mineral waters; analyzed bone, milk, urinary calculi, and gallstones; showed that muscles contain a large proportion of nitrogen; studied (with Vauquelin) chemistry of metal sulfites and phosphites; showed (with Thenard) that mercury exists in two oxidation states; showed that sulfuric acid can act as a desiccant.

**Claude Louis Berthollet**
**M.D. Paris 1778**
Lived 1748-1822. Determined composition of $NH_3$, HCN, $H_2S$; the latter two compounds disproved Lavoisier's contention that oxygen was the key component of acids; introduced aqueous chlorine as a bleaching agent; one of the originators of volumetric analysis; showed presence of nitrogen in animal matter; discovered cyanogen chloride and potassium chlorate; co-founded modern chemical nomenclature.

**Louis Nicolas Vauquelin**
**M.A. Paris 1790**
Lived 1763-1829. Discovered chromium, recognized existence of beryllium, and discovered BeO; discovered first amino acid - asparagine (isolated from asparagus); isolated camphoric acid, quinic acid, and cyanic acid from natural products; developed methods for the separation of platinum metals; studied action of wine, vinegar, and oils on vessels made of tin and lead; investigated the respiration of insects.

**Joseph Louis Gay-Lussac**
**M.A. Paris 1800**
Lived 1778-1850. Co-discovered Charles's Law relating temperature to the volume of gases; discovered boron and established elementary nature of iodine and sulfur (both with Thenard); analyzed sugar; showed that fluoride was a constituent of bones; discovered law of combining volumes and originator of volumetric analysis; showed that one volume of oxygen reacts with two volumes of hydrogen to give water, and established similar relationships for $NH_3 + HCl$, $N_2 + O_2$, and $N_2 + 3H_2$; developed assay of $Ag^+$ by titration with chloride; studied chemistry of cyanogen and determined its composition; showed that "prussic acid" was HCN; first to prepare ethyl iodide, hydrogen fluoride, organic amides, and the peroxides of Na and K; coined the name racemic acid; held world record for manned balloon flight (7019 meters) and pioneered measurement of temperature, pressure, humidity, and magnetic field strength as a function of height.

**Elias Rudolph Camerarius, Sr.**
**M.D. Tübingen 1663**
Lived 1641-1695. Professor of medicine; wrote books on the palpitations of the heart, pleurisy, skull fractures, and the use of medicinal plants.

**Elias Rudolph Camerarius, Jr.**
**M.D. Tübingen 1691**
Lived 1673-1734. Professor of medicine; wrote a history of the epidemic fever; proposed a new system of physiology; despite great scholarship and his skepticism of the work of others, Camerarius was an exceptionally credulous man who devoted himself zealously to mysticism and the secret arts - he opposed innovation and progress and was especially hostile to the iatrophysical methods then being developed for the treatment of disease.

**Burchard David Mauchart**
**Lic.Med. Tübingen 1722**
Lived 1696-1751. Professor of anatomy and surgery; ophthalmologist.

**Philipp Friedrich Gmelin**
**M.D. Tübingen 1742**
Lived 1721-1768. Professor of botany and chemistry; studied chemistry of antimony; wrote texts on the pancreatic ducts, mineral waters, and botany.

**Johann Friedrich Gmelin**
**M.D. Tübingen 1769**
Lived 1748-1804. Apothecary, chemist, botanist, and physician; advocate of the phlogiston theory and opponent of Lavoisier; explored synthesis of metallic alloys, especially of transition metals; wrote textbooks on pharmacy, mineralogy, poisons, technical chemistry, botany, and the history of chemistry.

**Friedrich Stromeyer**
**M.D. Göttingen 1800**
Lived 1776-1835. Discovered cadmium; started first German university chemistry teaching laboratory; first to recommend starch as a reagent for free iodine; studied chemistry of arsine and bismuthate salts.

**Robert Wilhelm Eberhard Bunsen**
**Ph.D. Göttingen 1830**
Lived 1811-1899. Discovered organo-arsenic compounds and first effective antidote for arsenic poisoning; invented the spectroscope and co-founded (with Kirchhoff) spectrochemical analysis; discovered (with Kirchhoff) cesium and rubidium, and isolated lithium; pioneer in the field of photochemistry and discovered photochemical induction periods; expert on gas analyses and wrote influential text on gasometric methods; invented Bunsen burner; first to propose correct explanation of the operation of geysers; developed first large-scale electrolytic process for the production of magnesium metal.

**Heinrich Will**
**Ph.D. Giessen 1839**
Lived 1812-1890. Co-inventor of improved method for determining nitrogen in organic compounds; co-discoverer of trinitroresorcinol; showed that oil of mustard is allyl thiocyanate; invented a vapor pressure method to determine molecular weights; studied products of the potassium reduction of carbon monoxide.

**Friedrich August Kekulé**
**Ph.D. Giessen 1852**
Lived 1829-1896. Co-founded structural organic chemistry; established structure of benzene; introduced concept of resonance, tetravalency of carbon, and existence of double and triple bonds; first to recognize that in hydrocarbons the carbon atoms are connected to each other; derived the 2n+2 rule for the stoichiometry of alkanes; studied organic acids, azo and diazo compounds, electrolysis of dibasic acids, and carboxylation of aryl bromides.

**Adolf J. F. Wilhelm Ritter von Baeyer**
**Ph.D. Berlin 1858**
Lived 1835-1917. Received the Nobel Prize in 1905 for his work on organic dyes and aromatic compounds; discovered barbiturates, aspirin, phenolphthalein, and methyldichloroarsine; discovered ring strain; synthesized indigo; introduced the term lactam and concept of tautomerism; made first polyacetylenes; studied chemistry of uric acid, purines, and terpenes.

**Henry Adam Weber**
**B.S. Munich 1868**
Lived 1845-1912. Professor of chemistry. Studied the manufacture of sugar from sorghum; expert in agricultural and food chemistry; made exhaustive sanitary examination of Illinois rivers; designed first chemistry building at U. of Illinois.

**John Ulric Nef**
**Ph.D. Munich 1886**
Lived 1862-1915. Formulated early concept of a transition state, which he called an "active molecular condition"; determined chemical nature of fulminates (-ONC) and studied chemistry of isocyanides; contended that the carbon atom in CO, fulminates, and isocyanides can be considered divalent; showed that the reactivity of beta-ketoester and beta-diketonate conjugate bases is centered at oxygen and not at carbon; prepared mono- and dihaloacetylenes; studied mechanism of sugar fermentation and action of alkalis on sugars.

**William McPherson**
**D.Sc. Ohio State 1895**
Lived 1864-1951. Professor of chemistry. Synthesized hydroxyazo compounds; studied the reaction of sucrose with acids; advised US Army on chemical warfare during WWI; wrote influential series of textbooks on general chemistry.

**Howard Johnson Lucas**
**M.A. Ohio State 1908**
Lived 1885-1963. One of first to apply Lewis's electronic theory to organic reaction mechanisms; first kinetic study of acid catalyzed hydration of an olefin; discovered the Lucas reagent ($HCl/ZnCl_2$) for the analysis of alcohols; first to recognize the relationship between acidity of para-substituted benzoic acids and other electronic properties; first proof of existence of halonium ions and their stereochemical consequences in substitution reactions; studied pi-complexes of olefins and acetylenes with Ag and Hg cations.

**William Gould Young**
**Ph.D. CalTech 1929**
Lived 1902-1980. Professor of chemistry. Studied allylic rearrangements, displacement reactions of allylic compounds, and allylic Grignard reagents; investigated atmospheric oxidation reactions; chemistry of plant pigments and carbohydrates; studied thermal decomposition of alcohols.

**John D. Roberts**
**Ph.D. UCLA 1944**
Born 1918. Discovered rearrangement of cyclopropylcarbinyl cation and studied the norbornyl cation; used Hammett sigma constants to understand substituent effects on reactivity; early advocate of MO calculations and NMR in organic chemistry; suggested benzyne mechanism for nucleophilic substitution of non-activated aryl halides.

## David I. Schuster

**Ph.D. CalTech 1961**

Born 1935. Professor of chemistry; fellow of the AAAS; specialist in organic photochemistry; extensively studied the photochemistry of ketones in solution; elucidated the mechanism for the [2+2] photocycloaddition of unsaturated ketones to olefins; studied flash photolysis with Lord George Porter; investigated the chemistry of neurotransmitter receptors; discovered the [2+2] photocycloaddition of unsaturated ketones to fullerenes; studied photo-induced electron transfer pathways in functionalized fullerene derivatives; devoted teacher; concert pianist.

### Legend

Primary Influence

Secondary Influence

Biographical information obtained from the University of Illinois Chemical Genealogy Database. Inspired by Dr. Adam Urbach. Designed and edited by Paul Bracher.