**Chapter 1: Introduction**

ChemLab is a language that will allow users to conveniently manipulate chemical elements. It can be used to solve chemistry and organic chemistry problems including, but not limited to, stoichiometeric calculations, oxidation-reduction reactions, acid-base reactions, gas stoichiometry, chemical equilibrium, thermodynamics, stereochemistry, and electrochemistry. It may also be used for intensive study of a molecule's properties such as chirality or aromaticity. These questions are mostly procedural and there is a general approach to solving each specific type of problem. For example, to determine the molecular formula of a compound: 1) use the mass percents and molar mass to determine the mass of each element present in 1 mole of compound 2) determine the number of moles of each element present in 1 mole of compound. Albeit these problems can generally be distilled down to a series of plug-and-chug math calculations, these calculations can become extremely tedious to work out by hand as molecules and compounds become more complex (imagine having to balance a chemical equation with Botox: C6760H10447N1743O2010S32 ). Our language can be used to easily create programs to solve such problems through the use of our specially designed data types and utilities.