**Thoughts about Science and Engineering for Budding Scientists**Tom Browder <tom.browder@gmail.com>, June 2015

**General**

What are you passionate about?  
Originality trumps a lot.  
Report is important (organization, appearance, grammar, spelling,  
 content, conciseness, objectivity)  
Schedule events (deadlines) on the road to the fair  
Open source software available for most any scientific computing analysis need (see some below).

**Practical engineering process for inventors**

Use Linux: install VitualBox <<https://www.virtualbox.org>>, with it install Debian 8 <<https://www.debian.org>>  
Use BRL-CAD <<http://brlcad.org>> for designing a 3D object  
Using the BRL-CAD model, convert it to stl  
Use online 3D printer <<http://www.shapeways.com>> to price object  
Use <<http://www.emachineshop.com>> CAD tool to design and price object  
Use openfoam cfd program <<http://openfoam.org>> for stress analysis  
Use elmer fea program <<https://www.csc.fi/web/elmer/elmer>>  
Compare processes  
Compare design strength with differing materials with FEA  
Use LWP <<http://cpan.org>> to conduct web crawl data collection project  
Use R <<http://www.r-project.org>> for statistical analysis  
Use LaTeX <<http://www.latex-project.org>>for documentation

**Other ideas**

Use Wolfram <<http://www.wolframalpha.com>> for problem solving  
Confirm an existing study (replication)

**Chemistry links**

Computational chemistry <<https://en.wikipedia.org/?title=Computational_chemistry>>  
Statistical mechanics <<https://en.wikipedia.org/wiki/Statistical_mechanics>>

**Programming language links**

Perl 5<<http://www.perl.org>>  
Perl 6 <<http://perl6.org>>  
Python <<https://www.python.org>>  
Rust <<http://www.rust-lang.org>>  
C/C++ <<https://gcc.gnu.org>>