

## **Standard Tools for Physics 416**

For the course it is necessary to write programs and plot data. We have chosen convenient packages from the Gnu Open Source programs. We have loaded these programs on the computers you are using in the lab. You can also install them on your own computer if you wish. For programming we have chosen **wxdevcpp** a windows port of the gcc compiler. For graphing/fitting we have chosen **sciDAVis**. I have also included a well known minimization package used by high energy physicists for the last 35 years called **Minuit**.

You are free to use any programming language you like and any graphing/fitting package with the exception of Microsoft Excel (not a professional statistics tool).

**Installing at Home:** Follow the instructions at the following links:

wxdevcpp – <http://wxdsgn.sourceforge.net/>

scidavis - <http://scidavis.sourceforge.net/download.html>

pyminuit - <http://www.kaij.org/blog/?p=123> (for windows)

<http://code.google.com/p/pyminuit/wiki/HowToInstall> (for mac or linux)

### **Manuals and Tutorials (In Sm1077 it is already installed)**

wxdevcpp - <http://wxdsgn.sourceforge.net/?q=node/6>

scidavis-<http://www.physics.ohio-state.edu/~durkin/phys416/labs/sciDAVis.pdf>

scidavis-<http://scidavis.sourceforge.net/help/manual/index.html>

pyminuit-<http://code.google.com/p/pyminuit/wiki/GettingStartedGuide>

### **First Lab Period**

You should become familiar with programming and making simple plots. The WxDev-C++ program is designed to implement windows widgets. We won't need windows widgets, but the program also provides a convenient interface for C and C++ programming. To see how to use this follow the tutorial at <http://thiscouldbebetter.wordpress.com/2011/06/18/hello-world-in-c-using-wxdev-c/>.

**Note: All your class material should be saved on the U:/ drive assigned to you.**

Once you have done this tutorial you need to learn how to deal with random numbers in C/C++. The code on the next page is code that outputs 100 random numbers distributed from 0-1 in a file c:\out.txt (put the file anywhere that is convenient).

```
#include <cstdlib>
#include <iostream>
#include <math.h>
Using namespace std;
Int main(int argc,char *argv[])
{
    Int i;
    Float x;
    FILE *fp;
    fp=fopen("c:/out.txt","w");
    printf(" hello world");
    srand(123);
    for(i=0;i<100;i++){
        x=rand();
        x=x/RAND_MAX;
        fprintf(fp," %f \n",x);
    }
    fclose(fp);
    system("PAUSE");
    return EXIT_SUCCESS;
}
```

Now you can copy and paste the data from out.txt into the spread sheet in sciDAVis and try making a histogram.