Breakdancer

**BreakDancer-1.1.** released under GPLv3, is a Perl/Cpp package that provides genome-wide detection of structural variants from next generation paired-end sequencing reads. It includes two complementary programs.

BreakDancerMax predicts five types of structural variants: insertions, deletions, inversions, inter- and intra-chromosomal translocations from next-generation short paired-end sequencing reads using read pairs that are mapped with unexpected separation distances or orientation.

**Installation Notes**

Breakdancer requires sudo access due to installing the required perl modules.

**Getting Breakdancer**

```bash
sudo apt-get install subversion
svn co https://breakdancer.svn.sourceforge.net/svnroot/breakdancer
cd breakdancer
```

**Getting Samtools-0.1.6**

```bash
wget http://sourceforge.net/projects/samtools/files/samtools/0.1.6/samtools-0.1.6.tar.bz2
tar xjf samtools-0.1.6.tar.bz2
cd samtools-0.1.6
make
```

Should you receive an error when making and are on an Ubuntu/Linux system try changing the following line in Makefile:

```bash
samtools:lib $(AOBJS)
    $(CC) $(CFLAGS) -o $@ $(AOBJS) -lm $(LIBPATH) $(LIBCURSES)
-lz -L. -lbam
```

to

```bash
samtools:lib $(AOBJS)
    $(CC) $(CFLAGS) -o $@ $(AOBJS) -lm $(LIBPATH) $(LIBCURSES)
-L. -lbam -lz
```

And running 'make' again.

*It is now assumed that you are in the breakdancer directory, inside it you've placed a samtools-0.1.6 directory and have compiled the samtools directory.*
Alter Breakdancer’s Makefile

Change the following line in Makefile:

```
all:
g++ -g -Wall -O2 -I/Users/kchen/samtools/samtools-0.1.6
BreakDancerMax.cpp AlnParser.cpp Poisson.cpp -o breakdancer-max -lm -lz
-L/Users/kchen/samtools/samtools-0.1.6 -lbam
```

to

```
all:
g++ -g -Wall -O2 -I samtools-0.1.6/ BreakDancerMax.cpp
AlnParser.cpp Poisson.cpp -o breakdancer_max -lm -L samtools-0.1.6/ -lbam
-lz
```

Changing both the path of the -I and -L flag and also moving the -lz library flag after -lbam

Congrats! You’ve, hopefully, installed the CPP portion of Breakdancer. But there is also a Perl script that Breakdancer must run so we need to handle the prerequisites for that.

Prerequisites for bam2cfg.pl

Change the shebang/header in the bam2cfp.pl from:

```
#!/gsc/bin/perl
```

to

```
#!/usr/bin/env perl
```

Install the required perl modules.

```
sudo cpan install Math::CDF
sudo cpan install Statistics::Descriptive
sudo cpan install GD::Graph
sudo cpan install GD::Graph::histogram
```

Running Breakdancer

For sanity just update you PATH environmental variable to include looking into the breakdancer directory for bam2cfp.pl and breakdancer_max.