

# EMAN

## Tutorial Session #1

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Using the GUI  
A First Reconstruction  
Particle Selection  
Preliminary Models

# Survey

- Unix Familiarity
- Linux Familiarity
- C++/Fortran
- Python or other Scripting Language
- Used EMAN
- ... on your own data?

# Install EMAN

- *cd ~*
- *tar xvzf EMAN.tgz*

# Install EMAN

- *cd ~*
- *tar xvzf EMAN.tgz*
- edit *.zshenv* :  
export PATH=\$PATH:\$HOME/bin:\$HOME/EMAN/bin  
export LD\_LIBRARY\_PATH=\$HOME/EMAN/lib  
export PYTHONPATH=\$PYTHONPATH:\$HOME/EMAN/lib
- For zsh, edit *.zshenv*
- for bash edit *.bash\_profile*
- For tcsh, edit *.tcshrc* and use *setenv* (rather than *export*) and remove the *'=*

# Install EMAN

- *svdcmp*
- *cd EMAN/altlib*
- *mv \*gsl\* ../lib*
- *svdcmp*

# EMAN Documentation

- *<>* denotes a parameter to fill in, ie *<input file>*
- *[]* denotes an optional parameter, ie *[mask=<radius>]*
- *italics* denote something to be typed into the computer

*example:*

```
proc2d <input file> <output file> [mask=<r>] [mrc] [spider]  
[pgm]
```

```
proc2d file.hed file.spi spider mask=22
```

- *<program> help* (won't work with python scripts yet)
- *<program>* (shows usage information)

# GUI

## (eman browser)

- `cd ~/demo/samples`
- `run 'eman'`

# A First Reconstruction (preliminary model)

- *cd ~/demo/BTV/nonoise*
- Look at start.hed/img
- *startcsym start.hed 10 sym=c3*
- Look at sym.hed/img and threed.0a.mrc
- *mv threed.0a.mrc threed.0.mrc*
- *volume threed.0a.mrc 2.5 set=110*
- *proc3d threed.0.mrc threed.0a.mrc automask2=8,.8,5*
- Look at threed.0.mrc and threed.0a.mrc

# A First Reconstruction (refinement)

- *refine 3 hard=25 median sym=c3 ang=9 mask=28 pad=96  
classkeep=1 classiter=8 xfiles=2.5,110,99 3dit=1 3dit2=2  
amask=8,.8,5*
- Wait ...
- Examine:
  - x.\*.mrc / threed.\*a.mrc
  - classes.\*.mrc
  - cls\*.lst

# GUI

- eman
- boxer
- helixboxer
- ctfit
- qsegment(/chimera)
- glmatrix

- v4
- v2

## Non-EMAN Programs

- vis5d+
- chimera

# Boxing

## (aka Particle Selection)

- `cd ~/demo/samples/boxer`
- `boxer jj5339.f.mrc`

Tricks:

- `makeboxref.py groel.mrc sym=d7 invert ang=15`
- `batchboxer input=jj5346.f.mrc auto=.3,.7,.1 dbout=5346.box  
refimg=best.hed`
- `alignhuge jj0881f.mrc jj0880f.mrc jj0881.ali.mrc`
- `focalpair jj0880f.mrc jj0881f.mrc 880.1.mrc im1=0880.init.hed  
im2=0881.init.hed sffile=groel.sm filt=4`

# Boxing

## (aka Particle Selection)

- *cd ~/demo/groel/stage1*
- *batchboxer input=jj5337.f.mrc dbbox=5337.box  
output=../stage2/5337.hed invert*

etc.

# Initial Model (with symmetry)

- *startcsym (or startoct):*
- *cd ~/demo/groel/stage2*
- *proc2d 5337.hed orig.hed lp=14 ...*
- *cenalignint orig.hed maxshift=8 frac=0/4 ...*
- *startcsym ali.hed 50 sym=c7 [fixrot=90]*
- *volume threed.0a.mrc 2.8 set=800*
- *proc3d threed.0a.mrc masked.mrc automask2=15,.8,5*

# Initial Model (with symmetry)

- *examine:*

*avg.hed*

*classes.hed*

*sym.hed*

*threed.0a.mrc*

*masked.mrc*

# Initial Model (without symmetry)

- *startnrclasses and startAny:*
- *cd ~/demo/tough\_cases/asymmetric/KIF/stage1*
- *startnrclasses start.hed 20*
- *examine classes.nr.hed, make good.hed*
- *startAny good.hed*

# Basic Image Processing

- *iminfo*
- *proc2d*
- *proc3d*
- *procpdb.py*