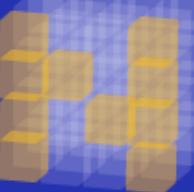


NumPy and SciPy

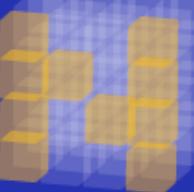
A “His” Story

Travis E. Oliphant



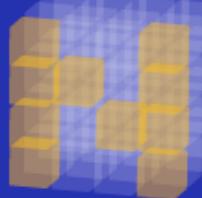
Tell me a story...





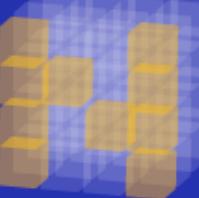
My story of SciPy...



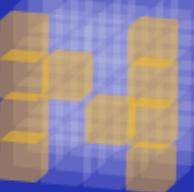


In the beginning....





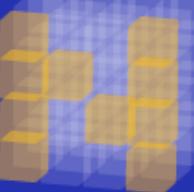
was Guido....



was Guido....



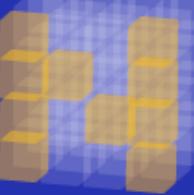
EuroSciPy
2008



Jim Fulton

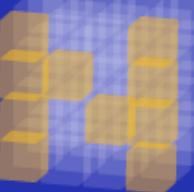


- Created first Matrix object
- Released it to the net in 1994
- Started getting feedback on Matrix-SIG
- Convinced Guido to change some syntax
 - `a[0, l]` instead of `a[(0, l)]`
 - `a[::-2]` instead of only `a[:]`
 - Ellipsis operator



Jim Hugunin

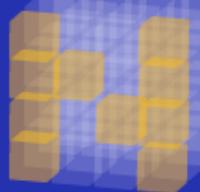


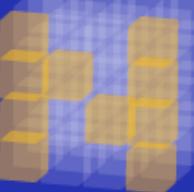


Supporting cast...



Paul Dubois





David Ascher



Jim Fulton

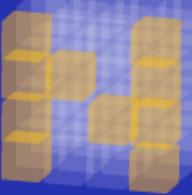
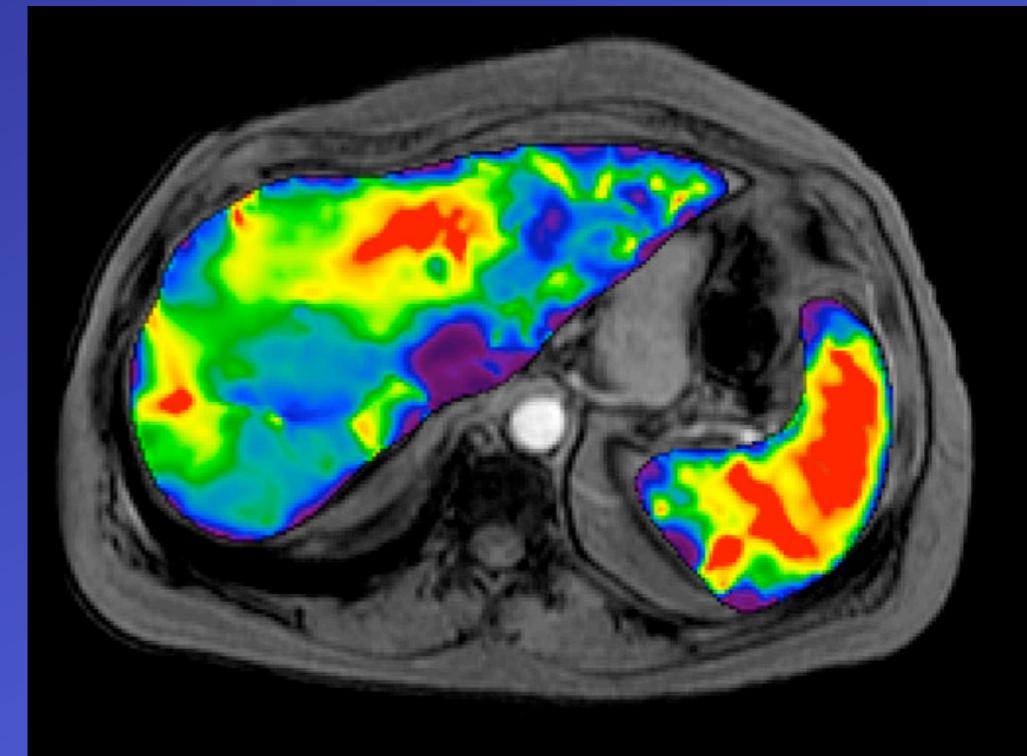


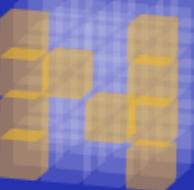
1997



Medical Imaging at

Mayo Clinic





Michael A. Miller

Guido's essay on
reference counting

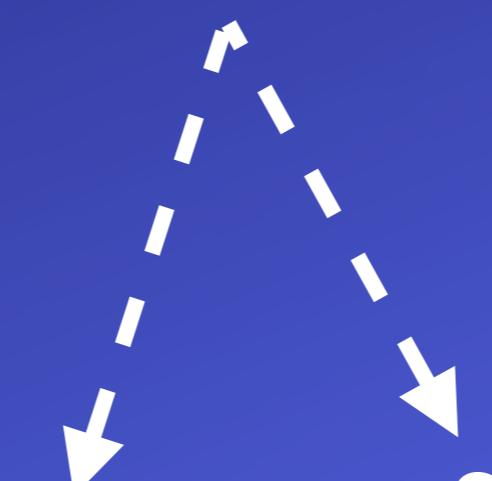
TableIO

1998
numpyio

Reference to
Numeric C-API

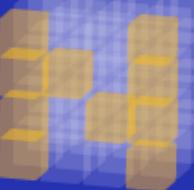


NumPy



SciPy



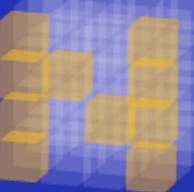


| 1998-2000

multipack

ODE's (odepack)
Integrals (quadpack)
Optimization (minpack)

sparse matrices
cephes (special functions)
fftw wrappers
signal processing



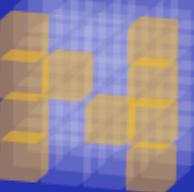
| 1998-2000

multipack

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signal processing





1998-2000

multipack

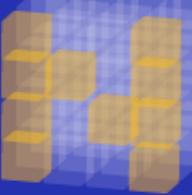
ODE's (odepack)
Integrals (quadpack)
Optimization (minpack)

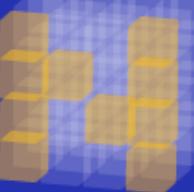


sparse matrices
cephes (special functions)
fftw wrappers
signal processing



Pearu Peterson

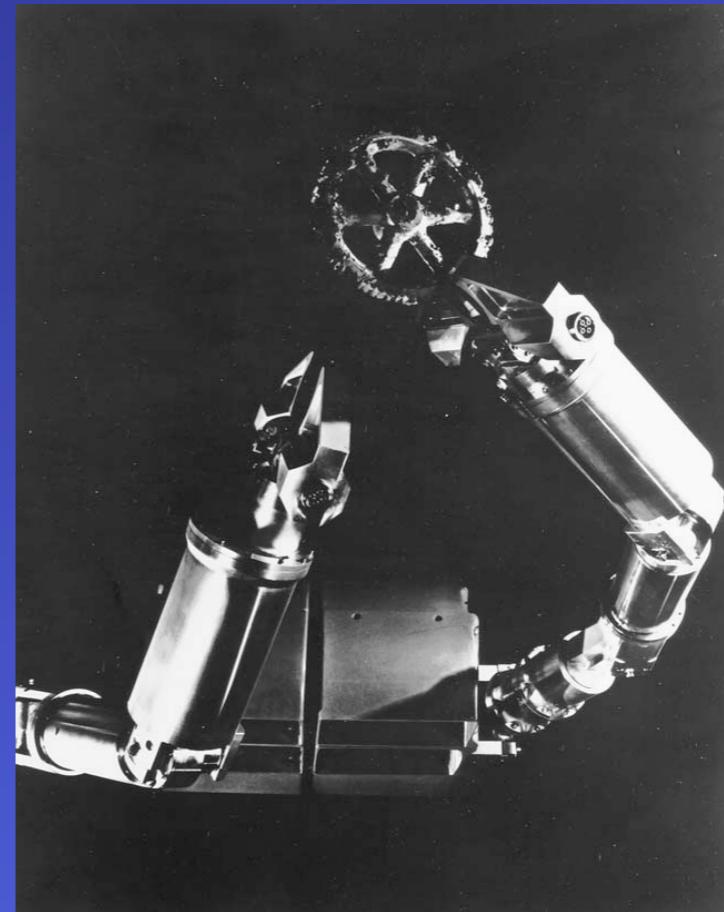


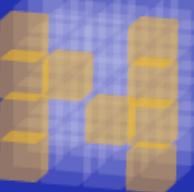


Pearu Peterson



automator



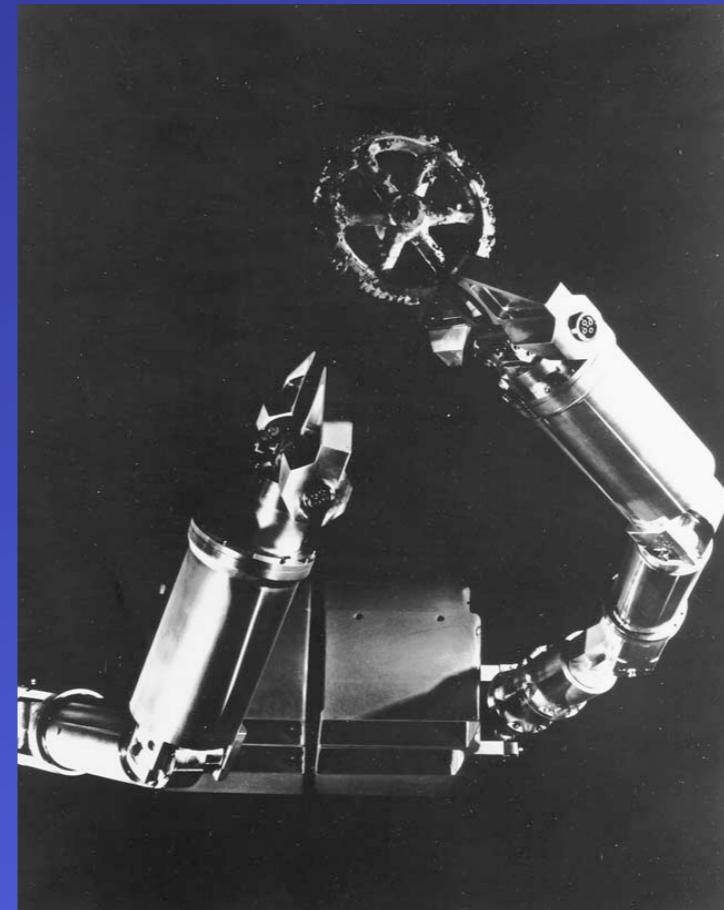


Pearu Peterson

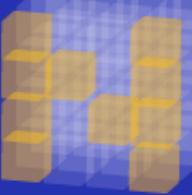


F2Py

automator

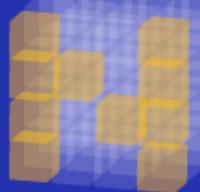


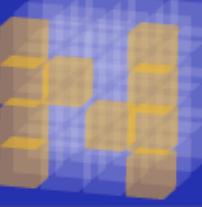
Eric Jones



Eric Jones

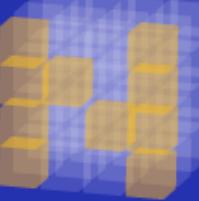
Weave
Genetic Algorithms
Cluster

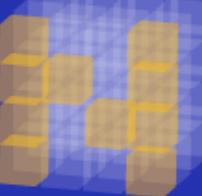


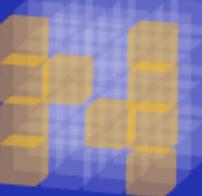


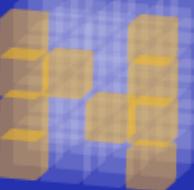
EuroSciPy
2008



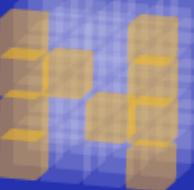








SciPy 2001

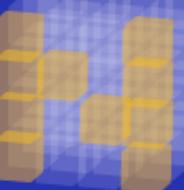


Gary
Strangman

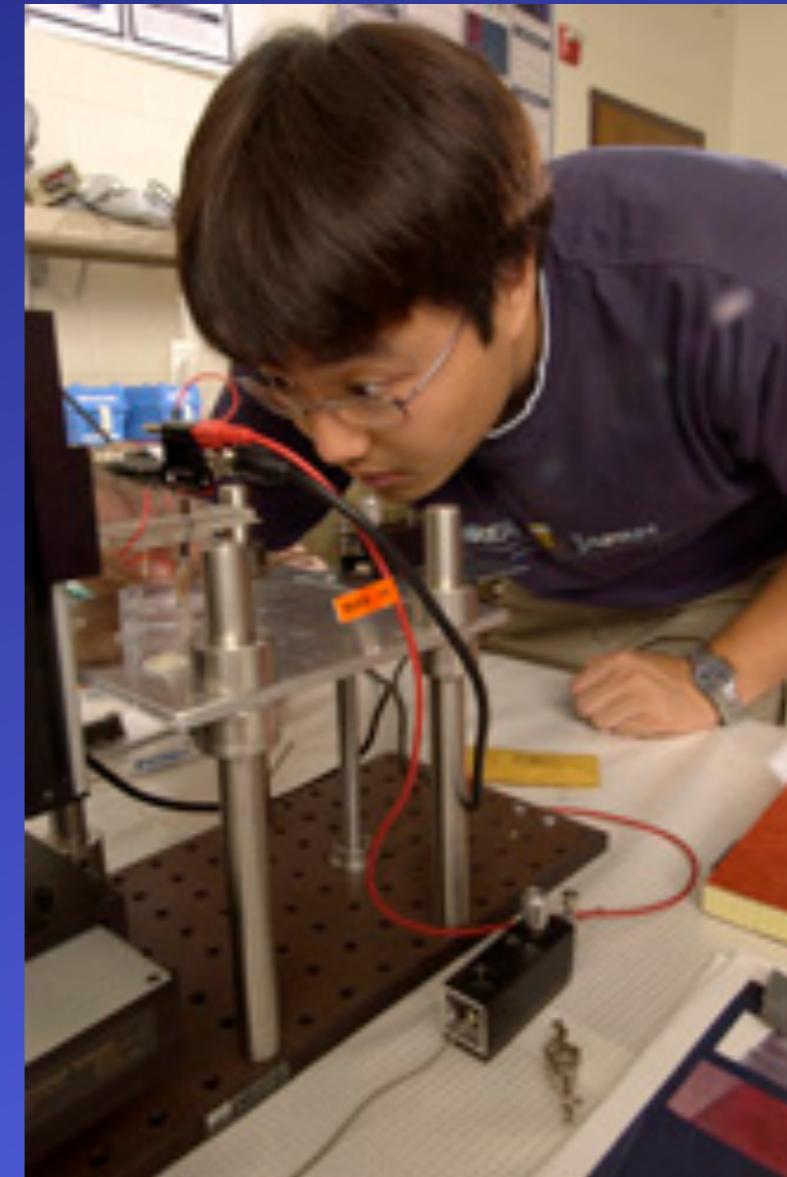


SciPy 2001

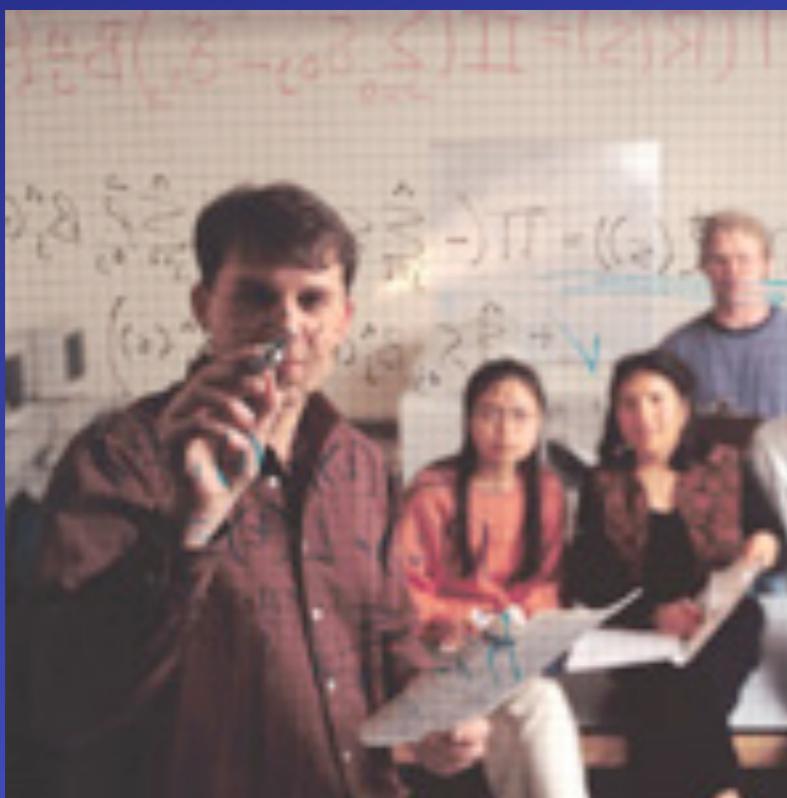
BYU

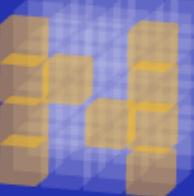


Research



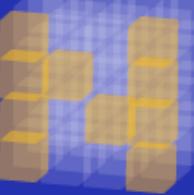
Teaching





BYU : enlist students

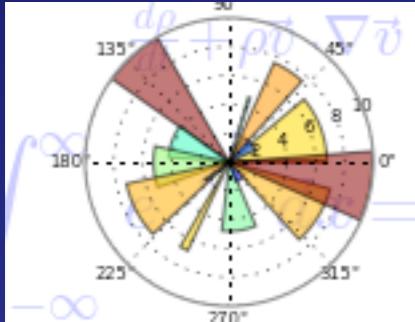




BYU : enlist students



Important Help



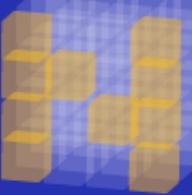
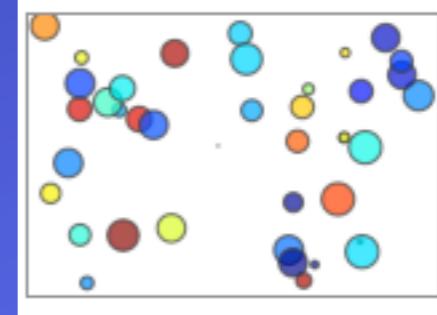
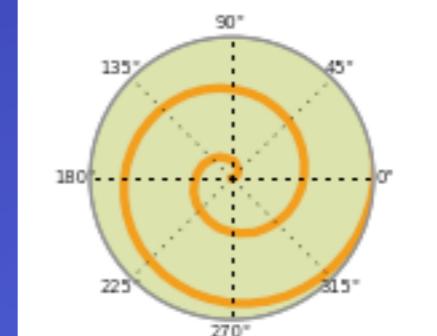
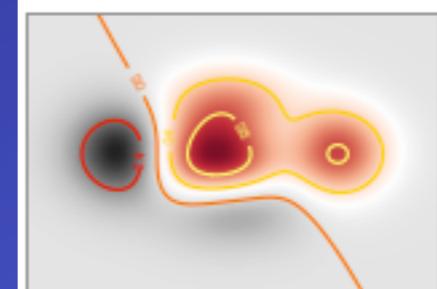
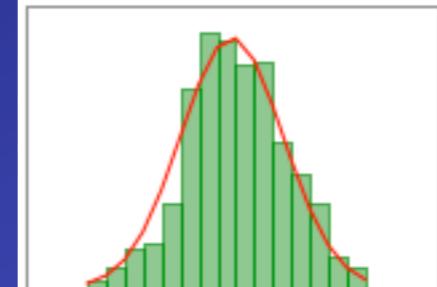
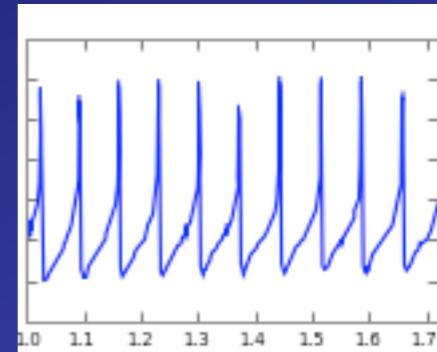
$\nabla \vec{v} = -\nabla p + \mu \nabla^2 \vec{v} + \rho \vec{g}$

$F_G = G \frac{m_1 m_2}{r^2}$

$W_{\delta_1 \rho_1 \sigma_2} = U_{\delta_1 \rho_1}^{3\beta} + \frac{1}{8\pi^2} \int_{-\infty}^{r_\alpha} d\alpha_2 \left[\frac{U_{\delta_1 \rho_1}^{3\beta} U_{\delta_2 \rho_2}^{1\beta}}{U_{\rho_1 \sigma_2}^{0\beta}} \right]$

$v = \sqrt{\kappa}$

John Hunter
2001



IPython

Janko Hauser

Fernando Perez
Dec 10, 2001

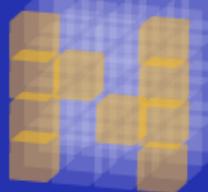


```
PyLab
Enthought Python Distribution (2.5.2001) -- http://code.enthought.com
Python 2.5.2 IEPD 2.5.2001 (release25-maint:60919M, Feb 21 2008, 10:31:43) [MSC
v.1310 32 bit (Intel)]
Type "copyright", "credits" or "license" for more information.

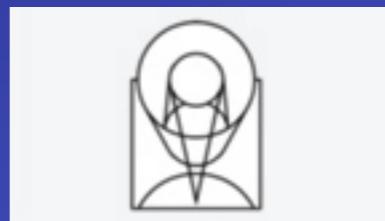
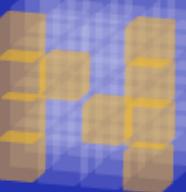
IPython 0.8.1 -- An enhanced Interactive Python.
?      -> Introduction to IPython's features;
%magic -> Information about IPython's 'magic' % functions.
help   -> Python's own help system.
object? -> Details about 'object'. ?object also works, ?? prints more.

Welcome to pylab, a matplotlib-based Python environment.
For more information, type 'help(pylab)'.

In [1]: a = array([1,2,3,4])
In [2]: a + 10
Out[2]: array([11, 12, 13, 14])
In [3]: -
```

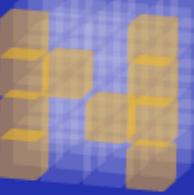


Numarray 2003



Perry Greenfield
J. Todd Miller
Rick White
Paul Barrett

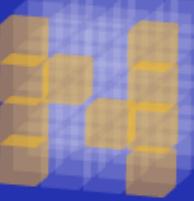




Numarray Issues

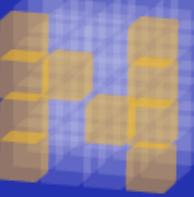
- was too slow for small arrays
- incomplete implementation of ufunc C-API
- minimal Numeric code re-use





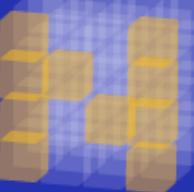
ndimage





ndimage



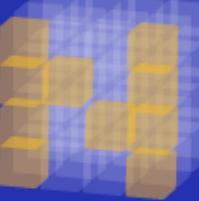


Split in the Community

SciPy/Numeric

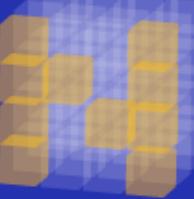


Numarray/ndimage



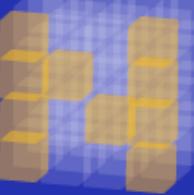
NumPy

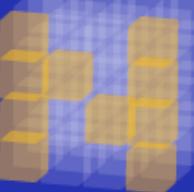


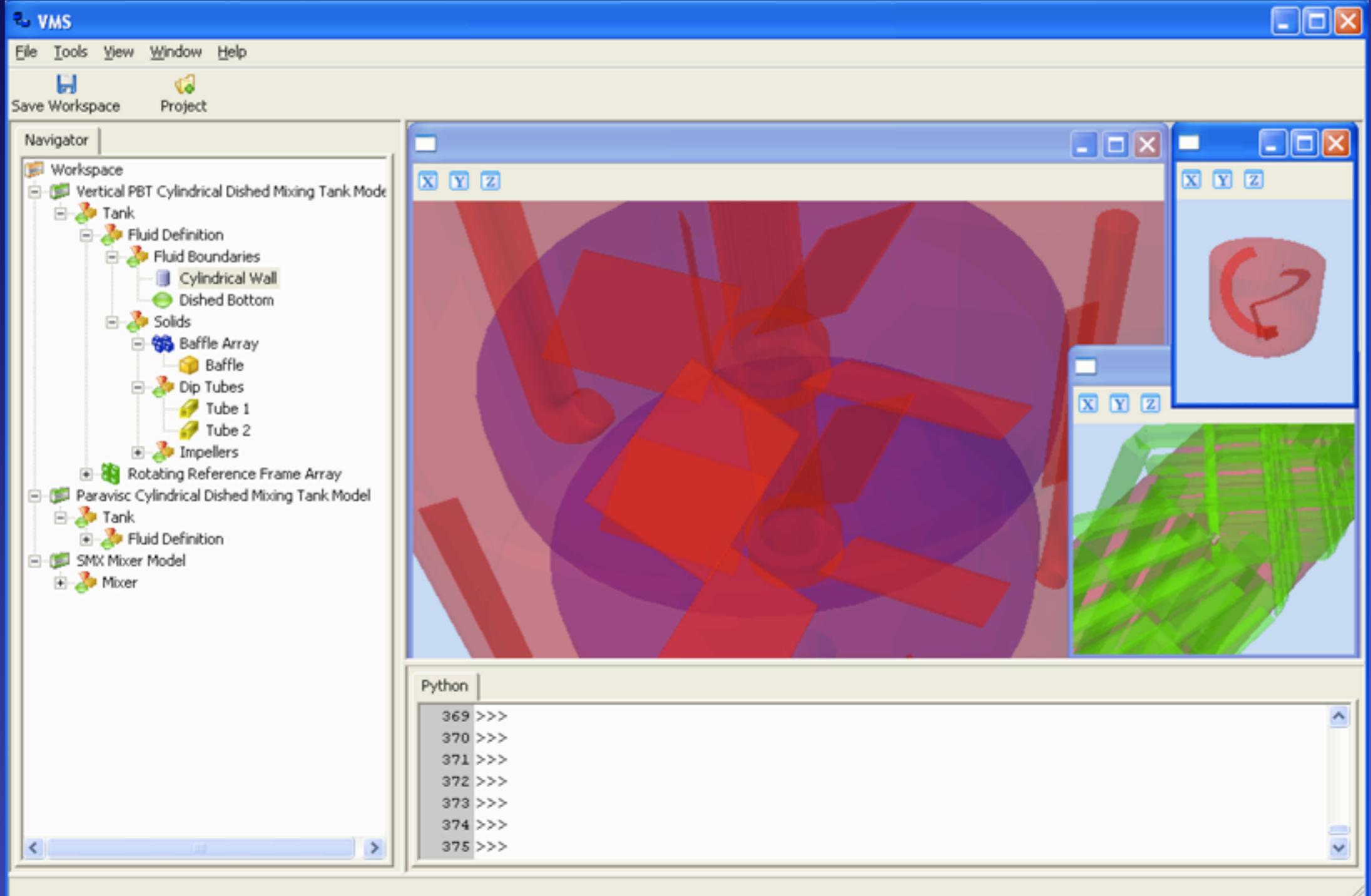


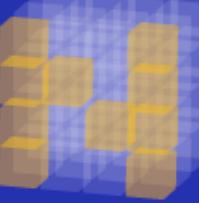
ENTHOUGHT
SCIENTIFIC COMPUTING SOLUTIONS

EuroSciPy
2008





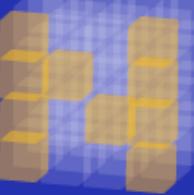




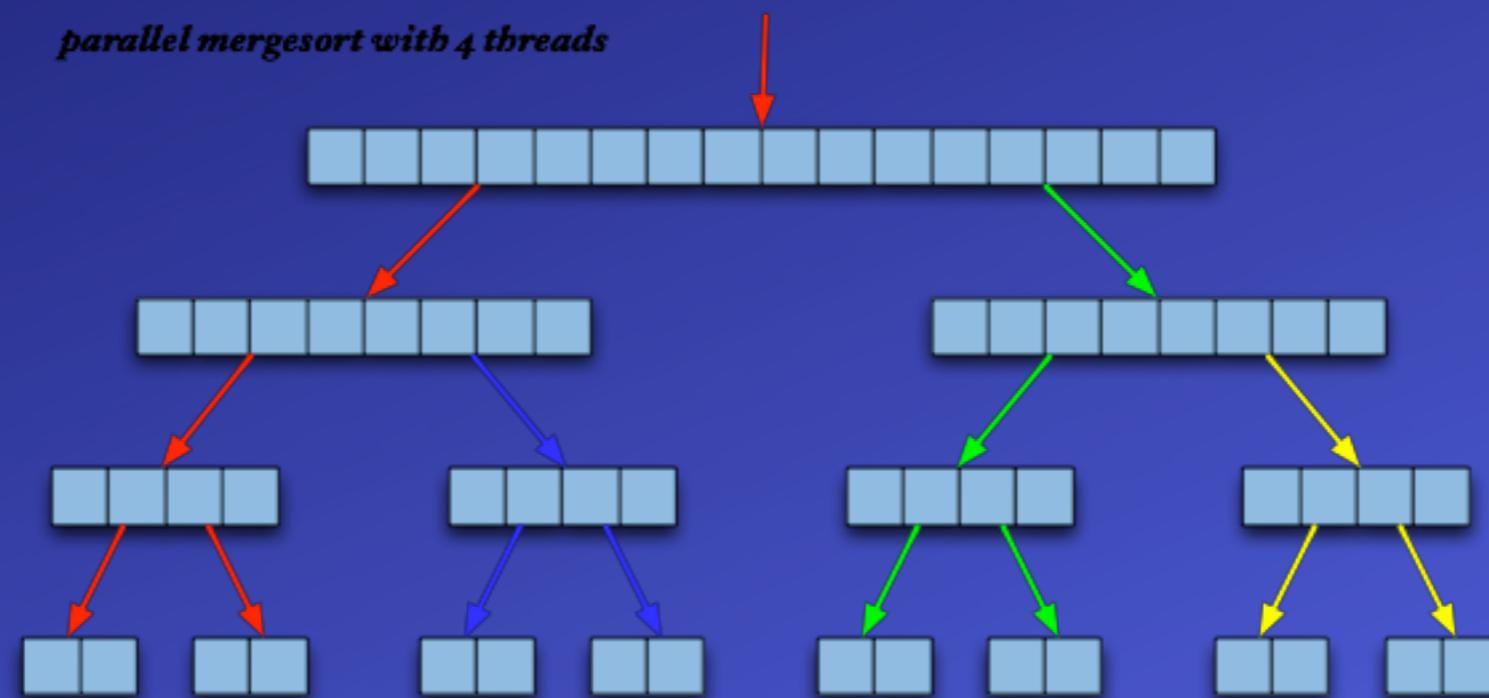
Robert Kern

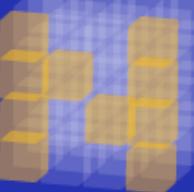


EuroSciPy
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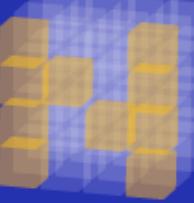
Chuck Harris

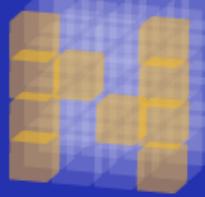




Over 50 SVN committers (about 15 very active)

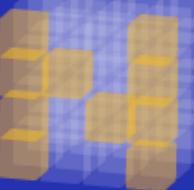






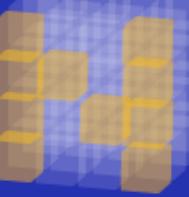
Observations





Observations

- Sharing code is addictive (like community theatre)
- Need the cathedral to bring the bazaar
- Be willing to let go of your code --- somebody out there can make it better than you did, let them when they gain your trust.



Thank you!!
I'm excited by what
we are building together!!

