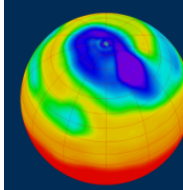




**National Centre for  
Atmospheric Science**  
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# Python introductions

Thanks to all contributors:

Alison Pamment, Sam Pepler, Ag Stephens, Stephen Pascoe,  
Matt Pryor, Anabelle Guillory, Graham Parton, Esther  
Conway, Wendy Garland, Alan Iwi and Matt Pritchard.

# BEFORE WE START (1)

We cannot teach you Python in a day...  
...but hopefully we can show you that it is:

- Human-readable (relatively)
- Useful (even if you only know a bit)
- Flexible (you can use it in many places/ways)

# BEFORE WE START (2)

Teaching materials courtesy of:

<http://www.software-carpentry.org/>



# Overview

- Introduction – why we recommend Python
- Basics and control flow
- Lists, tuples and slicing
- Input/output
- Strings and text processing
- Functions, libraries and scripts
- Error handling and logging
- Sets, dictionaries and OOP

# What is Python?

- A simple interpreted language
- Very human-readable with clean syntax
- Making it a very good “learn to programme” language

# Why do we recommend Python?

- It is **open source** and **free**
- It is **cross-platform** (including Windows)
- It can be used for simple scripting through to writing full-blown complex applications
- Many libraries/tools to tackle all kinds of problems
- In the environmental science community it continues to grow in popularity...so **we can share code!**

# Python version?

Python has multiple personalities!

- **Python 3** – new; different

*But not used much yet*

- **Python 2.6+** – established,

*Used extensively in our community.*

*Used in this course!*

But what changes?

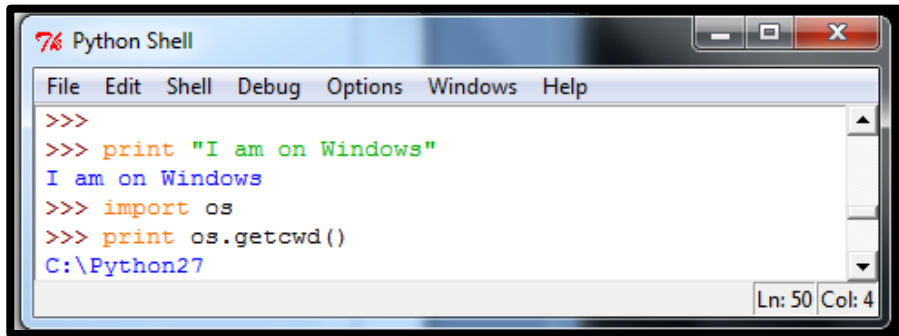
E.g. `print` changes from a statement to a function...

```
>>> print "hello" # in Python 2.* to...
```

```
>>> print ("hello") # in Python 3.*
```



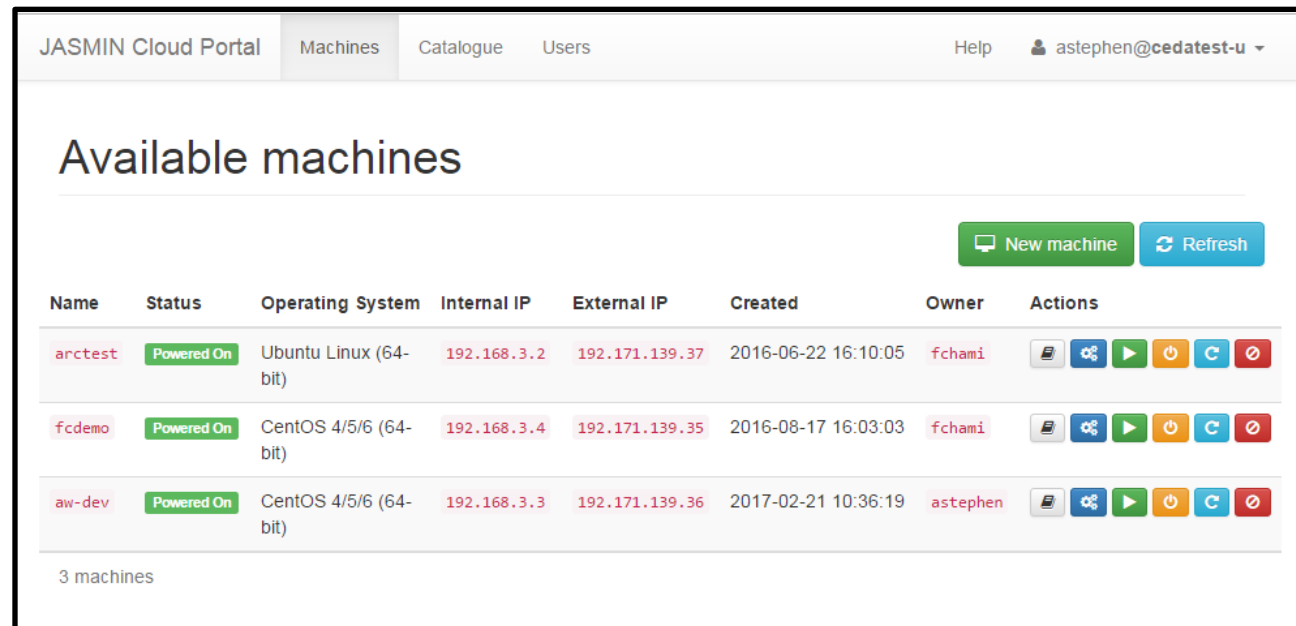
# What can you do with python?



```
Python Shell
File Edit Shell Debug Options Windows Help
>>>
>>> print "I am on Windows"
I am on Windows
>>> import os
>>> print os.getcwd()
C:\Python27
Ln: 50 Col: 4
```

Interactive “shell”: allows quick learning/testing/use.

Web-programming: frameworks make this easy.



JASMIN Cloud Portal Machines Catalogue Users Help astephen@cedatest-u

### Available machines

[New machine](#) [Refresh](#)

Name	Status	Operating System	Internal IP	External IP	Created	Owner	Actions
arctest	Powered On	Ubuntu Linux (64-bit)	192.168.3.2	192.171.139.37	2016-06-22 16:10:05	fchami	<a href="#">View</a> <a href="#">Edit</a> <a href="#">Run</a> <a href="#">Power On</a> <a href="#">Power Off</a> <a href="#">Refresh</a>
fcdemo	Powered On	CentOS 4/5/6 (64-bit)	192.168.3.4	192.171.139.35	2016-08-17 16:03:03	fchami	<a href="#">View</a> <a href="#">Edit</a> <a href="#">Run</a> <a href="#">Power On</a> <a href="#">Power Off</a> <a href="#">Refresh</a>
aw-dev	Powered On	CentOS 4/5/6 (64-bit)	192.168.3.3	192.171.139.36	2017-02-21 10:36:19	astephen	<a href="#">View</a> <a href="#">Edit</a> <a href="#">Run</a> <a href="#">Power On</a> <a href="#">Power Off</a> <a href="#">Refresh</a>

3 machines



# What can you do with python?



## Iris 1.12

[home](#) | [examples](#) | [gallery](#) | [contents](#) |

### Iris user guide

#### How to use the user guide

If you are reading this user guide for the first time it is strongly recommended that you read the user guide fully before experimenting with your own data files.

Much of the content has supplementary links to the reference documents. Please follow these links in order to understand the guide but they may be useful for future exploration.

Since later pages depend on earlier ones, try reading this user guide in order and [previous](#) links.

#### User guide table of contents

- [1. Introduction](#)
  - [1.1. Iris data structures](#)
  - [1.2. Cubes in practice](#)

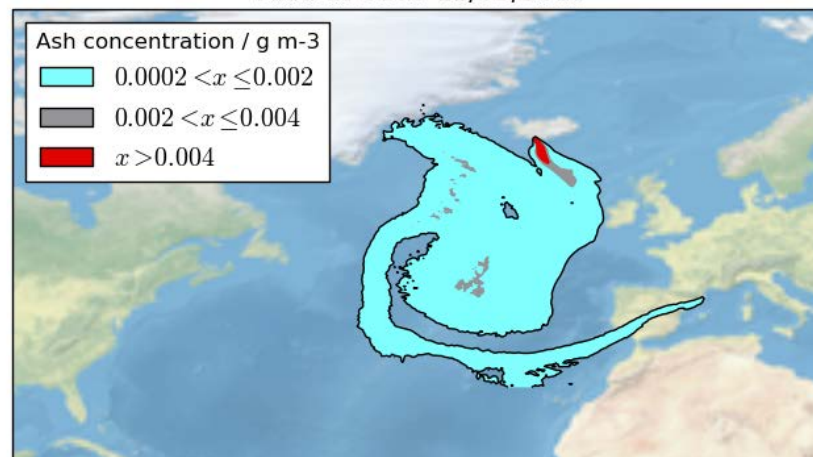
Open source packages for  
data analysis and  
visualisation.

[User guide](#)

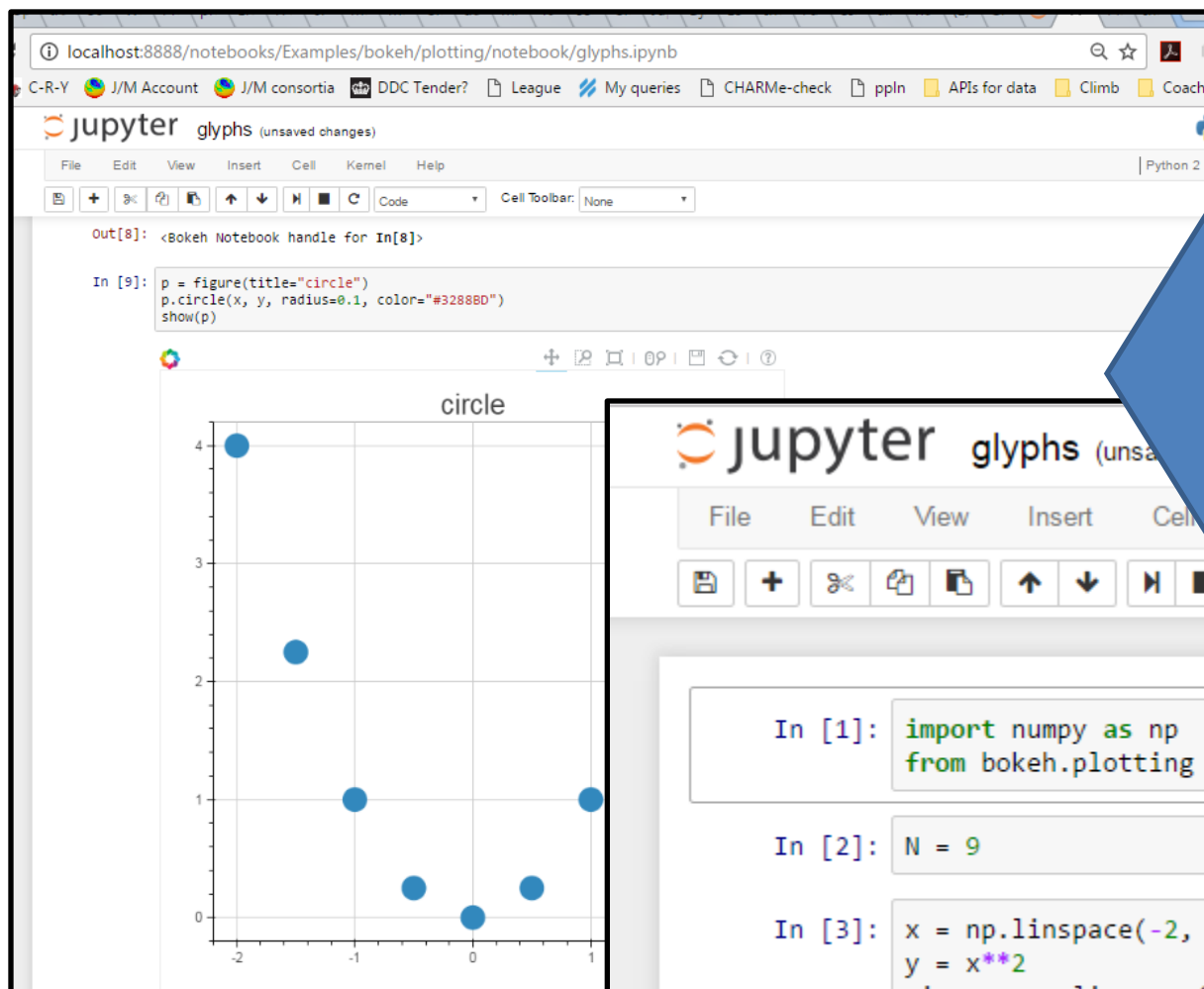
- [How to use the user guide](#)
- [User guide table of contents](#)

[Previous topic](#)

Volcanic ash concentration forecast  
valid at 0600 11/05/2010



# What can you do with python?



**Jupyter  
Notebooks run  
interactively  
inside your  
browser!**

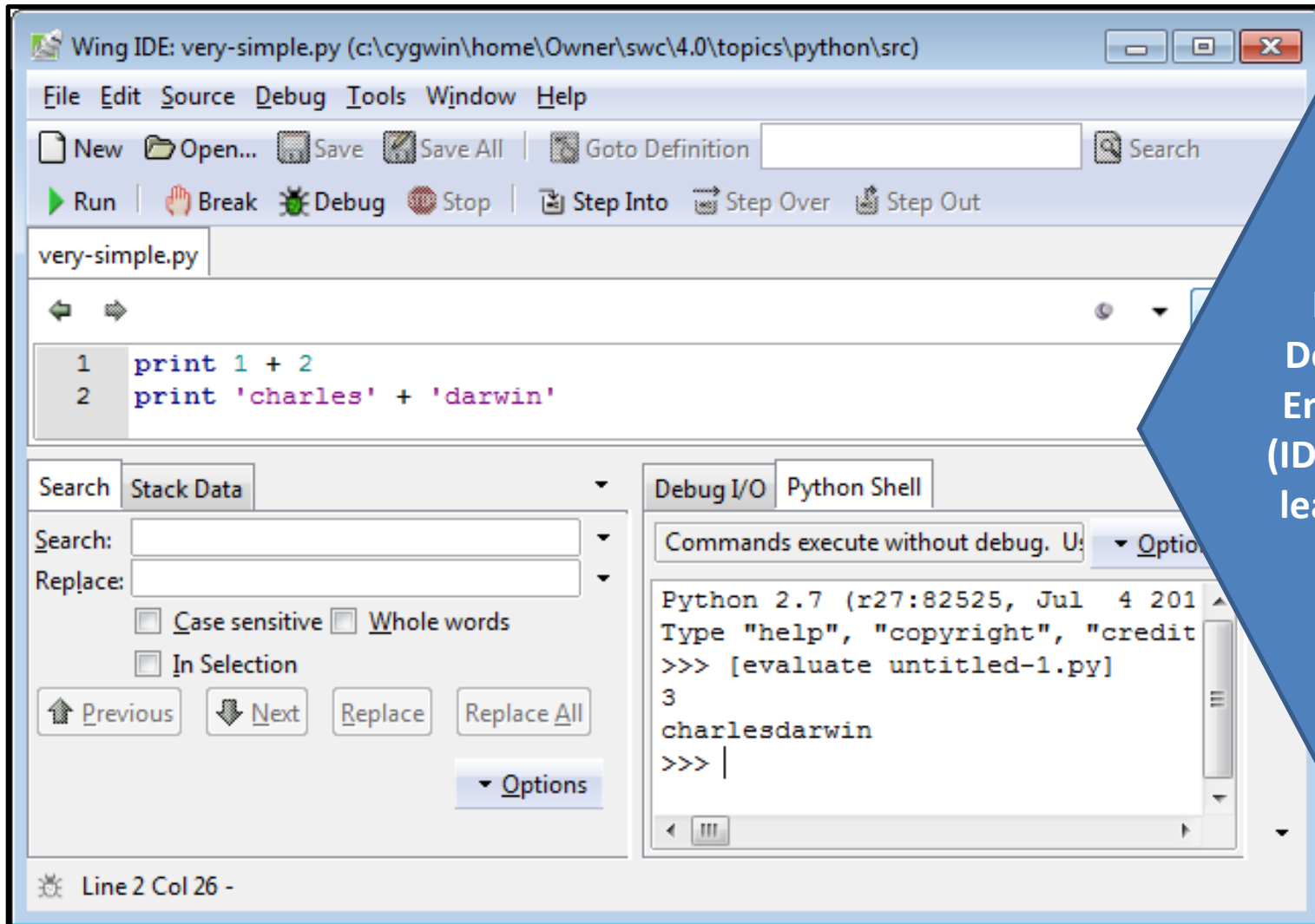
A screenshot of a Jupyter Notebook interface showing three code cells. The notebook title is `glyphs (unsaved changes)`. The menu bar includes `File`, `Edit`, `View`, `Insert`, and `Cell`. The toolbar shows icons for saving, adding cells, deleting cells, and other notebook controls. The code cells contain the following Python code:

```
In [1]: import numpy as np
        from bokeh.plotting import figure, show, output_notebook

In [2]: N = 9

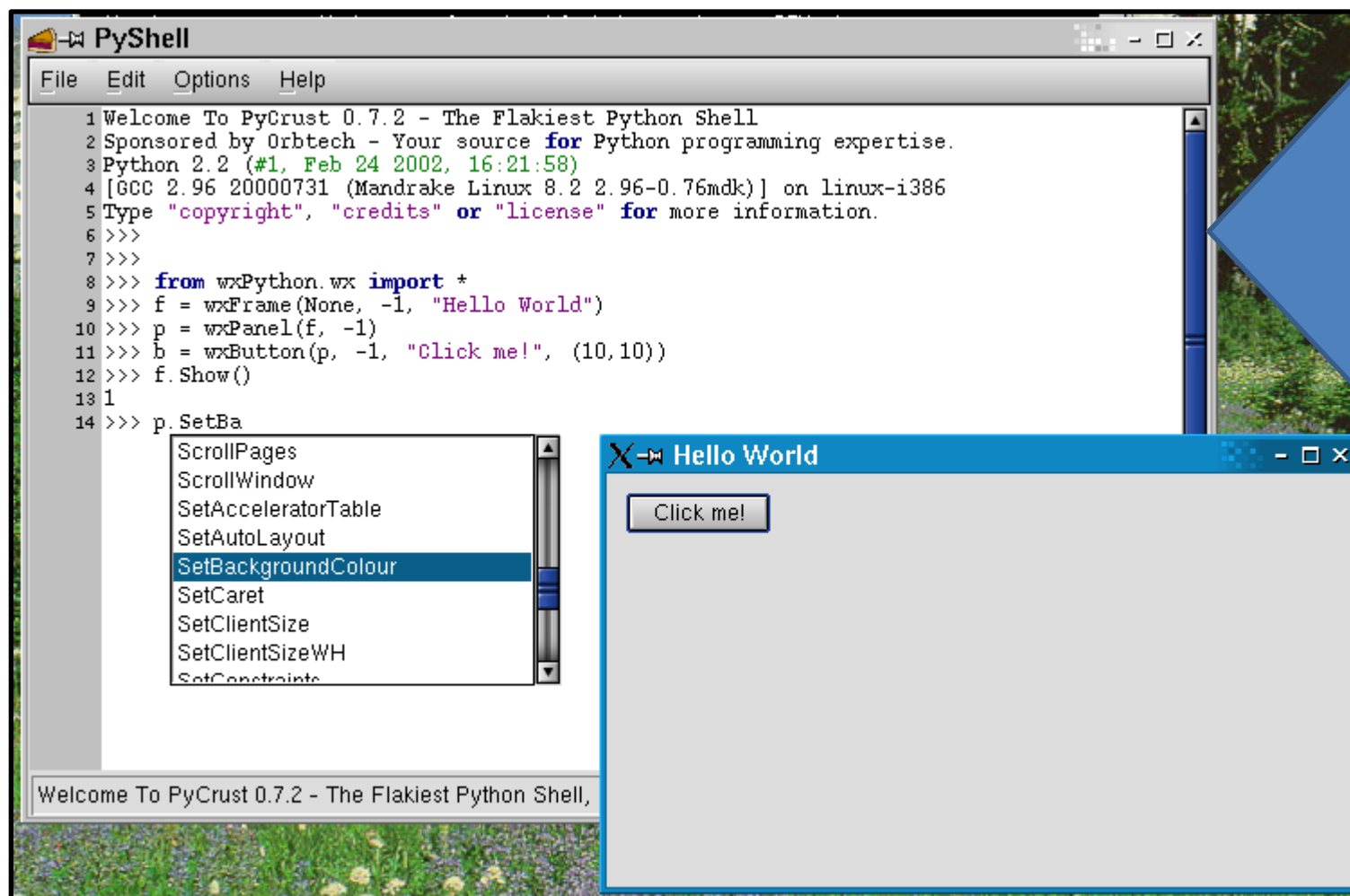
In [3]: x = np.linspace(-2, 2, N)
        y = x**2
        sizes = np.linspace(10, 20, N)
        xpts = np.array([-0.09, -.12, .0, .12, .09])
        ypts = np.array([-0.1, .02, .1, .02, -0.1])
```

# What can you do with python?



Integrated Development Environments (IDEs): help you learn/manage coding.

# What can you do with python?



Tools for  
building GUIs:  
e.g. wxpython

# Let's get to work...