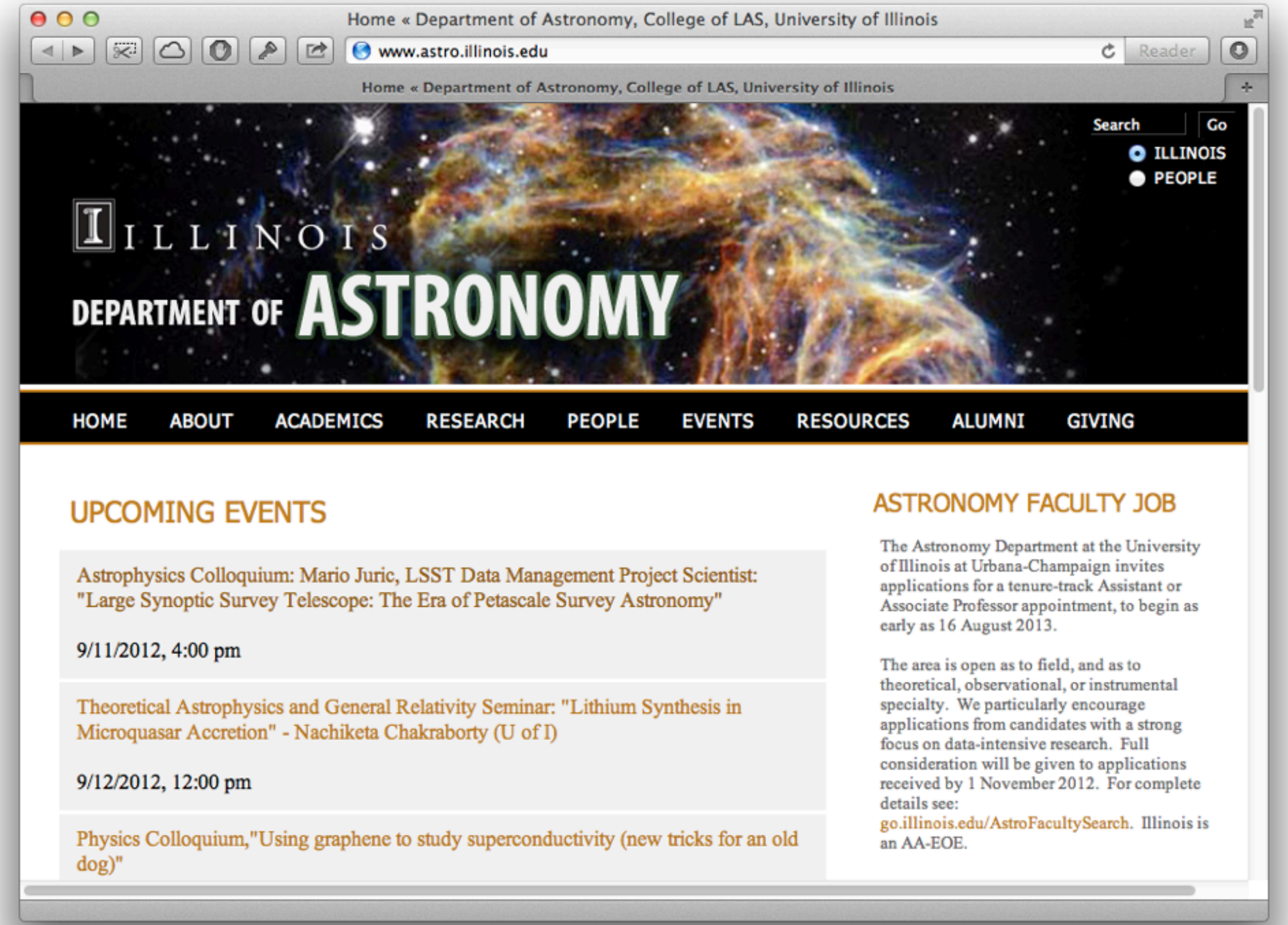
Informatics in the Astronomy Classroom

Your tour guide

Robert J. Brunner
University of Illinois

Illinois Informatics Institute
Student *Volunteers*

Background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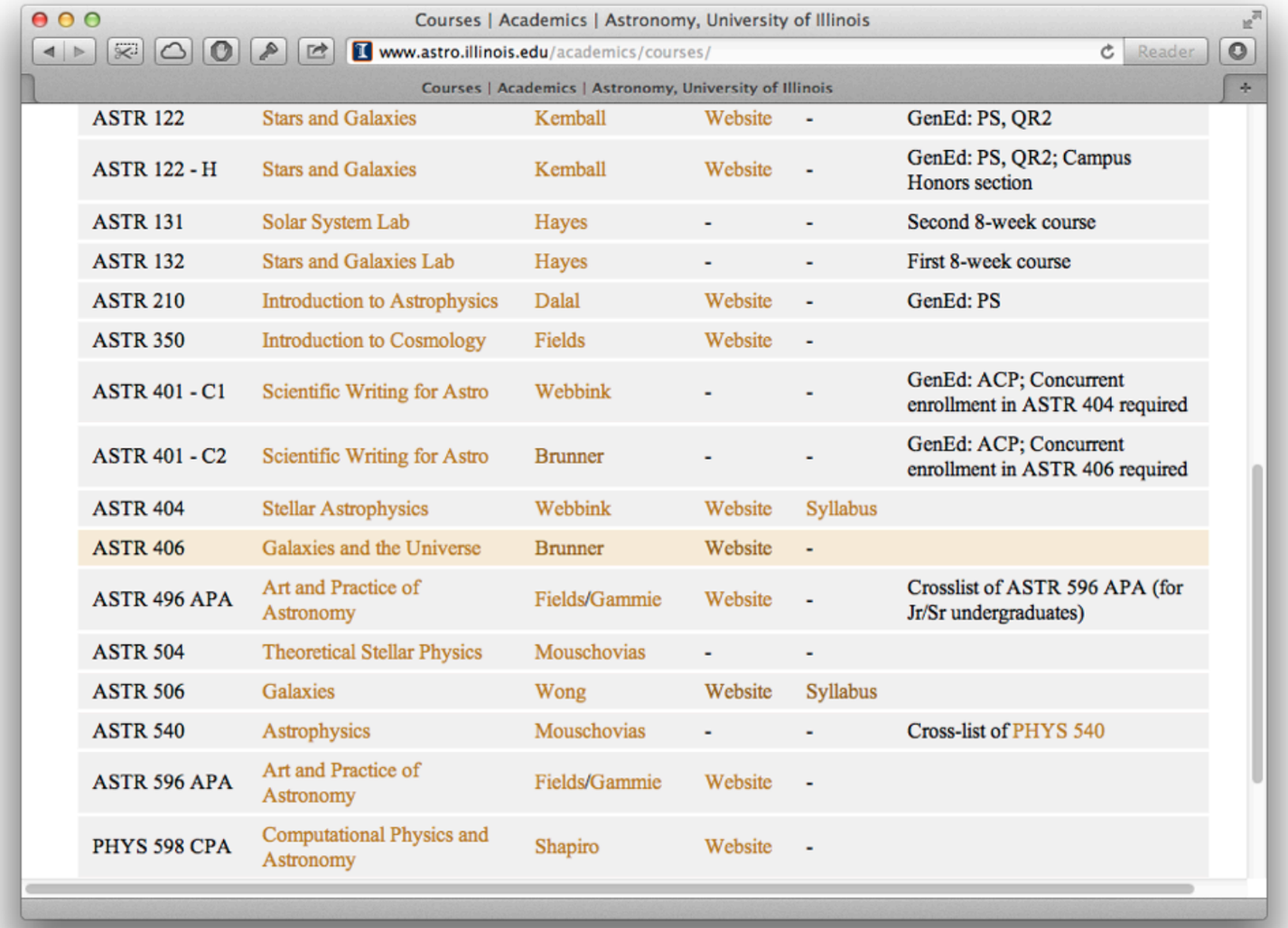
Astrophysics Colloquium: Mario Juric, LSST Data Management Project Scientist: "Large Synoptic Survey Telescope: The Era of Petascale Survey Astronomy"
9/11/2012, 4:00 pm
Theoretical Astrophysics and General Relativity Seminar: "Lithium Synthesis in Microquasar Accretion" - Nachiketa Chakraborty (U of I)
9/12/2012, 12:00 pm
Physics Colloquium,"Using graphene to study superconductivity (new tricks for an old dog)"
ASTRONOMY FACULTY JOB
The Astronomy Department at the University of Illinois at Urbana-Champaign invites applications for a tenure-track Assistant or Associate Professor appointment, to begin as early as 16 August 2013.
The area is open as to field, and as to theoretical, observational, or instrumental specialty. We particularly encourage applications from candidates with a strong focus on data-intensive research. Full consideration will be given to applications received by 1 November 2012. For complete details see: go.illinois.edu/AstroFacultySearch. Illinois is an AA-EOE.

Why?



ASTR 122	Stars and Galaxies	Kemball	Website	-	GenEd: PS, QR2
ASTR 122 - H	Stars and Galaxies	Kemball	Website	-	GenEd: PS, QR2; Campus Honors section
ASTR 131	Solar System Lab	Hayes	-	-	Second 8-week course
ASTR 132	Stars and Galaxies Lab	Hayes	-	-	First 8-week course
ASTR 210	Introduction to Astrophysics	Dalal	Website	-	GenEd: PS
ASTR 350	Introduction to Cosmology	Fields	Website	-	
ASTR 401 - C1	Scientific Writing for Astro	Webbink	-	-	GenEd: ACP; Concurrent enrollment in ASTR 404 required
ASTR 401 - C2	Scientific Writing for Astro	Brunner	-	-	GenEd: ACP; Concurrent enrollment in ASTR 406 required
ASTR 404	Stellar Astrophysics	Webbink	Website	Syllabus	
ASTR 406	Galaxies and the Universe	Brunner	Website	-	
ASTR 496 APA	Art and Practice of Astronomy	Fields/Gammie	Website	-	Crosslist of ASTR 596 APA (for Jr/Sr undergraduates)
ASTR 504	Theoretical Stellar Physics	Mouschovias	-	-	
ASTR 506	Galaxies	Wong	Website	Syllabus	
ASTR 540	Astrophysics	Mouschovias	-	-	Cross-list of PHYS 540
ASTR 596 APA	Art and Practice of Astronomy	Fields/Gammie	Website	-	
PHYS 598 CPA	Computational Physics and Astronomy	Shapiro	Website	-	

Undergraduates

Graduates Students

When are students going to be trained in the practical issues?

How?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Welcome Informatics PhD candidates
Microsoft's Imagine Cup
Informatics Graduate Student Reception
BIOE 498/598 Computational Cancer Biology – Fall course
AFRO 498 Race, Gender and Information Communication Technology
Welcome Informatics PhD candidates
Informatics Graduate Students
Fourteen students joined two to make up the first cohort of Informatic PhD students. This photo was taken by E. Paul Ponder at a reception held on August 24, 2012.
Microsoft's Imagine Cup
From Microsoft:

Who?

Undergraduates

From inverse-square law: $m_1 - m_2 = -2.5 \log \left(\frac{f_1}{f_2} \right)$

$$I(r) = I(r_e) e^{-b[(r/r_e)^{1/n} - 1]}$$

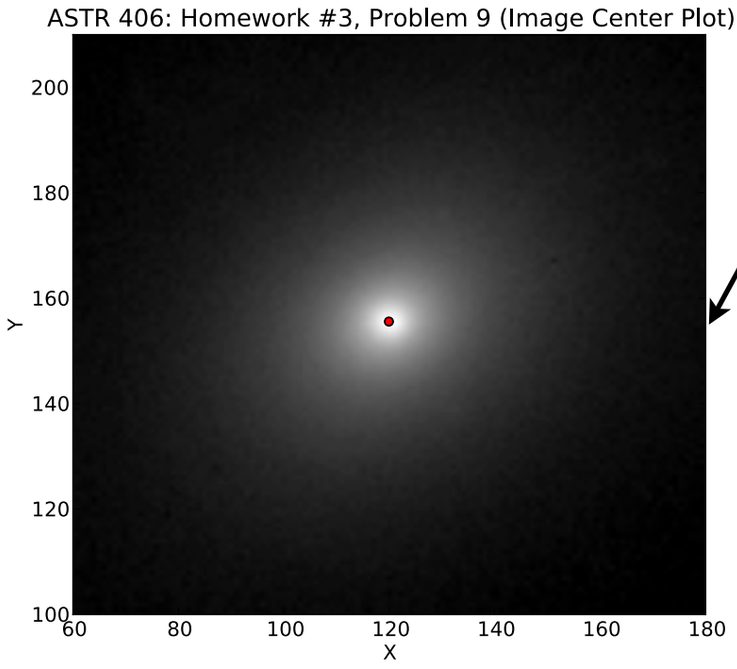
Undergraduates

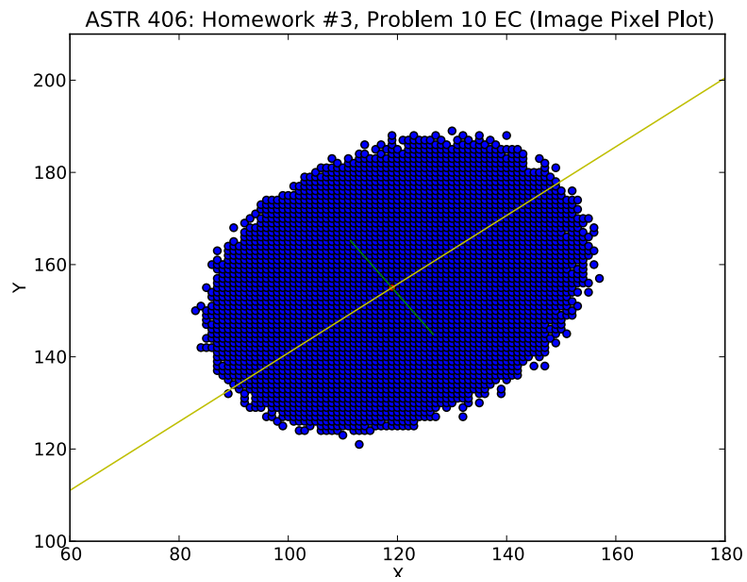
From inverse-square law: $m_1 - m_2 = -2.5 \log\left(\frac{f_1}{f_2}\right)$

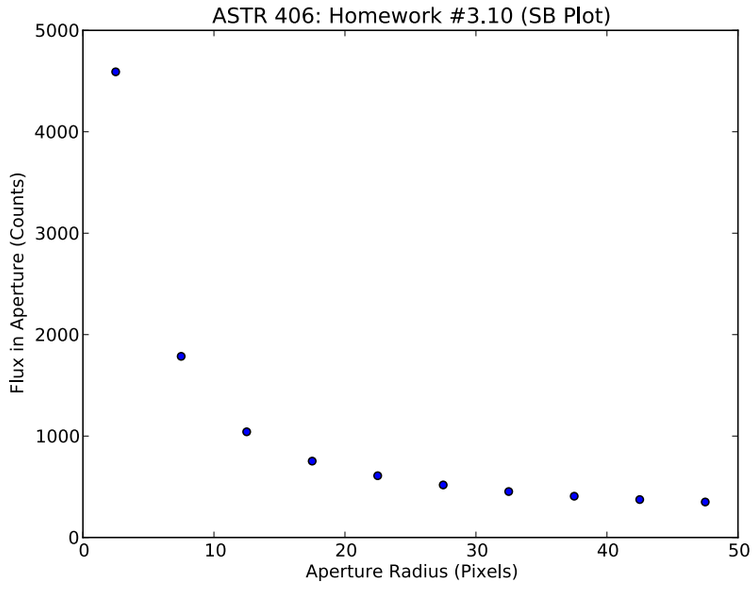
$$I(r) = I(r_e)e^{-b[(r/r_e)^{1/n}-1]}$$

Ugh Magnitudes!

python™







Undergraduates

$$n(r,z) = \sum_i n_i(0,0) e^{(-r/h_r,i)} e^{(-z/h_z,i)}$$

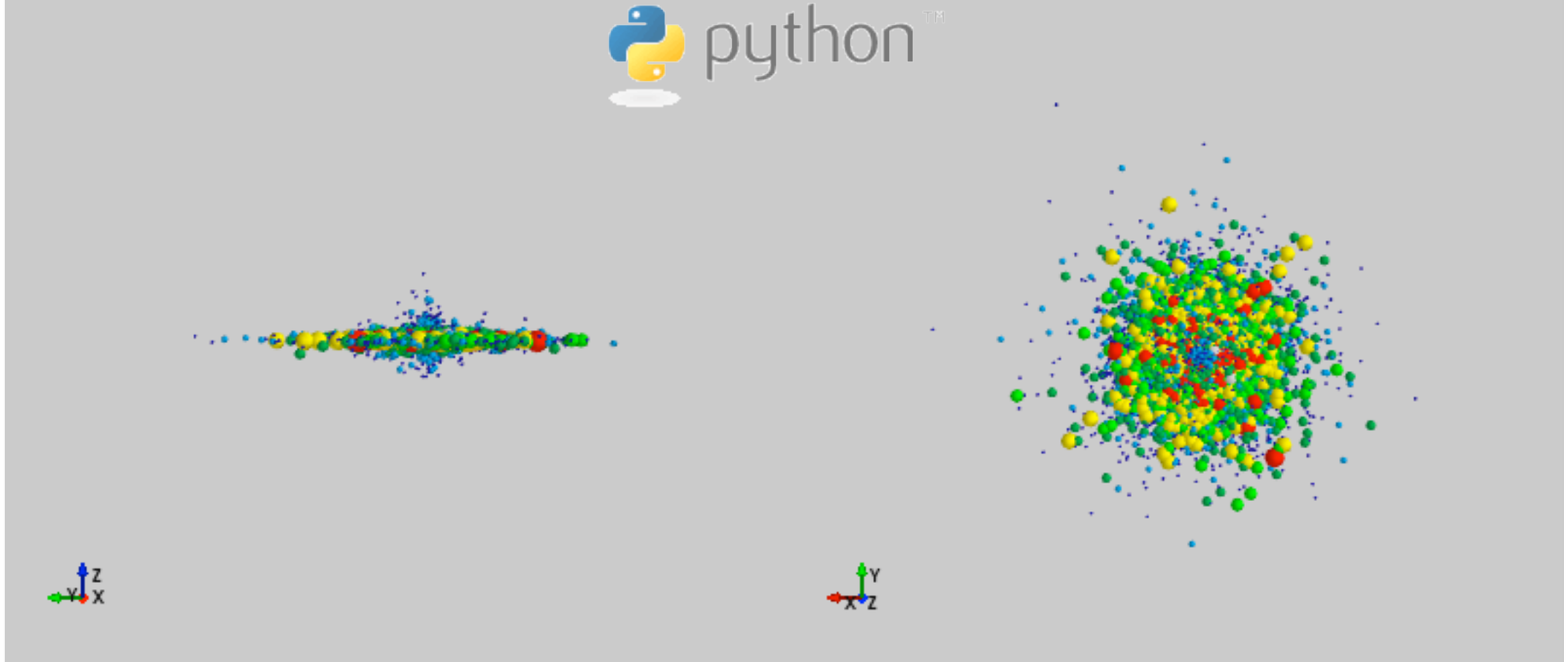
h_r is the scale length
h_z is the scale height

Undergraduates

$$n(r,z) = \sum_i n_i(0,0) e^{(-r/h_r,i)} e^{(-z/h_z,i)}$$

h_r is the scale length
h_z is the scale height

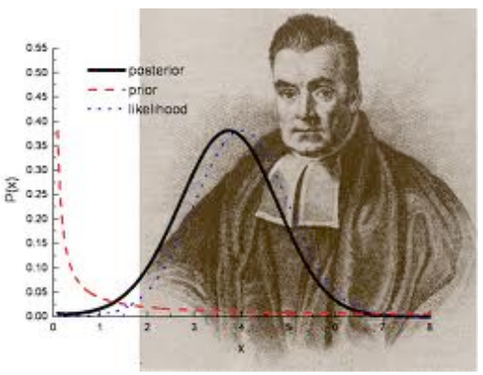
Nice formula, but what does this mean?

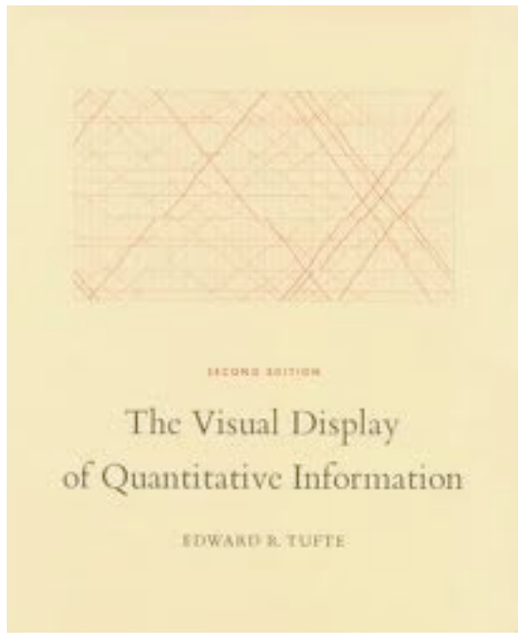


Lessons Learned

Data Science skills are not acquired by osmosis!

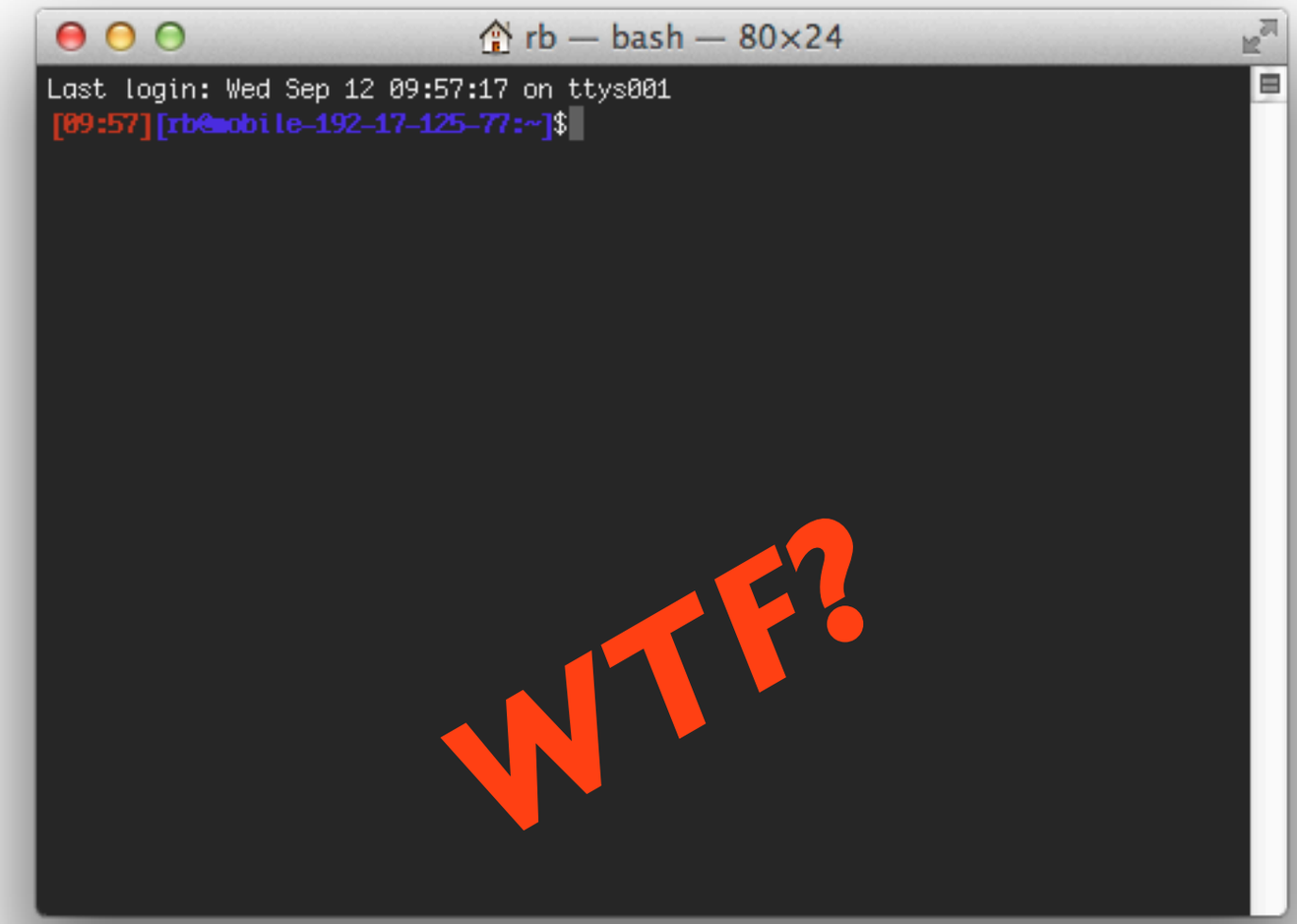
Vastly different backgrounds, experiences, and interests.



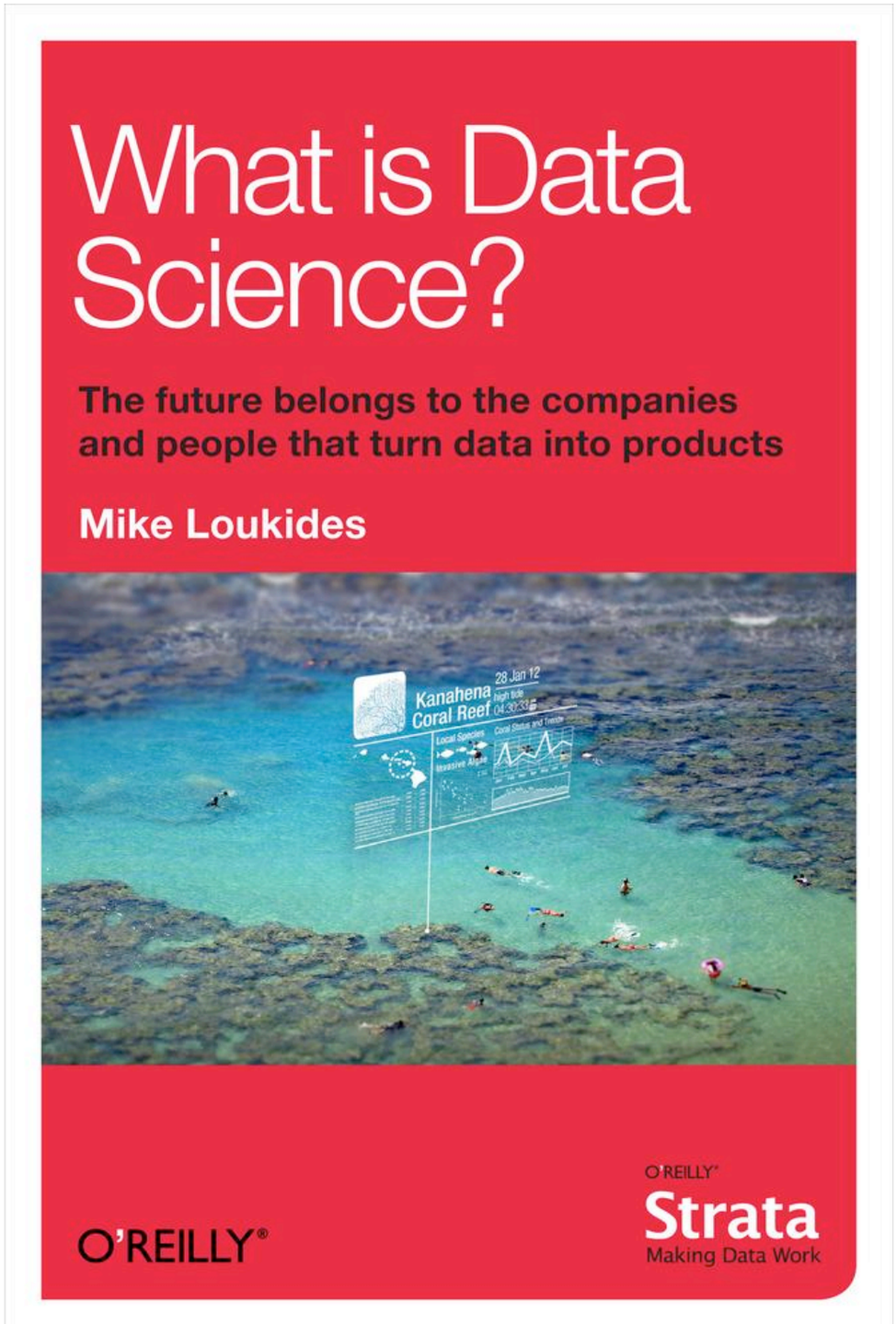


Lessons Learned

Deficiency in basic skills.



The Market

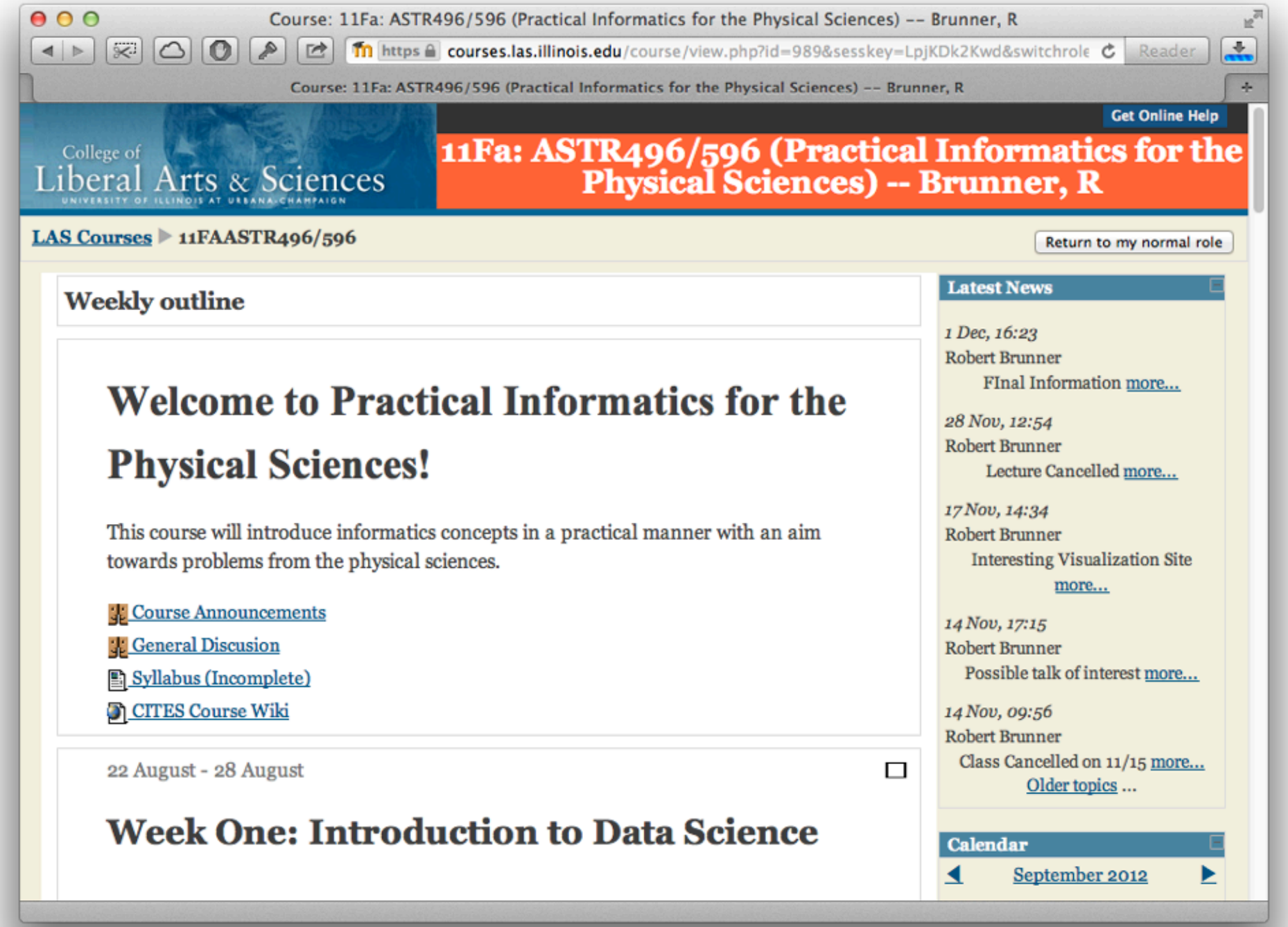


amazon.com

LinkedIn

Google™

Round II


Course: 11Fa: ASTR496/596 (Practical Informatics for the Physical Sciences) -- Brunner, R
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Return to my normal role
Weekly outline
Welcome to Practical Informatics for the Physical Sciences!
This course will introduce informatics concepts in a practical manner with an aim towards problems from the physical sciences.
Course Announcements
General Discusion
Syllabus (Incomplete)
CITES Course Wiki
22 August - 28 August
Week One: Introduction to Data Science
Latest News
1 Dec, 16:23
Robert Brunner
FInal Information more...
28 Nov, 12:54
Robert Brunner
Lecture Cancelled more...
17 Nov, 14:34
Robert Brunner
Interesting Visualization Site
more...
14 Nov, 17:15
Robert Brunner
Possible talk of interest more...
14 Nov, 09:56
Robert Brunner
Class Cancelled on 11/15 more...
Older topics ...
Calendar
September 2012

Lessons Learned II

Template Code

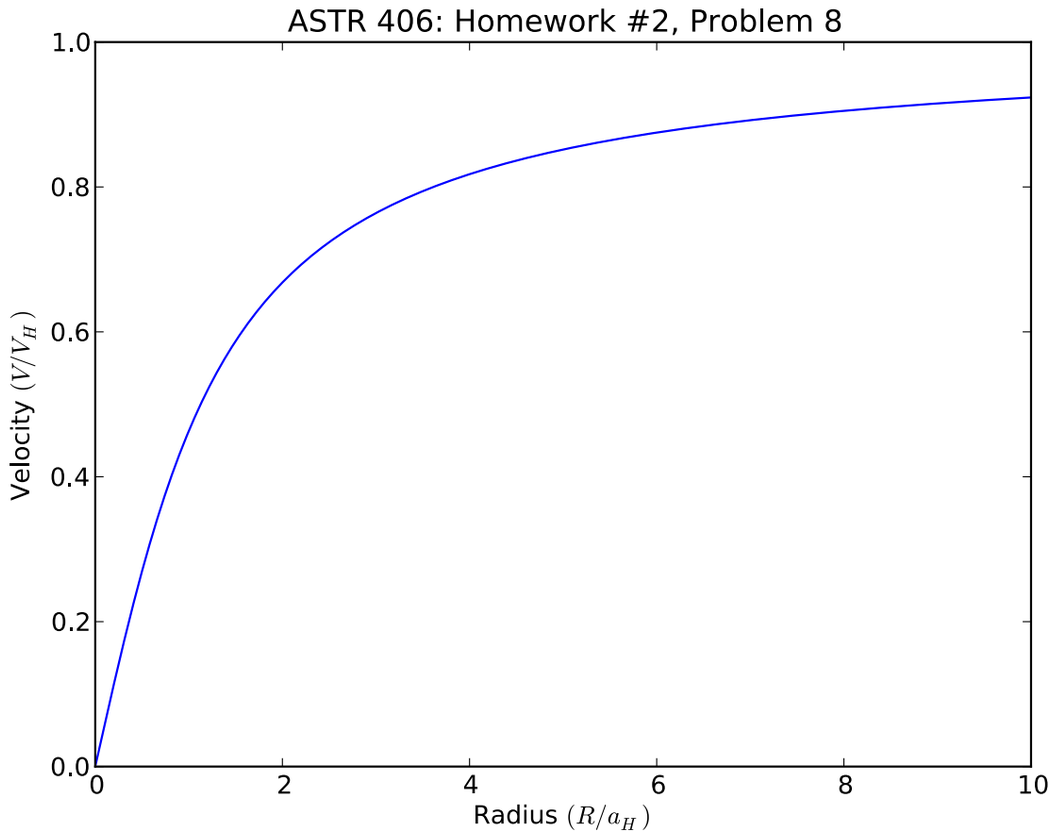
```
#! /usr/bin/env python

def vCircular(distance):
    return sqrt(1.0 - atan(distance)/distance)

def my_plot(x, y):
    ...
    pyplt.savefig("File.pdf")

# General Main method.

if __name__ == '__main__':
    ...
    y = map(vCircular, x)
    my_plot(x, y)
```



Lessons Learned II

Round III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ILLINOIS
Introduction to Data Science
Robert J. Brunner
This course will introduce the basic concepts of working with data, particularly large data for both scientific and commercial applications.
Coming Soon

Summary

Informatics Training:

integrate into curriculum

new opportunities

learn from/work with industry

Leverage existing work and knowledge

Your tour guide

bigdog@illinois.edu

http://lcdm.astro.illinois.edu