

# Astronomy Town Hall Meeting

## Nov. 2014

# Topics of Discussion

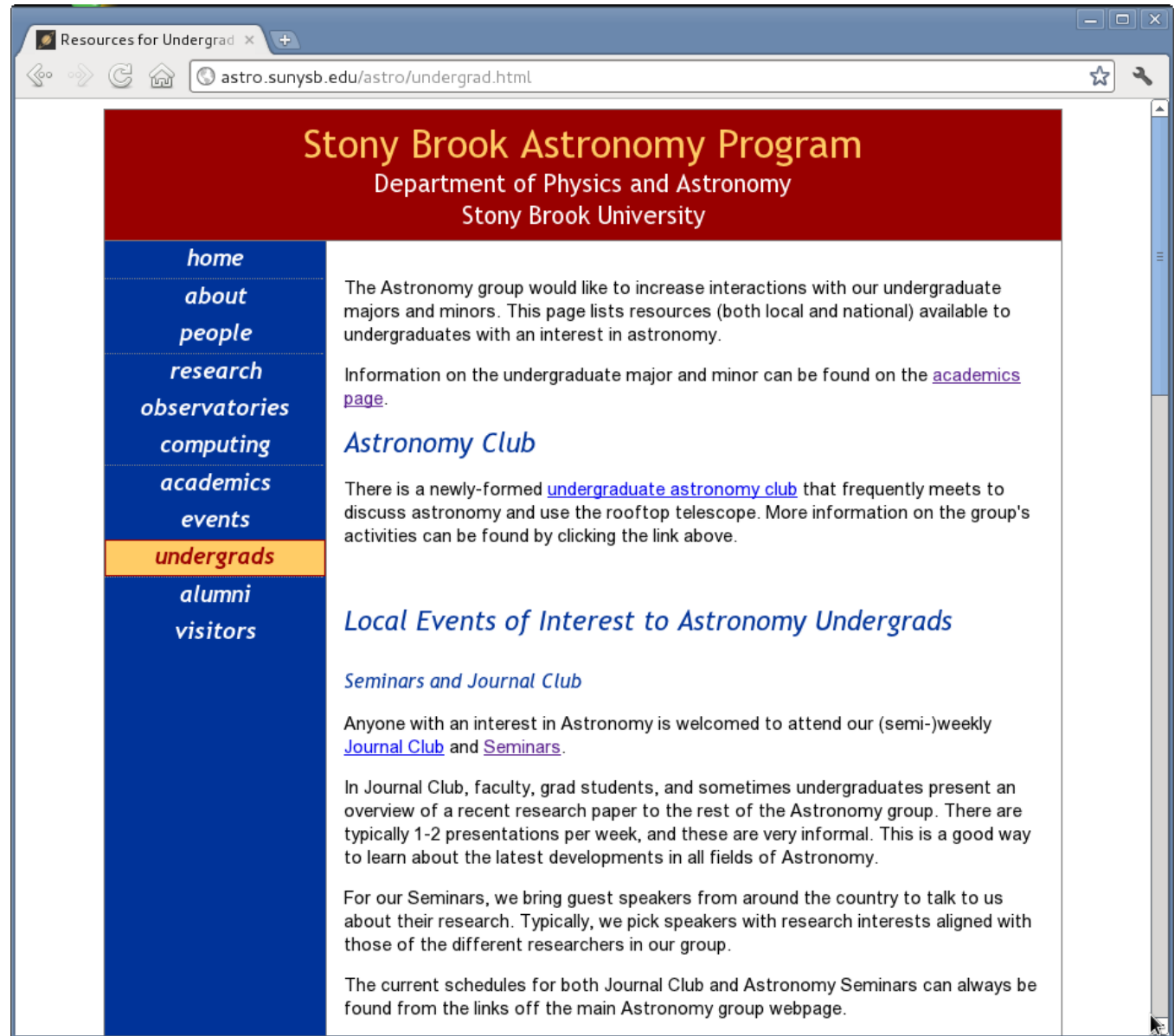
- Astronomy courses
- Research opportunities
- Astronomy club
- Graduate School

# UG Astro Webpage

<http://www.astro.sunysb.edu/astro/undergrad.html>

Topics of interest for undergrad astronomy majors.

Links to class information, research opportunities, Astro club, events, etc.



# Astronomy Courses

- [AST 203](#) is the prerequisite for most classes
- [AST 34x](#)-level classes offered on a 2-year cycle—plan ahead
- [AST 205](#) offered on a 2-year cycle
- Many students take [AST 443](#) (Observational Techniques) to satisfy major requirements
  - *Can be used in place of the senior Physics lab* ([PHY 445](#)) if you are a double major (note: if you plan to later do the MAT in Physics, then you will need to take the Physics lab)
- Many students also do research or reading classes to satisfy major requirements—plan ahead
  - You need to find an advisor who agrees to mentor you for this.
  - You may not find someone willing to do 3 credits in one semester.
- Physics major and Astronomy major are closely related—many students double major
- Talk to Prof. Zingale for information about the major

# AST 205 & 34x Sequence

- AST 205 (Planetary Science)
  - Fall 2014
  - Fall 2016
- AST 341 (Stars & Radiation):
  - Fall 2014
  - Fall 2016
- AST 346 (Galaxies):
  - Spring 2013
  - Spring 2015
- AST 347 (Cosmology):
  - Fall 2013
  - Fall 2015

# Astronomy Degree

- In addition to the courses, there is a writing requirement

*All students majoring in Astronomy/ Planetary Sciences must submit **two papers** (term papers or independent research papers) to the Astronomy coordinator for Department evaluation by the end of the junior year. If this evaluation is satisfactory, the student will have fulfilled the upper- division writing requirement.*

- Don't wait until the very last semester just before graduation to turn these in...

# Honors

- In your Junior year, you can apply to become a candidate for Departmental honors
  - Need to complete a thesis as part of your research coursework
  - You will want to have an faculty mentor lined up at this point.

# Research Opportunities

- [AST 200](#) (Current Astronomical Research at Stony Brook) is a good way to see what research is taking place here
- [PHY 277](#) (Computation for Physics and Astronomy) provides a good basis for the tools you will need to do research
- Local opportunities
  - Knock on doors
  - Talk to fellow students
  - Look at the UG section of the Astro Group webpage
- UG student office (back of ESS 437) available to research-active students
- Course credit:
  - [AST 287: Introductory Research](#)
  - [AST 345: Undergraduate Research](#)
  - AST 447: Senior Tutorial
  - AST 475: Teaching Practicum
  - [AST 487: Senior Research](#)



# Local Research Opportunities

- From Prof. Lattimer:
  - I have a project to upgrade the database I keep of neutron star masses. I want to include properties of the binaries containing the stars, and make some comparative graphs.
  - Another project I envision is to model the high-density equation of state in a variety of simple ways to explore the consequences of large neutron star mass measurements for limits to radii and other neutron star properties. This would require a little computational experience like PHY 277.
- From Prof. Zingale:
  - I have several software development projects for students who have had courses on ODEs and PDEs, and some programming background.
  - I am always looking for students who to take the lead on some new simulation projects using existing codes.
- From Prof. Walter:
  - I have space for undergrads doing analysis of old nova data. AST 203 / PHY 277 required. Desire to learn to program in IDL a plus.

# Local Research Opportunities

- From Prof. Simon
  - Mike Simon regularly includes undergraduates in his research on the astrophysics of stars much younger than the sun. My current interests include:
    - Mass measurements of stars that still retain their circumstellar disks using ALMA data that will, one happy day, finally be taken and mysteriously arrive here.
    - Measurements of the effective temperatures of the ALMA targets using observed and synthetic high resolution spectra.
    - Calculation of custom evolutionary tracks of young stars using the Modules in Experimental Stellar Astronomy (MESA).
    - Identifying very nearby stars younger than about 50 MY suitable for asteroseismological study using data from the extended Kepler (K2) Mission.
  - Suitable preparation includes some of the following, not necessarily all found in one individual:
    - Astronomy knowledge at least through the AST 203 and or 205 levels.
    - Physics through the PHY 131,2 or 141,2, and Modern Physics levels.
    - Math or Applied Math at levels required the above.
    - A level of comfort with computers such as provided in the Introduction to Computing Course.

# External Research Opportunities

- NSF REU program
  - Provides stipend and travel expenses for ~10 week research experience at a University in the US.
  - Previous SBU students went to Hawaii, Harvard, Texas, SF, ...
  - Highly competitive
  - applications due in Dec./Jan.
- Many other summer opportunities exist—look at the UG webpage
- Typically application requires: transcript, 2-3 letters of recommendation, statement of interests

# Graduate School

- Apply during senior year
- Both Physics and Astronomy programs and Astronomy/Astrophysics program
- Strong application:
  - Physics GREs + general GREs
  - GPA
  - Letters of reference
  - Research experience
- PhD graduate students are fully supported
  - Teaching/research assistant with annual stipend (~\$27,000) + tuition waiver
- ~4 – 6 years to get degree (sometimes shorter, sometimes longer)

# Timeline

- Applications are due in winter of your senior year
  - You'll hear in March-ish
  - Deadline to make a choice is typically April 15<sup>th</sup> of your senior year

# Physics GREs

- Dates ([https://www.ets.org/gre/subject/register/centers\\_dates/](https://www.ets.org/gre/subject/register/centers_dates/))
  - 09/27/14
  - 10/25/14
  - 04/18/15
- Content (<https://www.ets.org/gre/subject/about/content/physics>)
  - Classical mechanics: 20%
  - E&M: 18%
  - Optics and waves: 9%
  - Thermo and stat mech: 10%
  - Quantum: 12%
  - Atomic physics: 10%
  - Special relativity: 6%
  - Laboratory methods: 6%
  - Specialized topics: 9%

You may not have had all the upper level courses on these topics by the time you take the exam. Plan your schedule as best as you can and look over the practice exams.

# Careers

- Astronomy research provides students with the skills to do data analysis, software/algorithm design, and problem solving
  - Not every path requires a graduate degree
- Career paths
  - Academic (all levels)
  - Industry
    - Astro related
    - Software
    - Financial
    - ...
  - National observatories
  - National Laboratories
  - Museums/Planetariums
  - Journalism
  - ...

# Undergraduate Astronomy Club

- Revived ~2010
- Run observing sessions
- Use rooftop telescope (and know how to use it better than the faculty)
- Help with open nights
- Annual AstroFest

