

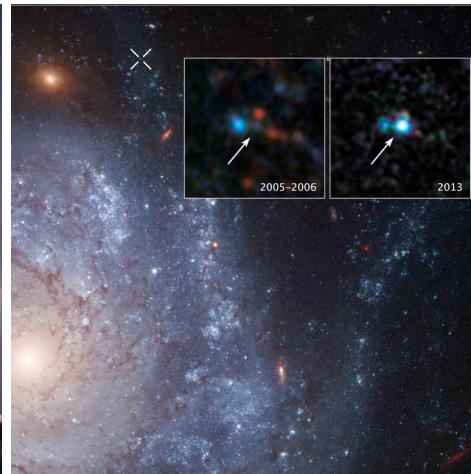
# ASTR 199 CIA

## CAREERS IN ASTRONOMY

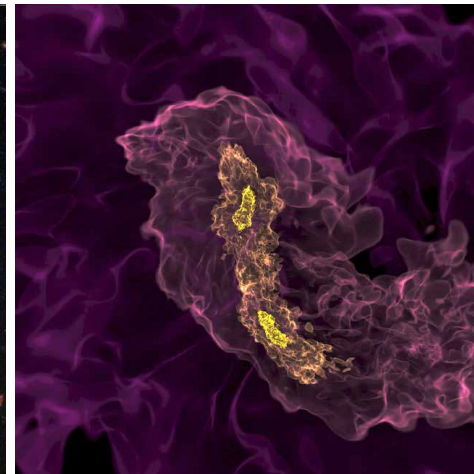
August 24, 2016



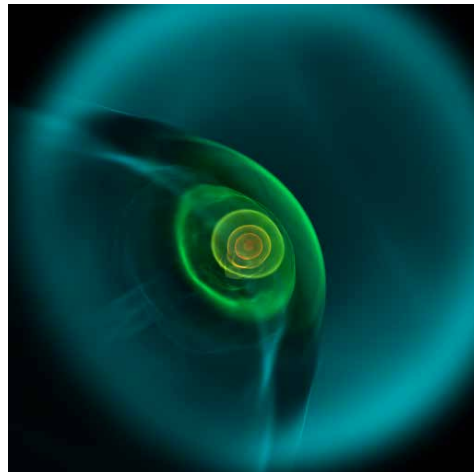
10-METER SOUTH POLE TELESCOPE



SUPERNOVAE WITH HUBBLE



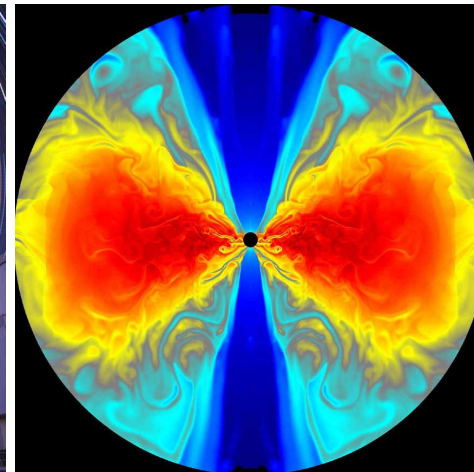
BINARY MERGER



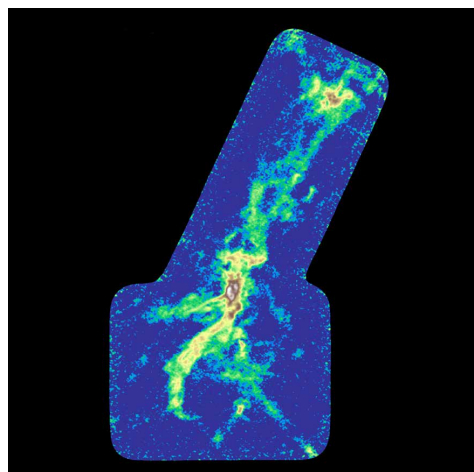
SUPERNOVA SHOCKWAVE



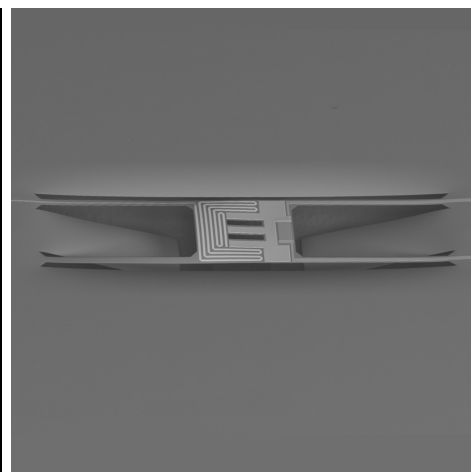
DARK ENERGY SURVEY



BLACK HOLE ACCRETION DISK



MOLECULAR CLOUDS WITH CARMA



DETECTOR FABRICATION



LSST



# Welcome to Illinois Astronomy!

We are proud you are joining us!

We are the **University** of Illinois

We promise the Universe  
...it's right there in the name!

In Astronomy: **we deliver!**

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# ILLINOIS

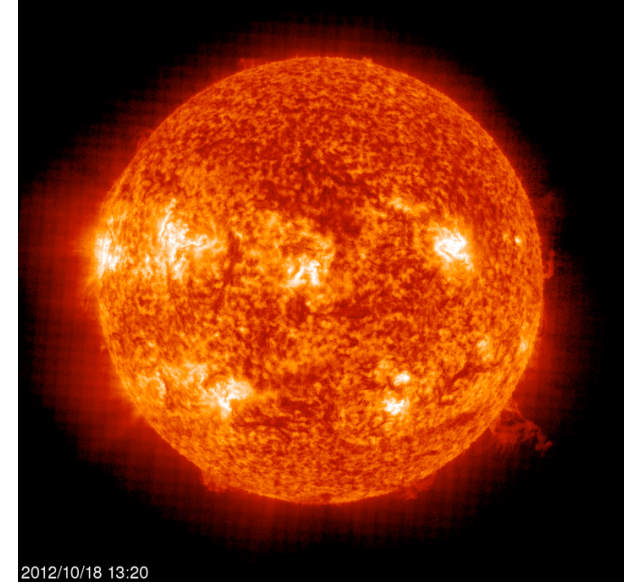




**Preview**



# The Fate of the Stars



the Sun and all stars:

- ▶ constantly emit energy
- ▶ have finite (not infinite) mass = finite fuel supply
- ▶ energy is conserved = not created or destroyed

And so?

- ▶ all stars – including the Sun – must eventually “burn out”
- ▶ = run out of energy = **run out of fuel**:

- ▶ **the Sun all stars are doomed to die**

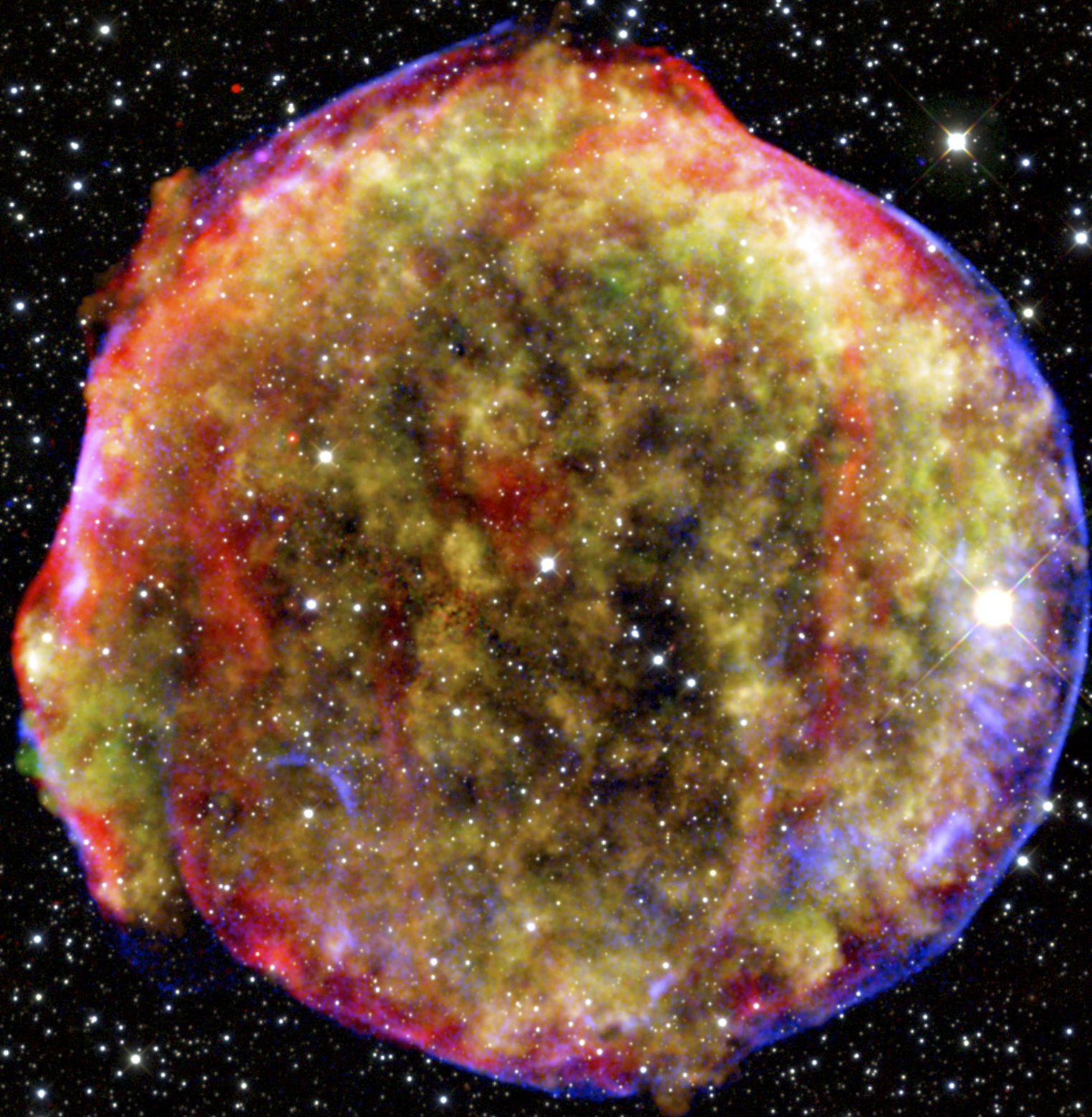
the Sun cannot live forever!

But the Sun and other stars are alive today,  
so...?

- ▶ stars alive today were not alive forever
- ▶ **all stars must be born as well as die**
- ▶ **the Sun and stars have life cycles**



# Cosmic Explosions



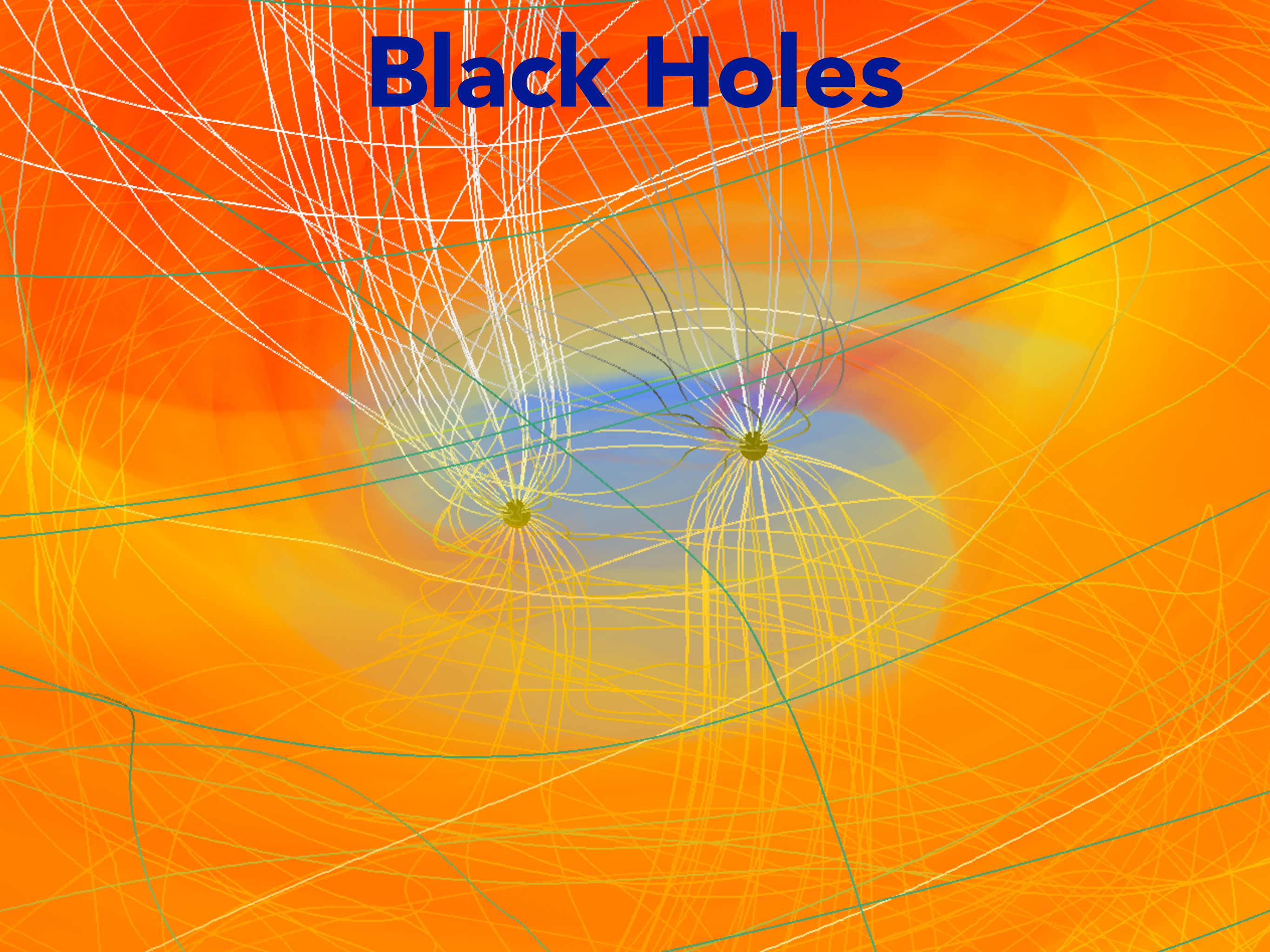


# NEW WORLDS



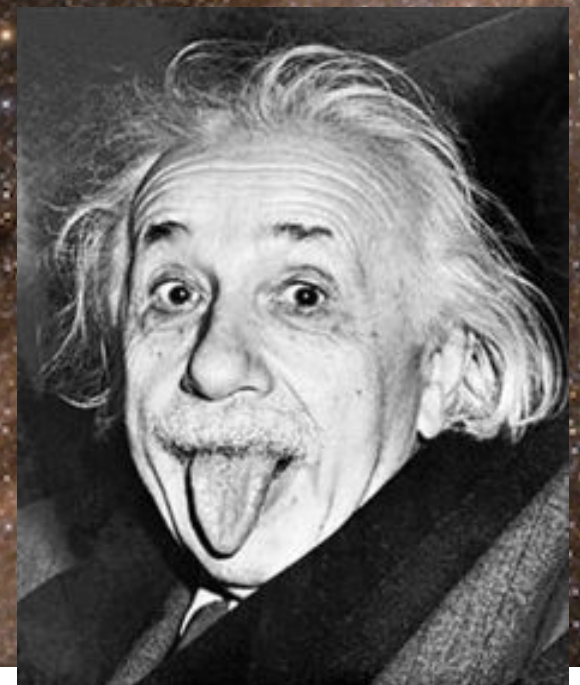
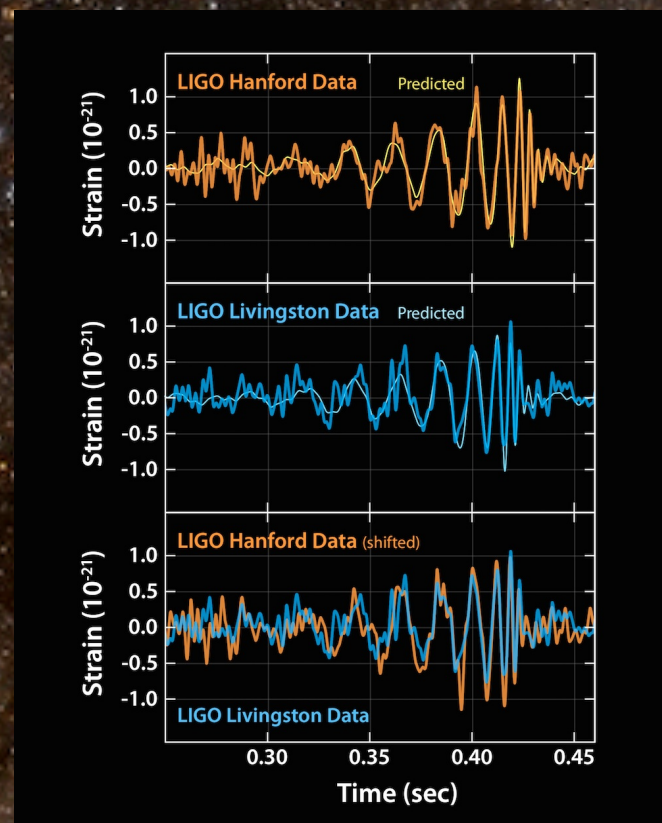


# Black Holes

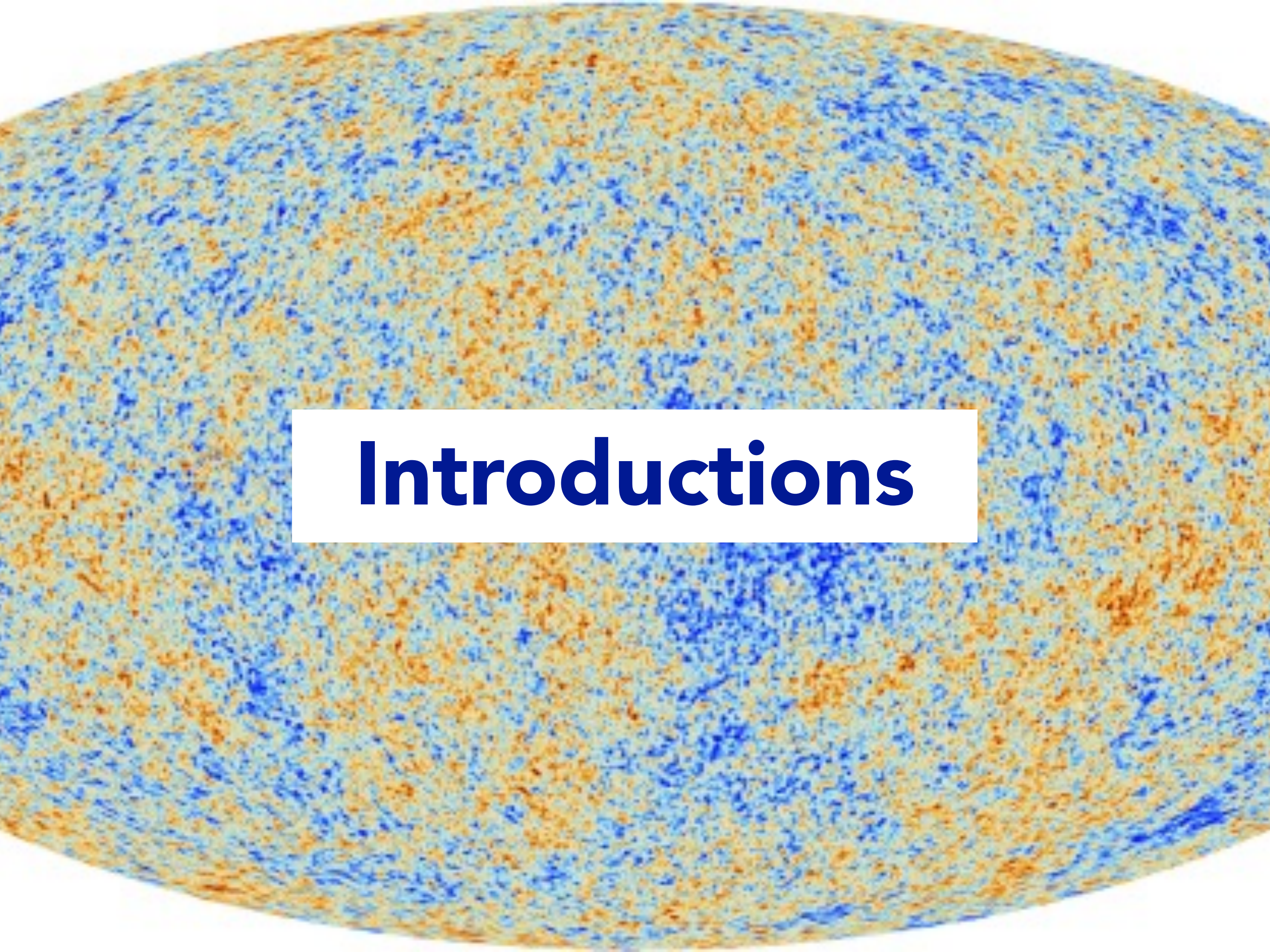




# GRAVITY WAVES & BLACK HOLES







# **Introductions**



# Brian Fields

- Please call me **Brian**
- I'm from: Champaign, IL
- Prof of Astronomy, Physics
- Astro Department Chair
- Research Interests: the big bang, exploding stars, high-energy particles from space
- Fun fact: meet **Chewie**!







# Your Advisor:

## Bryan Dunne or Brian Fields



When to talk to your advisor?

- emergencies (or Dean of Students, or 911)
- choosing classes next semester
- questions on the Astronomy major, degree requirements
- other questions or concerns—if we can't answer, we'll try to find somebody who can

**best to email to make an appointment, but stop by if something is urgent**



# Introductions

1. Turn to your neighbors
2. Ask:
  - **What would you prefer to be called?**
  - **Where are you from = where do you think of as home?**
  - **A tweetable fun fact or story?**
3. After you've practiced, we'll go around the room





**Interlude: Say Cheese!**



# ASTR 199 CIA: Preview

Your class: a **record number** of new Astronomy and CS+Astronomy majors!

But most of you are not yet taking Astronomy

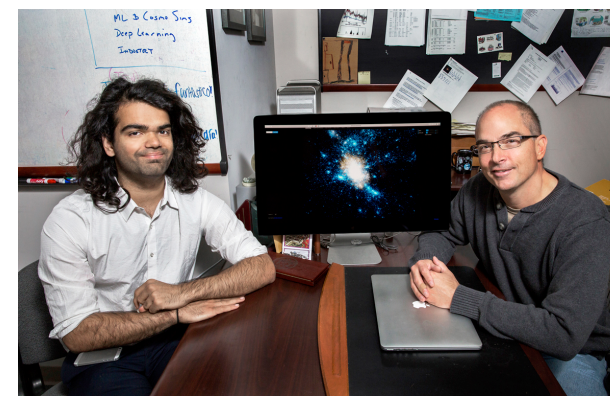
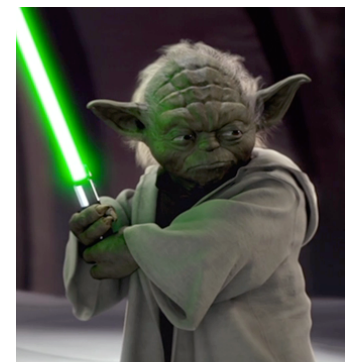
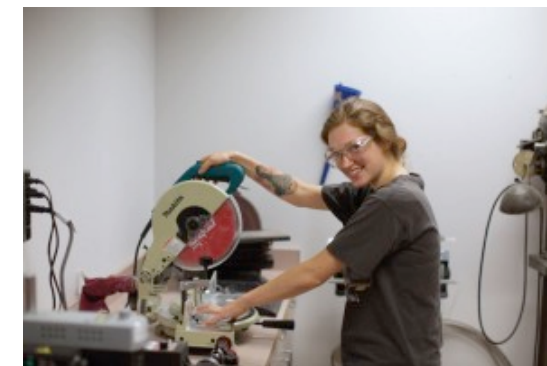
- situation normal! building math and physics muscles

in **ASTR 199**:

- meet your fellow majors
- learn secrets of success in Astronomy and at Illinois
- discover opportunities: research, student organizations
- learn what you can do with an Astronomy degree—in academia and research, and beyond
- get a headstart on advising for next semester



Astro Class of 2016





# ASTR 199 CIA:

## Rights and Responsibilities

ASTR 199 should be

- Fun!
- Useful
- Not a burden on your time

Grading: pass/fail = S/U

Course Requirements:

- **Come to class**—attendance taken with iClickers, **2 unexcused absences allowed**
- **Participate**—ask questions! demand to know!
- **Homework**—assigned occasionally, pass/fail, lowest score dropped
- Post homework answers on Compass



# What can I do with an Astronomy Degree?



Analysis of 2010 Census Data:  
American Community Survey

Salaries and employment for  
recent graduates

**Astronomy & Astrophysics is  
the only science in top 10!**

Astro unemployment: 2.1%

MAJOR	CATEGORY	NUMBER OF MAJORS	MEDIAN EARNINGS
1	Engineering	2,339	\$110,000
2	Engineering	756	75,000
3	Engineering	856	73,000
4	Engineering	1,258	70,000
5	Engineering	32,260	65,000
6	Engineering	2,573	65,000
7	Business	3,777	62,000
8	Physical Sciences	1,792	62,000
9	Engineering	91,227	60,000
10	Engineering	81,527	60,000

**What do  
you  
notice?  
Guesses  
for #1?  
For #8?**



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	MAJOR	CATEGORY	NUMBER OF MAJORS	MEDIAN EARNINGS
1	Petroleum Eng.	Engineering	2,339	\$110,000
2	Mining And Mineral Eng.	Engineering	756	75,000
3	Metallurgical Eng.	Engineering	856	73,000
4	Naval Architecture And Marine Eng.	Engineering	1,258	70,000
5	Chemical Eng.	Engineering	32,260	65,000
6	Nuclear Eng.	Engineering	2,573	65,000
7	Actuarial Science	Business	3,777	62,000
8	Astronomy And Astrophysics	Physical Sciences	1,792	62,000
9	Mechanical Eng.	Engineering	91,227	60,000
10	Electrical Eng.	Engineering	81,527	60,000



# Who's Who: Illinois Astrophysics Faculty



**Robert Brunner**  
Cosmology,  
AGN,  
Data Science



**Neal Dalal**  
Cosmology,  
Gravitation



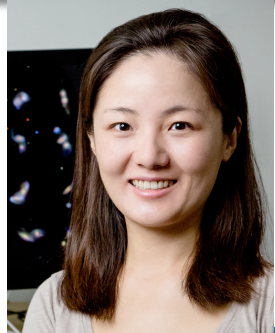
**Brian Fields**  
Cosmology,  
Supernovae,  
Nuke & Particle Astro



**Charles Gammie**  
Accretion Disks,  
Black Holes,  
GRMHD



**Athol Kembell**  
Grav. Lensing,  
Stellar Evol.,  
Data Science



**Xin Liu**  
Black Holes  
Cosmology  
Time Domain



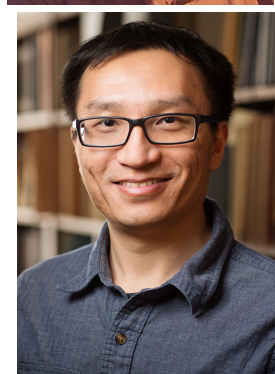
**Leslie Looney**  
Star & Planet  
Formation



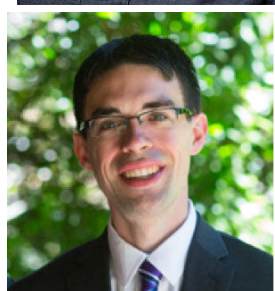
**Telemachos  
Mouschovias**  
Star Formation



**Paul Ricker**  
Cosmology,  
Clusters,  
Supernovae



**Yue Shen**  
Black Holes  
Cosmology  
Data Science  
Time Domain



**Matt Turk**  
First Stars  
Data Science



**Joaquin Vieira**  
Cosmology,  
High-z Galaxies,  
Instrumentation



**Tony Wong**  
Galaxies,  
Star Formation



**Gabrielle Allen**  
Numerical  
Relativity  
Data Science



**Peter Adshead**  
Cosmology  
Particle Astro



**Jeff Filippini**  
Cosmology  
Dark Matter  
Instrumentation



**Robert Gruendl**  
Survey Science  
Interstellar  
Medium



**Felipe Menanteau**  
Cosmology  
Data Science



**Gil Holder**  
Cosmology,  
Survey Science



**Ed Seidel**  
Numerical  
Relativity



**Jessie Shelton**  
Cosmology  
Particle Astro



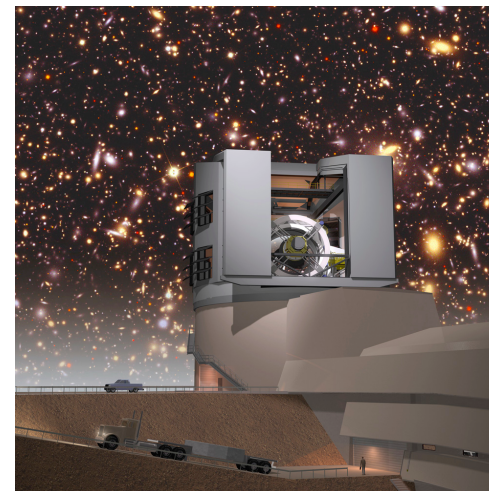
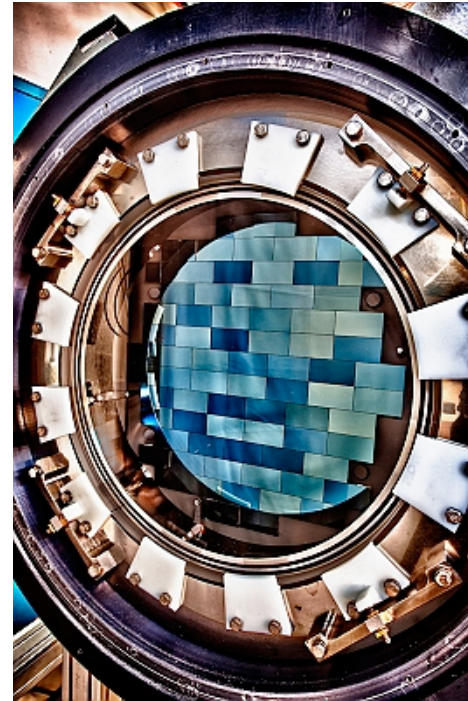
**Stuart Shapiro**  
Relativity  
Astrophysics



# Dept & Campus Facilities

## Present

- Dark Energy Survey, Chile
- South Pole Telescope
- National Center for Supercomputing Applications
- Blue Waters National Petascale Computing Facility



## Future

- Large Synoptic Survey Telescope, Chile





# Illinois Astrophysics Landscape

Astronomy spans the campus: integrative collaborations



**Where are we?  
You are here**

**Physics**

**NCSA**

**Chemistry**

**Statistics**

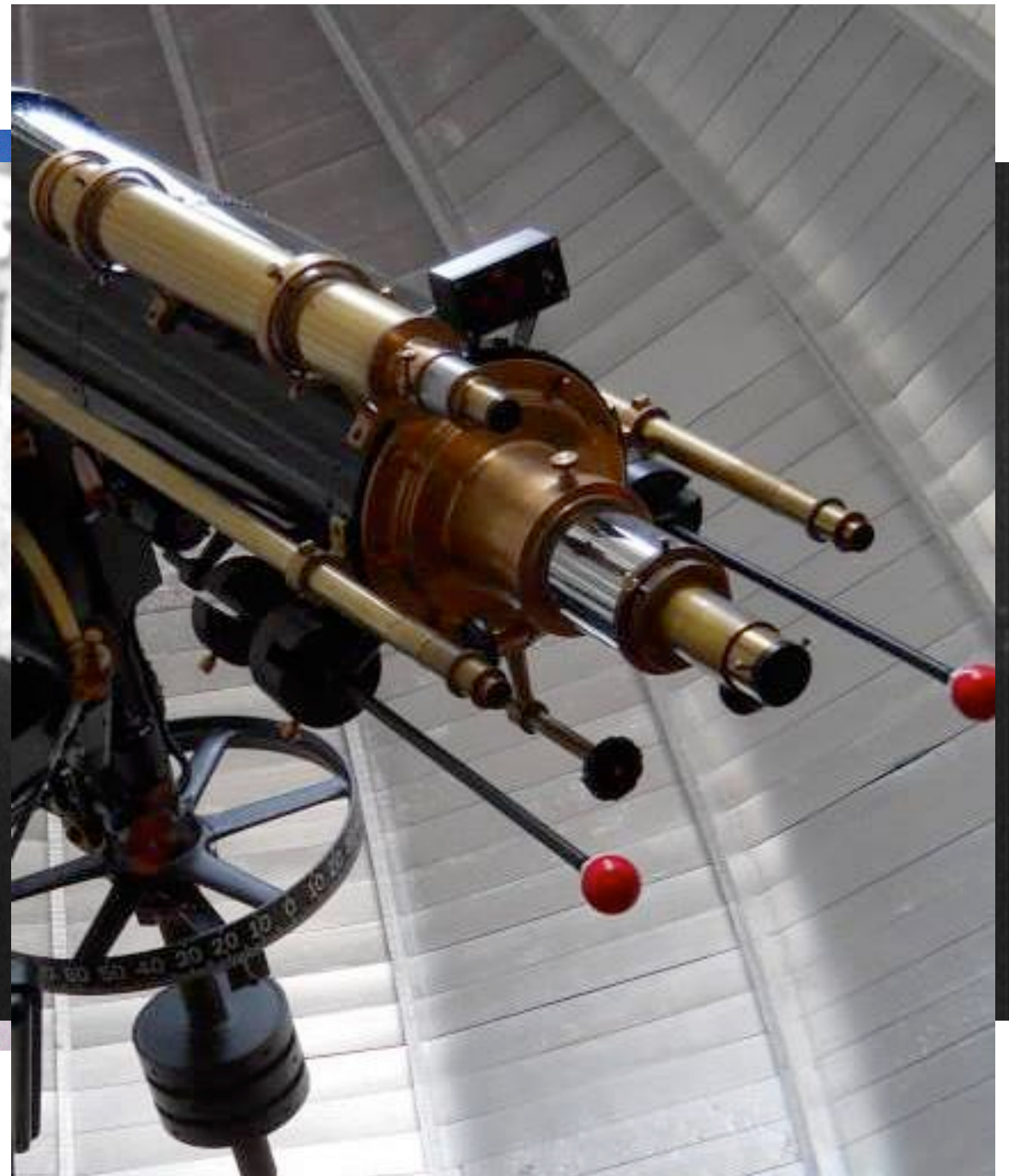
**Astrobiology  
Institute**

**Engineering**

**Other astrophysical sites?**

**Bonus: Campus Observatory?**





# Illinois Campus Observatory

National Landmark



# For Next Time: Homework

- Visit course webpage and compass pages
- On **Compass**:
  - find class picture
  - identify yourself
  - collect credit!
- Next week: tools for success at U. Illinois and in Astronomy  
—bring questions!