The Physics of Interstellar
HON 210, Fall 2025

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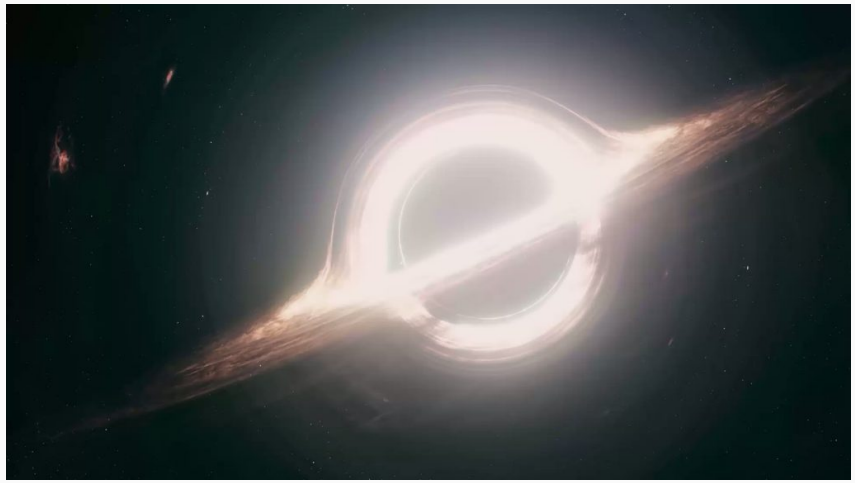


CAST
(in order of appearance)

Murph (older)	ELLEN BURSTYN
Cooper	MATTHEW McCONAUGHEY
Murph (10 Yrs.)	MACKENZIE FOY
Donald	JOHN LITHGOW
Tom (15 Yrs.)	TIMOTHÉE CHALAMET
School Principal	DAVID OYELOWO
Ms. Hanley	COLLETTE WOLFE
Boots	FRANCIS XAVIER McCARTHY
TARS	BILL IRWIN
Brand	ANNE HATHAWAY
Smith	ANDREW BORBA
Doyle	WES BENTLEY
Williams	WILLIAM DEVANE
Professor Brand	MICHAEL CAINE
Romilly	DAVID GYASI
CASE	JOSH STEWART
Tom	CASEY AFFLECK
Lois	LEAH CAIRNS
Murph	JESSICA CHASTAIN
Coop	LIAM DICKINSON
Getty	TOPHER GRACE
Mann	MATT DAMON
Girl on Truck	FLORA NOLAN
Boy on Truck	GRIFFEN FRASER
Doctor	JEFF HEPHNER
Nurse Practitioner	LENA GEORGAS
Administrator	ELYES GABEL
Nurse	BROOKE SMITH
Crew Chief	RUSS FEGA

The Syllabus

- **Website**

  `http://people.uncw.edu/hermanr/Interstellar/`

- **Grades**

Item	Percentage
Assignments	40%
Paper	10%
Presentation	10%
Midterm Exam	20%
Final Exam	20%

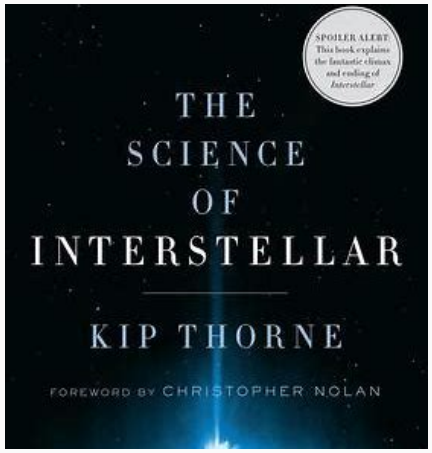


Figure 1: Main Textbook.

- **Textbooks**

The Science of Interstellar, Kip Thorne, 2014.

Interstellar: The Complete Screenplay, J. Nolan and C. Nolan, 2014.

See also - `http://people.uncw.edu/hermanr/booklist.htm`

Artificial Intelligence Use Policy

Learning to use AI responsibly is an essential skill. You are encouraged to explore AI tools for brainstorming, idea generation, and research assistance while maintaining academic integrity and developing critical thinking skills.

Permitted Uses

- **Small assignments:** AI may be used for brainstorming, drafting, and iterative improvement
- **Research projects:** AI may assist with literature review, organizing and refining arguments.
- **All uses:** Must be properly disclosed and attributed.

Attribution: All AI use must be acknowledged at the end of your submission. Include:

- Which AI tool(s) you used and how key prompts generated useful content.
- A brief description of how AI-generated material was incorporated or modified.

Verification: You are responsible for fact-checking all AI outputs.

Quality Control: Effective AI use requires skillful prompting and critical evaluation.

Prohibited Practices

- Submitting AI-generated work as your own without attribution.
- Using AI-generated citations without verification.
- Relying on AI for factual claims without independent confirmation.

Academic Integrity Failure to properly attribute AI use violates university honor code policies. While AI can enhance your work, it cannot replace your critical thinking, analysis, and original contribution to the assignment.

The Science of Interstellar - Kip Thorne

- Preface
  - To Explain How Science Works
  - The science is at the frontier of understanding
- Thorne explains the science
- And interprets what is in the movie
- Wants it different than other movies!

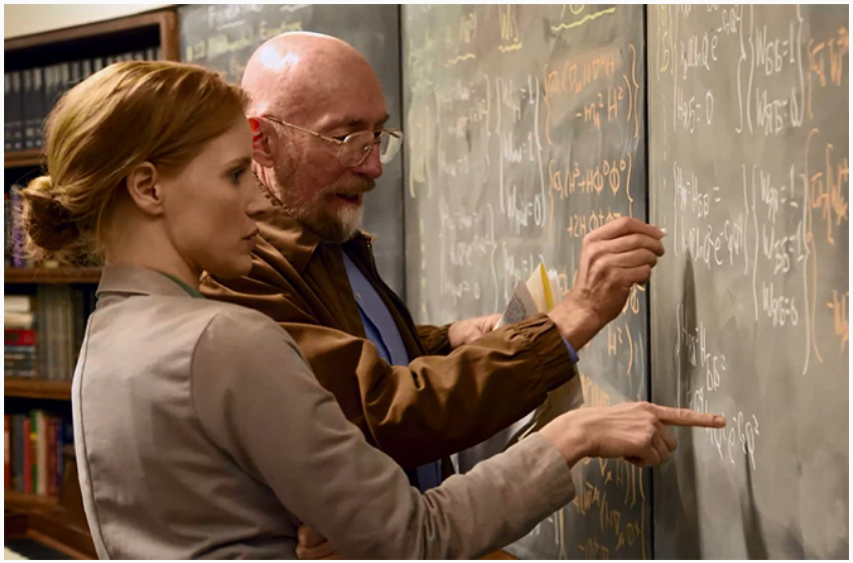
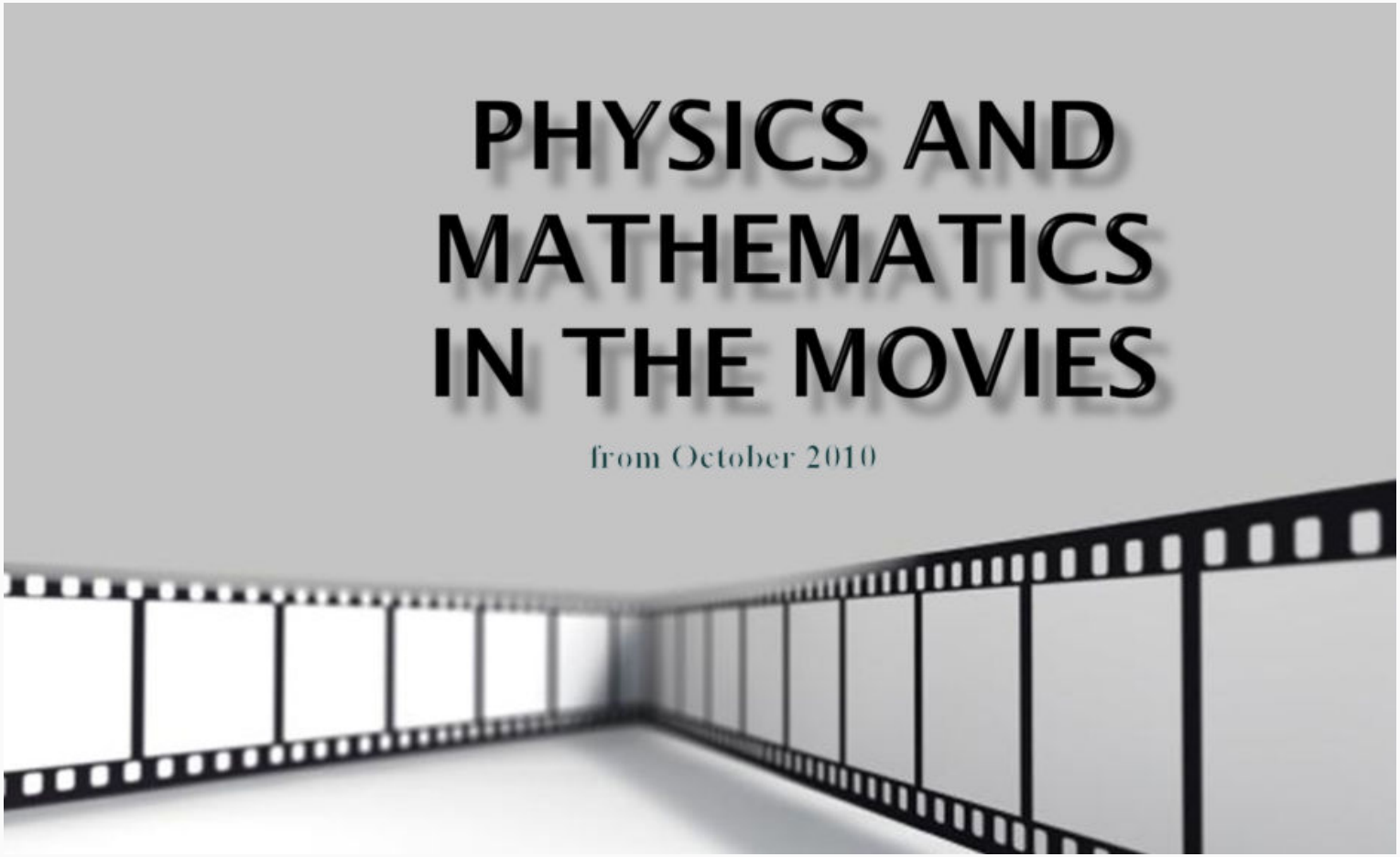


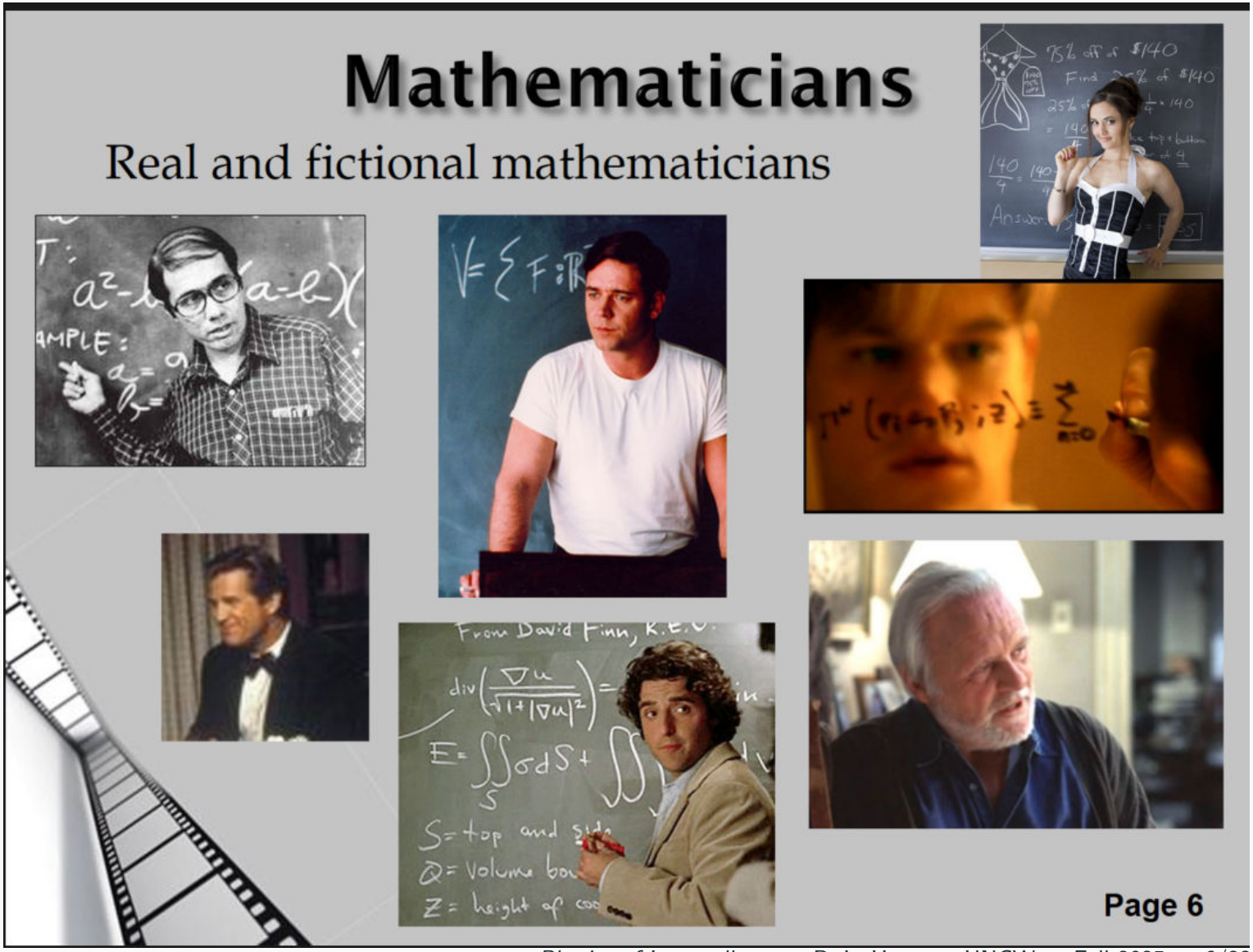
Figure 2: Thorne at Board of *Interstellar*.

What movies?

Science in Movies



Mathematicians in Movies



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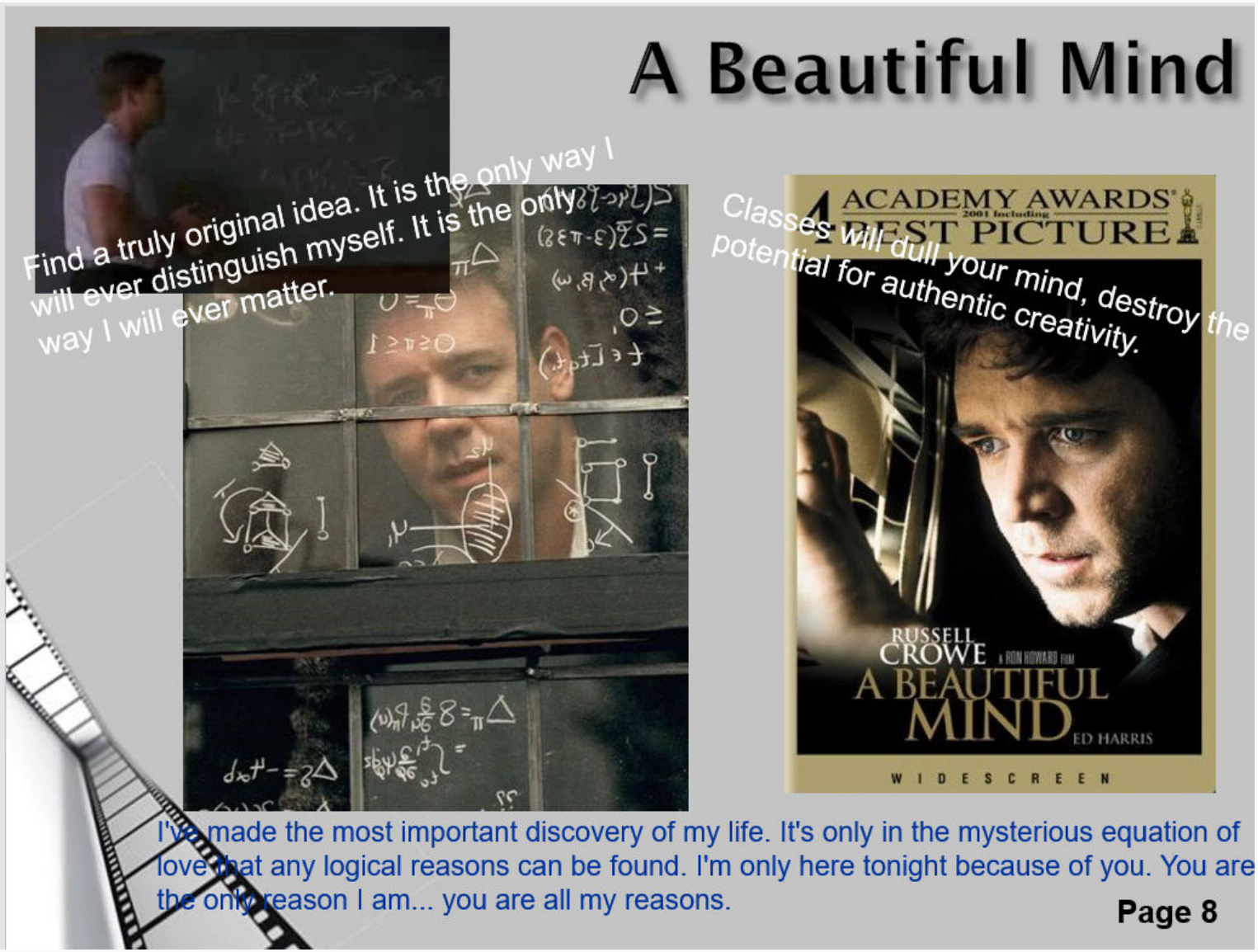

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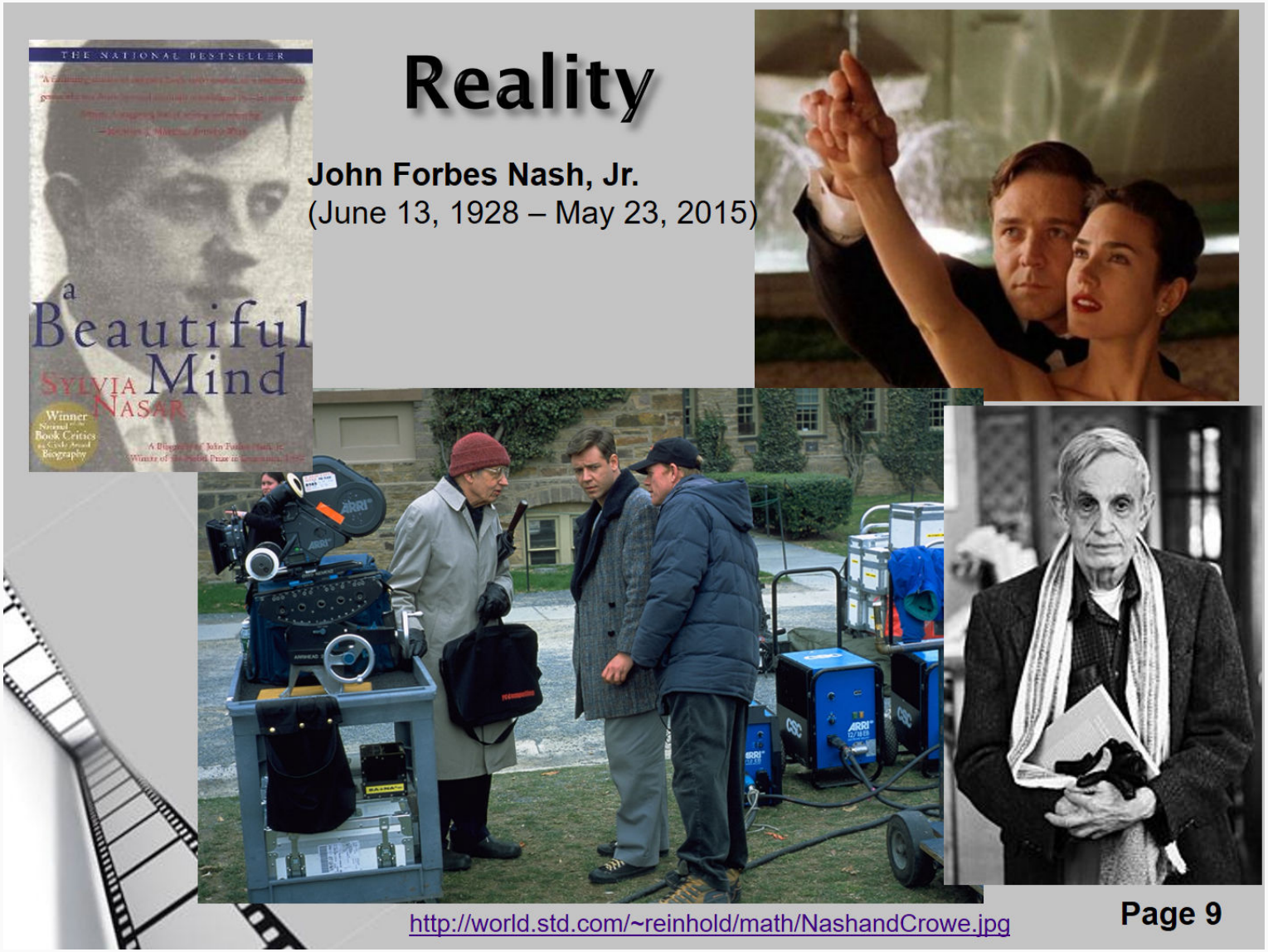
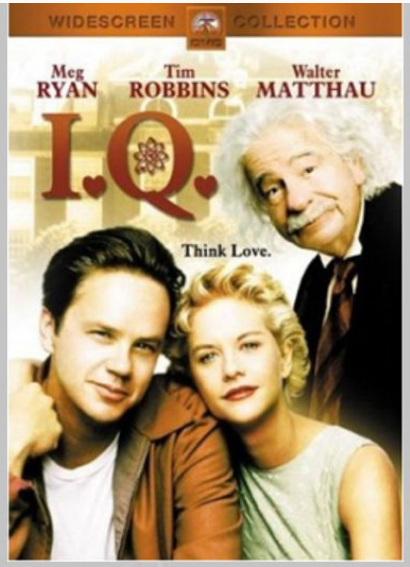
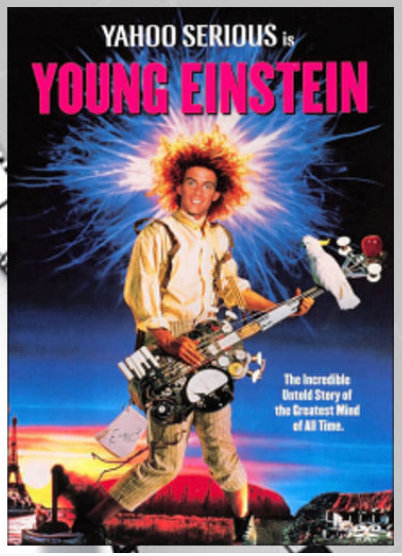


Recent Movies about Mathematicians

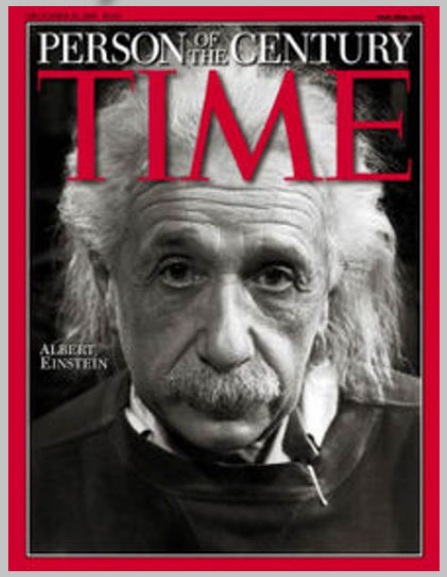
- 2014: *The Imitation Game* - A biopic focusing on Alan Turing, a British mathematician and cryptanalyst who was instrumental in cracking the Enigma code during World War II
- 2015: *The Man Who Knew Infinity* - A biographical drama about the Indian mathematician Srinivasa Ramanujan.
- 2017: *Hidden Figures* - A biographical drama about African-American female mathematicians at NASA, including Katherine Johnson, Dorothy Vaughan, and Mary Jackson.
- 2021: *Adventures Of A Mathematician* - A biographical film about Polish mathematician Stan Ulam.
- 2023: *Marguerite's Theorem* - A French-Swiss drama about a female mathematics student whose career is jeopardized by an error in her work.

Physicists in Movies





Physicists

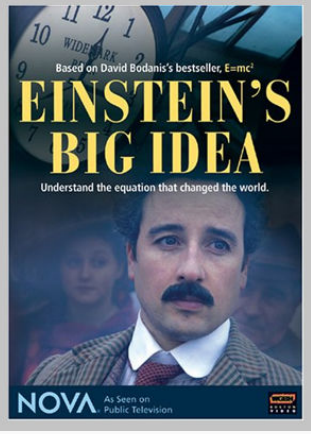


LIGHTS ALL ASKEW IN THE HEAVENS

Men of Science More or Less Agog Over Results of Eclipse Observations.

EINSTEIN THEORY TRIUMPHS

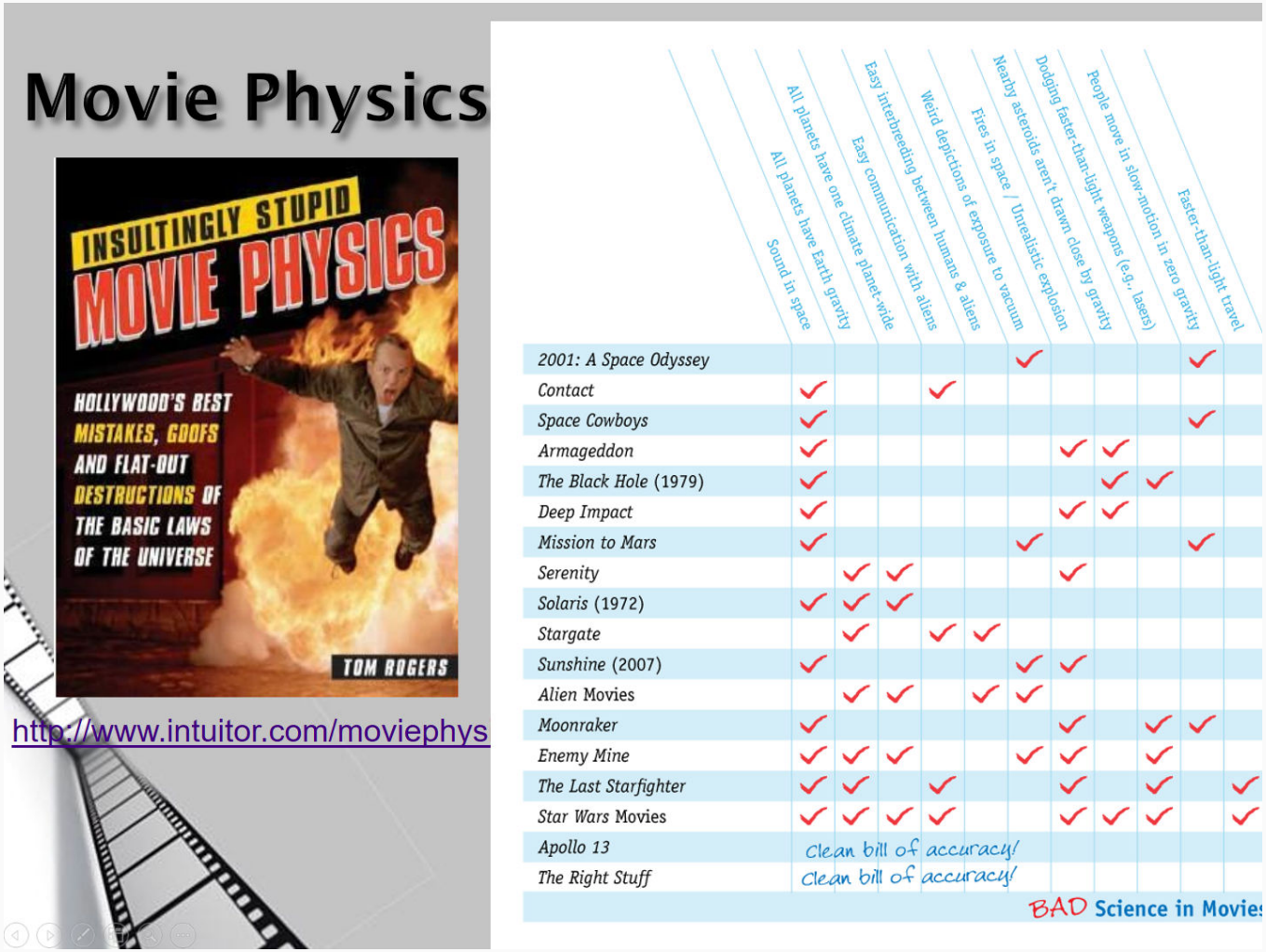
Stars Not Where They Seemed or Were Calculated to be, but Nobody Need Worry.



Physicists in the Movies

- 2014: *The Theory of Everything*: Based on the life of Stephen Hawking, a British theoretical physicist, the film depicts his relationship with his wife, Jane Wilde, his battle with motor neuron disease, and his efforts to revolutionize our understanding of the universe.
- 2020: *Radioactive* - A biographical drama about Marie Curie, starring Rosamund Pike, exploring her groundbreaking work with radioactive elements and the potential for both good and ill.
- 2022: *A Compassionate Spy*: This documentary explores the story of Ted Hall, a brilliant physicist recruited into the Manhattan Project, and how he passed information to the Soviet Union out of fear of a nuclear holocaust.
- 2023: *Oppenheimer*: This biographical thriller focuses on J. Robert Oppenheimer, the theoretical physicist who helped develop the first nuclear weapons during World War II.

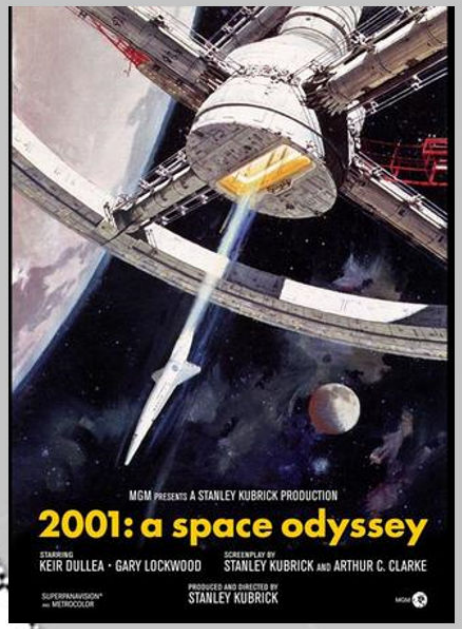
Bad Science in Movies

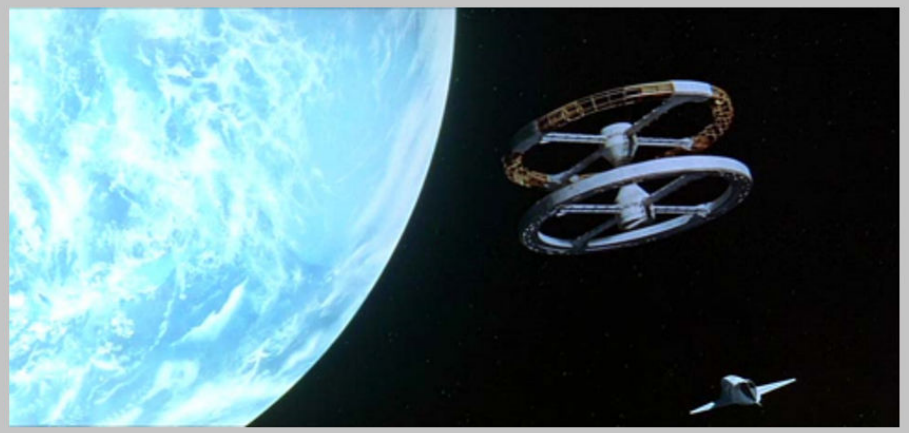


Insultingly Stupid Movie Physics: http://www.intuitor.com/moviephysics/

Space Travel

2001 A Space Odessey





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IMDb selections: https://www.imdb.com/list/ls025756791/

TV Shows

Time Travel


Time Travel
CHARLTON HESTON RODDY McDOWALL
PLANET OF THE APES
A GEORGE PAL PRODUCTION
H.G. WELLS'
THE TIME MACHINE
DVD
STEVEN SPIELBERG Presents
BACK TO THE FUTURE
A ROBERT ZEMECKIS Film
He was never in time for his classes....
He wasn't in time for his dinner....
Then one day... he wasn't in his time at all.
"BACK TO THE FUTURE" MICHAEL J. FOX
CHRISTOPHER LLOYD - LEA THOMPSON - CRISPIN GLOVER
ROBERT ZEMECKIS & BOB GALE ALAN SILVESTRI BOB GALE NEIL CANTON
STEVEN SPIELBERG KATHLEEN KENNEDY FRANK MARSHALL
ROBERT ZEMECKIS
A UNIVERSAL Picture
Eric Bana
Rachel McAdams
The Time Traveler's Wife
From The Acclaimed Bestseller
August 14
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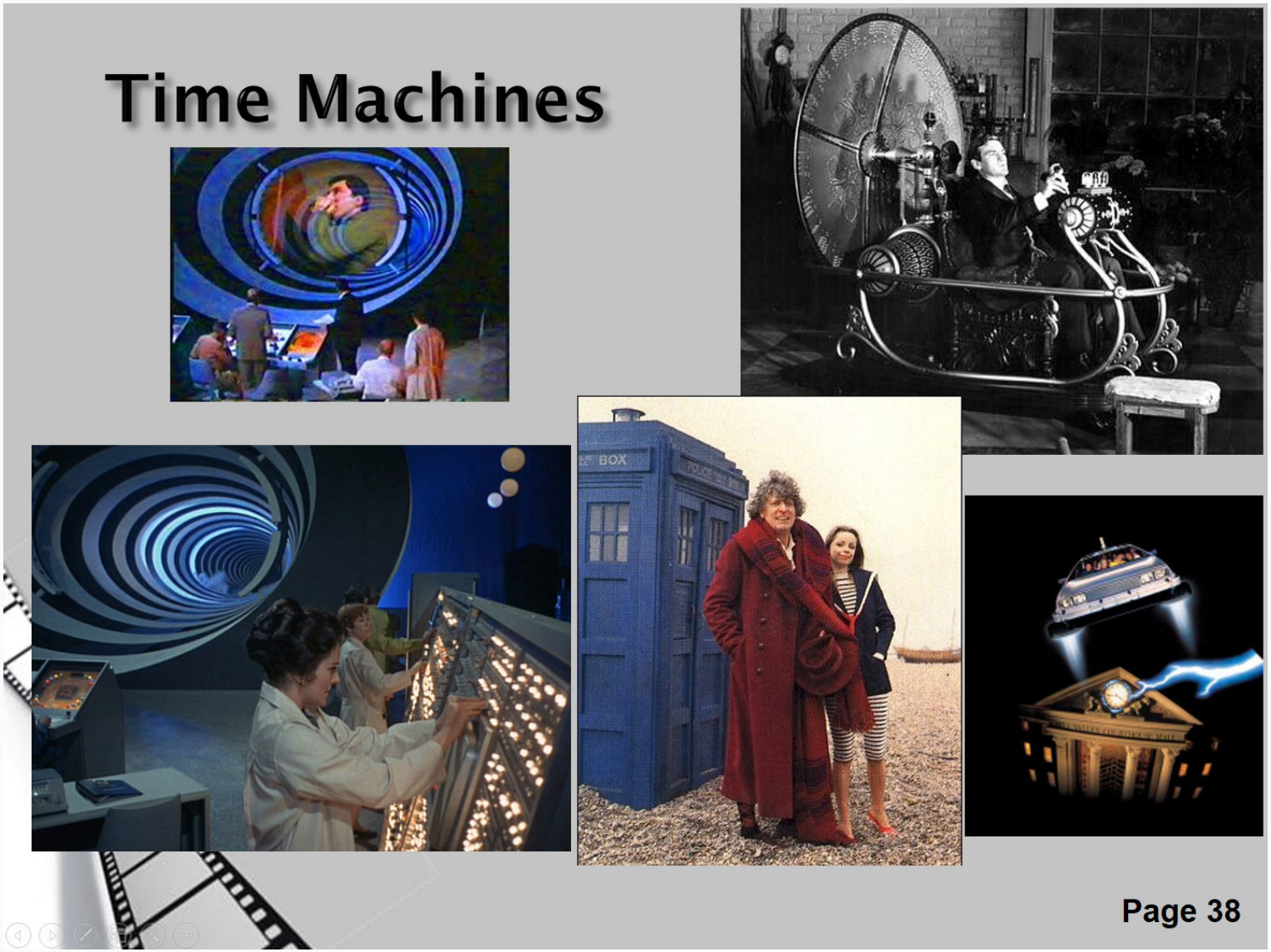
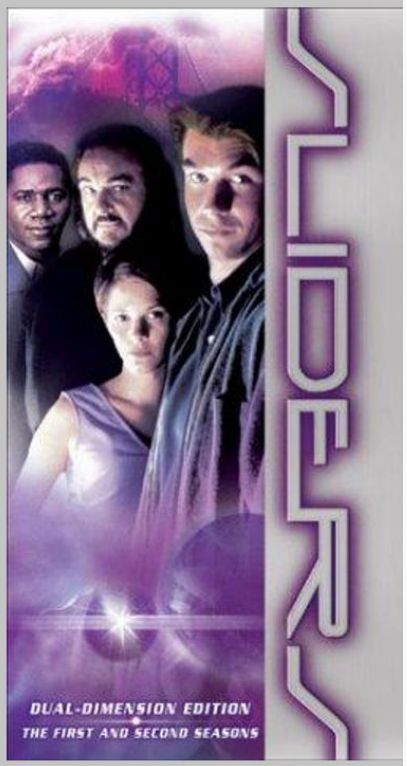
Time Machines



Unlocking the Secrets

Taking a Quantum Leap



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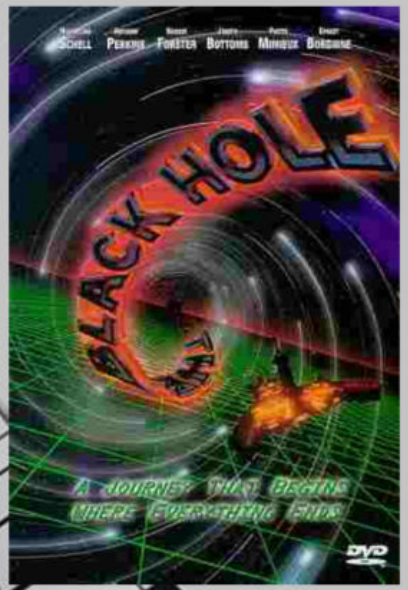
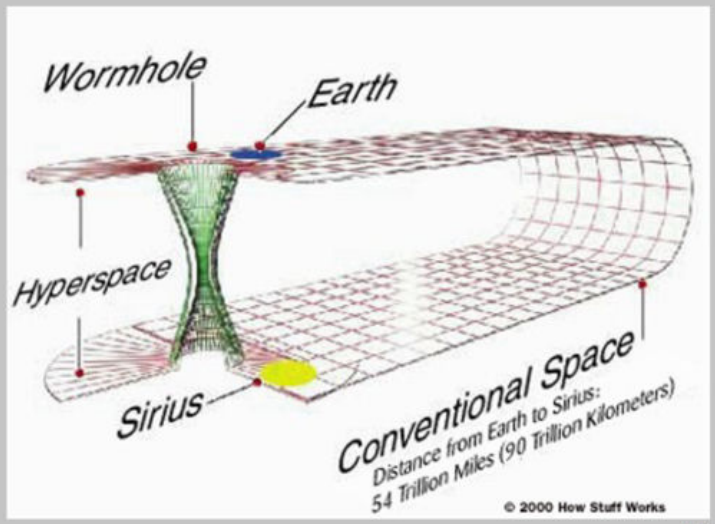
Enter the Wormholes and Paradoxes

Wormhole Portals





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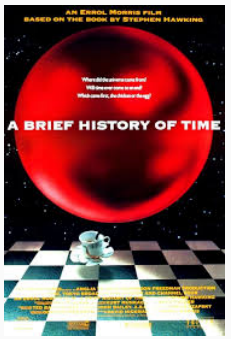
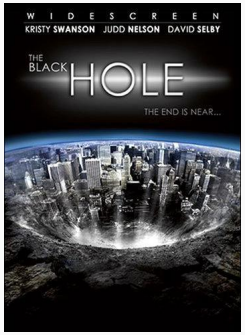
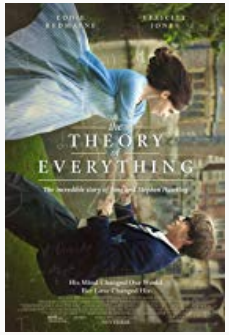
Black Holes in Film

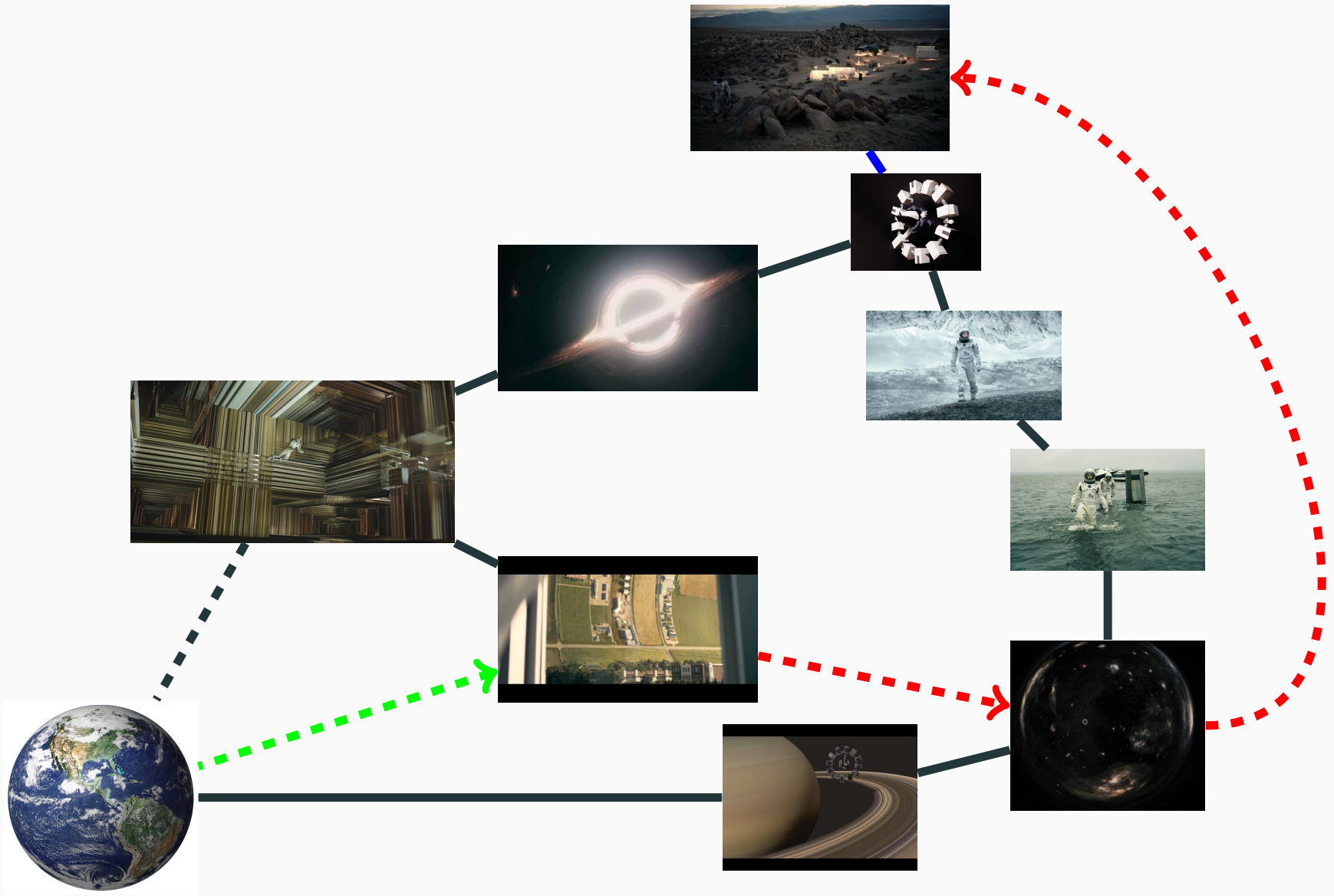
- The Black Hole, 1979
- A Brief History of Time, 1992
- Event Horizon, 1997
- The Black Hole, 2006
- Star Trek, 2009
- Interstellar, 2014
- The Theory of Everything, 2014



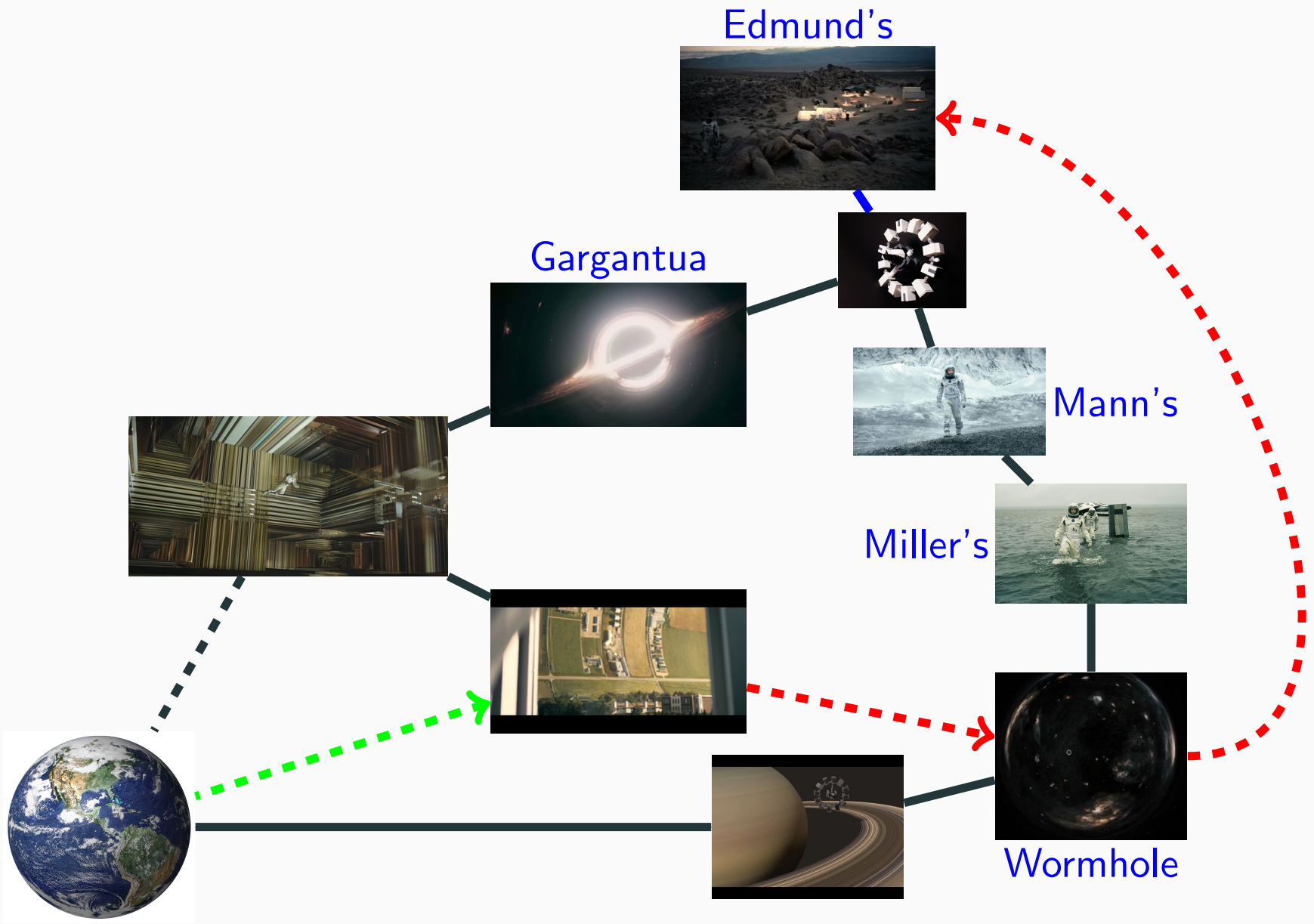




Interstellar - The Movie



Interstellar - The Movie



Screenplay and Storyboards

Begin reading the screenplay and book.

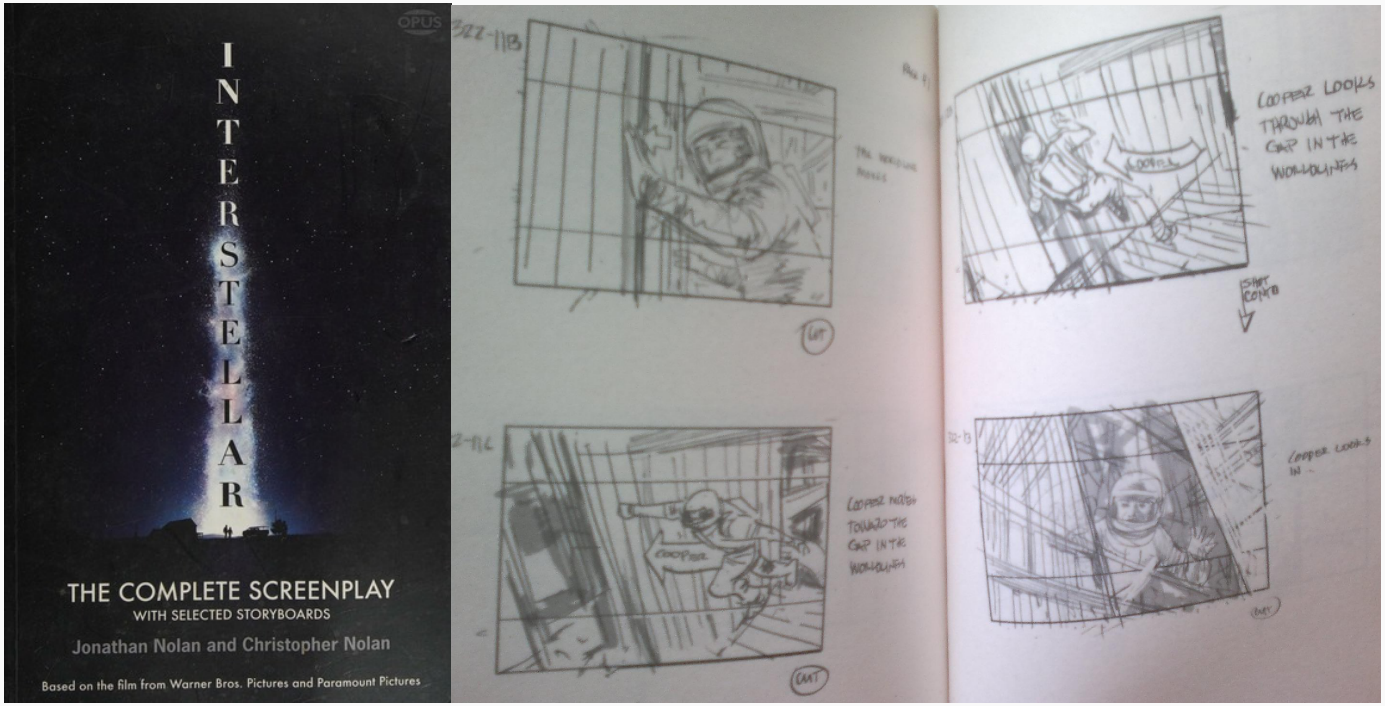


Figure 3: Screenplay and Storyboards

Interstellar Storyboard Art - video (6 min)

Tentative Topics Covered

Classes	Topic	Reading
Aug 21	Introduction	Start Screenplay
Aug 26-28	The Universe as We Know It	Ch 2-3
Sep 2-4	Relativity and Tides	Ch 4
Sep 11	Black Holes, Gargantua	Ch 5-6
Sep 16-18	Orbits and Gravitational Lensing	Ch 7-8
Sep 23	Quasars and Accretion Disks	Ch 9, Finish Screenplay
Sep 25	Blight, Oxygen, Dust Bowl	Ch 11-12, Story Boards
Sep 30	Interstellar Travel	Ch 13
Oct 2	Screenplay/Story Board - discussion	
Oct 7	**Exam**	**Ch 1-13**
Oct 14	Wormhole Physics	Ch 14-15
Oct 16	Gravitational Waves	Ch 16
Oct 21	Miller's Planet	Ch 17-18
Oct 23	Mann's Planet	Ch 19
Oct 28	Rotating Space Stations/Endurance	Ch 20
Oct 30	4^{th} and 5^{th} Dimensions	Ch 21-22
Nov 4	More Gravity	Ch 23-24
Nov 6	Professor's Equation	Ch 25
Nov 11	Singularities and Quantum Gravity	Ch 26
Nov 13	The Tesseract	Ch 29
Nov 18-25	Student Presentations	
Dec 2	Epilogue	