



# Movies vs Astronomy: Science fact or science fiction?

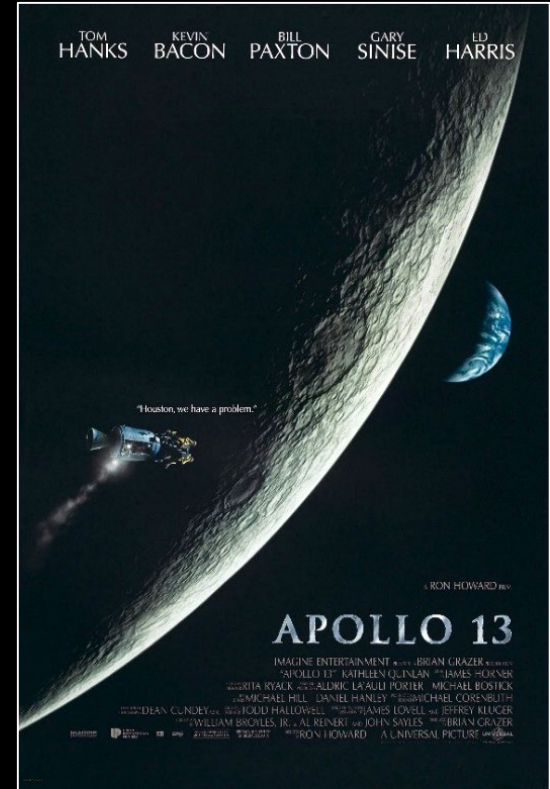
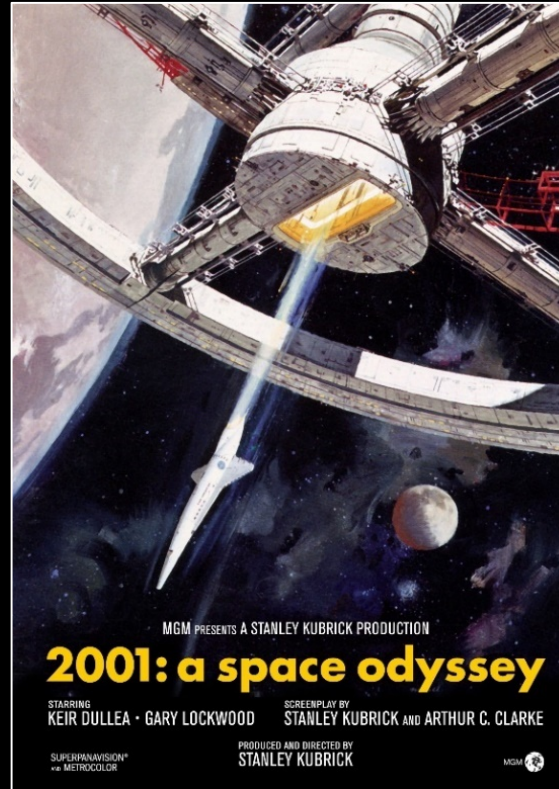
Dr. Jonathan Crass



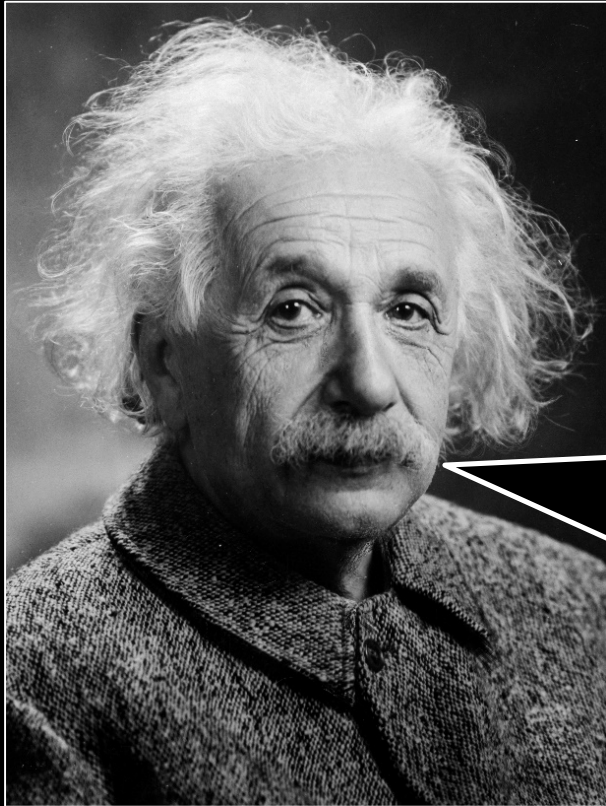
UNIVERSITY OF  
NOTRE DAME



# Science Fiction



# Science Fantasy



Under no circumstances  
can you travel faster than  
the speed of light.

**ABSOLUTELY NONE!**









# Recent Science Fiction Movies





DON'T

LET

GO

SANDRA BULLOCK  
GEORGE CLOONEY

FROM DIRECTOR ALFONSO CUARÓN

# GRAVITY

WARNER BROS. PICTURES PRESENTS  
AN ESPERANTO FILMO/JHEYDAY FILMS PRODUCTION AN ALFONSO CUARÓN FILM SANDRA BULLOCK GEORGE CLOONEY  
"GRAVITY" MUSIC BY STEVEN PRICE COSTUME DESIGNER JANY TEMME VISUAL EFFECTS SUPERVISOR TIM WEBBER EDITORS ALFONSO CUARÓN MARK SANGER  
PRODUCTION DESIGNER ANDY NICHOLSON DIRECTOR OF PHOTOGRAPHY EMMANUEL LUBEZKI, A.S.C., A.M.I.C. EXECUTIVE PRODUCERS CHRIS DE FARIA NIKKI PENNY STEPHEN JONES  
WRITTEN BY ALFONSO CUARÓN & JONÁS CUARÓN PRODUCED BY ALFONSO CUARÓN DAVID HEYMAN  
DIRECTED BY ALFONSO CUARÓN

[gravity-movie.net](http://gravity-movie.net)

MPAA RATED PG-13

SEE IT IN 2D AND 3D

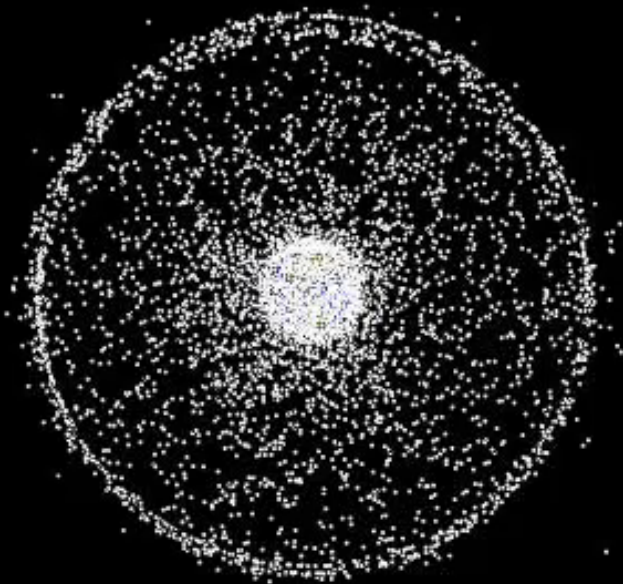
WARNER BROS. PICTURES  
A Time Warner Entertainment Company, L.P. Member of the Time Warner Entertainment Group



OCTOBER





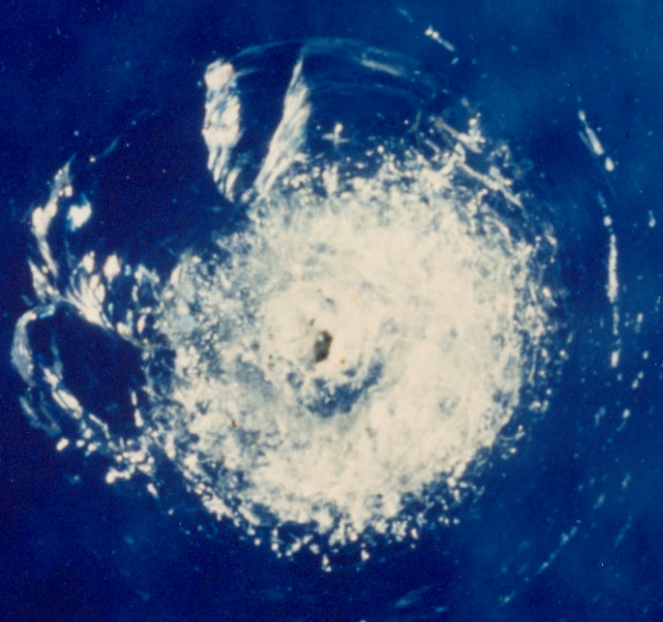




“The greatest risk to space missions  
comes from non-trackable debris”

Nicholas Johnson  
*NASA chief scientist for orbital debris*

STS-7 Window Pit



1 mm

4





# The GOOD

- The repeated orbital debris impacts
- The speed of the oncoming debris
- The transition from the vacuum of space
  - Silence in space
  - Sound in a pressurised airlock





# The BAD

- Satellite communications being disrupted
- The HST, ISS and Tiangong-I being close enough to travel between them
- Momentum
  - For every action there is an equal and opposite reaction










# Other Opinions

 **Neil deGrasse Tyson**   
@neiltyson  


Mysteries of **#Gravity**: Why Bullock, a medical Doctor, is servicing the Hubble Space Telescope.

RETWEETS 1,488 LIKES 1,184 





11:50 PM - 6 Oct 2013

 **Neil deGrasse Tyson**   
@neiltyson  


Mysteries of **#Gravity**: Why Bullock's hair, in otherwise convincing zero-G scenes, did not float freely on her head.

RETWEETS 1,056 LIKES 836 

12:15 AM - 7 Oct 2013

 **Neil deGrasse Tyson**   
@neiltyson  

Mysteries of **#Gravity**: How Hubble (350mi up) ISS (230mi up) & a Chinese Space Station are all in sight lines of one another.

RETWEETS 1,119 LIKES 827 

12:00 AM - 7 Oct 2013

 **Neil deGrasse Tyson**   
@neiltyson  

The film **#Gravity** should be renamed "Zero Gravity"

RETWEETS 1,312 LIKES 1,079 

11:35 PM - 6 Oct 2013

A RIDLEY SCOTT FILM

HELP IS ONLY 140 MILLION MILES AWAY



MATT DAMON

# THE MARTIAN

TWENTIETH CENTURY FOX PRESENTS A SCOTT FREE / KINGFISHER GENIUS PRODUCTION A RIDLEY SCOTT FILM MATT DAMON "THE MARTIAN" JESSICA CHASTAIN KRISTEN WIG JEFF DANIELS MICHAEL PERLA KATE MARA SEAN BEAN SEBASTIAN STAN ANSEL ELWINE AND CHRIVETEL EL GUER "PHARRY GREGSON-WILLIAMS" BOB JANTY VAYES AND PIETRO SCALIA AND "GEO" ARTHUR MAX AND "BOB" BARDUSZ WOLSKI AND "BOB" SIMON KINGBERG BY RIDLEY SCOTT AND MICHAEL SCHAEFER AND ADITYA SODI MARK RUFAM AND ANDY WEIR AND BREW BOGDARD AND RIDLEY SCOTT

IN CINEMAS SEPTEMBER 30 IN 3D



#TheMartian





A RIDLEY SCOTT FILM

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IN CINEMAS SEPTEMBER 30 IN 3D



#TheMartian







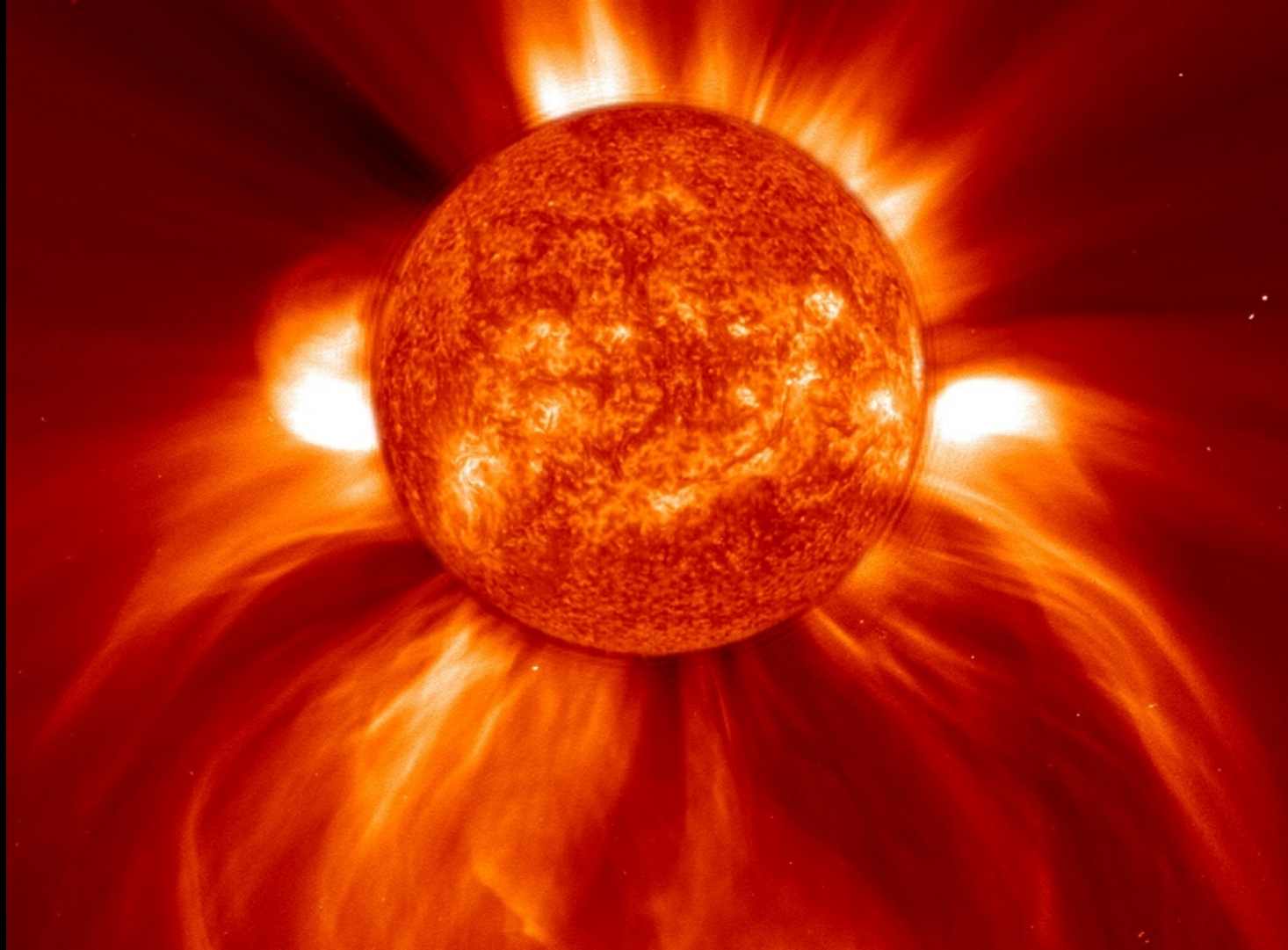




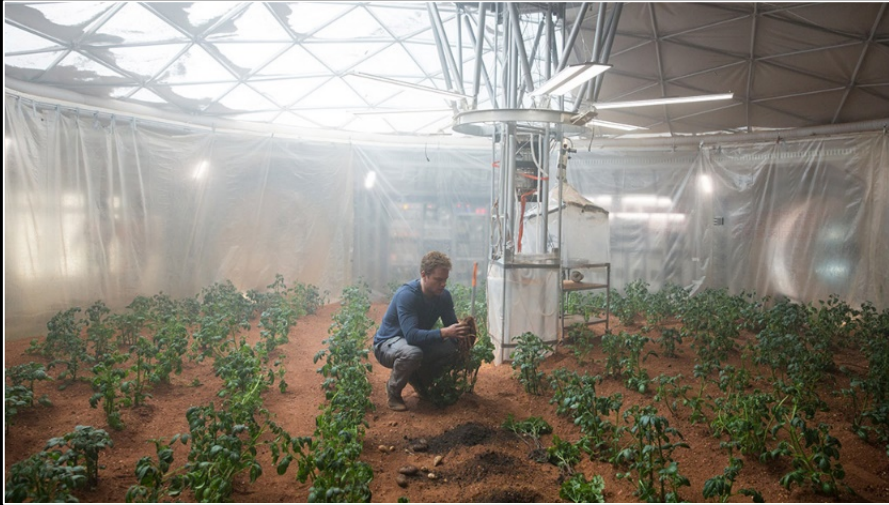
# Transport







# The Problem of Food



The air to breathe...

Oxygen

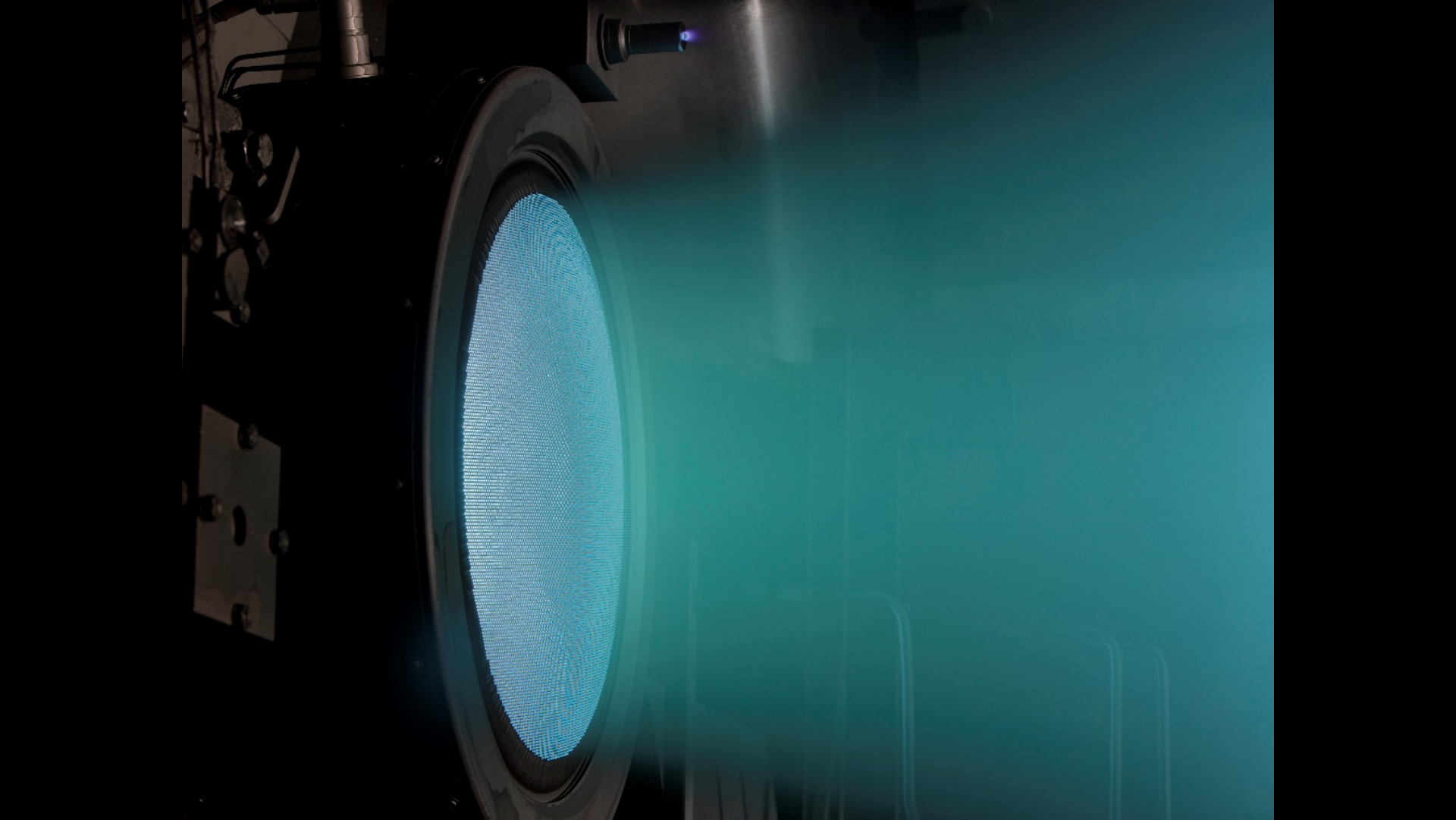


# The Hermes



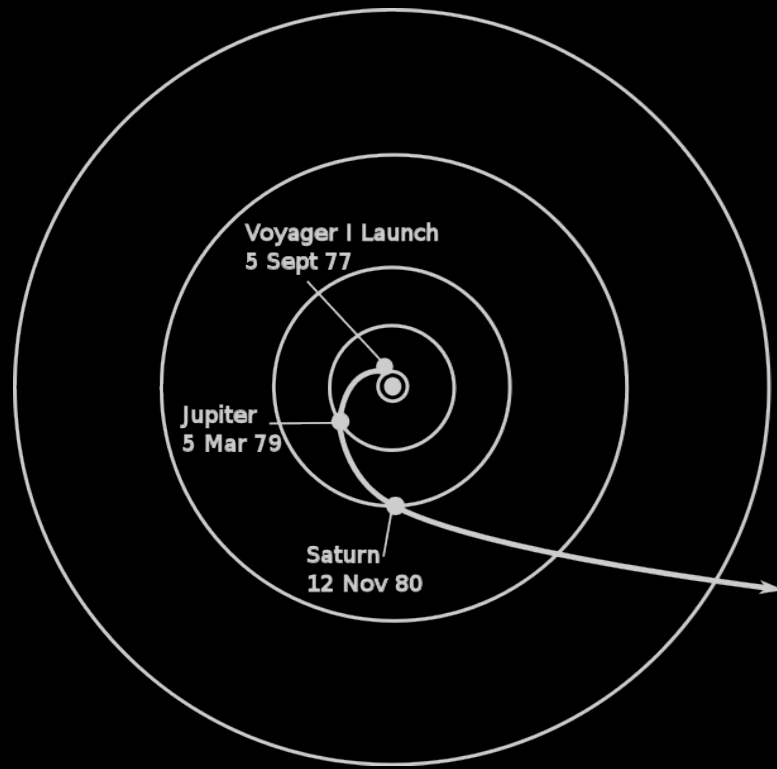
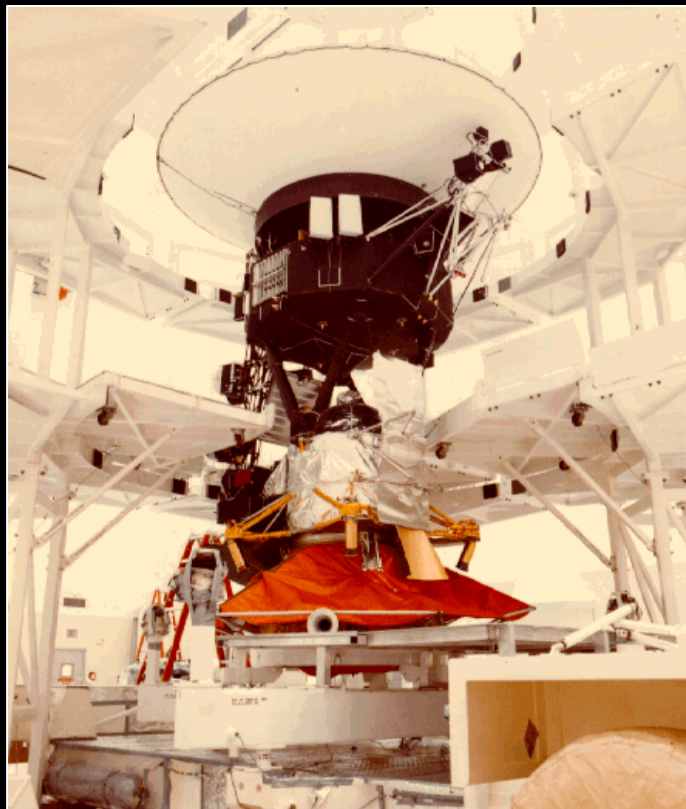








# Gravity Assists/Flyby



MATTHEW  
McCONAUGHEY

ANNE  
HATHAWAY

JESSICA  
CHASTAIN

MICHAEL  
AND  
CAINE



THE END OF EARTH WILL NOT BE THE END OF US.

A FILM BY CHRISTOPHER NOLAN

# INTERSTELLAR

PARAMOUNT PICTURES AND WARNER BROS. PICTURES PRESENT  
A PARAMOUNT PICTURES AND WARNER BROS. PICTURES PRODUCTION  
A FILM BY CHRISTOPHER NOLAN  
CASTING BY MATTHEW MCGONAGLE  
COSTUME DESIGNER ANNE HATHAWAY  
PRODUCTION DESIGNER JESSICA CHASTAIN  
EXECUTIVE PRODUCERS BILLY BRAUN, ELLEN BURSTYN, AND MICHAEL CAINE  
PRODUCED BY MARY ZUPPES  
EXECUTIVE PRODUCERS JEFF ZIMMER AND LEEA SMITH  
PRODUCED BY KATHY AN GROWLEY  
EXECUTIVE PRODUCERS BOYFRIENDS  
EXECUTIVE PRODUCERS JORDAN GOLDBERG, KIM MILES, MITCHELL THOMAS, TULL  
EXECUTIVE PRODUCERS JONATHAN NOLAN AND CHRISTOPHER NOLAN  
EXECUTIVE PRODUCERS EMMA THOMAS, CHRISTOPHER NOLAN, LYNDA OBST  
WRITTEN BY CHRISTOPHER NOLAN  
DIRECTED BY CHRISTOPHER NOLAN

IN THEATRES AND IMAX

EVERYWHERE

NOVEMBER 7

[interstellarmovie.com](http://interstellarmovie.com) [interstellar.com](http://interstellar.com)





MATTHEW  
McCONAUGHEY

ANNE  
HATHAWAY

JESSICA  
CHASTAIN

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PRODUCED BY MARY ZUPPES  
EDITED BY PHILIPPE LEON  
MUSIC BY JONAS ZIMMER  
EXECUTIVE PRODUCERS LEEA SMITH AND JONATHAN GROFFLEY  
EXECUTIVE PRODUCERS DON TEVAK, BOYTEM, IRENE ASSO,  
AND JORDAN GOLDBERG  
EXECUTIVE PRODUCERS MATTI TORNE, THOMAS STILU  
PRODUCED BY JONATHAN NOLAN AND CHRISTOPHER NOLAN  
SCREENPLAY BY EMMA THOMAS, CHRISTOPHER NOLAN, LYNDA OBST  
DIRECTED BY CHRISTOPHER NOLAN

IN THEATRES AND IMAX

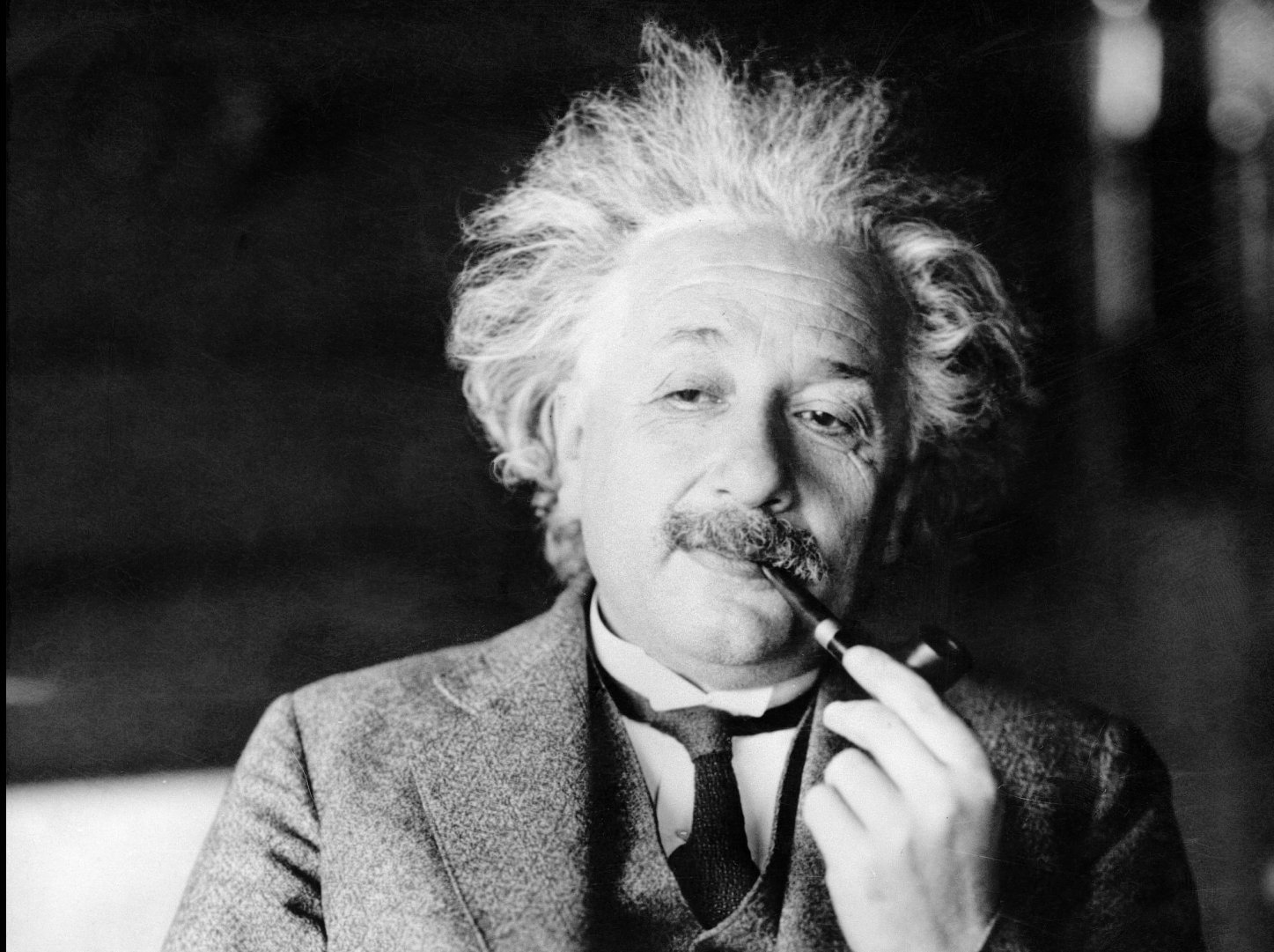
EVERYWHERE

NOVEMBER 7

[interstellarmovie.com](http://interstellarmovie.com) [interstellar.com](http://interstellar.com)

# The beginnings of Interstellar



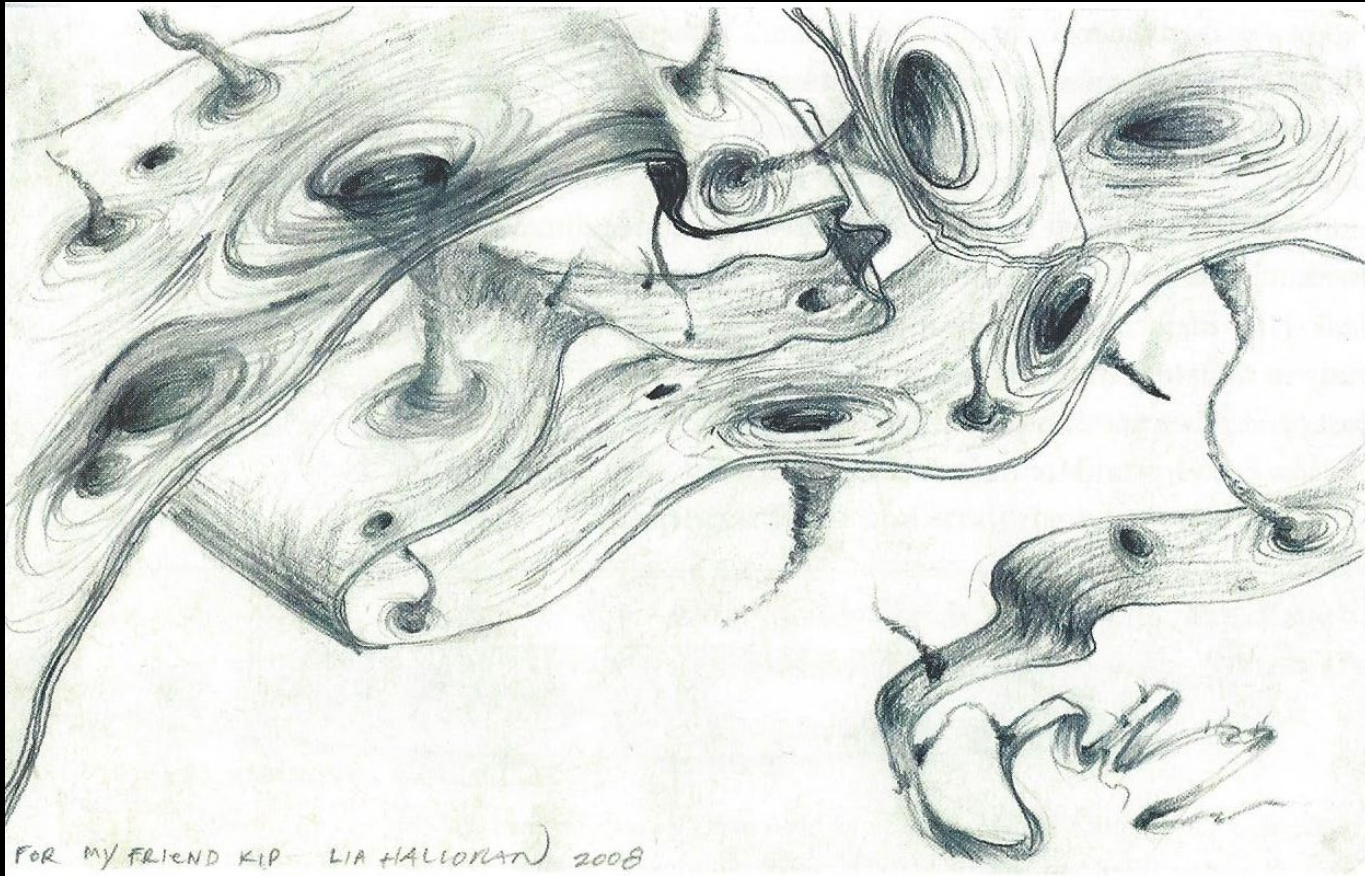




# Higher Dimensions

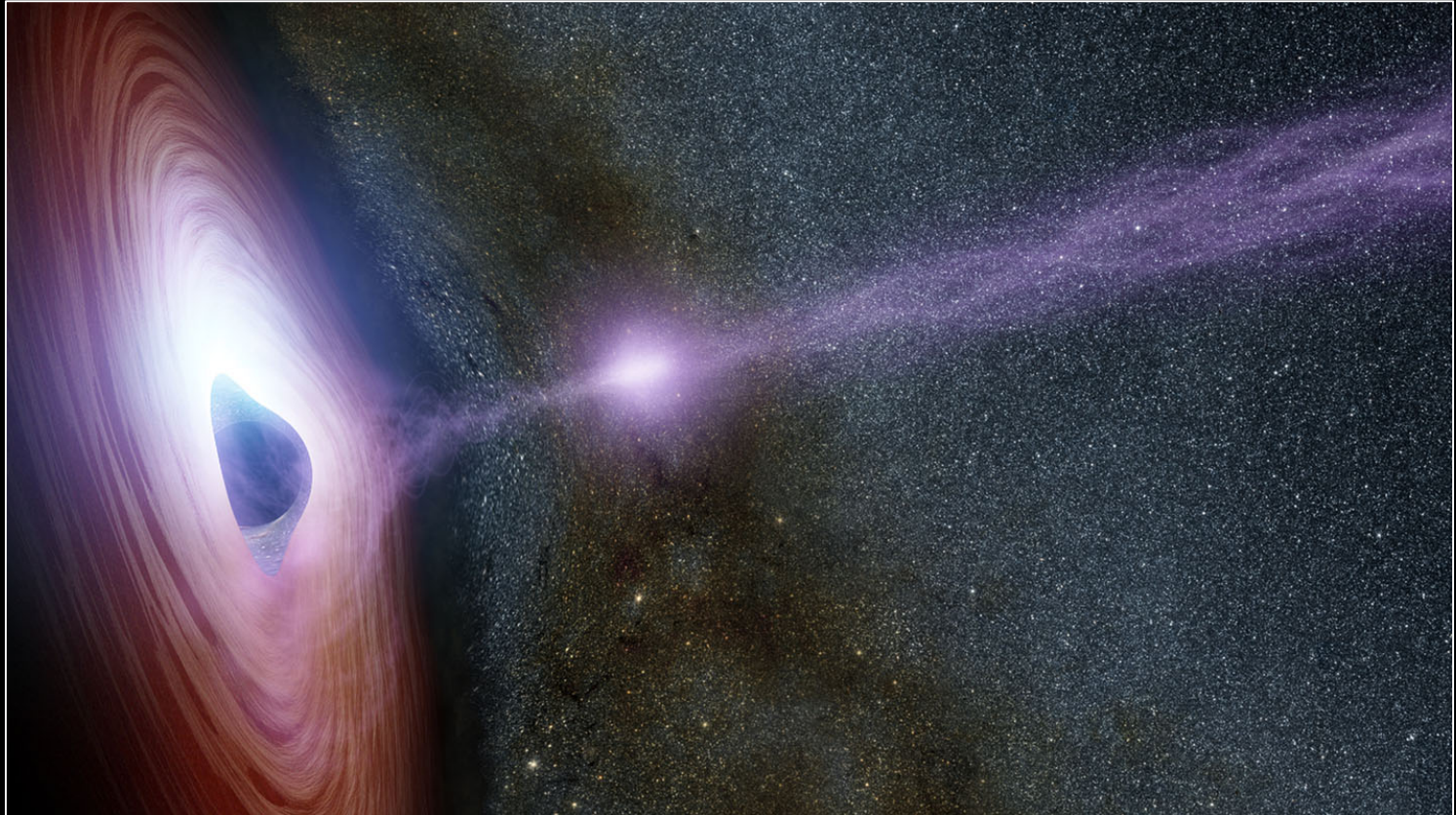
- We “experience” a four dimensional world:
  - Three dimensions in space
  - One dimension in time
- But what’s to say there aren’t other dimensions which we can’t experience
  - String theory says there could be as many as 26!

# Wormholes & Blackholes

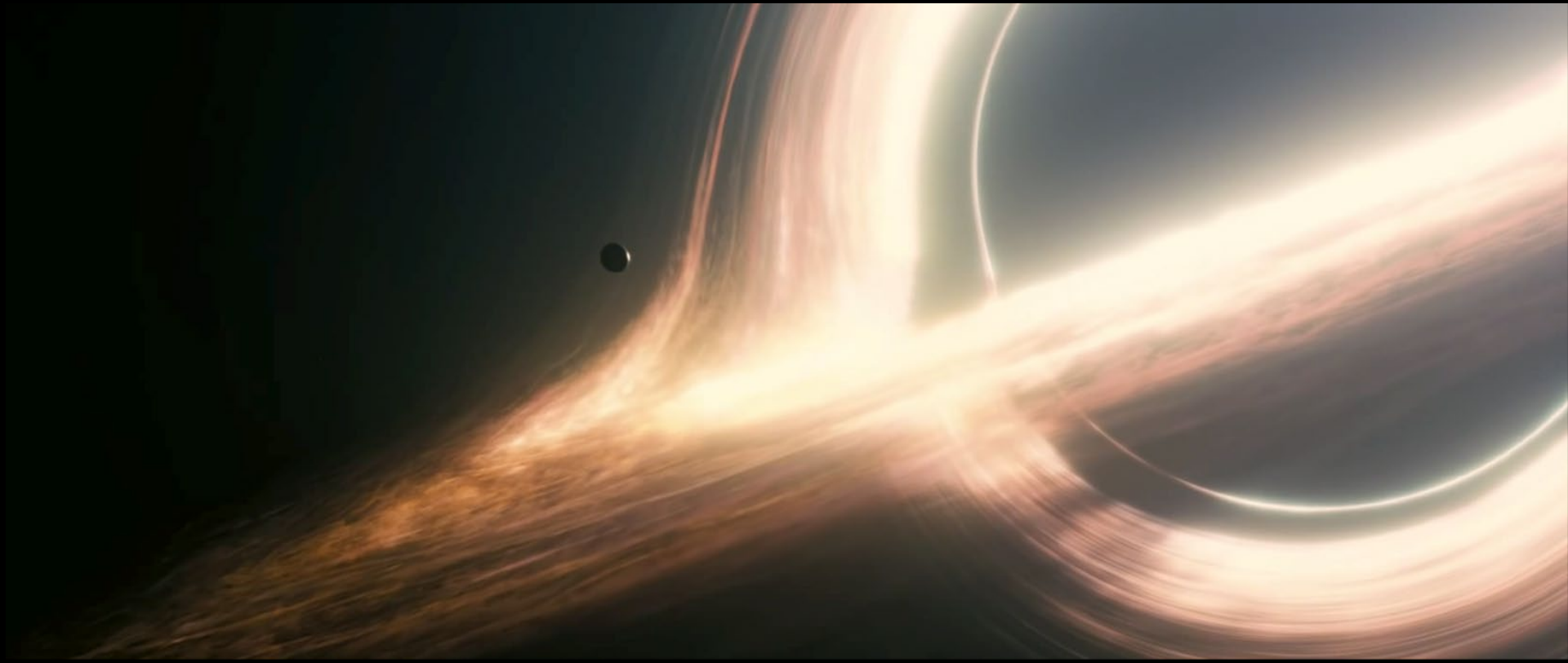




# Blackholes











# Time





# GPS



# Long Duration Space Travel

- Sending humans anywhere beyond Earth takes a long time
  - You need to slow down the bodies metabolism
    - Reduces the need for food
    - Slows aging
- Therapeutic hypothermia

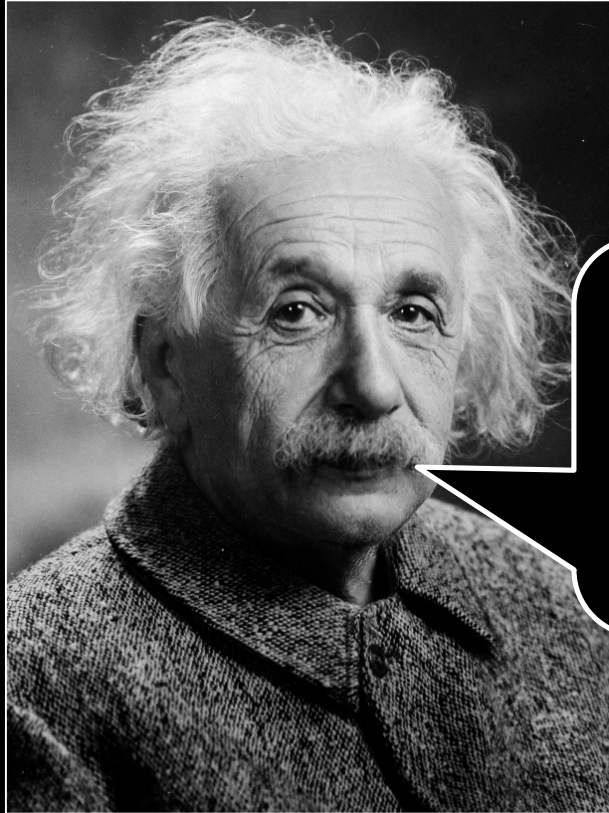


# Mars500





# Into a Blackhole...



No information can escape  
from a black hole.

**ABSOLUTELY NONE!**

SPOILER ALERT:  
This book explains  
the fantastic climax  
and ending of  
*Interstellar*

THE  
SCIENCE  
OF  
INTERSTELLAR

---

KIP THORNE

FOREWORD BY CHRISTOPHER NOLAN



