People Like to Make Things Up

- Hollywood producers never took Physics 10
  - It shows
- At least hire consultants
- Otherwise you just have to pull ideas out of thin air

The Good Eggs

- Despite the general lack of care/concern for physics in movies, a few get things outstandingly right!
  - 2001: A Space Odyssey (1968, before moon landings!)
  - 2010 sequel to 2001
  - Modern Star Trek movies get a lot of the details right
    - but by no means all… Get seat-belts for gracious sake!
- Most movies in which they let Mother Nature take care of the choreography, things work out well
  - It’s the rigged-up stunt scenes where things go wrong

The Rotten Eggs

- Though entertaining (and I like some of these), among the most guilty betrayers of physics are:
  - Armageddon! (at the top of the list for a reason)
  - Mummy movies
  - Cliffhanger (couldn’t even bear the previews)
  - Mission Impossible (either one)
  - Speed (fun, but wrong)
  - Mel Gibson, Schwarzenegger, James Bond movies
- Interesting case study: Armageddon vs. Deep Impact
  - Deep Impact hired science consultants and did okay
Themes of physics misrepresentation

- Everything goes BOOM, and explodes in huge fireball
  - Real life more often just crunches (we're not loaded with dynamite)
- Momentum seldom conserved
  - Bullet sends victim flying out window, shooter remains motionless
- Hearing sound in space
  - No air to carry sound waves
- Seeing laser beams in space
  - What are they reflecting off of? Is it smoky?
- Aerodynamic spaceships, airplane-like maneuvering
- Exploding rather than imploding submarines
- Fake props: wrong inertia properties
  - Raiders of the Lost Arc: swiped huge gold statue like it was nothing!

Movie Examples…

- Goldeneye, catch up to airplane
  - Terminal velocity of human: 50 m/s, up to 70 m/s if you reduce your effective area by a factor of two
  - Terminal velocity of plane in dive configuration: 75-80 m/s (more with engine at full power)
  - Got a late start, too…
  - Also problem pulling out of dive!

Calculations relating to selected scenes

- Speed, bus jump
  - 150-200 ft, level (call it 45 m)
  - Bus at 30 m/s (67 mph): takes 1.5 seconds to cross
  - Drops 11 m (36 ft) in 1.5 s
  - Could work, at 15-20 degree launch angle, no air drag

Websites & Assignments

- Websites
  - www.space.com/opinions/columns/opinions/plait_000217.html
  - www.badastronomy.com/
- Assignments