COMPUTER SCIENCE

STUDENT CHOSEN TOPICS, THURSDAY MAY 24TH + TUESDAY MAY 29TH

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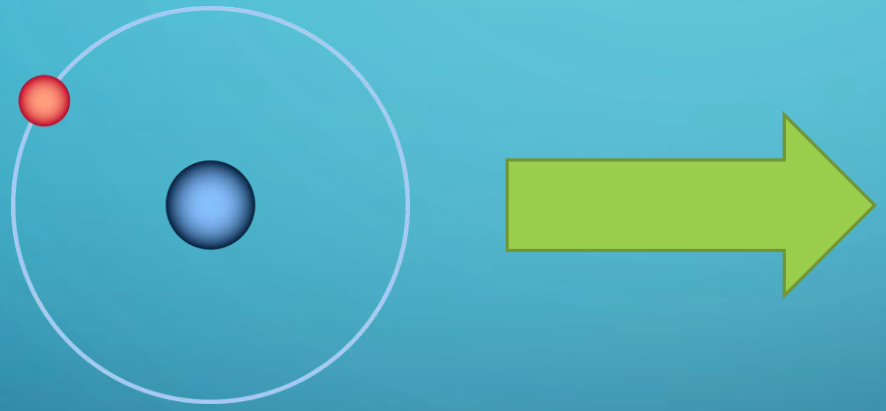
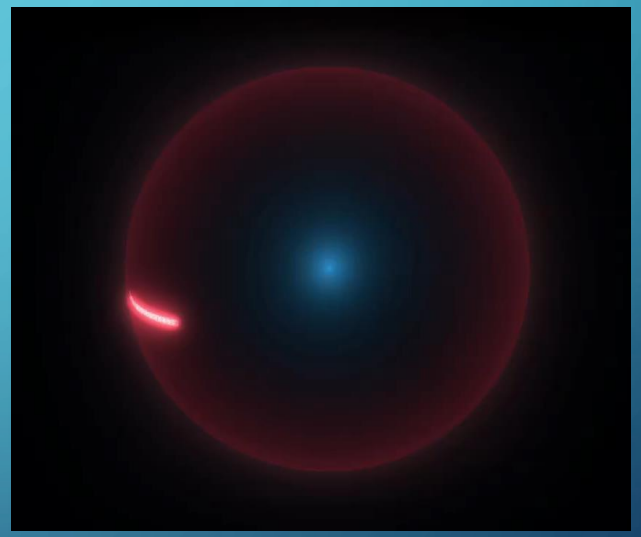
FINAL PROJECTS

- 3 different project descriptions, you need to:
  - Complete the coding, using all of the skills we've learned
  - Write user documentation
  - Write a report
  - Give a 10 minute presentation showcasing your work (last day of classes, June 5th)
- Due dates:
  - ~~Pick your project (1 of the 3 given): April 3rd – tell me in person or in email!~~
  - **Update your github account regularly as you add sources, make changes, and code.**
  - Submit Report, code, supporting documents: June 4th at midnight
  - Give presentation: June 5th in class

QUANTUM MECHANICS AND COMPUTER SCIENCE

- What is quantum mechanics? How does it relate to CS or how can it be used in CS?





- Resources:
  - http://www.nybooks.com/articles/2017/01/19/trouble-with-quantum-mechanics/
  - https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2013/lecture-notes/
  - https://uwaterloo.ca/institute-for-quantum-computing/quantum-computing-101

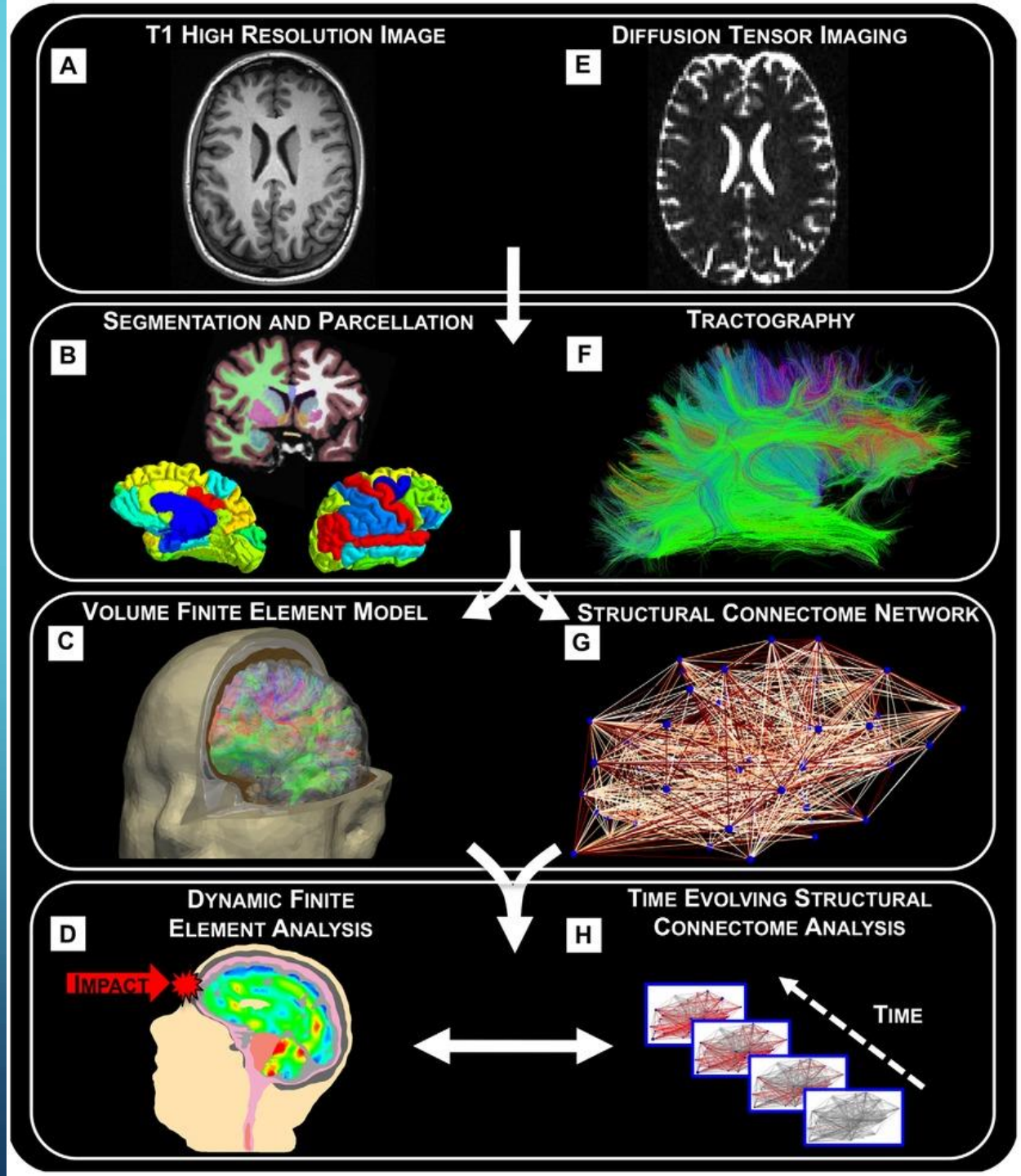
INDUSTRIAL CONTROL SYSTEMS SECURITY

- ICS = any device, instrument, and associated software and networks used to operate or automate industrial processes. Why would security by a priority with these systems?

- Resources:
  - https://nvlpubs.nist.gov/nistpubs/specialpublications/nist.sp.800-82r2.pdf
  - https://www.csoonline.com/article/3262641/critical-infrastructure/8-questions-to-ask-about-your-industrial-control-systems-security.html
  - https://www.helpnetsecurity.com/insecuremag/issue-52-december-2016/

MIND CONTROL AND UNDERSTANDING THE BRAIN

- Why is understanding the brain so difficult? Do we have a working model of the brain?
- Resources:
  - https://www.humanbrainproject.eu/en/brain-simulation/
  - https://bluebrain.epfl.ch/
  - https://www.mpg.de/18011/Optogenetics
  - Combining the Finite Element Method with Structural Connectome-based Analysis for Modeling Neurotrauma: Connectome Neurotrauma Mechanics (2012)
  - https://www.mayfieldclinic.com/PE-AnatBrain.htm



ETHICS AND AI

- Resources:
  - https://intelligence.org/files/EthicsofAI.pdf
  - https://www.theguardian.com/technology/2018/apr/16/cambridge-analytica-scandal-highlights-need-for-ai-regulation

The Map of Artificial Intelligence Ethical Issues

	Short Term	Long Term
AI as agents	Structural unemployment Fairness in algorithms Machine ethics Proliferation of autonomous weapons	Finalizing human values for machines to propagate Status of humanity in a world dominated by artificial agents Controlling artificial general intelligence and creating friendly superintelligence
AI as subjects	Legal status of autonomous systems Suffering in reinforcement learners	Consciousness in artificial intelligence Well-being of AIs Moral status of mind uploads

SUPERCOMPUTERS

- Resources:
  - https://www.scinethpc.ca/
  - https://www.top500.org/
  - http://www.explainthatstuff.com/how-supercomputers-work.html
  - https://cvw.cac.cornell.edu/gpu/structure