



ASME 2016 IDETC/CIE

International Design Engineering Technical Conferences & Computers and Information in Engineering Conference

CONFERENCE
Aug 21 - 24, 2016

Charlotte, NC, USA



Challenges in the Design of Complex Systems NSF/ASME Student Design Essay Competition 2016

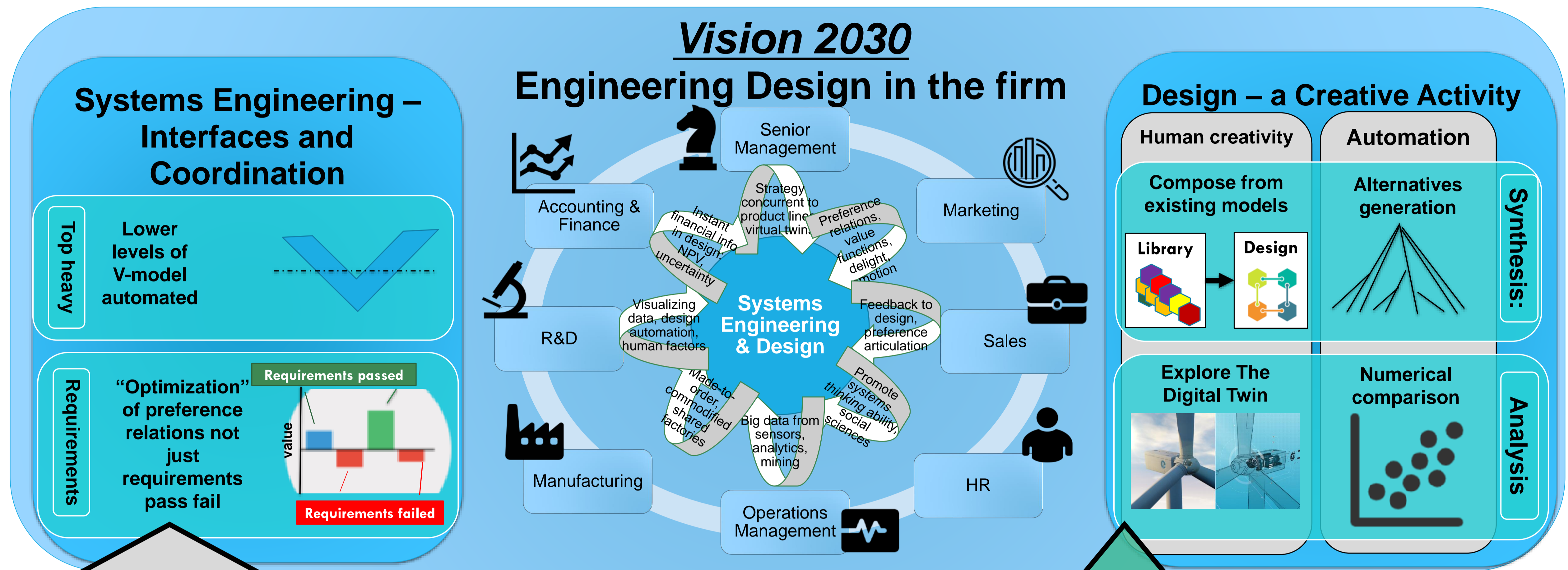
Joshua Sutherland & Marc-Andre Chavy-Macdonald

Department of Systems Innovation, Graduate School of Engineering, The University of Tokyo
1st Year PhD Candidates

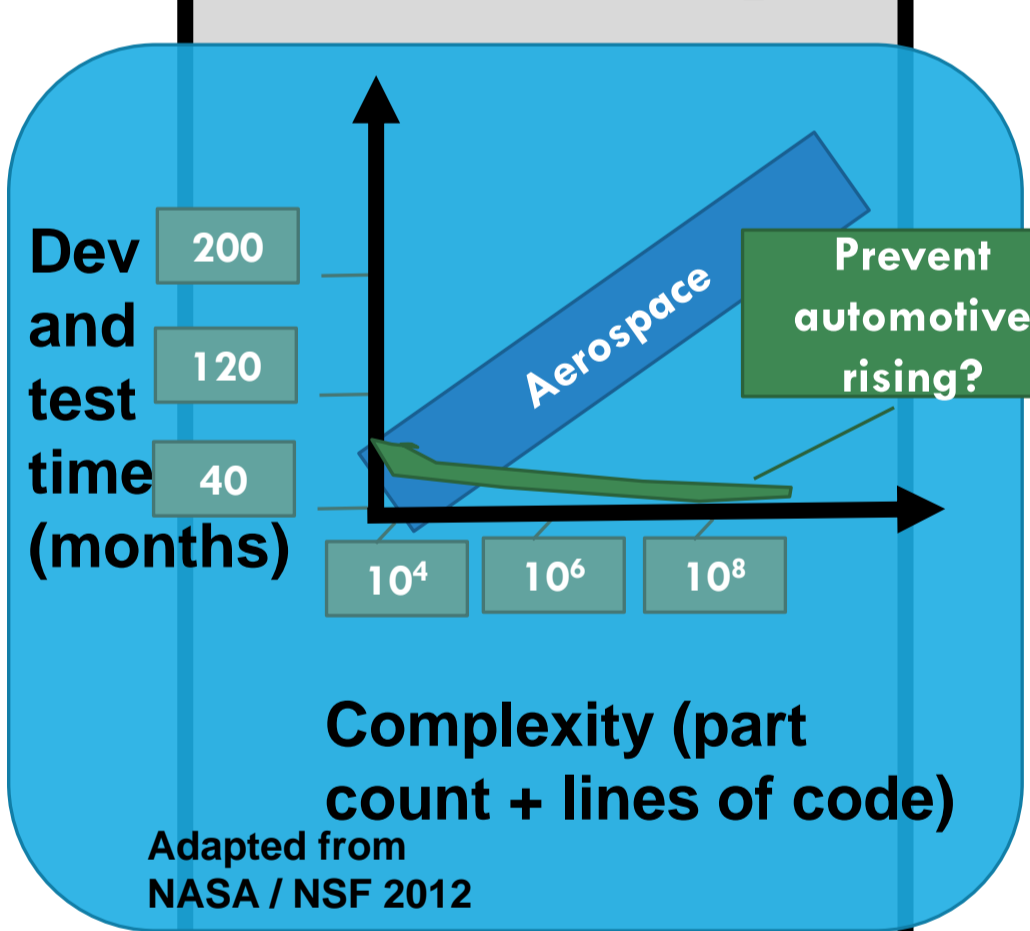
Advisor: Professor Kazuhiro Aoyama



東京大学
THE UNIVERSITY OF TOKYO



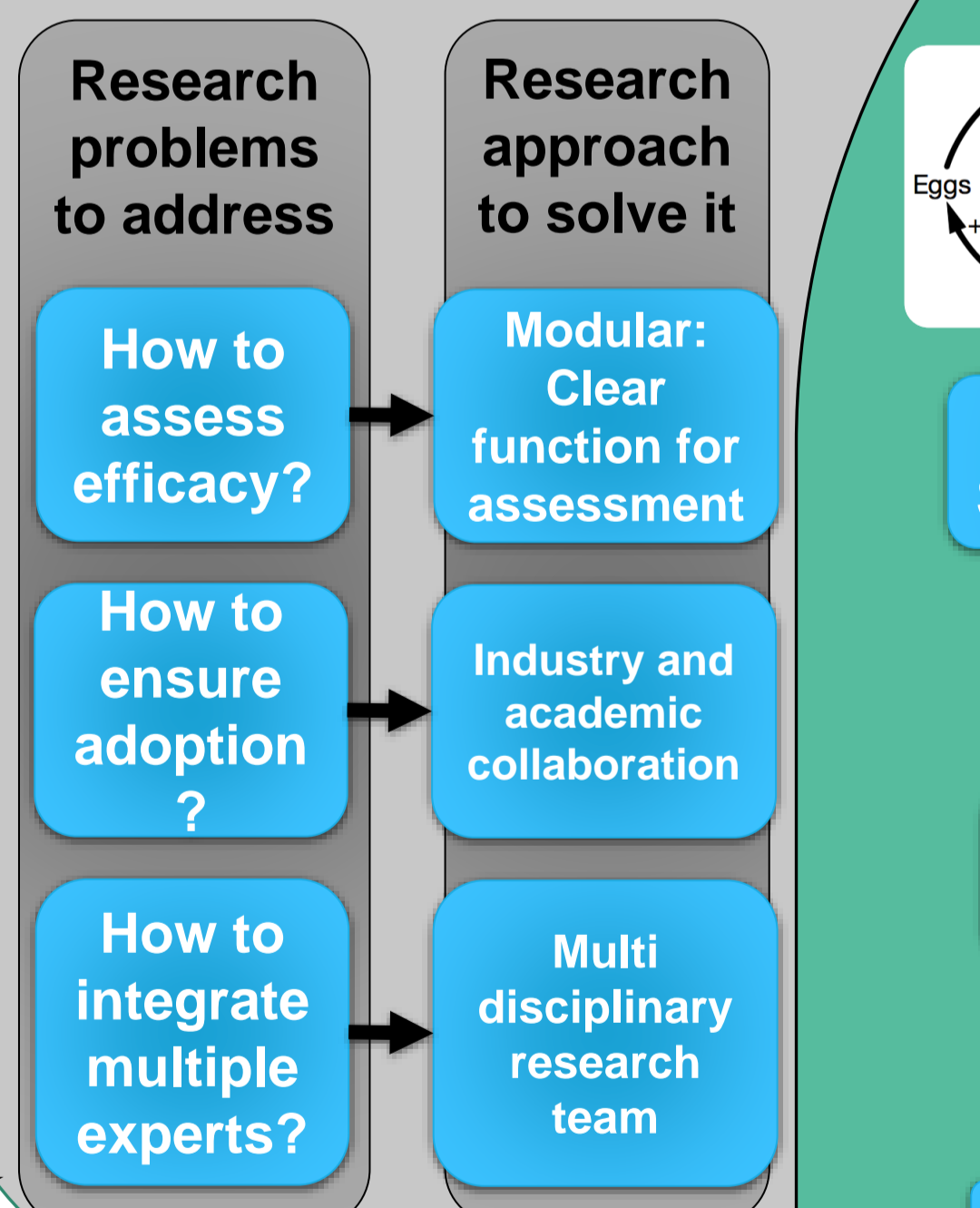
Bridging the Gap With Research



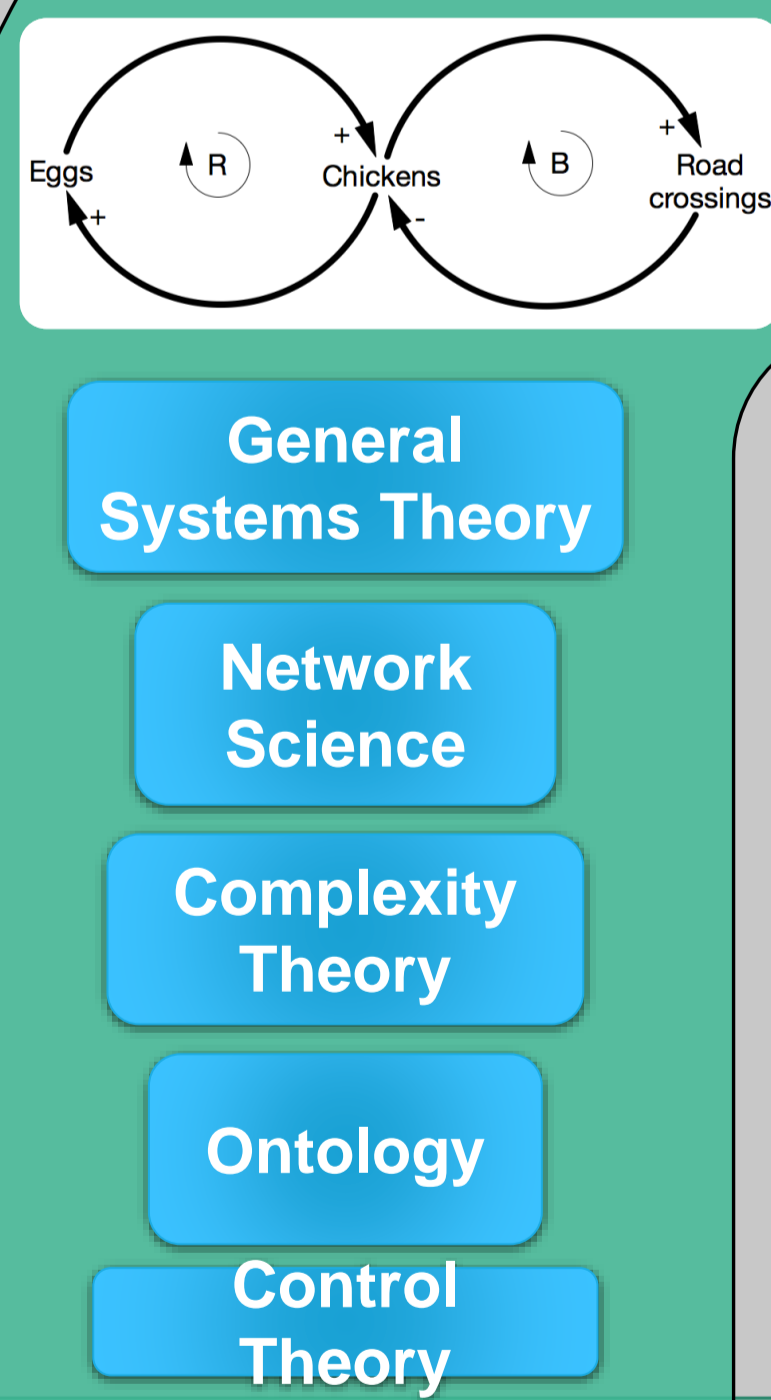
Systems Engineering: Cannot keep up with growing complexity

- Crisis:
 - Overruns
 - Cost rises
 - Faulty products

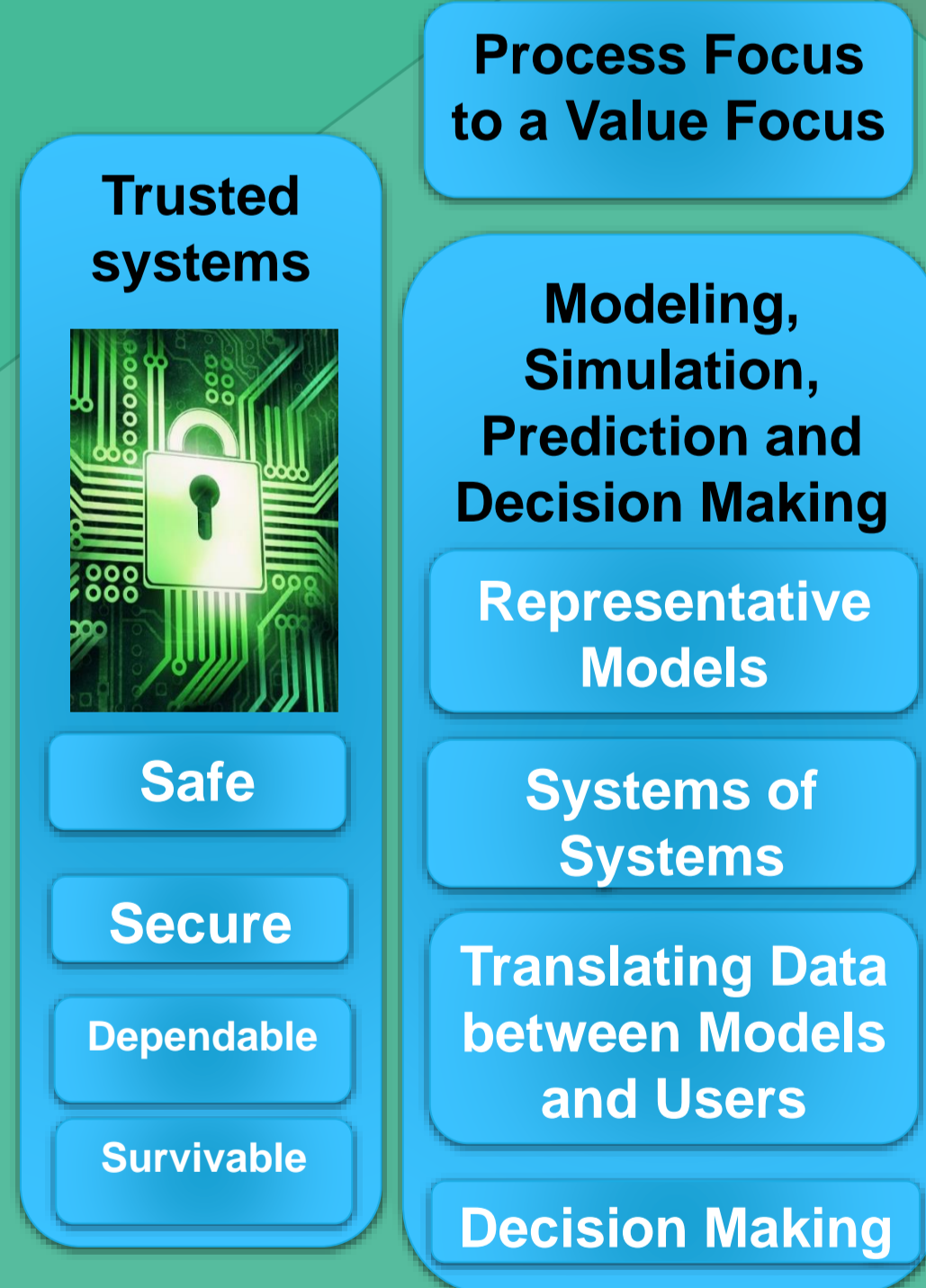
Complex Systems R&D Approach



Systems Science and Theory

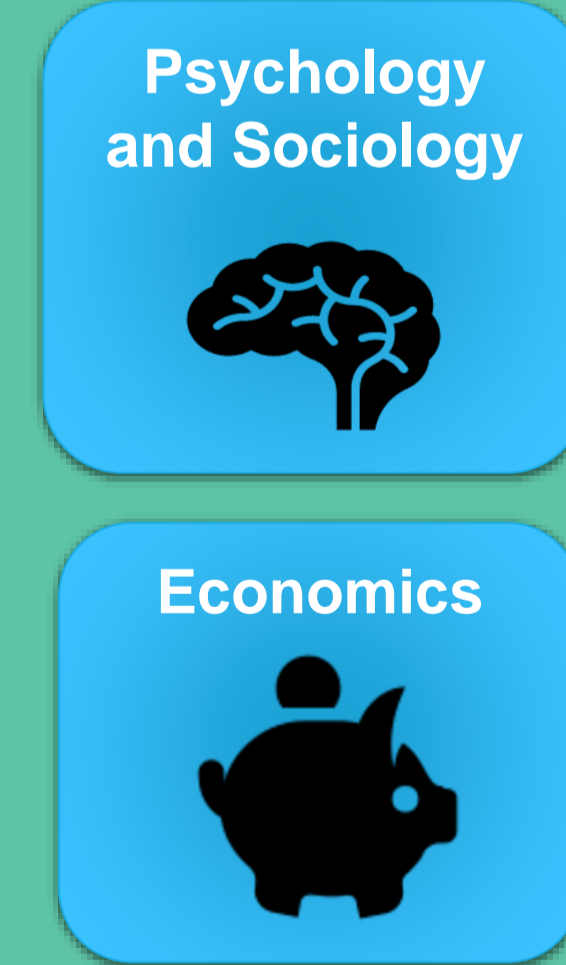


Engineering and Systems Design



Critical enabler
Information Technology

Adjacent research fields



2016: Current State and Trends

Current Systems Engineering & Design – Theory and Practice:

- Not deeply grounded in theory
- Handbook and process based

2000 -> 2016 -> 2030 Views

- More: Computing, Connectivity, VR, AI & Complexity = Autonomous and alternative power trains

Incumbent automaker:

Develops Concerns & Fears:

- Disruptive technology
- Commoditization
- New competitors
- Environmental legislation

Opportunities & Excitement:

- Use cutting edge technology to address massive world problems