UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

AGENDA – CAP Executive Board Meeting – June 5, 2019 – 5:00-7:30 PM

5:00 – 6:00 Networking Hour – Engineering Student Projects

Haptic Interfaces | Engineers for Exploration (E4E) | NanoEngineering Technology Society (NETS)

Artificial Muscle Actuators | Human-Powered Submarine

6:00 – 6:15 CAP Chairman – Nik Devereaux, Viasat

- New CAP Partners: Aira, D&K Engineering. GKN Aerospace, Hewlett-Packard, ServiceNow, ViaTouch Interactive Media
- Haptic Interfaces Presentation

Andrea Frank, 2nd year Ph.D Student, Computer Science & Engineering

Aamodh Suresh, 3rd year Ph.D Student, Mechanical & Aerospace Engineering

6:15 – 6:45 Dean's Report – Albert P. Pisano

- Rising Rankings and Scaling Education
- Advancing Research Collaborations
- Franklin Antonio Hall Update
- Systems Engineering & Co-op Status
- Strategic Plan 2020
- Engineering All Four Years (E4) Initiative Progress – Professor Steven Swanson, Computer Science & Engineering

6:45 – 7:05 Faculty Presentation – Michael Yip, Asst. Professor, Electrical & Computer Engineering

Machine Learning Applications for Robot Control and Planning

7:05 – 7:20 Breakout Session – Strategic Plan 2020

Table Discussion and Report Out

7:20 – 7:30 CAP Business – William W. Dyer, Director, Corporate Affiliates Program

- CAP Talent Programs Updates
- Research Expo Results
- MAE Senior Project Showcase
- Masters of Advanced Studies (MAS) Enrollment
- Spirit of Solar CAP Executive Cruise Save-the-Date
- Upcoming Events

Dates to Remember

June 12, 2019	MAE Senior Project Day
June 24, 2019	Deadline: Fall 2019 MAS Enrollment
September 30, 2019	CAP Executive Spirit of Solar Cruise
October 2, 2019	New Faculty Welcome
October 4, 2019	Shu Chien Lifetime Achievement Celebration
October 4, 2019	Sustainable Power & Energy Center (SPEC) Research Summit
October 10, 2019	**Fall CAP Executive Board Meeting**
October 23, 2019	Center for Wearable Sensors (CWS) Research Summit

Jacobs School CAP Mission: Drive the corporate affiliate strategy and build productive, substantive relationships between companies, faculty and students to achieve goals in research, recruitment and education in the interest of enhancing the reputation of the Jacobs School.

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

2020 Strategic Plan – Discussion Questions

What are the bold, relevant breakout moves to enable the Jacobs School to accelerate our march to cachet?

- What are the important grand challenges that the Jacobs School is uniquely positioned to address?
- What is the role of systems engineering and data analytics in the modern engineering curricula?
- How can we innovate on industry-academia partnerships for the benefit of society?
- How can we rebrand Engineering as the intellectual hub for addressing complex societal problems that can no longer be resolved by deterministic models in siloed disciplines?
- How can we attract the best talent that represents changing demographics and culture?

Notes:

UC San Diego

JACOBS SCHOOL OF ENGINEERING

Corporate Affiliates Program

Welcome
CAP Executive Board

June 5, 2019

CAP Chairman and Vice Chairman

Nik Devereaux

Director of Software Engineering
Viasat

GB Singh

Director of Engineering
Solar Turbines

Welcome

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Welcome New CAP Partners

aira

D&K engineering

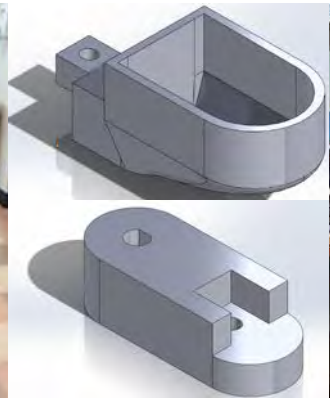
GKN AEROSPACE

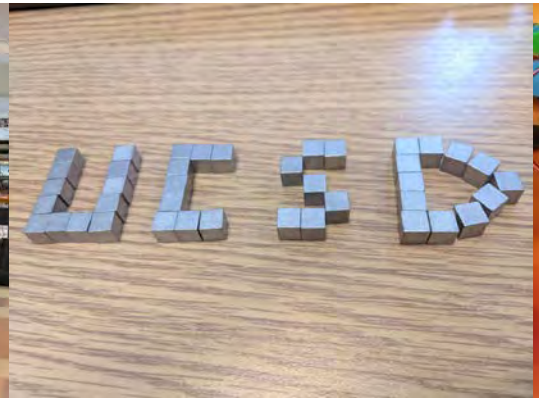
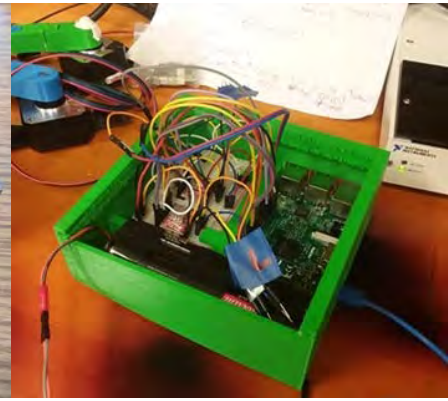
hp

servicenow

VIA Touch
INTERACTIVE MEDIA

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Wearable haptic navigational aid for the blind via ungrounded kinesthetic feedback

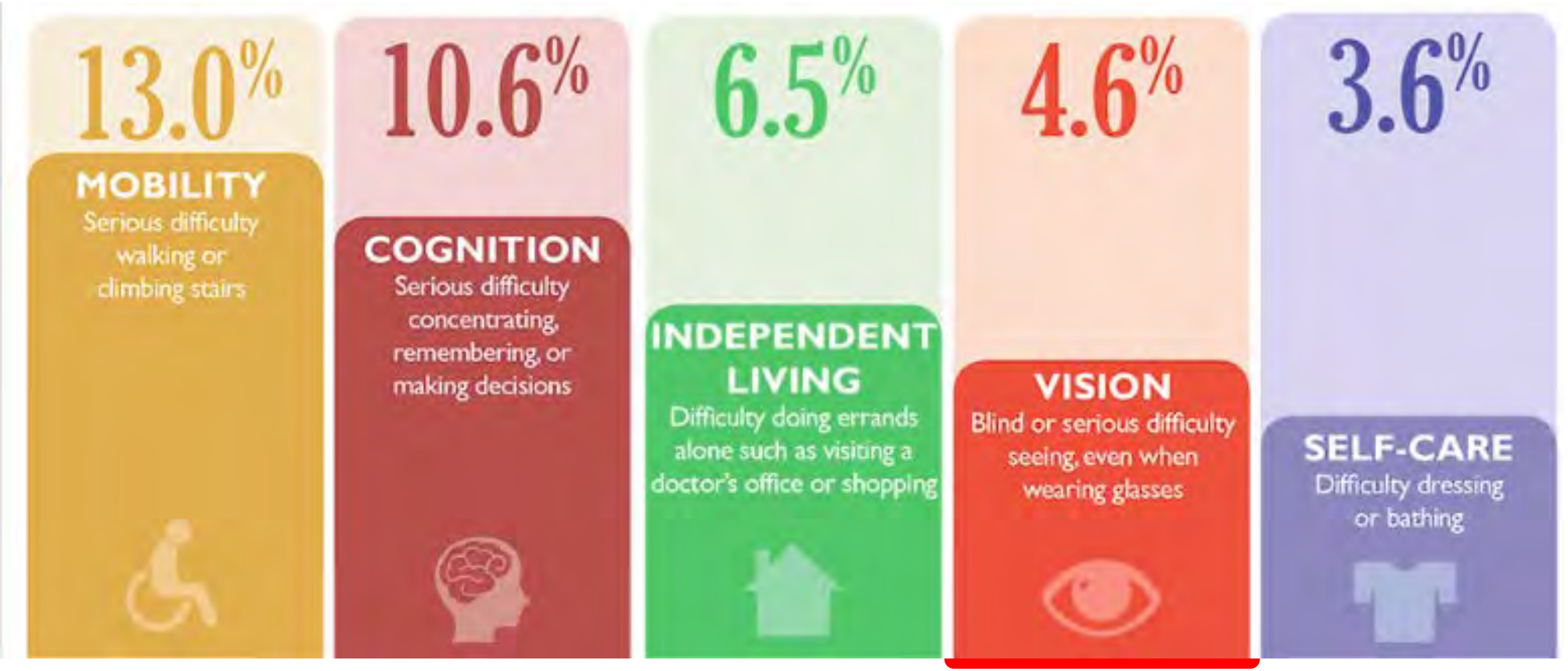
Andrea Frank and Aamodh Suresh

MAE 207: Haptic Interfaces
Professor Tania Morimoto
Department of Mechanical and Aerospace Engineering
University of California, San Diego

CONTEXTUAL ROBOTICS INSTITUTE

UC San Diego
JACOBS SCHOOL OF ENGINEERING

I. Motivation



Source: CDC: Disability Impacts all of us, www.cdc.gov/dsiabilities

"The ability to move about and travel safely without assistance is one of the cornerstones of independence for people who are blind or visually impaired."

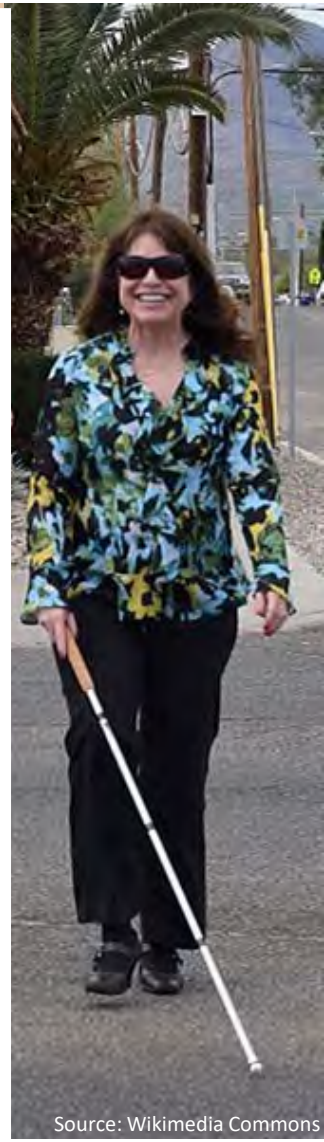
- WH Jacobson. The art and science of teaching orientation and mobility to persons with visual impairments. 1993.

Traditional Solutions

- Personal guides
- Guide dogs
- White canes


Source: WikiHow


Source: Wikimedia Commons


Source: Wikimedia Commons

Technical Solutions

GPS dependent

but...

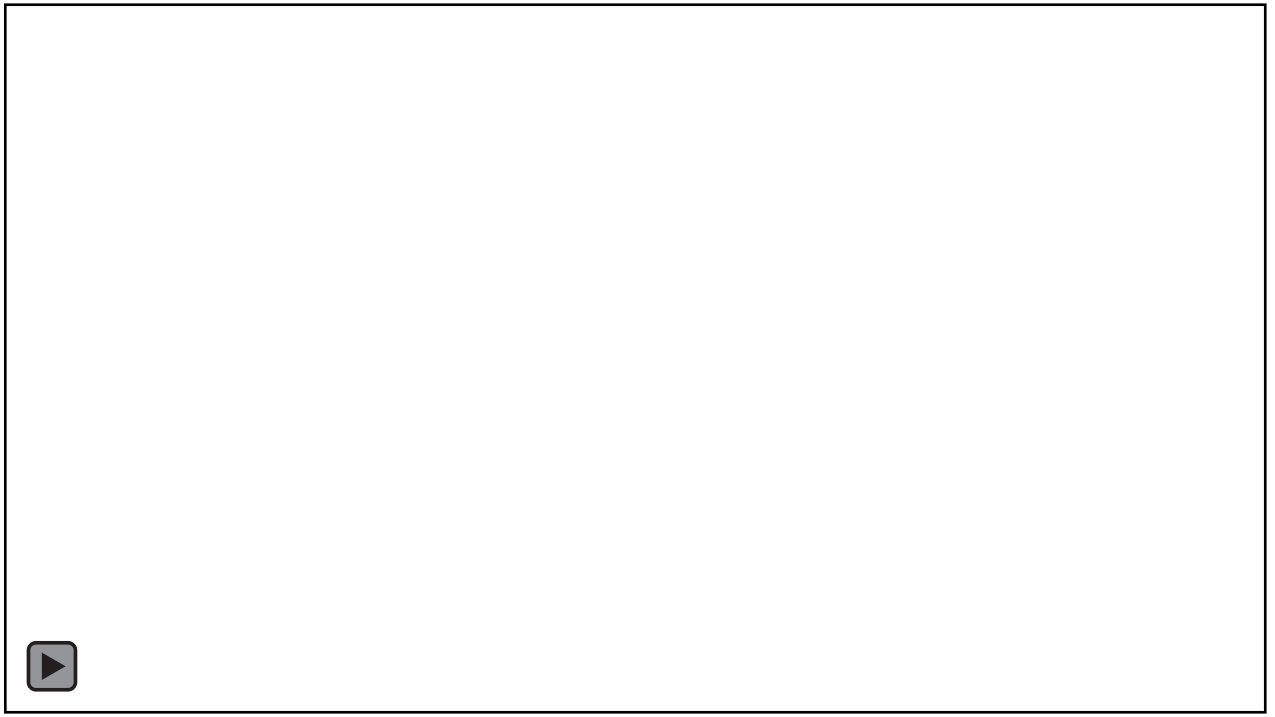
Monopolizes hands

Specific infrastructure

Inappropriate modes of communication

Our solution

- Wearable haptic device
- Mimics a personal guide leading the VIP by the shoulder
- **Mobile ungrounded kinesthetic feedback** via simple eccentric mass arm



Our solution

~~GPS dependent~~

GPS Independent

~~Specific infrastructure~~

No Infrastructure

~~Inappropriate modes of communication~~

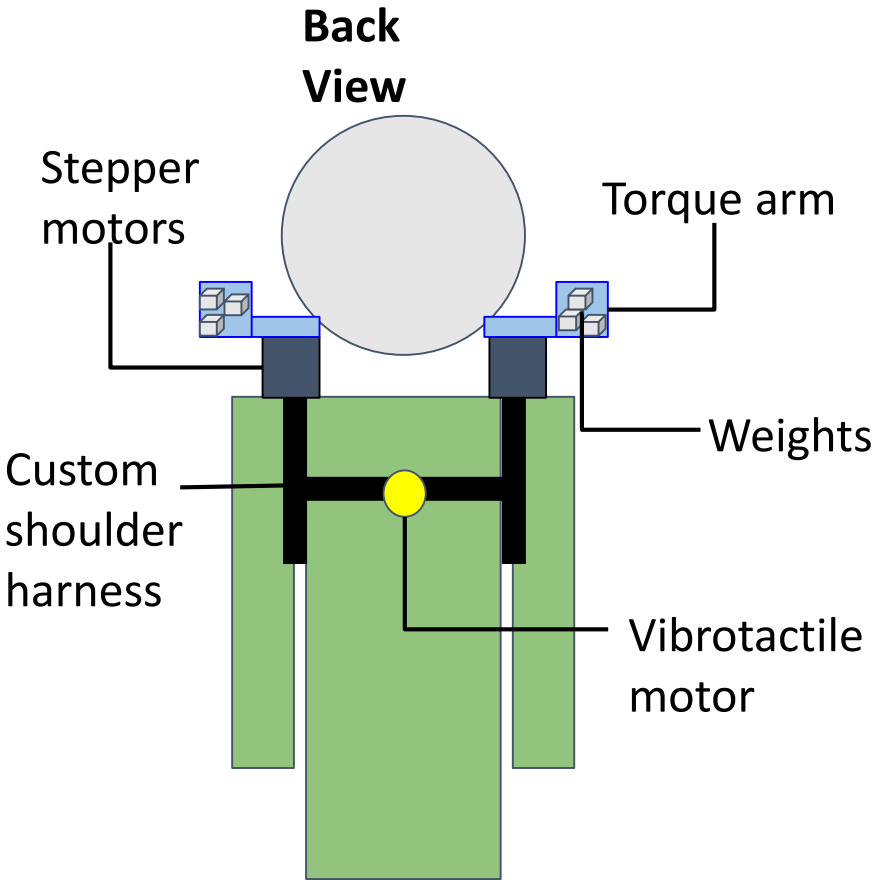
Intuitive Haptic Guidance

~~Monopolize hands~~

Hands-Free

II. Device Design

Working and Assembly of device



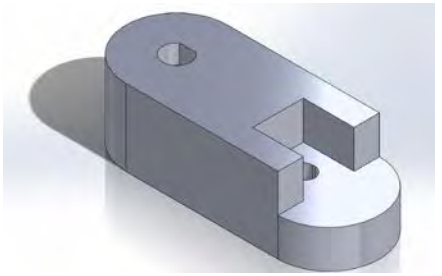
Working

- User feels a ‘pull’ from torque acting from weights.
- Stepper motor controls the direction of the ‘pull’ precisely.
- User can be guided through an obstacle environment.

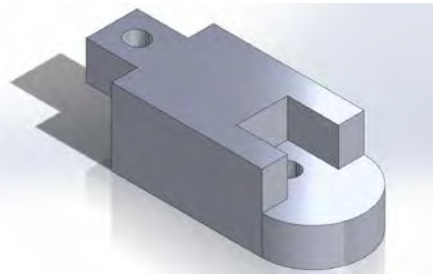
Signaling

- Vibration: start/stop notification
- Torque angle: direction

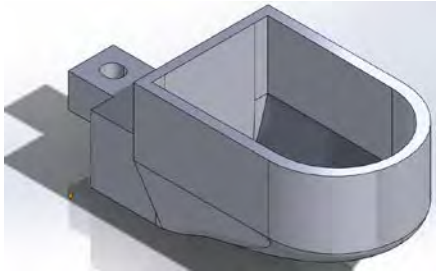
Mechanical Design



Motor Connector



Torque arm extender

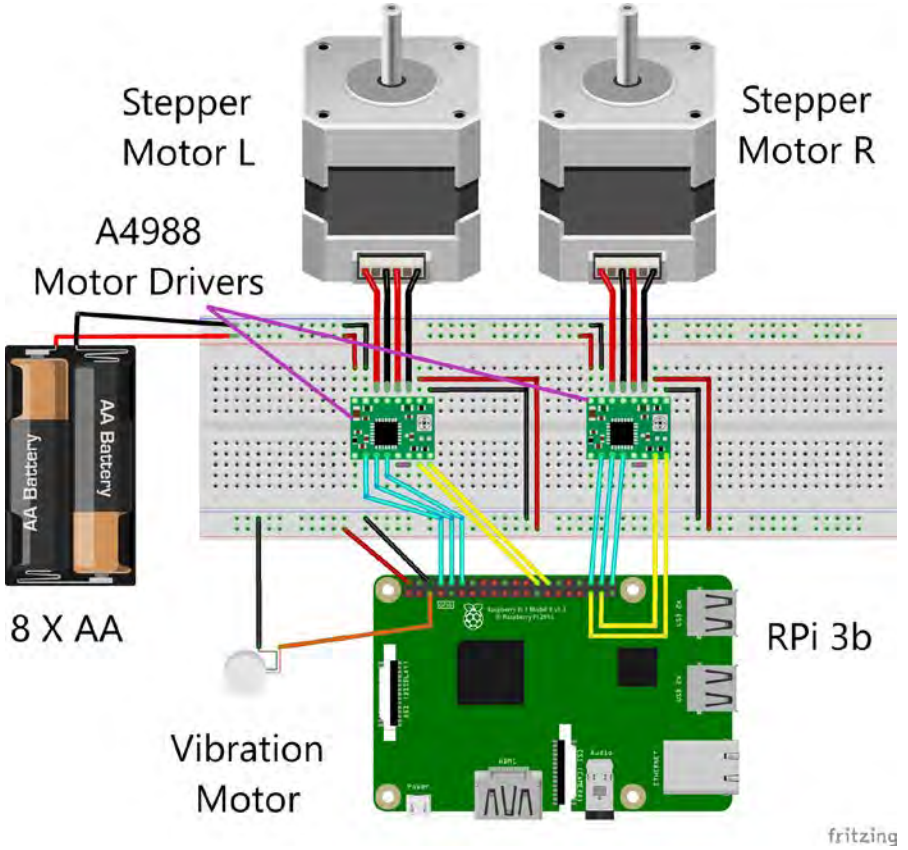


Weight holder

Tungsten Weights

- 3D printed parts.
- Modular design.
- Easy to manufacture and assemble.
- Variable torque design.

Electrical/ Electronics Design



- Stepper motors for precision and accuracy.
- Raspberry Pi 3 microcontroller.
- L298N motor drivers.
- Eccentric motor for vibro-tactile feedback.

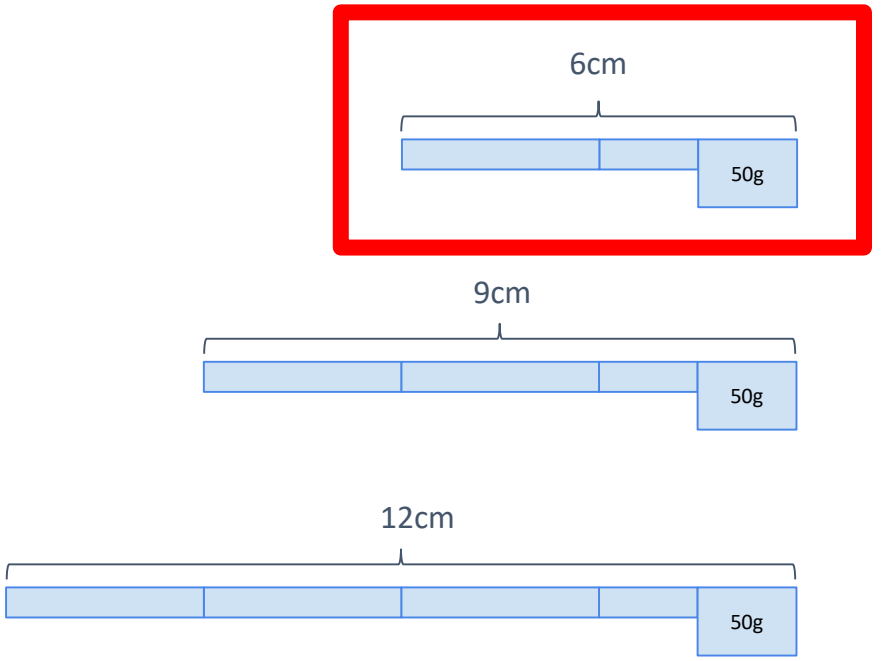
III. Evaluation

$$Correct = \begin{cases} 1 & \text{if guess is correct} \\ -1 & \text{if guess is incorrect.} \end{cases}$$

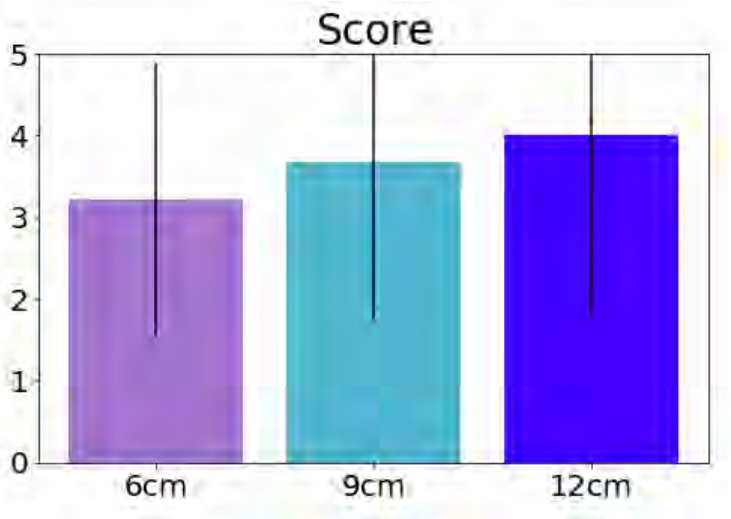
$$Confidence \in \{i \in \mathbb{Z} : i \in [0,5]\}$$

$$Score = Correct \times Confidence$$

User Study I: Effect of Torque

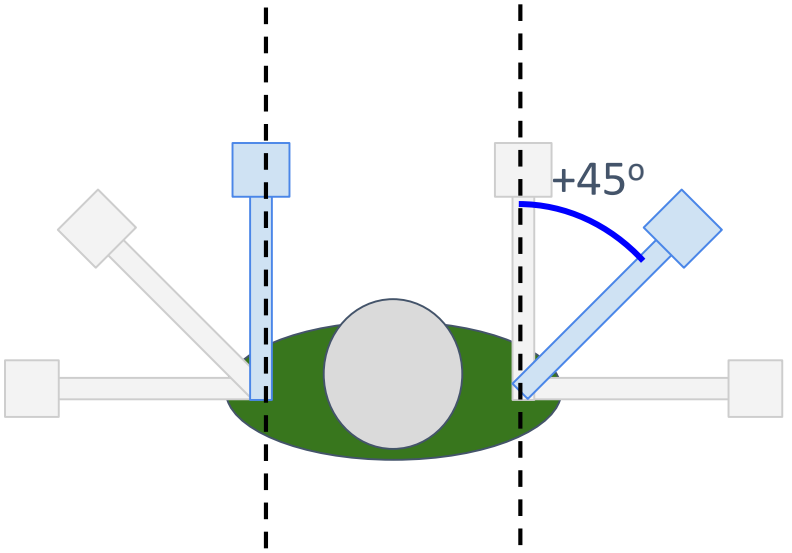


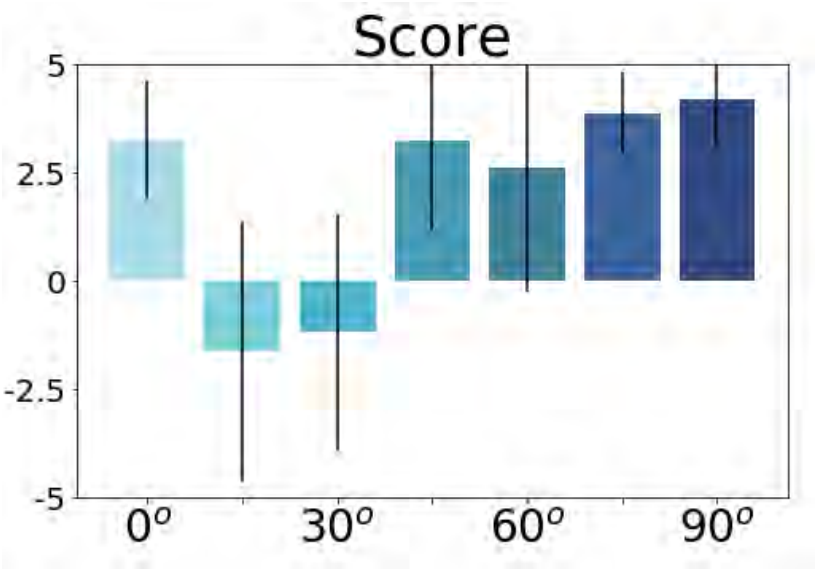
$$\tau = F \cdot r$$



User Study II: Effect of Angle

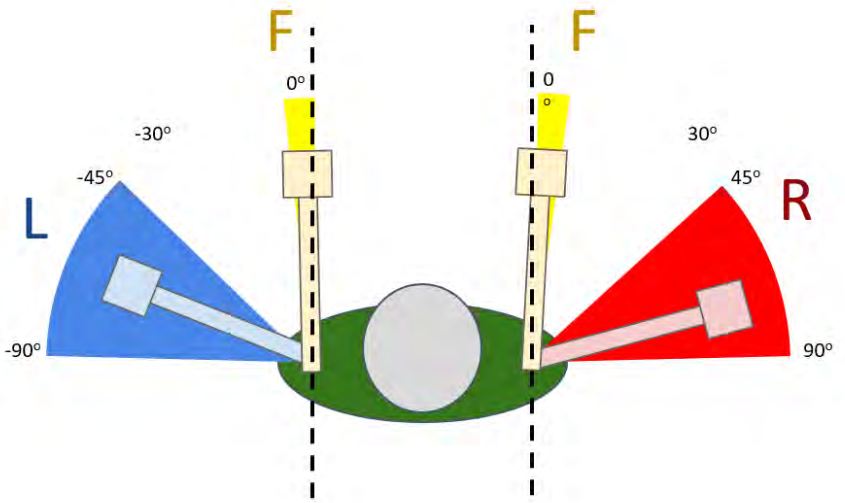
Angle: Between -90º and 90º in 15º intervals

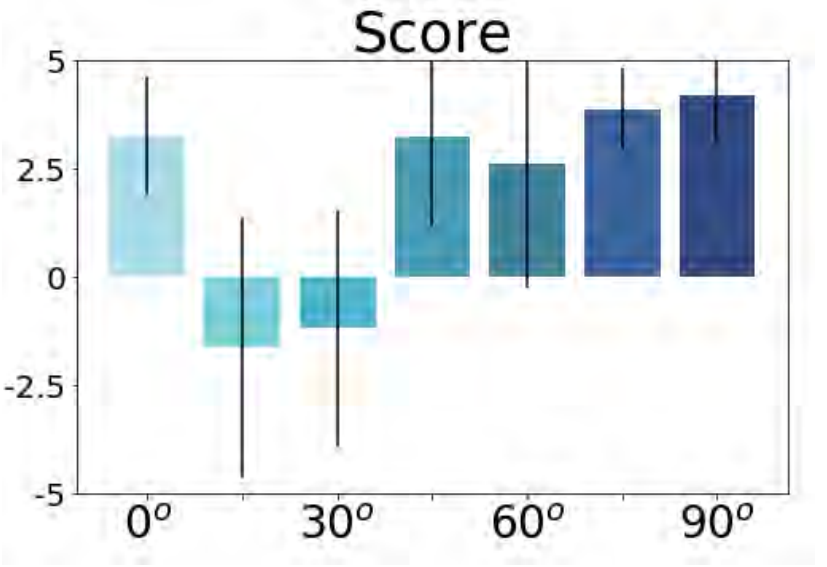




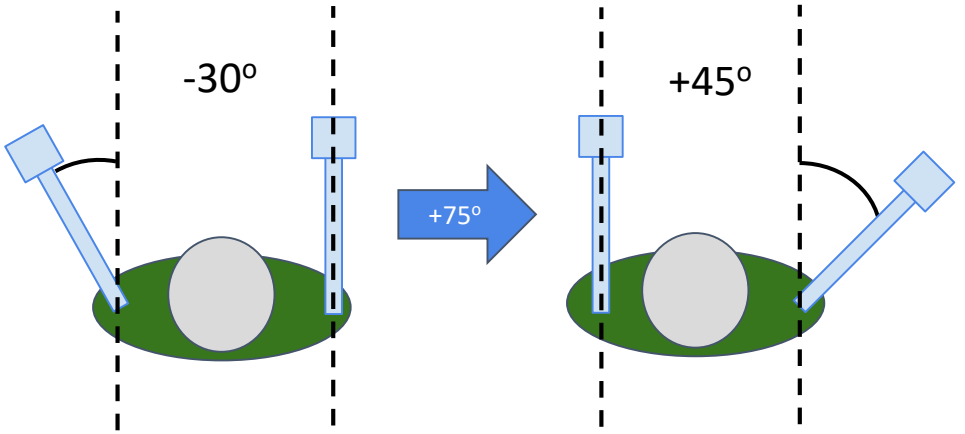
User Study II: Effect of Angle

Angle: Between -90º and 90º in 15º intervals





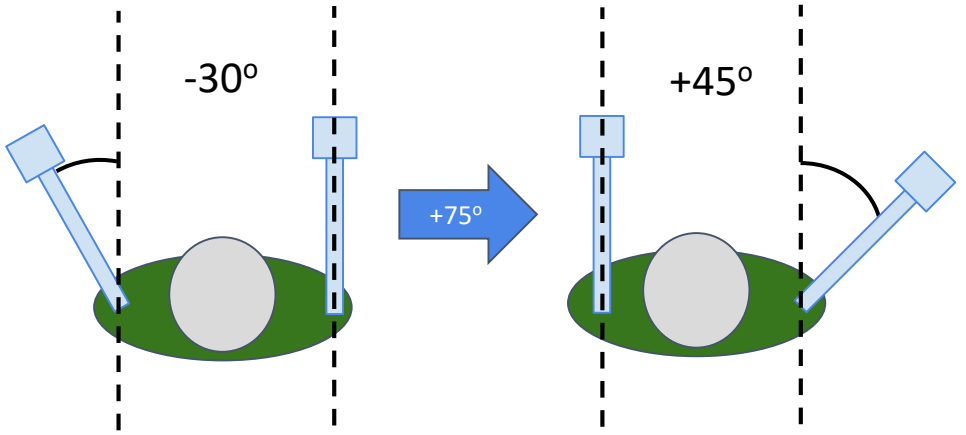
User Study III: Effect of Transitions

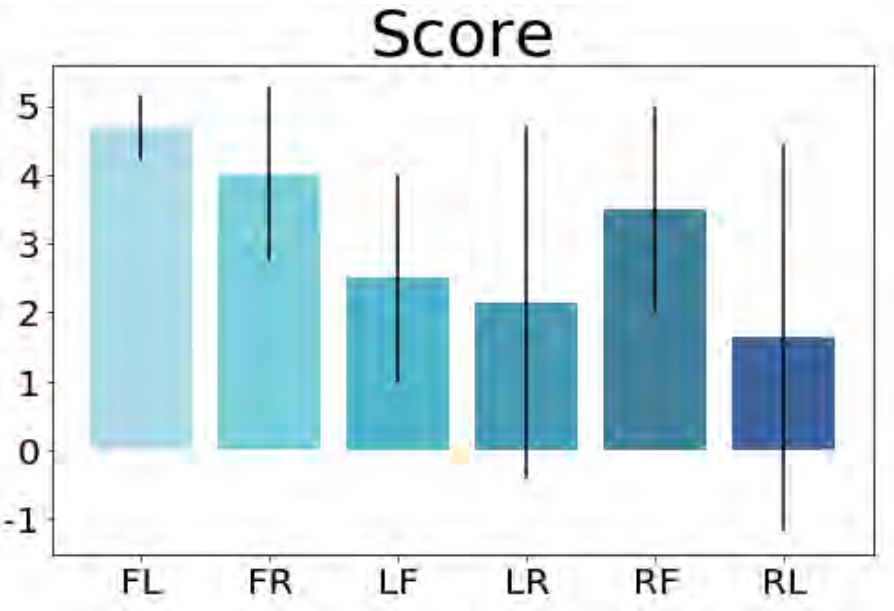


Transitions:

1. Front to Left (FL)
2. Front to Right (FR)
3. Left to Front (LF)
4. Left to Right (LR)
5. Right to Front (RF)
6. Right to Left (RL)

User Study III: Effect of Transitions



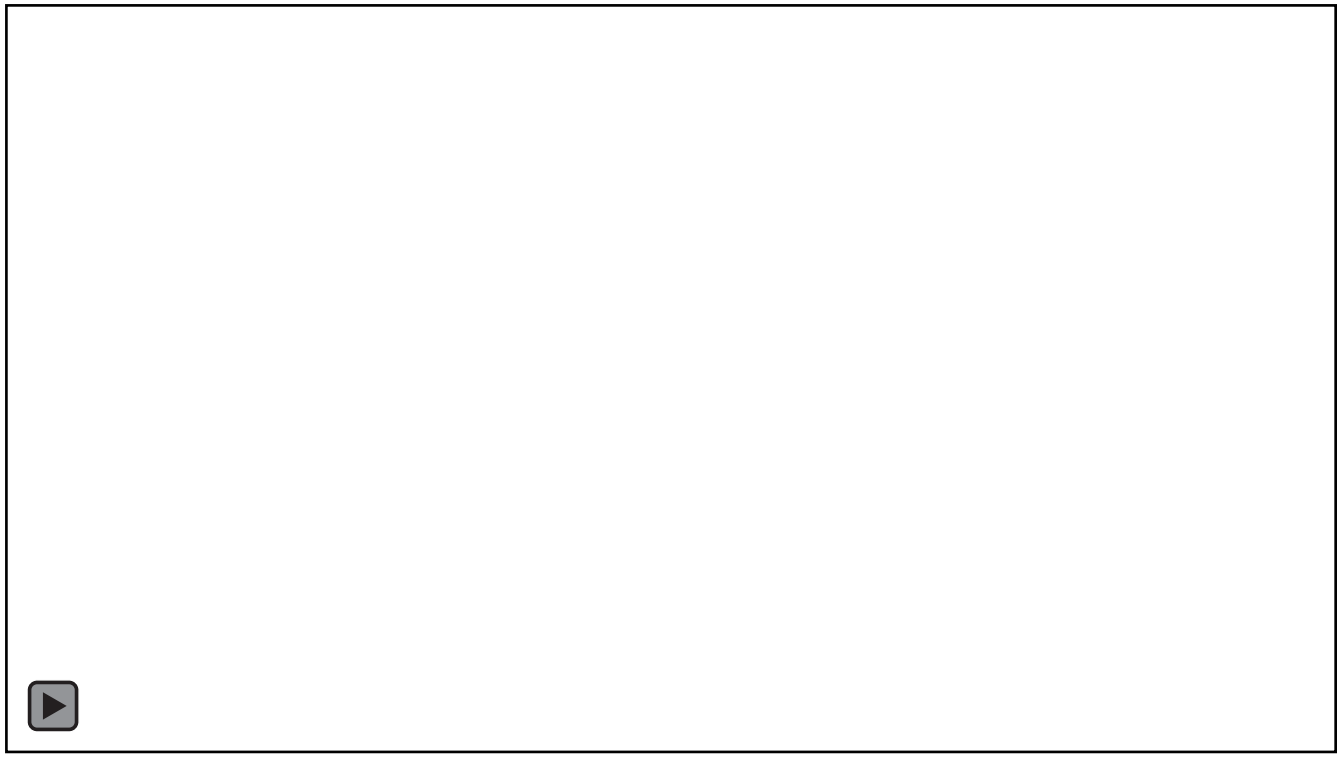


Key Observations:

- People relied on transitions **more** than absolute position
- Duration of movement also played a part

IV. Contributions

- Novel, ungrounded indoor navigational aid for VIPs
- Average confidence score of 3.63 /5
- Transitions more informative than absolute state



V. Ongoing Work

AI and user feedback integration

- Camera for active perception
- Risk-Aware path planning [1]
  - Nobel prize winning Prospect Theory to model human perception of environment
  - Sampling based planner to generate optimal paths in perceived environment
  - Machine Learning to learn the human perception model
- Natural and intuitive human-like motion
- Incorporate preliminary user feedback to improve design

[1] *A. Suresh and S. Martinez* **Planning under risk and uncertainty based on Prospect-theoretic models ,**Arxiv, April, 2019, arXiv:1904.02851.

UC San Diego

JACOBS SCHOOL OF ENGINEERING

Mechanical and Aerospace Engineering

Tania Morimoto
Assistant Professor
Mechanical & Aerospace Engineering

Saurabh Jadhav
Teacher's Assistant
MAE207

Thank you! Questions?

DEAN'S BRIEF

Albert P. Pisano

Dean, Jacobs School of Engineering

Accelerating the March to Cachet

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Rising Rankings!

(US News, March 2019)

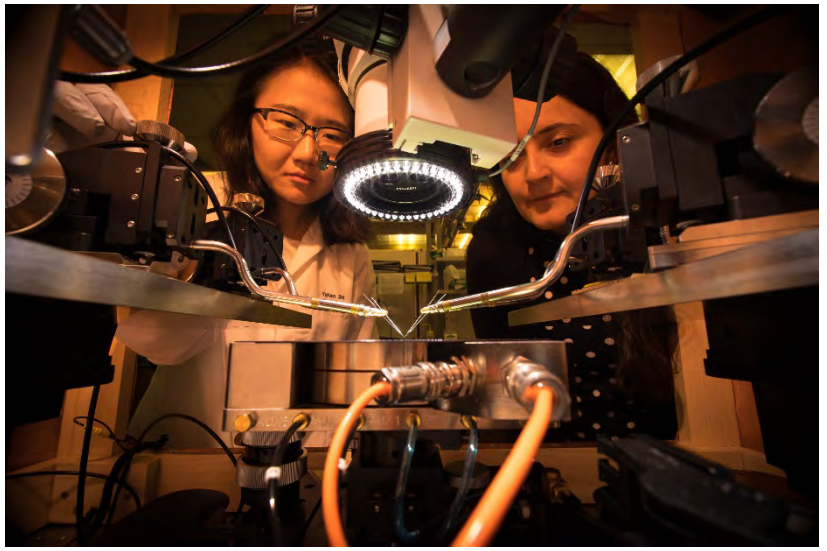
- #6 Best Public Engineering School in US
- #11 Overall, up from #17 in 2016

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Transforming Engineering Education….at Scale

- 250 Faculty, over 90 hires in last 5 years
- 2,749 Degrees Conferred in 2018
  - #2 in nation for bachelor's degrees awarded to women
  - #3 in nation for bachelor's degrees awarded overall
  - 2.3x growth in master's

Research & Innovation Leader



- **$188M Research Expenditures in FY2018**
  CAGR 6% Over 4 Years

- **Approximately 1/3 of research is in partnership with industry**
  136 Jacobs School technologies licensed in the last 5 years

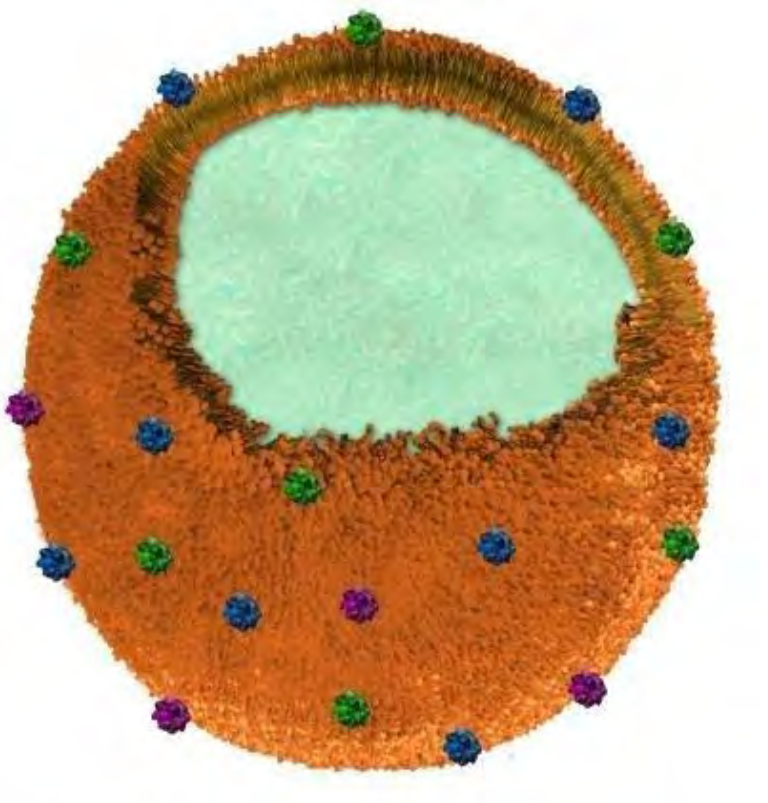
UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Agile Research Centers and Institutes

- Nano-Immuno Engineering (NEW!)
- Contextual Robotics
- Wearable Sensors
- Wireless Communications
- Microbiome Innovation
- CHO Systems Biology
- Extreme Events Research
- Machine Integrated Computing and Security
- Visual Computing
- Engineered Natural Intelligence
- Sustainable Power and Energy
- Deep Decarbonization Initiative

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Nano-Immuno Engineering Agile Center



- Bio-Inspired Materials and Technologies to Activate, Cloak from, or Program the Immune System.
- Innovations to treat and prevent Cancer, Heart Disease, Autoimmune or Infectious Disease.
- NanoEngineering, Bioengineering, Moores Cancer Center

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Agile Research Centers Foster Industry Collaboration (70 Partners)

UC San Diego

JACOBS SCHOOL OF ENGINEERING

Corporate Affiliates Program

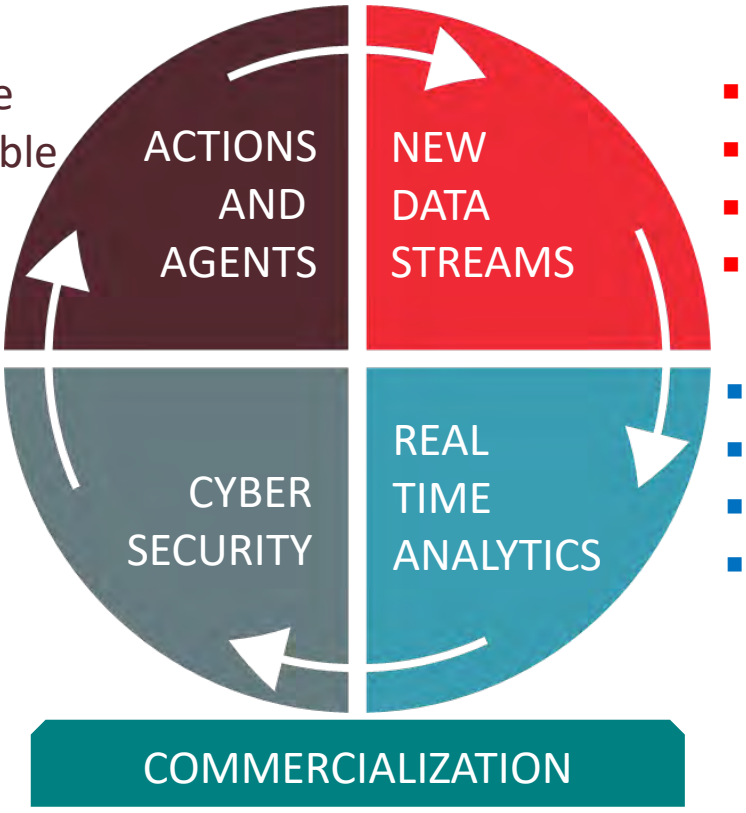
Franklin Antonio Hall

Industry-relevant research centers under one roof creates a powerful ecosystem to build the digital future

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Research Vision for the Digital Future

- Precision Healthcare
- Distributed Renewable Energy
- Smart Materials
- Autonomy



- Sensors
- Hardware
- Machine Vision
- 5G Networks

- Machine-integrated Security
- Cryptography
- Privacy
- Authentication

- Data Science
- Machine Learning
- Edge Computing
- Bioinformatics

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Collaboratories for the Digital Future

Machine-Integrated Computing and Security

Institute for the Global Entrepreneur

Halıcıoğlu Data Science Institute

Wearable Sensors

High Energy Density Science

NanoImmuno Engineering | IEM

Precision Genomics | Salk

Contextual Robotics Institute

Sustainable Power and Energy

Wireless Communications

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Innovation Ecosystem: Precision Medicine

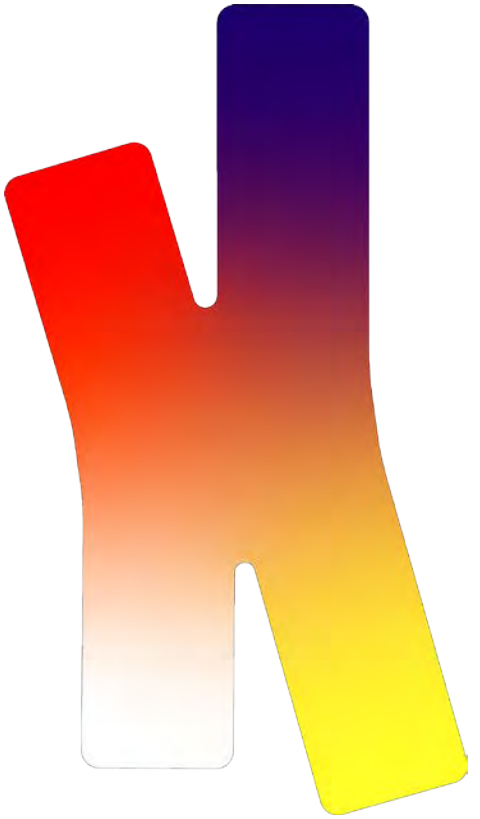
Machine-Integrated Computing and Security

Institute for the Global Entrepreneur

Halıcıoğlu Data Science Institute

Wearable Sensors

High Energy Density Science



NanoImmuno Engineering | IEM

Precision Genomics | Salk

Contextual Robotics Institute

Sustainable Power and Energy

Wireless Communications

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Innovation Ecosystem: Sustainable Cities

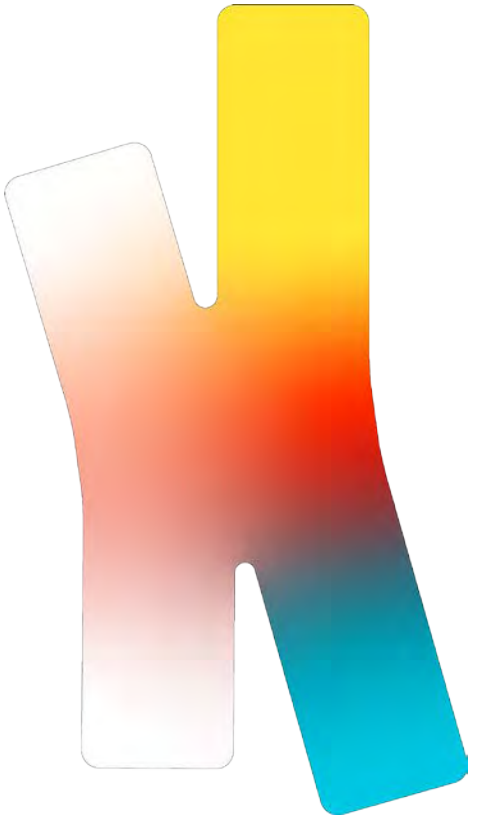
Machine-Integrated Computing and Security

Institute for the Global Entrepreneur

Halıcıoğlu Data Science Institute

Wearable Sensors

High Energy Density Science



NanoImmuno Engineering | IEM

Precision Genomics | Salk

Contextual Robotics Institute

Sustainable Power and Energy

Wireless Communications

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Innovation Ecosystem: Connected Health

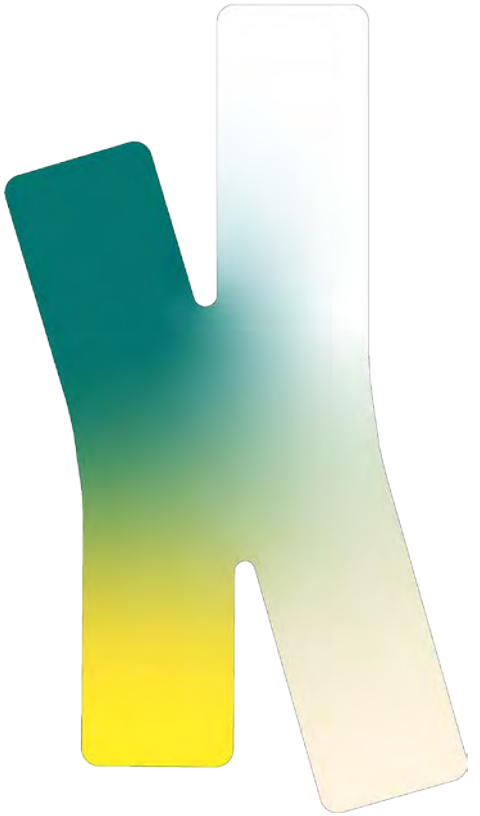
Machine-Integrated Computing and Security

Institute for the Global Entrepreneur

Halıcıoğlu Data Science Institute

Wearable Sensors

High Energy Density Science



NanoImmuno Engineering | IEM

Precision Genomics | Salk

Contextual Robotics Institute

Sustainable Power and Energy

Wireless Communications

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Franklin Antonio Hall Groundbreaking



Save the Date!
15 November 2019 @ 3 p.m.

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Systems Engineering Education Initiative

You Said

- The proposed content is on point
- Go beyond ECE undergrads-consider a schoolwide BS/Co-op/MS program
- Make sure we add “stickiness” for corporate partners
- Include live design, test-driven design; models and visualization
- Make sure to focus on ethics and humans in the loop
- Machine Learning and AI will be key skills for the future

We Did

- All feedback part of the White Paper for Systems Engineering
- Reinforced our resolve to move forward with this initiative, incorporating components recommended by CAP
- Faculty recruitment underway
- Now expanding beyond ECE to Mechanical/Aerospace and Structural Engineering
- Goal of “Stickiness and Industry Connection” inspiring new ideas on Co-op as Innovation Accelerator

Co-op Pilot Summer-Fall 2019

- First in the UC System
- Pilot to run July-December 2019
- Over 450 student applicants

Thank you to our 13 participating CAP Partners

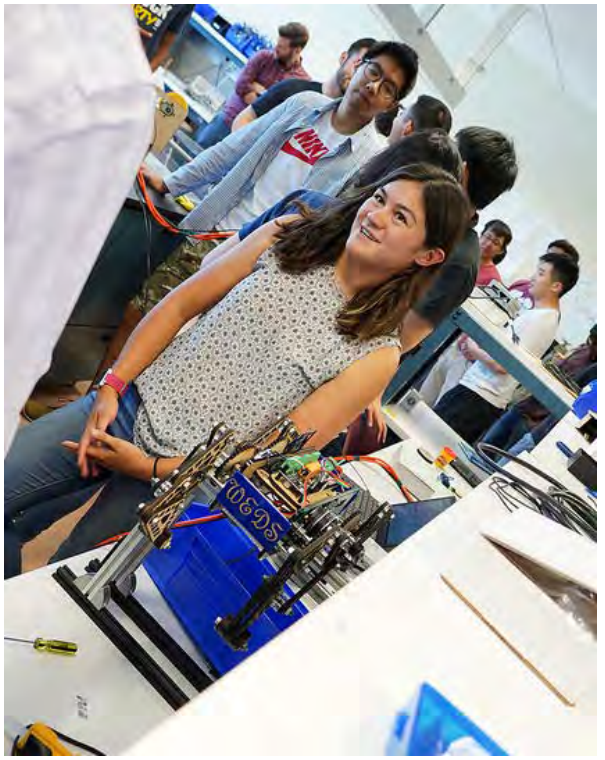
ATA ENGINEERING, INC.
appfolio
brain corp
GENERAL ATOMICS
Instrumentation Laboratory
A Werfen Company
intuit
NORTHROP GRUMMAN
servicenow
Solar Turbines
A Caterpillar Company
SPAWAR
teradata.
ThermoFisher SCIENTIFIC
Viasat

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

JACOBS SCHOOL STRATEGIC PLAN 2020

UC San Diego
JACOBS SCHOOL OF ENGINEERING

The Jacobs School Today



- One of the nation's largest engineering schools, providing leadership, talent and technology at scale
- Graduates recognized for core engineering knowledge that enables them to solve new problems
- Research powerhouse known for biotechnology & communications…..but we are much broader
- Working with industry is part of our DNA
- The engineering schools of the next decade will collaborate their way to greatness...

The Jacobs School in the Next decade

- **Sustained Performance** → **Reputation** (10 Yrs)
- **Sustained Reputation** → **Cache** (20 Yrs)

- Drive towards relevance and cache
- No silver bullet--broad set of coordinated efforts
- Striving toward recognition (not ranking)
- Last Strategic Plan 2013
- Need unified voice of the faculty to ensure the right culture, attitude and inclusive Strategic Plan

2020 Strategic Plan – Discussion Questions

What are the bold, relevant breakout moves to enable the Jacobs School to accelerate our march to cachet?

- What are the important grand challenges that the Jacobs School is uniquely positioned to address?
- What is the role of systems engineering and data analytics in the modern engineering curricula?
- How can we innovate on industry-academia partnerships for the benefit of society?
- How can we rebrand Engineering as the intellectual hub for addressing complex societal problems that can no longer be resolved by deterministic models in siloed disciplines?
- How can we attract the best talent that represents changing demographics and culture?

Faculty Presentation

Steven Swanson

Professor, Computer Science & Engineering

Experience Engineering all Four Years (E4) Initiative

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

E4 Initiative: Hands-on Classes for All Engineering Students

- Founded ~2015
- Advantages of hands-on learning
  - Increased student engagement
  - Increased retention
  - Better-prepared for the real jobs
- Hands-on courses in all six engineering departments
  - Freshmen and sophomores – Get them early!
  - Extending to the upper-division

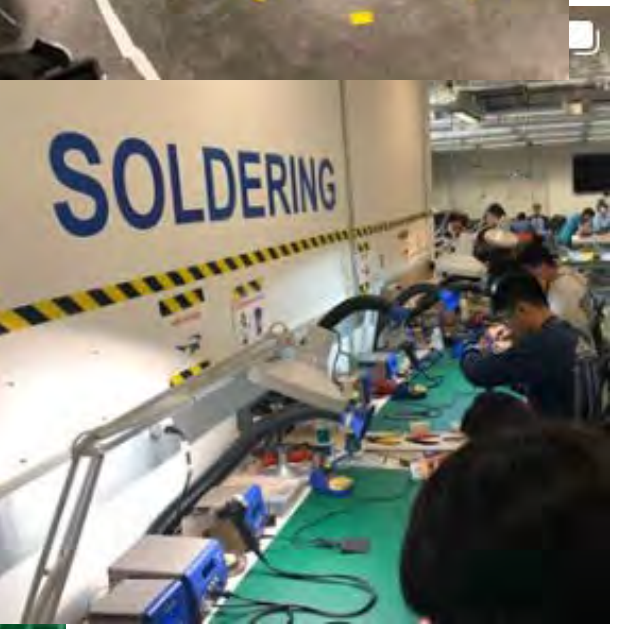
The Envision Maker Studio

- Facilities
  - 3500 sq ft of making space
  - 2100 sq ft of classrooms
- Tools
  - 3D Printers
  - Laser cutter
  - Hand tools
- Staff
  - Staff director, assistant director, and faculty director
  - ”Envisionaries” – student support staff

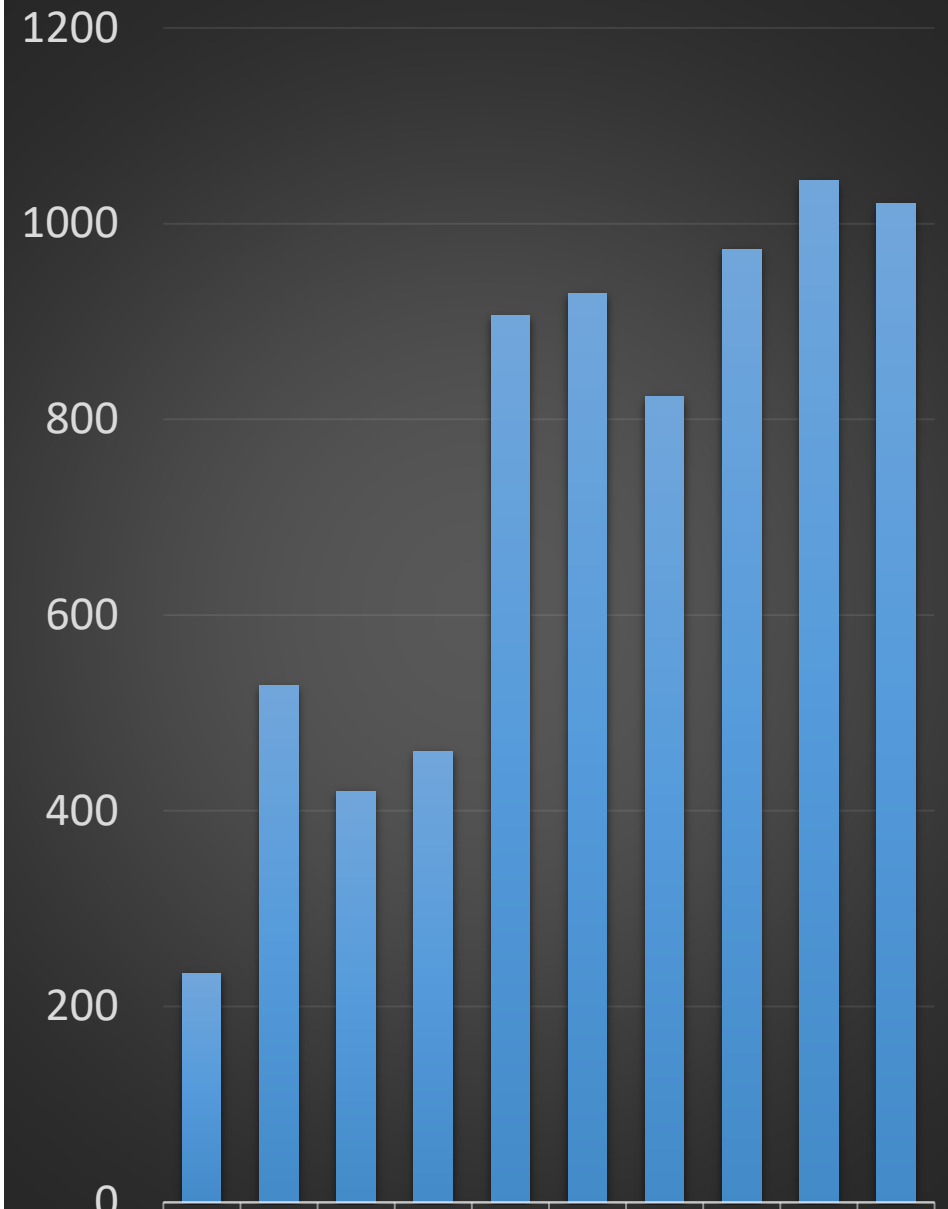

Jesse Dewald


Curt Schurgers

The Envision Maker Studio

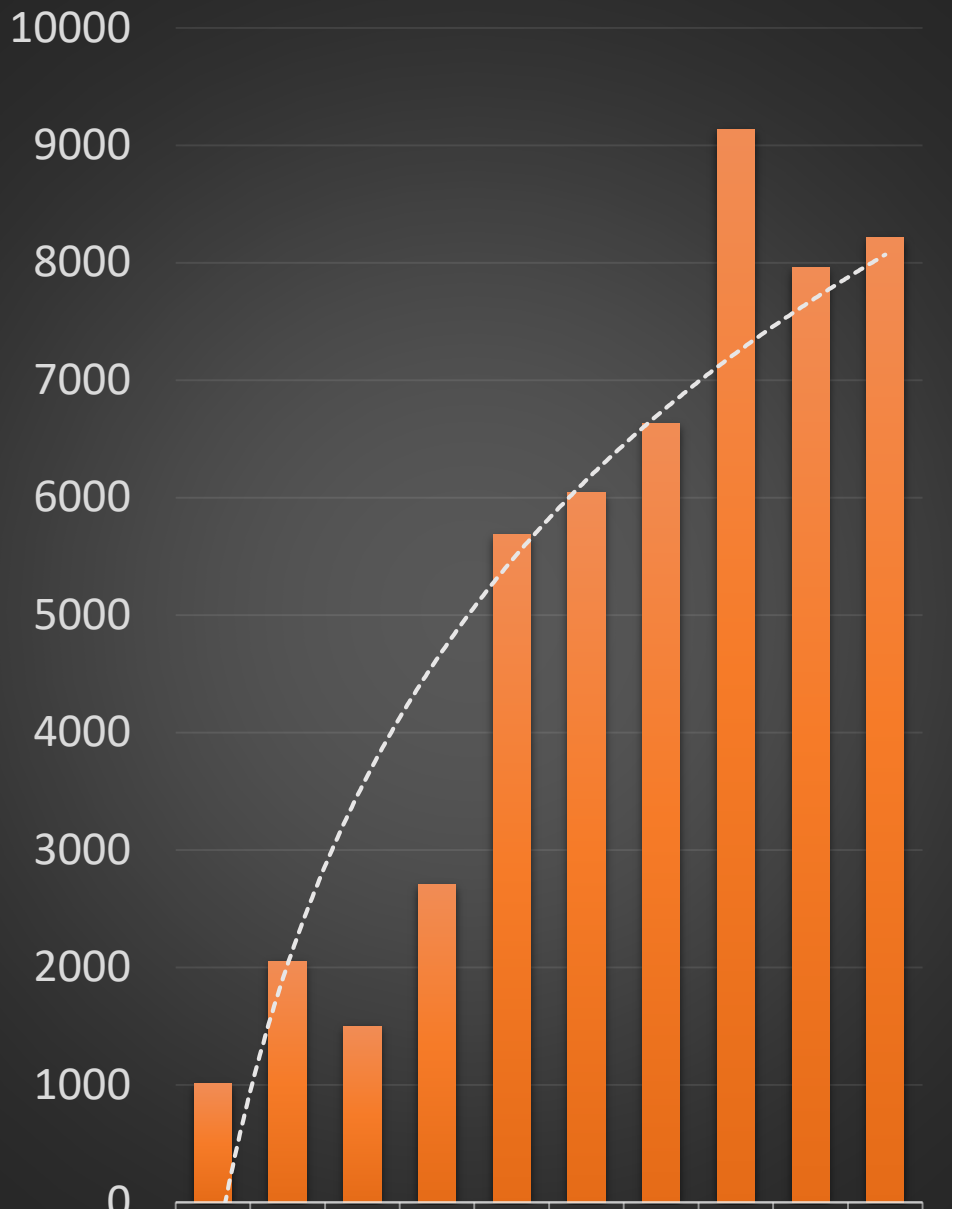


Students

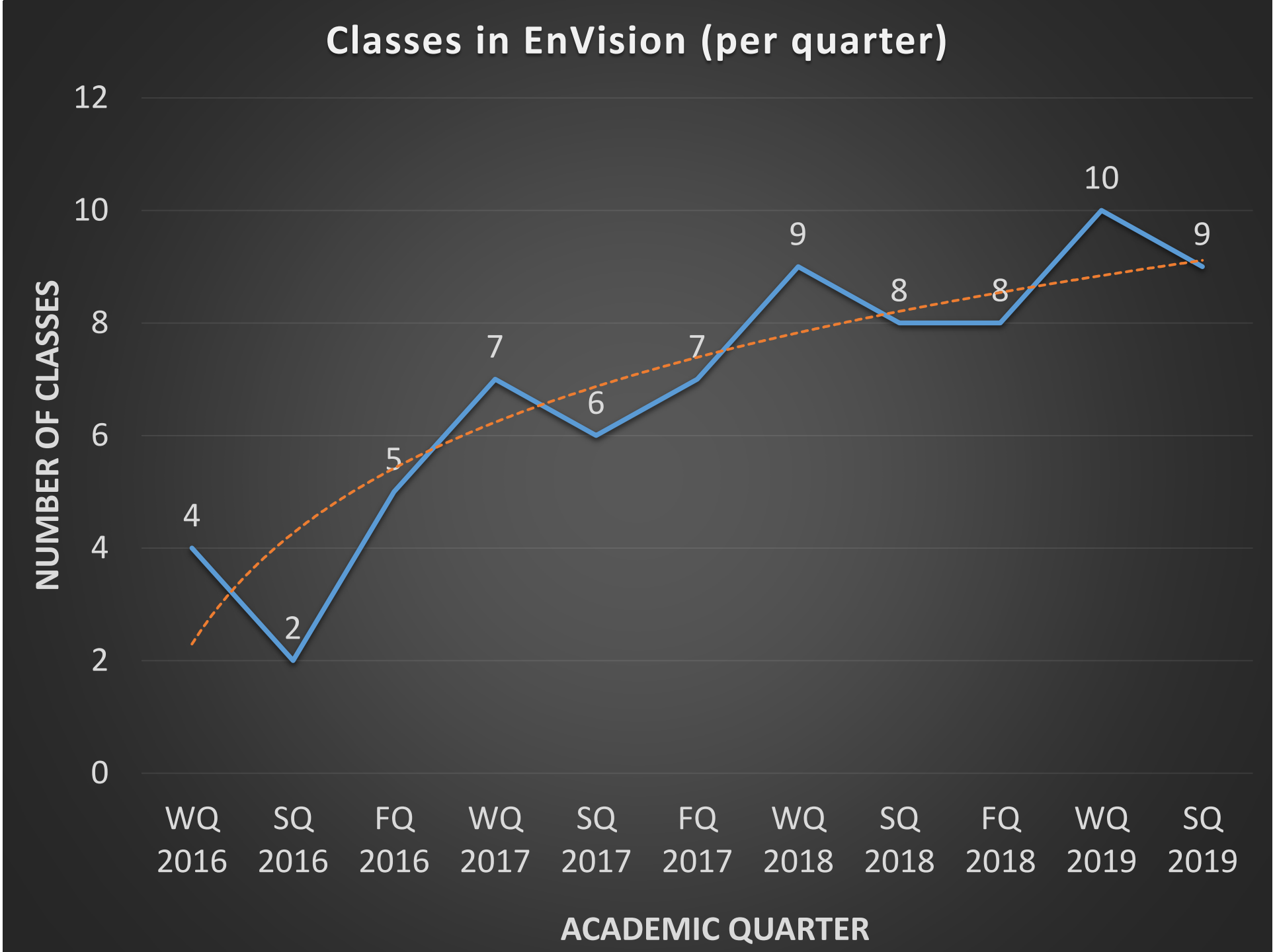


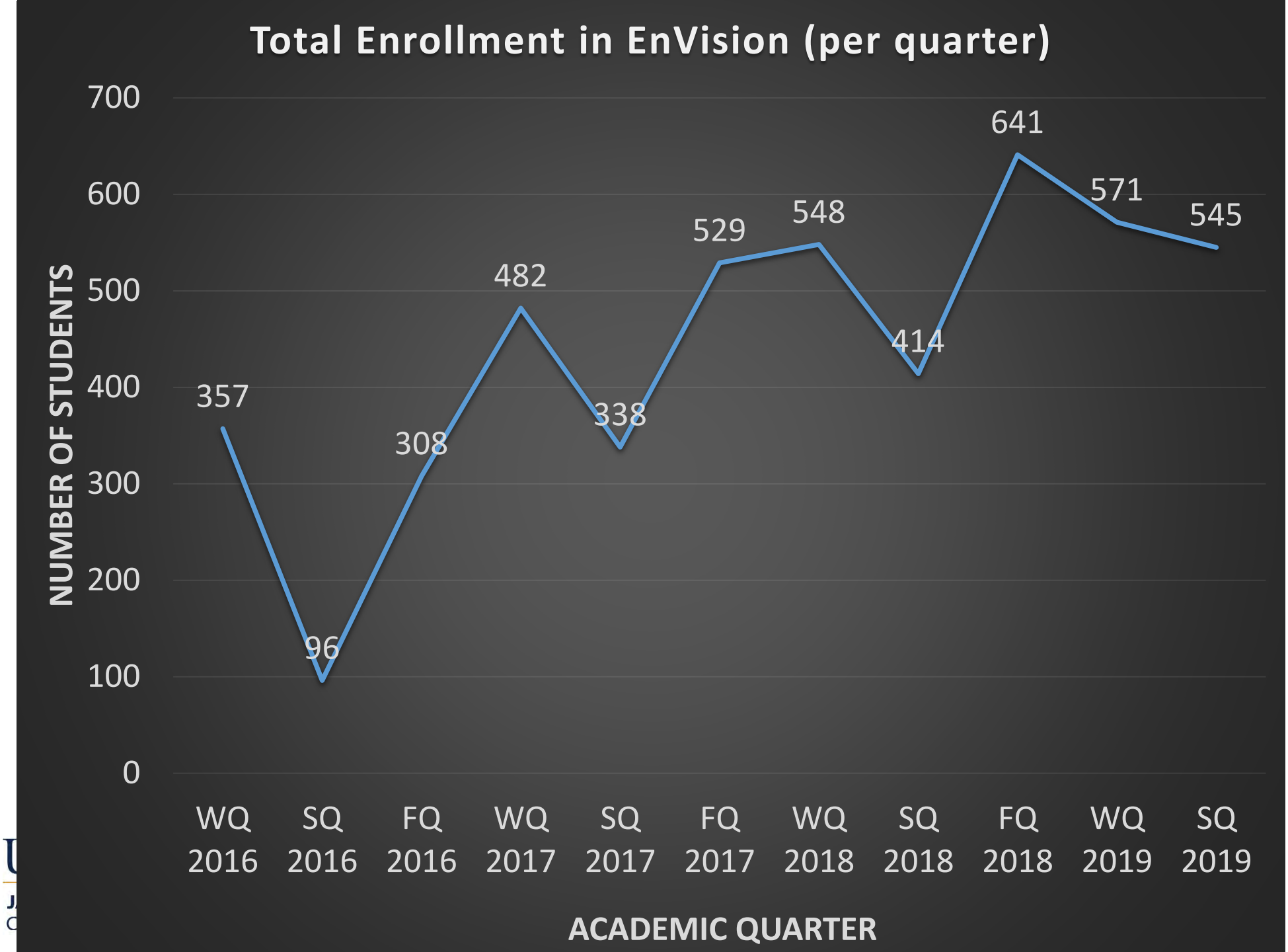
	Spring 2016	Fall 2016	Winter 2017	Spring 2017	Fall 2017	Winter 2018	Spring 2018	Fall 2018	Winter 2019	Spring 2019 (est)
Students	234	528	420	461	906	929	823	974	1044	1020

Sign Ins



	Spring 2016	Fall 2016	Winter 2017	Spring 2017	Fall 2017	Winter 2018	Spring 2018	Fall 2018	Winter 2019	Spring 2019 (est)
Uses	1010	2053	1501	2706	5683	6044	6628	9139	7957	8215


Classes in EnVision (per quarter)
NUMBER OF CLASSES
12
10
8
6
4
2
0
4
2
5
7
6
7
9
8
8
10
9
WQ 2016
SQ 2016
FQ 2016
WQ 2017
SQ 2017
FQ 2017
WQ 2018
SQ 2018
FQ 2018
WQ 2019
SQ 2019
ACADEMIC QUARTER


Total Enrollment in EnVision (per quarter)
NUMBER OF STUDENTS
700
600
500
400
300
200
100
0
357
96
308
482
338
529
548
414
641
571
545
WQ 2016
SQ 2016
FQ 2016
WQ 2017
SQ 2017
FQ 2017
WQ 2018
SQ 2018
FQ 2018
WQ 2019
SQ 2019
ACADEMIC QUARTER

What's Next for E4?

- Extending reach to upper division courses
- Coordinating with other hands-on initiatives across JSOE
  - Building a maker culture
  - Extending deeper into curricula
  - Avoiding replicated effort and easing access
- Evaluation of Teaching Effectiveness
  - What works best in hands-on education?
  - How can we track student success?

Faculty Presentation

Michael Yip

Assistant Professor, Electrical & Computer Engineering

Machine Learning Applications for Robot Control and Planning

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Machine Learning Applications for Robot Control and Planning

Michael Yip, Ph.D.
Assistant Professor, Electrical and Computer Engineering
ucsdarclab.com

ARClab
advanced robotics and controls

UC San Diego
JACOBS SCHOOL OF ENGINEERING

Acknowledgements

Students
Nikhil Das
Florian Richter
Ahmed Qureshi
Dimitri Schrieber
Winnie Kuang
Naman Gupta
Yuheng Zhi
Mrinal Verghese
Aaron Gunn

Other Collaborators
Ryan Orosco (Otolaryng.)
Phil Weissbrod (Otolaryng.)
Steve Hong (Otolaryng.)
Alex Norbash (Radiology)

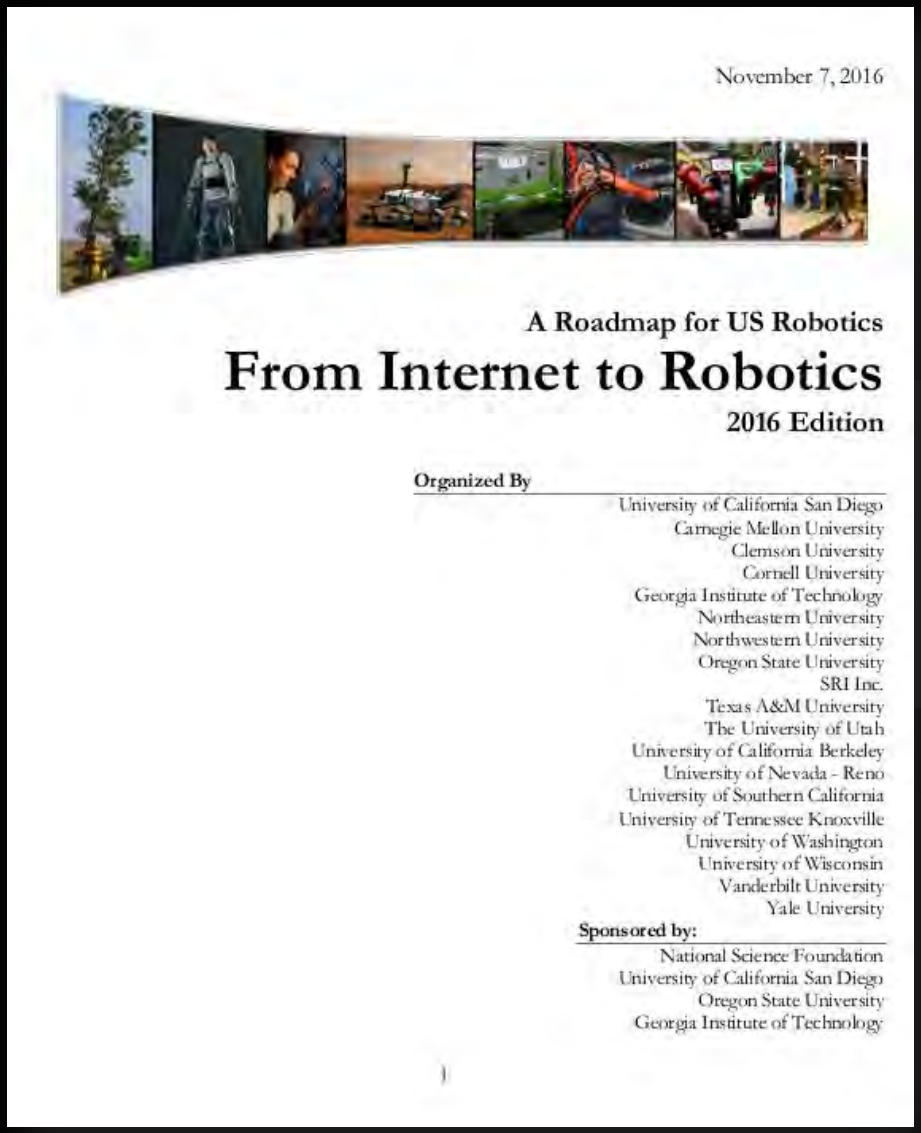
NASA NSF INTUITIVE SURGICAL®

UC San Diego
JACOBS SCHOOL OF ENGINEERING

American Cancer Society® U.S.ARMY

and private donors

2016 Congressional U.S. Roadmap for Robotics



November 7, 2016

A Roadmap for US Robotics

From Internet to Robotics

2016 Edition

Organized By

University of California San Diego
Carnegie Mellon University
Clemson University
Cornell University
Georgia Institute of Technology
Northeastern University
Northwestern University
Oregon State University
SRI Inc.
Texas A&M University
The University of Utah
University of California Berkeley
University of Nevada - Reno
University of Southern California
University of Tennessee Knoxville
University of Washington
University of Wisconsin
Vanderbilt University
Yale University

Sponsored by:

National Science Foundation
University of California San Diego
Oregon State University
Georgia Institute of Technology

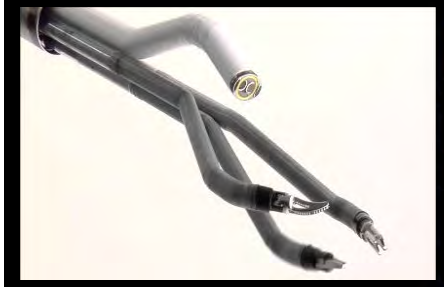
"The basic assumptions of most existing [robot] manipulation algorithms are not being satisfied in targeted application areas.

Truly autonomous manipulation will depend on the robot's ability to acquire adequate, task-relevant environmental models when they are not available."


3DHD

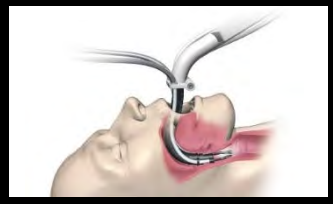
Surgical Robotics Today

INTUITIVE SURGICAL®



MAKO SURGICAL CORP®

Medrobotics®



TITAN MEDICAL

AURIS™

STEREOTAXIS

THINK SURGICAL™

TransEnterix™

CMR cambridge medical robotics

Mazor Robotics

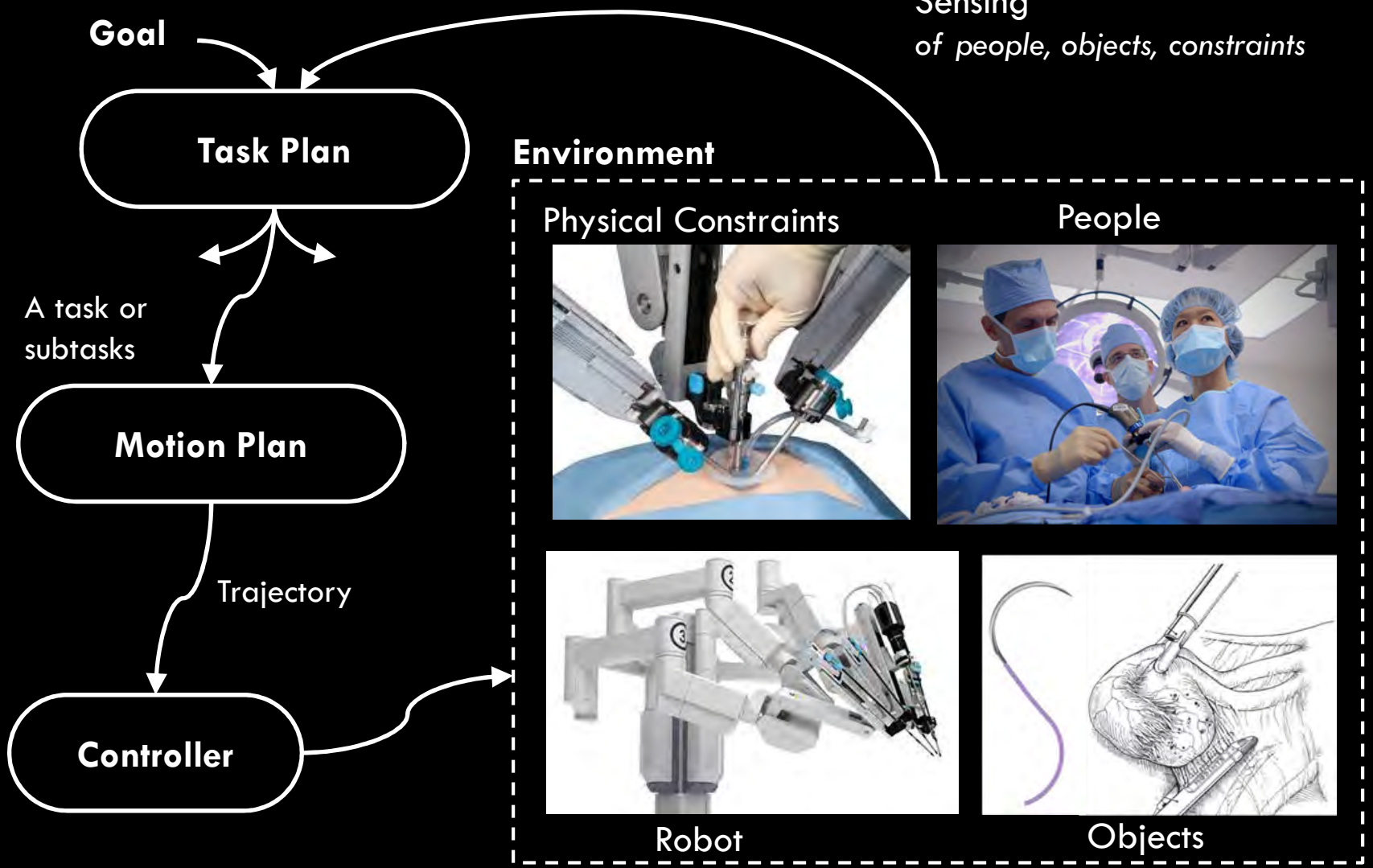
ARTAS™ ROBOTIC HAIR RESTORATION

VIRTUALINCISION

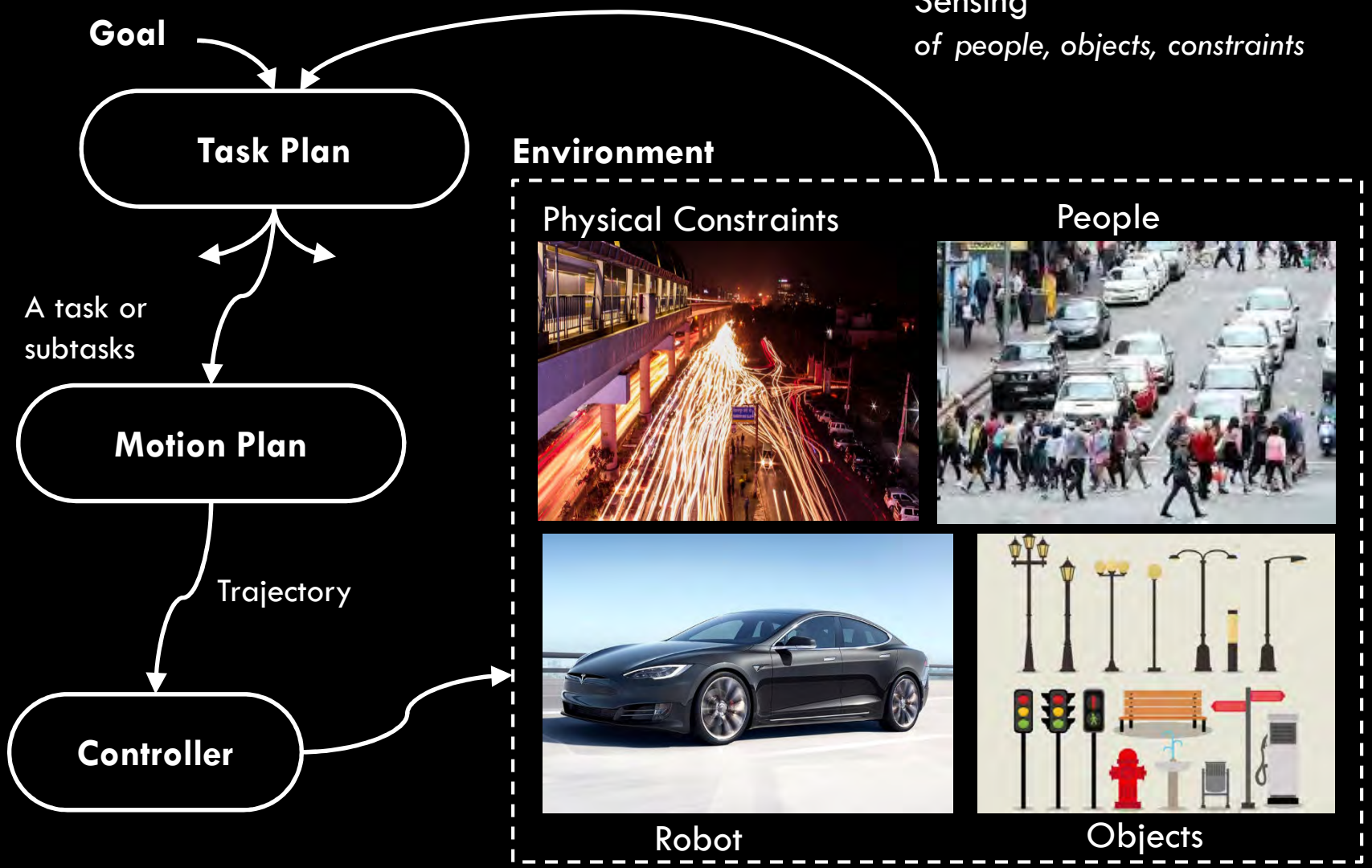
Corindus Vascular Robotics

… and 60+ more

The Robot Process



The Robot Process



Levels of Autonomy

DaVinci

Mako Surgical

Cyberknife

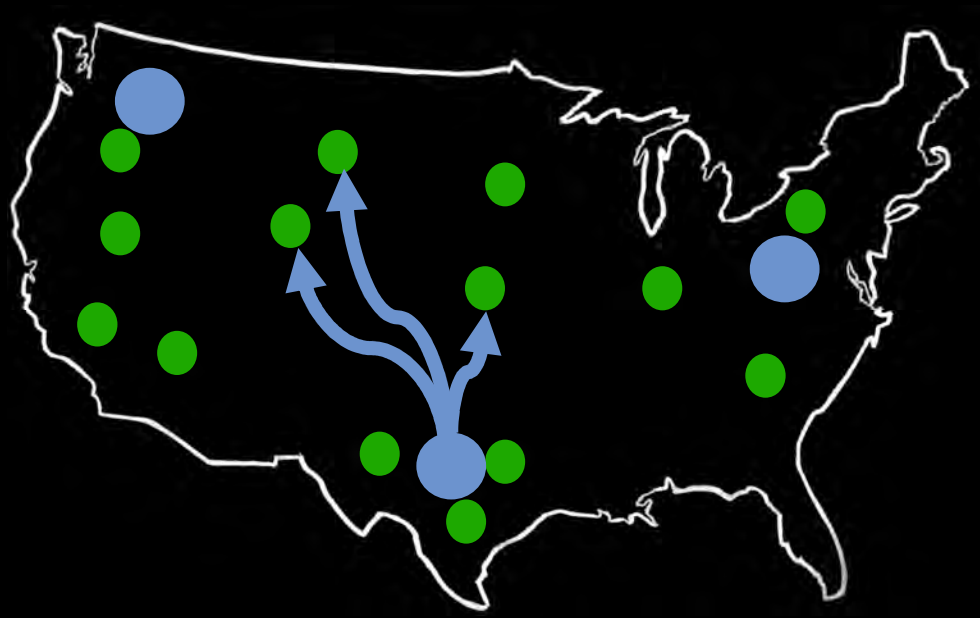
None

Direct Control

Shared Control

Supervised Autonomy

Full Autonomy

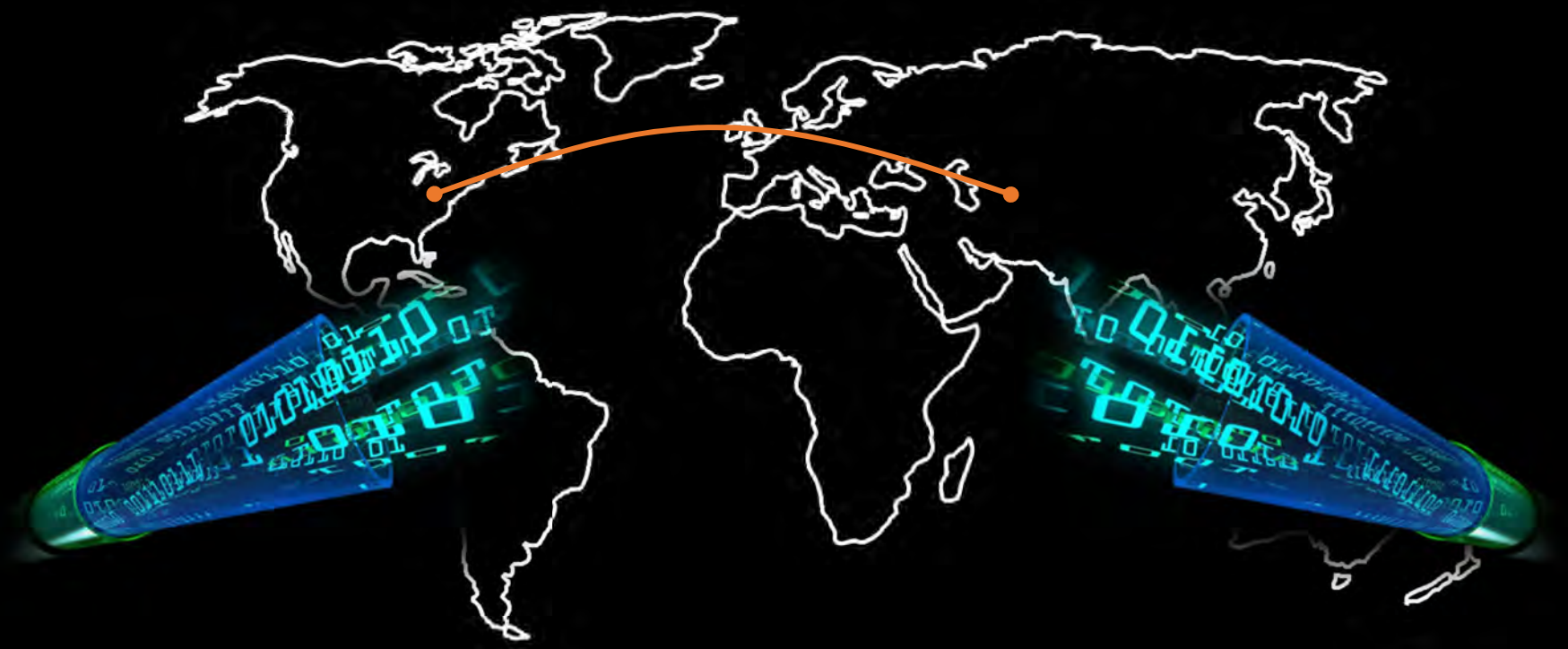


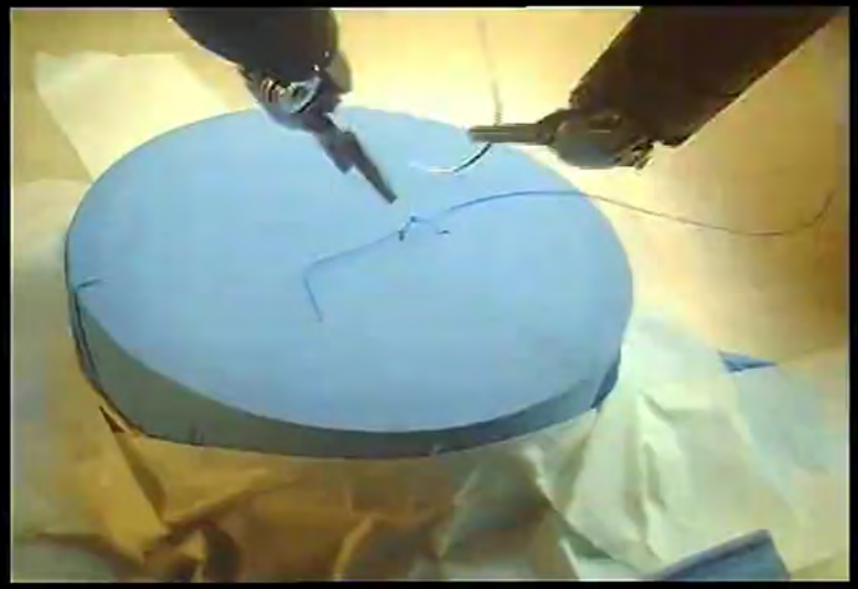
Saving lives across the US and the World

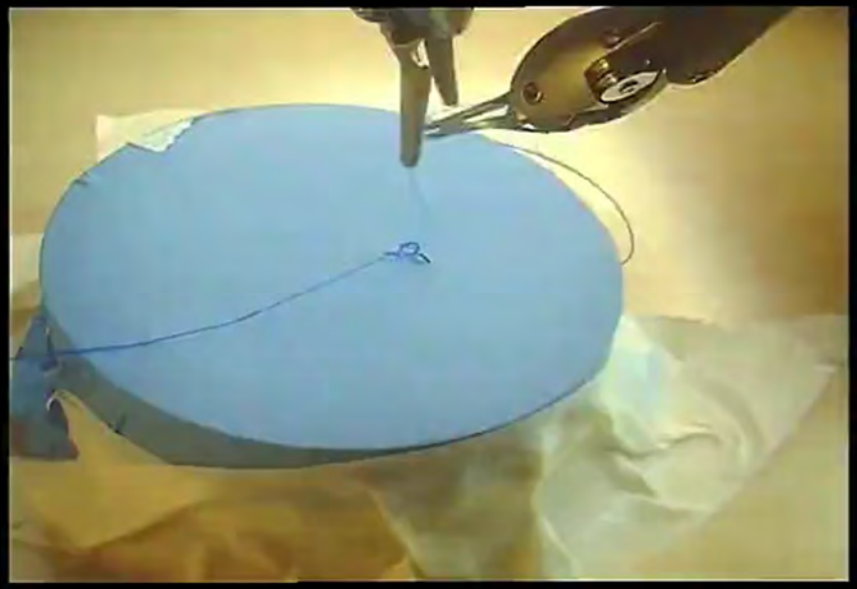
Robotic surgery to expands surgical access to high-quality, consistent, and immediate surgery.

The Golden Hour Rule

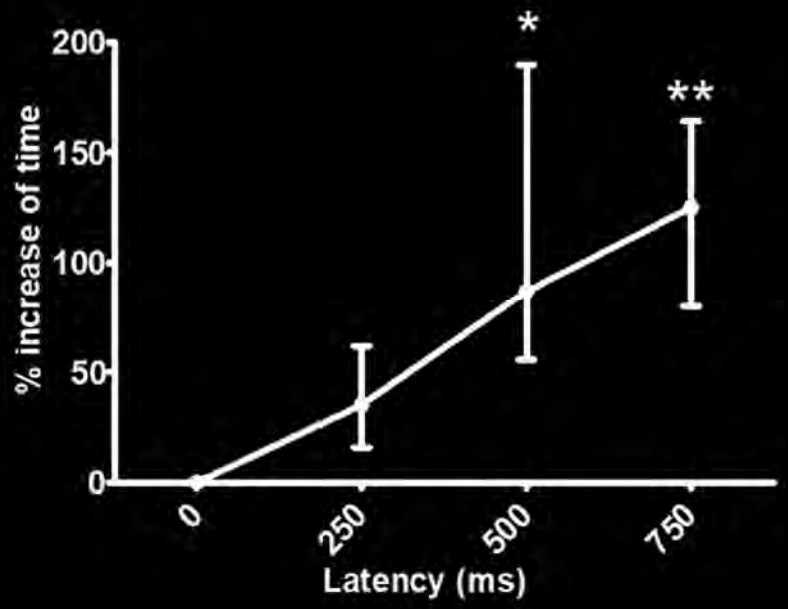
Key barrier to telerobotic surgery is **signal latency and degradation**



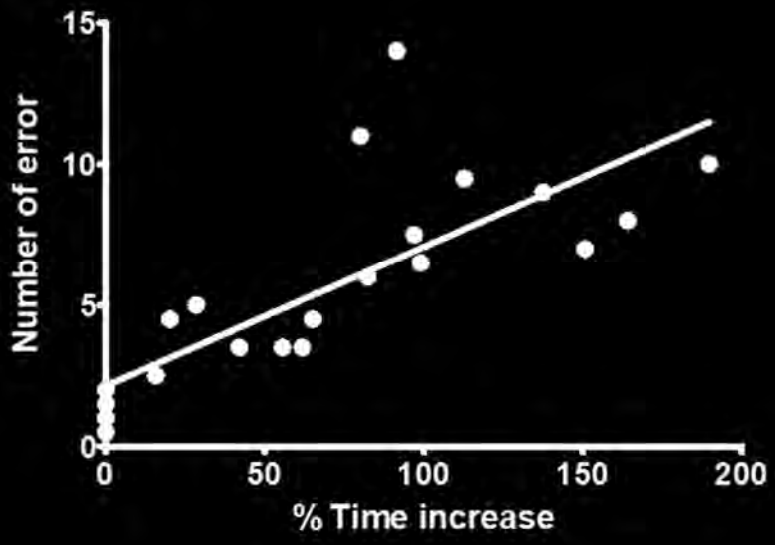




Without time delay



With time delay

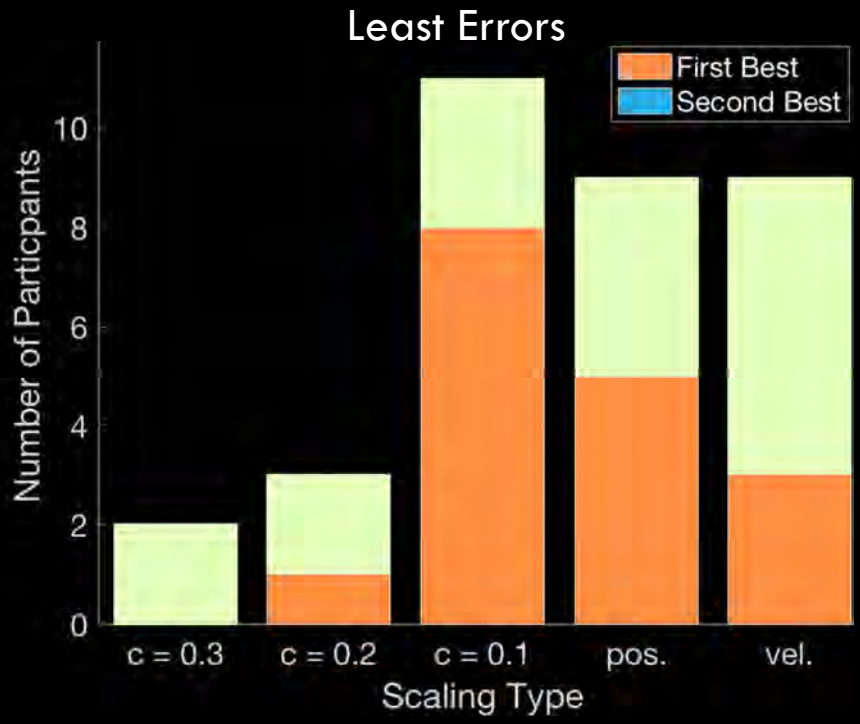


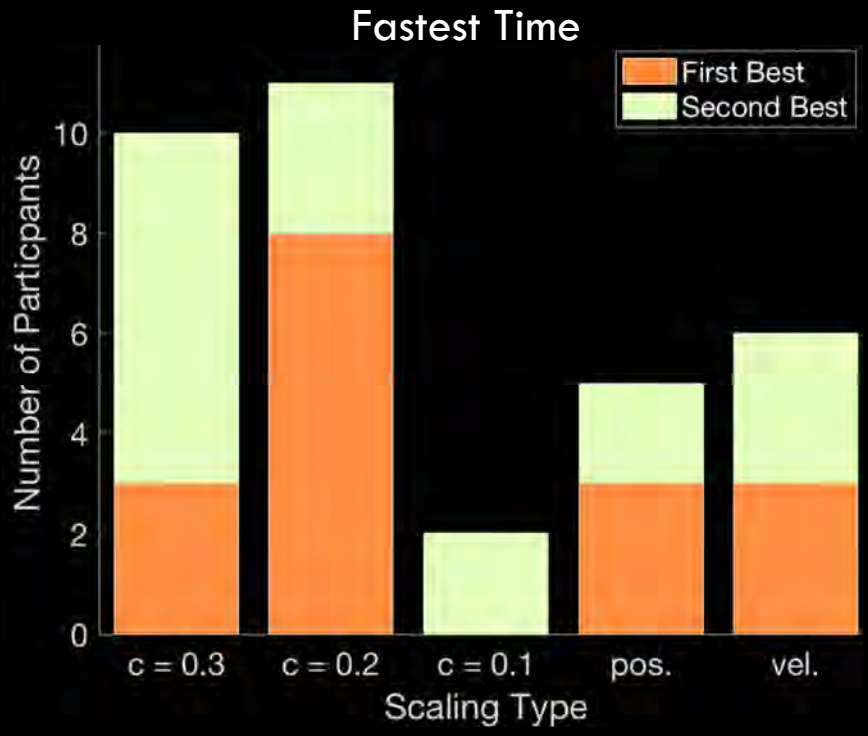
Clinician-specific Dynamic Scaling

Tailor motion scaling (shown to statistically reduce chance of errors) to specific clinician preferences or styles.

- ☐ Scale 1
- ☐ Scale 2
- ☑ Scale 3

Each doctor is different

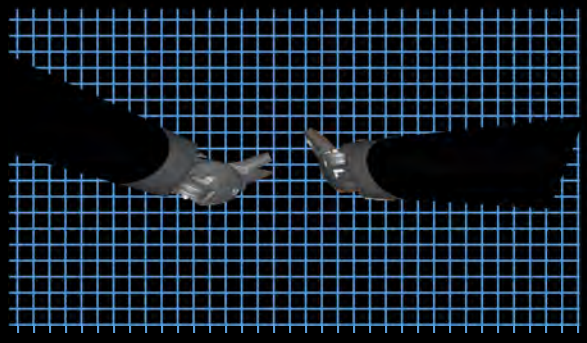




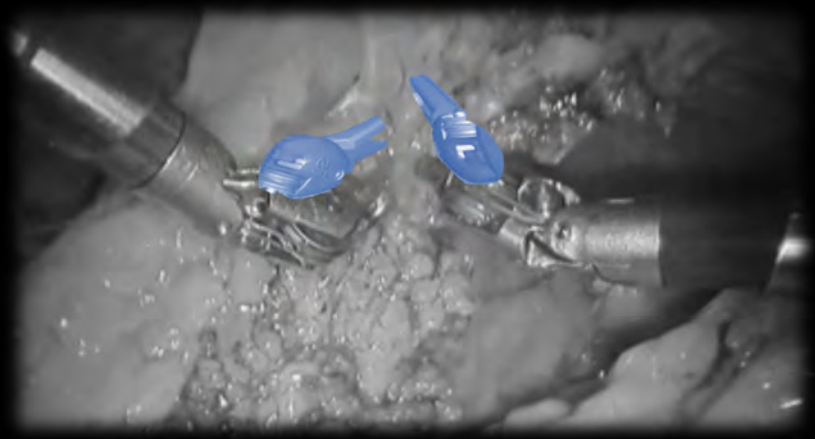
Augmented Reality Predictive Displays

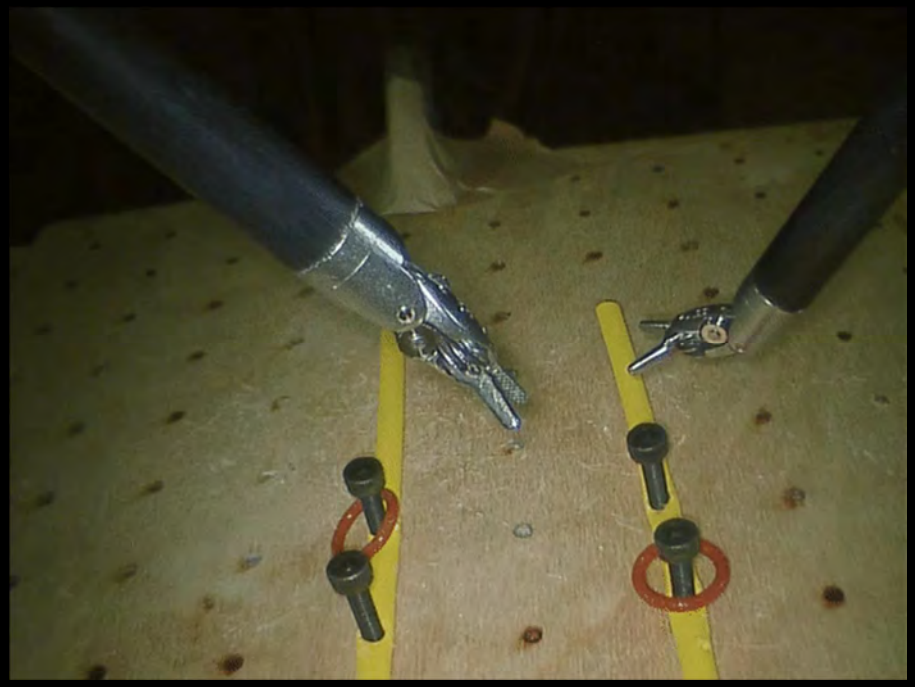
Real-time visualization of expected instrument position over the delayed video stream.

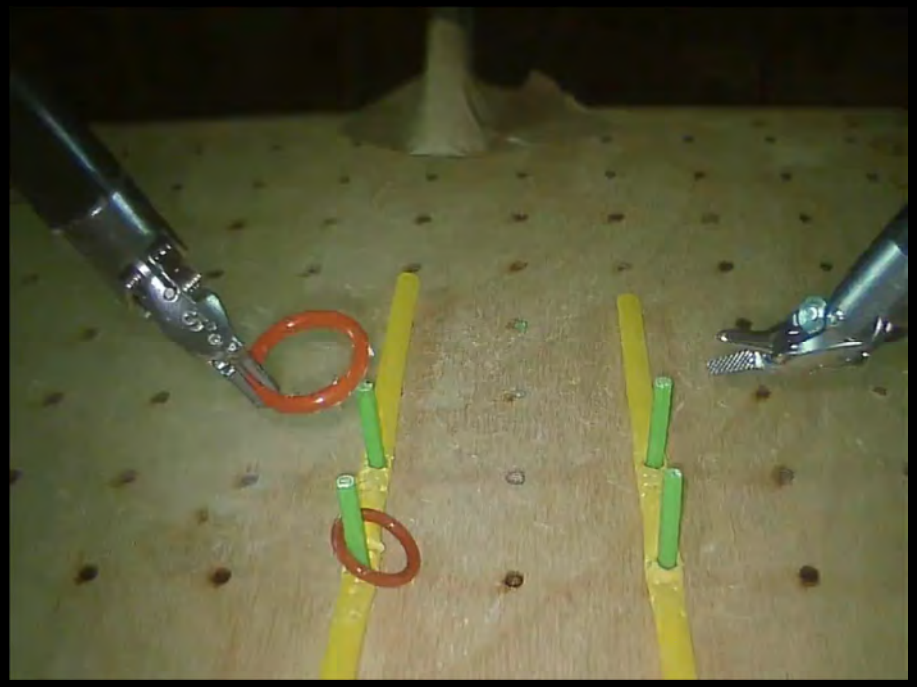
Delayed Video



Commanded Poses



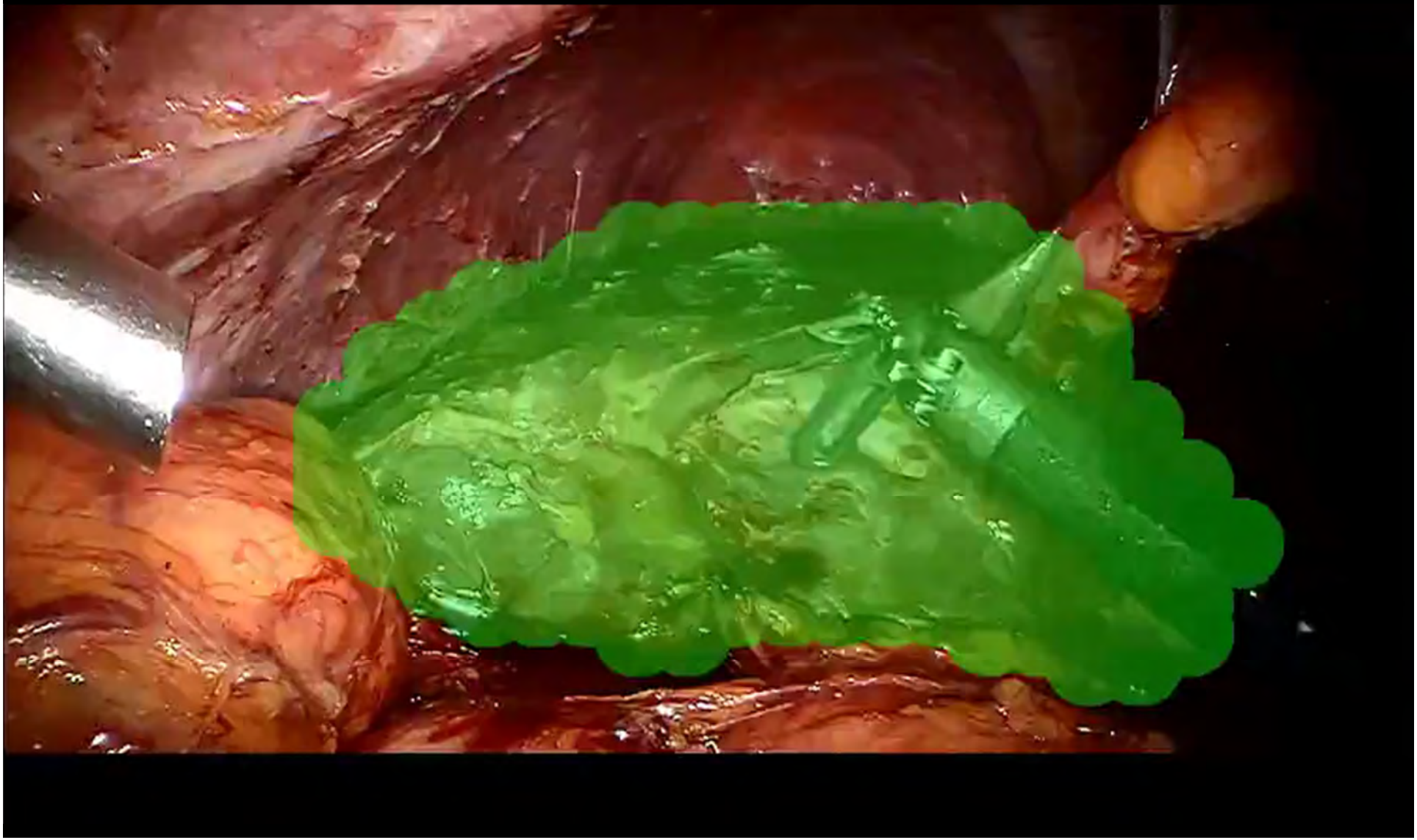


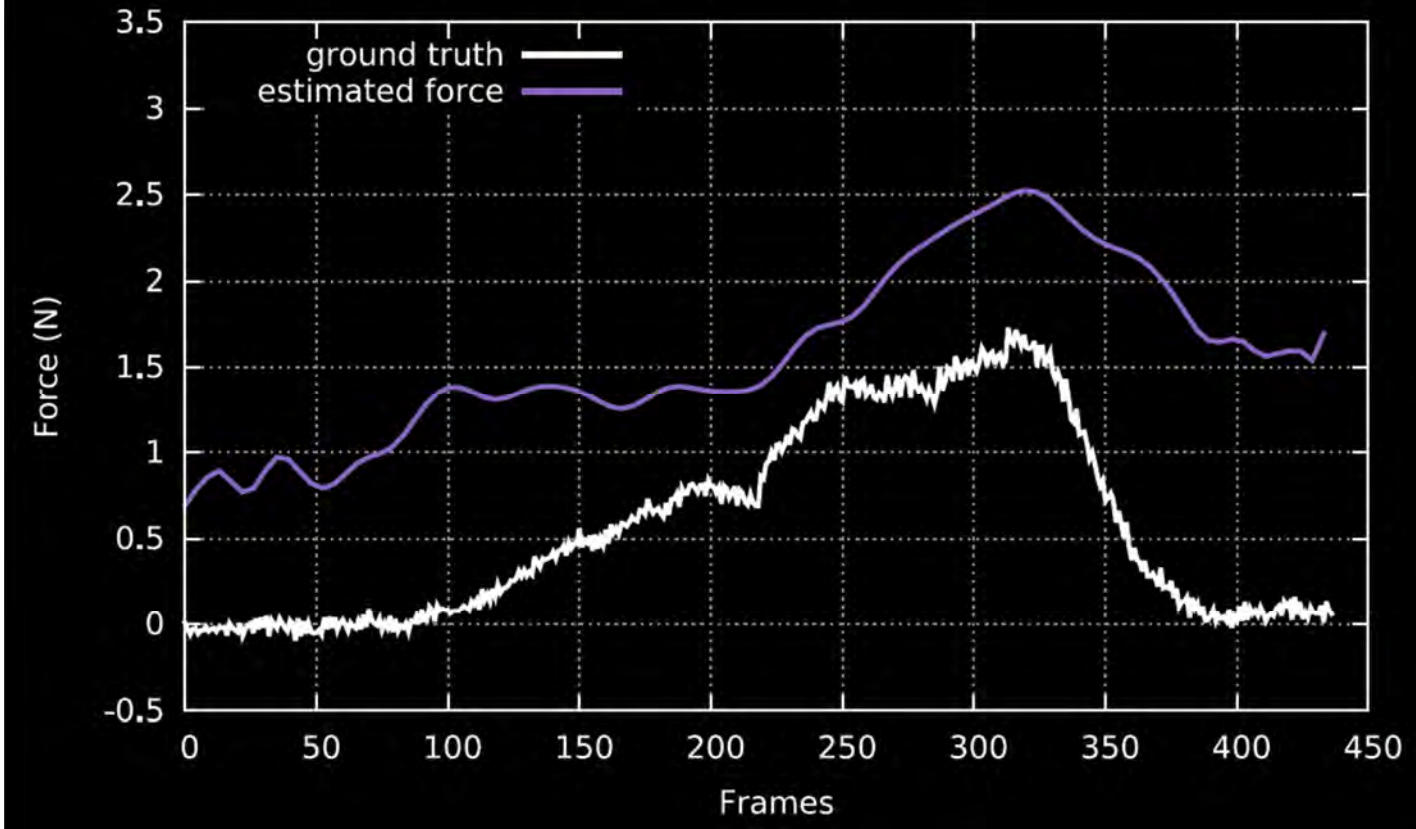


19% ***reduction in procedure time without negatively affecting human error***

Learning Visuo-Haptic Feedback

Machine vision provides virtually generated haptic cues



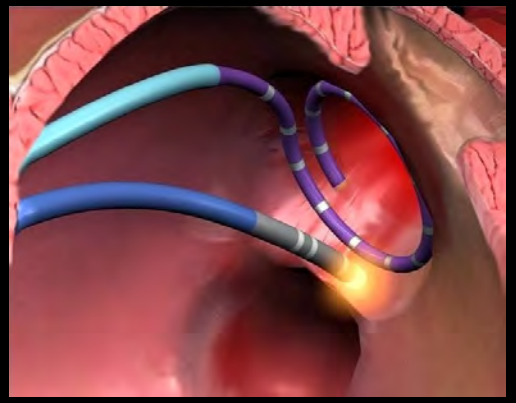

ground truth
estimated force
Force (N)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
0
50
100
150
200
250
300
350
400
450
Frames

Learning Controllers

Many complex systems have:

Inaccurate or unknown system models

Unknown environment dynamics



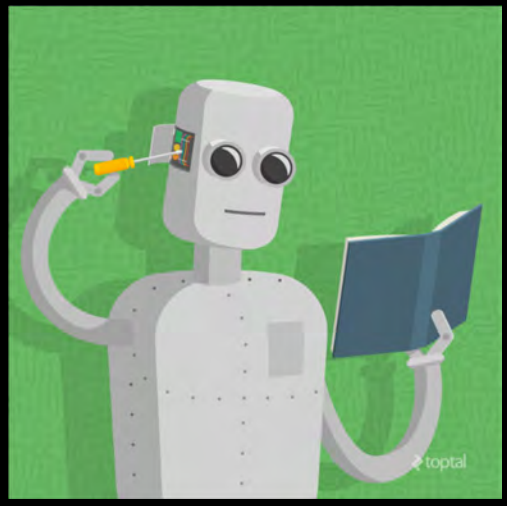
We can *learn* to control complex systems

(BUT Wait! Not neural networks just yet!)

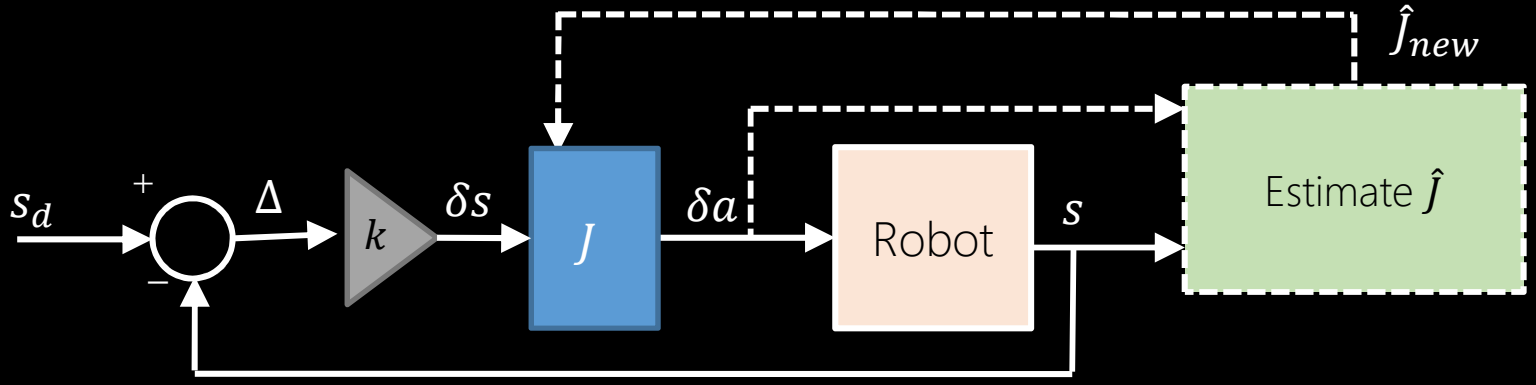
Large Training Time

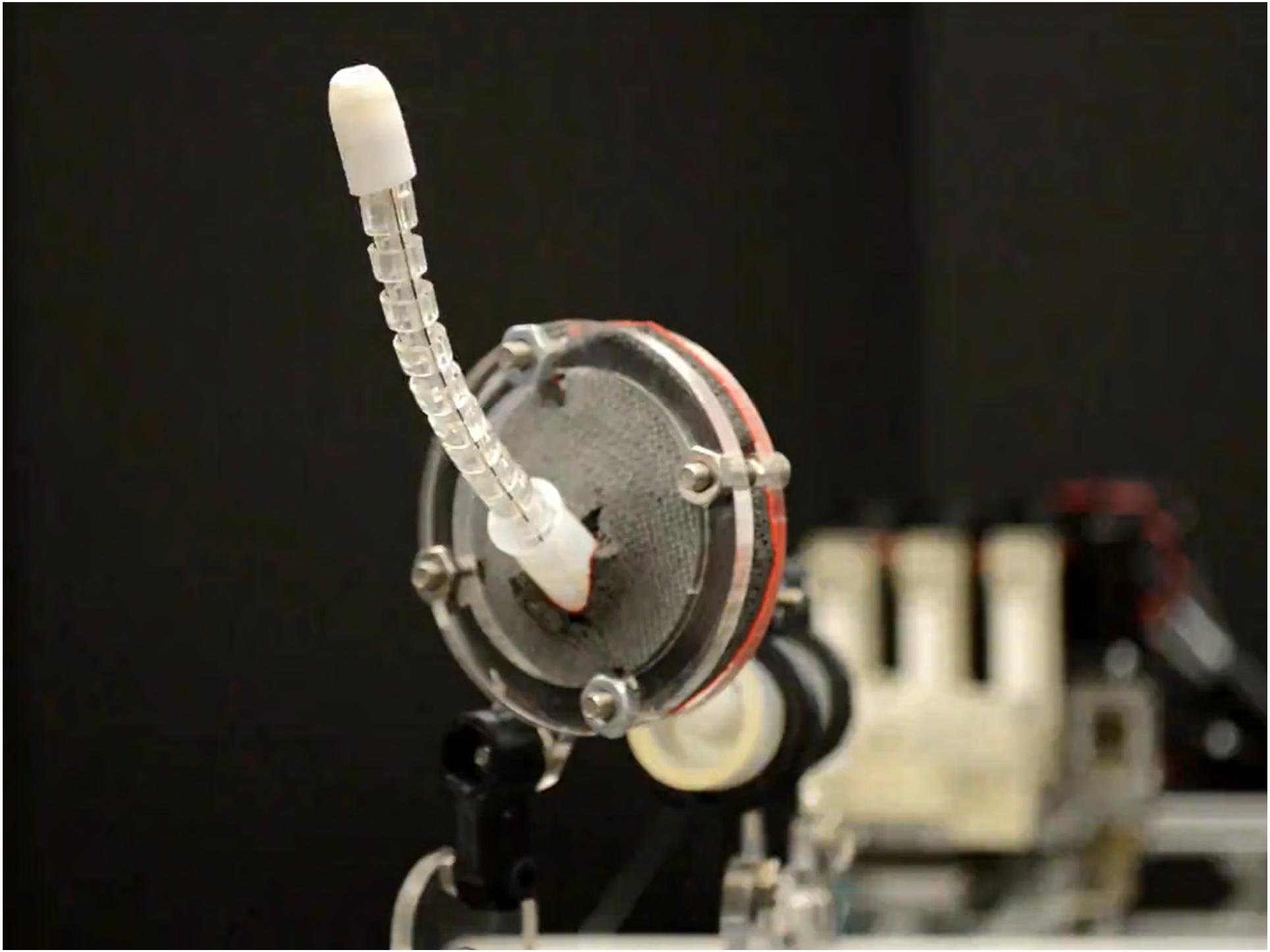
Large amounts of data needed

Lose sense of understanding



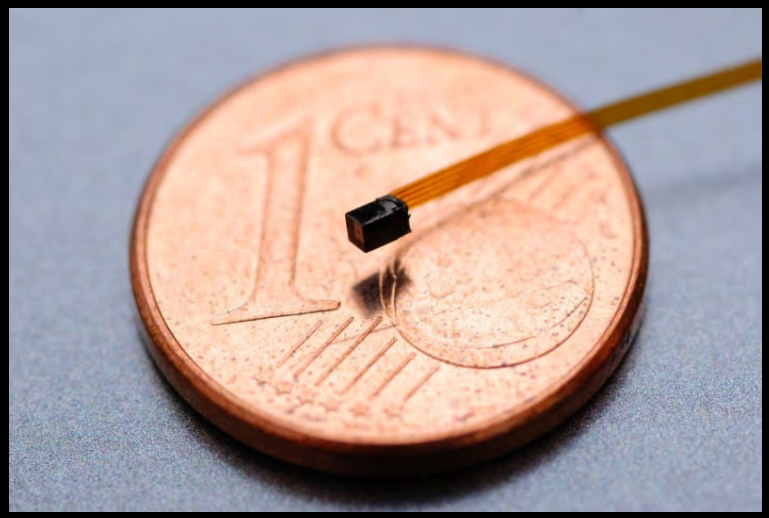
Online Model-free Control



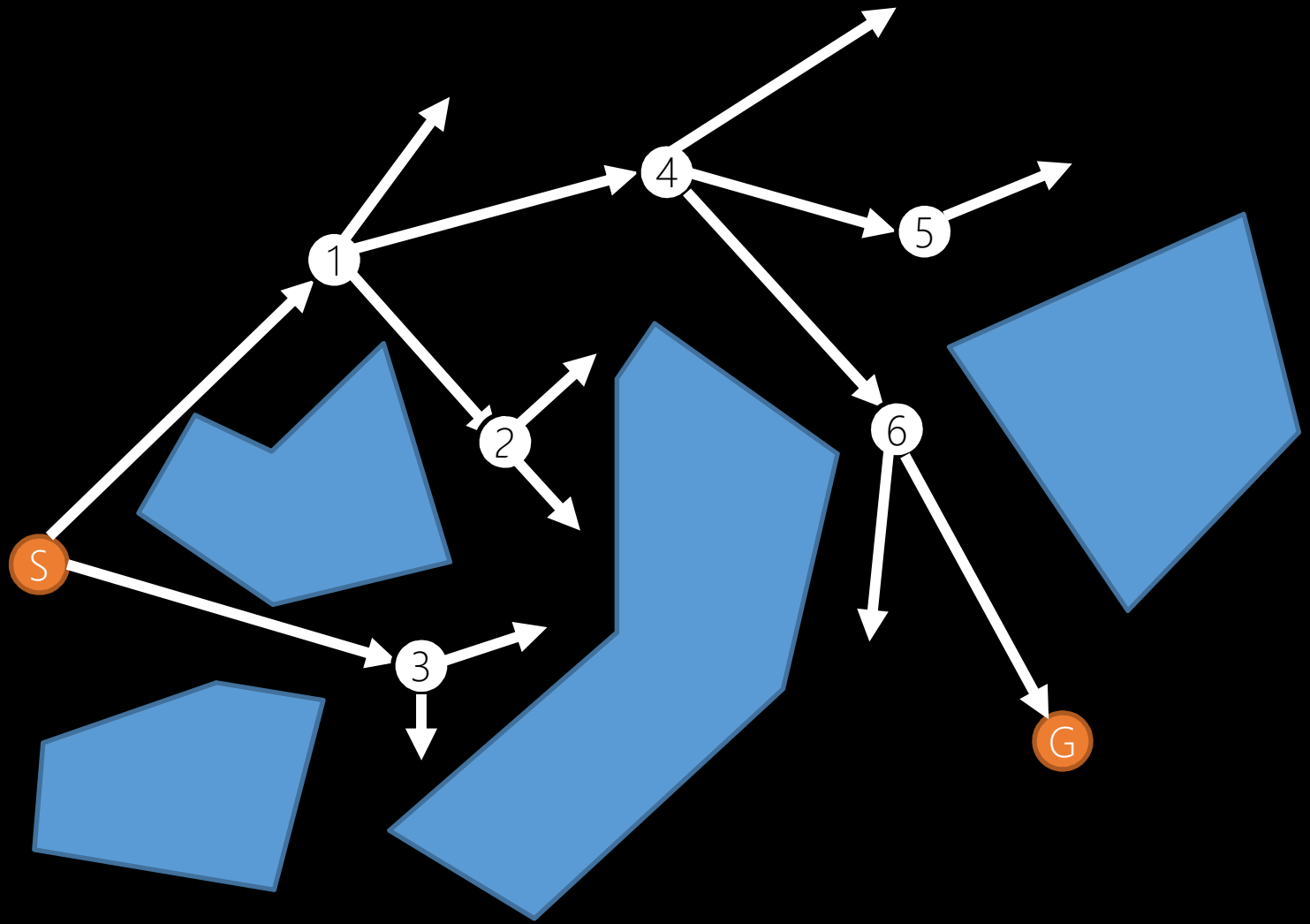


Visual Adaptation

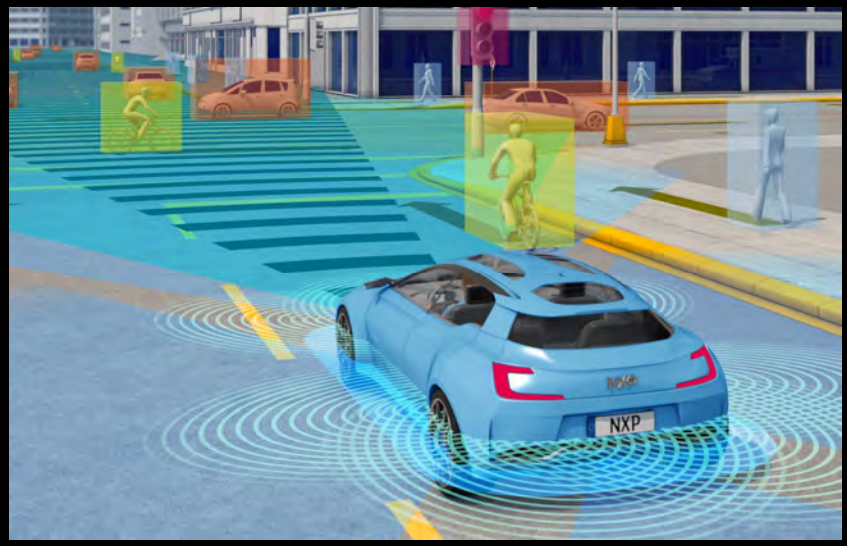
Ego-centric Navigation



Motion Planning

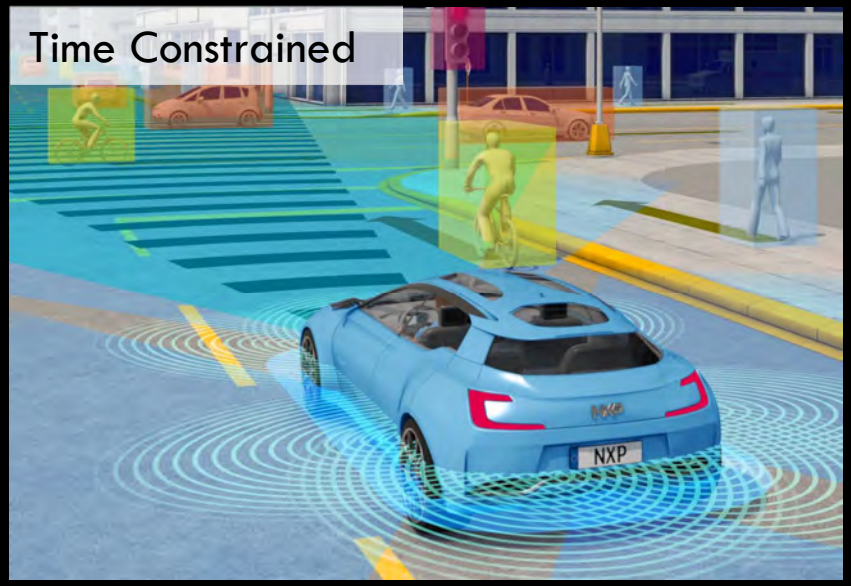


Applications



What are some challenges?

Time Constrained



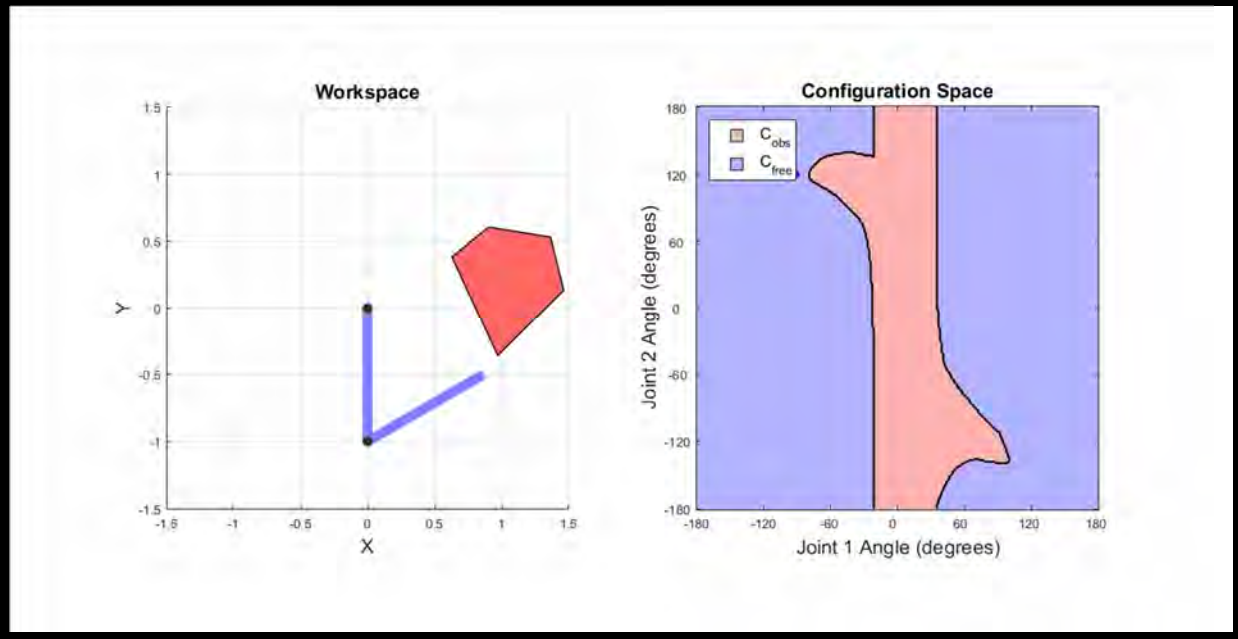
Optimality

Safety-Aware

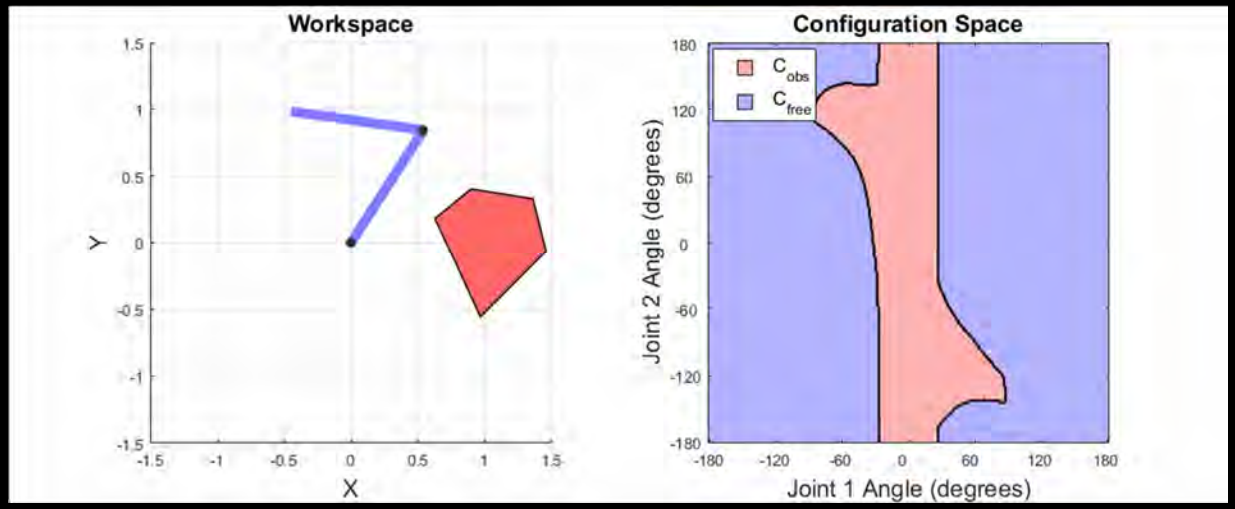
Dynamic Environments

Sampling: Configuration Space

Moving robot

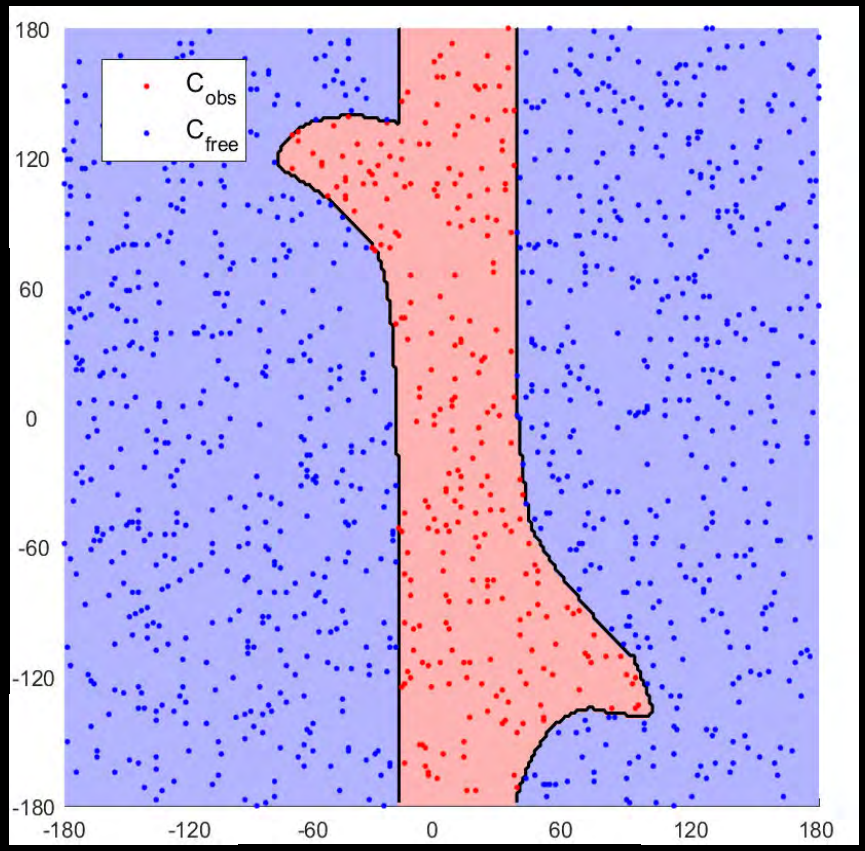


Moving Obstacles



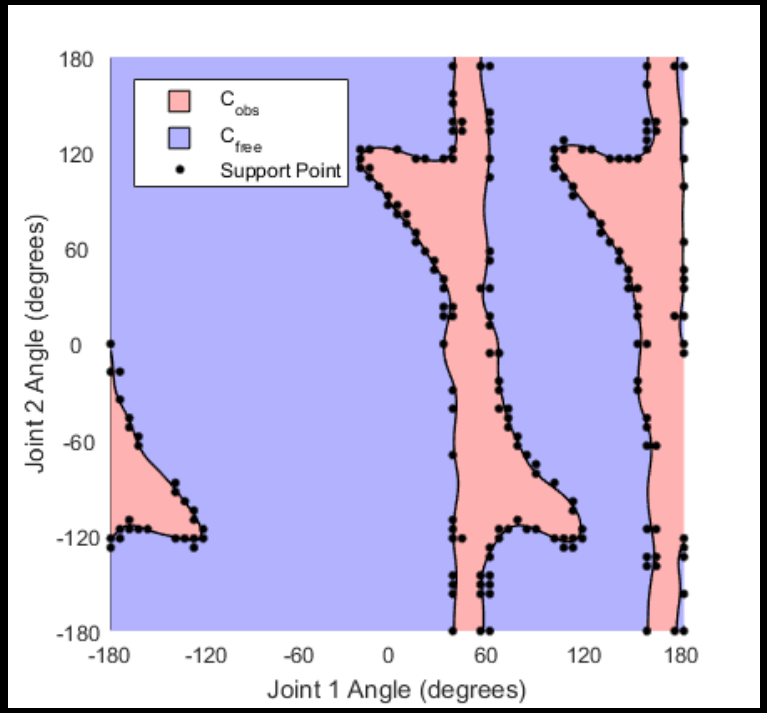
Retrieving C-space Map

Naïve Approach: Run geometric collision detector on mesh bodies for all possible interactions: computationally costly!



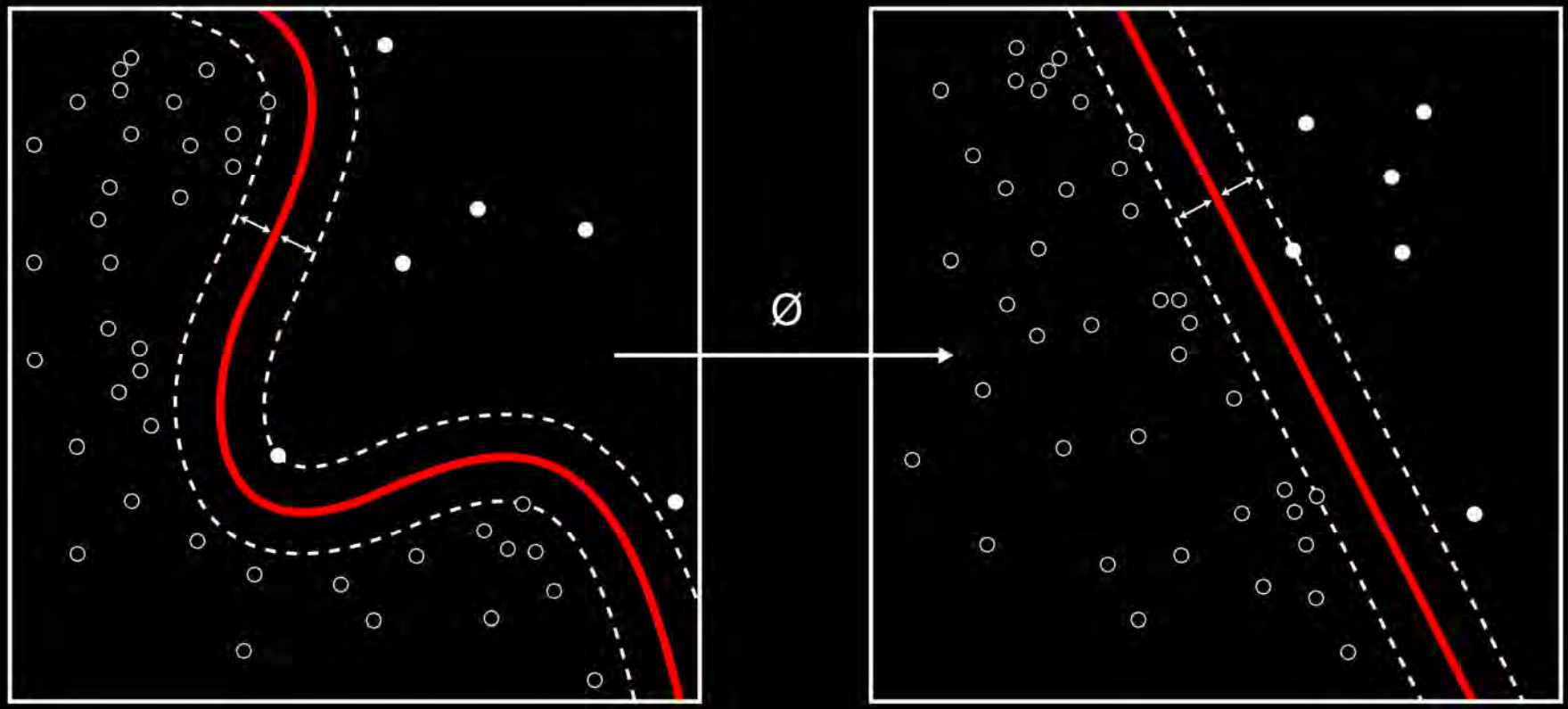
Fastron: Classifier-based Collision Checker for Fast and Power-Efficient Collision Checking

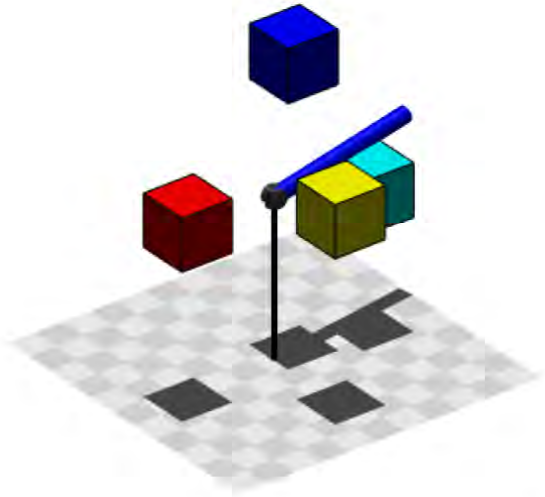
Model-free classifier and *active learning* strategy to replace costly geometric collision checks

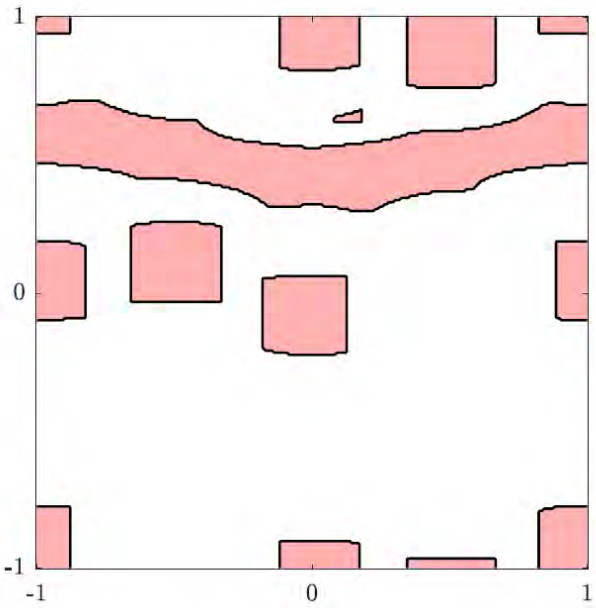


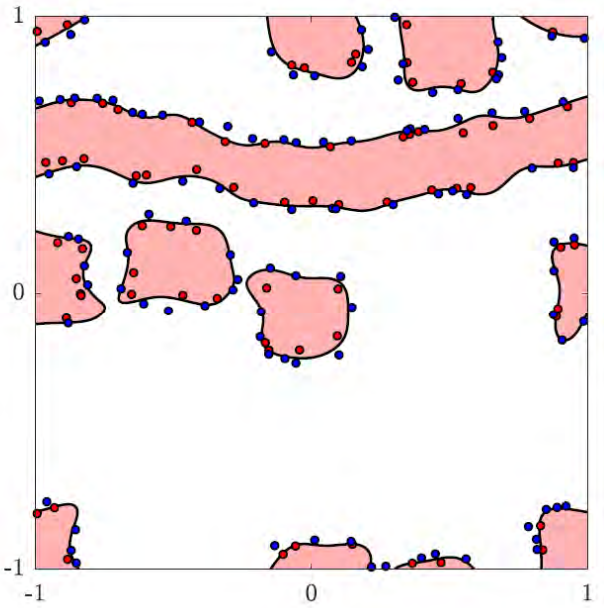
N. Das, N. Gupta, M. Yip, Conference on Robot Learning (CoRL), PMLR vol. 78, pp. 496-504, 2017.
N. Das, M. Yip, U.S. Provisional Patent.

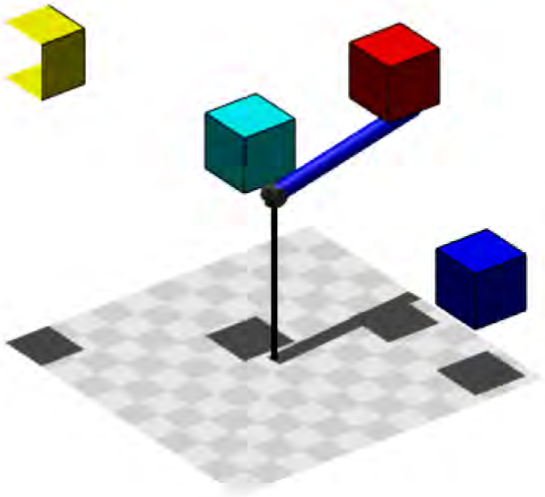
The kernel Perceptron Classifier

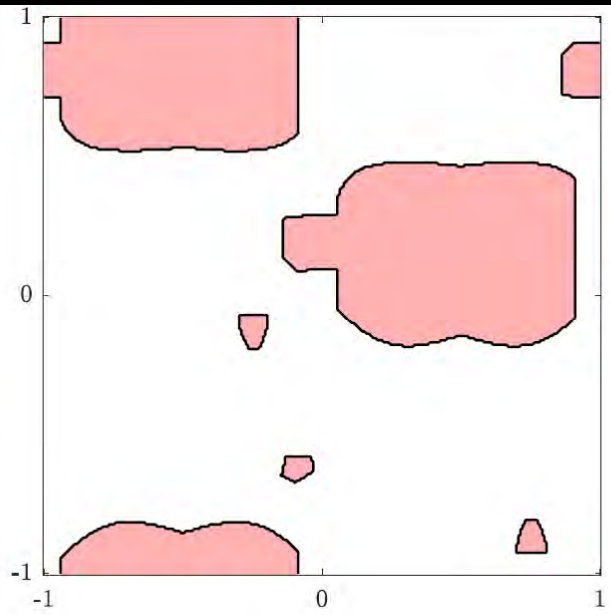


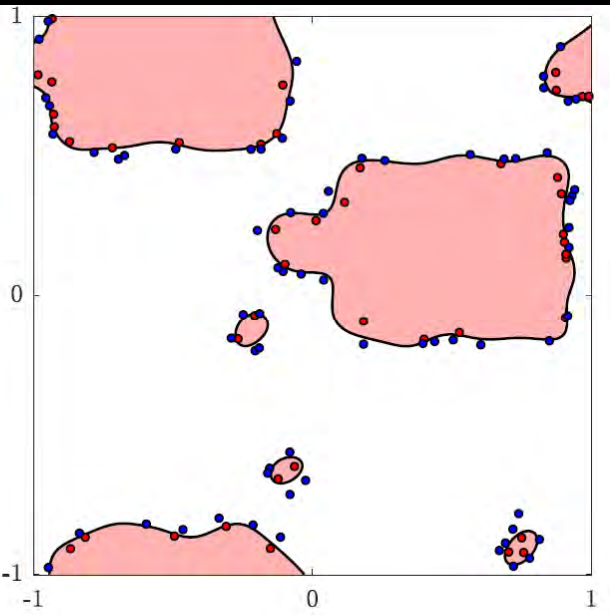



1
0
-1
-1
0
1


1
0
-1
-1
0
1




1
0
-1
-1
0
1


1
0
-1
-1
0
1

Active Learning Strategy

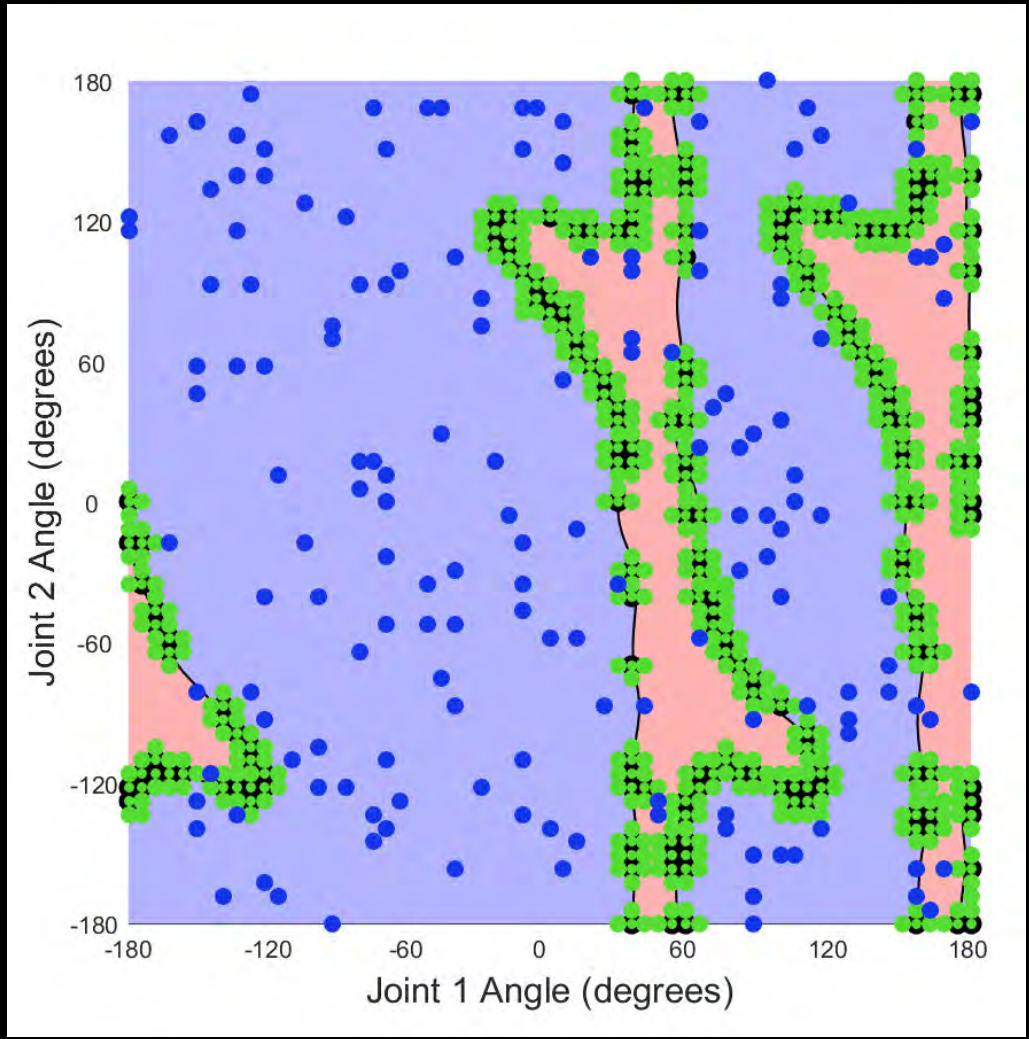
Exploitation:

Sample near boundary to observe dynamical changes

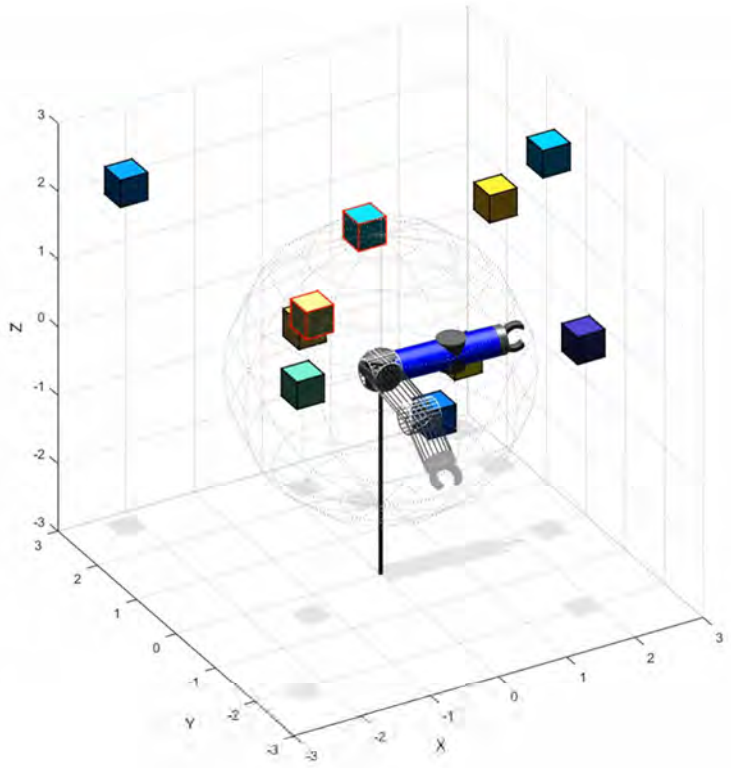
Exploration:

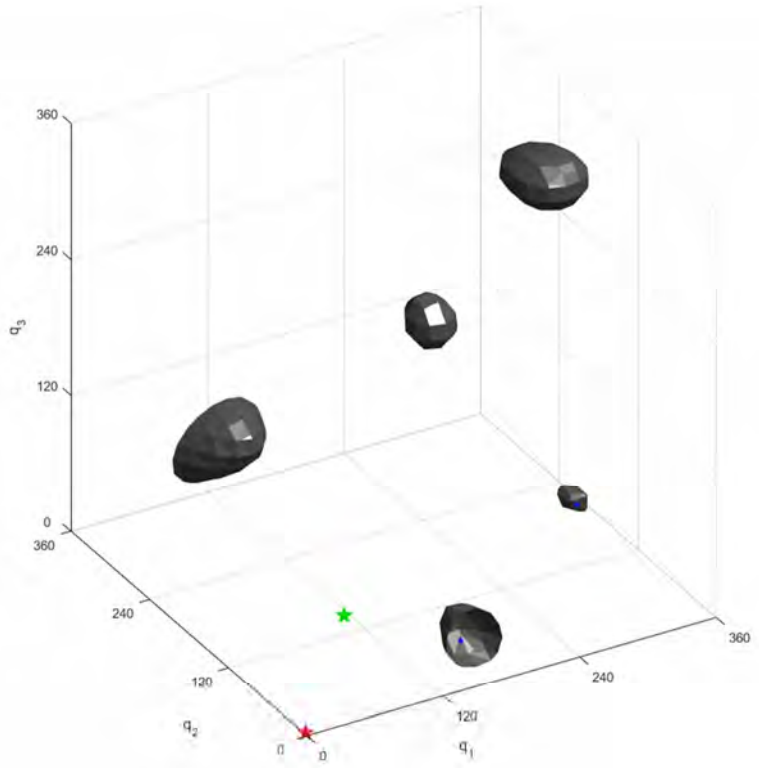
Sample in new areas

Uniform or directed sampling

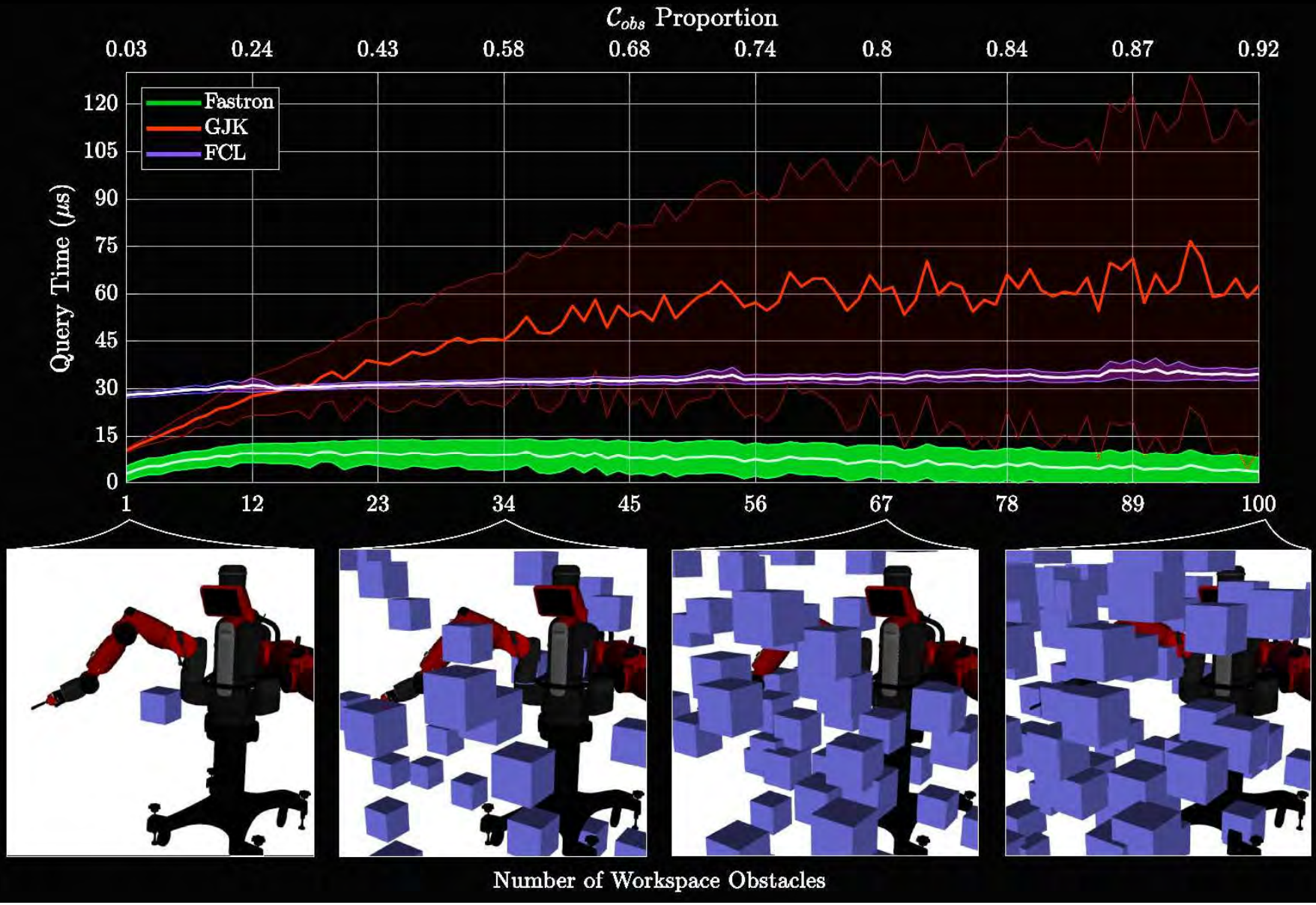


Responsive modeling in moving environments

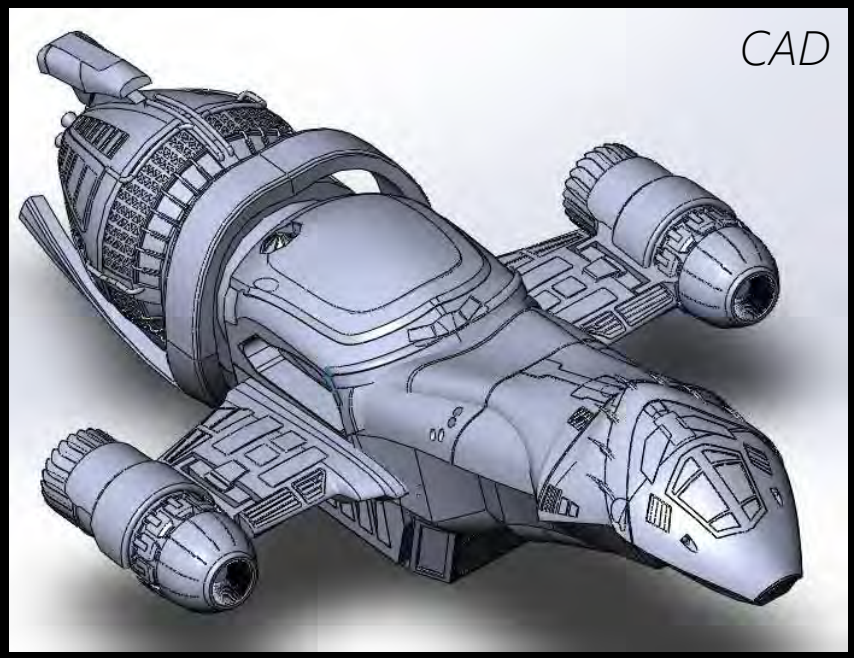


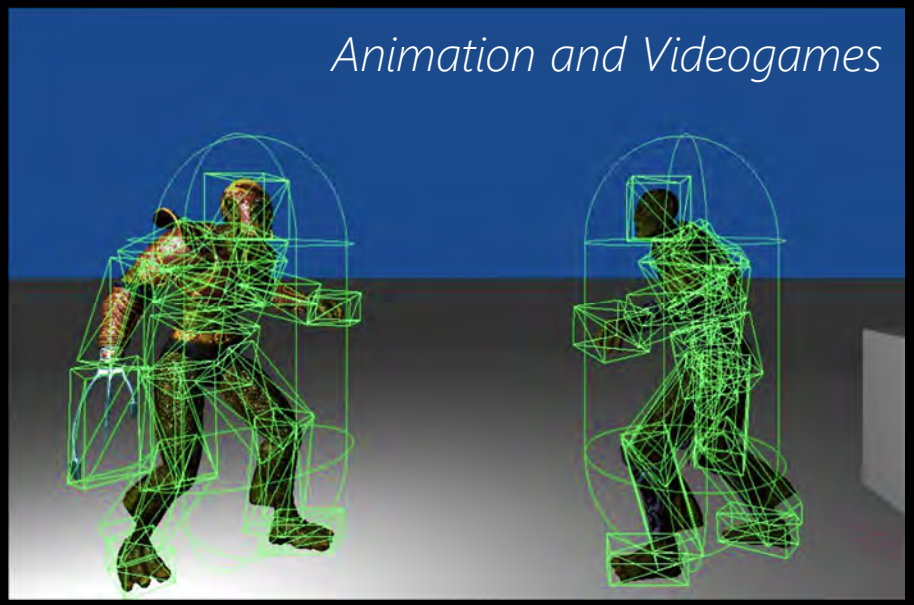


Complexity vs. Computation

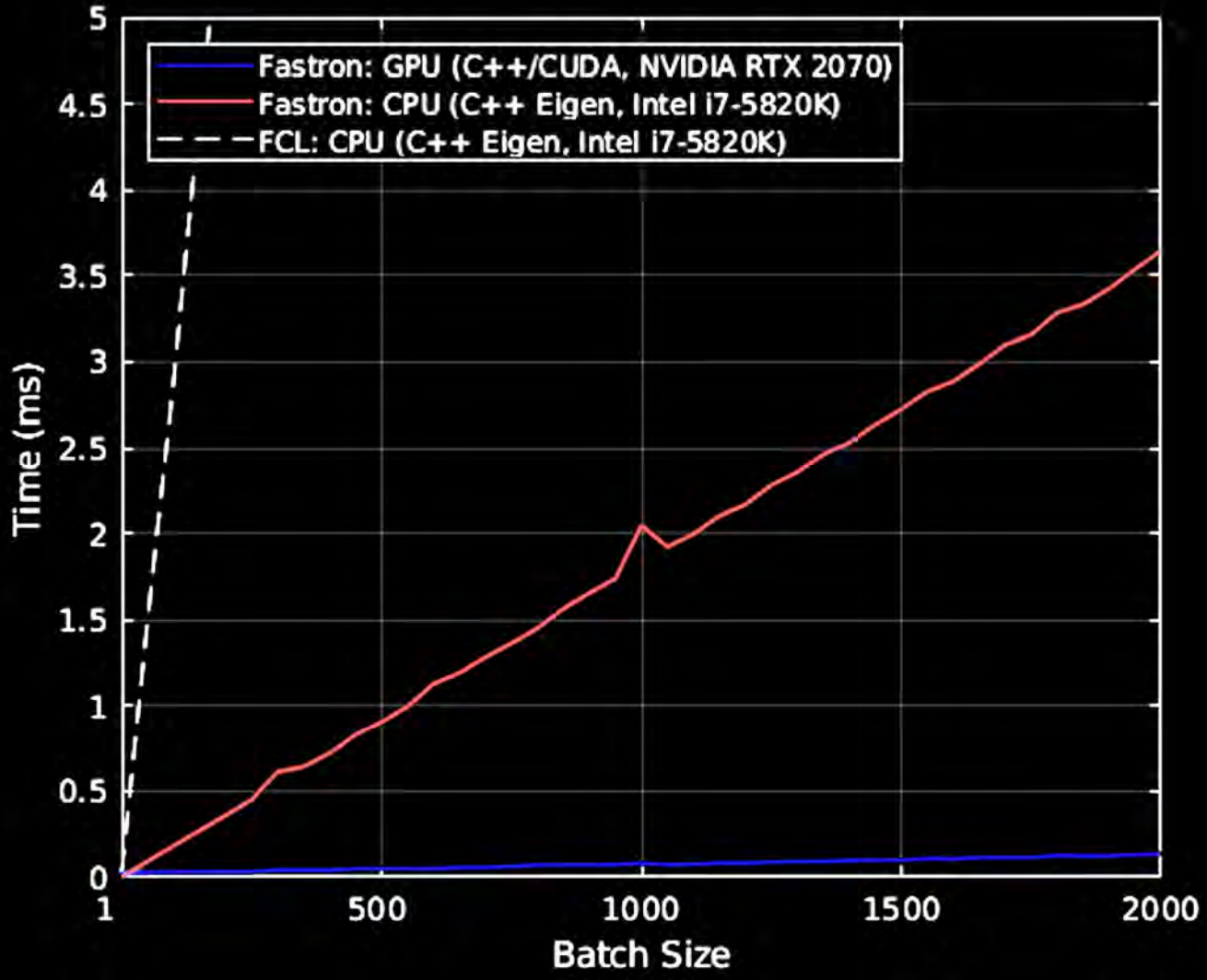


Broad applications





Significant Mobile Planning Applications



more soon…

Breakout Session – 2020 Strategic Plan

What are the bold, relevant breakout moves to enable the Jacobs School to accelerate our march to cachet?

- What are the important grand challenges that the Jacobs School is uniquely positioned to address?
- What is the role of systems engineering and data analytics in the modern engineering curricula?
- How can we innovate on industry-academia partnerships for the benefit of society?
- How can we rebrand Engineering as the intellectual hub for addressing complex societal problems that can no longer be resolved by deterministic models in siloed disciplines?
- How can we attract the best talent that represents changing demographics and culture?

CAP BUSINESS

William W. Dyer

Director, Corporate Affiliates Program, Jacobs School of Engineering

CAP Business

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Jacobs School Corporate Affiliates Program

CAP Team update

Erica Kosa
Interim Manager
Talent Programs (TIP, Co-op, general recruitment)
JacobsTIP@eng.ucsd.edu

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Talent Programs 2019

Team Internship Program & Cooperative Education (Co-op)

Thank you to all 2019 TIP & Co-op Partners!

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Start Early: 2019-2020 Recruitment

Schedule your Recruitment Strategy Meetings with the CAP Team!

- Students are accepting offers earlier and earlier
- Competition is fierce, especially in the Fall
- Utilize CAP to target the right students for your organization

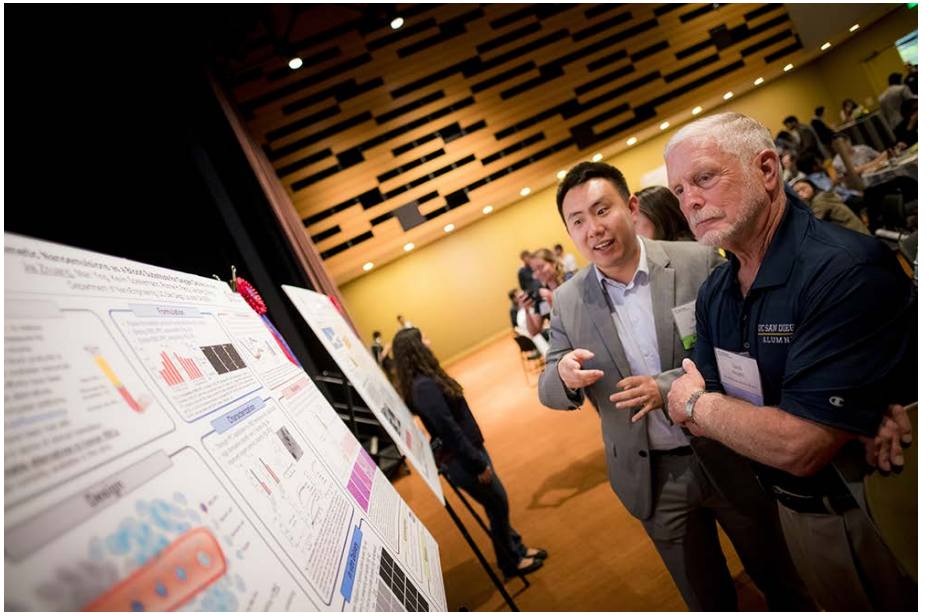
Contact:
Paula Kreger
Services Manager, Corporate Affiliates Program
pkreger@eng.ucsd.edu | 858-534-3148

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Jia Zhuang, Best of Show
Research Expo 2019

Biomimetic Nanoemulsions as a Blood Substitute for Oxygen Delivery in vivo

- NanoParticles that look and act like red blood cells
- Blood substitute with 3-month shelf life
- Does not activate immune system



Many thanks to our CAP sponsors!

ASML

Viasat

leidos

Lawrence Livermore National Laboratory

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

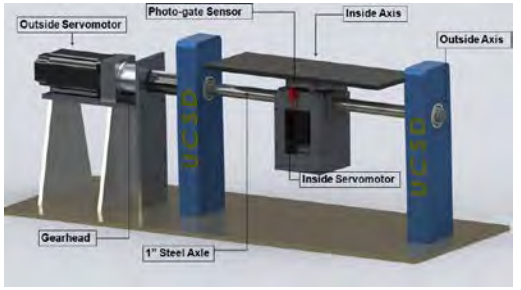
brain corp

Qualcomm

Mechanical & Aerospce Engineering
Senior Project Showcase

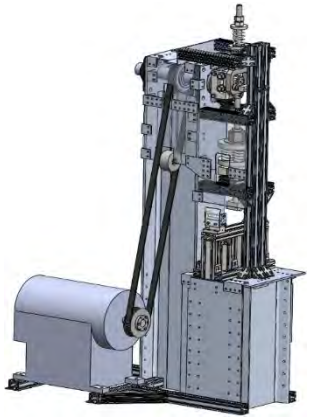
Stop by to chat with graduating seniors and see their capstone design hardware and posters

- Date: Wednesday, June 12, 11:30am – 2:30pm
- Location: Price Center West Ballrooms
- 51 posters across Aerospace, Environmental, and Mecahnical Engineering



Cohu – Delta Design

Teradata



ATA Engineering

Contact:
Professor Nate Delson
ndelson@ucsd.edu
858-534-0655
mae.ucsd.edu/design

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Master of Advanced Studies

MAS programs are interdisciplinary engineering degrees designed for working professionals with classes taught on Fridays and Saturdays every other week.

Architecture-based Enterprise Systems Engineering (AESE)

Engineering professionals with 5+ years of relevant professional experience who are in a position to drive enterprise systems

Wireless Embedded Systems (WES)

Engineering professionals with a background in CS / EE who want to enhance their understanding of IoT, edge computing, and 5G (6G…)

Data Science and Engineering (DSE)

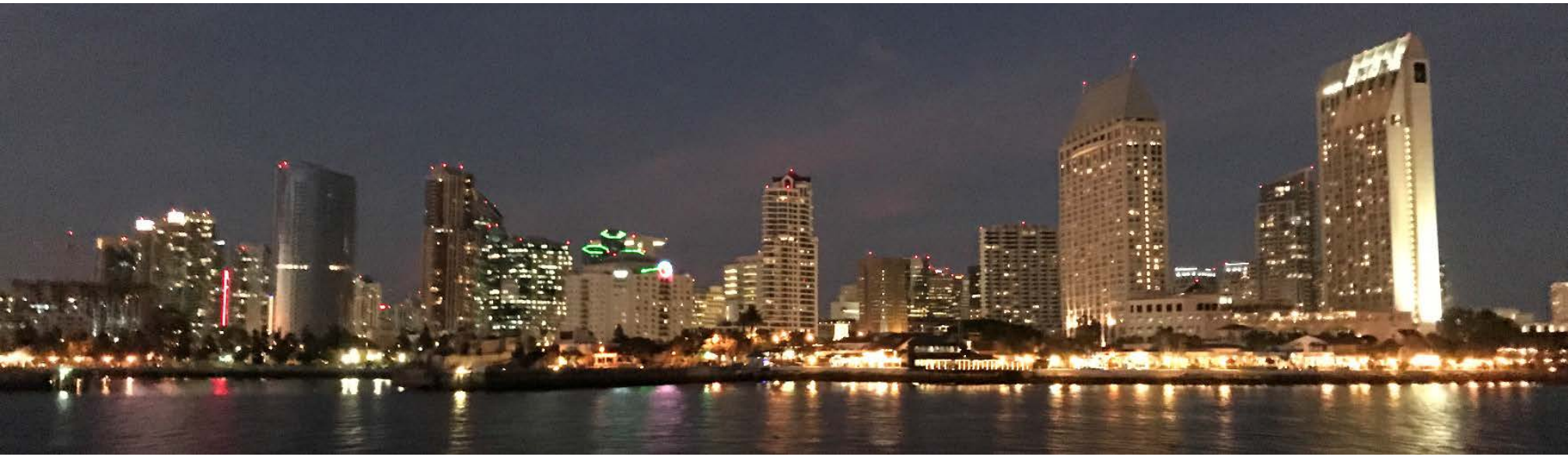
Engineering professionals with a background in CS / Math / Statistics with substantial experience in data analysis

Contact:
Phillip McMullen
Director, Executive Education
pmcmullen@eng.ucsd.edu
(858) 822-4536
Jacobsschool.ucsd.edu/mas

Fall 2019 Enrollment Deadline: June 24, 2019

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Spirit of Solar CAP Executive Cruise



Save the date!

30 September 2019, 5-7:30pm

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

All Upcoming Opportunities

June 12, 2019	MAE Senior Project Showcase
June 24, 2019	Deadline: Fall 2019 MAS Enrollment
September 30, 2019	**CAP Executive Spirit of Solar Cruise**
October 2, 2019	New Faculty Welcome
October 4, 2019	Shu Chien Lifetime Achievement Celebration
October 4, 2019	Sustainable Power & Energy Center (SPEC) Research Summit
October 10, 2019	**Fall CAP Executive Board Meeting**
October 23, 2019	Center for Wearable Sensors (CWS) Research Summit

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Thank You CAP Executive Board!

Next Board Meeting: October 10, 2019