MECHANICAL ENGINEERING

College of Engineering

Raymond K. Yee, Ph.D., P.E.
Professor and Interim Chair
Department of Mechanical Engineering

Overview of the ME Department

- The department offers two academic degrees:
  - Bachelor of Science in Mechanical Engineering
  - Master of Science in Mechanical Engineering
- Minor in Robotics
- The department accepts freshman and upper-division transfer students as well as graduate students
- About half of our graduating seniors started transfer students from community colleges in the San Francisco Bay Area and beyond

>900 students ~800+ BSME students ~150 MSME students	15 Full-time faculty 25 part-time faculty	One admin analyst One admin coordinator One technician (to be hired)

BSME Curriculum

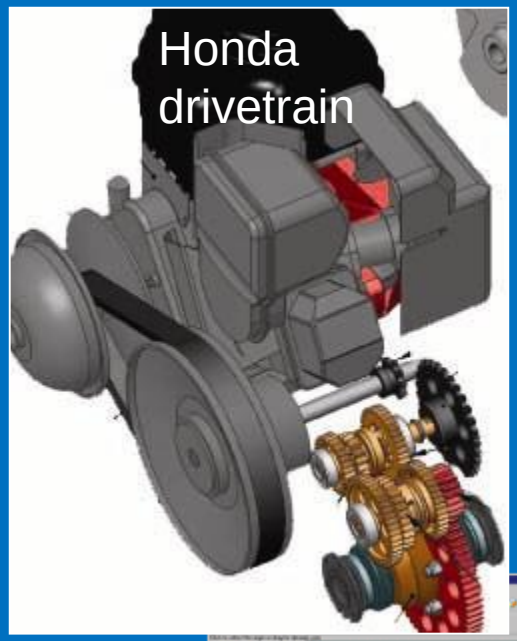
- General Education: 24 units
- Math/Physics/Chemistry: 30 units
- Lower Division (Introductory) Engineering Courses: 18 units
  - Programming, CAD, circuits, statics, etc.
- Upper Division Coursework: 38 units
  - Mechanics, thermodynamics, machine design, mechatronics and controls, etc.
- Advanced Design Class: 3 units
- Senior Design Sequence: 6 units
- Electives: 6 units
- Total: 125 units for major

Mechanical Engineering

Focus Areas and Specialization

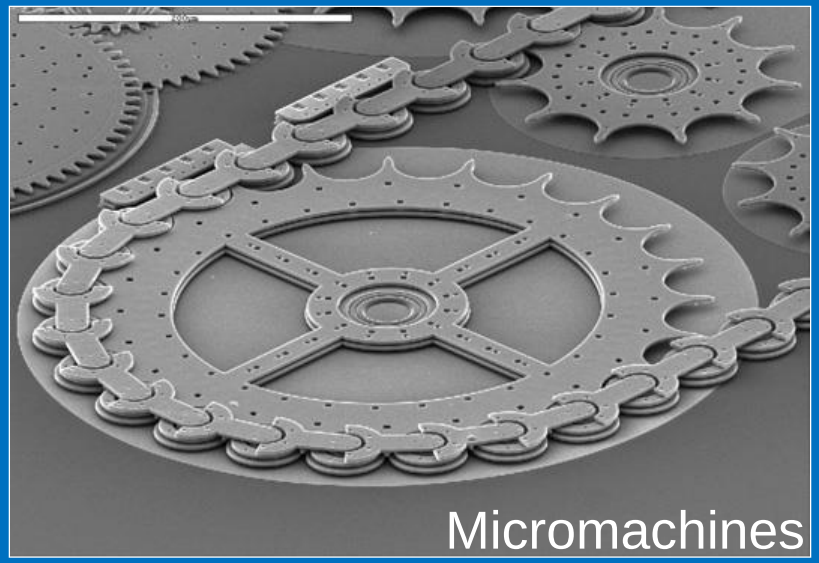
Mechanical Design
Mechatronics
Thermal Sciences

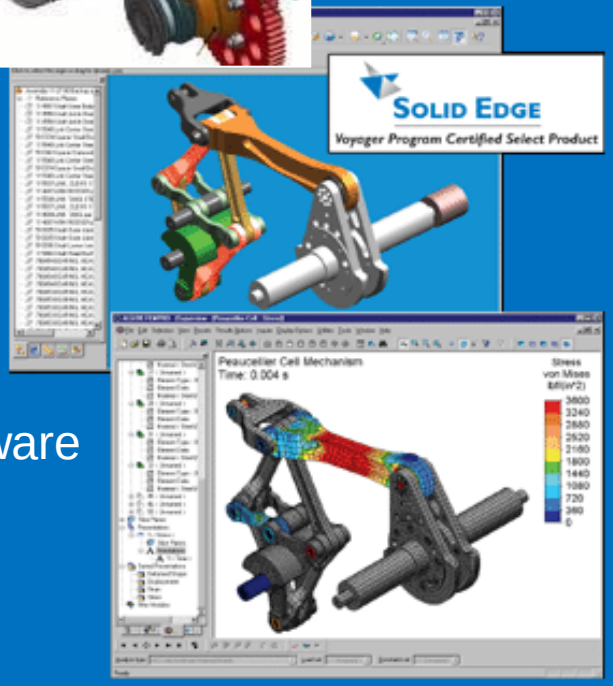
Mechanical Design



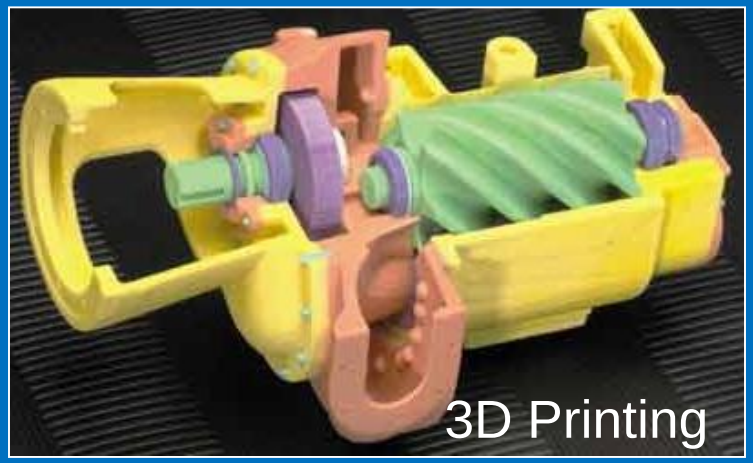
Solid modeling and finite element analysis

Prototyping

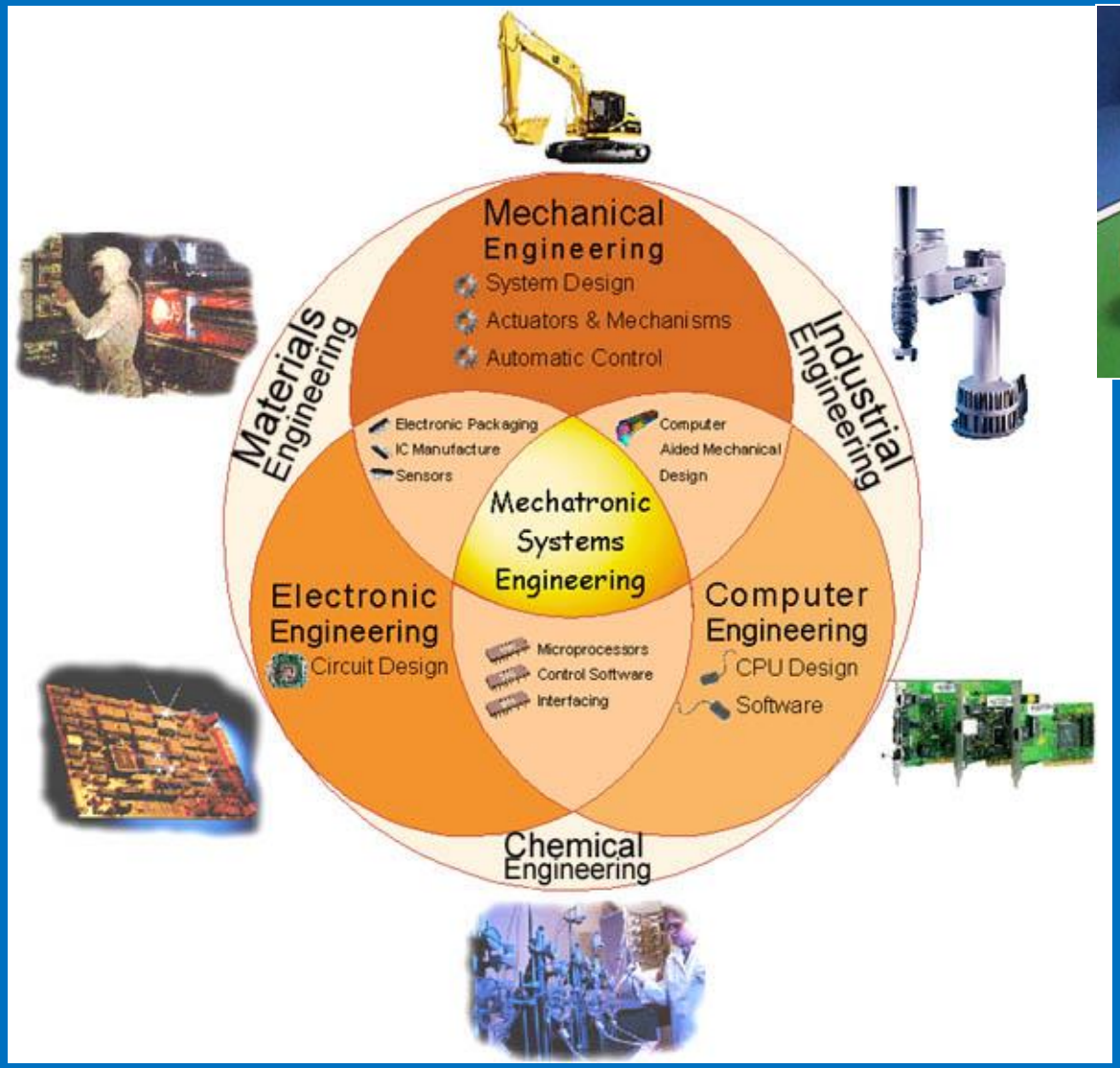




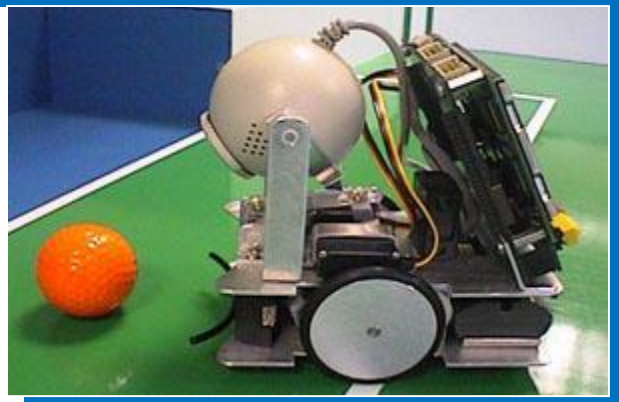
FEA software



Mechatronics



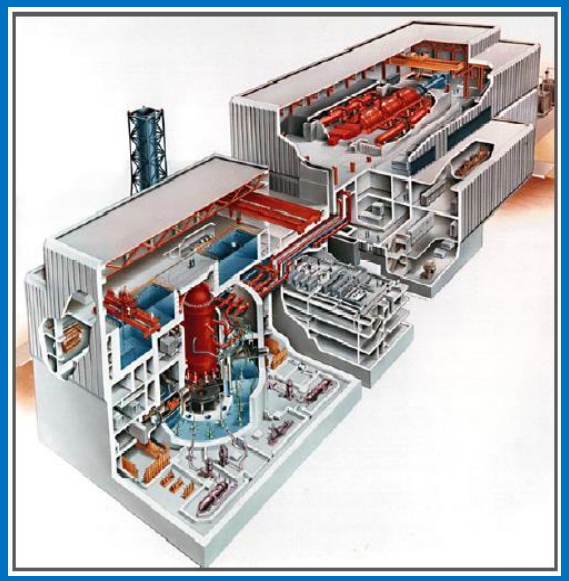
Soccerbot



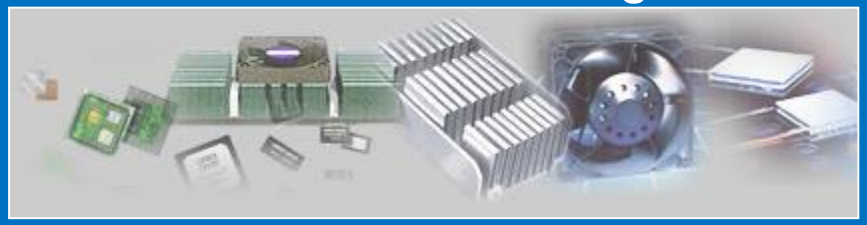
Humanoid Robot

Thermal Sciences

Power Generation



Thermal Management



www.coolingzone.com

Solar powered car

Multi-channel Battery Cycler (charging & discharging) for Cell-level Characterization

Unique Strength of Our Educational Programs at SJSU

- **Dynamic curricula**: Required fundamentals + contemporary electives
- **Hands-on experiences**: Involving projects & prototype construction and testing in many courses
- **Modern tools**: 3-D printing, sensor/control systems, CAD solid modelling, numerical modelling (ANSYS, IcePak, etc.)
- **One-year senior design project,** including design and manufacture of prototypes, and testing
- **Well-qualified part-time instructors** from Silicon Valley industry who bring in current industrial practices
- **In-person** student advising every semester
- **Professors**, not TA, teach their classes
- **Easy access** to professors during office hours
- **Industry internship** opportunities
- **Active** student clubs and organizations

Senior Design Projects – Culminating Exp.

- Students work on one-year group project, including design and manufacture of prototype for testing and evaluation.
- A chance to apply and integrate what students have learned into a culminating project.
- The scope of the projects are often considerable, and require background research, market research, design, analysis, implementation, evaluation (testing), and documentation.
- It is a chance for strong technical skills to be put to the test, and for creativity to shine!

Examples of Senior Design Projects by Undergraduate ME students

Satellite Debris Collection Using Innovative Adhesive Methods
https://www.youtube.com/watch?time_continue=3&v=fSIzLBcNSrc

Staircase Climbing Wheelchair (Winner of Regional ASME design Competition)

Spartan Superway
https://www.youtube.com/watch?v=2JiUSu25Meg&feature=youtu.be

Our senior design students regularly win ASME's regional design competition – took 1st & 2nd in oral presentation and poster competition in the past for the western half of the US.

SAE INTERNATIONAL

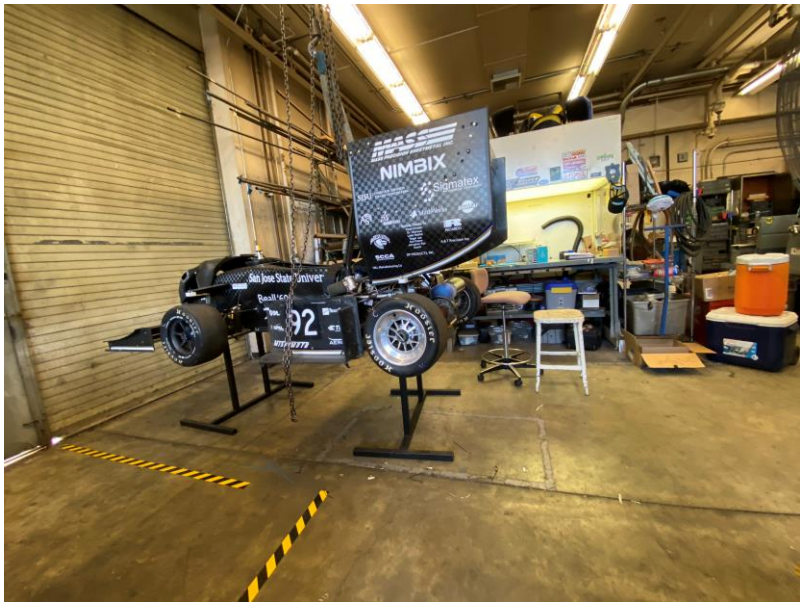
SAE Formula Car won the international competition held in Nebraska summer 2015;
1st win ever by a California-based team!
Took 6th place in the largest competition in Michigan in 2017.

Note: FSAE Electric - Spartan Racing Electric (SRE) car competed in 2021 in the FSAE Competition in Michigan and took the 1st place in Endurance and 2nd place Overall.

You can check out part of the design review in Nebraska in 2017, where they took first place in design: https://www.facebook.com/FormulaSAE/videos/696687393850747/ (SJSU shows up at about 20 minute point)

SAE Teams – FSAE, FSAE Electric, Mini-Baja

Our facilities – the ME machine shop (E 123)



Modern Laboratories and Equipment

- **Electronics cooling laboratory**
  Dir: Prof. N. Okamoto
  Funded by:

National Science Foundation
WHERE DISCOVERIES BEGIN

Rockwell Collins

Additional labs

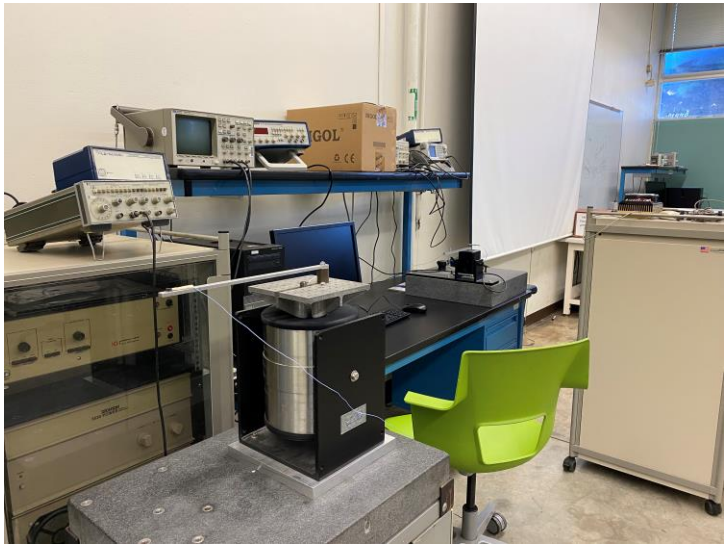
- **Robotics**
  Dir: Prof. W. Du
- **Micro-fabrication systems technology**
  Dir: Prof. J. Lee
- **Mechatronics**
  Dir: Prof. M. Sharifi

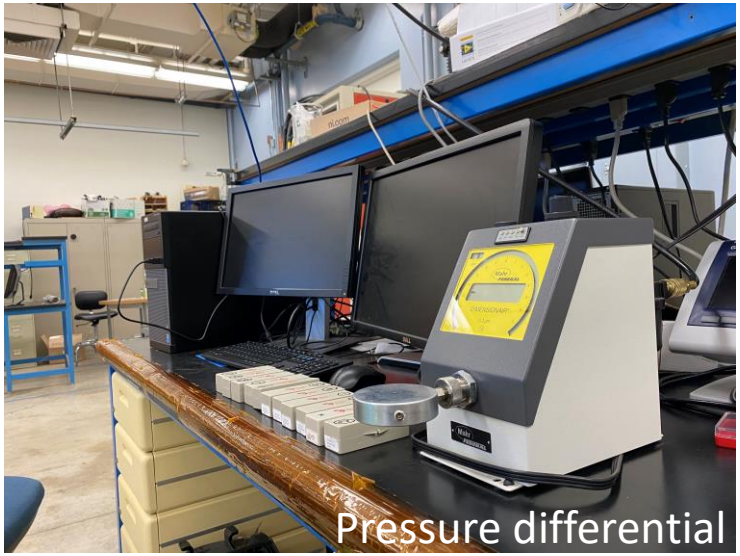
(Full list on Dept website)

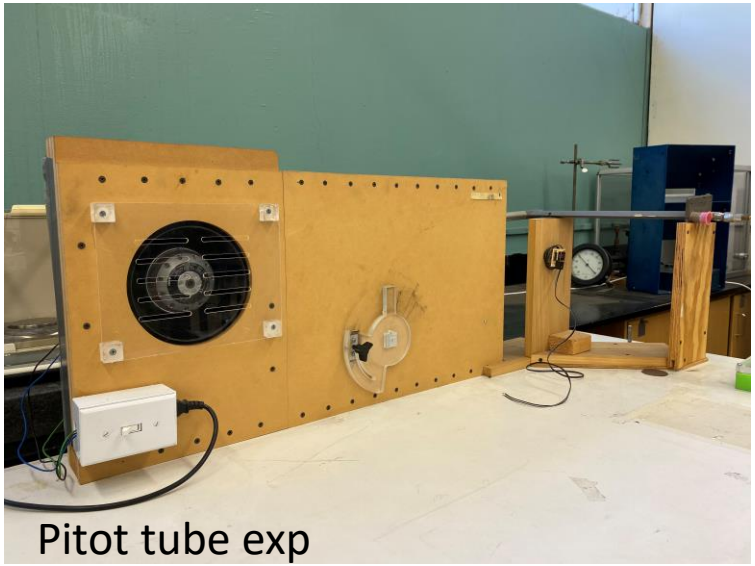
- **Product Design laboratory**
  Dir: Prof. R. Yee

Metal 3D Printer

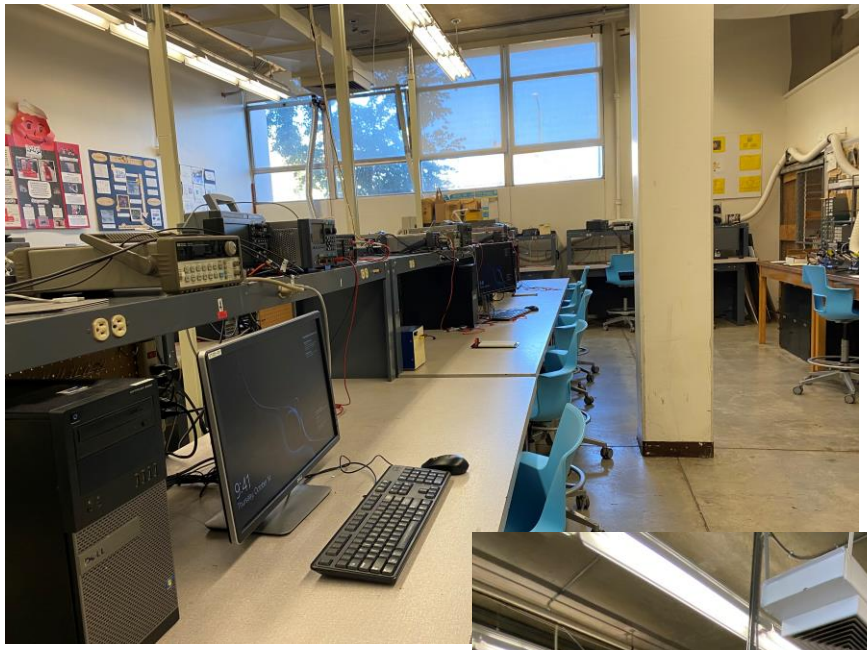
Our facilities – instrumentation & data acquisition lab (E 133 – Profs. Mysore & Zaidi)

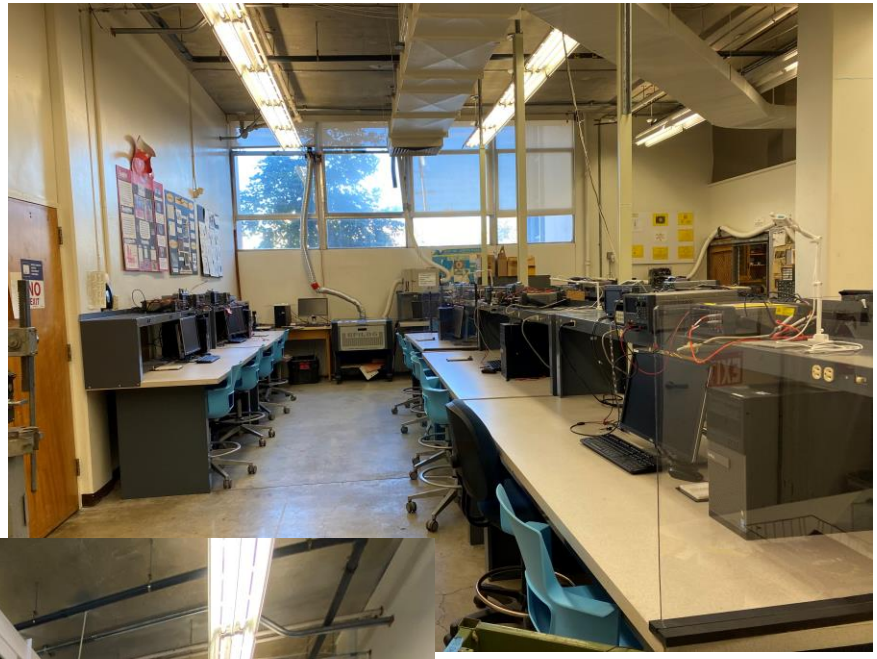


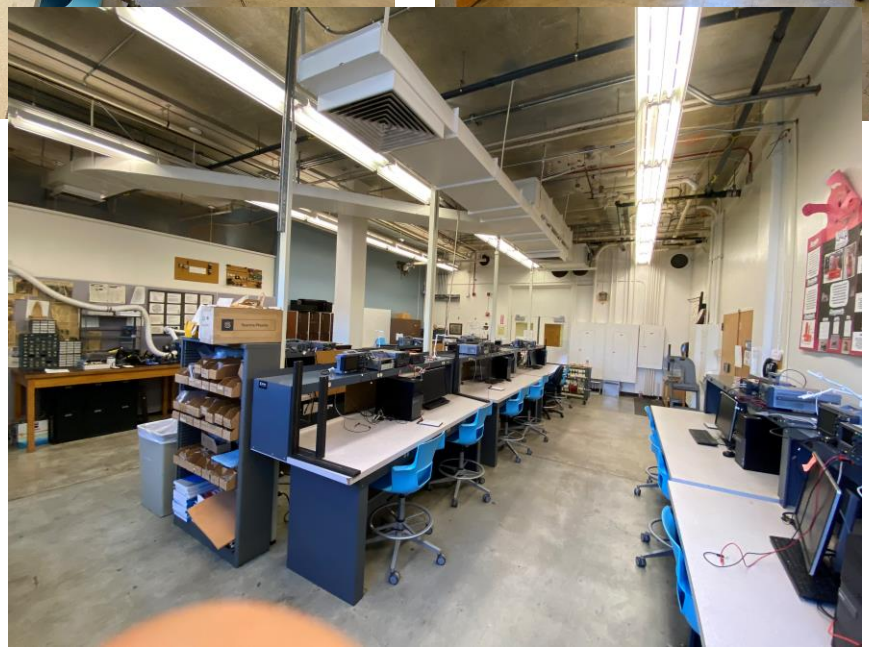




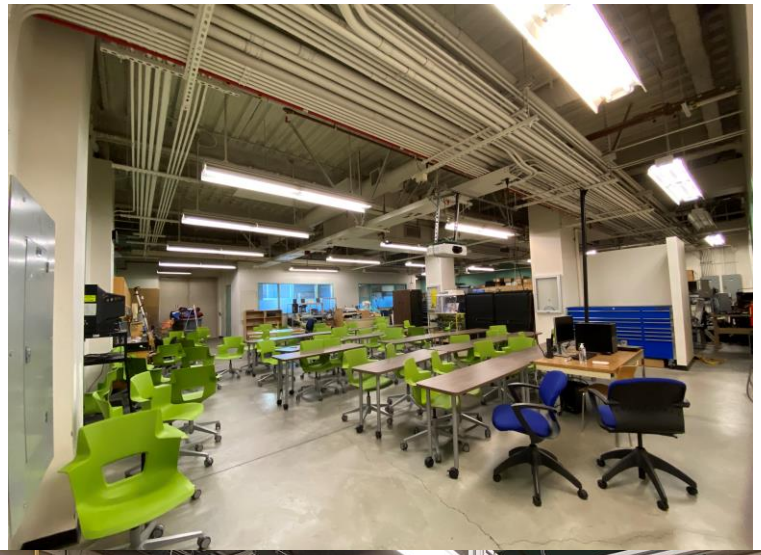
Our facilities – Mechatronics lab (E 125 – Dr. Sharifi)

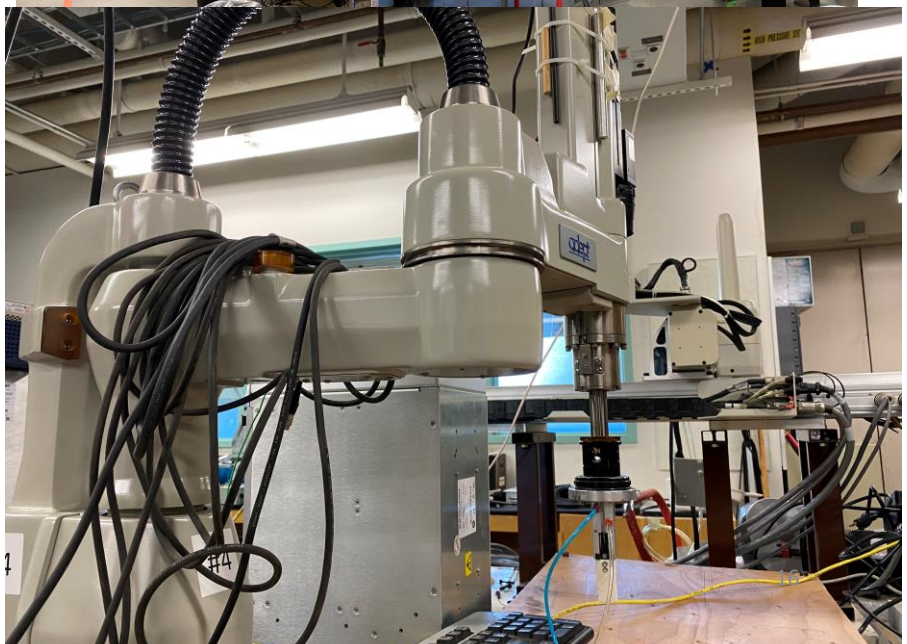






Our facilities – Robotics lab (E 192 – Drs. Du, Jiang & Sharifi)

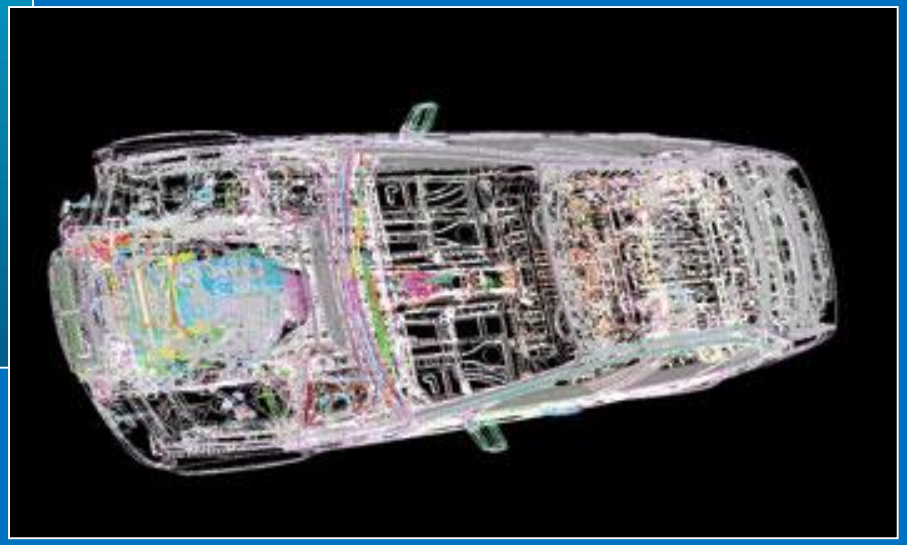




Our facilities – Computer-aided Design (CAD) Lab (E 213/215 - Dr. Agarwal)

Software and CAD Programs

Autodesk suite (AutoCAD, Inventor)
Solidworks, Ansys, COMSOL



Internships and Career Opportunities

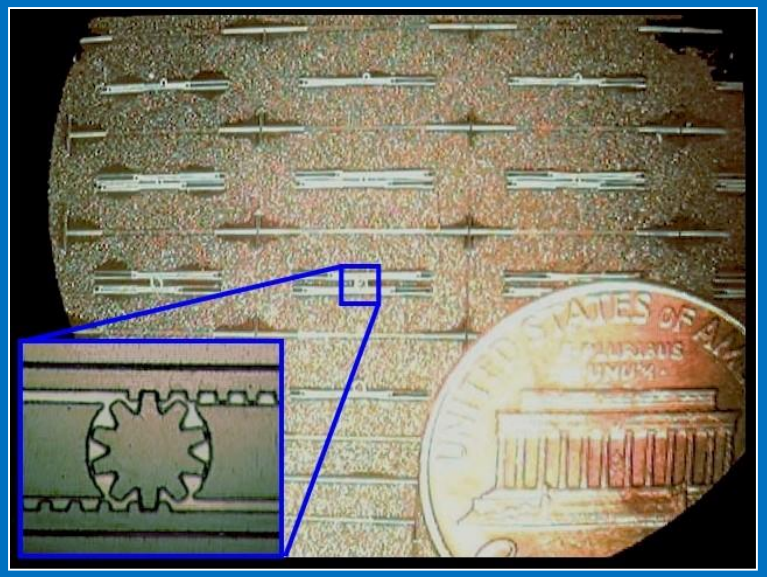
Internships
5-20 hrs/wk in industry or on-campus during school year
20-40 hrs/wk during summer

Example ME Employers

Semiconductor Applied Materials, Novellus, LAM Research, KLA-Tencor, AMD, Intel, Texas Instruments	**Aerospace/Automotive** NASA-Ames, Lockheed-Martin, Boeing, Maxar Space System, Northrop Grumman, TESLA
IT and Electronics Hewlett-Packard, Apple Computers, Seagate, IBM, Quantum, Gener8 (small-scale design and manufacturing)	**Thermal Management** Cisco, Google, Hewlett Packard, Applied Thermal, Electronic Cooling Solutions, Facebook
Biotechnology Boston Scientific, Medtronic, Nektar, Genentech, Intuitive Surgical	**Energy/Alternative Energy** PG&E, Erin Engineering, SunPower, Therma

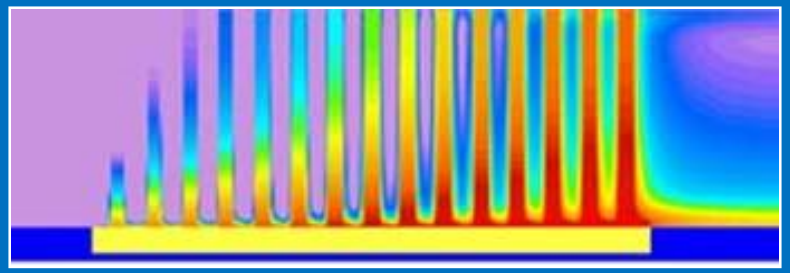
Faculty Research and Projects

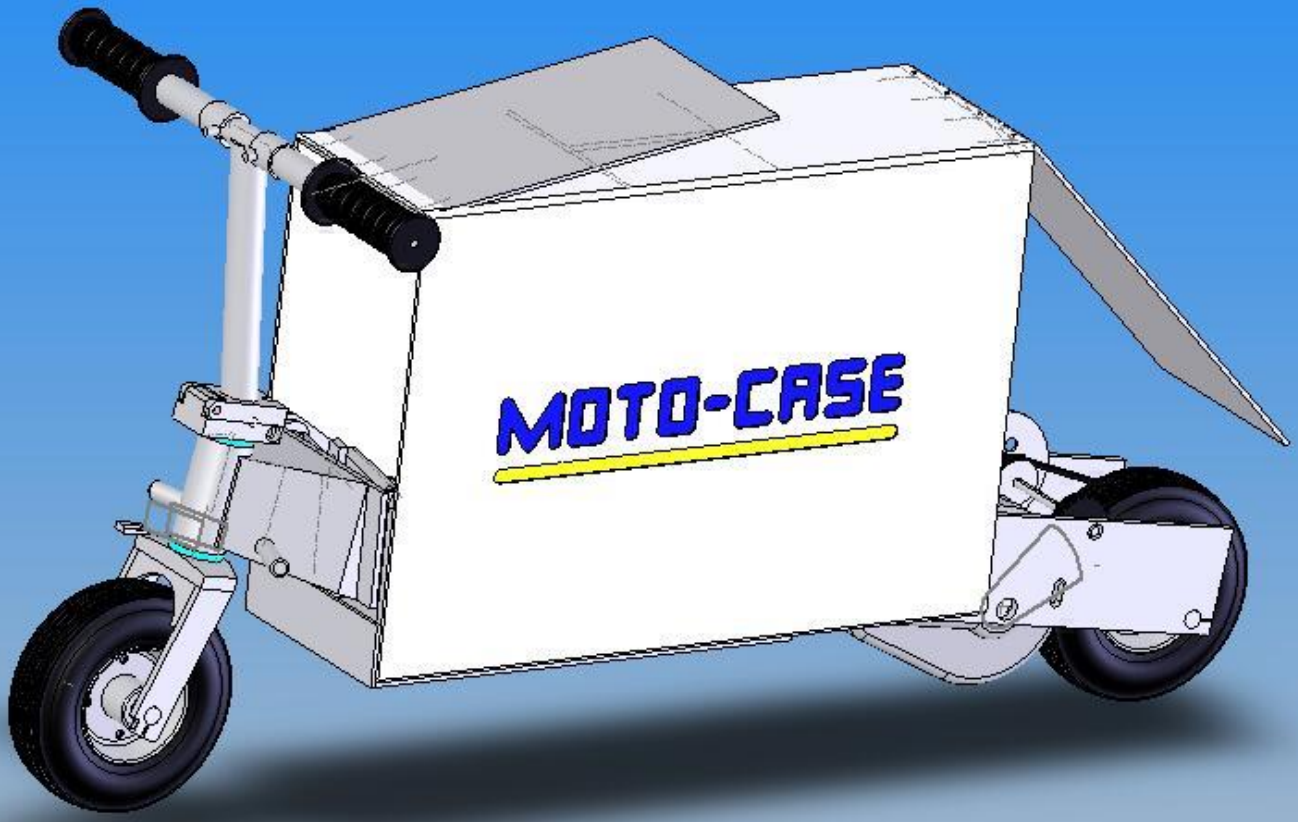
Moto-Case
Advisor:
Prof. R. Yee
Patent pending



Micro-gear fabrication
Advisor: Prof. J. Lee

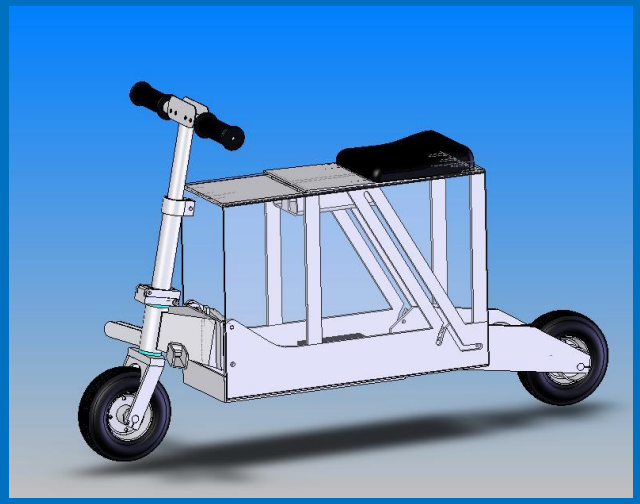
Numerical Thermal Simulation
Advisor: Prof. N. Okamoto



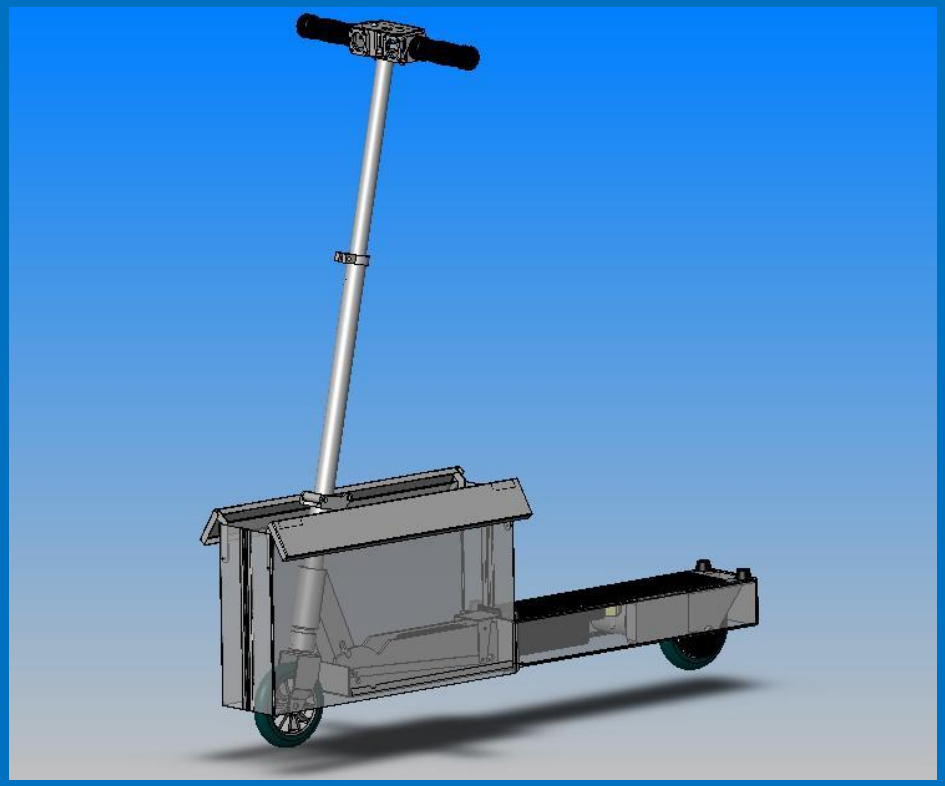

MOTO-CASE

MOTO-CASE

Version 1



Version 2



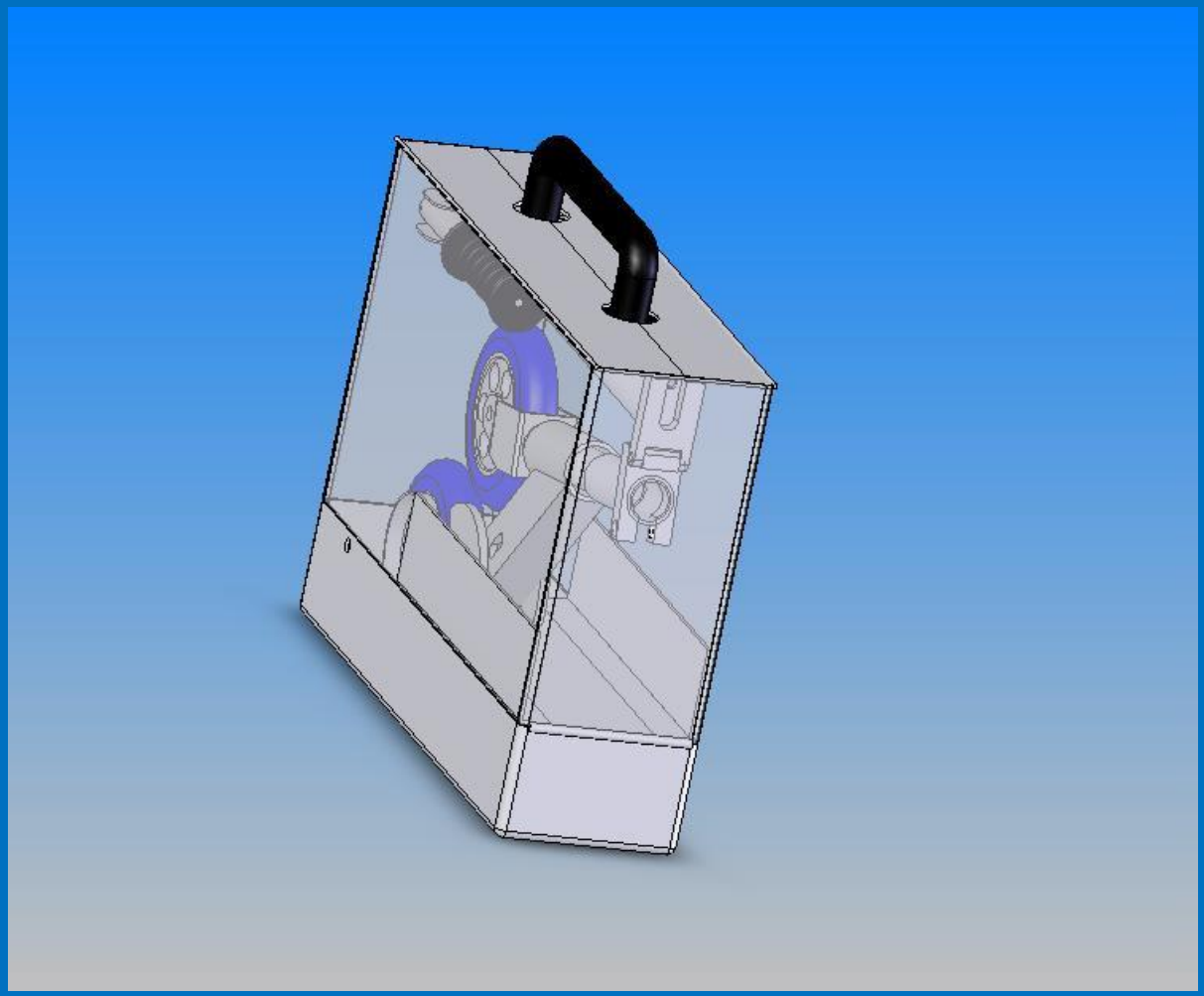
MOTO-CASE

2nd Generation prototype

Specs:

- 14 mph
- 17 lbs
- 400 watt electric motor
- Nickel-metal hydride (NiMH) battery 3.3 AH 24V 3lbs

MOTO-CASE



THANK YOU FOR YOUR

INTEREST IN

OUR DEPARTMENT