Interdisciplinary Connectivity in Materials Science and Engineering at MIT

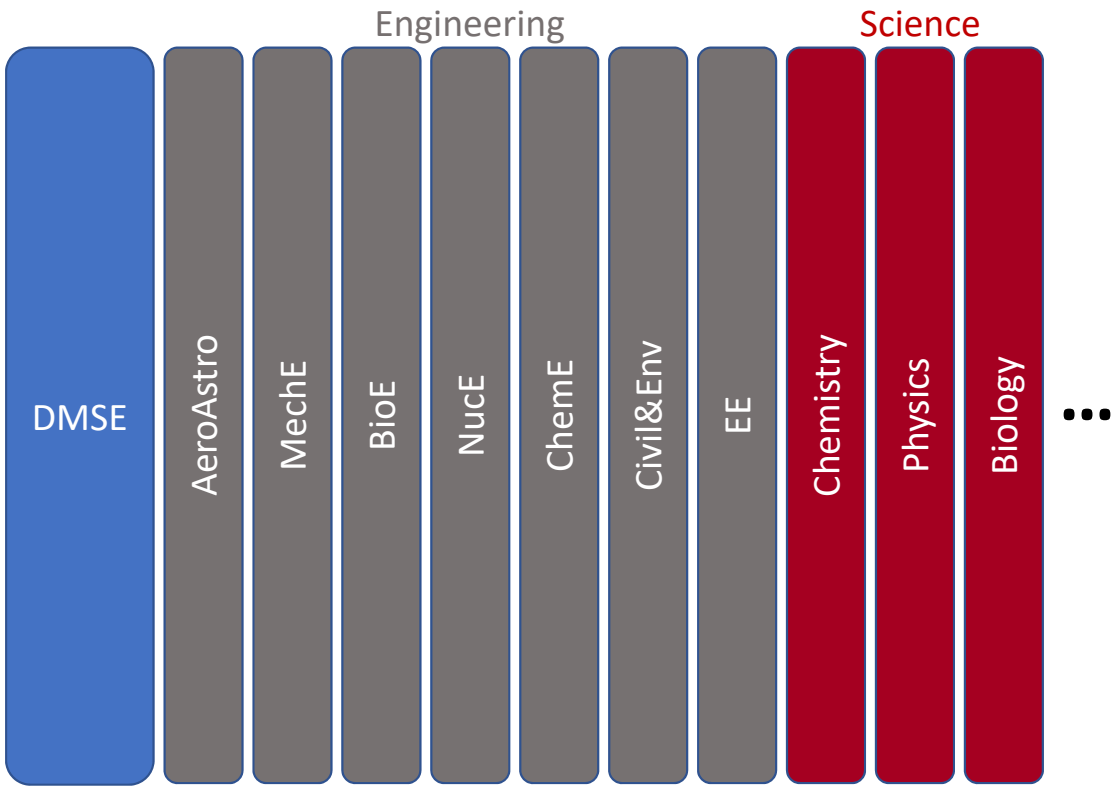
Materials Science and Engineering

How does an interdisciplinary unit define and differentiate itself?

At MIT, Departments are ‘vertical’ structures centered on curriculum

Our role in DMSE is to define the field for MIT students

Internal positioning begins with philosophy



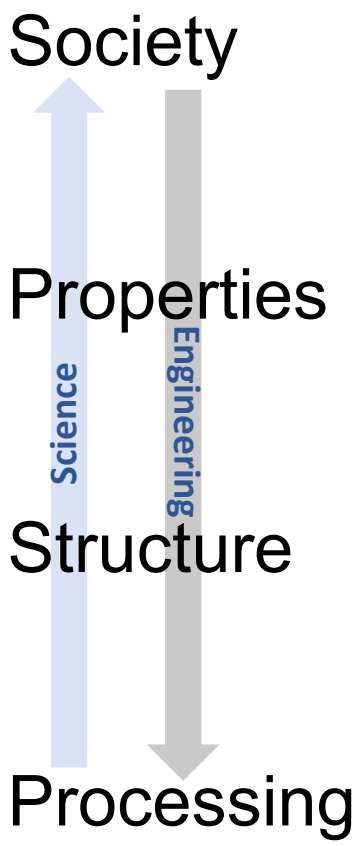
Materials Science and Engineering

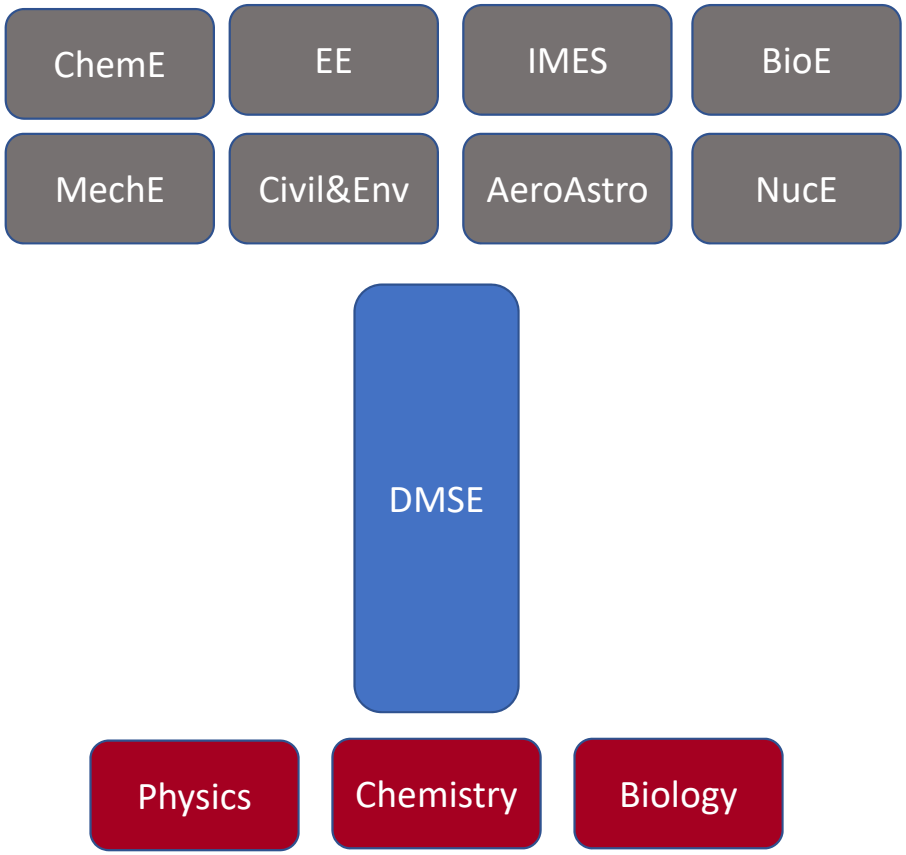
"Architects of Solid Matter"

Our *medium* is **atoms, molecules**

Our *product* is **solid matter** with desirable properties

Our *tools* include any/all methods to understand and control materials





DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

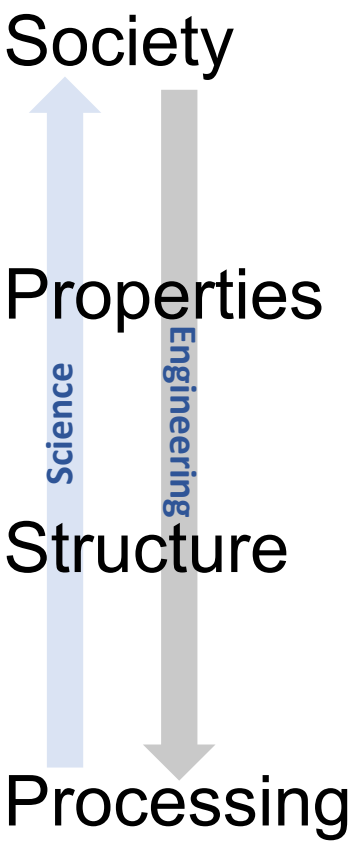
Materials Science and Engineering

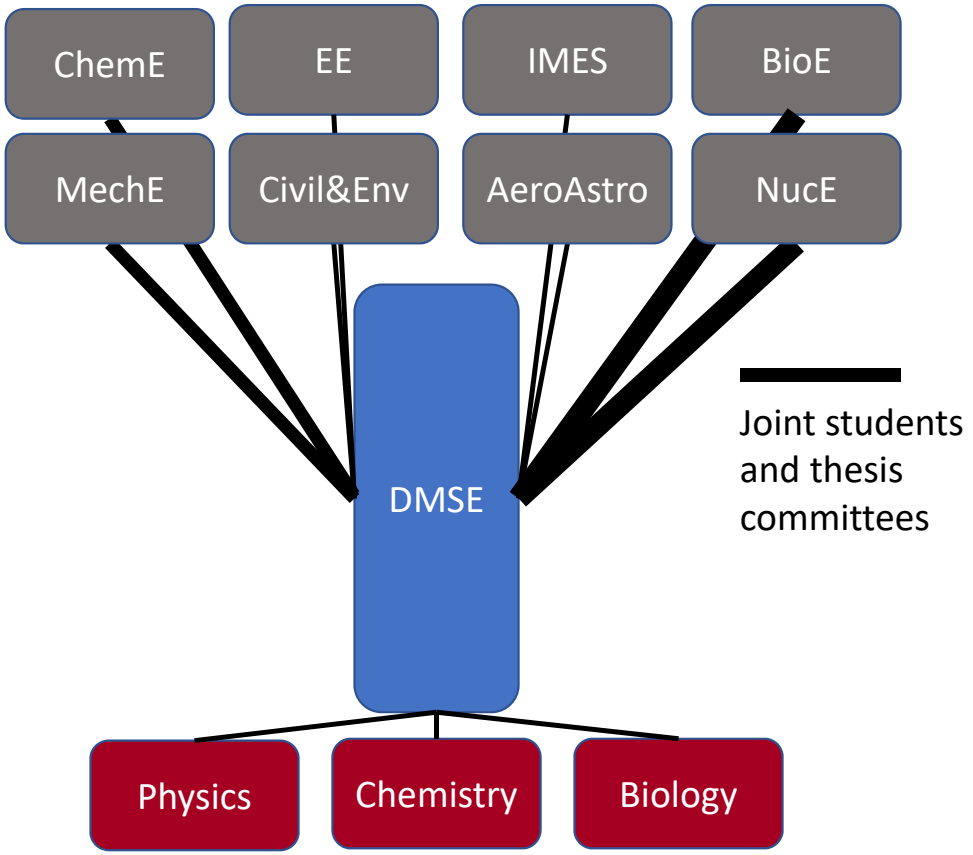
"Architects of Solid Matter"

Our *medium* is **atoms, molecules**

Our *product* is **solid matter** with desirable properties

Our *tools* include any/all methods to understand and control materials





DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

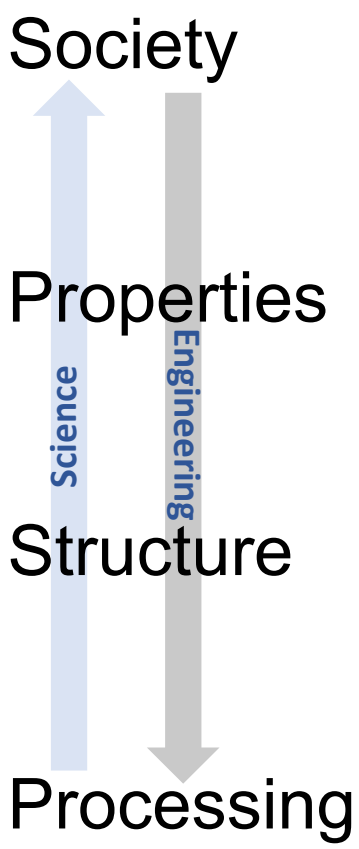
Materials Science and Engineering

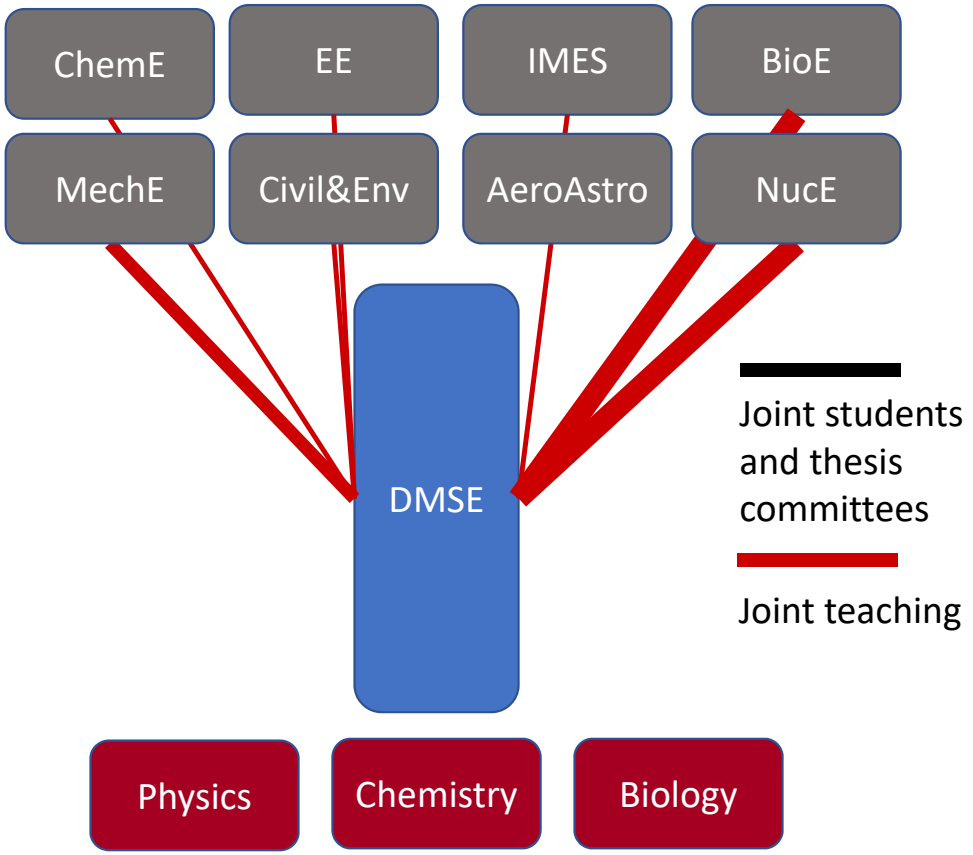
"Architects of Solid Matter"

Our *medium* is **atoms, molecules**

Our *product* is **solid matter** with desirable properties

Our *tools* include any/all methods to understand and control materials





DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

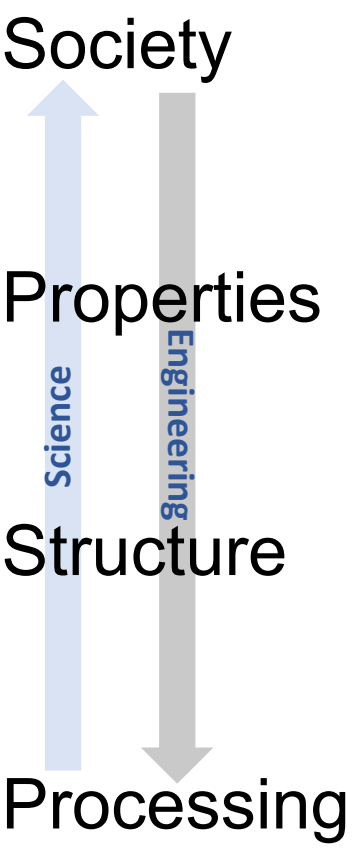
Materials Science and Engineering

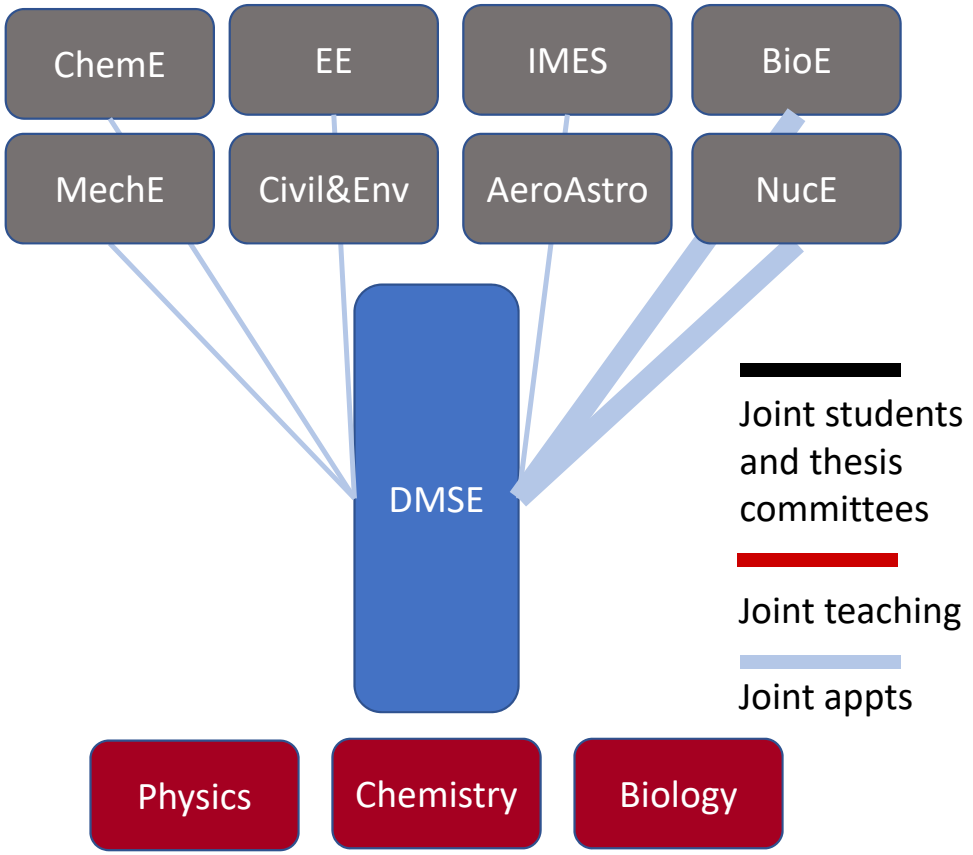
"Architects of Solid Matter"

Our *medium* is **atoms, molecules**

Our *product* is **solid matter** with desirable properties

Our *tools* include any/all methods to understand and control materials





DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

Materials Science and Engineering

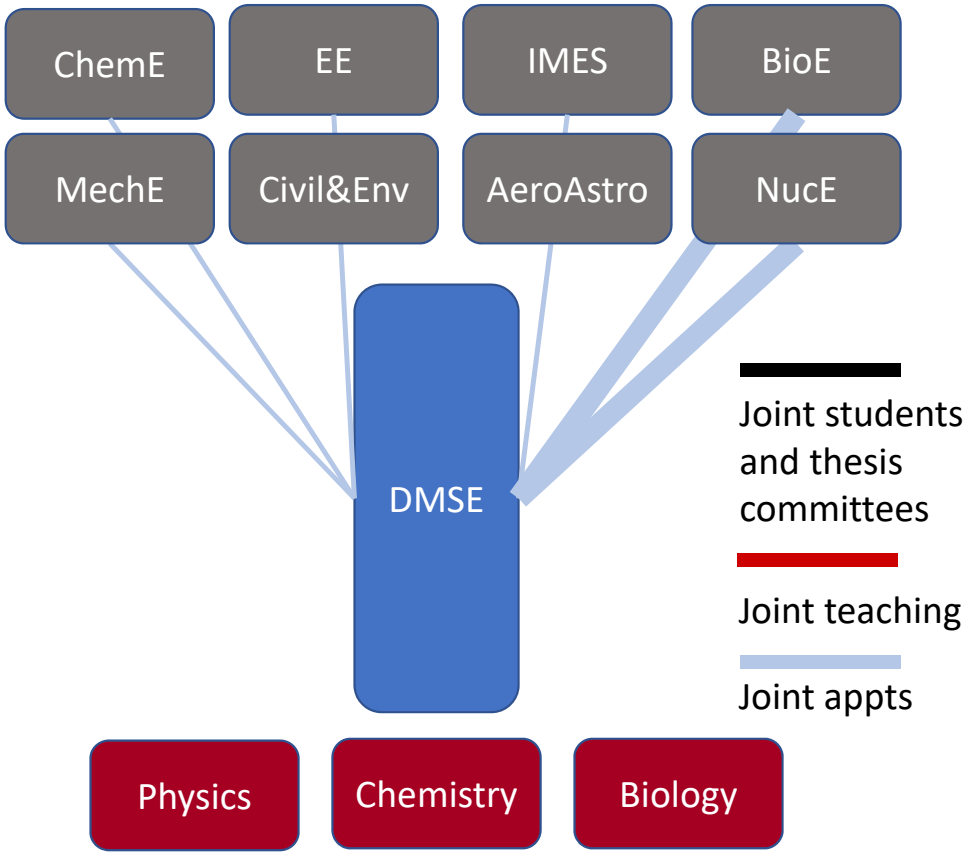
Faculty appointment principles:

Is this good for MSE students?

Favor faculty with clear “core” fit with DMSE
- “comfort” test
- 3.091 test

Require teaching of listed DMSE courses

Require participation in a DMSE academic committee



Currently 32.5 FTE (33 people), 9 joint appointments

DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

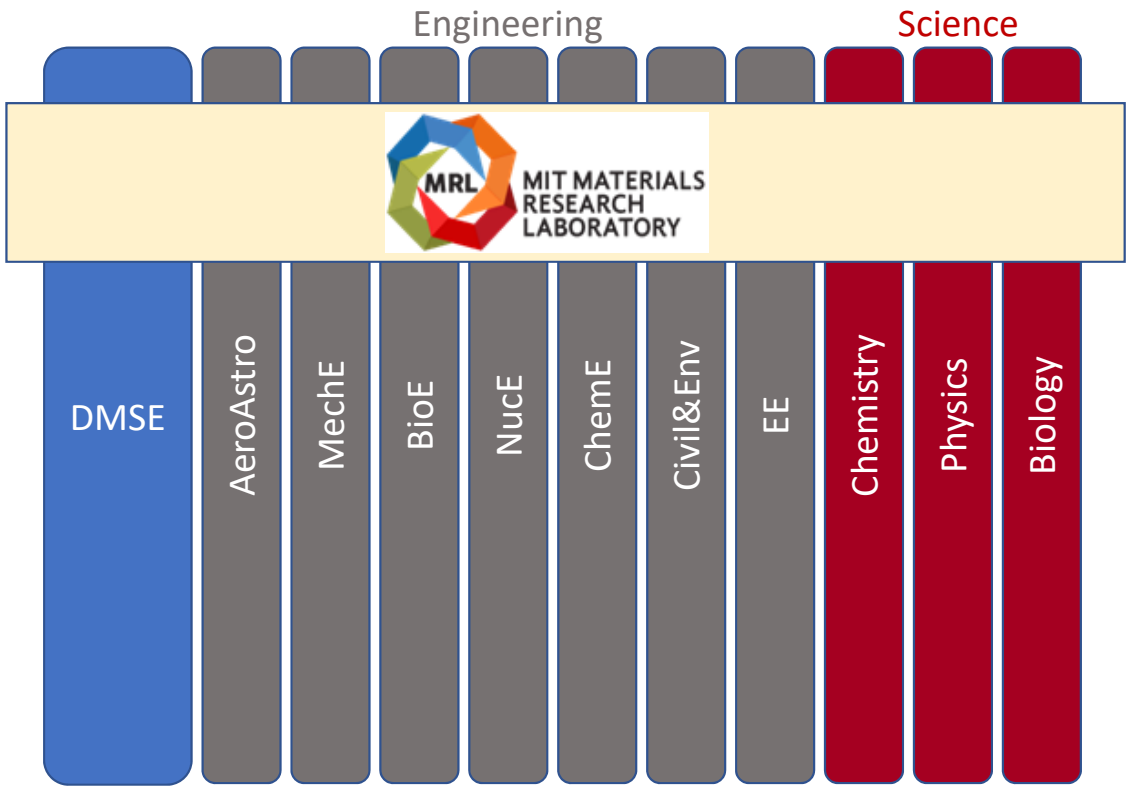
Materials Science and Engineering

What about research?

At MIT, Departments are ‘vertical’ structures centered on curriculum

“Labs and Centers” are ‘horizontal’ structures that faculty affiliate with

They provide a cost center, manage some space, manage equipment and shared facilities, and are a connector within the Institute and to industry beyond



DMSE	Allanore, Antoine Anikeeva, Polina Beach, Geoffrey Carter, Craig W Chiang, Yet-Ming Clark, Joel Fink, Yoel Fitzgerald, Eugene A Hu, Juejun Gradecak, Silvija Holten-Anderson, Niels Kimerling, Lionel MacFarlane, Robert Olivetti, Elsa Ross, Caroline Rupp, Jennifer Sadoway, Donald Schuh, Chris Tasan, Cem Thompson, Carl Tuller, Harry L Van Vliet, Krystyn
BIO ENG	Ribbeck, Katharina Grodzinsky, Alan
NUCLEAR	Yildiz, Bilge
MECH ENG	Anthony, Brian Buonassisi, Tonio Chen, Gang Hart, A John Kolpak, Alexie Kim, Sang-Gook McKinely, Gareth Shao-Horn, Yang Wang, Evelyn
EECS	Antoniadis, Dimitri Boning, Duane Englund, Dirk Han, Ruonan Kong, Jing Leeb, Steven Liu, Luqiao Palaciaos, Tomas Perreault, David White, Jacob
CHEM ENG	Brushett, Fikile Doyle, Patrick Olsen, Bradley Yuriy, Roman
MRL	Agarwal, Anu Kirchain, Randolph Michel, Jurgen Norris, Gregory
PHYSICS	Ashoori, Raymond Checkelsky, Joe Cisse, Ibrahim Comin, Riccardo England, Jeremy Fu, Liang Gedik, Nuh Gore, Jeff Jarillo-Herrero, Pablo Joannopoulos, John Kardar, Mehran Lee, Patrick A Levitov, Leonid Moodera, Jagadeesh Soljacic, Marin Tgamark, Max Todadri, Senthil Wen, Xiao-Gang
CHEMISTRY	Cummins, Christopher C. Johnson, Jeremiah Nelson, Keith Surendranath, Yogesh
MATHEMATICS	Johnson, Steven
ARCHITECTURE	Tibbets, Skylar

MRL MIT MATERIALS RESEARCH LABORATORY

…and others!

Faculty from the Schools Engineering, Science and Architecture

DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

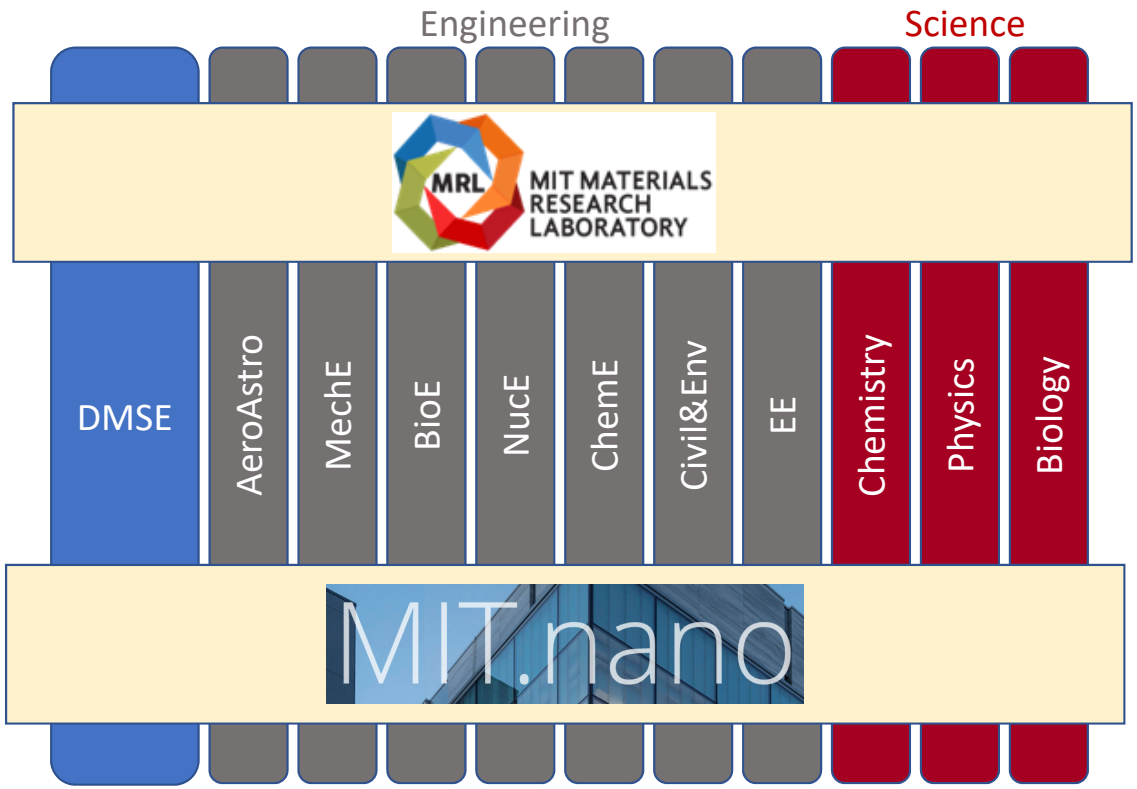
Materials Science and Engineering

What about research?

At MIT, Departments are ‘vertical’ structures centered on curriculum

“Labs and Centers” are ‘horizontal’ structures that faculty affiliate with

They provide a cost center, manage some space, manage equipment and shared facilities, and are a connector within the Institute and to industry beyond



MIT.nano

A new 200,000-square-foot center for nanoscience and nanotechnology open to the entire community of faculty, researchers, and students and outside corporate users.

Maker spaces
Outfitted with tools to translate the ideas developed in MIT.nano into prototypes and handheld demos.

Upper & lower clean rooms
Two pristine, particle-free environments—each two stories tall and optimized for energy, airflow, and future flexibility—for the design and fabrication of micro- and nanoscale structures.

Nanoscale imaging
MIT's "quietest" space for nanoscale viewing, optimized for imaging with low vibration and low electromagnetic interference.

DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

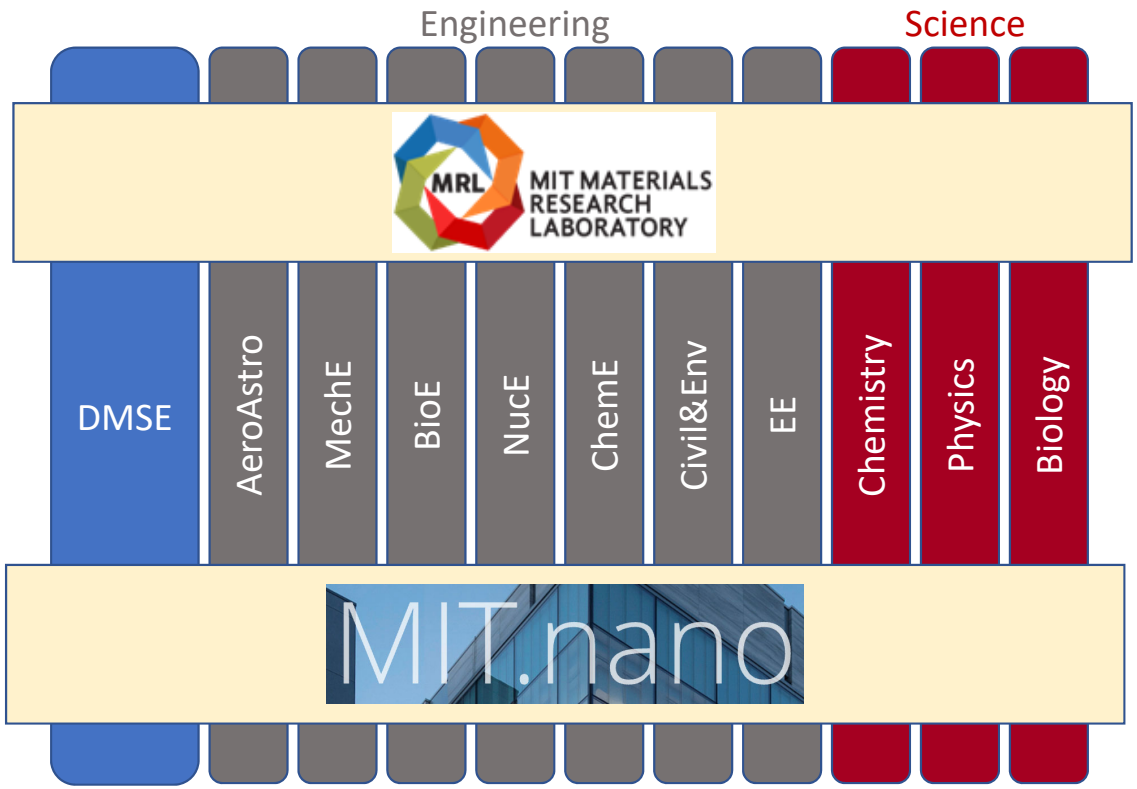
Materials Science and Engineering

What about research?

At MIT, Departments are ‘vertical’ structures centered on curriculum

“Labs and Centers” are ‘horizontal’ structures that faculty affiliate with

They provide a cost center, manage some space, manage equipment and shared facilities, and are a connector within the Institute and to industry beyond



DMSE DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING

Materials Science and Engineering

How does an interdisciplinary unit define and differentiate itself?

Focus on:

- philosophy
- curriculum
- student experience

Leverage:

- joint teaching
- joint appointments
- centers and labs