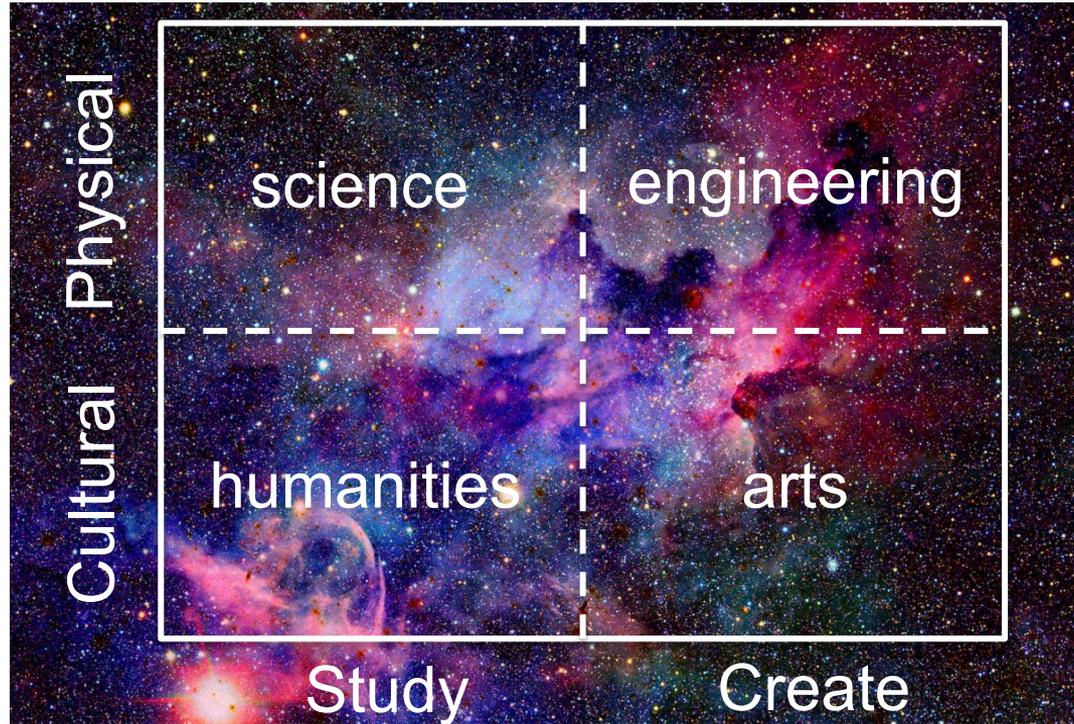


Aerospace & Mechanical Engineering

Junior Parents Weekend (*pandemic version*)
March 2021

Prof. David B. Go
Rooney Family Collegiate Professor & Department Chair
(*& alum '01, Morrissey Manor*)

What is Engineering all About?



Engineering is about **creating** our physical world

What is Engineering all About?



mechanical
engineering



aerospace
engineering



1776 1842

1886

1903

1933 1944

1969

1982

2007

?



The professional engineer

Early engineering programs focused on providing their graduates with considerable hands-on training.

The scientific engineer

Programs started to emphasize the fundamental science and greater adoption of applied math/calculation.



Tryggvason and Apelian, Journal of Metals, V.58, No.10, pp. 14-17 (2006)

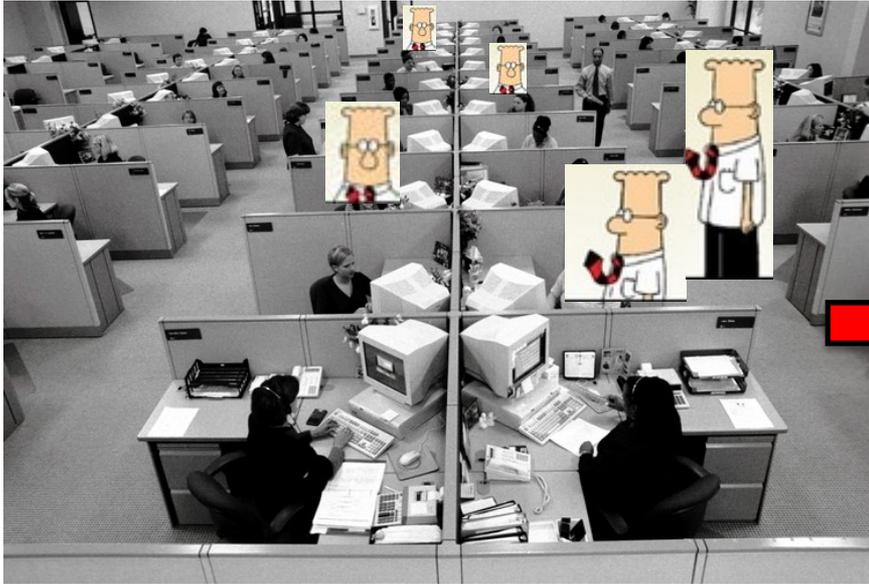
The 21st Century “Entrepreneurial” Engineer

- **Knows Everything** — Can find information quickly and knows how to evaluate and use that information; lifelong learners not tied to the degree they earned.
- **Can Do Anything** — Understands the fundamentals to the degree that they can quickly understand what needs to be done and acquire the tools/skills needed to do it.
- **Collaborates** — Has the communication skills, interpersonal skills, and understanding of global and current issues to work with anybody, anywhere.
- **Innovates** — Has the entrepreneurial spirit and the managerial skills to identify needs, devise new solutions, and see them through.



The Entrepreneurial Engineer

Commodity Engineers



Entrepreneurial Engineers

BostonDynamics

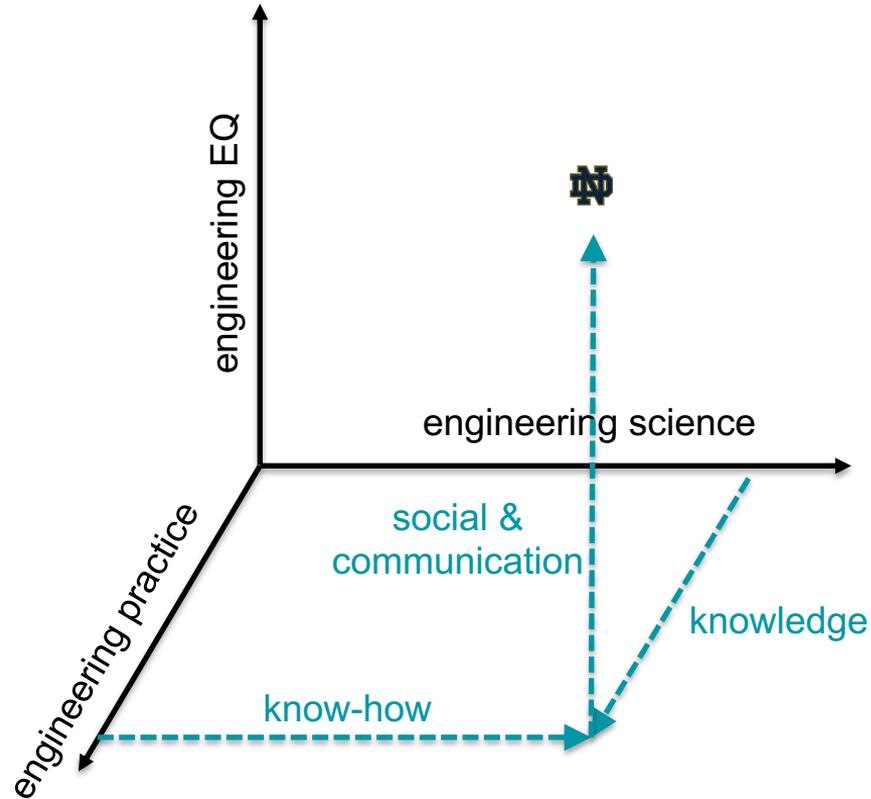


TESLA



SPACEX

The Engineering Coordinate System



First Year	Calculus I General Chemistry Engineering Systems I	Calculus II Biochemistry Physics I Engineering Systems II
Sophomore	Calculus III Physics II Mechanics I (Statics) Engineering Computing Lab I or Design Tools I Material Science or Intro to Aeronautics	Linear Algebra and Differential Equations Mechanics II (Dynamics) Solid Mechanics Thermodynamics Lab I or Design Tools I
Junior	Fluid Mechanics Differential Equations, Vibs & Control I Lab II and/or Design Tools II Mechanisms & Machines DOME or Aerospace Structures	Heat Transfer Differential Equations, Vibration & Control II Lab II or Design Tools II Theory & Exp. Aerodynamics or Intro to EE
Senior	Gas Turbines and Propulsion Aerospace Dynamics Flight Mechanics and Intro to Design Design Methodology	Orbital and Space Dynamics Aerospace Design Senior Design

AME Student Fabrication Lab

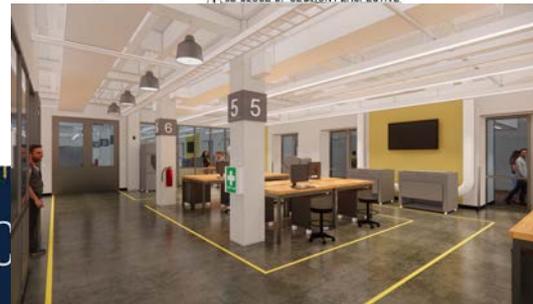


Engineering Innovation Hub



handtools and
fabrication space

ideation and
project space



Grand Challenges for Engineers



Make solar energy economical



Provide energy from fusion



Develop carbon sequestration methods



Manage the nitrogen cycle



Provide access to clean water



Restore and improve urban infrastructure



Advance health informatics



Engineer better medicines



Reverse-engineer the brain



Prevent nuclear terror



Secure cyberspace



Enhance virtual reality



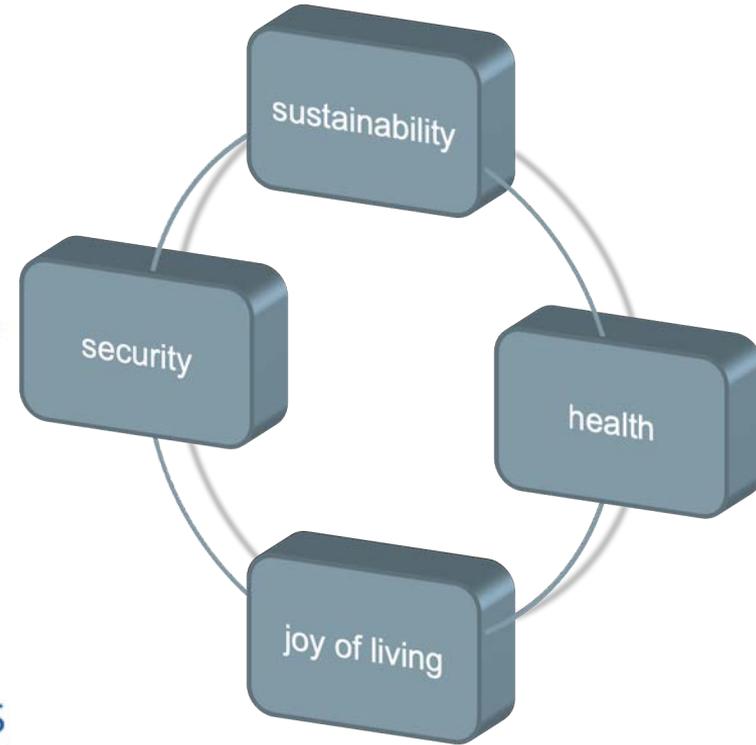
Advance personalized learning



Engineer the tools of scientific discovery



GRAND CHALLENGES
FOR ENGINEERING

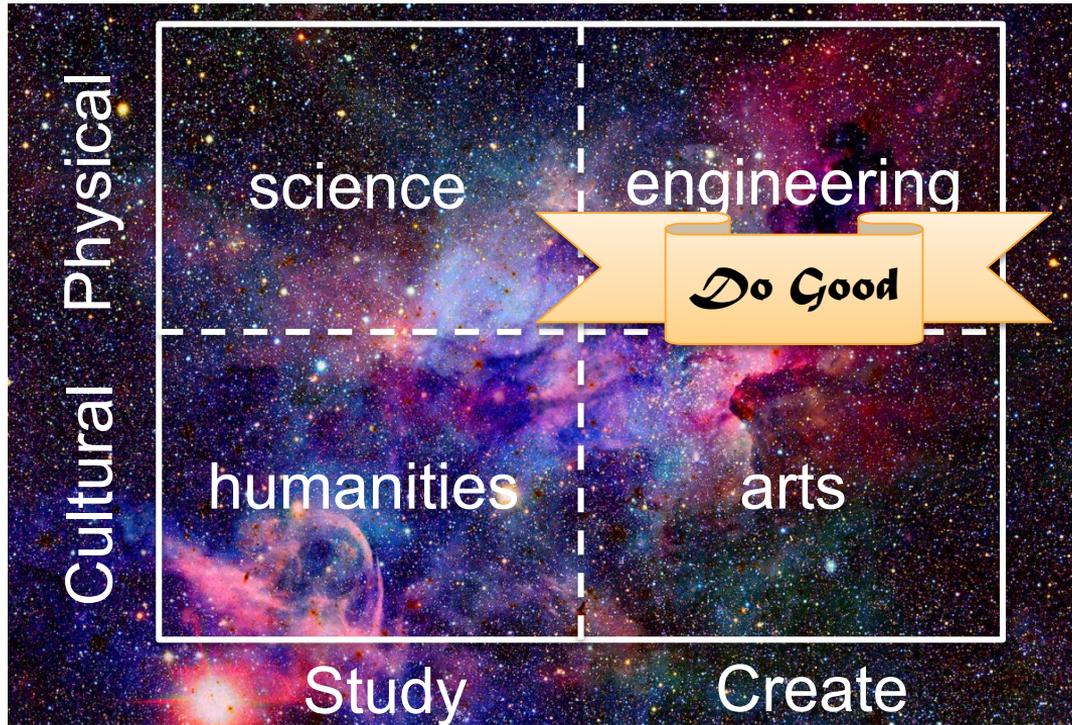




*“While on this subject, you will permit me, dear Father, to express a feeling which leaves me no rest. It is simply this: Notre Dame du Lac has been given to us by the Bishop only on condition that we build here a college. As there is no other within five hundred miles, this undertaking cannot fail of success, provided it receive assistance from our good friends in France. Soon it will be greatly developed, being evidently the most favorably located in the United States. **This college will be one of the most powerful means of doing good in this country,** and, at the same time, will offer every year a most useful resource to the Brothers’ Novitiate; and once the Sisters come – whose presence is so much desired here they must be prepared, not merely for domestic work, but also for teaching; and perhaps, too, the establishment of an academy. ... Finally, dear Father, you may well believe that this branch of your family is destined to grow and extend itself under the protection of Our Lady of the Lake and St. Joseph. At least such is my firm conviction; time will tell whether I am deceived or not.”*

Fr. Sorin to Blessed Basile Moreau, December 5, 1842

What is Engineering all About?



Engineering is about **creating** our physical world

Some AME Contacts

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