

ENGINEERING

(WITH A MECHANICAL BIAS)

CARROLL – 24 NOV 2020



A FEW OF THE ENGINEERING FLAVORS...

- Aerospace/Aeronautical
- Agricultural
- Biomedical
- Chemical
- Civil
- Computer/Software
- Electrical
- Environmental
- Industrial
- Materials
- Mechanical
- Mining
- Nuclear
- Petroleum



MY REALLY DUMBED DOWN (BIASED) SUMMARY...

(Don't decide your major based on my dumbed down summary → at least gain wise counsel from Google)

- Aerospace/Aeronautical – objects in air/space
- Agricultural – things related to food production
- Biomedical – engineering and anatomy combined
- Chemical – shampoo...creating new mixtures
- Civil* – buildings/structures that (mostly) don't move
- Computer/Software – electrical combined with coding
- Electrical – inconveniencing electrons
- Environmental – cleaning up our messes
- Industrial – things relating to manufacturing
- Materials – exploiting/understanding materials
- Mechanical – anything that moves/flows/interacts
- Mining – explosives/geotechnical
- Nuclear – atomic level physics (power/bombs)
- Petroleum – related to oil (a big field)

*My wife didn't approve of my Civil summary...it also includes water/hydrology/construction and is great for mission's work!



DEFINITION OF MECHANICAL ENGINEERING

Taken from Wikipedia...so you know it's true...

Highlighting Key

Yellow: disciplines

Green: tools

Gray: products

Blue: ...broadness...

- **Mechanical engineering** is an engineering branch that combines engineering **physics** and **mathematics** principles with **materials science** to design, analyze, manufacture, and maintain mechanical systems.[1] It is one of the oldest and **broadest** of the engineering branches.
- The mechanical engineering field requires an understanding of core areas including **mechanics**, **dynamics**, **thermodynamics**, **materials science**, **structural analysis**, and **electricity**. In addition to these core principles, mechanical engineers use tools such as **computer-aided design (CAD)**, **computer-aided manufacturing (CAM)**, and **product lifecycle management** to design and analyze **manufacturing plants**, **industrial equipment and machinery**, **heating and cooling systems**, **transport systems**, **aircraft**, **watercraft**, **robotics**, **medical devices**, **weapons**, and **others**. It is the branch of engineering that involves the design, production, and operation of machinery.^{[2][3]}
- Mechanical engineering emerged as a field during the Industrial Revolution in Europe in the 18th century...

MY DEFINITION OF A MECHANICAL ENGINEER

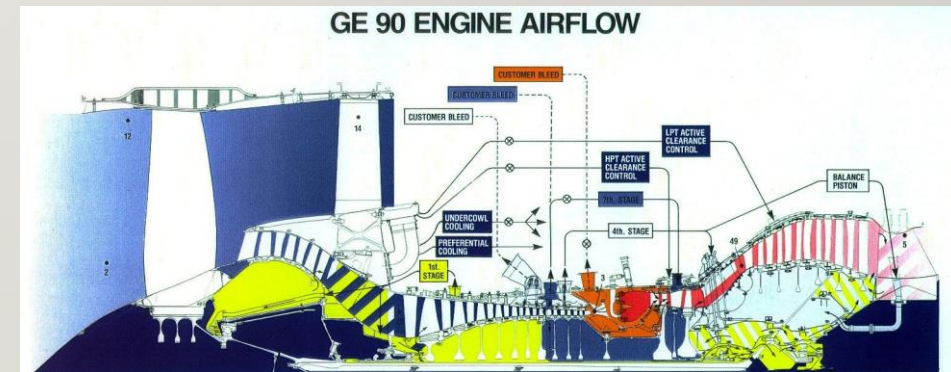
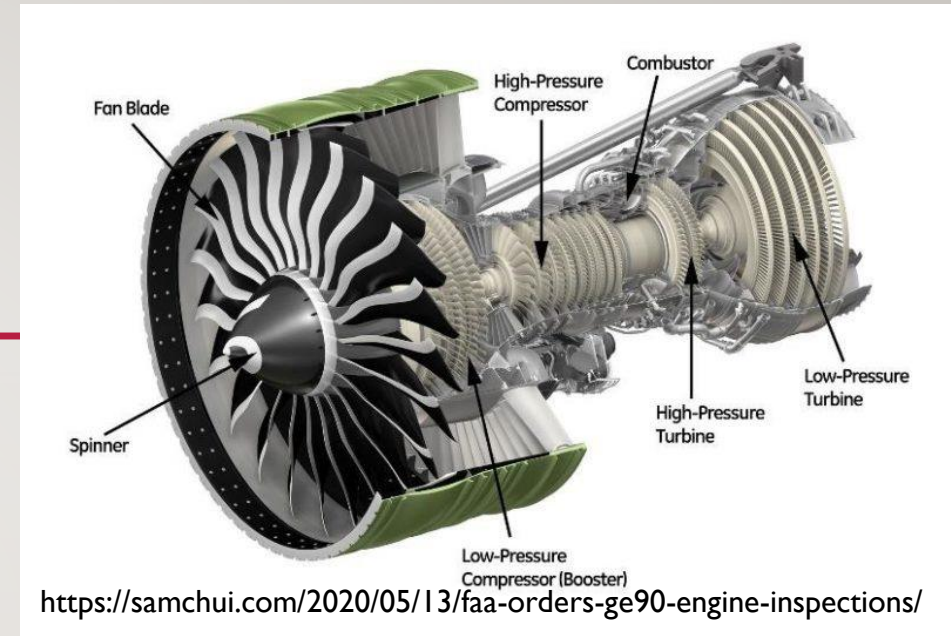
From my brain...not nearly as legit as Wikipedia...

- The poor fellow who has to touch every other engineering design discipline and become an expert in it
- But seriously...
 - It's extremely broad and gives you tons of job options
 - There are lots of focus areas you can go down within this discipline
 - A lot is expected of you since you are roughly familiar with multiple engineering disciplines
 - It's amazing how many overlapping disciplines can be touched by one problem...



EXAMPLE: TURBOFAN ENGINE

- As a Systems Engineer at GE I had to understand a little of everything about the GE90/GP7200
 - Assembly stackups; bearing function; material selection and quality; electrical connections; computer logic; adhesive function; aerodynamics; heat transfer; structural analysis; testing/qualification
- As a project manager for the Passport 20 I had to bring together a multi-discipline team and weigh their competing interests for the project
 - Teams: aero, heat transfer, manufacturing, testing
- Think of the interactions!
 - Computer initiates engine starter; air flow deflects fan blades; air is compressed by spinning machinery (and gets hot!); atomized fuel is ignited and mixed with compressed air; laser drilled holes keep blades functional for hours of flight time; cowl has to contain an “explosive” fan blade coming loose...



FINAL THOUGHTS ON THIS SUBJECT...

- Other disciplines I've had to be able to intelligibly talk about (at least roughly intelligibly):
 - Computer science; aerospace engineering; material science; chemistry/chemical engineering; electrical engineering; civil engineering (I mean I've got to act like I can understand my wife...); physics
- Various roles other classmates have had:
 - Sales; quality control/manufacturing floor technician; project managers
- If you like physics/mathematics and don't have a lifelong dream of designing shampoo (chemical engineer) or other products, Mechanical Engineering is a great, broad field which gives you lots of options (I was hired as an aerospace engineer...)
 - But beware, you have to learn a lot of different subjects in college to be a jack of all trades and master of none, and typically it's one of the more desired engineering programs (it's hard to get into)



NOW TO SUMMARIZE MY LIFE SINCE CARROLL... (10 YEARS)



COLLEGE (YEARS 1 - 3)

- Went to the University of Cincinnati
- Roomed with good friend from high school my 1st year, and with a friend from class my 2nd/3rd years
- Worked like crazy and got near perfect grades
- Got the co-op(s) I wanted with GE Aviation
- Was relatively isolated and miserable...



The day I got dropped off at UC... wearing my Sophomore year Carroll basketball shoes which I just recently got rid of



Luxury apartment (a little bigger than my dorm)



Wow this picture is perfect for that last bullet...such brooding contemplation...

SOMETHING CHANGED...

- I had everything I worked for, but wondered about purpose and meaning
- I started hanging around people who knew Jesus and were filled with joy
- These verses started meaning something to me:
 - “For it is by believing in your heart that you are made right with God, and it is by openly declaring your faith that you are saved.” Romans 10:10 (underlining mine)
 - “No, O people, the LORD has told you what is good, and this is what he requires of you: to do what is right, to love mercy, and to walk humbly with your God.” Micah 6:8 (underlining mine)
 - “The thief comes only to steal and kill and destroy. I came that they may have life and have it abundantly.” John 10:10 (underlining mine)

COLLEGE (YEARS 4 - 5)

- Moved into a crazy house with 4 guys who are now great friends
- Led a small group with my church and made some incredible friendships
- Had awesome experiences on mission trips
- Continued getting good grades (but had better priorities)
- Met an amazing woman (who is now my wife)



Got baptized



Siddall dorm small group



Birthday dinners!



Panama City Beach Mission Trip

AFTER COLLEGE

- Started work at WPAFB
- Got married (5 year anniversary this past August)
- Bought a house
- Coached Basketball, went to Nicaragua, taught Sunday School, part of a young married persons small group
- Adopted 2 kittens
- Looking forward to a baby girl in January!



Usher selfie

Nicaragua



Max and Little Buddy



Baby girl is coming!

MY CURRENT JOB



QUESTIONS???

