

The Georgia Tech logo is positioned on the left side of the slide, overlaid on a semi-transparent image of a mechanical component. It consists of the words "Georgia" and "Tech" stacked vertically in a white, sans-serif font. To the right of the text is a white outline of the Georgia Institute of Technology's tower.

**Georgia
Tech**

CREATING THE NEXT

ME & Interdisciplinary (MSE, BME, ECE) Capstone Design

Common Studio Session #4

Date 01/31/2022

REMINDERS/ANNOUNCEMENTS

- ALL Links and Slides are posted here:
<http://mecapstone.gatech.edu/students>
- All of you should be in a Studio section AND Lab section (specific to your team's primary advisor)
- Common MS Teams Support Network:
<https://mecapstone.gatech.edu/support>

Key Takeaways

1. Generate more ideas
 2. “Rules” of ideation
 3. Idea Generation CHECKLIST
- Relevance to Design Report
 - Function Tree
 - Morphological Matrix
 - Concept generation
 - Concept Selection and Justification

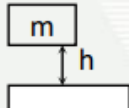
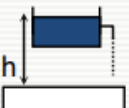
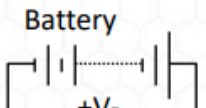
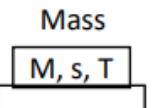
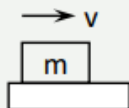
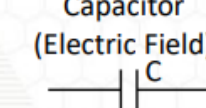
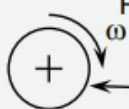

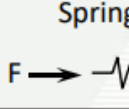
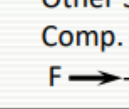
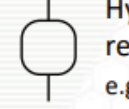
How to Ideate?



- First Principles approach
- Apply ideas from one domain to another

Generate more ideas *with functional decomposition and morphological matrices*

- Identify individual functions and sub-functions
- Functions are a Verb+Noun combination (example: loosen/tighten screws, measure force)
- Stay solution agnostic
- Consider WHY and WHAT, not HOW

Type of Energy	Mechanical	Hydraulic	Electrical	Thermal
Working Principle				
1	 Pot. Energy	 Liquid Res. Pot. E.	 Battery	 Mass M, s, T
2	 Moving Mass	Flowing Liquid	 Capacitor (Electric Field)	Heated Liquid
3	 Flywheel			Superheated Steam
4	 Wheel on incline Plane			
5	 Spring	 Other Springs Comp. Gas		
6		 Hydraulic reservoir e.g, Piston		

Different working principles to satisfy the function "store energy" by varying the type of energy.

Rules of Ideation



Stupidity/absurdity is part of the creative process

DO MORE

SPEAK UP

WRITE DOWN

Idea Generation Checklist

- SCAMPER- Substitute, Combine, Adapt, Magnify or minify, Put to other uses, Eliminate or elaborate, Rearrange or reverse
- CREATIVITY- Combine, Reverse, Enlarge, Adapt, Tinier, Instead of, Viewpoint change, In other words, To other uses, Yes!
- Analogies
 - Existing products or bio-inspired design

Relevance to Design Report

6. Design Concept Ideation

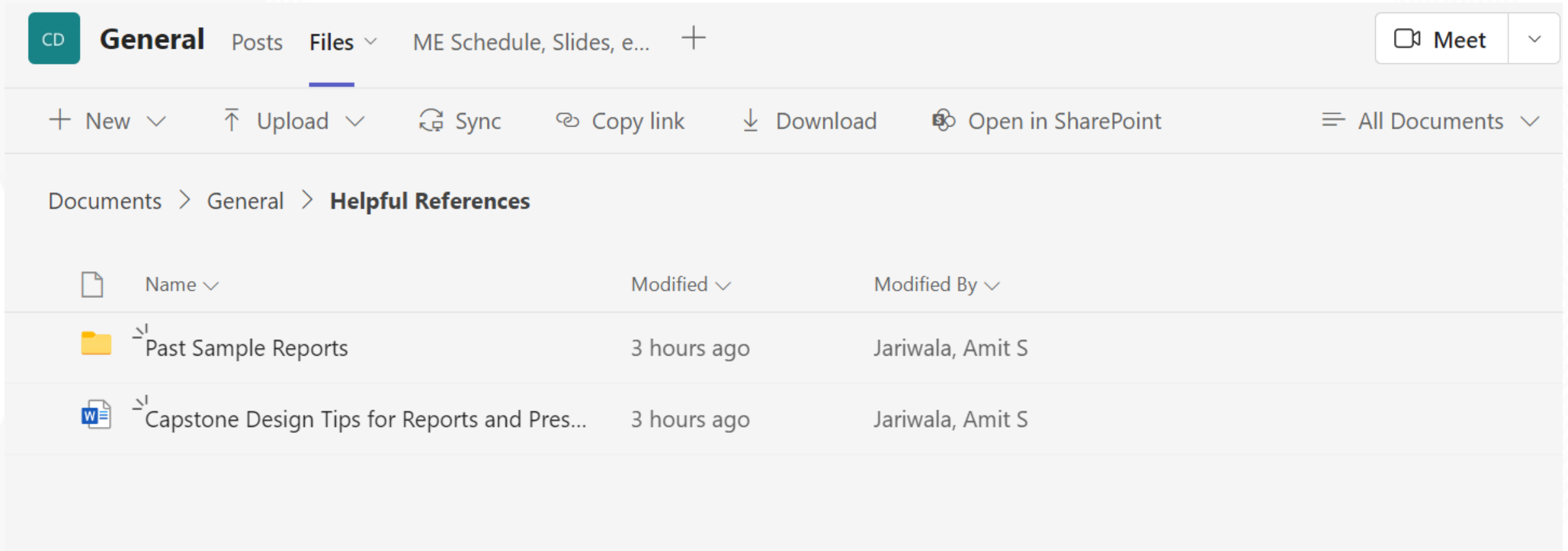
In this section, the concept ideas you generated are to be discussed. Feel free to use an appendix to include additional concepts and details.

- a. Discuss and list the functions that the design needs to fulfill
- b. Identify and describe different concepts for fulfilling each function. Use ideation techniques covered in lecture.
- c. Present and discuss a morphological (matrix) chart with these different concepts/possible solutions for each (sub)function
- d. Introduce and discuss the different integrated concepts you derived from the set of possible functional solutions

7. Preliminary Concept Selection and Justification

- a. Discuss the selection process used to identify the promising concept(s) to be designed further. Use a decision-matrix type approach, evaluation matrices, etc.
- b. Perform an initial evaluation of the (selected) concept(s)' feasibility with respect to the design specifications. If possible, perform quantitative analyses to confirm feasibility.
- c. Discuss potential risks and countermeasures that you foresee at this point

Helpful References on MS Teams



The screenshot displays the Microsoft Teams interface for a channel named 'General'. The 'Files' tab is selected, showing a list of documents. The breadcrumb path is 'Documents > General > Helpful References'. The file list includes a folder named 'Past Sample Reports' and a document titled 'Capstone Design Tips for Reports and Pres...'. Both were modified 3 hours ago by 'Jariwala, Amit S'. The interface also shows navigation options like 'New', 'Upload', 'Sync', 'Copy link', 'Download', and 'Open in SharePoint'.

CD **General** Posts **Files** ME Schedule, Slides, e... +

Meet

+ New Upload Sync Copy link Download Open in SharePoint All Documents

Documents > General > **Helpful References**

Name	Modified	Modified By
Past Sample Reports	3 hours ago	Jariwala, Amit S
Capstone Design Tips for Reports and Pres...	3 hours ago	Jariwala, Amit S

REFERENCES

- ALL Links and Slides are posted here: <http://mecapstone.gatech.edu/students>
- ME2110 Lecture Materials
 - Functions and Solutions, Design Concept Generation
 - [SLIDES](#) | [VIDEO](#)
 - Design Concept Evaluation
 - [SLIDES](#) | [VIDEO](#)
- The shape of ideation: <https://youtu.be/BErt2qRmoFQ>
- Visual tools for ideation: <https://youtu.be/ByjKT9IUkjA>

Industrial Design & Human Factors

- How do human factors impact your design problem?
- How will you explore human factors issues in your design process?
- What are the human interaction-points with your design problem? (from manufacture through to disposal)

- What Industrial Design considerations impact your design?
- How does visual hierarchy and language impact your design?
- How does branding factor into your design problem?



Prof. Wayne Li
Professor of the Practice of Design and
Engineering
School of Industrial Design

You may contact **Prof. Wayne Li** via email if you need more guidance on how you would apply this topic of Industrial Design to your project: wayne.li@design.gatech.edu