



ASME-CIE Hackathon 2021

Hackathon Problem 1: Digital Manufacturing –
Obfuscating the design with security features

Gary Mac

08.14.2021



Organizers & Mentors



Nikhil Gupta
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Hammond Pearce
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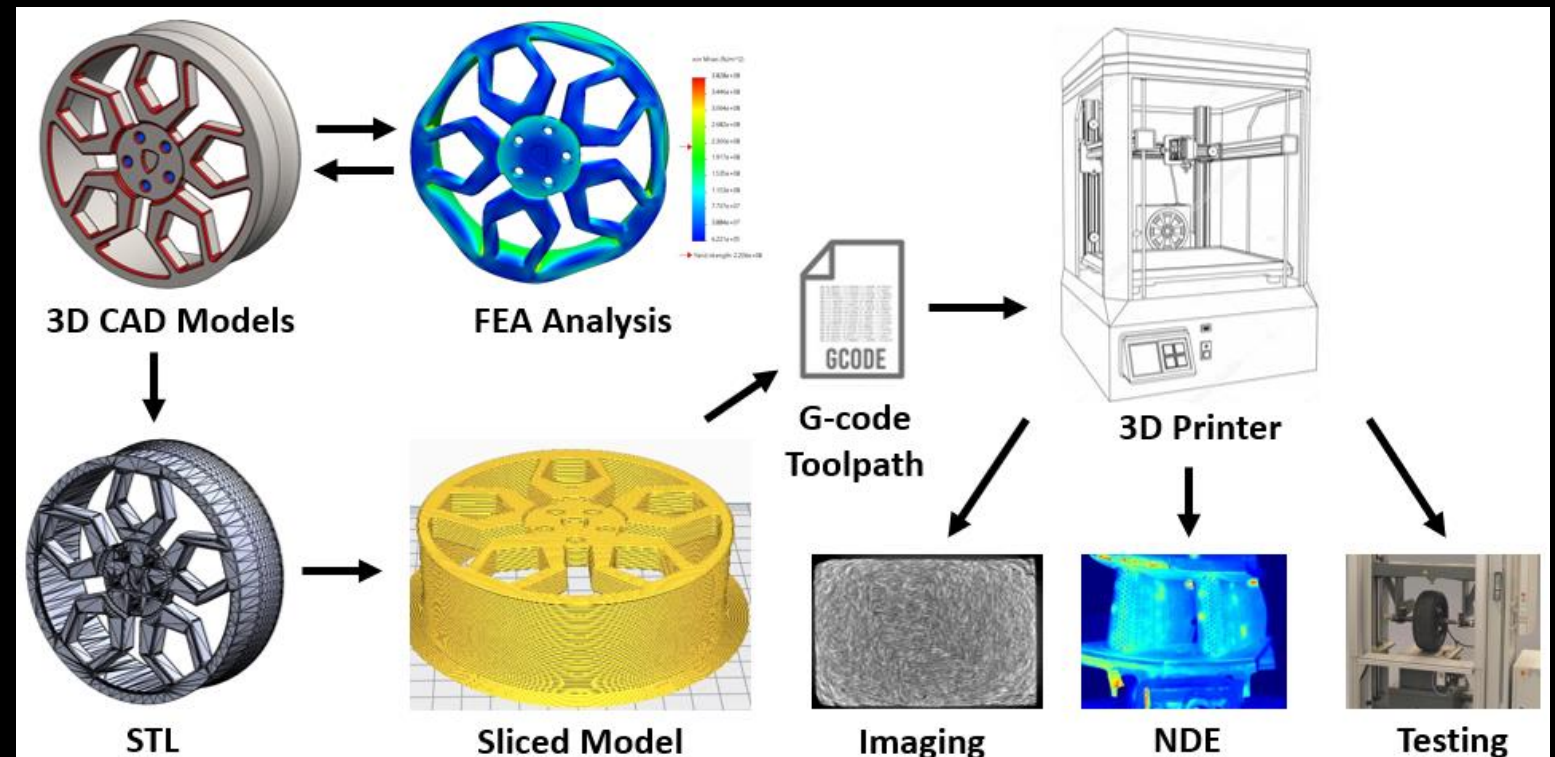


Zhenghui Sha
Assistant Professor
Mechanical Engineering
University of Texas at Austin

Additive Manufacturing (AM) Process

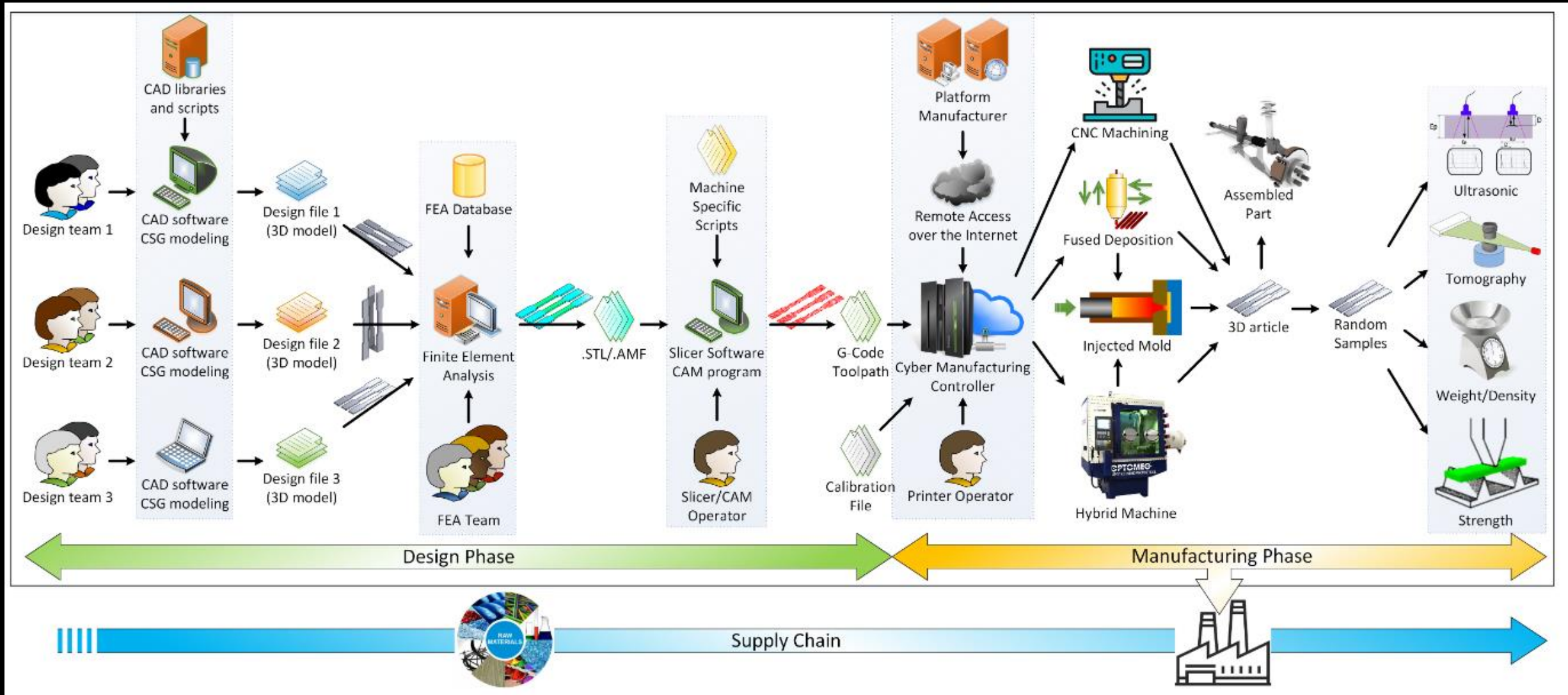
- Cyber-physical system that includes design files, computers, and 3D printers

Research Focus:
Digital manufacturing
Cybersecurity
Cyber-physical systems
Reverse engineering
File manipulation
CAD/STL/G-code
Software and hardware

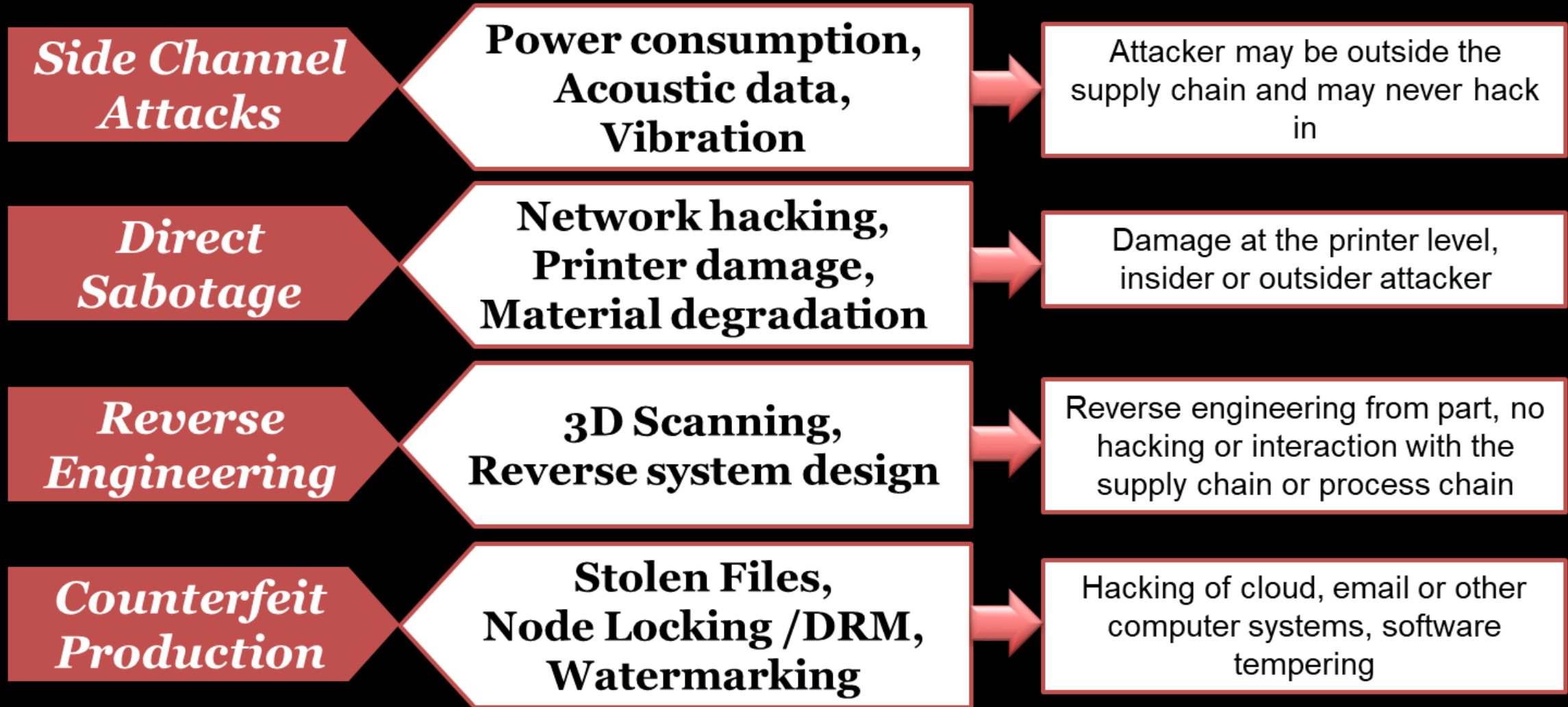




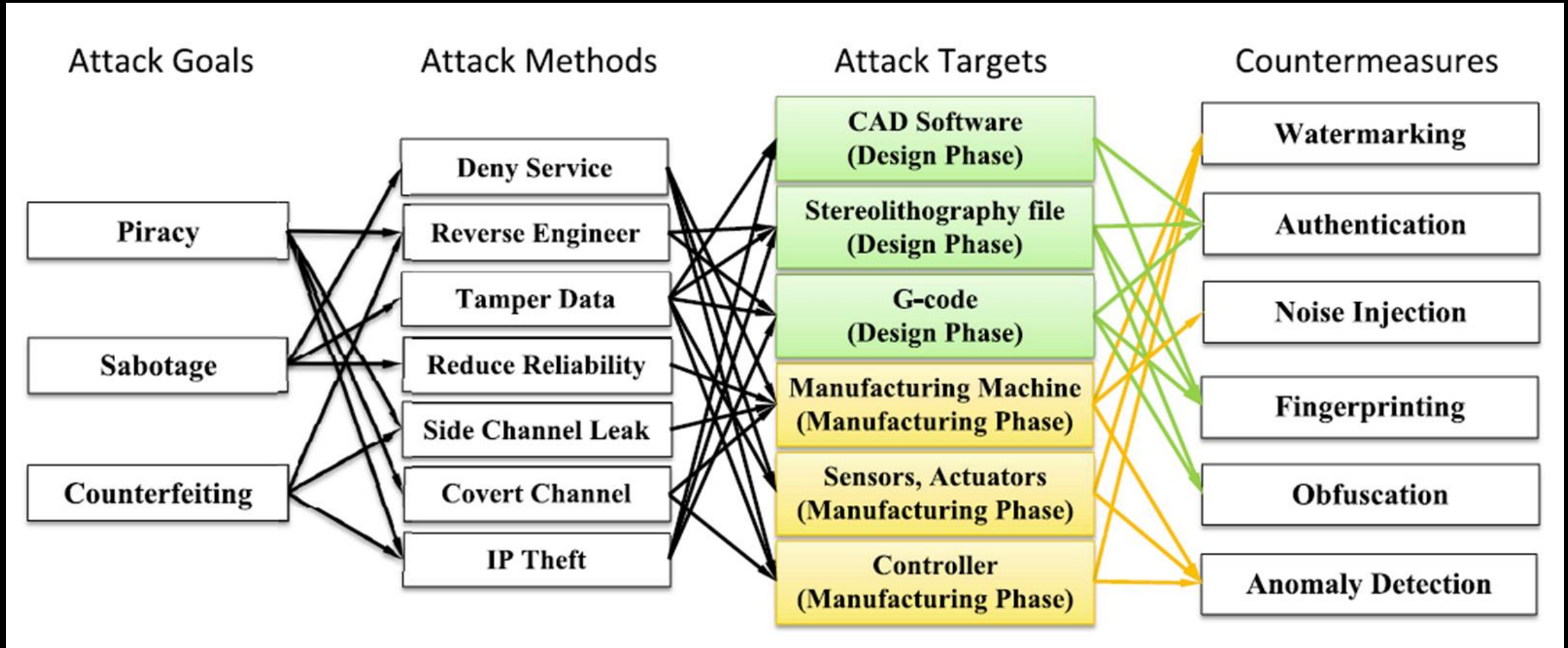
AM Process Chain



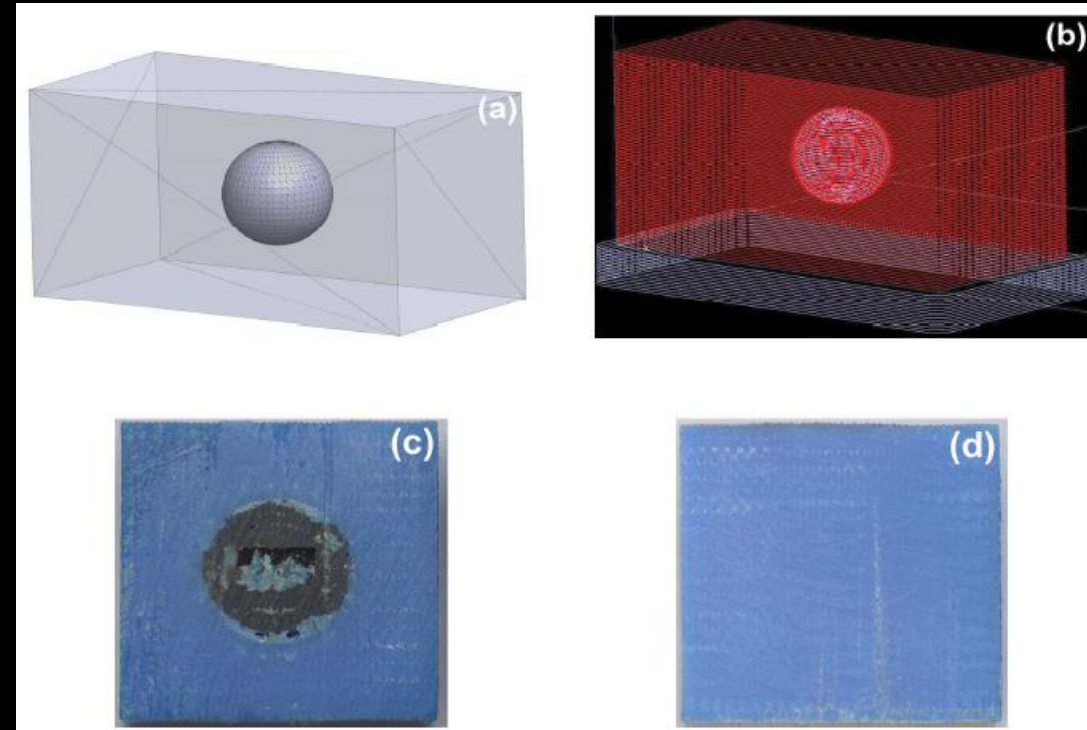
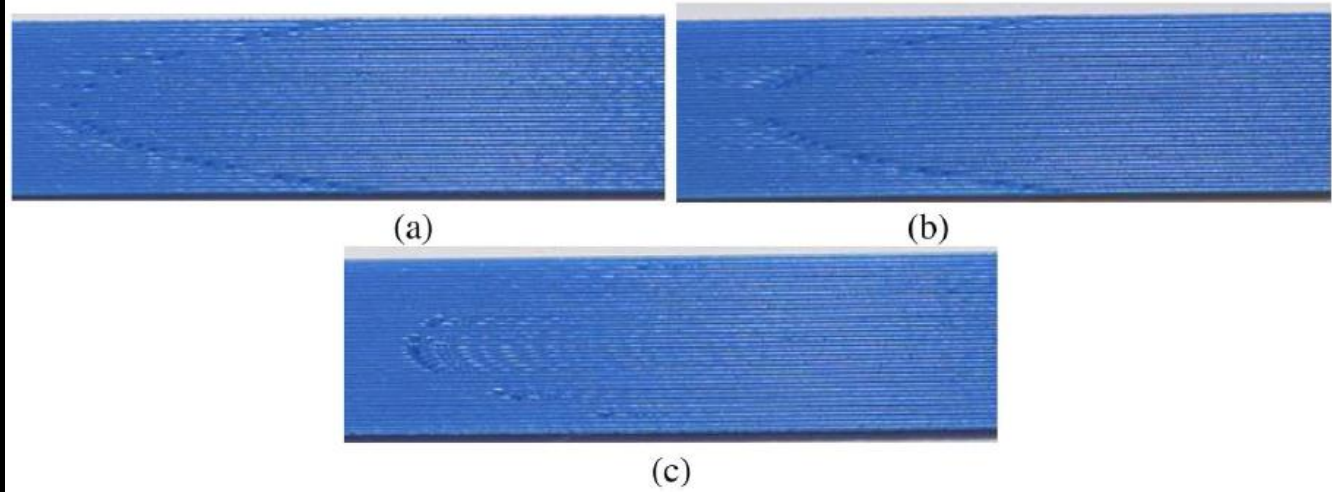
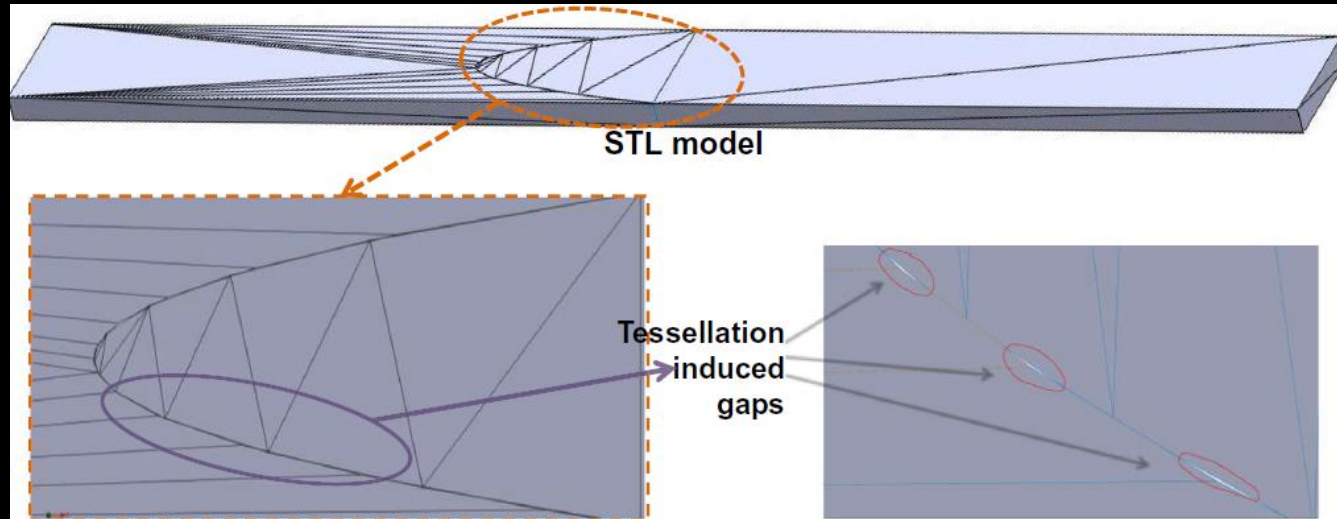
Threat Vectors



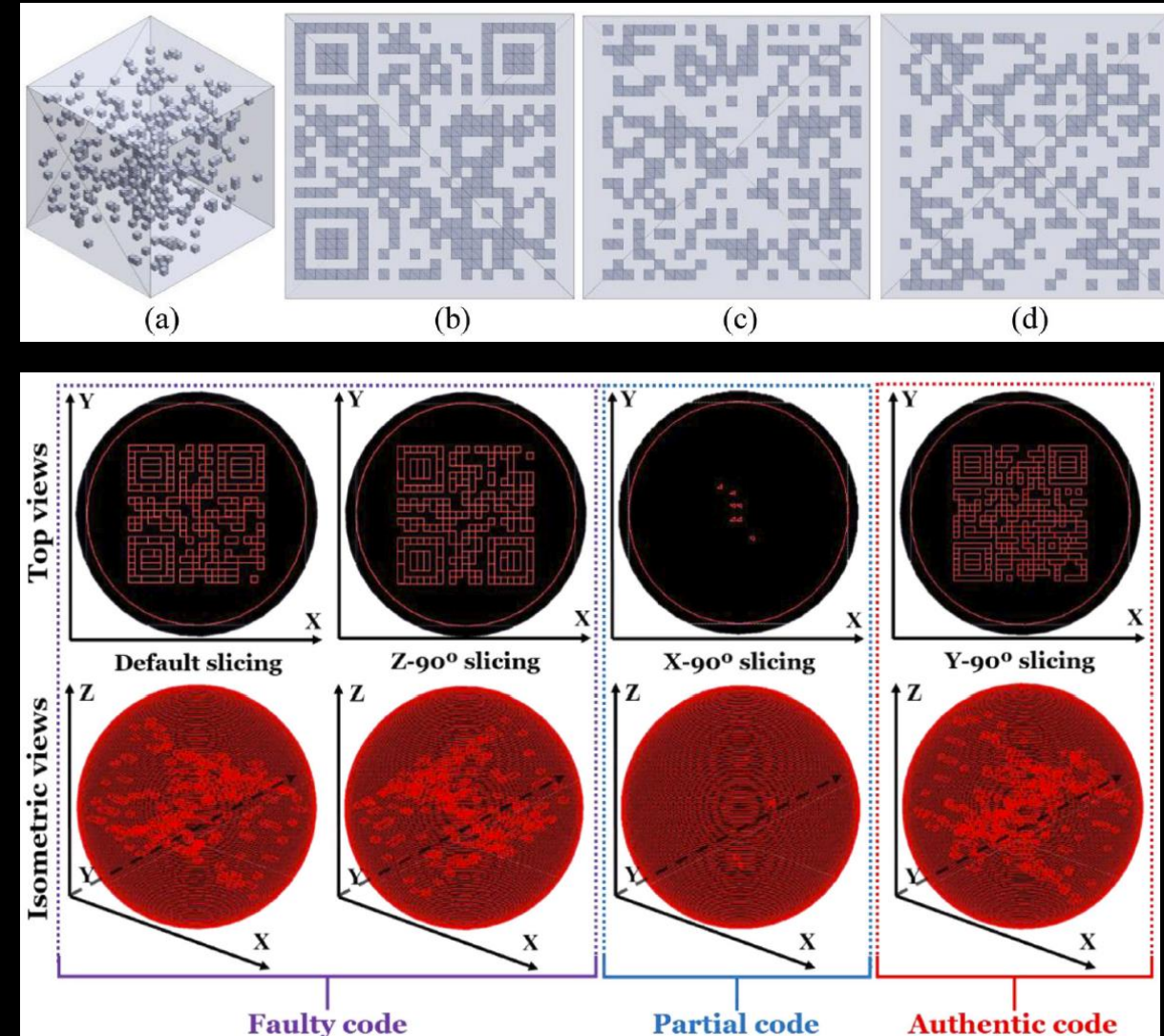
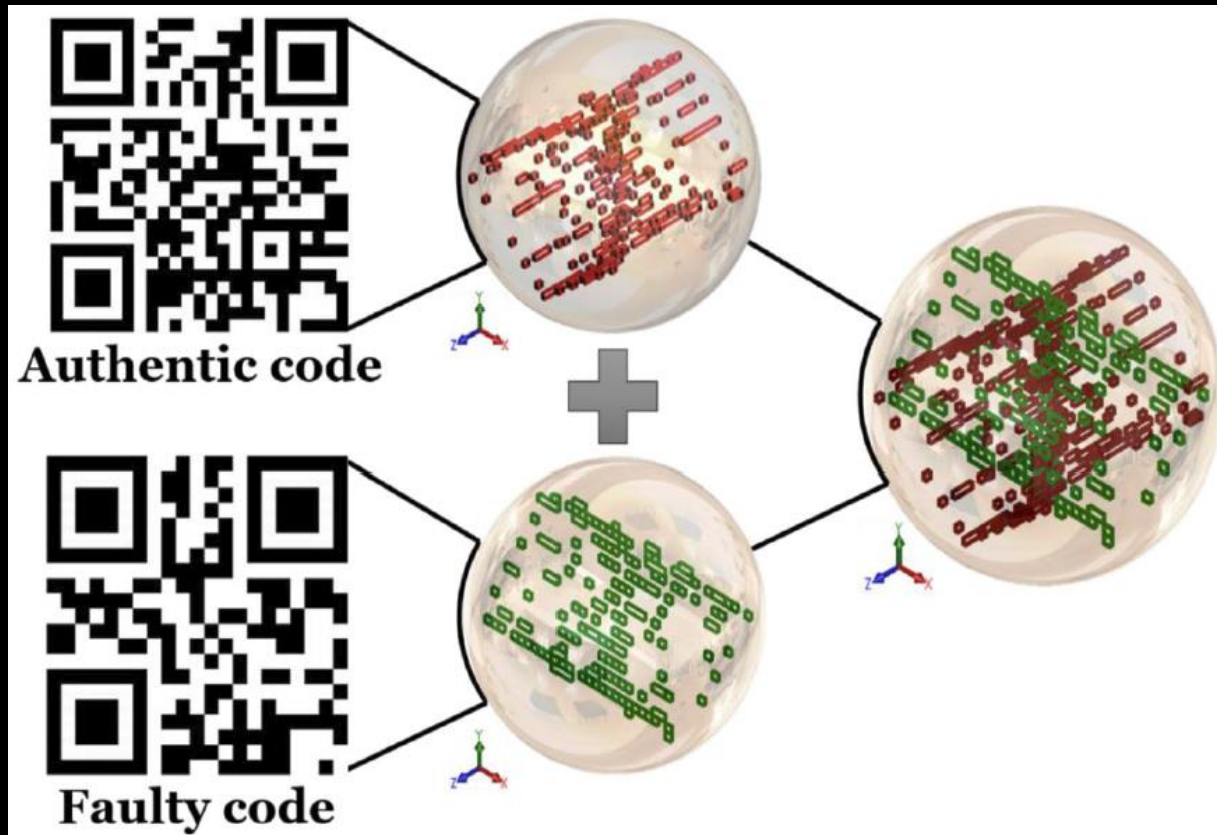
Attack Taxonomy



Research – Surface Markings & Embedded Code

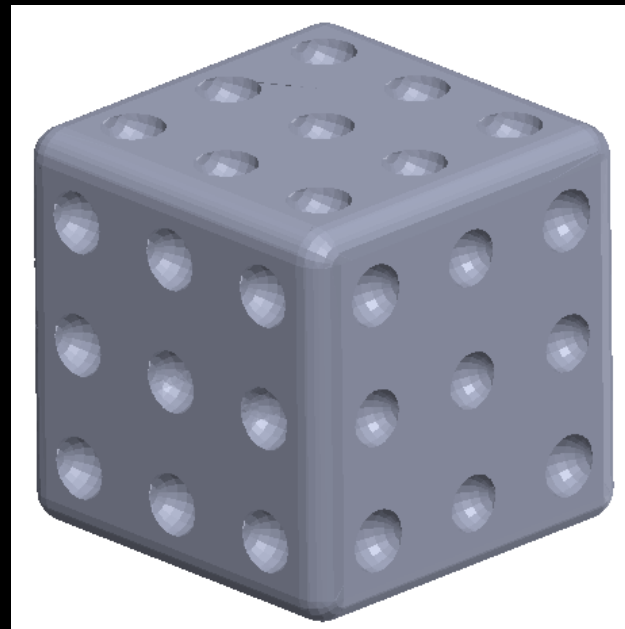
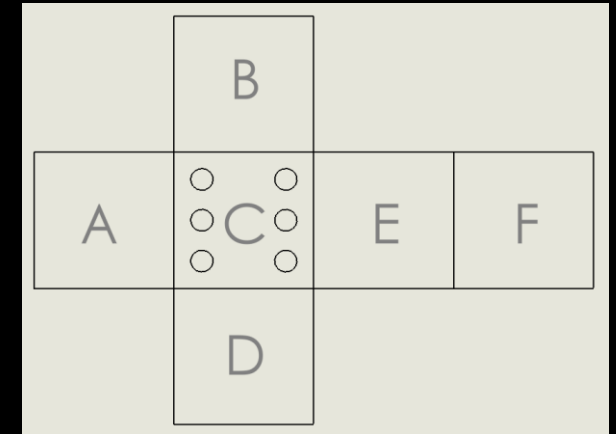


Embedded QR Codes



Hackathon Problem 1

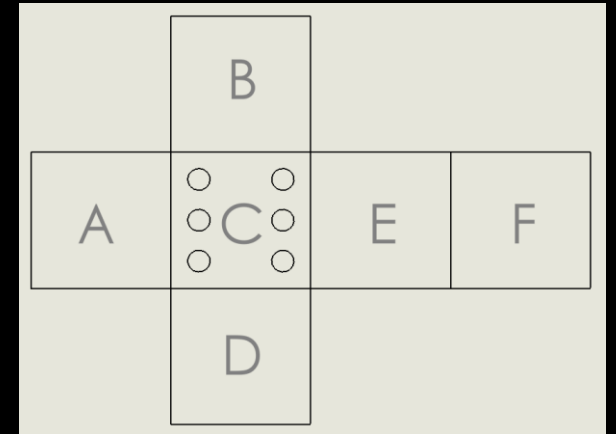
- Custom 6-sided dice (STL file format)
- Find evidence to make a convincing argument on what number each side represents



Die face letter	Die face value/number	Clue
A	?	
B	?	"Mountaintops inspire leaders, but valleys mature them"
C	6	"The best practice is to follow the advice posted on every railroad crossing. Stop to look at both sides."
D	?	
E	?	
F	?	

Hackathon Problem 1 - Submission

1. A detailed word document
 - i. Submission table for each die face value
 - ii. A description of the brainstorming process
 - iii. A summary of any other approach attempted
2. Complete the “Submission Template.csv”
3. Any supplementary file to support your report



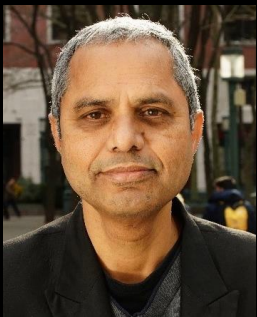
Die face letter	Die face value/number	Clue
A	?	
B	?	“Mountaintops inspire leaders, but valleys mature them”
C	6	“The best practice is to follow the advice posted on every railroad crossing. Stop to look at both sides.”
D	?	
E	?	
F	?	



Hackathon Problem 1 - Judges



Satish Bukkapatnam
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Industrial & Systems Engineering
Texas A&M University



Ramesh Karri
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Mark Yampolskiy
Associate Professor
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An Overview to Digital Manufacturing

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