

# Group #I1.03 - Modeling & Simulation of Academic Makerspace with AnyLogic

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## IHM Makerspace

- Built in 2018
- Mostly used for class projects
- RPM room is comprised of 3D printers, computers, laser-cutters, and soldering stations

## Problem Statement

- Without a predictive model, the Ingram Hall Makerspace struggles to address student needs in an efficient or cost-effective manner

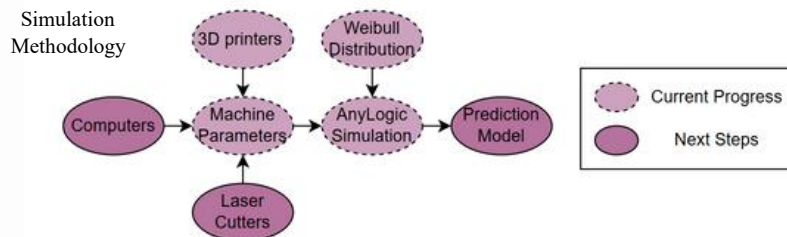
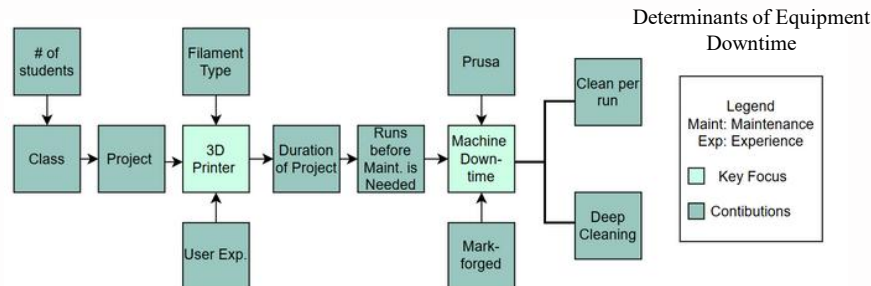
## Project Purpose

To construct an agent-based AnyLogic simulation that accurately predicts machine constraints with a level of reproducibility to remain relevant in Makerspace design regardless of machinery or service population.

## Project Objectives

- Predict Machine Failures
- Simulate Operational Times
- Model Maintenance Costs
- Optimize Floor Layout for Material and Human Flow
- Reduce Queuing Times

## Current Accomplishments



## Constraints

- Low access to, and unreliable data
- Low amount of literature
- AnyLogic's lack of flexibility for collaboration

## Future Plans

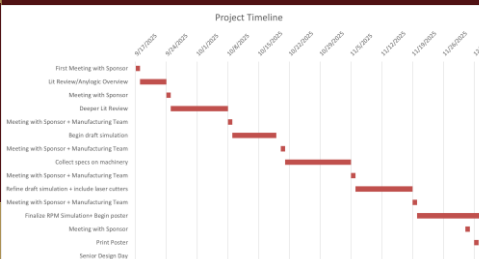
- Research and select best approach for modeling
- Complete formation of maintenance equations
- Formulate AnyLogic Model
- Ensure Model functionality

## Methodology

| Total                   | Productive                 | Maintenance                                         |
|-------------------------|----------------------------|-----------------------------------------------------|
| Total efficiency        | Productivity Maximized by: | Maintenance covers life cycle of production system: |
| Total life cycle        | Zero accidents             | Individual processes                                |
| Total manpower coverage | Zero defects               | Production management system                        |
|                         | Zero break down            |                                                     |

- We design for total machine life cycle
- We anticipate human interaction and workflow that affect machine lifespan
- We maximize productivity by predicting failure to reduce downtime
- We design for maintenance by providing a maintenance schedule based on machine failure

## Schedule



## Ethics & Human Factors

- Aim to create a model that is visually clear and modifiable
- Design for high-traffic areas to reduce bottlenecks
- Design to avoid data bias

## Team Members



Left to Right: Natalie Huth, George Bruen, Aleah White

## Acknowledgements

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