

# GNG 1103A – Deliverable D

## Options for Plant Processing Station

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October 20<sup>th</sup>, 2023

**Abstract**

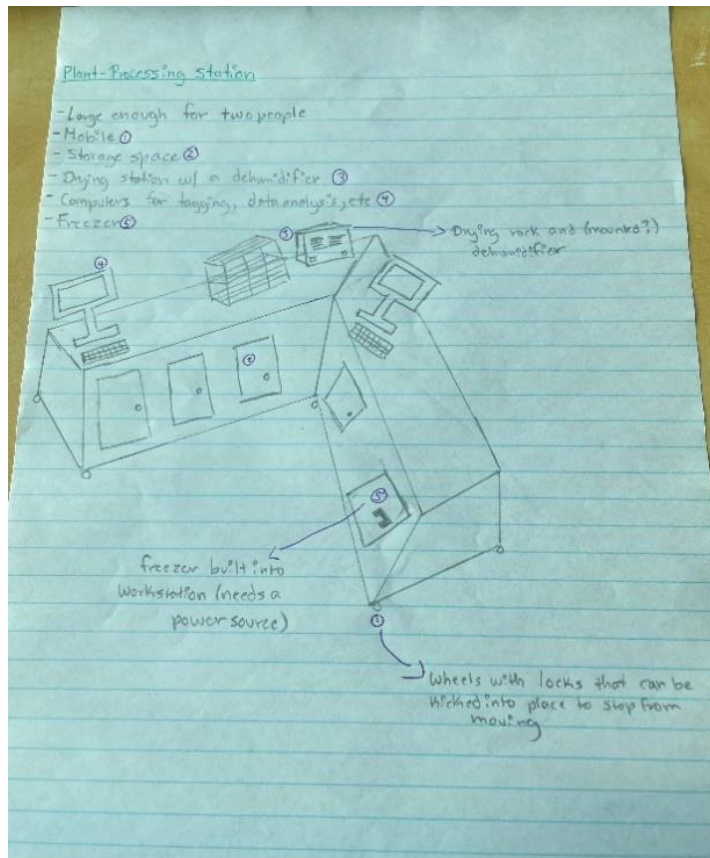
The Algonquins of Pikwakanagan First Nation need a plant processing station for their environmental monitoring work. The plant processing station would need to be mobile, have computers, include access to electricity, have adequate storage space, and include a freezer and humidifier. The following document presents preliminary sketches, three designs that incorporate different subsystems (the requirements listed above) from each of the preliminary sketches, and a final optimized design that will be used to create a prototype of the plant processing station.

## Table of Contents

1. Preliminary Sketches
2. Recombined Designs (Designs Presented to Client)
  - 2.1. Circular Design
  - 2.2. L-Shaped Design
  - 2.3. U-Shaped Design
3. Selection Matrix
4. Final Concept

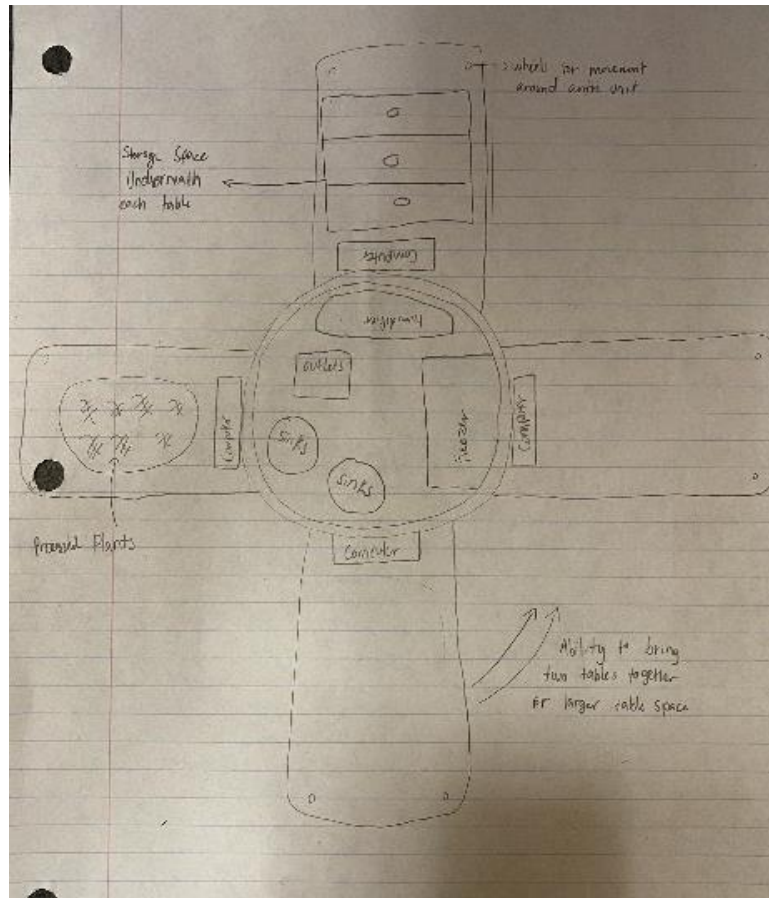
# 1. Preliminary Sketches

Design - Iniya



This design provides space with two computers for two people to work comfortably. The station has wheels with locks which allow it to be mobile like the client wanted. There are cabinets at the bottom of the station, providing storage space. Also, there is a dehumidifier on the desktop as a drying station for the plant processing and a freezer built in the station.

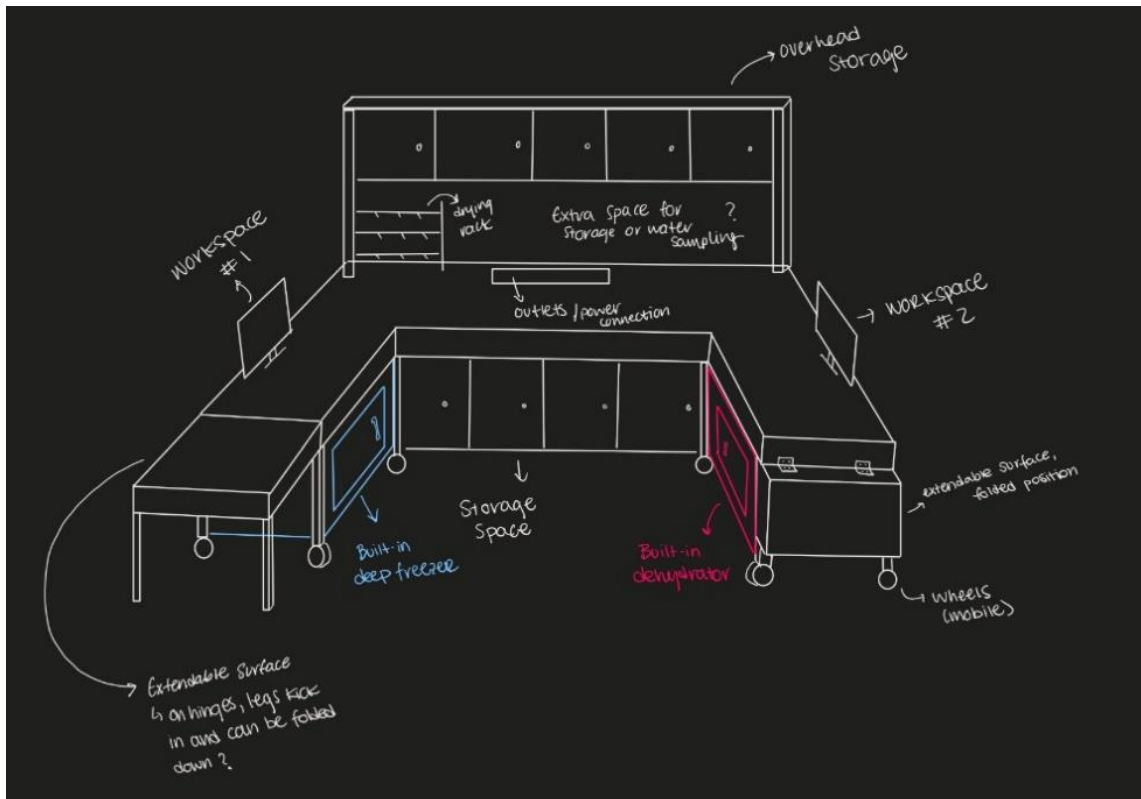
## Design – Abinad



This design is based around a circular central column with a tabletop separated into four quadrants that can rotate about the center. Since each quadrant includes a storage area, there is extensive room for features including wastewater storage and other powered appliances. This comes at the disadvantage of limited mobility due to the irregular shape, size, and weight.



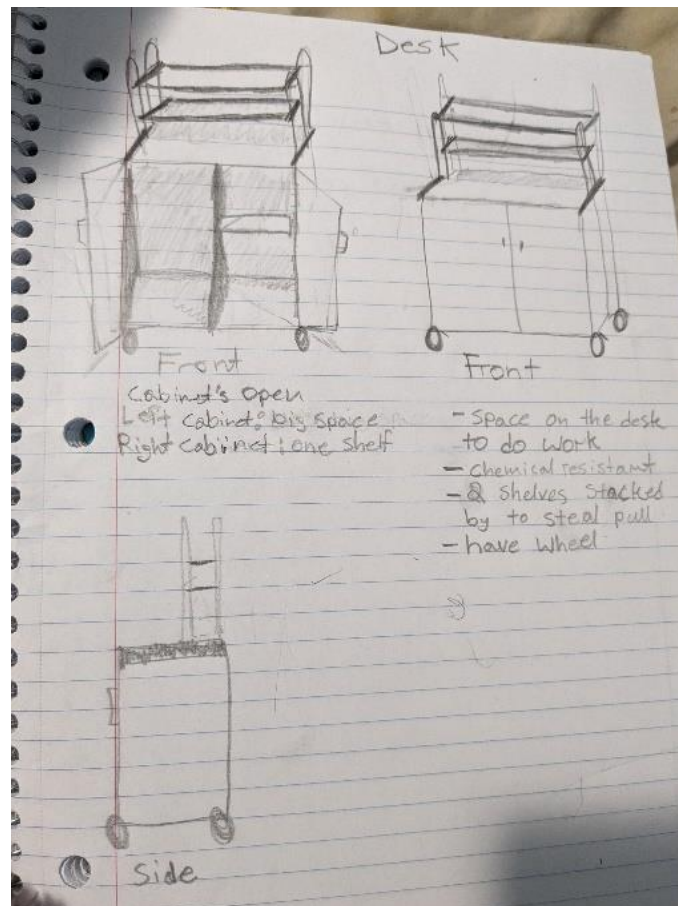
## Design – Leena



This design incorporates a large work area with easily accessible and plentiful storage space. The freezer and dehydrator are stored at the bottom of the design on either side, so that their weight can be distributed equally. The tabletop (left and right) may be extended, and the surface is smooth and uniform for easy cleaning. The entire system is on wheels so that it can be moved around, per the client's request. There is also free space beneath the overhead storage area. This free space allows for flexibility with future projects.

This design is limited in its mobility due to its size and weight. The U-shaped design makes it difficult for this workspace to round corners. The size of this design (and the fact that it is not and cannot become compact) means that it cannot be moved to the side to create more space in a room.

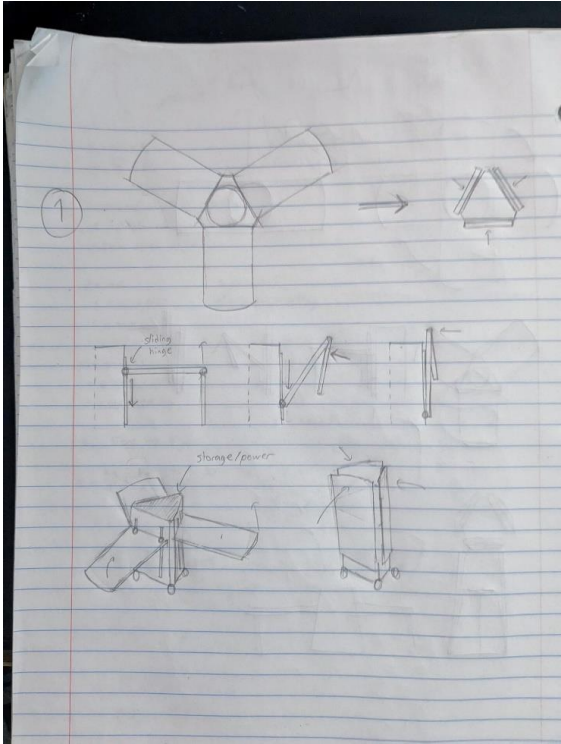
Design- Jasmine

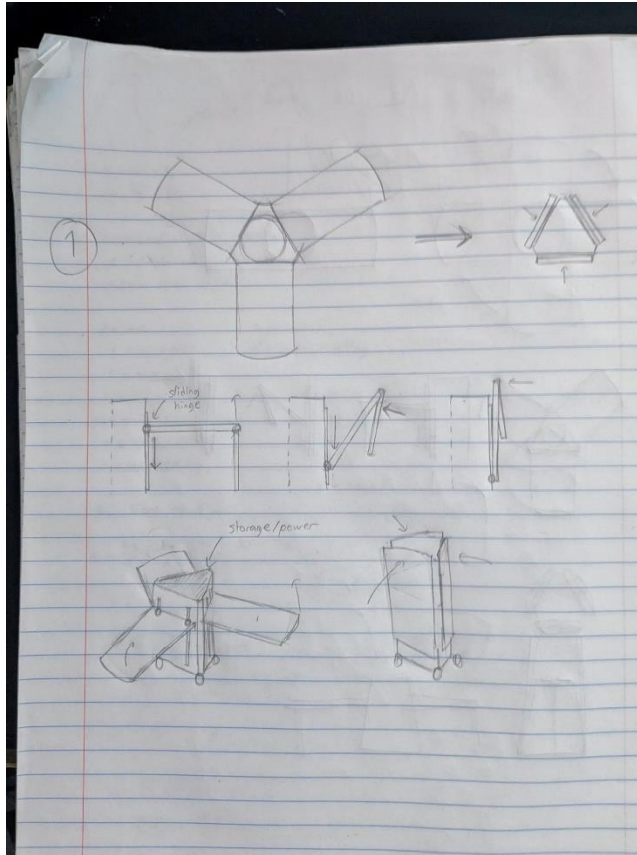


This design was created to connect multiple desks together through magnets on the sides to create one long desk if the user wanted to. Each individual desk provides shelves above the desk and on one side to the cabinets while providing a space to work on the desk. The left side of the cabinet at the bottom of the desk provides space for larger items. The desk also has wheels with locks making the station mobile. However, the downfall of this design is that it does not contain a freezer nor a dehydrator for the plant processing. Also, magnets can attach to other things and could be a safety hazard to connect or pull apart the desks.



Design – Lucas

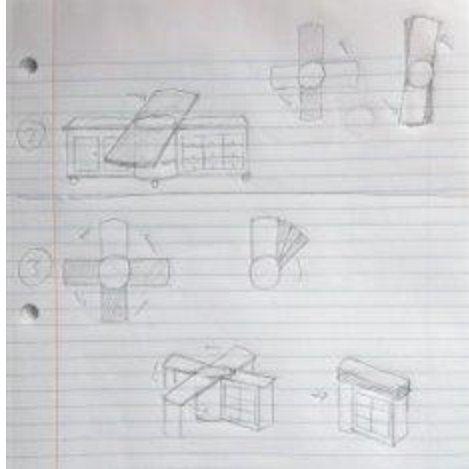




This design is based around a polygon, in this case a triangle to allow 3 individual tabletops. Sliding hinges allow the workstation to fold upward and occupy minimal space. This allows for better mobility and compatibility. The height of the workstation will be approximately the length of the tabletops. This way it is possible for the whole system to fit through small spaces or to be stored in limited space. Disadvantages to this design are the minimal storage space and user complexity. Since there are more moving parts, there can be more risk of failure or injury for the user.

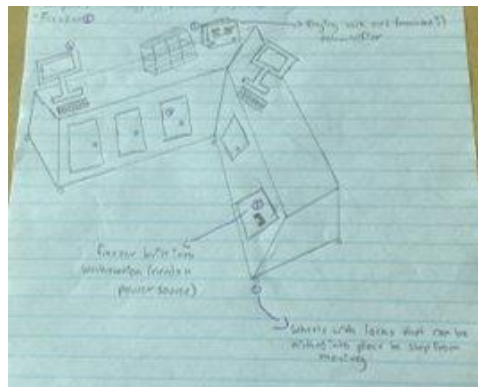
## 2.Designs Presented to Client:

### 2.1-Circular design



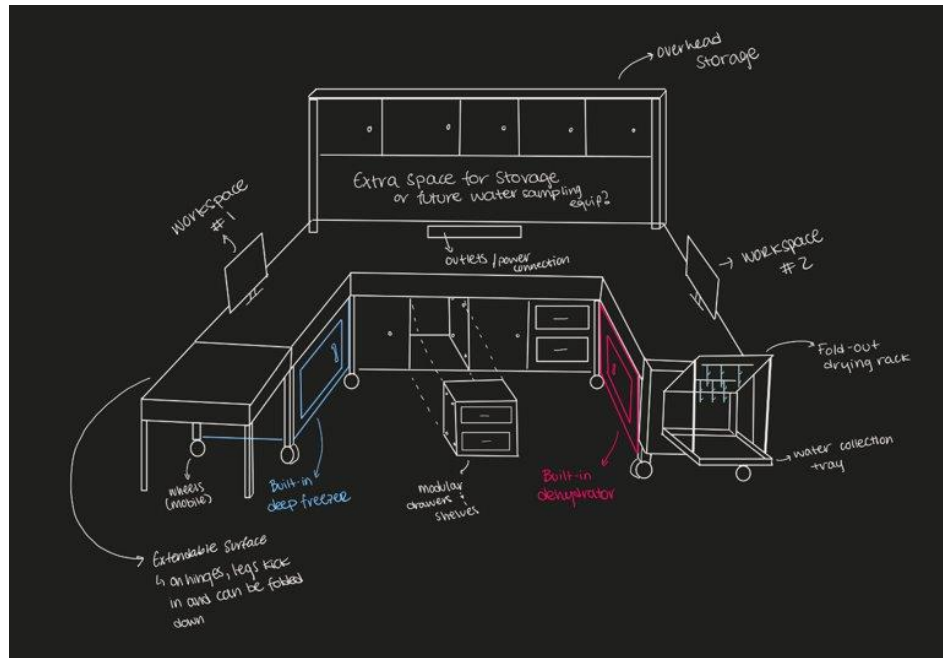
The center unit houses the electrical, computational, and hardware components. The circular tables fold up vertically and horizontally for flexibility and decreasing the overall size. There are both high and low tables: two high tables and two low tables that overlap. They are arranged in a linear fashion with cabinets incorporated into the lower tables. The design includes a removable waste-water storage beneath the central pillar for convenience and cleanliness.

## 2.2-L-shaped design



This design combines the shape and storage from Iniya's design with the mobility and functionality from Jasmine's design. It consists of an L-shaped workstation with two computer stations, staggered so that two people can work without getting in each other's way. The station is on wheels, so it is completely mobile, and it includes a built-in dehumidifier and freezer. Cabinets are built into the base for equipment and chemical storage. As was included in Jasmine's design, this station would be detachable into two individual stations to accommodate more people working or in case two people needed to work in different areas of the building. Advantages of this design are that it can be divided into smaller stations, and it has a simple structure which makes it easier to move around. However, storage is not maximized in this design which doesn't include as much space as a larger station or a station with overhead storage.

## 2.3-U-shaped design



This design combined the modular shelving system and collapsible drying rack from one design, with the U shape design from another. It features ample storage space, through which various lab activities can be carried out. The extendable surface at the edge of the table allows for more working surface area, in addition to the U-shaped tabletop. The freezer and dehydrator are built into the shelving space, and the shelves/drawers can be added and removed as needed for further customization. The large amount of storage space and workspace allows for future projects, such as water sampling, to be accommodated. There are two computer setups on either side of the workspace to allow for two people to work comfortably. A row of outlets is placed in the middle of the workstation. This enables power to be evenly distributed to either side of the station, powering the freezer, dehydrator, computers and any additional equipment. Wheels are placed throughout, allowing for mobility.

### 3. Selection Matrix

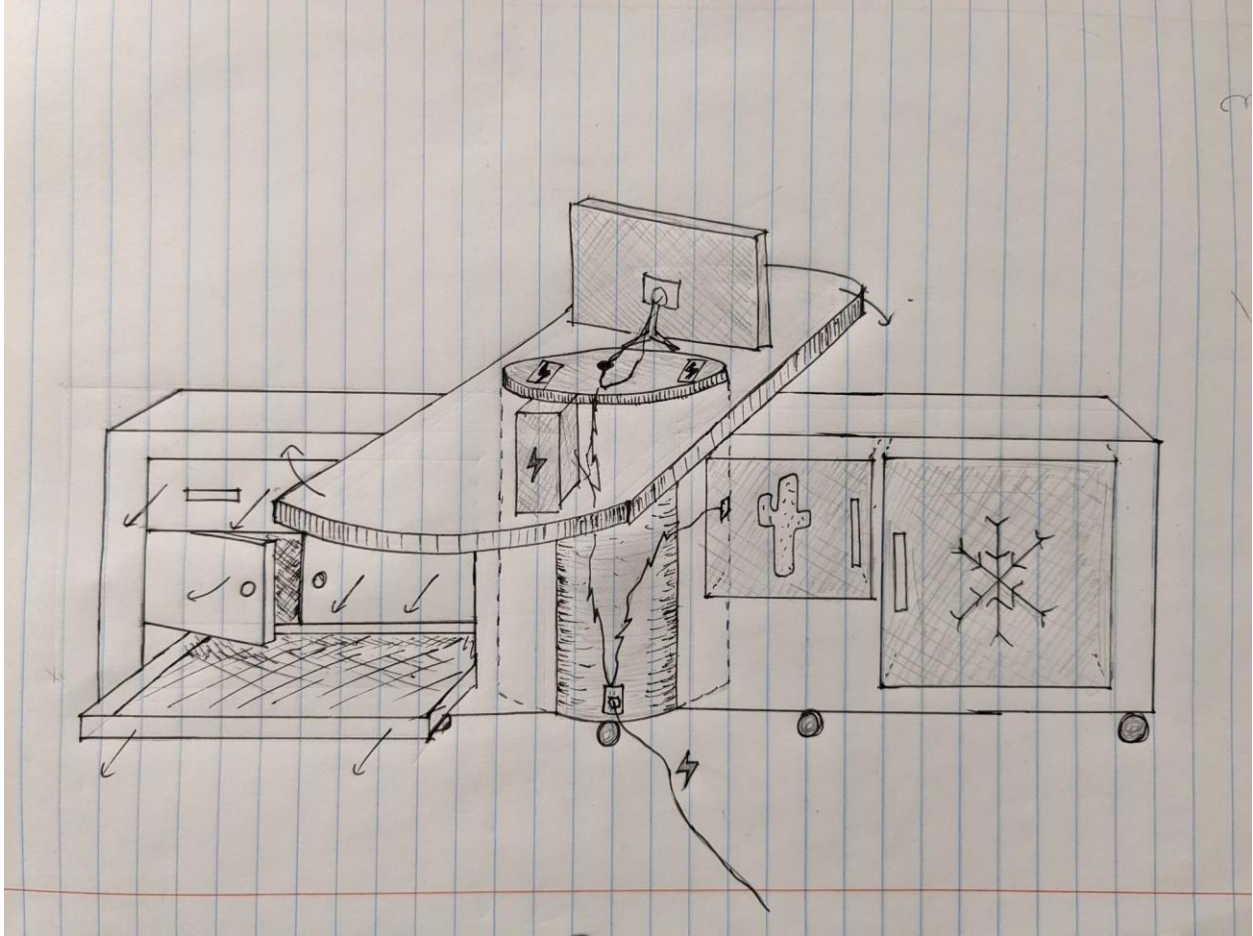
Criteria \ Design	2.1 Circular Design	2.2 L-Shaped Design	2.3 U-Shaped Design
Mobility	The tables can move and fold up vertically and horizontally for flexibility. However, the central pillar itself is stationary	Station on wheels which will allow the desk to move across the room. And can move to a corner of the room, providing more space.	Mobility is limited, as a result of the significant weight
Storage Space	Limited storage space	Moderate storage space	Ample underfoot and overhead storage

Appliances	Removable wastewater storage container. No freezer / dehumidifier.	Includes built in freezer and dehumidifier	Includes built in freezer and dehumidifier
Size	Compact	Moderately Sized	Relatively large
Additional Notes	The client favored the circular design out of the three which were presented.		The client approved of the significant storage space.

Notes for the Final Design

The circular design was favored by the client during the feedback meeting. Therefore, it was prioritized in the creation of the final design. However, this design did not incorporate the required freezer, dehydrator, and storage space. Thus, the final design implemented elements from the L and U-shaped designs to meet the requirements of the client. Overall, the final design is the combination of the beneficial elements from the selection matrix (as highlighted in green).

4. Final Concept



The following is a design which is made up of elements from all three designs which were presented to the client. This iteration was conceptualized utilizing feedback from the client as well as the selection matrix. Some of its key features include: a rotating tabletop to increase surface area and easily collapsible to fit in a smaller space (adapted from the circular design), extensive removable storage cabinets to maximize leg room and increase customizability (adapted from the U-shape design) and an integrated freezer and dehydrator for easier mobility of the whole system (from the L-shaped design). The center of the table houses the access to power. This section provides power to the freezer, dehydrator, and computers (the computers are stored in the central column to increase the available working surface area). The design is very compact overall, so that the entire system can be moved together. The wheels are placed at the bottom of the base to increase mobility.