

NEEL SHAH

Empathetic Engineer, Designer, Researcher, Creative Problem Solver

RESUME



EDUCATION

University of California, Berkeley | Master of Design (MDes) in Emerging Technologies and Product Design (2022-23)

Indian Institute of Technology (IIT), Madras | Bachelor and Master of Technology in Engineering Design (2014-19)

SKILLS

Programming: C, C++, MATLAB, Mathematica, Arduino, Python, Raspberry pi, Java

Design skills: CREO, Solidworks, Fusion 360, ANSYS, COMSOL, Rhino, Keyshot, Adobe Suite, Figma

Prototyping: 3D printing, Laser cutting, Woodworking, CNC, Electronics, Injection molding, Casting

EXPERIENCE

Tact Product Development | Redwood City, California, USA - Product Design Engineer Intern (May-Aug 2023)

Havells | Delhi, India - Research/Design Engineer (2019-2021)

Tvasta | Chennai, India - Research Intern (Jan-May 2018)

Bosch Rexroth | Ahmedabad, India - Summer Intern (Jun-Jul 2017)

CERN (European Organization for Nuclear Research) | Geneva, Switzerland - Summer Research Intern (May-Jul 2016)

CONTACT DETAILS

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Portfolio website

LinkedIn



MYCORRHIZAE

Mycorrhizae is an interactive exhibit highlighting the hidden communication between plants, mushrooms, and the underground forest ecosystem, known as the Mycorrhizal network.

Team

Justin Trainor, Albert Hodo, Gracy Kureel, Helena Kent

Role

Research, Ideation, Prototyping, 3D Rendering, Fabrication, and Animations

Year

2022

01

How might we use technology to create stronger connections between humans and nature?

A terrarium scene featuring a green plant with long, thin leaves on the left, a red mushroom with white spots in the center, and a glowing blue light source in the background. The scene is set in a dark environment with a blurred background.



WHAT CONNECTION WITH NATURE MEANS FOR PEOPLE?



"I've found that when I notice incredible natural things that I'd previously not seen, my connection to nature is increased."



"Nature gives me a immediate response to whether or not I am physically present."



"Feeling connected to nature means noticing the small movements over long periods of time."



"The most interesting aspects of nature are when you can see the humanity in nature."

DISCONNECT WITH NATURE LEADS TO POOR MENTAL HEALTH

USER JOURNEY MAP: Urban Commuter



Jessica Jones

- Female
- Product Manager
- 35
- Seattle, WA

Scenario

Jessica lives and works in Seattle. She spends 4 hours a day commuting to and from work on her bike in nature. On the weekends Jessica hikes and takes trips to the beach with her friends. Jessica has a small garden in her home where she grows vegetables.

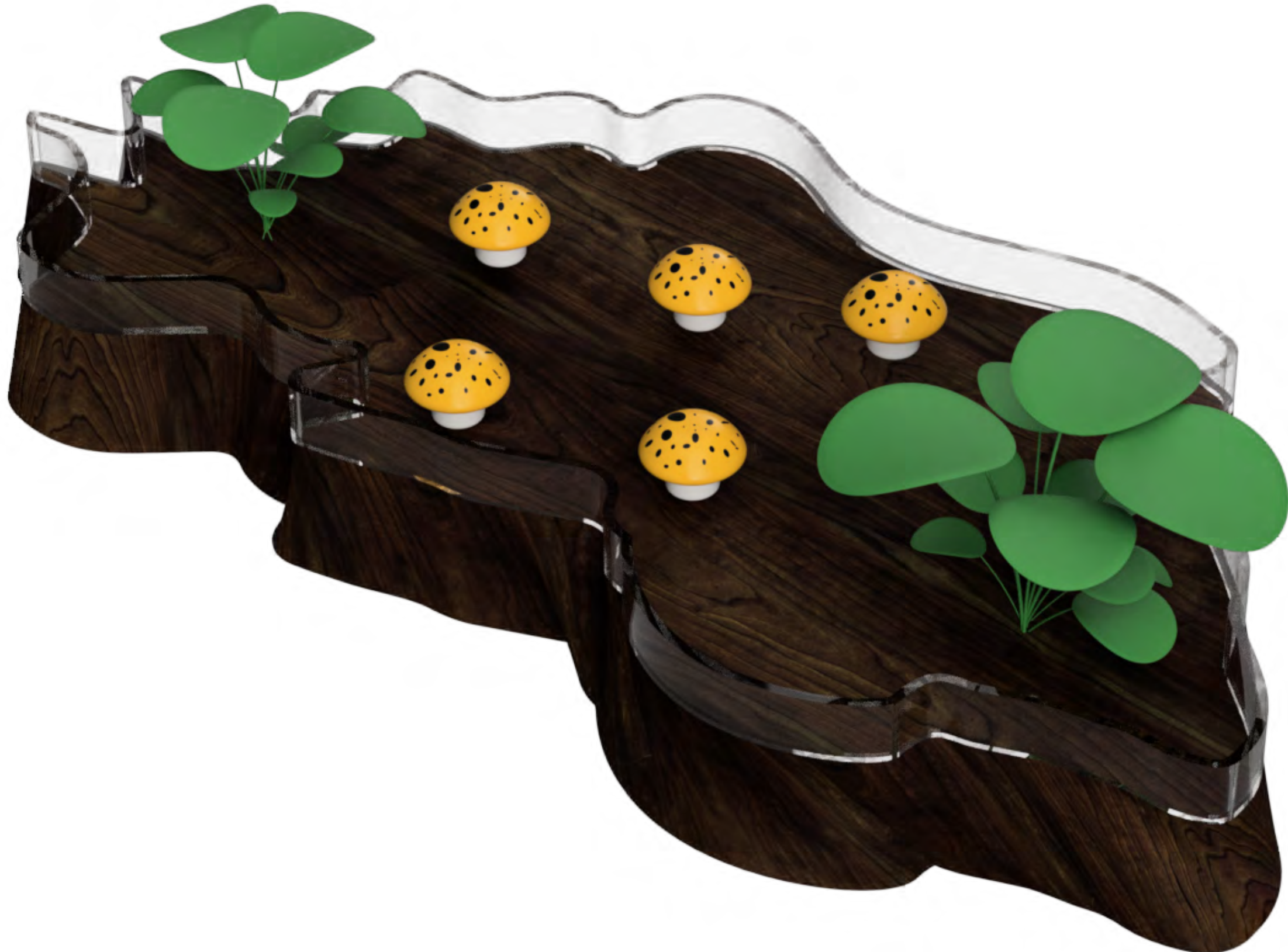
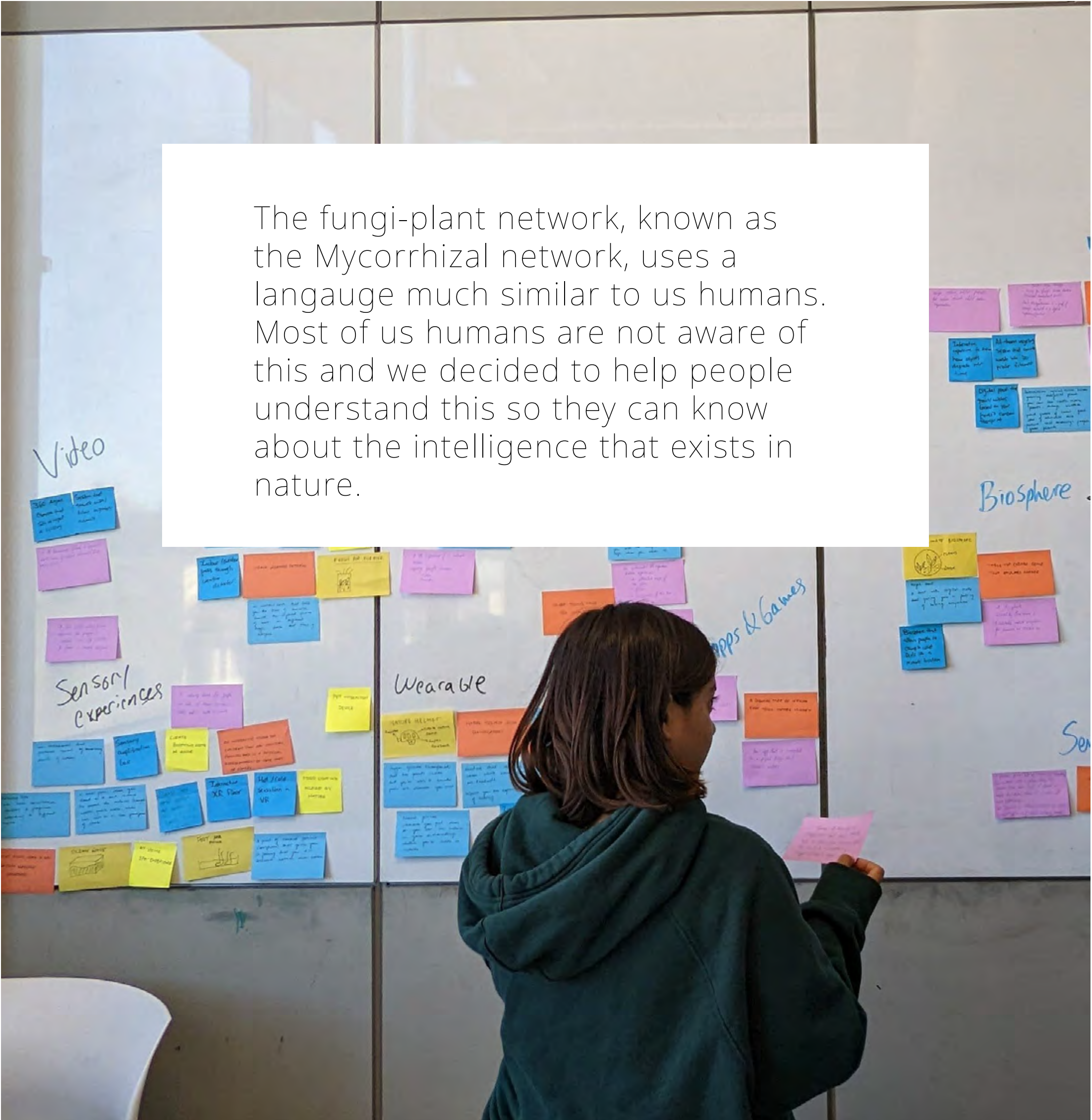
Expectations

- Connects to nature on a daily basis.
- Uses technology to connect with nature.

	Morning	Lunch	Afternoon	Evening	Night
ACTIVITIES	Morning Routine, Commute	Eating, Walk at Work	Finish Work, Commute Home	Gardens, Makes Dinner	Rest
DOING	<ul style="list-style-type: none"> • Making coffee • Taking her dog on a walk • Getting ready for work • Cooking breakfast 	<ul style="list-style-type: none"> • Eating lunch grown from her garden • Taking a walk in a park near where she works • Breathes the fresh air near the river where she works 	<ul style="list-style-type: none"> • Completes her work, and packs up her office supplies to commute home • Rides her bike home • Breathes the fresh air and listens to music while riding home 	<ul style="list-style-type: none"> • Cooks dinner • Talks to family • Watches TV • Plays with her dog • Water house plants 	<ul style="list-style-type: none"> • Reads a book while listening to nature sounds • Uses essential oils diffuser for soothing smells • Turns on warm lights
PAIN POINTS	<ul style="list-style-type: none"> • Not enough time to take dog on a walk • Forgets watering plants in the morning 	<ul style="list-style-type: none"> • She only has a limited period of time when she is allowed to walk before she has to return to work • She walks alone 	<ul style="list-style-type: none"> • Jessica has to balance her enjoyment of nature, with maintaining her safety while on the road 	<ul style="list-style-type: none"> • Lives at home and sometimes feels isolated despite talking with family • Doesn't always know what kind of care her plants need 	<ul style="list-style-type: none"> • It is sometimes difficult to wind-down from the long day • Jessica looks forward to resting
FEELING	Refreshed and awakened	Pensive, thinking about work	Happy to commute home outside	Jessica is tired from the day	Happy to rest and restore
OPPORTUNITIES	<ul style="list-style-type: none"> • An awareness of when and how much time her dog will need for their walk outside • A reminder to take care of her plants 	<ul style="list-style-type: none"> • A way for her to know who else in her office would also want to go on a walk • Flexible hours to take walks 	<ul style="list-style-type: none"> • Jessica would benefit from a device that both enables her to enjoy nature, while maintaining her safety 	<ul style="list-style-type: none"> • Jessica enjoys her evening activities, though because she lives alone, she would be happier if she had a community to do her activities with 	<ul style="list-style-type: none"> • She doesn't engage with nature much during the night • Jessica hibernates on her own to rest and restore



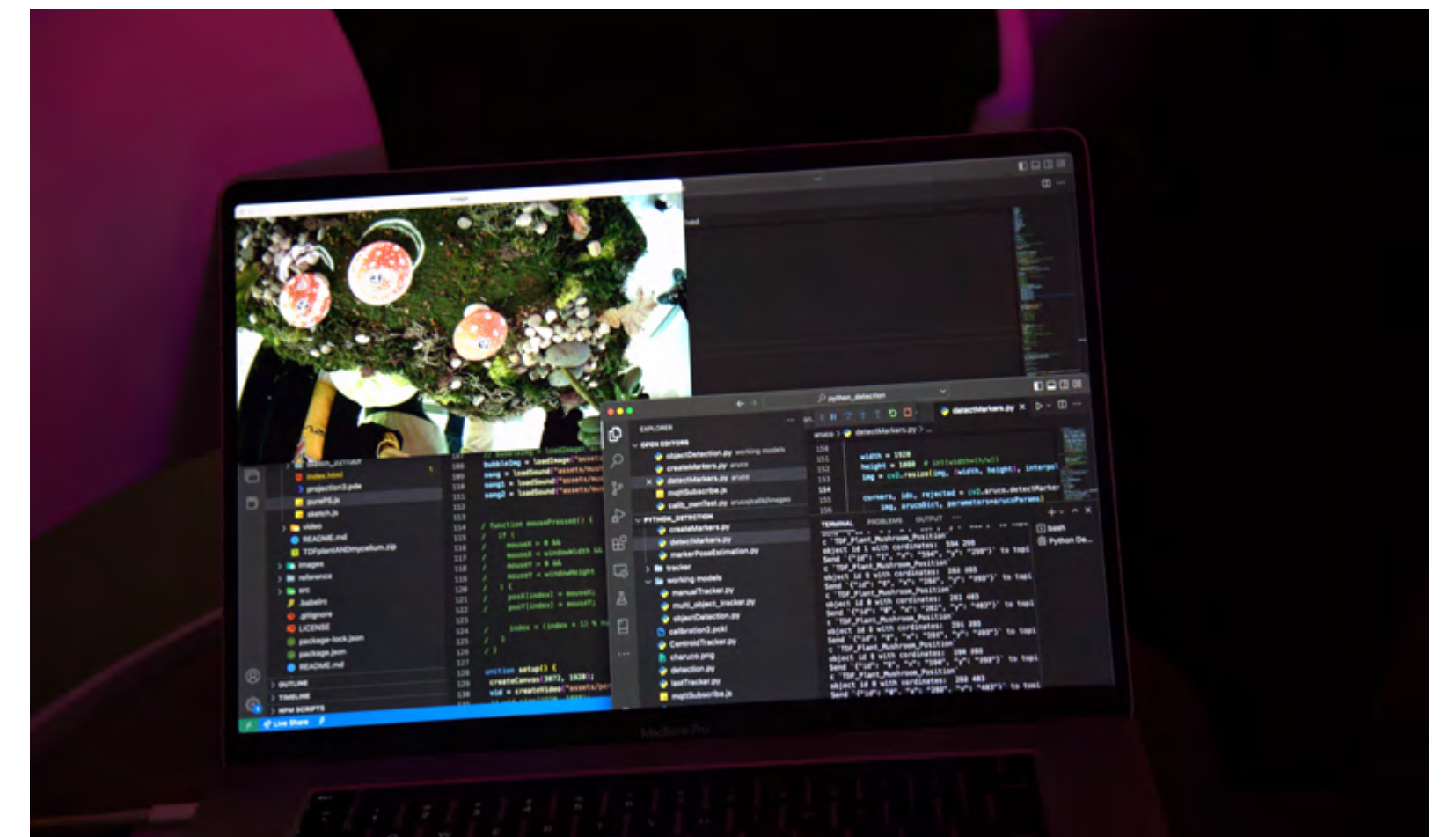
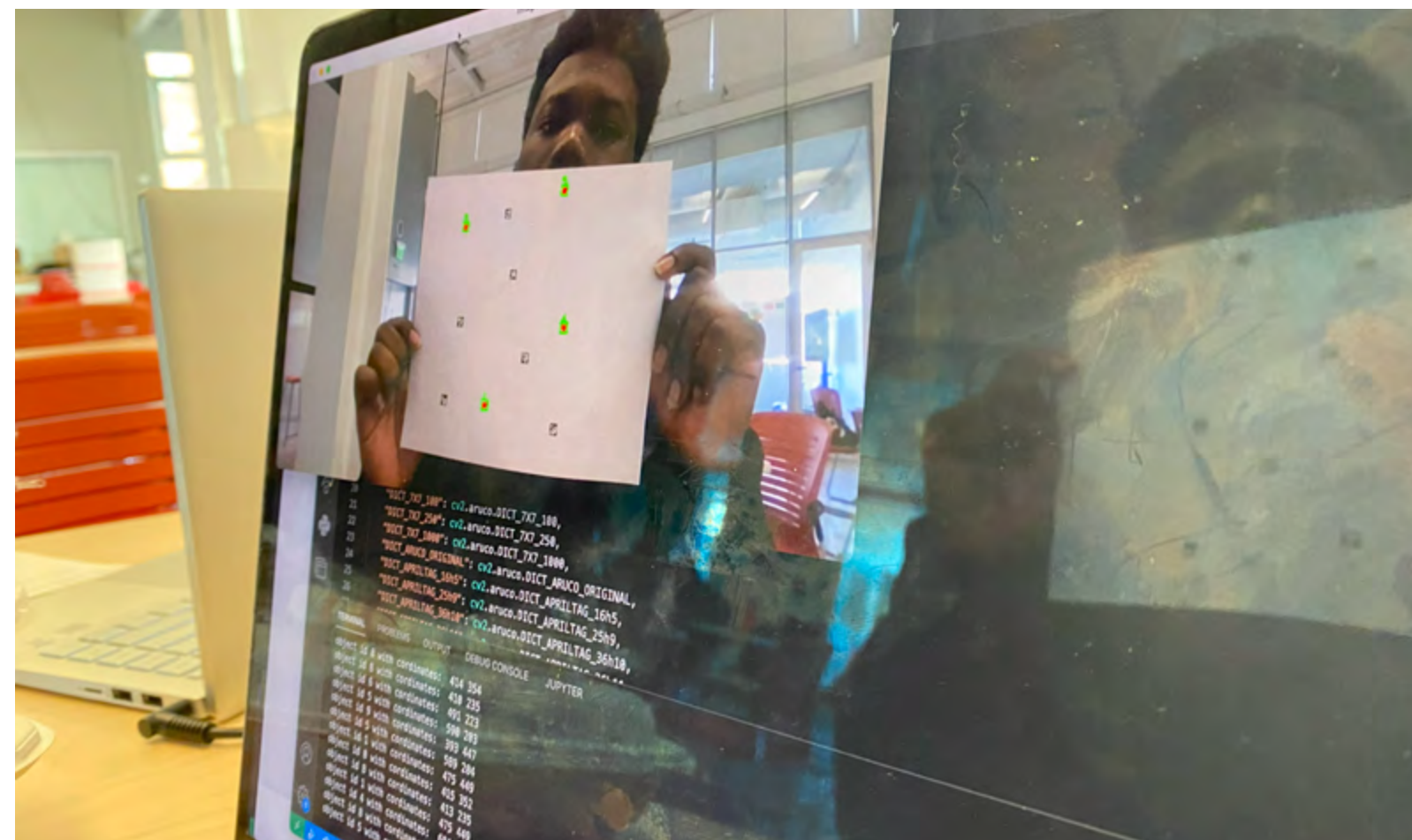
FINAL DESIGN CONCEPT



TECHNOLOGY AND PROTOTYPING

The project uses technologies like computer vision to identify the location of mushrooms and then uses projection mapping to create ripples on the mushroom with the help of a projector.

The prototyping process involved fabricating the micro-landscape terrarium decor along with 3D printing mushrooms.







PLANTS AIRLINE

Plants Airline is a plants migration & seeding project that aims to protect biodiversity against the impact of climate change.

Team

Ronan Chen, Phyllis Fei

Role

Research, Ideation, Prototyping, 3D Rendering, Fabrication, and Animations

Year

2023

02

SHIFTING PLANT HARDINESS ZONES IS LEAVING INHABITABLE CONDITIONS FOR LOCAL PLANT SPECIES

Zone2-Zone9



Pinegrass

Zone3-Zone8



Smooth Woodrush

Zone3-Zone8



Grouse Whortleberry

Zone4-Zone9



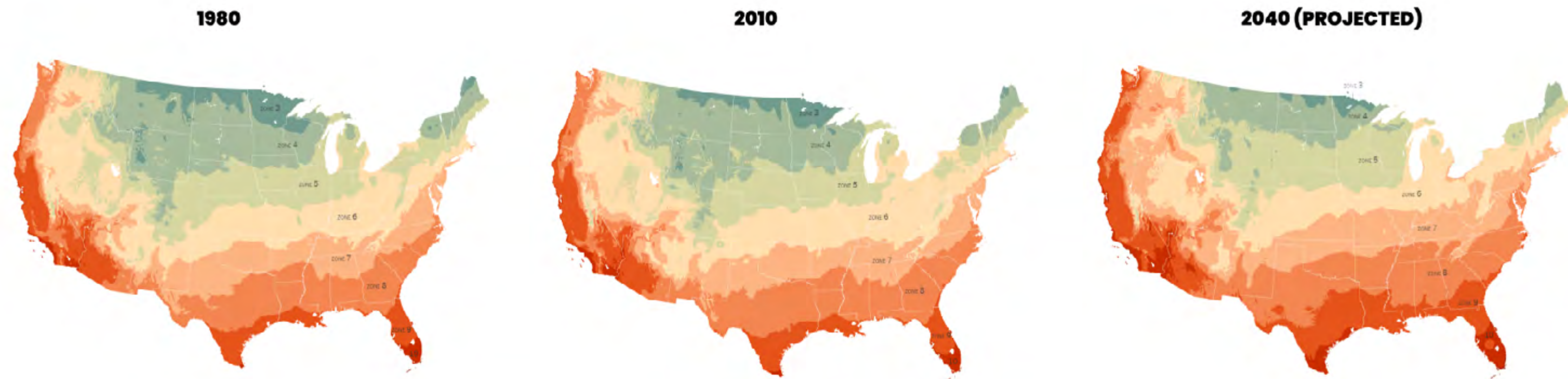
Oregon Boxwood

Zone4-Zone8



Whitebark Pine

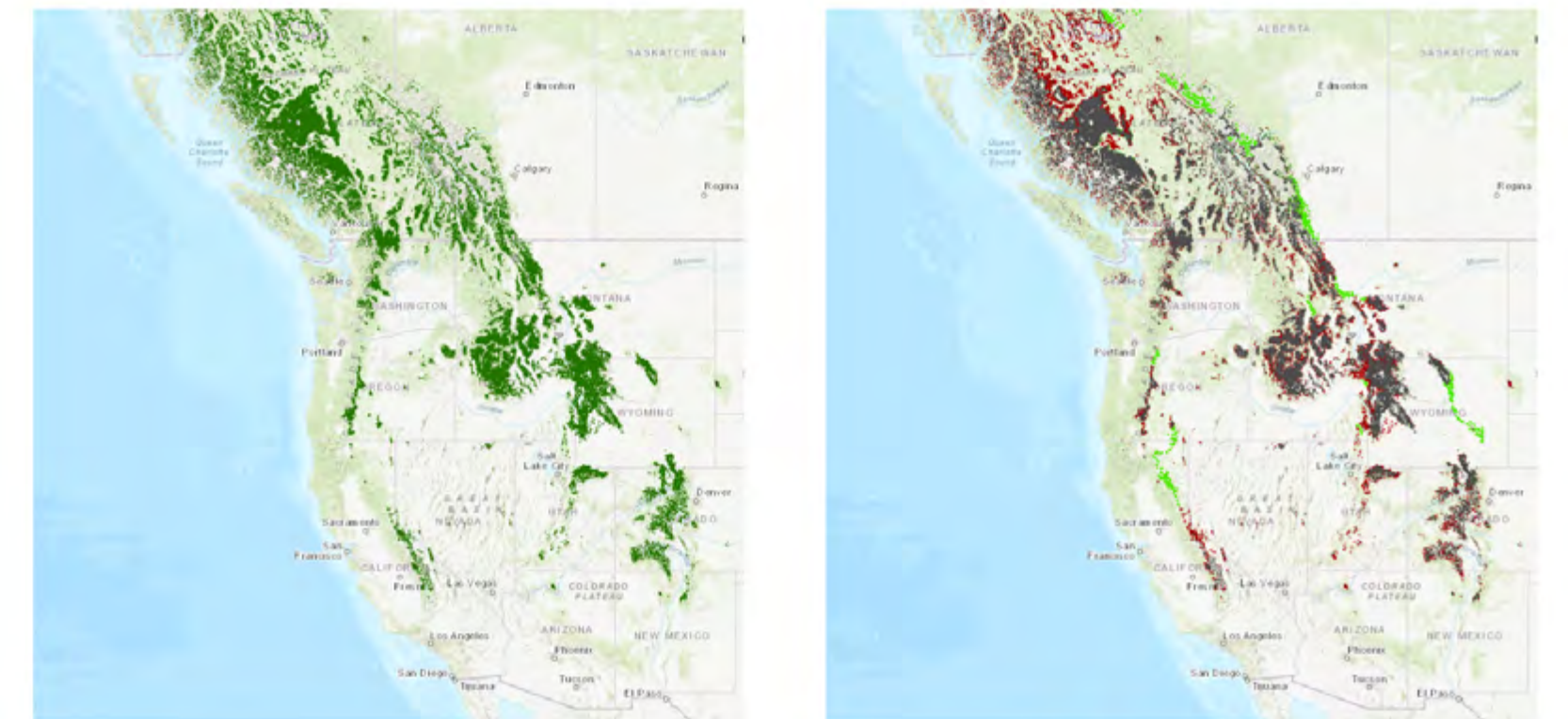
Plant Hardiness Zones Movement



*Source: National Oceanic And Atmospheric Administration

Zone 3 Zone 4 Zone 5 Zone 6 Zone 7 Zone 8 Zone 9 Zone 10

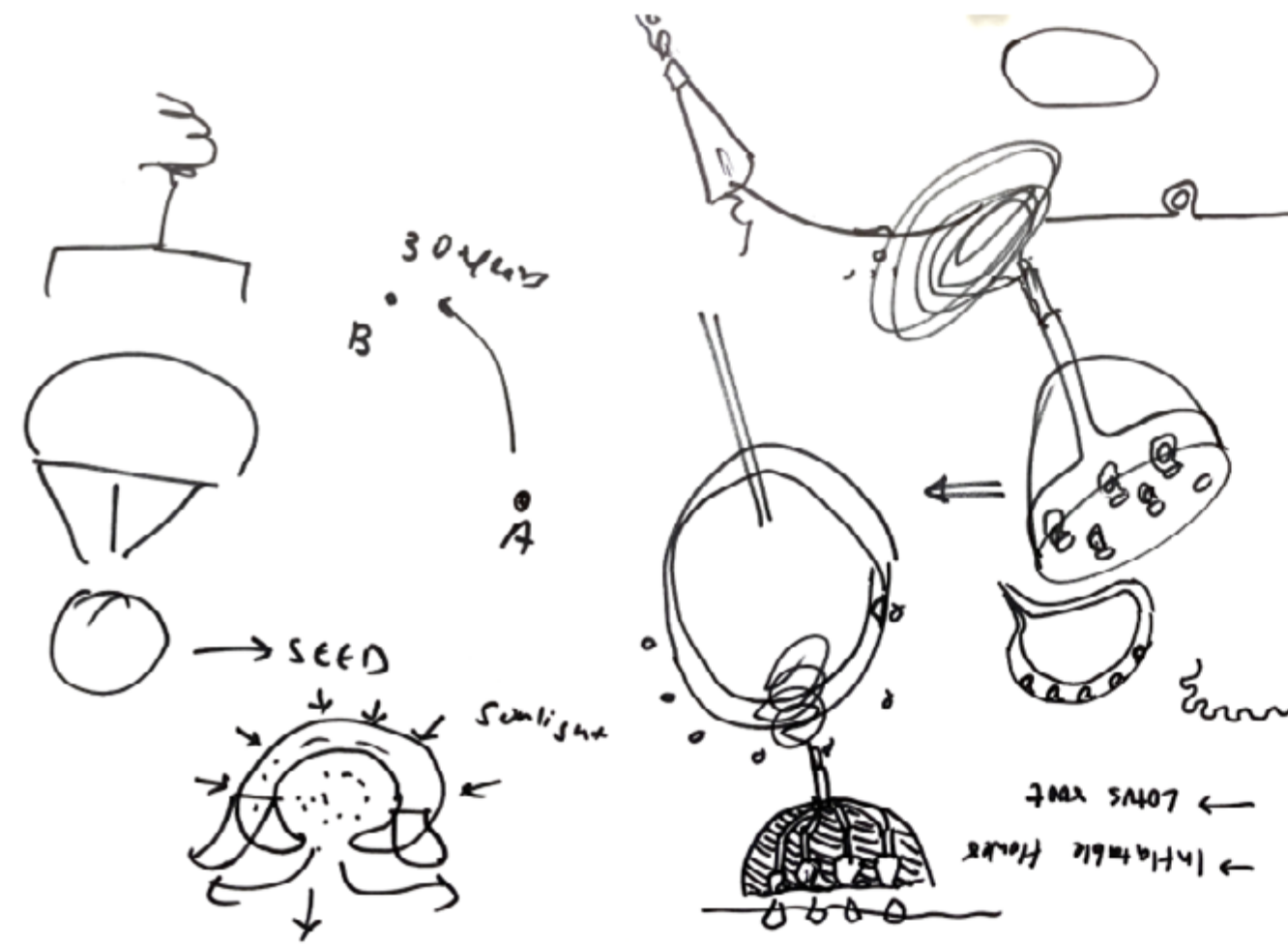
Whitebark Pine Community in California



Current Habitat
Projected Safe Zone
Projected Endangered Zone
Projected New Expanded Zone

SKETCHES

The form factor of our design was inspired from the lotus. Seeds from different species can be securely contained inside a capsule structure when being carried by drones.



01. Soft robotics as cushion

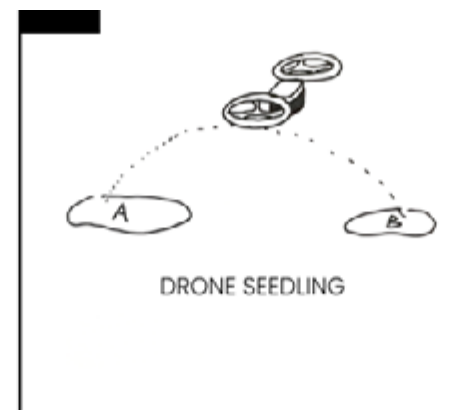
02. Lotus shape

03. Air inflation seedling

04. Capsule temperature sensing



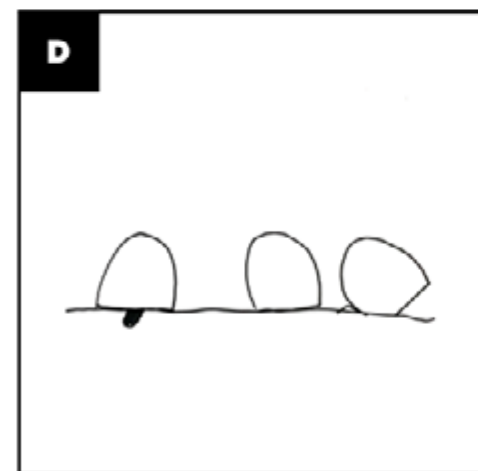
THE PIONEER CAPSULE IS FILLED WITH SEEDS THAT ARE BEING MIGRATED



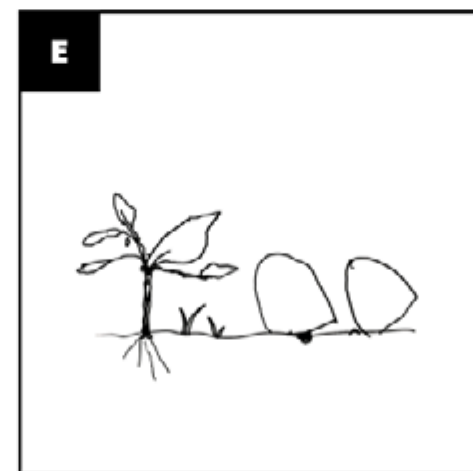
DRONES COLLECT THE PIONEER CAPSULES



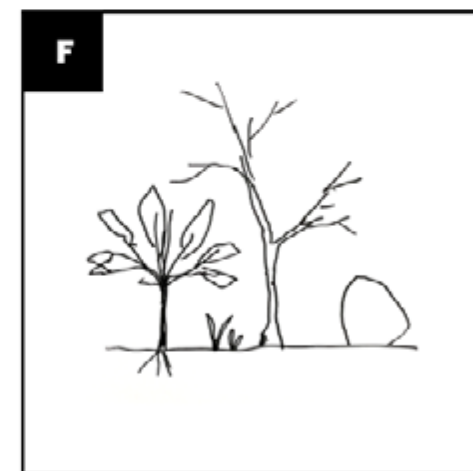
DRONES ARE USED TO DEPLOY THE PIONEER CAPSULES IN THE FIELD



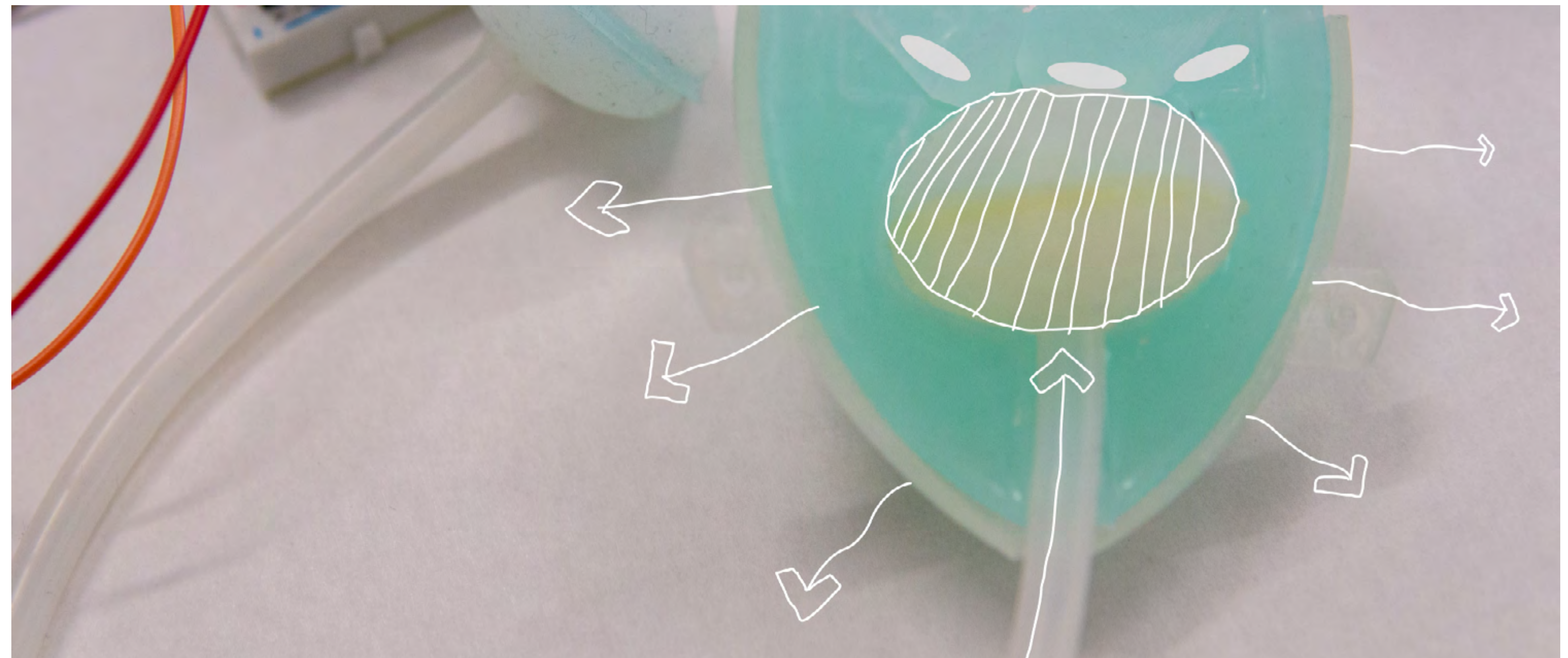
THE PIONEER CAPSULES MONITOR NEW ENVIRONMENT AND DO TRIAL SEEDINGS



MULTIPLE ITERATIONS OF THE SEEDINGS ARE PERFORMED

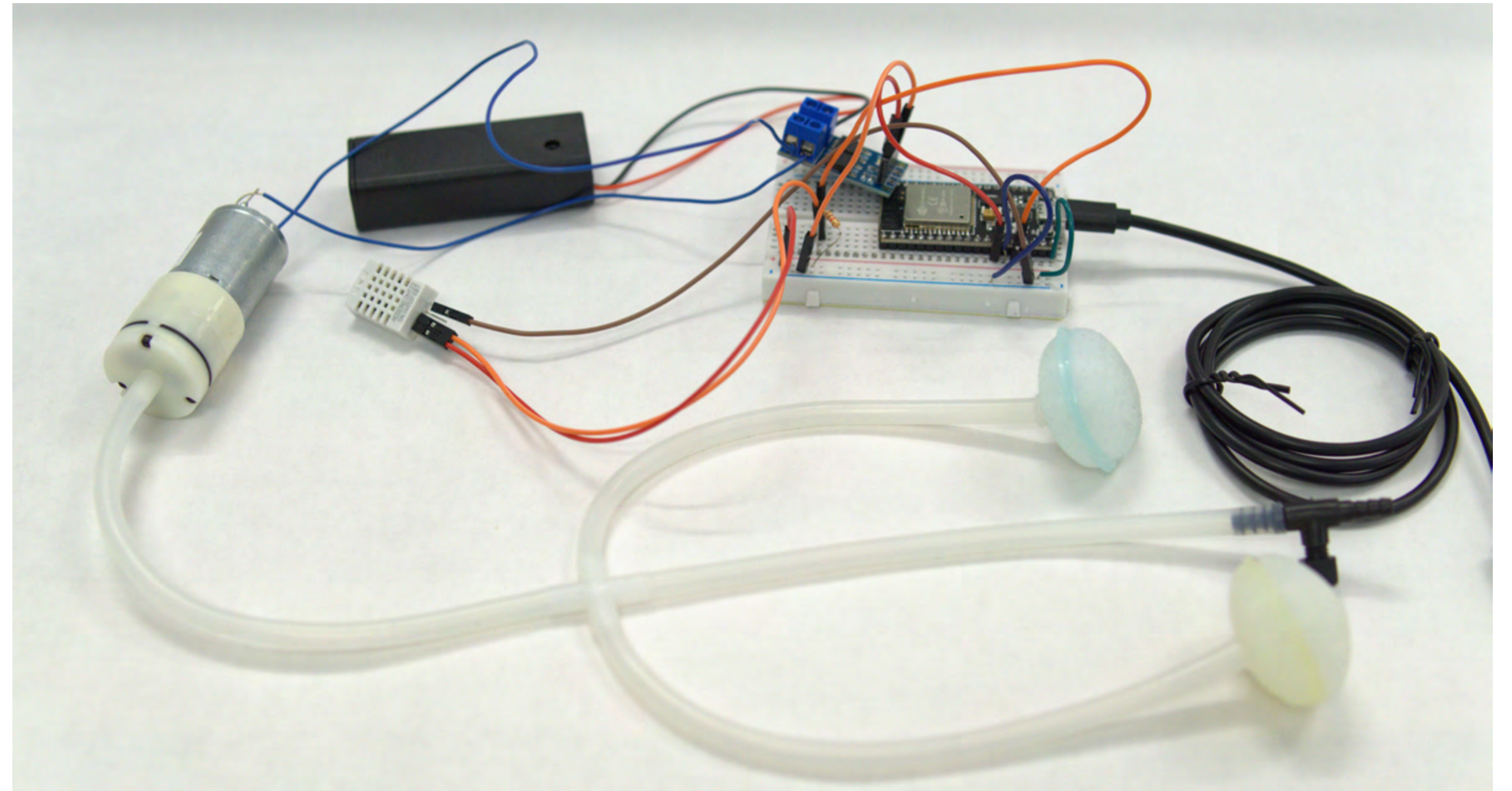


ONCE SUCCESSFUL SEEDINGS ARE POSSIBLE, LARGE SCALE DEPLOYMENT CAN BE PERFORMED



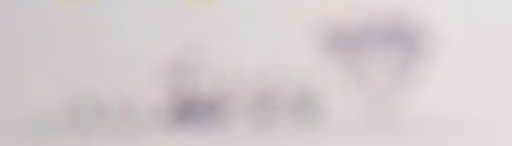
BUILDING A SOFT ROBOTIC SYSTEM

We use DHT22 to monitor the temperature data of the environment. Seed capsules are triggered when the temperature meets the fittest living condition of different plants. Each seed capsule has a bladder that pushes seeds out, a silicone protector that contains seeds, a case that protects the entire silicone structure, and a stand that helps display in our diorama.





Migratory Planning

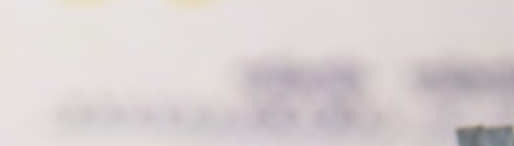


Plant with Dome Structure

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Plant with Dome Structure

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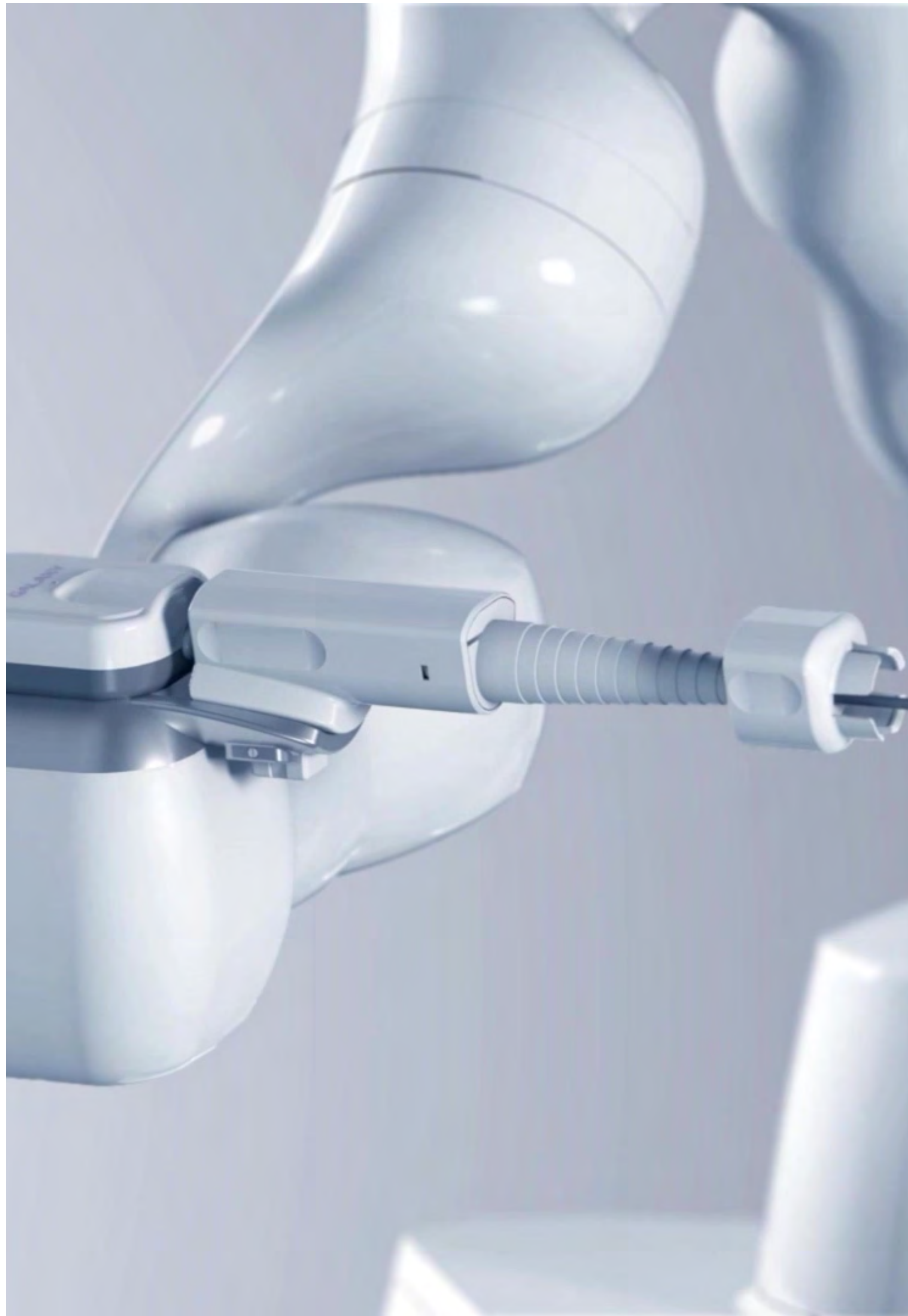


Plant with Dome Structure

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TACT X NOAH

Developing and testing surgical robot controllers used by doctors during bronchoscopy operations.

Background

The project was part of summer internship at Tact Product Development in Redwood City, CA.

Role

I worked on the initial prototype's 3D rendering, fabrication, simulations and testing.

Year

2023

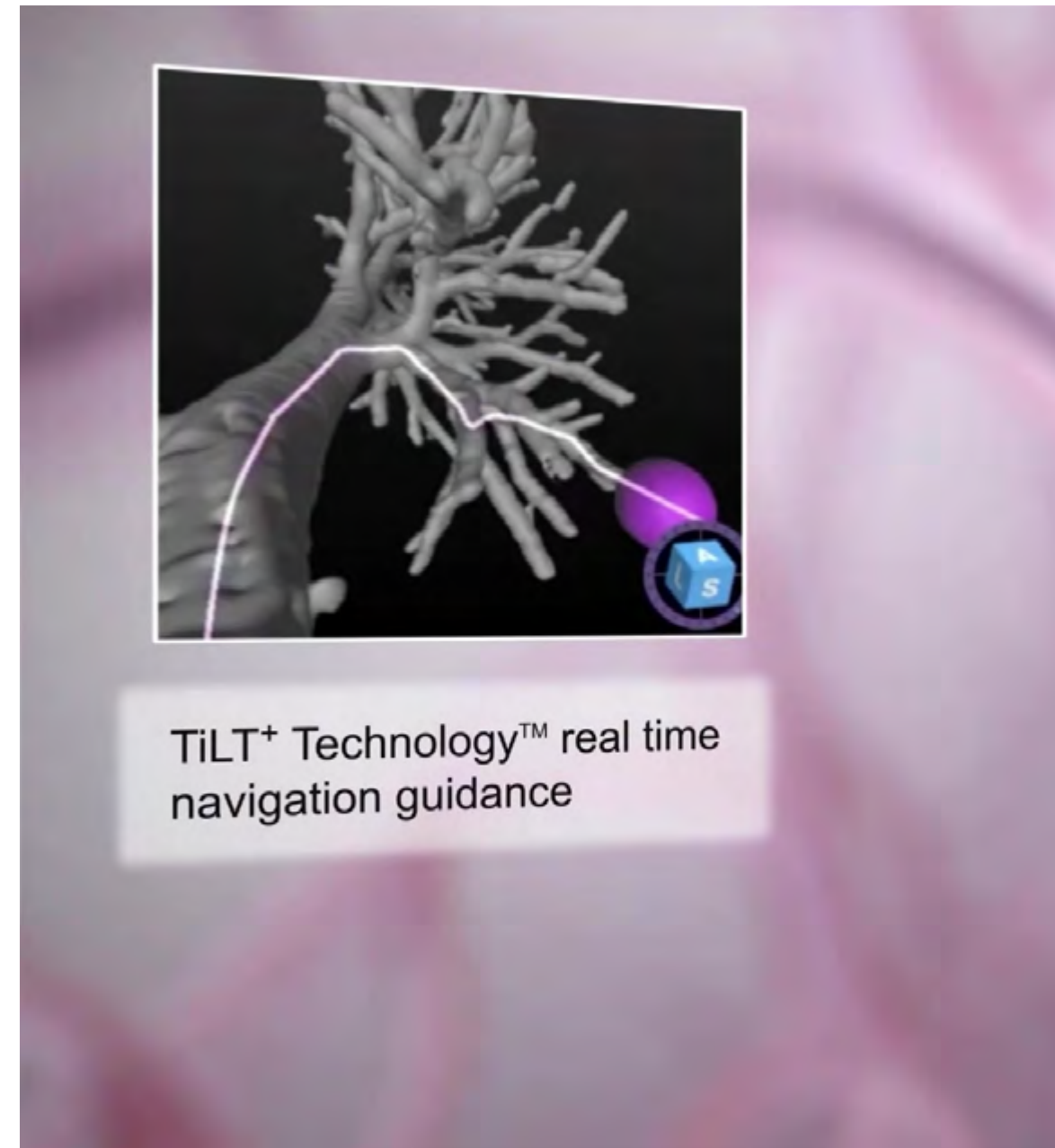
03

Noah is transforming the medical technology sector with the Galaxy System, which utilizes its exclusive TiLT+ Technology (Tool-in-Lesion Tomography).

This robotic-assisted bronchoscopy system stands out as the sole one of its kind, seamlessly integrating tomosynthesis by incorporating easily accessible C-arm fluoroscopy.

This integration allows for real-time updates on lesions while navigating nodules located in various lung areas, such as the pleural, middle, and outer periphery. Additionally, it provides tool-in-lesion confirmation, enhancing diagnostic success and boosting confidence.

My contribution involved developing the interface controller that connects this technology with doctors, enabling them to control the surgical robot hand effectively.





UNEARTHING THE FUTURE

Climate Adaptation and Mitigation for Smallholder Farmer Communities through 'Soil Designing'

Role

Research, Ideation, Prototyping, 3D Rendering, Fabrication, and Animations

Year

2023

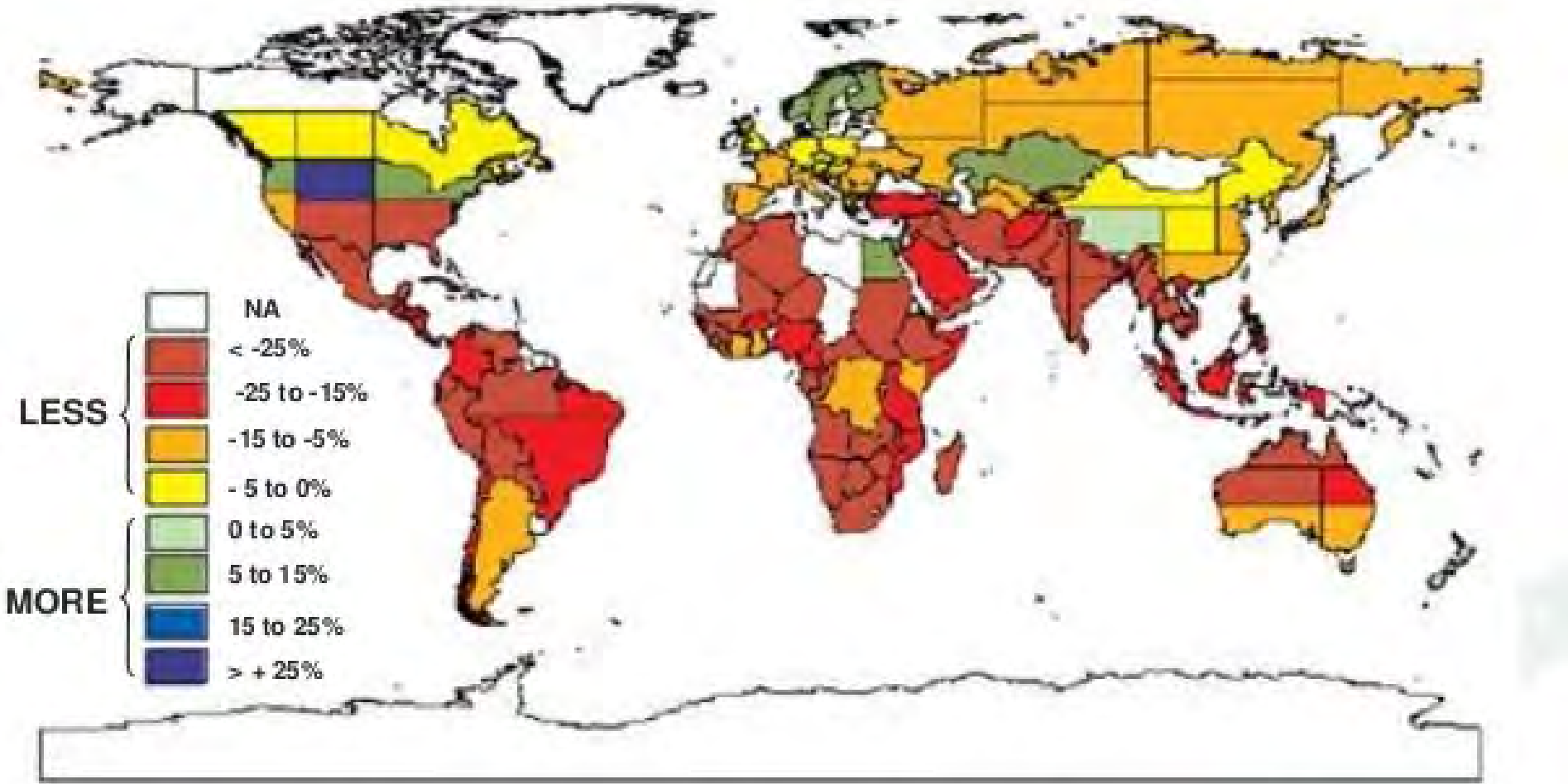
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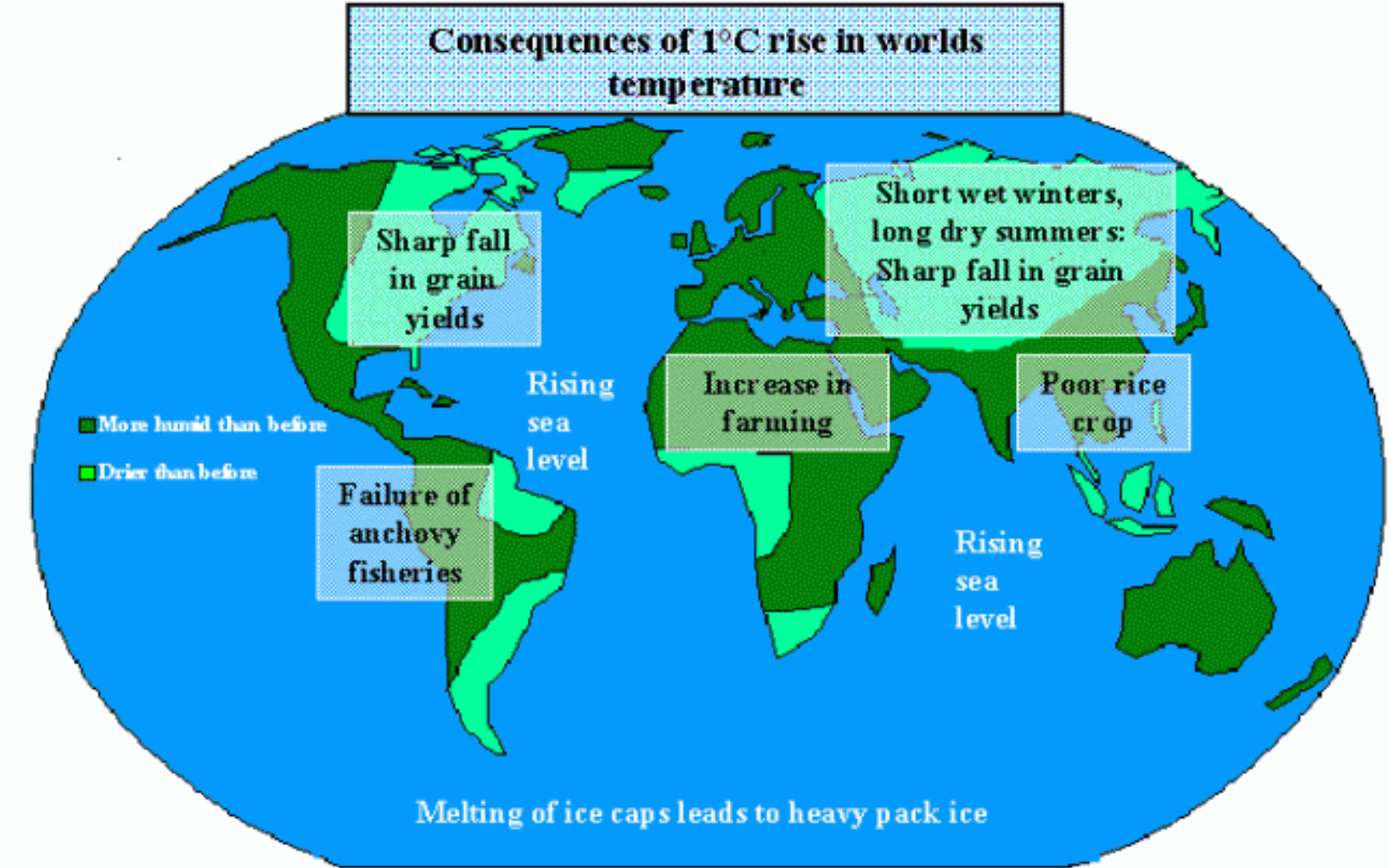
How might we enable smallholder farmers be more climate-resilient by improving soil health?

CLIMATE CHANGE IS GOING TO AFFECT FARMERS DRASTICALLY

Modelled % change in agricultural production due to climate change, 2080



Source: Cline WR, 2007: Global warming and agriculture: Impact estimates by country. Washington, D.C.: Center for Global Development, Peterson Institute for International Economics (cited in von Braun J (IFPRI), 2007)





WHAT SMALLHOLDER FARMERS AND EXPERTS HAVE TO SAY?



"We rely on our nearby community to implement sustainable practices."



"We want to use sensors to measure soil health but have financial constraints of implementing such technology."



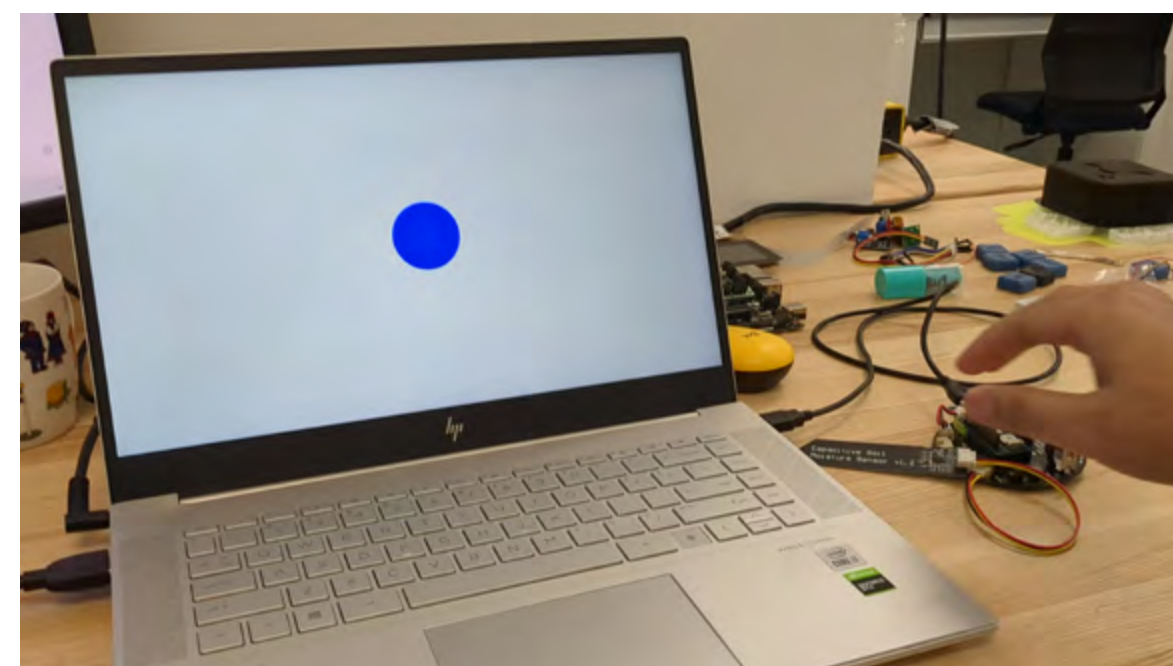
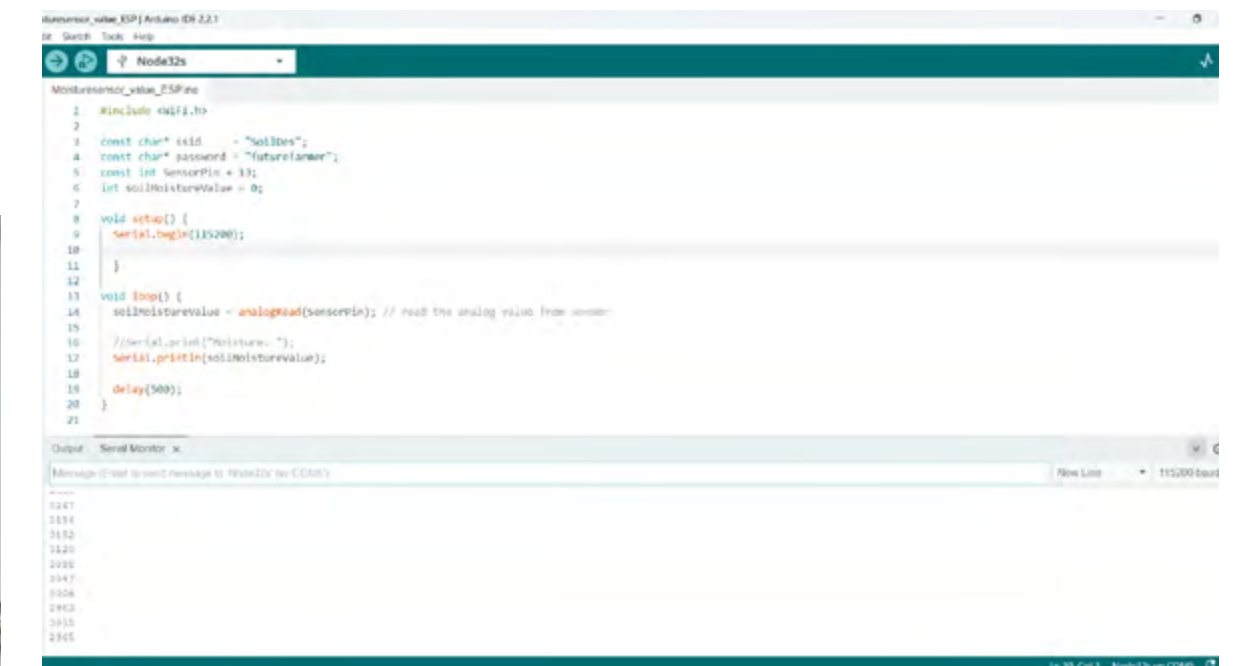
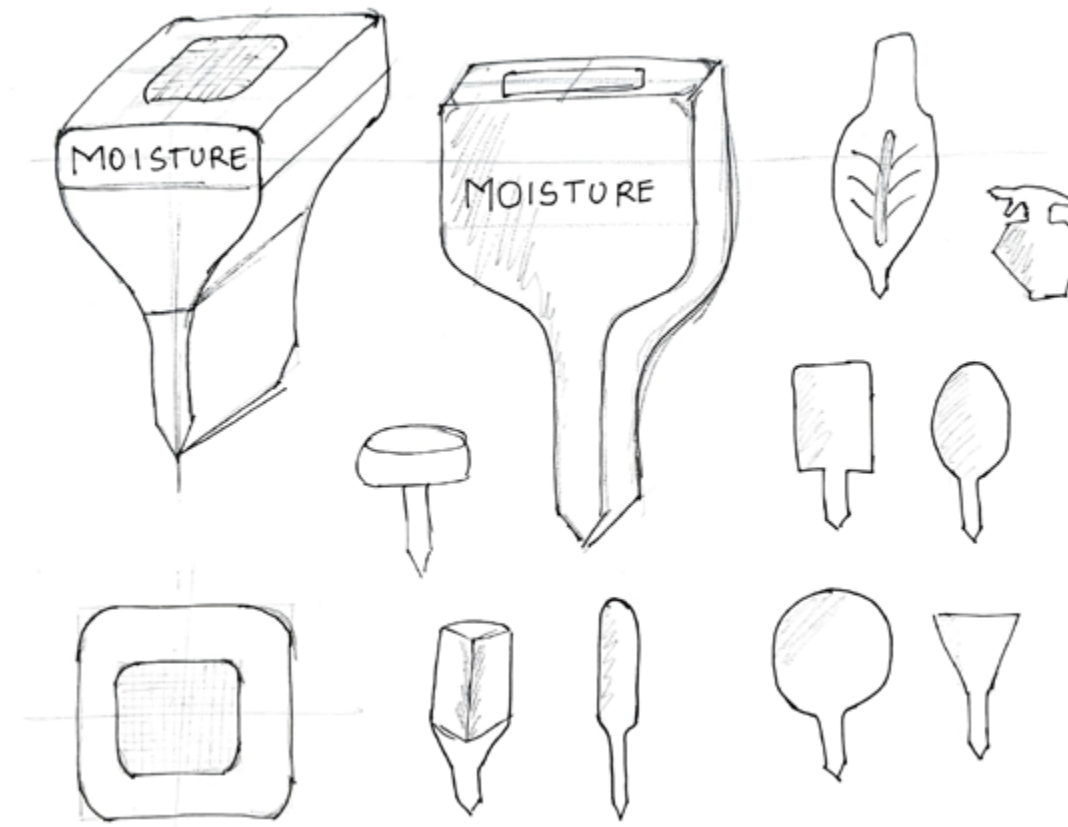
"There could be an opportunity in creating a cost effective service. Qualified technicians can go to the farm communities and conduct soil testing."



"Normally when you go and you have your soil or water tested, they don't want to give you any recommendations."

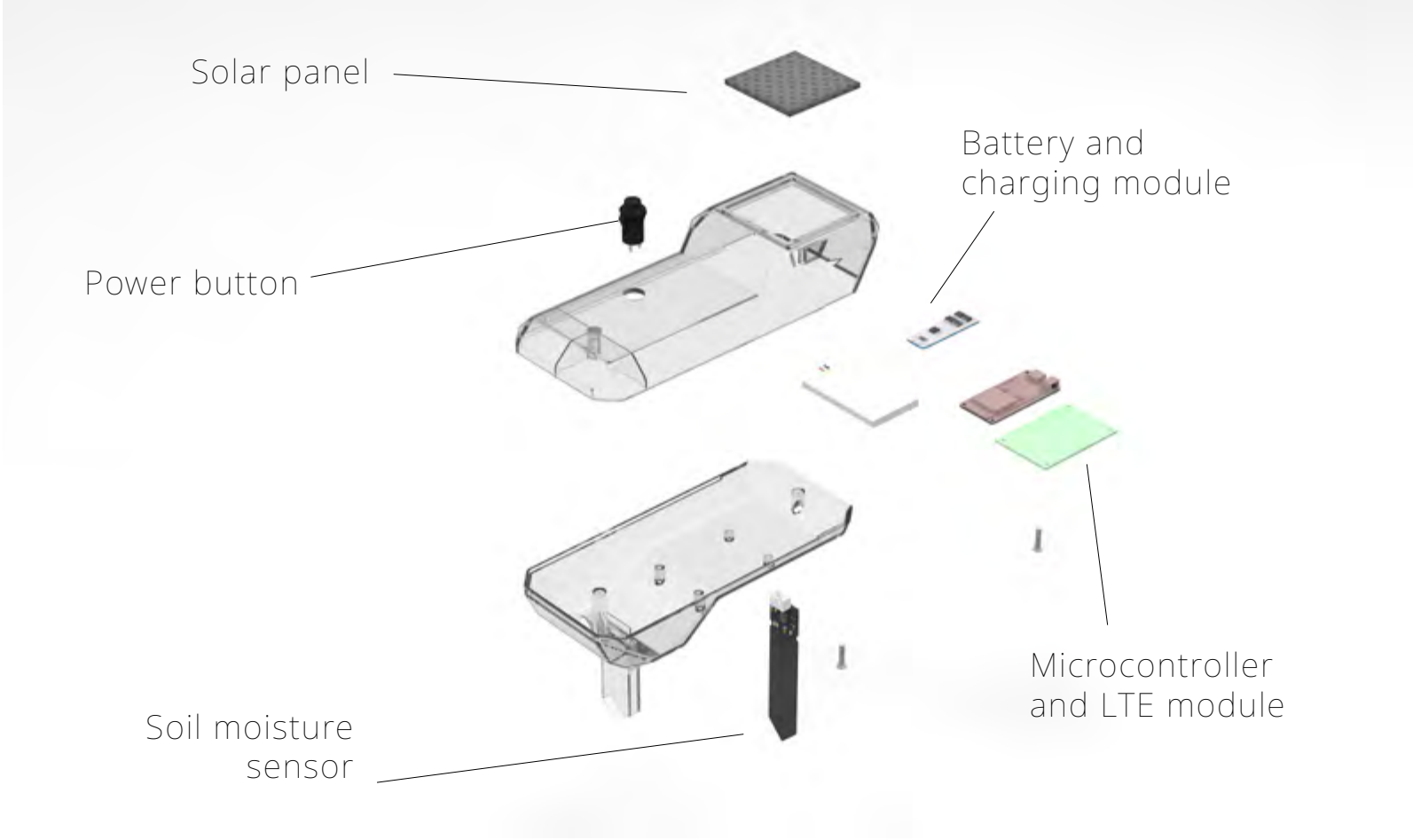
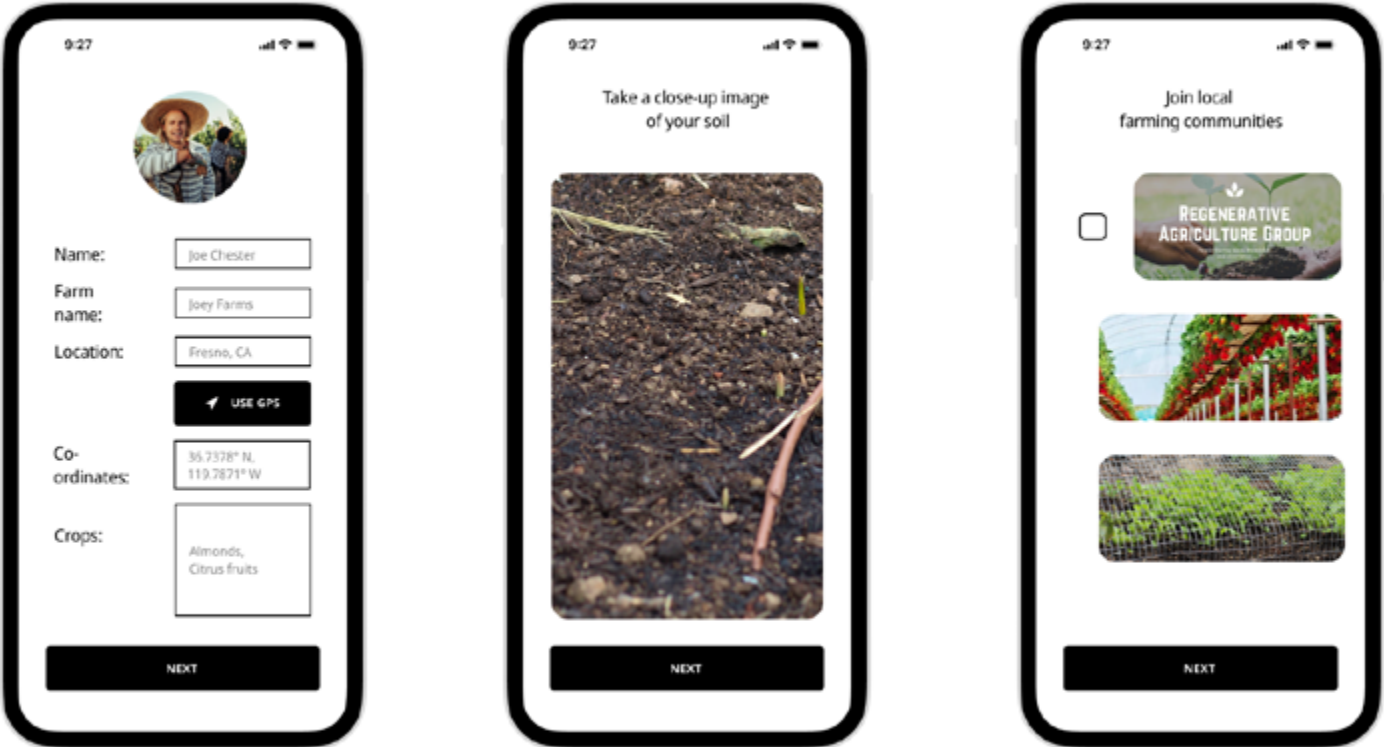
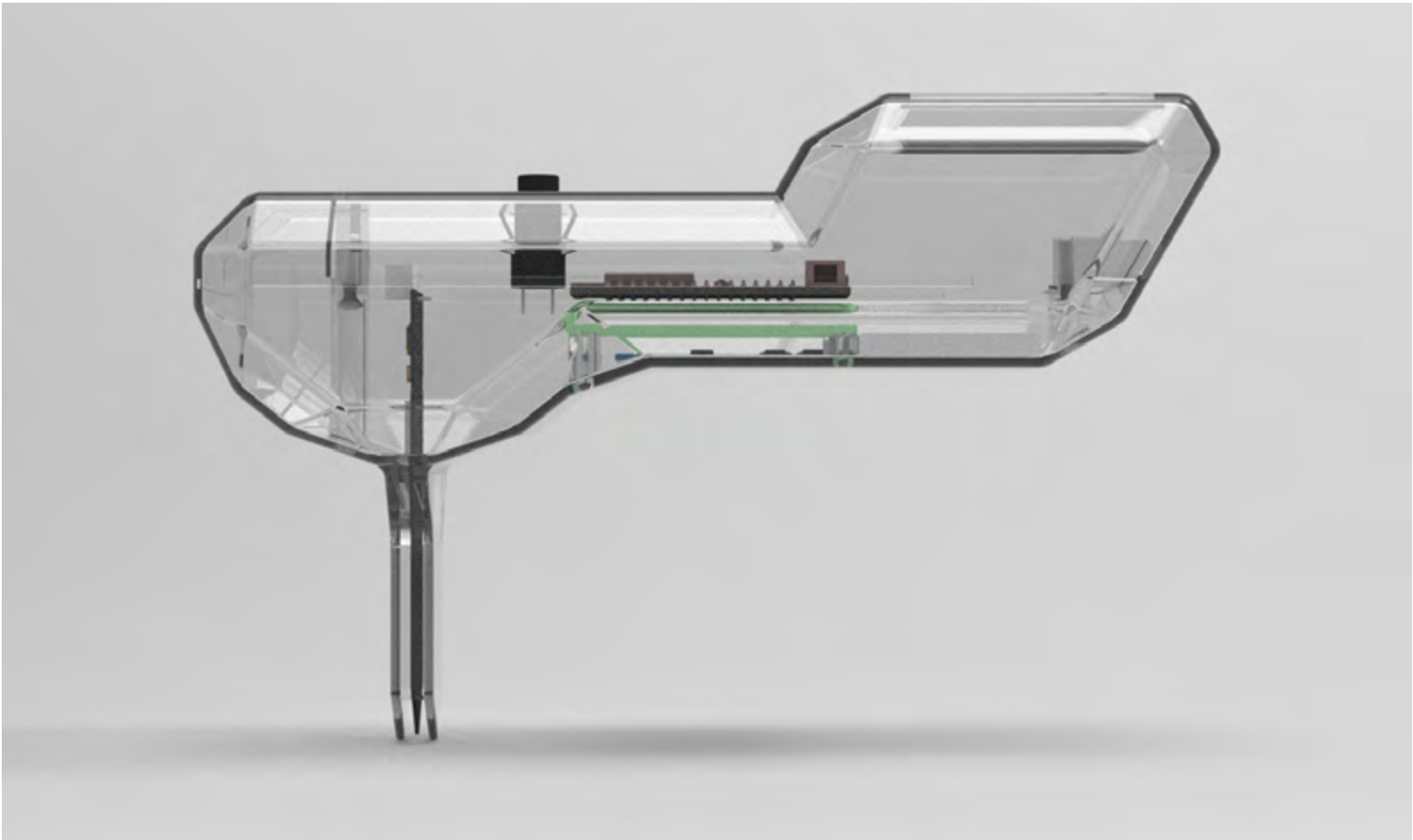
IDEATION & LOW FIDELITY PROTOTYPING

Several technologies and frameworks for improving soil health wear explored including wearable plant sensors, smart dust, robotic sensors and IoT-based sensor networks.



HARDWARE & SOFTWARE DESIGN

The final solution consists of a community based sensor network for monitoring and improving soil health. It's consists of modular hardware sensor units along with a mobile app for connecting farmers in the nearby community and providing suggestions for improvement, tracking soil history and visualizing soil health.





CONTACT DETAILS

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