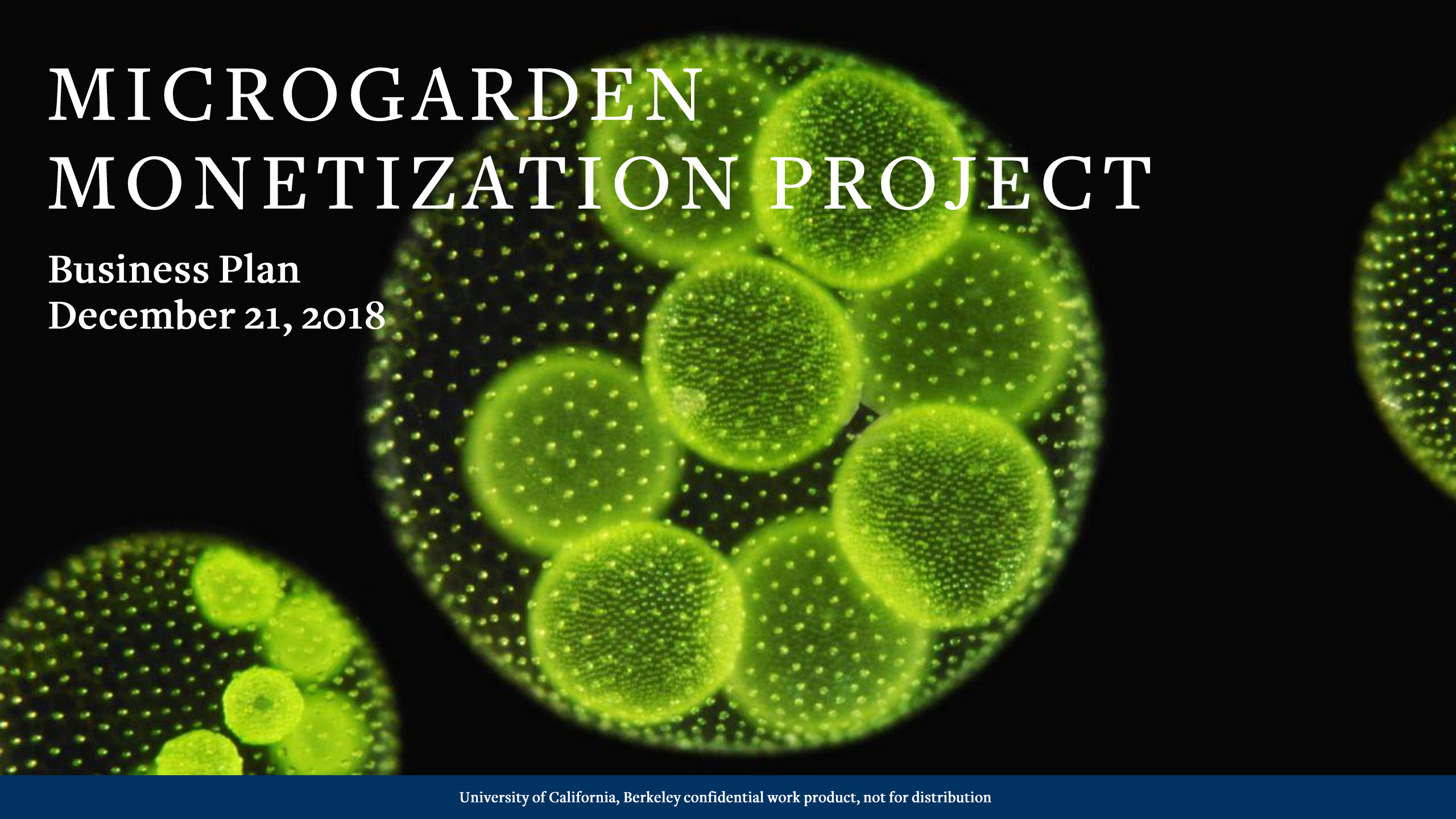


MICROGARDEN MONETIZATION PROJECT



Business Plan
December 21, 2018

Executive Summary

- The UC Berkeley Microgarden should pursue a focused and targeted growth effort that leverages its current relationships with the biology department
- Growth should be pursued with close attention to adding little to no additional overhead to the current operations.
- A paired down list of approximately 30 algae / fungal samples should be identified as a subset of the larger collection.
- Three product segments will likely drive the majority of the requests: 1) on-demand, 2) most popular, and 3) unique to UC Berkeley
- The team shall identify achievable and appropriate turn around times to inform their clients on expected fulfillment timelines and readiness.

OBJECTIVE

The goal of this presentation is to provide a starting point and a framework to begin the execution of a four stage growth process that allows the Microgarden to leverage its current strengths to expand the reach and customer base of its laboratory.

Our Understanding

SITUATION

- The global market for algae cultivation is expected to grow by a rate of 7.4% and be valued at \$1.1B by 2024. Leading this growth is the growth in algae based research to find alternative fuel sources.
- UC Berkeley has historically been at the forefront of developing new strains of algae that has developed a positive reputation in the research community.

CHALLENGES

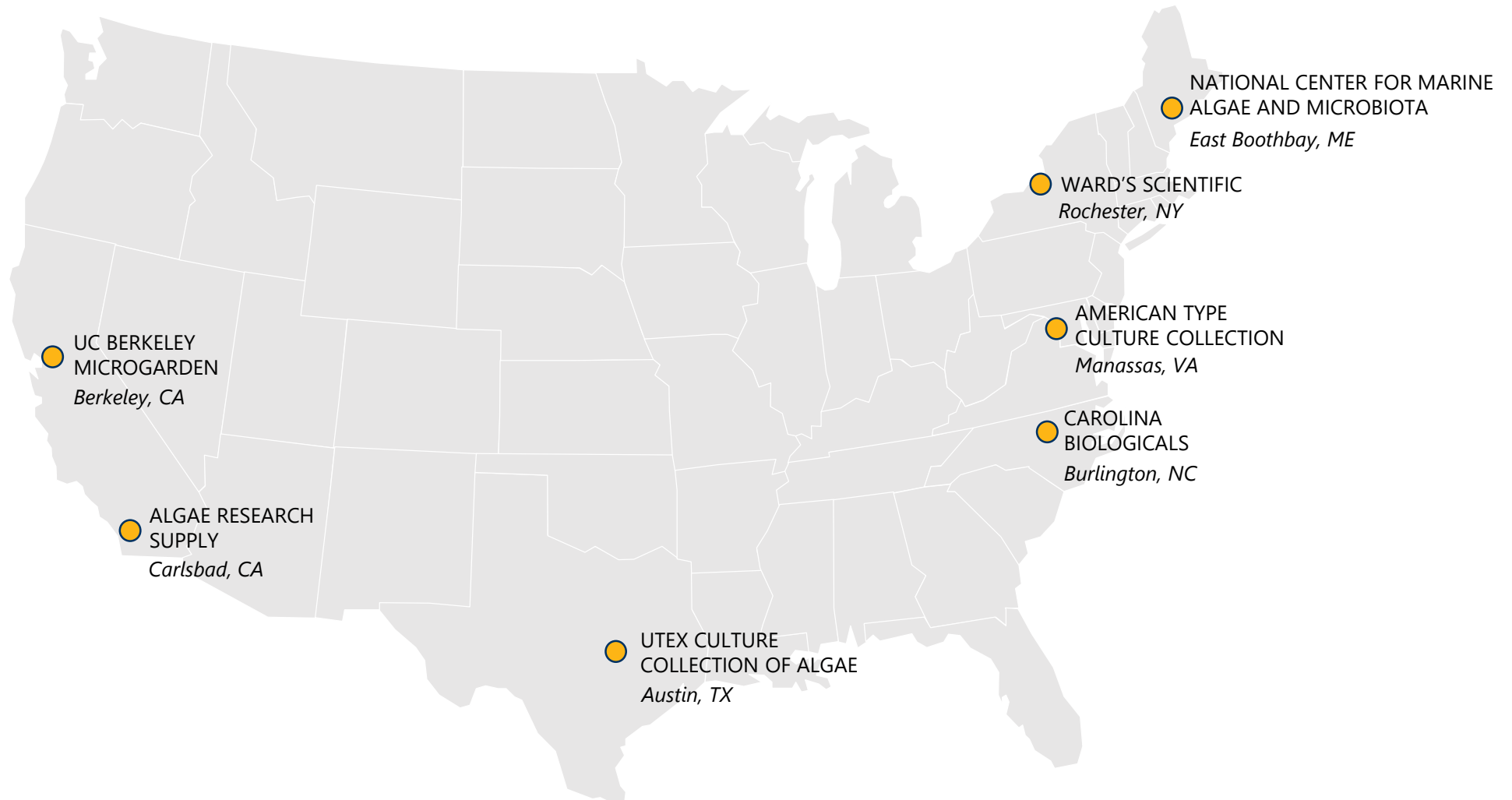
- The UC Berkeley Microgarden currently supplies algae and fungal samples to a variety of customers at virtually no cost.
- Aside from Biology 1A / 1B courses, current customers are sourced on an ad-hoc basis through word of mouth or prior knowledge of specific samples being available at UC Berkeley.
- There are lab and labor costs associated with the maintenance of a world-class catalog that are being absorbed by the University and largely uncompensated.
- There is no existing web presence on which to build a robust e-commerce platform to serve the algae market

KEY QUESTIONS

- What are the near, medium, and long-term opportunities to grow the UC Berkeley Microgarden into a viable revenue source for the lab and the College of Natural Resources?
- What are the inherent strengths, weaknesses and opportunities of the Microgarden operation?
- Who are the key competitors in this specific market? What parts of the market do they target? What, if anything, can be learned from the way they currently approach the market?
- When should each of the phases of growth be deployed?
- What resources must be secured before moving forward?

Competitive Landscape

The US market for on-demand algae culture samples is diverse. It covers activities spanning aquarium hobbyists to AP biology educators to academic researchers. There are 7 suppliers who meet the demands of the US market.



Competitors

Below is a list of the top algae / fungal research suppliers that serves a national customer base. These entities primarily serve, however are not just limited to an academic audience.

ORGANIZATION	TYPE	GEOGRAPHY	NO. OF CULTURES	PRIMARY MARKETS SERVED				NOTES
American Type Culture Collection (ATCC)	NON PROFIT	WORLDWIDE	7,500+	Research professionals, universities	●	●	●	Full service. Collection includes type strains. Largest curated library of samples, but considered expensive in the research community
UTEX Culture Collection of Algae	UNIVERSITY	WORLDWIDE	3,000+	Research professionals, universities	●	●		Not currently profitable. Has a curated list of 9 algae samples available for express purchase. Not genetically altered, predominately freshwater / soil.
Algae Research and Supply	FOR PROFIT	WORLDWIDE	< 20	K-12, educators, homeschoolers, aquarium hobbyists		●		Small education kits, culture samples, and lab tools. Algae samples priced between \$8-20.
Carolina Biologicals	FOR PROFIT	WORLDWIDE	500+	Teachers, professors, educators, professionals in health & science	●	●	●	Small education kits
Wards Scientific	FOR PROFIT	NATIONAL	< 70	Teachers & educators, K-12	●	●		Small education kits
National Center for Marine Algae and Microbiota	NON PROFIT	NATIONAL	2,500+	Researchers (marine biology),	●	●		Largest, most diverse collection of marine algae in the world. Other products / services include media kits, trainings, culture ID and consulting services.
UC Berkeley Microgarden	UNIVERSITY	WORLDWIDE (LTD)	600+	Ad hoc requests, researchers familiar with Microgarden collection, Bio 1A / 1B classes				

Pricing

The Microgarden should continue with the market accepted approach of offering differential pricing between educational institutions / non-profits and for-profit entities. Additional conversations are required to determine exact price point, but should fall within current market rates.



DIFFERENTIAL PRICING?

NO

YES

\$60

\$120

\$185

per sample
(education institutions / non-profits)

per sample
(for-profit intuitions)

per sample
(Algae Express sample)

ADDITIONAL NOTES

TBD



DIFFERENTIAL PRICING?

NO

YES

\$190+

\$220+

per sample
(education institutions / non-profits)

per sample
(for-profit intuitions)

ADDITIONAL NOTES

TBD



DIFFERENTIAL PRICING?

NO

YES

\$150+

\$175+

per sample
(education institutions / non-profits)

per sample
(for-profit intuitions)

ADDITIONAL NOTES

Full service. Collection includes type strains. Largest curated library of samples, but considered expensive in the research community



DIFFERENTIAL PRICING?

NO

YES

\$120*

\$180*

per sample
(education institutions / non-profits)

per sample
(all others)

ADDITIONAL NOTES

Pricing for algae samples should at least cover the cost of producing an individual sample (current cost estimates = ~\$100 / sample)

Suggested price

Cost of Goods Sold

The cost breakdown to produce a single organism is as follows:

GY5/2 (fungal, average- medium ingredient list, medium labor- water fungi)									
Plasticware	1 petri dish	\$0.10	5	\$0.50		GY5/2	1L	Cost per unit	Total
Media	L	\$6.78	0.2	\$1.36		P/3	1000 ml	1.2/L	\$1.20
Labor: Media	1 h	\$50.00	0.5	\$25.00		KH2PO4	1.4 g	\$106/1000g	\$0.15
Labor: Plate preparation	1 h	\$50.00	0.5	\$25.00		Na2HPO4	0.6 g	\$8.82/100g	\$0.05
Labor: Check and maint	1 h	\$50.00	0.25	\$12.50		MgSO4:7H2O	0.1 g	\$36.21/500g	\$0.01
Autoclave run (x2)	10 gallons (water)	\$0.07	144	\$9.36		Glucose	1.5 g	\$13.55/500g	\$0.04
	1 kWh (electricity)	\$0.18	90	\$16.63		Yeast Extract	0.5 g	\$112.6/500g	\$0.11
Space rental	1 week	\$0.20	1	\$0.20		Bacto Agar	15 g	\$159/454g	\$5.22
							TOTAL PER LITER		\$6.78
cost per single organism request				\$90.55			TOTAL for 200 ml Media		\$1.36

Products & Services

Within the Microgarden’s two distinct product and service categories, there exists distinct markets and offerings that should be differentiated going forward.



Algae & Fungal Samples

DESCRIPTION

The Microgarden’s typical customer will be looking to be supplied with high quality, on demand algae and fungal samples to support their education, commercial, or research interests. They will be able to select from a curated library of samples that will include the hands on expertise of the Microgarden team about how to maintain and cultivate the samples purchased.

MARKETS

EDUCATIONAL	College level biology courses on campus, UC and CSU campuses, and beyond
COMMERCIAL	For-profit entities using algae / fungal samples for research or commercial applications
RESEARCH	Academic research entities typically housed at research universities around the world

OFFERING

ON DEMAND	Select list of 7-10 samples that are always in supply and can be shipped around the world instantly
MOST POPULAR	Inventory of 20-30 samples that are most often requested by UCB customers
UNIQUE TO UCB	Samples that achieved notoriety having been founded / created by UCB faculty or researchers



Advisory Services

DESCRIPTION

There are customers who will be seeking specialized advisory services from the team at the Microgarden which requires a defined pricing model to accommodate the time and expertise of the team. For unique requests such as how to set up a new laboratory, maintenance of an existing collection, etc., the Microgarden will explore each opportunity on an as need basis, but will lean towards a **project based fee structure**.

MARKETS

LAB CREATION	Helping clients start and / or create their own microgarden labs
COLLECTION MAINTENANCE	For-profit entities using algae / fungal samples for research or commercial applications

OFFERING*

HOURLY	\$250 / hour
PROJECT BASED	Scope of project fee will be assessed on as need basis

**Any ongoing lab support / advisory work should be subject to new fees or project based assessments*

Four Stages Growth Approach

The Microgarden should explore a phased approach to growth, primarily focusing on the needs of internal customers (Biology 1A/1B ++) and then identifying new customers that leverages it’s unique geographic positioning as a west coast supplier of choice, thereby avoiding any unnecessary ballooning of overhead costs.

STAGE A

LOCAL FOCUS

The UC Berkeley Microgarden should identify classes on the UC Berkeley campus that can utilize the collection similar to the relationship established with the Biology 1A / 1B programs.

No immediate technology development required. Team can list collection samples on their current landing page .

STAGE B

STATEWIDE EXPANSION

Create partnerships with the UC and CSU systems to become the supplier of choice for introductory biology courses. Create a database of potential customer starting with UC Berkeley Alumni.

Explore the addition of a separate landing page on the CNR website that allows customers to view collection and make purchase requests online.

STAGE C

PRIVATE PARTNERS

Explore opportunities to expand the Microgarden’s service offering to meet the needs of for-profit entities like Bay Area biotech companies commercial and research interests.

Survey commercial clients to determine how the Microgarden team can meet purchasing requests (ACH payment, credit card, etc.)

STAGE D

ONLINE PRESENCE

When growth through the first three stages are more fully matured, the Microgarden should explore ways to expand it’s online presence to begin competing with larger national / international suppliers.

Identify of a third party web developer that can design, build, and deliver a robust e-commerce / fulfillment platform with appropriate brand considerations.

What is Needed to Move Forward

In order to advance the initiative forward, select infrastructure improvements and resource allocation must be addressed.

INITIAL EQUIPMENT

The Microgarden requires a retrofit / update of the two aging environmental chambers used to house the collection (which may include new compressors, fans, and a control panel) to ensure the creation and maintenance of quality, consistent samples.

OPERATIONAL GLIDE PATH

Leadership should clarify to operational / finance teams that they must provide the underlying support for the initial set up of the venture (e.g., creating internal charge strings, setting up account payables, etc.)

PHASED RESOURCES

Revenues generated from the Microgarden should be directed towards further developing the venture in the form of additional staffing, financial resources, etc.

Business Model Canvas | Phase 1: Local Focus



DESCRIPTION

The Biology 1A and 1B programs is the primary customer for the UC Berkeley Microgarden. To that end, the lab should scan the campus to identify which other programs have algae / fungal sample needs that could be met by forming a partnership with the Microgarden.

PROGRAM COMPONENTS

TBD

KEY ACTIVITIES

- 1 Engage Biology dept in discussion on areas of need where Microgarden can supply
- 2 Determine pricing structure to pilot for internal customers
- 3 Begin to pair down collection size into three segments: 1) on demand, 2) most popular, 3) UCB exclusive
- 4 Create a list of achievable turn-around times for the fulfillment within each category
- 5 Begin drafting a common "user manual" for each customer

MARKETING

Campus Discussions / Forums

Pursue focused conversations with current customers on the Microgarden collection and how to serve other educational needs

Word of Mouth

Continue to use marketing materials such as this presentation and other resources to communicate the existence of this program.

Website Landing Page

Jules and Irania should describe the Microgarden collection on the landing page, with information about TAT's and fulfillment.

KEY RESOURCES

Staffing

No additional staffing is required to support new volume from UCB. The lab will continue to be utilized as it is currently.

PARTNERS

Biology Program Coordinators

Conversations between UC Berkeley's biology department should be coordinated to identify appropriate pricing and volume for all classes that require servicing by the Microgarden.

VALUE PROPOSITION

- **Example:** UC Berkeley's biology program will identify 4 additional undergraduate and graduate level courses that require samples procured by the Microgarden each semester.
- **Value:** The biology program secures on demand fulfillment of their algae / fungal samples while supporting the laboratory of the Microgarden
- **Key Considerations:** Pricing for this service should be at the very least cost neutral (>\$100)

Business Model Canvas | Phase 2: Expand Statewide



DESCRIPTION

The UC Berkeley Microgarden can begin to explore expanding their client base to other statewide UC / CSU campuses with similar educational and research needs that exist within their respective biology departments.

PROGRAM COMPONENTS

TBD

KEY ACTIVITIES

- 1 Create a contact list of systemwide biology depts, chairs, and points of contact
- 2 Establish a pilot relationship with at least 1 other UC biology program
- 3 Determine how other UC's / CSU's source their algae samples, how much?
- 4 Assess whether any campuses could benefit from lab services the team can offer
- 5 Develop plan for ongoing relationships maintenance with statewide program coordinators

MARKETING

Word of Mouth

Once a list of UC biology department contacts has been established, begin establishing relationship

Word of Mouth

Continue to use marketing materials such as this presentation and other resources to communicate the existence of this program.

Website Landing Page

Jules and Irania should describe the Microgarden collection on the landing page, with information about TAT's and fulfillment.

KEY RESOURCES

Staffing

For pilot, staffing can be kept at current levels. If volume increases, fulfillment can be supported by hiring one temporary lab assistant to meet the additional demand

PARTNERS

UC Berkeley Biology Dept Alumni

Identify alumni who have matriculated to other campuses from UC Berkeley's biology department to understand existing educational needs

VALUE PROPOSITION

- **Example:** The Microgarden supplies educational kits for the introductory biology courses at UC San Diego and UC Davis.
- **Value:** Biology programs across the state can do business with another UC campus, while potentially receiving their algae / fungal supply at a lower cost.
- **Key Considerations:** Pricing for universities may vary depending on need and can be more than what the Microgarden charges UCB.

Imagine if...

The UC Berkeley Microgarden could identify 4 additional biology courses on campus that had a need for on demand algae cultures for the educational purposes of the class? In addition, the Microgarden identified through alums that have matriculated into teaching opportunities at other UC campuses that they would like to partner to supply algae samples for their classrooms.

PRICING MODEL

Options include:

- Creating an assessment for a fixed rate or per individual pricing
- Selling assessment scores to qualified enterprise partners
- Revenue sharing for recruitment partners

KEY QUESTIONS:

- Does UC Berkeley want to pursue a partnership with a third party?
- Which enterprise partners should we explore opportunities with?
- How does the pricing model allow UC Berkeley to scale appropriately?

Thermofisher Support

- Thermofisher does not currently have the capability to provide third party web development support to design, build, or deploy an e-commerce platform for the UC Berkeley Microgarden
- Thermofisher has expressed interest to list UC Berkeley Microgarden's collection on their "science" website for their customers to purchase directly through the lab. However, a pricing and revenue share model has not been discussed or explored.
- Thermofisher has laboratory space in their Vacaville facility that the UC Microgarden can utilize if / when space for the storage and cultivation of it's collection has overgrown the existing facilities on campus.

Berkeley
UNIVERSITY OF CALIFORNIA