



Program 1: Research Grants and Programming

Program Outputs

Leaders in Cellular Agriculture

Our philosophy is to fund people first, project second. This is because we believe that people are the most powerful infrastructure in a field, and the technical talent pool of cellular agriculture is still severely limited. We aim to support and empower leaders who will achieve sustained impact inside and outside the lab throughout their career.

Last 18 months

- Supported 36 scientists through our research grants
- New Harvest grantees participated in 45+ media and event engagements (see list in the “Additional Information” section).
- Three New Harvest fellows developed and taught the first [cellular agriculture course](#) at Tufts University in 2020. Due to its success, the course will continue in 2021.
- One New Harvest fellow drafted and shared a proposal with state representatives and senators to affect cellular agriculture research.
- One New Harvest fellow served as a guest editor for a special issue of the *International Journal of Molecular Sciences* titled “[Current Advances in Cellular Agriculture.](#)” The special issue began accepting submissions in March 2020 and will be published later in 2021.
- Four New Harvest fellows served as reviewers for a textbook on cellular agriculture (titled [Cellular Agriculture](#)) published by the American Chemical Society. This book was published in March 2021.
- New Harvest alumnus Jess Krieger founded a new company, [Ohayo Valley](#) - her second company in cellular agriculture (and the 4th company from New Harvest Research Program alumni).
- New Harvest alumnus Santiago Campuzano developed an [iOS app](#) to automate the process of counting cells - a fundamental and tedious step in most cultured meat experiments. The app is currently in beta testing.

Research Community

Beyond just financial support, our research programs create a research community environment that provides peer support, network connections, and unique visibility.

Last 18 months

- Held approximately 170 group meetings with grantees to provide the opportunity for peer-to-peer support and scientific feedback



- After feedback from grantees at the end of 2020, we implemented changes to these group meetings in early 2021. These changes were intended to adjust to the larger group size, more diverse research topics, and variety of time zones.
 - In an April 2021 satisfaction survey, 66% of grantees reported being satisfied with recent updates, including a transition to video conferencing.
 - Feedback from this survey contributed to several additional updates to the format of our meetings, implemented in June 2021. We will be gathering feedback on these changes at the end of Q3 2021.
- Grantee testimonials (Q2 2021):
 - “Working in cellular agriculture, there’s a feeling of being lost because it’s such a new field. It’s so valuable being able to connect with and learn from others who feel just as lost. New Harvest brings people and research together so we don’t have to solve every single problem we encounter from scratch every time, which makes us much more effective.” - Kai Steinmetz, New Harvest Research Fellow, New Zealand
 - “I thought at first New Harvest was just a funding organization that would cover the cost of my research and my tuition. But now I see that it’s this community that’s really there to support your research and career development and help you understand where you fit in to help build the industry.” - Vanessa Benjamin-Haley, New Harvest Research Fellow, The Bahamas

Prior to 2020

- Held five lab meets, where grantees met in person to foster a supportive research ecosystem that promotes learning from one another

Publicly Available Knowledge

Most innovation in cellular agriculture is currently occurring within private companies. This leads to a lack of independent, credible information which can appropriately guide and inform policymakers and consumers about cellular agriculture. By supporting academic research, we propel the field toward safe and transparent products.

Last 18 months

- 19 peer reviewed publications (see full list in the “Additional Information” section), bringing our total to 24 total publications from New Harvest grantees
- New Harvest grantees presented at 16 conferences and events to share their research (27 total to date).



Catalytic Funding

We believe our funding is most impactful in neglected areas, where it can be the catalyst for change. Every grantee we fund brings more people and funding into the field by mentoring undergraduates, publishing in new journals, collaborating with other labs, speaking at scientific conferences, and continuing as leaders beyond their education.

Last 18 months

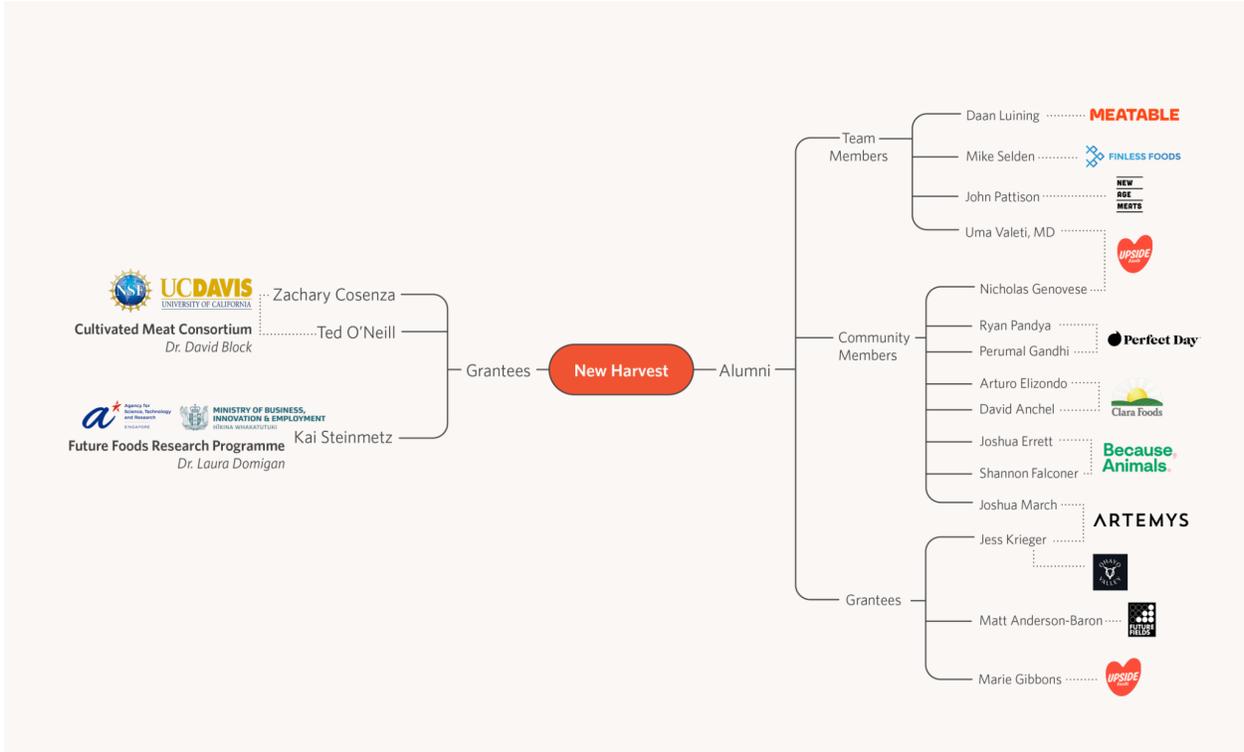
- Funded nine research labs in which New Harvest was their first funder for cellular agriculture research (23 total for program to date). All four fellowship awards in 2021 were to labs new to cellular agriculture research.
- New Harvest funding helped pave the way to securing \$5.5M for cultured meat research consortia in 2020, supporting 9 principal investigators and many researchers in training at:
 - the Future Foods Research Programme, a joint venture between the Agency for Science, Technology and Research and the Ministry of Innovation & Employment (New Zealand).
 - the Cultivated Meat Consortium at UC Davis (United States).
 - “Without New Harvest funding our first two graduate researchers, UC Davis may never have started the Cultivated Meat Consortium or won the first government grant for academic cultivated meat research in 2020. It truly planted the seed for something much greater.” - Kara Leong, Assistant Director of Development, Office of Research, UC Davis
- As of December 2020, the companies founded by New Harvest grantees, team members, and community members had raised more than \$640M and created more than 250 jobs.

Prior to 2020

- Saw a 500% increase in applications for our research grants from 2017 (6 applicants) to 2021 (36 applicants), indicating a clear need in the field. With additional funding and staff, we were able to increase the number of grantees in our program accordingly, growing from 8 grantees in 2017 to 31 grantees in 2021.
- We funded the first PhD student in cellular agriculture at Tufts in 2016. Since then, Tufts has become a hub of knowledge and talent in the field, with 8 graduate students, 2 postdoctoral scholars, 11 undergraduate students, and 5 sources of additional funding for cellular agriculture. Professor David Kaplan, the principal investigator of the research group, has also become a leader in cellular agriculture himself.



New Harvest's Network Effect:





Program 2: Cultured Meat Safety Initiative

Program Outputs

Our safety initiative program involved a series of projects connected to the program outcomes. Here we will outline each project and the associated outputs. All work on this program occurred in the last 18 months.

Fundraising Campaign: To support cultured meat safety research initiative

A fundraising campaign to support the cultured meat safety research initiative, including the cost of consultants, workshops design and implementation, and staff time.

Dates: July 2020 - December 2020

Donors: Robert Downey Jr.'s FootPrint Coalition, Center of Complex Interventions, Tipping Point Private Foundation, and Erin Culley and Richard Carlson

Campaign Reach: This fundraising campaign resulted in Robert Downey Jr. raising awareness about cellular agriculture via Robert Downey Jr.'s FootPrint Coalition's social media channels and website, in turn expanding the reach of New Harvest's mission:

- **Website:** Robert Downey Jr.'s FootPrint Coalition announced their grant to our safety initiative on their [website](#).
- **Animated Video:** Robert Downey Jr. narrated an [animated video](#) about the merits of cellular agriculture.
 - "If we continue to innovate and scale, cellular agriculture can usher in some balance that our world so desperately needs." - Robert Downey Jr.
- **Podcast/Video:** Robert Downey Jr.'s FootPrint Coalition interviewed executive director Isha Datar for their podcast, FootPrint Coalition's Downstream Channel. A [video of this interview](#) was shared on their YouTube channel and received 7,000+ views as of July 2021.

Cultured Meat Company 1:1 Conversations and Workshops

As a trusted convener in the field of cellular agriculture, New Harvest was able to bring together independent cultured meat and seafood companies to address the shared precompetitive challenge of food safety. Rather than speak for the field, New Harvest sought to act as a facilitator so that industry representatives could co-develop resources for the field.

- Held 1:1 conversations with 49 stakeholders leading up to the workshops



- These conversations were used to develop an understanding of the manufacturing processes currently being used.
- Held three virtual workshops between September - December 2020
 - 87 individuals, representing 50 companies from 18 different countries, participated (61 percent of the global industry in 2020). A full list of the participating individuals and companies can be found in the “Additional Information” section.
- Participants co-produced a modular manufacturing process diagram, portraying the majority of cultured meat and seafood production processes currently in development. This diagram serves as a framework to identify potential manufacturing hazards and product safety testing requirements. (see page 4 and 7 of the publication)
- Participants co-developed a list of priorities for future open-access research to address safety concerns for the whole community. (see page 20 and 21 of the publication)

Participant feedback:

- “New Harvest has the connections and expertise needed to bring companies together to share information and learn from each other. As a trusted, neutral third party, it’s one step ahead of regulatory agencies in encouraging openness.” - Ka Yi Ling, CTO/Co-founder, Shiok Meats, Cultured Meat Safety Initiative Participant
- After the workshops, 28 of the participating 50 companies signed on to our corporate donor program, collectively pledging more than \$80K in support of our programs and initiatives in 2021

Cultured Meat Safety Publication

The findings from the safety initiative workshops were compiled into a manuscript titled “Food Safety Considerations and Research Priorities for the Cultured Meat and Seafood Industry,” which was submitted for peer-review at Comprehensive Reviews in Food Science and Food Safety on February 1, 2021 (peer reviewers responded on April 15, 2021, and revisions were resubmitted June 28, 2021). The [preprint](#) was published on February 10, 2021 and had been viewed 1,055 times as of July 15, 2021. The final, [peer-reviewed publication](#), was published on October 10, 2021.

This publication presents the modular process diagram co-created during the workshops and outlines the open questions around precompetitive safety research that resulted from the workshops. It is the first publication in the field of cellular agriculture focused entirely on safety, providing a concrete description of current models of the cultured meat manufacturing process and allows informed targets of safety research to be identified.



Preprint: Kimberly J. Ong, Jeremiah Johnston, Isha Datar, et al. Food Safety Considerations and Research Priorities for the Cultured Meat and Seafood Industry. *Authorea*. February 10, 2021. (document attached in the “Additional Information” section)

Peer-reviewed publication: Kimberly J. Ong, Jeremiah Johnston, Isha Datar, et al. Food Safety Considerations and Research Priorities for the Cultured Meat and Seafood Industry. *Comprehensive Reviews in Food Science and Food Safety*. October 10, 2021.

Collaborators: Co-authored with Vireo Advisers (Kimberly J. Ong and Jo Anne Shatkin), Dwayne Holmes, and Vincent Sewalt

Target audience of publication: As the first of its kind, this publication identifies what data is required to demonstrate the safety of cultured meat and seafood, which will help the whole ecosystem.

- **Investors** are empowered to address and understand companies’ strategies towards developing safe products.
- **Companies** have a level playing field. Even new companies, without the funds to hire safety experts in-house, can use the framework to make informed and strategic decisions about their manufacturing process.
- **The public** is given a window into cultured meat’s safety considerations from the very beginning.
- **Regulators** are adequately equipped to consider appropriate regulatory processes for cultured meat.

Impact of publication: Although the peer-reviewed publication had yet to be published, the findings outlined in the pre-print helped to advance the conversation of safety in the cultured meat ecosystem.

- Dr. Jo Anne Shatkin and Dr. Kimberly Ong from Vireo Advisers have become the go-to experts in cultured meat safety. Since their involvement in this initiative, they have been invited to present at several fora to talk about cultured meat food safety, including at:
 - The Annual Meeting of The Society for Risk Analysis, *December 2020*
 - A meeting with Canadian federal representatives, *March 2021*
 - The upcoming Australian Institute of Food Science and Technology (AIFST), *October 2021*
 - An upcoming webinar for the Organisation for Economic Co-operation and Development (OECD) Working Party for the Safety of Novel Foods and Feeds, *October 2021*
- We had the opportunity to participate in an informational webinar for the OECD Working Party for the Safety of Novel Foods and Feeds to share an overview of cell-cultured animal food products and the safety initiative, which featured Vireo Advisers and New Harvest.



- Dr. Marko Appel and Dr. Gijs Kleter from Wageningen Food Safety Research (WFSR) were empowered to bring academia and industry together to submit a public-private partnership proposal to the Dutch government for pursuing research in food safety of cultured meat products. The grant proposal was framed around the process diagram presented in the publication.

Fundraising campaign: To support maximizing the impact of the safety publication

A fundraising campaign to maximize the impact of the safety publication by increasing accessibility of the paper. Equity and accessibility of research is a cornerstone of our work, striving toward maximizing the positive impact of this new technology. The goal of this campaign was 1) to cover the cost of the open access fee for the publication and 2) to cover the cost of developing a digital educational resources based on the findings of the publication (see “Project 2: Program Plans” for more information)

Fundraising goal: To raise \$14,000

Target audience: Community-level donors

Dates: February 2021 - March 2021

Donors: 30

Campaign results: \$14,000

Plans for follow-up: 1) To make the publication open access when it is published and 2) To develop and launch a digital educational resource based on the findings of the publication



Program 3: Community Building

Program Outputs

Last 18 months

- Collaborated on eight grant applications with research groups around the world (see table below). Three grants have been awarded, and five are at different stages of the application process.
 - Two research groups, from The University of the Fraser Valley and an unnamed university, submitted grants focused on the social aspect of cellular agriculture, bringing emerging leaders to our network and diversifying the ecosystem.
- A gift from New Harvest to the Cultivated Meat Consortium at UC Davis allowed the launch of the [Designated Emphasis in Biotechnology \(DEB\) Cellular Agriculture Research Award \(CARA\)](#) in the spring of 2021. Two doctoral students have been granted the CARA award thus far.
- A New Harvest staff member served on the advisory board for [XPRIZE Feed The Next Billion](#), a \$15M competition incentivizing teams to create fish or chicken using alternative protein sources, such as cellular agriculture.
- Completed the first phase of our ongoing listening campaign to determine the field's greatest needs, which involved connecting 1:1 with 45 cellular agriculture players. The findings will help guide future projects (see "Program 3: Project Plans").

Prior to 2020

- One of our first examples of community building are two companies which New Harvest supported in their launch: Perfect Day and Clara Foods. Both have continued to grow into major cellular agriculture companies.
 - Perfect Day has:
 - 190 employees (LinkedIn, as of July 14, 2021) and growing, with 20 current job openings.
 - raised \$361.5M in total funding, most recently with their Series C announced in July 2020.
 - obtained [GRAS](#) approval in March 2020, and throughout 2020 and 2021 launched three ice cream products using their whey protein: [Brave Robot](#), [Nick's](#), and [Graeter's](#).
 - Clara Foods has:
 - 58 employees (LinkedIn, as of July 14, 2021) and growing, with 8 current job openings.
 - raised \$56.8M in total funding, most recently with their Series B announced in April 2019.



The table below, shows a list of grants that we have supported with the potential to contribute to the trajectory of the field. *Additional grants are in progress or soon to be publicly announced.*

Project Lead Institution	Country	Grant Call	Project Title	Stage	New Harvest Role
University of the Fraser Valley	Canada	Future Skills Centre Shockproofing Canada program (CAD\$234,859)	Emerging agricultural technologies and the future of food: Exploring potential for increasing food security, local economic development, and environmental sustainability in Canada	Granted (Spring 2021)	Collaborator/ Partner
UC Davis	US	NSF Growing Convergence Research (GCR) Award (\$3.55 million)	Cultivated Meat Consortium (CMC)	Granted (Fall 2020)	Advisory Board Member/ Partner

Program 4: Public Engagement

Program Outputs

Last 18 months

- New Harvest staff had 40+ media and event engagements (see list in the “Additional Information” section), including [Science Friday on NPR](#).
- Launched a [12-part series](#) on the Cultured Meat and Future Food podcast, where cultured meat scientists a) speak frankly for a non-scientific audience about the science behind cultured meat and b) answer listener-submitted questions
 - The podcast has over 1,900 subscribers and the New Harvest episodes, specifically, have over 8,000 listens.
- New Harvest partnered with a local Brooklyn artist to design and sew cultured meat masks. We distributed masks to 450+ people across 12 countries. (See our [Instagram](#) highlight titled “Meat Masks”)
- Introduced a provocative “theme” to our (ultimately canceled) 2020 conference: [Elephant in the Room](#). A public submission Typeform received over 80 programming submissions.
 - See our [Instagram](#) highlight titled “🐘🐘🐘” for a snapshot of programming ideas submitted via Instagram.
- Additionally, we expanded opportunities for remote participation in our conference through [watch parties](#). For our 2020 conference, we received 15 applications from community members across four continents and eight countries who proposed their own livestream events. Prior to cancellation of the conference, we had an anticipated remote attendance of 510 people.
- Launched a [TikTok](#) and went viral with a [time lapse](#) of the decellularization process required to grow meat cells on a spinach scaffold. The time lapse clip ended up on a popular [YouTube](#) account with 12M+ followers.
 - Created the #cellag hashtag on TikTok. To the best of our knowledge, New Harvest is the only entity in the field to be active on the app with the exception of [Biomilq](#).
 - Our TikToks about cellular agriculture have received 566,000+ views in total.
- Ran a social media contest where community members entered to win merchandise provided by cellular agriculture companies. Over 100+ community members and 15 companies participated.
 - See [Instagram](#) highlight “swag swap”
- Published a [response](#) to a [widely circulated article in Forbes](#) written by a prominent skeptic of cultured meat. The skeptic then [responded to our response](#) on his podcast. The entire back and forth happened openly and in public. (Note that our initial response was written by Andrew Stout, a New Harvest grantee)



Prior to 2020

- In 2015, we [coined the term “cellular agriculture”](#) - creating an umbrella term, still used today, to describe both meat and non-meat efforts to grow animal products from cells. This created a shared vocabulary and purpose amongst everyone involved.
- Commissioned and published the [illustrations on this page](#) under a creative commons license. The [yellow burger](#) illustration, in particular, has become an iconic image and resource for anyone (reporters, companies, students, teachers, etc) trying to explain cultured meat.
- Hosted the [world’s first conference dedicated to cellular agriculture](#) in 2016, an act which effectively established the field by bringing everyone working to develop animal-free animal products together under the umbrella of “cellular agriculture.” We have hosted four conferences to date in San Francisco, Brooklyn, and Boston, making a specific effort to engage an audience outside of the highly saturated West coast.