Good Food Institute

Seeding RADICAL CHANGE

2021

YEAR IN REVIEW

About the cover and theme

Seeding radical change

The word “radical,” from the Latin *radicalis* meaning “of or having roots,” fascinates us. Its figurative meaning, “going to the origin, essential,” dates back to the 1650s. More recent meanings include “unconventional,” “very new and different from the usual or ordinary,” and “of people favoring rapid or sweeping changes in laws and government.” In botany, a plant’s radicle is its primary root—the first organ to appear when a seed germinates. A plant’s radicle grows downward into the soil, anchoring the young seedling to enable its breakthrough growth toward sunlight.

This word beautifully captures our 2021. Science-driven and solutions-focused, GFI is rooting our future food system with the support it needs to grow and flourish. We are laying the foundation for far more life-sustaining ways to feed the world, including radically reimagining how meat is made. Like what happens in healthy soil, GFI is growing a networked ecosystem, with nodes of connection brought together by supportive relationships and shared resources. Our work is enabling alt proteins not just to crack the surface, but to stretch toward the sun.

As the world faces choices at the intersection of climate and global health, “radical regeneration” is a phrase increasingly used to describe what it will take to enable a diversity of life to survive and thrive on our small blue dot of a planet. We couldn’t agree more.

Thank you for supporting our work. Together, we are seeding radical change.

Leadership team

Bruce Friedrich
founder and CEO

Varun Deshpande
GFI Asia managing director

Mirte Gosker
GFI Asia Pacific acting managing director

Gus Guadagnini
GFI Brazil managing director

Richard Parr
GFI Europe managing director

Sneha Singh
GFI India general manager

Nir Goldstein
GFI Israel managing director

Ilya Sheyman
president

Jessica Almy
vice president of policy

Caroline Bushnell
vice president of corporate engagement

Sarah David
general counsel and vice president of administration

Susan Halteman
vice president of development

Liz Specht, PhD
vice president of science and technology

Sheila Voss
vice president of communications

2021 by-the-numbers

Grantee Dr. Martinez and student group at Aarhus University

54

Research grants awarded

GFI awarded $5.7 million in grants focused on advancing the science of alternative proteins to research projects across 10 countries on four continents.

75

Reports and peer-reviewed papers

Open-access data and insights published by GFI's global teams, grantees, and programmatic partners grew understanding of and support for the rapidly evolving alt protein ecosystem.

2,310

GFIdeas community participants

In 2021, 800+ new members joined this multidisciplinary community of entrepreneurs, investors, and scientists who meet regularly to connect with, learn from, and help one another transform the global food system.

16

University campuses growing next-gen alt protein innovators

Student and academic leaders worldwide helped launch nine new alt protein courses, hosted 70+ events, and motivated faculty researchers to apply for (and successfully secure!) grants that they likely would not have otherwise.

Stanford Alt Protein Project students taste Wildtype cultivated salmon

10,000+

Stakeholders that GFI convened and connected

People hailing from 70+ countries were brought together by 130+ GFI-hosted conferences, technical workshops, roundtables, seminars, and networking events.

6,000+

Media hits, quotes, and op-eds

GFI's thought leadership found its way to outlets of influence, helping to grow public support and political will for alternative proteins as a global solution to global problems.

What's inside

In 2021, GFI grew the alternative protein ecosystem around the world.

GFI's international network is strategically rooted in the economies and geographies most critical to hastening a global protein transition. Based in hotspot hubs throughout Asia Pacific, Brazil, Europe, India, Israel, and the United States, each team pursues strategies that meet their region's specific needs while mobilizing system-scale change capable of redefining how the world makes meat. On this map, we note just a few of the top achievements of each region in 2021.

United States

GFI U.S. is ensuring that alternative proteins are recognized as an essential strategy to combat climate change while catalyzing public investment. After intense engagement with GFI U.S., the U.S. Department of Agriculture (USDA) announced a $10 million grant to create a center of excellence in cellular agriculture at Tufts University. This marks the USDA's first significant investment in cultivated meat and the U.S. government's largest to date.

Europe

GFI Europe is giving alternative proteins the support they need to flourish by advocating at the highest levels of government. After close engagement with GFI Europe, the National Food Strategy (NFS) team in the United Kingdom recommended a watershed £125 million investment in alternative protein research and innovation (more on page 8). GFI Europe also rallied nonprofit groups to strike down a proposed expansion of plant-based dairy labeling restrictions.

Brazil

GFI Brazil is seeking climate solutions in the natural world and inspiring influential companies to invest in transforming the global food system for good. Alongside the Climate and Land Use Alliance and other partners, GFI Brazil is optimizing native plant species to create alternative protein ingredients (learn about the Biomes Project on page 5). GFI Brazil also celebrated JBS's landmark $100 million investment in cultivated meat. In its press release, the world's largest meat company acknowledged GFI's support in reaching this milestone.

Israel

GFI Israel is accelerating innovation and breaking barriers to securing government support for alternative proteins. Ahead of his first meeting with U.S. president Joe Biden, Israeli prime minister Naftali Bennett sought GFI's expertise on the climate impact of food systems, even sharing a printout of GFI Israel's presentation with President Biden. Earlier in the year, at a 200-person event organized by GFI Israel, the CEO of the Israel Innovation Authority announced that he would "do everything possible to promote Israel's leadership in the field of alternative protein."

GFI's theory of change:

GFI works around the world to advance alternative proteins (plant-based and cultivated meat) to be as delicious, affordable, and accessible as conventional meat. By reimagining how meat is made, we can reduce harmful environmental impacts of our food system, decrease the risk of zoonotic disease, and feed more people with fewer resources. As a science-driven, international network of nonprofit organizations funded 100 percent by philanthropy, GFI is uniquely positioned to accelerate alternative proteins in ways that grow the entire field, creating a world where alternative proteins are no longer alternative.

The Good Food Institute is the most important organization pushing this work. It's second-to-none in the influence of its public policy efforts, its centrality to the ecosystem of companies and researchers, and its international footprint. It has also been effective at convincing traditional meat companies to explore alternative proteins, which could lead both to important products and turn political enemies into allies.

—Ezra Klein, "We Will Look Back on This Age of Cruelty to Animals in Horror"

The New York Times

India

GFI India is seeding and nurturing new growth for alternative proteins by empowering leaders across the sector. This year's India Smart Protein Innovation Challenge inspired more than 700 researchers and early-stage entrepreneurs to launch their careers in the field. The Smart Protein Summit 2021 brought together more than 1,100 attendees from 10 countries, fostering key connections in the alternative protein ecosystem.

Asia Pacific

GFI Asia Pacific is convening scientists and innovators to cultivate the alternative protein ecosystem across the world's most populous continent. This year, the GFI APAC team released groundbreaking new research and a B2B database on Singapore's plant-based meat manufacturing landscape that is galvanizing the industry. GFI APAC also addressed regional talent-pipeline bottlenecks by launching Southeast Asia's first alt protein university module and drove the conversation about food system change in Asia's largest media outlets.

Alternative proteins

increasingly recognized as a solution for tackling climate and biodiversity loss on planet-scale

If we could take a trip through Earth's history from the deep past into the present, what would we see? We would watch in awe as ecosystems blossom and shift, constantly adapting to make space for new life.

If we looked into the future, what would we wish to see? We would hope to discover fertile soil nourishing the next generation of growth, forests cleaning and cooling the air, waters teeming with vibrant life, and a global community whose members peacefully coexist with one another and the natural world.

The climate crisis is a direct threat not only to our world today but to the diversity of life this world can enable for future generations. We can face this threat head-on by transforming our food system in ways that simultaneously achieve global climate goals and protect biodiversity. Alternative proteins are key to scaling solutions quickly: We can reduce emissions, reverse deforestation, and allow ocean ecosystems to recover if we radically rethink how we use land and produce protein.

Throughout 2021, GFI's teams in Asia Pacific, Brazil, Europe, India, Israel, and the United States advanced alternative protein research, mobilized resources and talent, and empowered partners across the food system to address the root causes of the biggest challenges of our time. Together, we are creating radical change from the ground up.

Solutions rooted in nature

"Although nature is rich, this wealth must be used wisely. This could be humanity's great step into the future," said GFI Brazil scitech manager Cristiana Ambiel as she reflected on the Biomes Project.

Brazil is host to 20 percent of the world's biodiversity, and GFI Brazil's Biomes Project was inspired by the dizzying fact that a new species of flora or fauna is discovered in Brazil every three days. This groundbreaking project is designed to grow the alt protein ecosystem by taking inspiration from Brazil's natural resources and optimizing native plant species into sustainable food ingredients. As Cristiana notes, Brazil's ecosystems contain unparalleled riches, and protecting them from the harms of conventional farming practices is crucial.

GFI Brazil launched the Biomes Project in partnership with the Climate and Land Use Alliance to identify the potential of native species to create delicious, affordable products while promoting the preservation of biodiversity and sustainable use of natural resources. The project funds research aimed at seven plant species from the Amazonian and Cerrado regions. By incorporating principles of bioeconomics into the food production chain, the project has the chance to increase the domestic food supply and develop products that compete in the international market with unique flavors—all while benefiting both landscapes and livelihoods. The Biomes Project shows how investing in the natural world can create win-win-win solutions.

Although nature is rich, this wealth must be used wisely. This could be humanity's great step into the future.

—GFI BRAZIL SCITECH MANAGER CRISTIANA AMBIEL

Alternative proteins as a growing climate policy priority

"Unless industrial meat consumption goes down, no government in the world will stand a chance of meeting their climate obligations," stated Bruce Friedrich, GFI's founder and CEO, in a March 2021 conversation with *The Guardian*. "Now is the time for governments everywhere to use public dollars for the public good."

In 2021, GFI's international teams continued to advocate alternative proteins as a climate policy imperative on par with renewable energy. For more than a year, our U.S. team worked with Bill Gates's Breakthrough Energy on the group's Federal Climate Policy Playbook and Corporate Climate Action Playbook. The final policy report, which launched in February, endorses GFI's policy goals and highlights four of our resources.

We need concrete, practical solutions that give consumers choices while reducing emissions—The Good Food Institute does just that. I appreciated their collaboration on our Breakthrough Energy Corporate Climate Action Playbooks.

—BILL GATES ON LINKEDIN, FEBRUARY 2021

This year, GFI U.S. also joined forces with Climate Advisers and ClimateWorks Foundation to highlight alternative proteins as a key policy solution to the global climate crisis. The groups' policy brief focuses on the importance of alternative proteins in reaching Paris Agreement targets and calls for international cooperation in support of alt protein open-access research and development (R&D) and private sector incentives for both R&D and manufacturing.

By highlighting the value of government policies that elevate alternative proteins as a climate change mitigation strategy, we are inspiring others to join us in persuading governments and industry alike that alternative proteins urgently need their support.

Guaraná — studied for its potential as a sustainable ingredient for alt proteins

GFI in the news

South China Morning Post

To avert a climate crisis, governments need to reinvent meat

June 2021

"By using public funds to reduce consumption of conventional, resource-intensive meat and dairy, in favour of more nutrient-dense and sustainable alternatives, nations can contribute to a necessary global shift and preserve life on this planet for future generations,"

— GFI Asia Pacific senior communications manager Ryan Huling.

AFN

Can food systems really get to 'net zero?

July 2021

"Meat consumption per capita in the US is at an all time high and education for behavior change won't solve this problem on its own, but alt-proteins can tackle several problems at once, including climate change, antibiotic resistance, global hunger, and deforestation,"

—GFI corporate engagement project manager Emma Ignaszewski.

The New York Times

Next Food Frontier: Fish Made From Plants, or in a Lab

September 2021

"It's simply a smarter way to make seafood. Full stop."

—Mirte Gosker, GFI Asia Pacific acting managing director.

Planting the seeds for a global protein transition

GFI's teams around the world are ensuring alternative proteins are front and center in the global conversation on climate and public health. By nurturing key relationships with governments, nonprofits, and industry partners and leveraging our international network of GFI affiliate organizations, we're positioning alternative proteins on the agendas of the world's most influential conferences and international governing bodies.

At the first-ever United Nations Food Systems Summit held in September, GFI served as the innovation lead for action track #2, "Shift to sustainable consumption patterns." At the summit, Singapore's minister for sustainability and the environment, Grace Fu, stated: "We're also looking at novel foods, such as alternative proteins, which can be game changers for high-yield food production. We hope that these new methods can contribute to greater food security."

Billboard for COP26, Glasgow

Richard Parr, GFI Europe managing director, attending COP26 as a member of the GFI delegation

The following month, GFI teams engaged more than 50 representatives of governments, nonprofits, and industry who gathered in Glasgow for the most significant climate event of the year: the United Nations Climate Change Conference (COP26). With ClimateWorks Foundation, Climate Advisers, and the Atlantic Council, we also co-hosted an event focused on advocating government support of alternative proteins, moderated by the World Economic Forum. During the conference, GFI CEO Bruce Friedrich attended a 40-person dinner hosted by USDA secretary Tom Vilsack and UAE climate minister Her Excellency Mariam Almheiri to launch the Agriculture Innovation Mission for Climate, a joint initiative of the United States and the United Arab Emirates designed to accelerate climate-smart agriculture. Reflecting on the role alternative proteins will play in the transformation of our food system, Minister Almheiri stated: "We see alternative proteins as a key to strengthening food security and global climate mitigation efforts. Research and development is vital to driving alternative protein innovation and advancing the sustainability and resilience of our food system. We must mobilise political will and investment to accelerate the transition of our food system to more sustainable ways of producing protein for future generations."

A path toward a brighter future is right in front of us

Picture what's possible when food production relies on far less land, enabling forests and grasslands to stretch from sea to sea. Imagine the ocean when its wild populations bounce back. Think of the rivers, creeks, gulfs, and bays that are cleaner—and the human communities that are healthier—because industrial animal agriculture is no longer the default.

This brighter future relies on the world to radically rethink its relationship with food, land, and animals. As we move closer to 2030, the year by which global emissions must be halved in order to stand a chance of limiting warming to 1.5°C, the choices we make increase in importance and urgency. In 2021, GFI's work with the climate community and global leaders nourished the soil of the alt protein ecosystem, ensuring a better food future can take root and grow.

Seeding public leadership in the global protein transition

Acacia Smith and her team at GFI Europe moved quickly when they saw a rare opportunity to plant alternative proteins within a nation's food strategy.

The time was ripe. Having just left the European Union, the United Kingdom was looking for new opportunities to build a more sustainable and secure food system. Through the National Food Strategy (NFS), the nation was shining a bright light on its food supply—the first review of its kind in 75 years.

Acacia and her team laid down a strong foundation of connection with the NFS team—relationships they carefully tended through a tailor-made roundtable, technical discussions, supportive guidance, and shared resources. Through these networks of collaboration, GFI anchored the NFS team's support for alternative proteins and inspired them to call on the government to invest £125 million to drive innovation in the sector.

This focus on foundational ecosystem building—on connectivity, partnership, and resource-sharing with powerful public and private sector institutions—is central to GFI's work. Just as sunlight and healthy soil are vital elements for yielding strong, fruitful crops, GFI's global teams are building supportive networked ecosystems that are conducive to growth within the alternative protein community. In 2021, this work produced an abundance of opportunities for the growing sector.

Government investment cultivates transformation

While GFI Europe planted faith in alternative proteins within the NFS, advocacy efforts across GFI's international network nurtured similar belief within governments around the globe.

In Israel, GFI's collaboration with the Israeli government has created a vibrant ecosystem for alternative protein industry growth. This collaboration led to an invitation for GFI Israel managing director Nir Goldstein to brief Israeli prime minister Naftali Bennett on alternative proteins' climate advantages and action recommendations for U.S.-Israeli relations ahead of Prime Minister Bennett's first meeting with U.S. president Joe Biden.

"This was a once-in-a-generation chance to reimagine the national food system and strengthen the way future generations feed themselves. Alternative proteins had to be on the menu as a solution."

—ACACIA SMITH, GFI EUROPE POLICY MANAGER

The collaboration between GFI Israel and the Israeli government also inspired Israel's ambassador to the Food and Agriculture Organization of the United Nations (FAO), Yael Rubinstein, to organize an event dedicated to Israeli alternative protein innovation. In this first-of-its-kind gathering, delicious tastings of cultivated meat were prepared by Aleph Farms and served to the 100 guests in attendance, allowing senior leaders from the FAO, the World Food Programme, and the International Fund for Agricultural Development to taste the future of food.

Nir Goldstein and Ambassador Yael Rubinstein

Israel will play a key role in making this future a reality.

—NIR GOLDSTEIN, GFI ISRAEL MANAGING DIRECTOR

In the United States, GFI's advocacy efforts helped establish U.S. Representative and House Appropriations Chair Rosa DeLauro as the leading alternative protein champion in Congress. In 2021 Chair DeLauro called on the Biden administration to increase funding for alternative protein research, and she has repeatedly conveyed her support for GFI's mission.

Rep. DeLauro speaking at the opening plenary of the 2021 Good Food Conference

I'm honored to join you for the Good Food Institute's third annual conference: Charting the global roadmap for alternative proteins. ... I want you to know that I share this goal and have been proud to champion the growth of this movement since the beginning, and I'm thrilled with the progress we have made together in this past year.

—U.S. REPRESENTATIVE ROSA DELAURO (CT-03), CHAIR, HOUSE APPROPRIATIONS COMMITTEE

GFI Asia Pacific harnessed the power of the pen to put alternative proteins on the minds of millions in 2021. By placing pieces in influential outlets, GFI APAC reached critical masses of consumers and other decision-makers in the world's fastest-growing market for alternative proteins. Through a guest column in *World Food, Agriculture & Fisheries*—the official magazine of the FAO office in Korea—GFI APAC senior communications manager Ryan Huling cultivated a compelling vision to influence leaders across the region: "As the world slowly emerges from a traumatic period of pandemic-driven supply chain disruptions and public health emergencies, forward-thinking governments and business leaders are quietly constructing a more resilient global food system that could prevent future crises. A central element of that shift toward increased food security and sustainability is to reimagine meat consumption through innovative use of alternative proteins."

As governments strive to achieve bold national climate goals, alternative proteins offer a powerful solution for dramatically reducing the climate and public health risks of conventional animal agriculture. Establishing a robust set of internationally consistent codes and standards is essential to advancing the alternative protein sector and will support the transition to a more sustainable, secure, and just global food system.

—MIRTE GOSKER, GFI ASIA PACIFIC ACTING MANAGING DIRECTOR

Healthy regulations inspire healthy growth

For the alternative protein ecosystem to grow and thrive, it must be rooted in a healthy and equitable regulatory framework. Internationally consistent public policy must place alternative proteins on equal ground with other proteins to smooth the path to market.

Building a fair, clear, and efficient global regulatory framework is no small task—it requires scientists, entrepreneurs, and specialists who bring a deep understanding of the industry and international policy to explore potential bottlenecks and map solutions. In 2021, GFI's regional teams from Asia Pacific, Brazil, and the United States joined forces with the Western Pacific regional office of the World Health Organization (WHO-WRPO) to convene a historic two-day workshop to discuss the development of clear, efficient, and consistent regulations for alternative proteins. A second high-level event in which GFI Asia Pacific and GFI U.S. took part was the "Roundtable for Novel Food Regulations" organized by the Singapore Food Agency (SFA). SFA brought together representatives from GFI, WHO, FAO, startups, academia, and regulators from the United States, the United Kingdom, the Netherlands, Kuwait, Morocco, Australia, and New Zealand, to map out a path for fair labeling, trade, and approval for alternative proteins.

As part of our efforts to establish an international regulatory framework for alternative proteins, GFI teams in Brazil and the United States applied for and were granted official observer status in the Codex Alimentarius ("food code") Commission, a FAO-WHO initiative developing global standards to enhance the safety, quality, and fairness of food trade. GFI Brazil also continued to work closely with Embrapa, the main state-owned research entity affiliated with the Brazilian Ministry of Agriculture. In 2021, Brazil surpassed the United States for grant applications in GFI's call for proposals, with many coming from Embrapa itself, motivated by GFI Brazil's multiple presentations to Embrapa's scientists that urged more researchers to see themselves in the alt protein field.

Governments must double down

Inspired by GFI's work in 2021, global leaders are recognizing that alternative proteins will play a vital role in feeding future generations sustainably and nurturing life on this planet. For alternative proteins to continue gaining momentum, governments must double down in their support to radically reimagine how meat is made.

As Acacia thinks about her own team's work in 2021 and how that work syncs with the efforts of her GFI colleagues around the world, she's energized and optimistic. She knows she is part of a global, focused team rooted in science and scalable solutions: "With more public investment in alternative protein research, with more legislation that helps farmers and rural communities reap the rewards of these fertile new markets, and with the creation of robust regulations, we can hasten the transition to a more sustainable food system."

Working with shared purpose and relentless focus

While GFI is six distinct organizations strategically based around the world, we operate as a collaborative network with a shared set of objectives focused on system-level change.

Objective

01

GFI fosters a strong open-access alternative protein research and training ecosystem

GFI's science and technology teams map out the most neglected areas that will allow alternative proteins to compete on taste and price. We meet these challenges by developing open-access research and resources, educating and connecting the next generation of scientists and entrepreneurs, and funding research that benefits alternative protein development across the sector.

In 2021, GFI teams prioritized investing in both science and students, knowing the transformative power of each to nourish a growing alternative protein ecosystem. This past year alone, GFI awarded $5.7 million to 54 open-access research projects across 10 countries on four continents. At 16 of the world's top universities, GFI engaged and supported students and faculty to create new alt protein courses, pursue critically needed research, and share their work with the world. In just the past year, GFI grantees and staff scientists published 15 peer-reviewed articles based on GFI-funded research.

Chapel Hill Alt Protein Project

I see GFI as a platform beyond a funding platform. For junior faculty like myself, that grant was very important and I was able to develop my program. I was able to develop my network and secure that ten million dollar grant in collaboration with Dr. Kaplan. I was introduced to Dr. Kaplan by GFI, and without having GFI in the field, I wouldn't be successful. And I'm pretty sure that's the same feeling that so many people actually have.

—DR. REZA OVISSIPOUR OF VIRGINIA TECH, GFI GRANTEE AND RESEARCH PARTNER FOR A CENTER OF EXCELLENCE FOR CELLULAR AGRICULTURE TO BE ESTABLISHED AT TUFTS UNIVERSITY

Objective
02

GFI influences the public sector to support alternative proteins

GFI's policy teams around the world ensure that alternative proteins are a part of the policy discussion around climate change mitigation, global health, and biosecurity. In every region where we have a presence, we advocate government funding and incentives to transition to alternative proteins and are paving the way for the approval of novel proteins such as cultivated meat.

In 2021, GFI's international teams connected and mobilized several thousand government leaders, agencies, and other key stakeholders in multiple regions, convening coalitions, forums, and roundtables aimed at catalyzing cross-sector support for alt protein R&D. We also saw elected members of global governments champion increased investment and directly engage peers and funding agencies with forward-looking focus and urgency.

"The opportunity to invest more in alternative protein research has a boundless array of benefits that look out for decades. There's little we can do that will make more of a difference more rapidly than shift away from industrial meat production."

—U.S. REPRESENTATIVE EARL BLUMENAUER (D-OR), REPRESENTING THE 3RD DISTRICT OF OREGON

Objective
03

GFI influences the for-profit sector to prioritize alternative proteins

GFI's corporate engagement teams are catalyzing a transformation of our global meat supply. We work to replicate past market transformations by showing companies of all sizes, from startups to multinational corporations, how alternatives to animal products can be profitable while meeting environmental, social, and governance goals.

In 2021, GFI expanded its groundbreaking Advancing Solutions for Alternative Proteins project to Europe, helping companies and other stakeholders direct resources and talent to the most urgent and important challenges and opportunities across the sector. To spur further innovation, GFI teams met with more than 150 high-priority institutional investors and investor organizations to increase the capital flowing into the sector—a critical need for scaling the industry and delivering competitive products to market in ways that help the private sector meet corporate ESG and global goals.

"The investment is by far the largest ever made in this area by a traditional meat company. With this movement, JBS shows that it is willing to invest heavily to become the leader in cultivated meat production and immediately changes the global competitive scenario. We are increasingly certain: Brazil will play a leading role in the future of plant-based and cultivated meat."

—RAQUEL CASSELLI, GFI BRAZIL'S CORPORATE ENGAGEMENT MANAGER, REFLECTING ON JBS'S ACQUISITION OF CULTIVATED MEAT COMPANY BIOTECH FOODS

Raquel Casselli, GFI Brazil's corporate engagement manager

Stay up-to-date on each of these fronts by signing up for monthly highlights at gfi.org/newsletters

Breaking through:

A better food future rooted in science

"Meat without the animal," pondered Elliot Swartz in 2016, then a PhD candidate studying neuromuscular diseases at University of California Los Angeles. "How difficult could it be?"

Now serving as GFI's lead scientist on cultivated meat, Dr. Swartz is just one member of a growing network of multidisciplinary researchers around the world applying their signature curiosity and scrutiny to radically reimagine how meat is made. With the world at a climate crossroads, GFI is activating a new generation of scientists and students to see themselves working in the alt protein field, collaborating as a networked team, and hastening a global protein transition in our lifetimes.

A diverse, interconnected, collaborative ecosystem of scientists and science-driven practitioners is key to this transition, and in 2021, GFI grew and strengthened this network in new and catalytic ways.

UPSIDE Foods' new cultivation room

Nourishing the scientific soil

As a nonprofit think tank and open-access resource hub, GFI is uniquely positioned to empower high-quality research that nourishes the scientific soil and serves as the foundation for alternative protein growth. Our research program and engagement with universities fosters innovation, from our annual competitive research grant program and white space collaborations to exploratory grants and curriculum building.

The projects we fund not only address the most promising solutions to the field's most pressing challenges but also help researchers establish themselves in alternative protein science; secure funding from additional sources; and place alternative proteins on the radars of research institutes, colleges, and companies around the world.

Take Dr. Ciara McDonnell, a GFI grantee and renowned meat scientist who focuses on optimizing the flavor and function of plant-based proteins. With GFI's support, McDonnell and colleagues were able to integrate alternative proteins into the long-term institutional research agenda of Australia's national agency for scientific research. Then, in 2021, McDonnell seized the opportunity to lead the research team at a Sydney-based alternative protein company, crediting GFI's funding and support for her decision.

This exciting next chapter for McDonnell doesn't just advance the current alt protein field. It sends a strong and urgently needed message to her colleagues in conventional meat science: Focusing on alternative proteins is an incredibly worthy career shift that can tilt the world toward a more sustainable food future.

Elliot Swartz, PhD
GFI's lead scientist for cultivated meat

Growing a global ecosystem of foundational science for the field

McDonnell's path is one of many that GFI influenced this past year. In 2021, GFI U.S.'s Competitive Research Grant Program, which focused on whole cuts of meat and seafood, selected 38 awardees in 10 countries to receive a total of $5.6 million in funding (grants range from $50,000 to $250,000). GFI Brazil supported 14 additional grantees with $425,000 through its Biomes Project, a research initiative for universities and research institutions focused on native products from the Amazonian and Cerrado biomes. GFI Israel awarded $70,000 through two exploratory grants to Israeli researchers focused on plant-based technologies and launched another local grant program aiming to fund four exploratory research projects with $160,000.

Beyond supporting individual grantees, our team made significant strides to integrate alternative proteins into some of the world's leading research powerhouses. GFI India successfully engaged the Council of Scientific & Industrial Research, a national agency that coordinates 38 key laboratories across the country, to consider a proposal to prioritize alt protein research, set up infrastructure, and mobilize the scientific community. In Israel, the GFI team and GFI grantee Gaya Savion were instrumental in launching the Israeli cultivated meat consortium, an Israel Innovation Authority-facilitated group of more than 20 academic labs and companies working together to pilot scale production of cultivated meat, backed by $19 million in government funding.

In addition to supporting people and projects, GFI's science and technology team published numerous papers, reports, and analyses that contributed critical data and insights to inform the still-nascent field of alt proteins. Among these was the world's first-ever life cycle assessment and techno-economic analysis for cultivated meat that involved industry and government data and participation, all of which was shared under NDA with the researchers hired by GFI.

These studies created the most inclusive picture ever of what a global transition to cultivated meat might look like, indicating that massive environmental benefits could be realized by such a shift, and that, with government support, cultivated meat can become cost-competitive with some conventional meats by 2030. These same studies also spurred healthy conversation about the future of cultivated meat, illustrating the need for further research and development in the sector.

In all, GFI's team of experts contributed significantly to humanity's baseline knowledge of alternative proteins. Collectively, GFI's grantees and staff scientists had 15 professional papers published; released a production-volume forecasting model for each of the industry's three pillars; produced an in-depth analysis on a key cost driver (cell culture media); updated research summaries for alternative seafood; and made available a refreshed ATLAS database (ArcheType Library for Alternative Seafood, an open-access tool scientists can use to prioritize species for further research). (See the "Alternative seafood is sustainable seafood" spotlight on page 18.)

Breaking through the surface, grabbing global sunlight

Among the indicators of GFI's impact is the well-deserved attention earned by our own experts, grantees, and research partners, as well as the extent to which others are acknowledging and prioritizing alternative protein science in their own institutions.

The American Association for the Advancement of Science, the world's foremost scientific professional society, shined their light on the published papers of Dr. Julian McClements and his GFI-supported team by featuring them in the new Nature journal, *Science of Food*. In Europe, GFI grantee Dr. Mario Martinez was named the 2021 recipient of the Nils Foss Talent Prize, awarded to a talented and promising upcoming scientist who has made a significant contribution to the application of analytical technology to improve the sustainable use of agricultural resources.

Mario M. Martinez and students at the Department of Food Science and Aarhus University, Denmark

The power of a connected, collaborative community

While accolades and attention for individual research projects help raise the profile of the field, the true sustaining power can be found in the dynamic and ever-evolving network itself—the regular gatherings, the sharing of resources, and the exchanges of scrutinous questions and inspiring insights among colleagues who share a stake in one another's success. Throughout 2021, GFI served as a counterfactual convener, forum, and facilitator of knowledge exchange among scientists, students, and other stakeholders.

Each year, GFI engages the scientific community on the most urgent and important challenges, which are based on a database known as Advancing Solutions for Alternative Proteins (ASAP). To ensure this resource identifies the most promising solutions for the most pressing challenges, our team continually analyzes the current scientific landscape, identifies current and potential bottlenecks, and publishes concept notes that outline specific opportunities. In 2021, the ASAP platform published 20 new concept notes and earned about 20,000 page views across the entire database.

From our monthly Science of Alt Protein seminar series, technical workshops, and scientific advisory meetings to in-depth symposia and global conferences attended by thousands, in 2021 GFI brought together the brightest minds who are using science to produce proteins in novel ways. Take, for example, GFI India's Smart Protein Summit: The team convened a "Training the Next Generation" roundtable, at which all attendees, including leading scientists from India's most important research universities and cradles of innovation, expressed willingness to join together in supporting the National Mission for Smart Protein encompassing university coursework; R&D funding; and industry support, including lab- and pilot-scale infrastructure. (See pages 19-20 to learn more about 2021 events.)

Students planting seeds of alt protein science at universities worldwide

"I would not have known about cellular agriculture, nor the need for cell ag curriculum, without GFI's Alt Protein Project," shared Molly Gordon, a PhD candidate in cell biology at Johns Hopkins University.

Perhaps the most energizing proof of GFI's impact is in the students who are transforming their institutions into innovation hubs for alternative protein education, research, and new career pathways.

Just one clear indicator of change on the front lines: The Chapel Hill Alt Protein Project hosted their second North Carolina Alt Protein Ecosystem meetup this past year. The event was attended by 27 entrepreneurs, academics, and students from across North Carolina. Student leaders led the group through a brainstorm of challenges to and potential solutions for building an alternative protein hub in North Carolina. As proof of the success of these efforts, the Chapel Hill Alt Protein Project's faculty-led cultivated meat course maxed out its enrollment on day two of course registration for the spring 2022 semester.

In Singapore, the GFI Asia Pacific team worked with Nanyang Technological University, one of Asia's leading universities, to launch a precedent-setting course that will be replicated throughout the world's most densely populated region. Because of GFI's proactive efforts, this course will create a pathway into the sector for new talent, a vital effort that helps solve a field-wide talent bottleneck.

"These are all strong signals of growing grassroots momentum at universities worldwide," reflected Amy Huang, GFI's university innovation manager. "Students are powerful agents of change. They can reshape academia—and thus the future of food—in ways that no one else can."

Students are powerful agents of change. They can reshape academia—and thus the future of food—in ways that no one else can.

—AMY HUANG, GFI'S UNIVERSITY INNOVATION MANAGER

Students from UNC Chapel Hill's Alt Protein Project hosting a campus taste test of plant-based meat

Science can lead the way and light the path

The stakes get higher each year as the world nears dates by which global climate targets must be met. Complexities and challenges are everywhere on every front. Technological, political, economic, and social obstacles are real and numerous. How then, do GFI scientists approach this extraordinary work?

"We have a chance to shift how the world feeds itself," reflects Dr. Liz Specht, GFI's vice president of science and technology.

"Sustainable alternatives to conventional meat are breaking through. We see it in private investments, public investments, start-up companies, and announcements from established meat companies launching alt protein products and initiatives. We see more researchers working in this space, which is incredibly energizing on so many levels. All of this wasn't happening four or five years ago. Yes, significant challenges lie ahead, technological and otherwise. But look at what science and innovation has made possible. We've got a shot at changing how meat is made, and we're taking it."

We've got a shot at changing how meat is made, and we're taking it.

LIZ SPECHT, PHD
GFI'S VICE PRESIDENT OF SCIENCE AND TECHNOLOGY

Each month, we host two online seminars with leading experts from around the world: the *Science of Alt Proteins* and the *Business of Alt Proteins*. Learn more and register at gfi.org/community

Reports and publications that fed the field

In 2021, GFI and our strategic partners around the world published 60 authoritative reports, analyses, and data-driven insights designed to contribute critically needed baseline scientific and technological knowledge to the still-nascent field of alternative proteins—while informing and influencing public and political support for new ways of making meat.

A sampling of policy briefs, articles, and in-depth analyses

Global Food System Transition is Necessary to Keep Warming Below 1.5°C

April 2021

A policy brief co-published by GFI, Climate Advisers, and ClimateWorks Foundation, focused on the importance of alternative proteins in reaching Paris Agreement climate targets and setting out priority recommendations in advance of the UN Food Systems Summit and COP26

US Federal Climate Policy Playbook

March 2021

A publication of Breakthrough Energy, a Bill Gates-led nonprofit that spun out of his climate-focused venture fund, to which GFI contributed expertise and entire sections that position alternative proteins as a critical component of reaching net-zero emissions

LCA and TEA for cultivated meat

March 2021

A first-of-a-kind life cycle assessment and techno-economic analysis conducted by independent research firm CE Delft with support from GFI; the first studies to utilize data from government scientists and companies active in the cultivated meat supply chain and paint the most inclusive picture to date of the anticipated environmental impacts and costs of cultivated meat production

Scaffolding Biomaterials for 3D Cultivated Meat: Prospects and Challenges

November 2021

A comprehensive review of scaffolding technologies for cultivated meat, led by GFI senior scientist Claire Bomkamp, PhD, published in one of the most influential scientific journals in the world

Climate Advisers and Breakthrough Energy have joined GFI to make a compelling case that we cannot address the climate crisis without funding public research on alternative proteins. By putting protein diversification squarely on the agenda of U.S. and world leaders, we've significantly accelerated progress toward net-zero emissions.

—JESSICA ALMY, GFI VICE PRESIDENT OF POLICY, REFLECTING ON THE IMPACT OF THESE SIGNIFICANT REPORTS ON THE ENGAGEMENT OF POLICYMAKERS

Spotlight:

Alternative seafood is sustainable seafood

Conventional fishing practices adversely impact ocean ecosystems by contributing to climate change, harming habitats, and threatening marine species with extinction. Sustainable seafood is a climate solution that can protect the ocean and the diversity of life it enables. This past year, GFI's Sustainable Seafood Initiative (SSI) grew the plant-based and cultivated seafood ecosystem by publishing open-access resources, convening stakeholders, and advocating science-driven policies.

In 2021, the SSI team published an updated Ocean of Opportunity action paper and released a new version of an in-demand seafood species characteristics index, including the decision-making tool ATLAS (ArcheType Library for Alternative Seafood). Currently no other tool in the world does what ATLAS does—compiling data and calculating scores for environmental sustainability, public health, animal welfare, and seafood market sizes. By sharing data and convening conversations focused on environmental impacts and global health, GFI's SSI team is accelerating the development of delicious, truly sustainable seafood alternatives.

"P.S. The ATLAS site is fantastic!"

—Dr. D. Julian McClements, distinguished professor, Department of Food Science, University of Massachusetts, and author of *Future Foods: How Modern Science Is Transforming the Way We Eat*

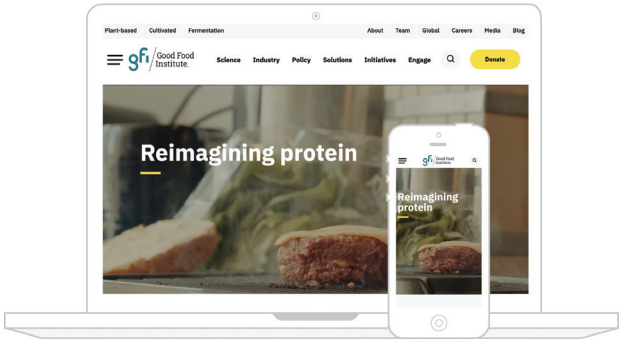
HIGHLIGHTS

Industry and innovation reports and resources

April	*Global and U.S. State of the Industry reports*
May	*Israel State of Alternative Protein Innovation Report*
May	*China Alternative Protein Innovation Insights: Plant-Based Meat*
Sept	*An Ocean of Opportunity: Plant-based and cultivated seafood for sustainable oceans without sacrifice*
Oct	*European Sustainable Proteins Market Research*
Dec	*The APAC Alternative Protein Ecosystem Database*

It's incredibly helpful to have GFI as an unbiased source of truth and knowledge. Independent data points like GFI's are how Homecoming can gain comfort to make investments in technologically dependent industries.

—CODY EVANS, HOMECOMING CAPITAL



GFI.org / The world's go-to reference for all things alt protein

In February 2021, GFI's new website launched and has since grown to become an in-demand information hub, serving as the world's go-to resource for the latest on alternative protein science, policy, and markets. The in-depth and expertly curated site, coupled with sister websites for our work in Asia Pacific, Brazil, Europe, India, and Israel, has become essential for informing, growing, and catalyzing the field.

Alternative proteins on the global stage:

GFI as convener, connector, and catalyst

From monthly seminars to global conferences, GFI hosted more than 130 events that connected 10,000+ people across sectors, disciplines, and geographies.

HIGHLIGHTS

Good Food Conference 2021

Attendees: 1,530

GFI's first-ever online conference that brought together scientists, policymakers, food company executives, entrepreneurs, investors, civil society leaders, students, and journalists from 67 countries and featured 50 live sessions with 200+ expert speakers and panelists

GFI India's Smart Protein Summit

Attendees: 1,134

A three-day, GFI India-convened event that gathered more than 1,100 science, business, and policy stakeholders and decision-makers from 10 countries to push forward urgent action across the Indian alternative protein, or "smart protein," sector

India needs to change its mindset around smart protein. It's a necessity to feed people. Feeding the planet should be a national mission for all of us.

—SURESH NARAYANAN, CHAIRMAN AND MANAGING DIRECTOR, NESTLÉ INDIA

WHO x GFI workshops: Regulatory and food safety aspects of protein alternatives to conventional animal products | ***Attendees: 120***

Co-hosted by GFI and the Western Pacific regional office of the World Health Organization (WHO-WRPO), featuring in-depth presentations from GFI Asia Pacific, Brazil, India, and the United States

Scientific and regulatory workshops for Brazilian regulators | ***Attendees: 60+***

A series of GFI-convened workshops that brought together officials from Brazil's ministry of agriculture and national health agency, renowned Brazilian scientists, and food safety experts from the European Food Safety Authority, the USDA, and the FDA

Climate and societal impacts of cultivated meat in Japan | ***Attendees: 400***

A high-profile webinar hosted by GFI Asia Pacific in collaboration with the Japan Association for Cellular Agriculture—an influential government-academia-industry coalition; attended by Japan's largest meat companies, top global media outlets, and seven governmental agencies

OTHER EVENTS LED BY GFI AND OUR STRATEGIC PARTNERS

Science of Alt Protein seminars (1,837 attendees) | Business of Alt Protein seminars (1,978 attendees) | GFI Consultancy x FoodPlus roundtables (1,200+ attendees) | Merck Cultivated Meat Expert Roundtable discussion series (90+ attendees) | Alt Protein Project student-led event series (1,764 attendees) | India Smart Protein Innovation Challenge webinars (750 attendees) | Costs and Environmental Impacts of Cultivated Meat webinar (563 attendees) | Seafood Webinar and Informal Networking (SWIM) webinars (658 attendees) | GFI x Bay Area AP networking mixer (80 attendees)

Even though we're deep into the field of alternative protein investment, the Good Food Conference 2021 surfaced insights and concepts that help inform and propel our work. The in-depth science sessions, policy panels, and pitch slam presentations especially energized us, equipping our team with increased optimism around the innovations and practical pathways that are getting us to a better food future. Kudos to the GFI team for convening and catalyzing the field!

—LISA FERIA, MANAGING PARTNER AND CEO, STRAY DOG CAPITAL

GFI on the global stage

GFI's international team of experts spoke on the world stage alongside governments and allied organizations working to place food and agriculture firmly on climate and global health agendas.

HIGHLIGHTS

UN Food Systems Summit

In collaboration with the World Economic Forum, GFI led an alternative protein working group of more than 50 nonprofits, universities, and companies to garner support and implement ideas in conjunction with the UN Food Systems Summit. The group co-created an integrated set of innovative alternative protein solutions to build a healthier, more sustainable, and equitable food system.

Codex annual meeting

Thanks to the hard work of GFI's policy experts, Codex added alternative proteins to this year's agenda and established GFI as the field's subject matter expert, inviting the FAO and the WHO to call on us to provide technical assistance and introduce them to alt protein companies and scientists around the world.

COP26

A global delegation from GFI attended the COP26 summit in Glasgow. The team co-hosted an event focused on rallying government support for alternative proteins, joined allied organizations to advocate an $11 billion alternative protein "sprint" via Agriculture Innovation Mission for Climate, and placed billboards around Glasgow. In the lead-up to Glasgow, GFI Israel hosted a reception for the Israeli delegation, serving cultivated chicken to government officials and securing enthusiastic commitments to embracing alternative proteins as part of Israel's national climate strategy.

OTHER EVENTS WHERE GFI AND OUR STRATEGIC PARTNERS TOOK THE STAGE

2021 China Meat Health Consumption Industry Conference | Asia-Pacific Agri-Food Innovation Summit | Blue Eco Forum 2021 | EY Innovation Studio | Financial Times Global Food Systems Summit | Food Biotech Congress | Future Food-Tech | Gulfood | Hi & Fi Asia-China 2021 | International Society for Stem Cell Research | Industrializing Cell-Based Meats & Seafood | International Tropical Agriculture Week | New Food Conference | New Hope Natural Products Expo | The Culinary Institute's Global Plant-Forward Conference | The Global Conference for Food Safety Regulation and Sustainability | UN General Assembly | Wired Conference 2021

Recordings for GFI-convened conferences and events are accessible via gfi.org. Visit gfi.org/events to see upcoming events.

In the news:

The power of sunlight on the story of alt proteins

Throughout 2021, GFI's insights and resources were sought and featured in leading global and national media outlets, enabling us to grow public support and political will for alternative proteins.

MAKING SENSE

Food, Climate, and Pandemic Risk

April 2021

"There is immense potential here for allocating more resources, more talent, more attention toward this field and having that manifest as a really outsized impact on the world." —Liz Specht, PhD, vice president of science and technology, GFI

TIME

The Cow That Could Feed the Planet

November 2021

"Just like renewable energy and electric vehicles have been successful because of government policies, we need the same government support for cultivated meat."—Bruce Friedrich, founder and CEO, GFI

CNN

How alternative meats could help save the planet

September 2021

By Bruce Friedrich, founder and CEO, GFI; and Dr. Anand Gopal, executive director of strategy and policy, Energy Innovation

"The world is highly unlikely to meet Paris Agreement targets unless conventional meat consumption goes down globally, and so far, the only plausible suggestion for making that happen is to produce the meat that consumers love—but to make it from plants or to cultivate it from cells."

The New York Times

Climate Change: What Must Be Done, Now

August 2021

By Bruce Friedrich, founder and CEO, GFI

"If we really believe that climate change is 'code red for humanity,' the climate community should support government funding for research as well as private sector incentives for plant-based and cultivated meat."

The Economist

Can Americans be convinced to eat less meat?

November 2021

"It's really critical that we get more government investment in this space … alternative proteins are just massively underinvested in as a climate solution." —Caroline Bushnell, vice president of corporate engagement, GFI

nature biotechnology

No bones, no scales, no eyeballs: appetite grows for cell-based seafood

November 2021

"Each step of the (cultivation) process presents its own set of challenges. Developing cell lines, for example, can consume years of a company's early R&D budget." —Jen Lamy, senior sustainable seafood manager, GFI

CNBC

This whole-plant start-up is taking on Asia's meat industry

April 2021

"Demand for plant-based meat is skyrocketing. We have seen, in 2020, a 300 percent increase globally in [plant-based, fermentation-enabled, and cultivated protein] investments. And here in Asia Pacific, we actually saw a sixfold rise in investments in alternative proteins." —Mirte Gosker, acting managing director, GFI APAC

Shoutouts for GFI

"Alternative proteins have massive potential to mitigate climate change, and GFI's global teams of experts are accelerating the shift through their excellent policy, science, and corporate engagement work, as well as through their extensive open access resources and insights. QCF is proud to support them."

—CRESSIDA POLLOCK AND TONG WU, QUADRATURE CLIMATE FOUNDATION

"Having the opportunity to present my research on a GFI stage was a milestone moment for me. Being there with my fellow panelists and engaging with the researchers that GFI convened led to so many connections I would not have made otherwise. This field is quickly luring the brightest of the brightest minds and GFI excels at bringing them together."

—MIEK SCHLANGEN, PHD CANDIDATE IN FOOD PROCESS ENGINEERING, WAGENINGEN UNIVERSITY

"Few things are more important than creating a more sustainable future of food. That's why I'm so enthusiastic about GFI's work - they harness science, policy, and the power of capitalism to create the sort of food future that I've been committed to through Whole Foods for my entire adult life. I'm pleased and proud to support them."

—JOHN MACKEY, FOUNDER, WHOLE FOODS

"Brazilian Agricultural Research Corporation began researching the plant-based product segment in 2018, and it was an immense joy to get to know GFI right from the start. You act as bridges between the production sector and the research and development sector. In this sense, GFI's support for Embrapa is essential in our movement toward innovation. It is not just about financial support for our research, but also about producing knowledge about the market, connections with the production sector, and consumer research that you develop, which also guide our decision-making. We can only thank you for the work you do in Brazil and the world."

—CAROLINE MELLINGER SILVA, PHD, RESEARCHER AT EMBRAPA

"I've had the fortune to witness the massive impact GFI is having on our food system and planet from the inside and outside. There is no better resource that synthesizes the progress, challenges, and opportunities within the global alternative protein sector. GFI is not only an essential resource for the alternative protein industry, it's also a key catalyst for change within our food system—bringing people and ideas together to solve some of the biggest challenges facing our planet. GFI also brought me together with my two co-founders at Synthesis Capital!"

—DAVID WELCH, SYNTHESIS CAPITAL

"Everyone in GFI's orbit knows the extent to which GFI shapes and hastens the alt protein industry. Less well publicized, but equally important, is how it sculpts its people into conscientious and capable future leaders of the industry."

—BLAKE BRYNE, GFI ALUM

Bruce Friedrich named a "2021 American Food Hero" by *EatingWell* magazine

EatingWell's annual American Food Heroes list honors people who are "shaking up the food world in exciting and impactful ways." The magazine declares: "Behind the scenes of this [alternative protein] surge—everywhere you turn, from advising new companies and funding scientific research to sparking our cultural obsession with meat alternatives—is Bruce Friedrich."

Seeding RADICAL CHANGE

Our global relationship with food and food systems must be radically reimagined. Your support gets the world closer to a sustainable, secure, and just food future.

GFI.ORG

gfi / Good Food Institute℠

Powered 100% by philanthropy, GFI is an international network of organizations working to make the global food system better for the planet, people, and animals.

Mission:

We are developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.

Vision:

A world where alternative proteins are no longer alternative.

Values:

Believe change is possible.
Do the most good we can.
Share knowledge freely.
Act on evidence.
Invite everyone to the table.

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