

TOWARDS PERSONALIZED GASTRONOMY 2050



PROJECT

**GASTRO
NOMÍA**



bcc
innovation



basque
culinary
center



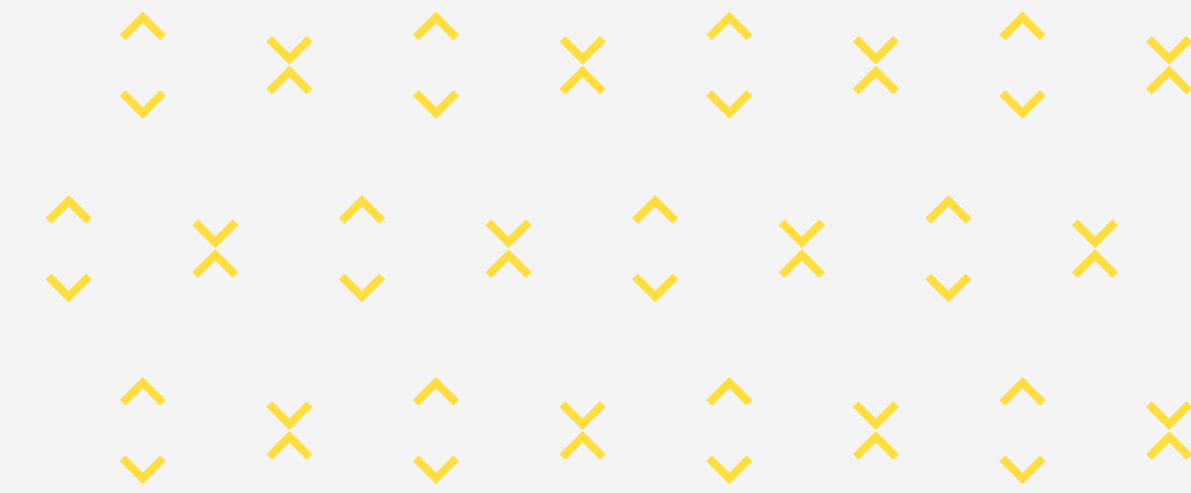
Project Gastronomía:
Towards Personalized
Gastronomy 2050



Author: BCCInnovation

Disclaimer
This report summarizes discussions held in an informal workshop setting. The views expressed are those of the individual participants who took part, and do not necessarily reflect those of their respective organizations, the Basque Culinary Center nor Project Gastronomía.

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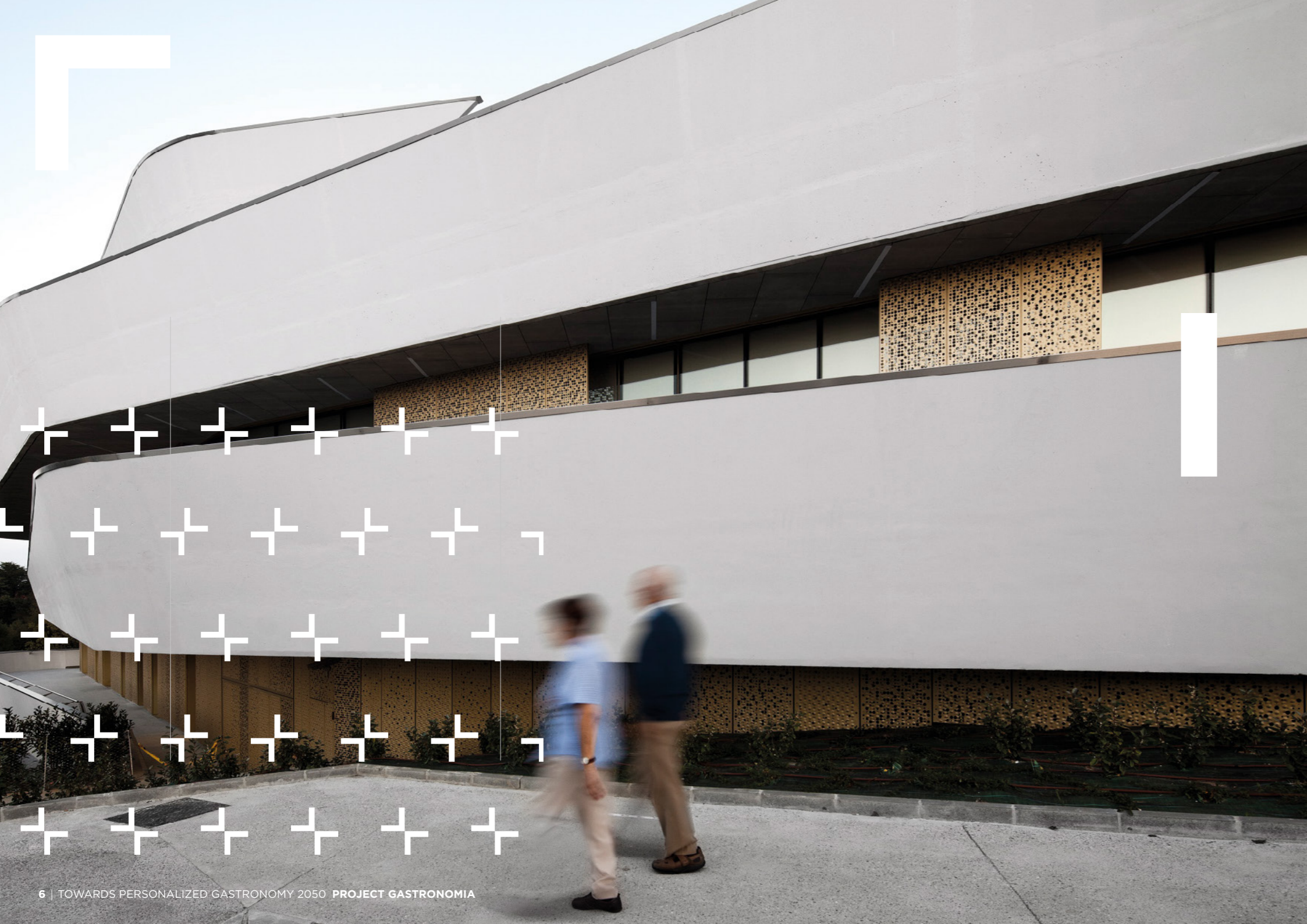




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FOREWORD

If you do not know the Basque Culinary Center, you might think “Why is a cooking school organizing an event with scientists, doctors, cultural experts, and technologists?” First of all, we are not a cooking school. From its very inception, we conceived BCC as exemplifying a multidisciplinary approach to gastronomy. This holistic vision is essential to the Basque Culinary Center.

Today over 600 students from over 32 countries are at the Basque Culinary Center - many are enrolled in our multidisciplinary degrees that include cooking, applied sciences, management, and more. We are also a research center, a gastronomy-focused technology center within the Basque Science, Technology, and Innovation Network. When we started the Basque Culinary Center there was nothing like this at an international level.

Project Gastronomía, an initiative led from our center, imbues this holistic vision and also challenges old ones. Fifteen years ago, gastronomy was fine-dining or haute-cuisine. Today, gastronomy is more democratic and more complex. Initiatives like Project Gastronomía help us explore the complex challenges and possibilities of gastronomy as a vehicle to achieve healthier longer lives, environmental sustainability, and tackle climate change.

In this spirit, “Towards Personalized Gastronomy 2050” brings together invited experts at the forefront of the research and generating new knowledge in areas such as nutrigenetics, nutrigenomics, public health, artificial intelligence, and more. It is essential that we work together with key companies, research projects, and different experts to listen and produce concrete solutions. Together, these experts help us look for answers and reconsider how we think about gastronomy.

I hope all of you will bring home samples of inspiration that you can apply in your everyday life.

Welcome!



Joxe Mari Aizega
Director of the Basque Culinary Center (BCC)



ACKNOWLEDGEMENTS

MANY THANKS TO EACH OF OUR EXPERTS WHO PARTICIPATED IN OUR WORKSHOP AND EVENT:

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OVERVIEW

WHAT IS PROJECT GASTRONOMÍA?

Project Gastronomía is an initiative that addresses the food system challenges of the future through gastronomy in ways that are humanistic, sustainable, healthy, and delicious.

We believe we best do this by creating a space for multidisciplinary stakeholders to reflect on these challenges and create relevant solutions today. Through our workshops and events, we help stakeholders create images of the future of food, foster network creation, and formulate practical actions to enact change.

Project Gastronomía is led by the Basque Culinary Center's BCCInnovation. BCCInnovation's mission, as a technology center, is to generate applied knowledge about gastronomy and the culinary experience and transfer it to haute cuisine professionals, the gastronomy value chain, and society as a whole.

OUR PREVIOUS EVENTS

As part of our mission to bring gastronomy stakeholders together, we have held a number of events that center on rethinking the possibilities of gastronomy. Our most recent events include:



Gastronomy and Multisensory Design 2050.

A two-day event bringing together chefs, food scientists to hospitality designers to discuss multisensory design and the future of London's food system in 2050.



Interfaces Summit at Copenhagen Techfest 2018.

Capstone activity for the Summit held by Mold Magazine, where participants from academia, tech, design and food industry developed scenarios for Copenhagen 2035.



Fine Dining Restaurants in 2050.

A workshop-led event to explore how fine dining could be reinvented, with experts and participants from Azurmendi (a three Michelin star restaurant) to Moley Robotics.



Gastronomy & Tech 2050.

Exploration of the impact of technology on gastronomy with workshop participants from IDEO, MIT Media Lab, and others.



Barcelona Maker Faire.

A panel discussion at Maker Faire moderated by FAB City Global Initiative with Barcelona Food Hub and Aquapioneers.

TOWARDS PERSONALIZED GASTRONOMY: EUSKADI 2050

After holding events in London and Copenhagen in 2018, our last event of the year focused on our home of Euskadi (Basque Country): "Towards Personalized Gastronomy: Euskadi 2050." The two-day event brought together multidisciplinary perspectives from AI experts to public health experts and researchers to business leaders to explore the future of Personalized Gastronomy in the Basque Country.

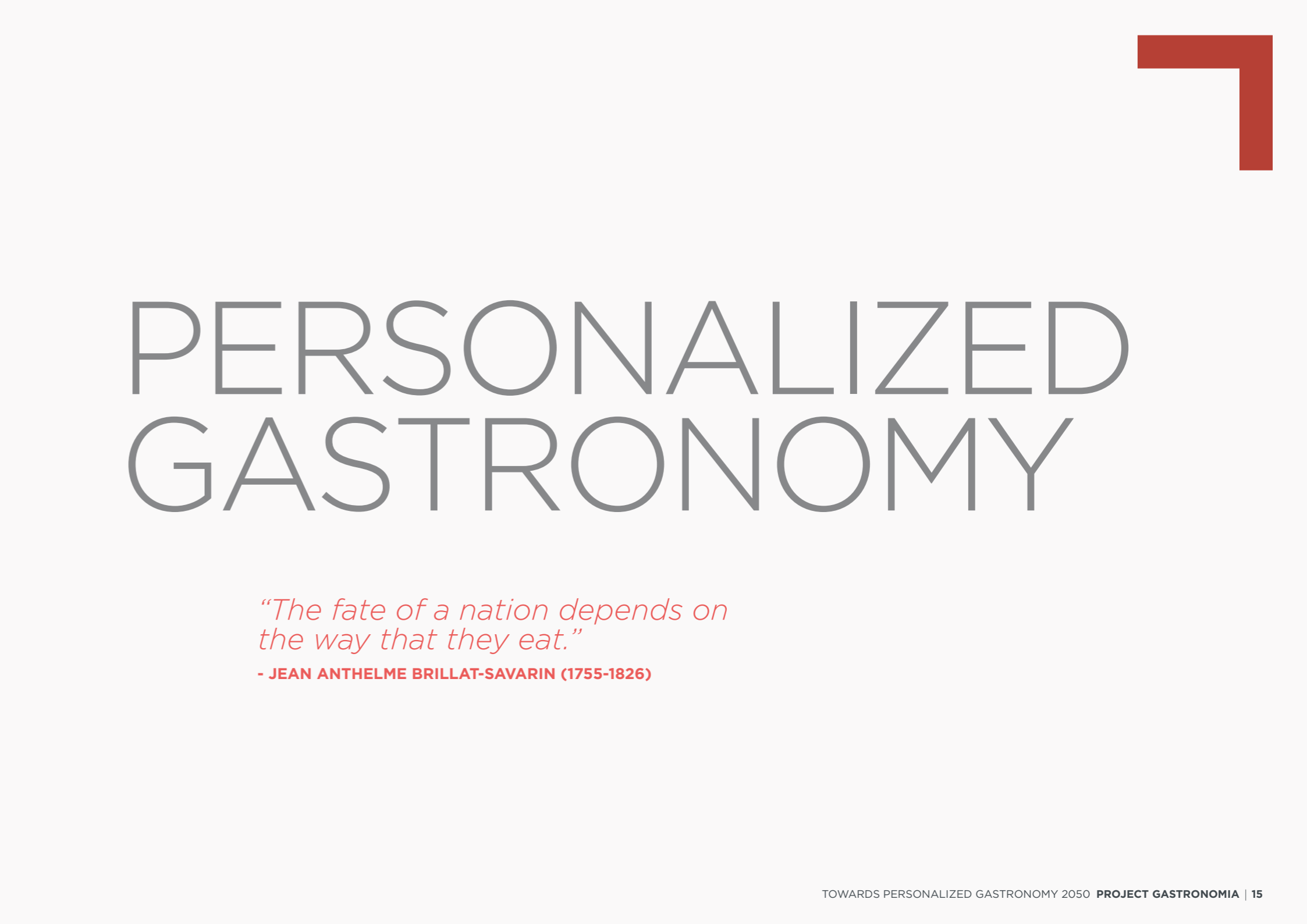
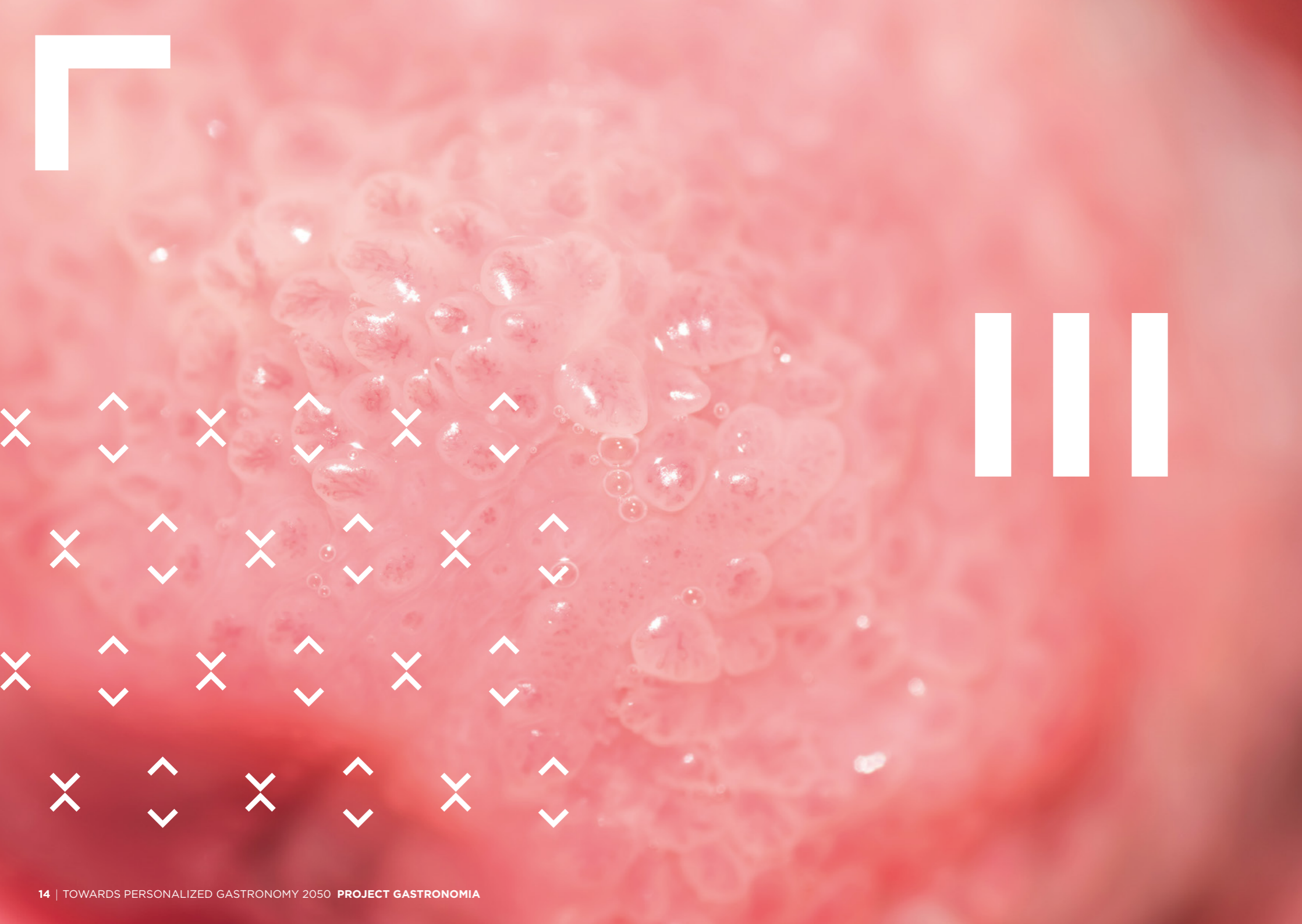
This report introduces the novel concept of Personalized Gastronomy and summarizes the discussions, questions, and insights from the two-day event.

This report includes:

- What is Personalized Gastronomy and how it will benefit and impact the public health
- Key insights from the talks given by our invited speakers, among the top experts in the world, on fermentation to precision nutrition
- Results from a futures-focused workshop, involving our invited speakers, to explore key issues and possibilities for Personalized Gastronomy for the Basque Country in 2050.

While the topics discussed here involve many cutting-edge science and technologies, this report is not intended for academic audience only. Our report is designed to be inclusive and engage with the broader public of the Basque Country and the world.





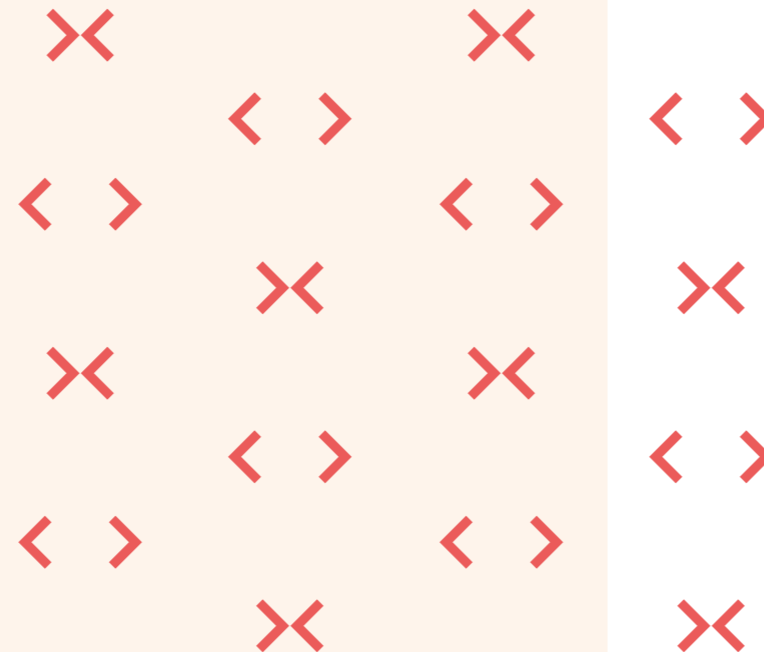
PERSONALIZED GASTRONOMY

*“The fate of a nation depends on
the way that they eat.”*

- JEAN ANTHELME BRILLAT-SAVARIN (1755-1826)

WHAT IS PERSONALIZED GASTRONOMY?

We have long known the connection between what we eat and our health. In the 18th century Jean Anthelme Brillat-Savarin, a famed French gastronome, believed that gastronomy should be studied as a science - to better nourish our minds and bodies. New understanding of our bodies, our food, and nutrition are helping us approach gastronomy more closely to what Brillat-Savarin originally envisioned. We call this Personalized Gastronomy.



REVOLUTION IN UNDERSTANDING OUR HEALTH, FOOD, AND BODIES

Personalized Gastronomy is the next revolution on what we eat and how we eat it. It empowers diners to take a proactive attitude towards their health and enjoyment, through a new comprehension of the unique characteristics of our bodies. As discoveries in Personalized Gastronomy continue, it fosters a new way to think about how we design food experiences, be proactive about our health, and approach precision nutrition.

Personalized Gastronomy can be a supporting tool in Basque Government's vision for gastronomy. Its ability to create new approaches to food experiences and health can be leveraged to help achieve the

government's goal for what it calls the 4S: Segura, Saludable, Singular y Sostenible (Safe, Healthy, Unique, and Sustainable).¹

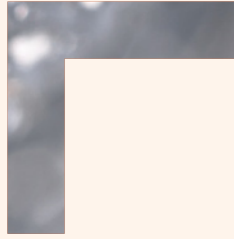
A Critical Moment for Food and Health in Spain and the Basque Country

Looking into the future, Spain will face unique challenges as its population ages, enjoys longer life spans, and faces threats of chronic diseases like obesity and diabetes. Personalized Gastronomy may be a critical tool to address these challenges and ensure a healthy, high quality of life.

Statisticians forecast that by 2040 the average lifespan will exceed 85 years, the longest in the world, while by 2050 the over-65s population will be over 34% of the total population². In 2017, the Basque Country has

the highest proportion of over-65s with 21.7% vs. 18.8% for all of Spain.³ Basque Statistical Office (EUSTAT) forecasts that its population of over-65s over could increase by up to 72% by 2061.⁴

Despite being the co-origins of the Mediterranean Diet, Spain is not immune to chronic diseases. Our invited speaker Dr. Sonia Gaztambide Sáenz, the head of Endocrinology and Nutrition Services at Hospital Universitario de Cruces, highlighted that over 40% of children (6-8 years old) in Spain are either overweight or obese.⁵ Among those over 18, more than 30% have or will have a high risk of developing diabetes.⁶ While the causes of these chronic diseases are multifactorial, Personalized Gastronomy can provide novel ways of managing our health through healthier foods.

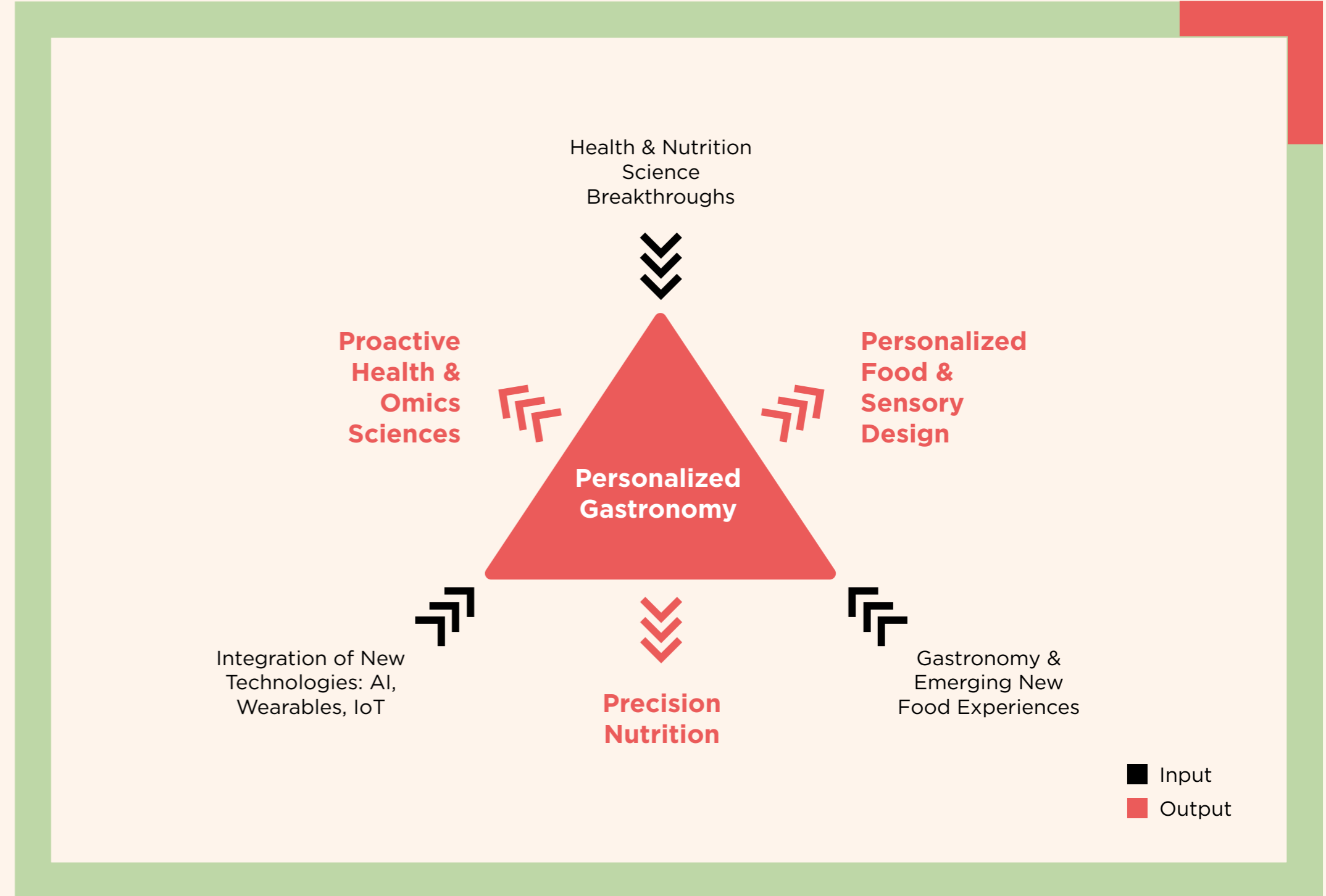
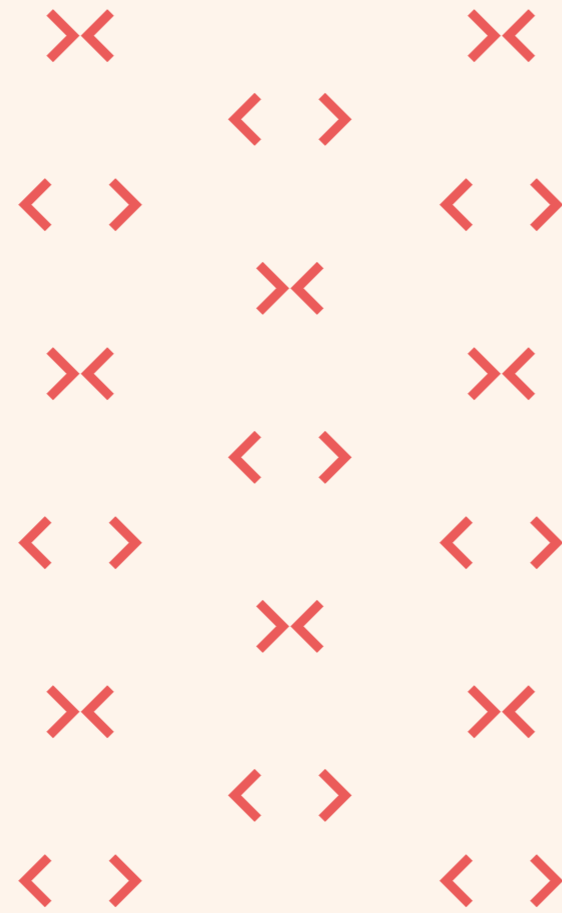


BENEFITS OF PERSONALIZED GASTRONOMY

The possibilities for Personalized Gastronomy are expansive and revolutionary. It helps us explore our complex and unique relationship between our socio-cultural values, our senses, our lifestyle, our genetics (ours and those of our gut microbiota), our food, and our health.

PERSONALIZED GASTRONOMY CAN HELP US:

- Enhance gastronomy through highly engineered foods for health;
- Design groundbreaking food experiences with natural ingredients;
- Lessen the risk of certain illnesses; and,
- Achieve personalized and precision nutrition.



THE SCIENCE & TECHNOLOGY THAT ENABLES PERSONALIZED GASTRONOMY



UNDERSTANDING HOW WE TASTE

We are learning more about how we taste and sense food. New techniques are allowing us to manipulate flavors at the molecular level, such as creating more flavorful sugar while reducing the amount.



NEW UNDERSTANDING OF HEALTH WITH OMICS SCIENCES

Omics sciences is a wide field of sciences that studies the molecular-level structure, functions, and dynamics of and between organisms. Omics Sciences explore many new areas of human health, such as the influence of gut microbes on our health (see “Omics sciences: Gut Microbiota in Our Health”, p. 21) and the relationship between our genes and how we taste and react to certain foods.



WEARABLES AS HEALTHCARE TOOLS

Today’s wearables, like the Apple Watch, can detect heart issues like atrial fibrillation. Future devices will monitor for life-threatening illness, communicate with restaurants on your diet requirements, and even administer medication.



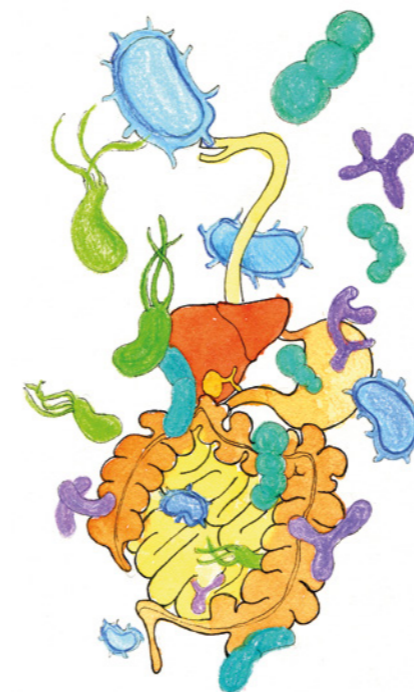
ARTIFICIAL INTELLIGENCE-POWERED BREAKTHROUGHS

Behind the recent breakthroughs in genetics and wearables is our ability to store massive amounts of data (Big Data) and use artificial intelligence to aid in new genetic and health discoveries, as well as, smarter and earlier medical diagnosis.

OMICS SCIENCES

THE SPECIAL ROLE OF GUT MICROBIOTA IN OUR HEALTH

BASED ON TALKS FROM OUR INVITED SPEAKERS PROF. JOSÉ MARÍA ORDOVÁS AND PROF. DANIEL RAMÓN



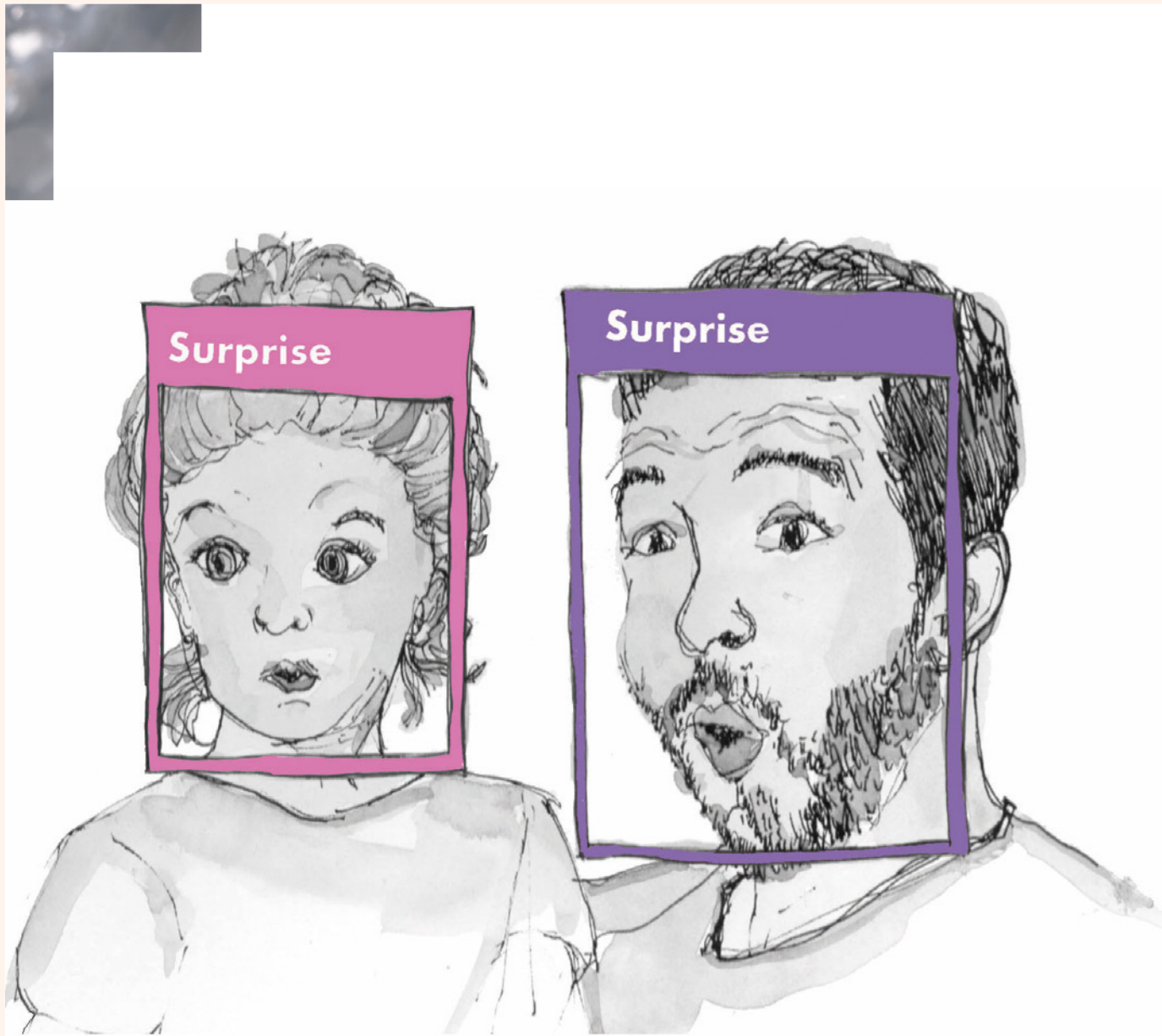
Which is more likely to raise blood sugar levels: sushi or ice cream? Conventional thinking would say ice cream, but that’s not always true. A study by the Weizmann Institute found that for some people, their blood sugar levels rose more from eating sushi than from ice cream!

The study found that given a person’s particular health and dietary history, physical activity, and - *most interestingly* - gut microbes, each person’s blood sugar level would respond differently to certain foods.⁷ Weizmann Institute study is one of many that illustrate the role of gut microbes, better known as gut microbiota, in our health.

As part of omics sciences, this study of gut microbiota has highlighted important connections to our health and even our behavior. Our invited speaker Prof. Jose María Ordovás, lab director of nutrition and genomics at Tufts University, shared that indole, a chemical made by bacteria in the gut, encourages “hedonistic eating”

in people⁸. Essentially, this bacteria activates the reward-section of our brain and encourages us to eat more! While some microbes encourage gluttonous behavior, there are others that may discourage obesity. Prof. Daniel Ramón, vice-president of R&D in health & nutrition for Archer Daniels Midland, has identified the bacteria *Bifidobacterium animalis* is one such microbe.⁹ In a recent study by Prof. Ramón, participants who took pills with this bacteria on average reduced their waist size by nearly ~2 centimeters and significantly improved their body mass index (BMI).

While further studies are needed, Prof. Ramón hopes that we can soon INCORPORATE these types of beneficial microbes - commonly called probiotics - into everyday foods. He has been involved with successful tests to include this bacteria into foods like yogurts and sports drinks.



AI: THE NEW INGREDIENT

BASED ON A TALK BY OUR
INVITED SPEAKER AITOR MORENO
FERNÁNDEZ DE LECETA, PH.D.

Aitor Moreno Fernández de Leceta, a leading expert in artificial intelligence at Ibermática, has worked with data and AI - from machine learning to expert systems - through the entire gastronomic ecosystem. We share some of his thoughts on how data and AI impact Personalized Gastronomy.

IMPACT 01

Personalization: Health Preference to Emotional State

While other invited speakers spoke of foods personalized for our genetic profile, our gut microbes, and our health goals, Moreno Fernández de Leceta suggested that emotion could be another factor.

Restaurants may offer recommendations based on our emotional state. AI-powered cameras may detect that a guest is tired (needs coffee?), sick (immune boosting foods?), or excited (perhaps champagne to celebrate?). The purpose, Moreno Fernández de Leceta added, is for a chef to know you like your own mother. She knows just exactly what sort of food you want when she sees you.

IMPACT 02

Enabling Omics sciences

Big Data and AI play a critical role in the fields of omics sciences. Omics sciences examine the structure, function, and dynamics of organisms at the molecular level. It includes the study of genomics, metabolomics, and other fields. Given the complexity of omics sciences, Big Data and AI are required to help scientists manage and analyze the data. Without these tools, research in genetics, gut microbes, and other areas would not be feasible.

IMPACT 03

Automating Healthcare Systems

Today, Ibermática builds intelligent software that helps doctors and health-related scientists develop a holistic understanding of their patients and identify patterns among patients. The system can analyze patterns of patients who respond well to specific treatments or new types of illness across all of its patients and identify them immediately.

With at-home sensors like Amazon Echo to wearables like Apple Watch, it is possible that in the future these data will be linked directly to a doctor's computer. Based on one's physical activity and behavior, an advanced healthcare AI system can perform early diagnosis and recommended specific treatments based on each person's background. (See: "The Healthcare System Becomes Disrupted by Apps?" for more)



IV

THREE MAJOR SHIFTS:

HOW PERSONALIZED GASTRONOMY WILL
CHANGE OUR VIEW OF HEALTH, OUR
BODIES, AND FOOD.



PERSONALIZED GASTRONOMY



**SHIFT 01
PREEMPTING AND
MINIMIZING RISK
OF ILLNESSES**

**Proactive
Health &
Omics
sciences**

Health & Nutrition
Science
Breakthroughs

**Personalized
Gastronomy**

**Personalized
Food &
Sensory
Design**

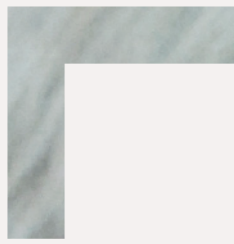
**SHIFT 03
MORE HEALTHY,
MORE DELICIOUS
DINING
EXPERIENCE**

Integration of New
Technologies: AI,
Wearables, IoT

**Precision
Nutrition**

**SHIFT 02
PERSONALIZED
DIETS FOR YOU &
YOUR BACTERIA**

Gastronomy &
Emerging New
Food Experiences



SHIFT 01

PREEMPTING AND MINIMIZING RISK OF ILLNESSES

Personalized Gastronomy could help foster a world that focuses on your health. Instead of once-a-year medical check-ups, AI-powered wearables will monitor and help manage your health around the clock. Early detection of risks for diseases like osteoporosis or heart illness will help our ability to better manage illnesses and reduce their occurrence.

Wearables today can already monitor our physical activity and our heart. Future devices promise much more, from monitoring for signs of an infection and administering medications as needed. Future wearables will communicate directly to our doctors and use AI to get a picture of our health, immediately identify health risks, and recommend early prevention techniques.

PHARMACY & LAB ON A CHIP



Wearables are quickly moving from an accessory for the tech-obsessed to a significant health tool. In late 2018, Apple enabled its ECG-monitor in its Apple Watch 4. A few weeks after, a 46-year old American's Apple Watch detected an undiagnosed atrial fibrillation that was later confirmed by doctors.¹⁰

People over 65 years old are particularly at risk for atrial fibrillation, which can lead to stroke or heart failure. It is expected that by 2050, one in three Spaniards will be over +65 years of age.¹¹ For the Basque Country, which will likely age more than Spain, wearable technologies will be a critical tool in maintaining the quality of life and quality of health services.

The research on medical wearables is continuing. Newcastle University piloted the use of wearables to detect Alzheimer's and identify early signs of the disease.¹² More ambitious is the hope that wearables can be like "pharmacy-&-lab-on-a-chip" that works with doctors and AI to rapidly detect, predict, and treat diseases.



SHIFT 02

PERSONALIZING DIETS FOR YOU & YOUR BACTERIA

Our invited speakers Prof. José María Ordovás, Prof. Daniel Ramón, and Prof. Guillermo Reglero have highlighted how our genetic profile and microbiome shape our health and nutritional needs. (See: “Gut Microbiota in our Health”, p. 21) Using this knowledge, chefs will have critical roles in developing food that considers each person’s genetic profile and their microbiome.

As we better understand our microbiome and how it affects our health, chefs and scientists will work together to design foods that both incorporate (probiotic) and feed (prebiotic) microbes and the compounds they produce (postbiotic or metabolites) in our body that promote health. (See: “Revisiting Tradition & Health with Fermentation”, next page)

Today, companies like DNAfit and Viome are offering analysis of one’s genetic profile, microbiome, and generating recommendations for a personalized diet for under a thousand euros. However, we are still in the early stages of what scientists hope to achieve.



REVISITING TRADITION & HEALTH WITH FERMENTATION

Humanity has used fermentation, like in dry sausages to kimchi and yogurt, to preserve foods and develop new flavors. Recent studies on fermentation are revealing new ways this ancient culinary technique may help improve our physical and mental health. Chefs working alongside scientists may soon design new fermented foods to create healthier meals and unique flavors.

Fermented foods can impact our health by containing:

- beneficial microbes (probiotics);
- compounds that encourage good microbes to grow (prebiotics);
- compounds from fermentation (metabolites) that improve our health;
- increases the bioavailability of certain nutrients in food.

With metabolites, for example,

studies indicate during the fermentation process of doenjang, a Korean soybean paste, beneficial metabolites are created that function as antioxidants.¹³ Other studies suggest that probiotics and certain fermented foods can positively influence a person’s perceived stress and anxiety.¹⁴ Future chefs may incorporate specific microbes and compounds to create new healthy, fermented foods that address particular disease risks and even mental states.

In the Basque Country, Ramón Perisé of Mugaritz with BCCInnovation researchers Diego Prado and Blanca del Noval are exploring ways to apply different methods of fermentation from around the world to create new food experiences. Through their research, they have been investigating fermentation processes from countries like Indonesia to Japan.

BCCInnovation research chefs have created a novel way to reduce food waste in restaurants, specifically old bread. Using Japanese fermentation techniques, they have transformed old bread into a bread-version of soy sauce. This is one example of the exciting possibilities being unlocked at BCCInnovation. Through the work that Prado and Del Noval are doing in fermentation, they are helping create a new palette of flavors for creating innovative foods - with added benefits of possible health benefits and tackling ecological sustainability.



Old bread koji

THE CONNECTION BETWEEN OUR GENES & NUTRITION

BASED ON TALKS BY OUR INVITED SPEAKERS PROF. GUILLERMO REGLERO & PROF. JOSÉ MARÍA ORDOVÁS.

Cultures everywhere seem to understand the influence of food in our health. Within omics sciences, we are beginning to understand that deeper links exist between the two. In the field of nutrigenomics and nutrigenetics, scientists are researching how the relationship between our diets and genetics shape our health.

Our invited speaker Prof. Guillermo Reglero, director at Instituto IMDEA Alimentación, shared that research in this area

has accelerated since the 1980s. Prof. Reglero highlighted that certain essential oils, such as those from herbs like oregano and cilantro, influence genes that help manage toxins in the body.¹⁵ This finding is a powerful example of nutrigenomics, which studies how nutrients affect how genes are expressed in the human body.

In the intersection between the Mediterranean Diet,¹⁶ genetics, and health, Prof. José Ordovás, lab director

of nutrition and genomics at the USDA, conducted a study that indicates how the diet influences how specific genes, associated with cardiovascular diseases, are expressed. People who carry these high-risk genes were able to reduce their risk significantly by adopting the Mediterranean Diet. Prof. Ordovás estimates that if we can apply this learning, Spain could prevent over 9000 strokes per year.

Genetics also influences how our bodies respond to food (called nutrigenetics). Prof. Ordovás notes a recent study that indicates our sensitivity and perception to bitter foods may be partly genetic.¹⁷ Unfortunately for some, bitter foods, such as endives and olive oil, are considered an essential part of the Mediterranean Diet. While the Mediterranean Diet has many benefits that can help offset genetic risks, our very perception of the Mediterranean Diet is also influenced by our genetic profile.



SHIFT 03 MORE HEALTHY, MORE DELICIOUS DINING EXPERIENCE

Our advancing knowledge about the chemistry of taste and our organoleptic receptors (sensory receptors) is helping create new ingredients and creative applications of traditional ones to enhance flavors without over-relying on fat, sugar, or salt. Food scientists and chefs may soon reinvent processed foods as healthy and nutritious, unlike their reputation today as a cheap source of empty calories.

Invited speaker Dr. Pedro Luis Prieto Hontoria, innovation manager of Fresh Business Perú, shares that many chefs and food scientists today are redesigning foods to be more environmentally sustainable and vegan-focused. Supermarkets in Australia to the United States

now feature vegan parmesan using cashews and coconuts to ahi tuna sashimi made from Roma tomatoes. These are potentially early examples of healthy processed foods that reinterpret traditional foods for a healthier and more sustainable living.

In 2018, Nestlé released a new form of sugar, molecularly restructured, that enables their Milkybar to taste as sweet as its regular Milkybars but with 30% less sugar.¹⁸ New methods of processing ingredients will challenge today's assumptions that natural means healthier. We may see more food products that have the salt, fat, and sugar-based flavors we crave but with fewer health repercussions.

Among traditional ingredients, food scientists are also identifying how certain sensations can help us feel more satiated, helping us control our food intake. Copenhagen University has studied how hot spices like cayenne peppers in food can make people feel more satiated, reducing their food intake.¹⁹ In other studies, food textures have been found to influence food consumption rate and feelings of satiation.²⁰

Continuing collaboration between research chefs and food scientists will lead to new foods that are interesting, delicious and contain fewer amounts of elements like salt than expected.

ROBOTS & DNA-TAILORED MEALS: AT RESTAURANTS AND OUR KITCHENS

BASED ON OUR TALKS FROM OUR INVITED SPEAKERS NICK POPOVICI AND MAGDALENA GÓRSKA

From our favorite restaurants to our kitchens at home, we are beginning to see the possibilities of how Personalized Gastronomy will shape our lives. In London, a new kind of restaurant offers personalized meals according to your DNA. At Vita Mojo's restaurants, each meal is tailored based on one's health goals, lifestyle, and genetic information. Nick Popovici, the founder of Vita Mojo, is testing these personalized dishes at his restaurants and expects to help other restaurants adopt this technology.

Vita Mojo's partnership with DNAFit, a personal genomics company, allows DNAFit customers to share health and food-related genetic information with Vita Mojo's chefs. Based on one's genetic profile and health goals, chefs at Vita Mojo will adjust the particular amount of

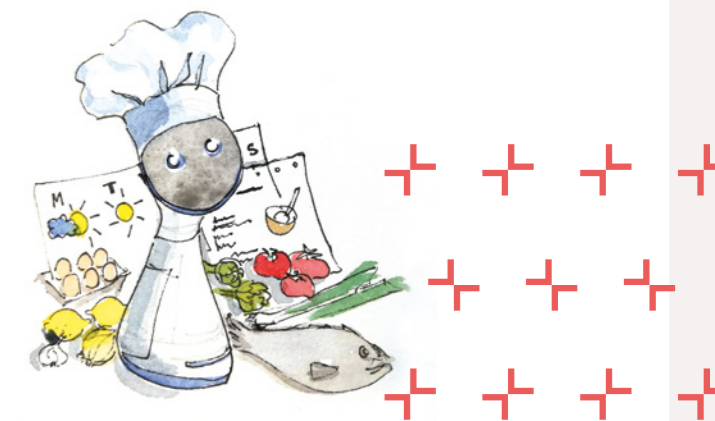
fats, micronutrients, and specific ingredients (based on how your genes may influence how you taste).

But what about at home? Magdalena Górška of BSH presented how new technologies can change the way we cook at home. BSH is the German company behind leading brands like Bosch, Siemens and local Spanish brands like Balay.

BSH is developing a personal kitchen assistant named Mykie. The endearing Mykie, which stands for "my kitchen elf," sits on the kitchen counter and assists its human throughout the cooking process. It can suggest recipes based on what you have in your smart fridge, preheat your oven, and walk you through each step of the cooking process. As a social robot, Mykie's "virtual social cooking" feature lets

you attend a cooking class remotely in real-time. Through Mykie, the chef instructor will be able to help you cook a new recipe.

While not discussed by Górška, we can imagine that the technologies developed by Vita Mojo may also find its way to a personal kitchen assistant like Mykie, helping you stay healthy based on your health goals and health profile.



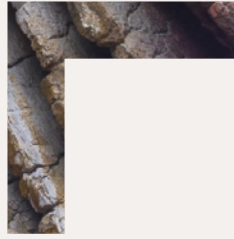


V

Along the breathtaking cliffs of the Basque Coast, there's the Flysch. This "Great Book of the Earth" catalogs millions of years of geographical history written in successive rocky strata.

EUSKADI 2050 GAME



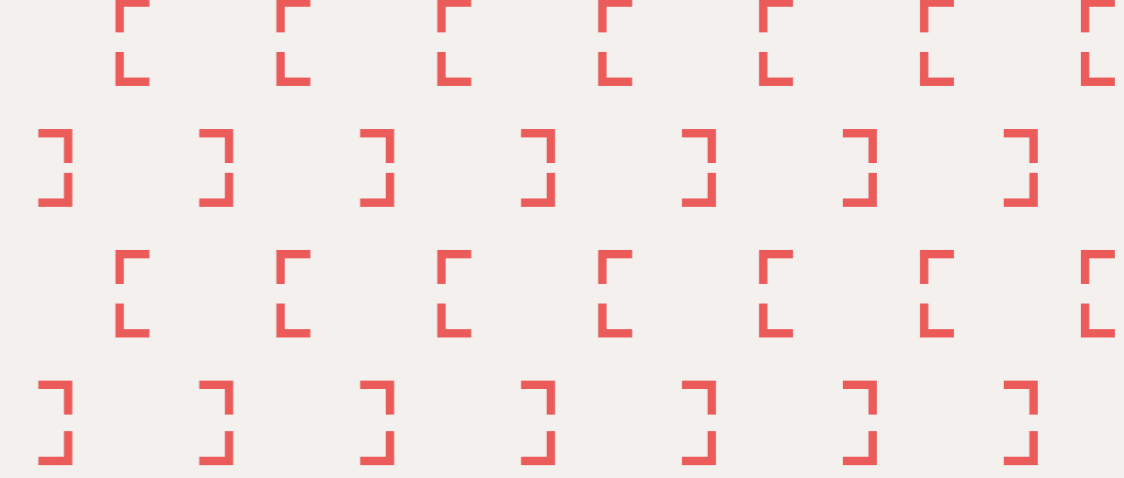


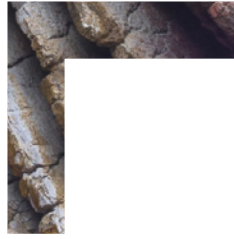
METHODOLOGY

For the second day of the event, we brought together our experts to imagine the possible impact of Personalized Gastronomy on a future Basque Country of 2050. How might we imagine a Basque Country - with its deep-rooted and fervent gastronomic culture - be like in 2050? How might Personalized Gastronomy shape that future, especially concerning food and health?

Using our food systems game, the experts explored the various interconnections and disruptive events that occur throughout the supply chain from the producer to the consumer. The use of a game allows for open collaboration and exploration of these complex topics.

The European Union and the International Red Cross & Red Crescent are among the many organizations that use futures focused games to address challenging interdisciplinary questions.





RESULT OF THE GAME

EUSKADI 2050: SNAPSHOTS OF A POSSIBLE FUTURE



How might Personalized Gastronomy influence the future of Euskadi 2050? What challenges might we face 30 years from now? What decisions might we have to make? What changes could we see through the entire supply chain and adjacent sectors and issues?

Below are some imagined possibilities by our invited speakers and our own insights that were developed during the second day of our event. To help our experts think more creatively, in a more open and systemic way, we encouraged them to explore broader topics, like privacy issues and personal freedom, that are not immediately connected to Personalized Gastronomy.

These are not predictions, but rather a way to think about what might happen. It is also a chance to ask ourselves: What are possible future challenges? What considerations and decisions do we need to make? Is this sort of future desirable or to be avoided?

WHAT IF...

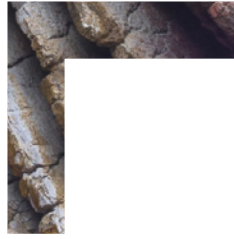
1. THE HEALTHCARE SYSTEM BECOMES DISRUPTED BY APPS?

As the Basque Country moves into the mid-21st century, the healthcare system will be radically transformed by apps on your phone or wearable. Using your wearable, you can view real-time diagnosis and treatment recommendations suggested by your AI-virtual doctor - or if you prefer at a higher cost a human doctor. Medical AI software will generate these diagnoses using medical sensors in your watch, clothing, or even implanted inside you.

Human doctors, hospitals, and clinics will still exist of course. However, for the majority in the Basque Country, their healthcare experience is with their wearables or other medical devices, not at the hospital. With doctors and scientists able

to analyze medical and health data in real-time, we may even see exponential breakthroughs in scientific knowledge. Traditional clinical trials will be obsolete. Doctors and scientists will use AI software to compare medical histories between millions of people in seconds and develop new insights and knowledge. Automated, real-time health monitoring and diagnosis will not only help ensure higher-quality of life but also decreased healthcare cost. Our invited speakers believe that Basque Country could see life-expectancies reaching 110 years driven in part by Personalized Gastronomy. In any case, advances in healthcare automation and medical wearables will be critical as the Basque Country will age significantly by 2050. The Basque Gov't forecast that the over-65 population will increase up to 72% from 2016 to 2061.⁴





WHAT IF...

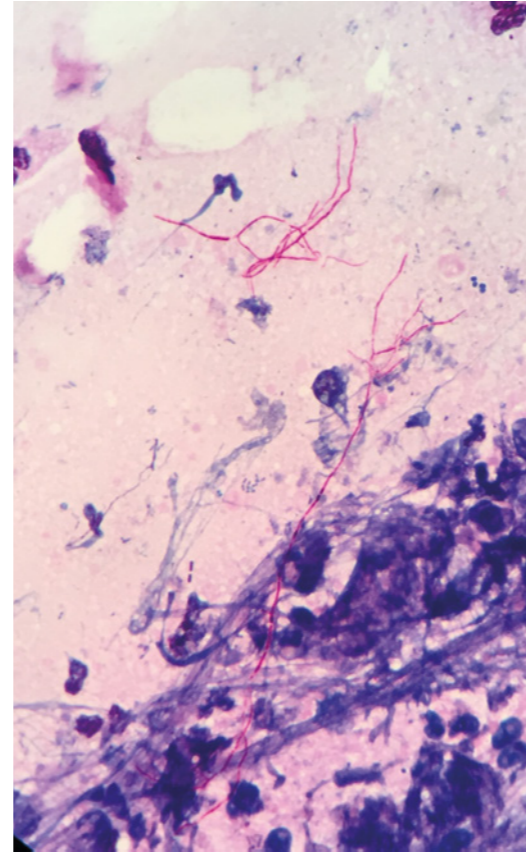
2. BACTERIA COULD MAKE DRUGS OBSOLETE?

As we better understand how bacteria and other microbes play a critical role in keeping us healthy, how might it change medicine and drugs in the future? Breakthroughs in genetic engineering and other technologies may mean that future drugs could be made within our bodies, using modified bacteria and other microbes.

Scientific-breakthroughs could allow chefs to create a new class of pharmaceutical foods, where microbes help create the required pharmaceuticals in your body. Alternatively,

specialty-designed microbes inside an implanted “living-pharmacy-on-a-chip” could also produce medicines as needed.

In 2017, the biotechnology company Synlogic began clinical trials of pills filled with genetically modified the common *E. coli* bacteria. Synlogic modified the bacteria to live in the gut and help remove toxic ammonia in people with certain metabolic liver diseases.²¹ While today Synlogic is delivering these therapeutic bacteria using pills, our invited speakers imagine **new methods such as bacteria-producing implants or incorporating such modified microbes in our food.**



WHAT IF...

3. RESTAURANTS BECOME SPOTIFIED?

With changing values and better technology, we are demanding better and more personalized experiences. The music streaming platform Spotify exemplifies personalization, which designs unique musical experience for each of its 180 million users.²² The same experience will happen in restaurants.

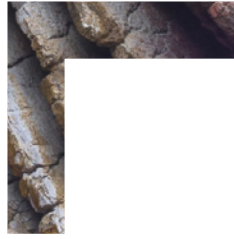
When visiting a restaurant, your health wearable may transmit your nutritional needs to the chef based on its real-time data of vital signs. No matter what you order, the chef will adjust your meal to make sure the right combination of nutrients are in your dish. Specialized ingredients will help achieve the same desired flavors, without compromising one’s health.

(See: “More Healthy, More Delicious Dining Experience”, p. 34)

The chef will tinker with the ingredients of the dish to adjust to your specific genotypes (genetic traits), which affect your perception of taste (such as bitterness).

Moreover, just as Spotify relies on algorithms to predict what music you like, future chefs will use algorithms and AI to imagine new dishes. These new dishes could be based on information on previous orders at other restaurants. Empowered with this data and AI assistants, chefs may experiment with unusual ingredient combinations that only the specific restaurant guest would enjoy.





WHAT IF...

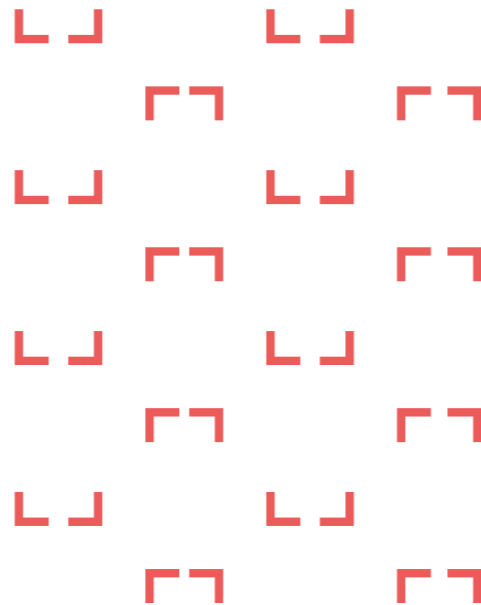
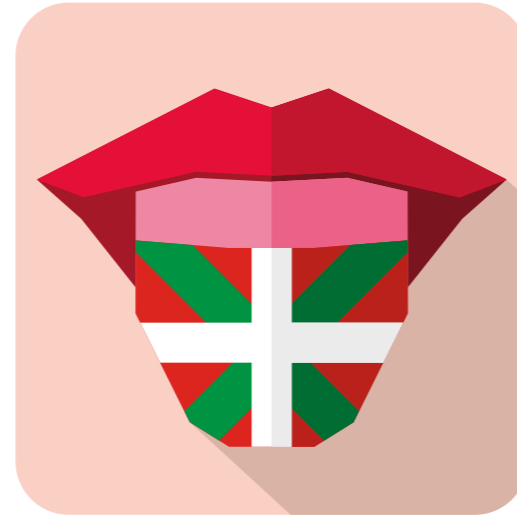
4. THE CHEF-LED REINVENTION OF FOOD CREATES A CULINARY RENAISSANCE?

The better understanding of how we taste and how ingredients affect our perception of food will radically transform our health and how we eat. Processed foods will be reinvented and allow everyone to enjoy nutritious, delicious, and affordable foods. Today's concern about nutrition will be obsolete, while new culinary techniques will flourish.

The future will see the maturing of redesigned ingredients and reimagining traditional ingredients. **Food scientists are already developing new ways to maintain the sweetness of real sugar while using less of it (See: "More Healthy, More Delicious Dining Experience", p. 34).**

Nanotechnology will allow flavor compounds and nutrients to be designed at the nano-level to provide specific flavors and bioavailability (available nutrients that can be absorbed). And experiments, like those by BCCInnovation, are creating new foods and experiences by creatively applying new and ancient fermentation techniques.

We envision a possible future where chefs will create new, unique culinary styles and dishes while meeting our nutritional needs. Delicious foods can express many different kinds of flavors without being devoid of nutritional value or sacrificing health. Given Basque Country's rich culinary tradition and pride, the future may be an exceptionally exciting for Basque chefs.



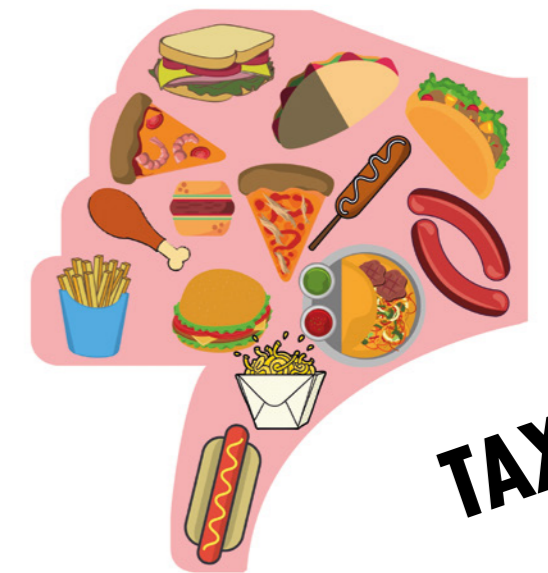
WHAT IF...

5. BETTER HEALTH MEANS SACRIFICING FREEDOM? Medical wearables hold promise as potentially vital tools to help us proactively manage our health. It can also monitor for what it considers an inappropriate amount of alcohol, sugars, calories, and other substances that we consume. Could the government impose higher taxes (effectively penalties) for those who consume too much of "bad" foods?

These "bad behavior" taxes could be justified as certain foods are more harmful to the environment, costly to the healthcare system, and costly to our health. However, **would such monitoring and taxation mean a loss of our personal freedoms?**

In such a world, it might be a social status to drink and eat freely; the rich could pay the extra-taxes for over consuming or eating "forbidden" bad foods. On the other hand, this also means the poor will pay less taxes and will be generally healthier.

There may be a future debate if higher taxation on unhealthy lifestyles would mean less personal freedom or greater social justice?



TAXES



WHAT IF...

6. PERSONALIZED GASTRONOMY TRANSFORMS BASQUE TRADITIONAL FOODS?

As the Basque Country ages in population and an influx of new immigrants arrive, what will Basque identity look like in 2050? Our invited speakers agreed that *euskera* (the Basque language) and Basque gastronomy will be the fundamental components for maintaining the Basque identity. But if our concept of food radically changes by 2050, what will Basque culture look like?

Basque chefs will likely play a critical role in maintaining the Basque identity through Basque restaurants, at txokos (gastronomic societies), and our kitchens. Chefs will have to wrestle with keeping Basque culinary traditions while also personalizing food to improve our health.

Health-focused taxation and personalized approaches to health and gastronomy may make traditional Basque foods luxury items enjoyed by high-paying tourists. The traditional food will not disappear entirely, it will just be reserved for special occasions. We can see hints of this today. The Basque delicacy of *angulas* (baby eels) began as common Basque food, but prices today (around **€500/kg**) make them a specialty item reserved for special occasions.²³

Will people still enjoy Gildas in Donostia or will its famed pintxos be transformed by food that is better personalized according to one's personal health? These could be the types of questions asked among chefs in the Basque Country.



FOOD AS A *LIVING* WAY OF LIFE

BASED ON THE TALK BY OUR INVITED SPEAKER F. XAVIER MEDINA, PH.D.

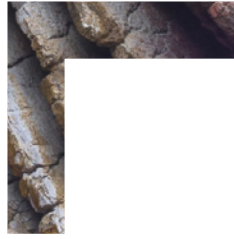
Our invited speaker F. Xavier Medina, Director of the UNESCO Chair on Food, Culture and Development at the Universitat Oberta de Catalunya (UOC), is an advocate for exploring the relationship between culture and food. Dr. Medina takes inspiration from writer Manuel Vázquez Montalbán's maxim: "A people that does not drink their wine or eat their cheese, has a serious identity problem."

In recent years, UNESCO has declared many food traditions, such as the Mediterranean Diet and French Gastronomy, as intangible cultural heritage. But does intangible mean unchanging? Medina remarks that food culture changes: "Today, we don't eat like we used to 50 years ago. And in 2050, we will not eat like we eat today."

The Basque Country has experienced many such changes. The Basque were among the first Europeans to adapt to food from the Americas. Basque foods like *talo* (tortilla-type bread) and *tolosako babarrunak* (Tolosa bean) trace their origin to South America. More recently in the 1970s, French nouvelle cuisine influenced the development of the New Basque Cuisine.

If Personalized Gastronomy transforms food – personalizing for our health and favorite flavors – what would Basque food look like? Would we recognize it as Basque? Medina believes that the "the capacity to transform different elements and nutrients into food is what makes us human." And if that is true, we can be sure that Basque food will continue to evolve and still be Basque at the same time.



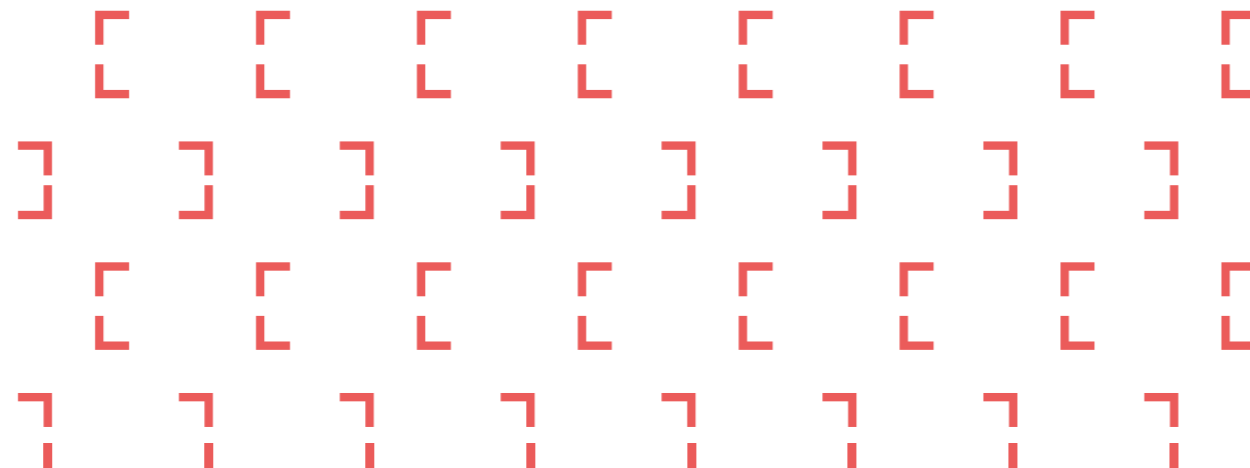


WHAT IF...

7. BETTER HEALTH REQUIRES SACRIFICING OUR HEALTH PRIVACY?

The benefits of Personalized Gastronomy – healthier living, longer life, and reduced health cost – will require sharing extensive data about our personal health with doctors, restaurants, and the government. Who will own our genetic information, physical activity history, and health history? Who will have access and what is our role in deciding how others use it? How do we safeguard against the danger that this data, either legally or maliciously gathered, may generate new forms of discrimination and social stigma.

Emerging new technologies that help enable better privacy, from quantum-resistant encryption to blockchains, may allow us to better protect and control how our data is used. However, new regulations and safety measures will need to be placed to protect against discrimination based on genetic background and health history. Explorations and discussions on possible new forms of discrimination and exploitation and how to protect against them need to be discussed today.



WHAT IF...

8. THE BASQUE LIFESPAN EXCEEDS 110 YEARS?

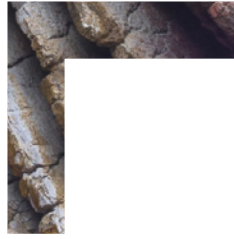
Our invited speakers speculated that breakthroughs, like Personalized Gastronomy, and new medical technologies could help us expand our lifespan to 110 years. Speakers anticipated that an aging, but longer-living Basque population will also generate major changes in how we view aging, work, and community.

The new lifespans of 110 years, exceeding today's 85.8 years, will be realized by new technologies that will allow us to change major organs with organic synthetic organs supplemented by cyborg-like technologies.²⁴ Today, companies like Samsung have developed exoskeletons to assist the elderly, while the use of lab-grown organs have undergone clinical trials in animals in 2018.²⁵ By 2050, in thirty years, it is hoped that

such technologies have matured and are in widespread use. Our speakers speculate that the new technologies may push our active working age up to 80 years old, instead of the expected 65 of today.

How we live will need to be redesigned for the longer-living and aging Basque society. The household will be managed through automated and robotic home assistance, including virtual nurses to automated food shopping. **More dramatically, we will see the reinvention of the pueblo modelo (the village model) with an emphasis on intergenerational living spaces.** From txokos to apartment buildings, they will be reinvented to allow for stronger community relationships between the young and the old.





WHAT IF...

9. PRECISION FOOD PRODUCTION IN EUSKADI IS THE NORM

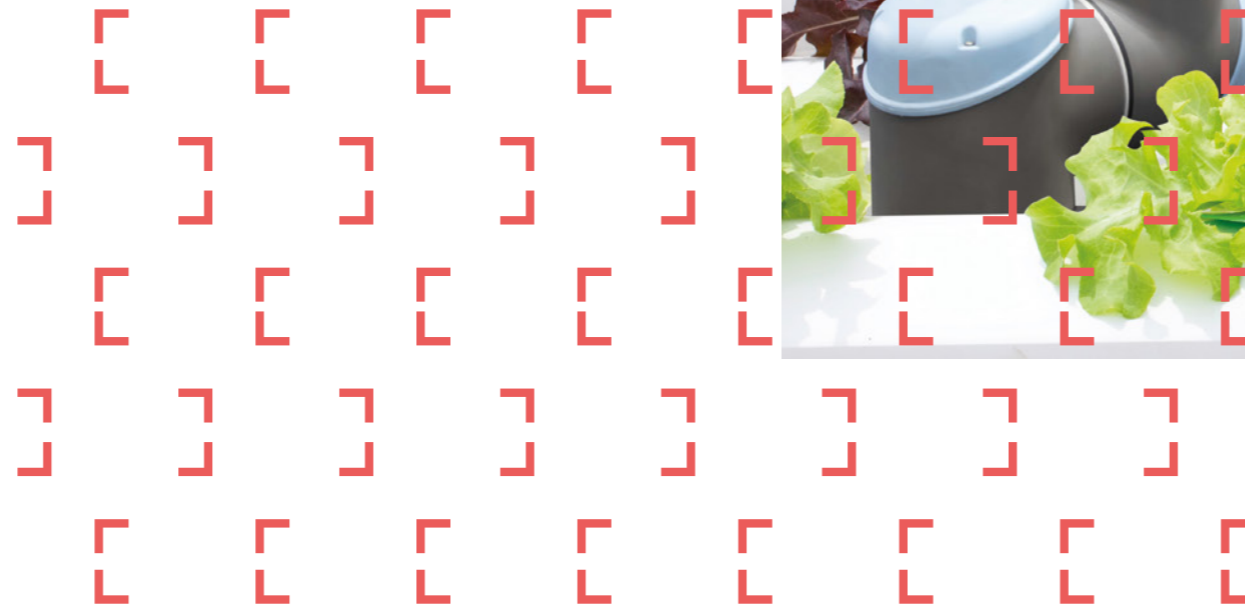
Technology plays a critical role in what and how we eat. From plant breeding and fermentation to aeroponics, humans have long experimented and adopted new ways of growing and processing food. Our invited speakers have explored ways new technologies can make radical changes that make a more efficient, sustainable, and nutritious food system.

Maturing technologies - from sensors, artificial intelligence, and robotics - will allow farmers to farm more efficiently by monitoring the health of plants and precisely applying nutrients

as needed (at the individual plant level). Waste will be minimized as farmers will be better informed of consumer demand and middlemen, will need to evolve their role in the food supply chain. Instead, supermarkets will shed its stores to be a digitally-enabled distribution platform, delivering food directly to people's homes. In this scenario, the producers - the farmers - will be able to more efficiently sell directly to consumers with better profitability.

New tools for processing food will produce foods more efficiently and with less waste. Food robotics, such as 3D printers, could further disrupt food distribution. Not all food

will be made this way. Yet, such technologies will allow us to make fresh food on-demand, further reducing food wastage compared to the amount of ready-made-food that goes unsold today. Integrated with this production process, nanotechnologies would be applied to create ingredients and compounds with higher bioavailability, increasing the nutritiousness of food.





VI



NEXT STEPS

01

CO-CREATE A BETTER FOOD FUTURE

Partner with our multidisciplinary food experts at BCCInnovation. Work with our food scientists, multisensory researchers, and R&D chefs to create new food-related techniques, products, processes, and businesses that help create a better food system.

02

CO- EXPLORE BETTER FUTURES

Partner with us for a public or private Project Gastronomía event to better understand food challenges and opportunities, such as new ways of thinking about the food system to new food-related business projects.

For more details on the Gastro-Challenge please contact us at: pg@bculinary.com

Take part in the Future of Gastronomy at ProjectGastronomia.org

For more information or specific requests, contact us at: pg@bculinary.com

03

PARTICIPATE IN OUR GASTRO- CHALLENGE

Describe a day in the food production sector in Euskadi 2050, based on the Future of Food Report. Does the farmer still exist as a figure? What skills does a farmer have? Has it been redefined? How is it organized? What does seasonality mean in Euskadi 2050?

The winning prize will be published, alongside your photo and biography, in our next report!





VII

OUR PAST GASTRO- CHALLENGE

PREVIOUS GASTRO-CHALLENGE FOR LONDON IN 2050

In our *Future of Food Report for 2050*, which was developed from our Gastronomy & Multisensory Design event in London, we challenged our readers to explore and respond to this question:

What will a healthy, sustainable and delicious menu in London 2050 look like?

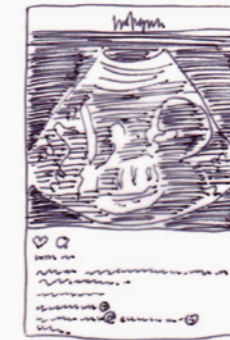
GASTRO-CHALLENGE WINNER: KAI TU'S 32ND BIRTHDAY DINNER AT ALMANAC

Among the many responses we received, we are thrilled to feature Kaii Tu's artifact from the future: a menu for a Londoner's birthday dinner in 2050.

This menu explores the concept of food as an experience of time, allowing us to revisit moments of our past and help us prepare for the future. Tu's work also examines what it means for a child today to have their entire lives captured on social media.

You can view Kaii Tu's 32nd Birthday Dinner at the Almanac at our website: <http://ProjectGastronomia.org/en/Gastro-Challenges/London2050>

We thank Kaii and everyone who participated in our gastro-challenge!



For my 32nd birthday, I treated myself to dinner at **Almanac**.

I unlocked my account to the restaurant, to let the chef design the menu by mining my data.

Most days, I just drink a personalised nutritional smoothie for breakfast, lunch, and dinner. It's fast, sustainable, and contains the optimum level of nutrients tailored to me.

Restaurants are far and few between nowadays, and they mainly have to grow their own food. Almanac is actually quite encyclopedic in the foods they grow, and the chef is skilled in cooking techniques from a wide variety of cultures and times.

Almanac

15 April 2050 dinner for Tristan Chang

MY AMINE-BONDING THE SIZE OF PEPPER DICE, A TENDER BRAISED CUBE OF CHICKEN WAS TOPPED WITH A GINGER EMULSION AND DEHIDRATED SEALED ON DUST. I DIDN'T HAVE A MEMORY OF THIS, UNTIL I SMELLED THE SCENT OF ORANGE BLOSSOMS FROM THE BACKYARD OF MY GRANDPARENTS' HOME. MY PARENTS ALWAYS TALKED ABOUT THIS DISH AS THE MAIN COURSE SERVED AT THEIR WEDDING RECEPTION IN THAT BACKYARD!

THIS BROUGHT ME BACK IMMEDIATELY. MY FAMILY SUMMERED IN ALCANTAR EVERY YEAR WHEN I WAS LITTLE, AND WE ALWAYS WENT TO THIS ONE BEACH SHACK ON A SECLUDED COVE, WHERE WE HAD LOADS OF CHEESEPIZZES.

KIDDOS TO THE ALMANAC CHEF FOR FINDING THIS PLACE! I COULD SMELL THE WATER AND SUNSHINE IN THE AIR. IT WAS JUST A BEVE WITH A BURBON OF WAKAME RECALLING THE SEA, AND LIKE THE MEMORY, THE PIECES WERE FRAGMENTARY. SIMPLER TIMES.

HERE, A WHEAT CRISP WAS TOPPED WITH A CILLOUCH OF BEEF AND LAMB SAUSAGE, YOGURT, BEEF PUREE. A SHANKARAMA, COMPLETE WITH THE SPECIAL SESAME-GARLIC SAUCE FROM THAT ONE KEBAB SHOP ON BRIDGE ROAD. THE CHEF MUST HAVE DONE A LOT OF RESEARCH TO FIND THAT RECIPE, SINCE THE SHOP HAS LONG BEEN CLOSED. WHEN I CAUGHT A WHIFF OF CILLOUCH, MY FAVORITE COLOGNE IN MY TEENS, IT ALL CAME BACK TO ME: MY FEISTY KISS.

DRY SHRED AND BAMBROO, THE BAKEDEN LAPSOCA SKIN OF A DAY-OLD BAK COW, AND THE SMELL OF HOSPITAL DISINFECTANT. I'D RATHER NOT TALK ABOUT WHAT HAPPENED ON THIS DAY, IN KIND OF A DARK PERIOD OF MY 20'S. BUT I DID GROW FROM IT.

SPHERES OF OLIVE OIL, FLOURELLE MILK, AND TOMATO JUICE, ALL DUSTED WITH A FINE LAYER OF ASH AND BASIL POWDER. THIS WAS THE MARGHERITA PIZZA I HAD ORDERED MY TRIP TO NAPLES EARLIER THIS YEAR. A FAVORITE MEMORY. THEY MADE THE EXPERIENCE THAT MUCH MORE AUTHENTIC BY BAKING ME WHAT ONE HOUR AFTER THE LAST COURSE, WITH ONLY THE AROMA OF NEAPOLITAN ALLEYWAY TO GUIDE THE FLAME.

THE CHEF CHECKED UP MY GENOMIC ANALYSIS, AND FOUND THE RISK OF COLON CANCER. WELL, IF THE FRESHEST BLUEBERRIES SET ON A FIELD OF PULVERIZED DAYS WITH THE FRAGRANCE OF GINGER ESSENTIAL OILS REDUCES THAT RISK, I'D SAY MY REMEDY EVERY DAY!

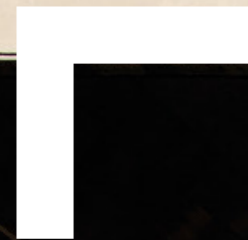
Tomorrow
blueberry - oats



About Kaii Tu

Kaii Tu is a product designer whose work blending analytical thinking and craft reaches across boundaries: from furniture and consumer products in market today, to interactive experiences and systems of tomorrow. He has collaborated with both startups and Fortune 500 companies. Kaii graduated from Harvard University, and studied design at Design Academy Eindhoven and California College of the Arts. On the side, he writes about his eating, cooking, and travel adventures as a Californian living in Spain at www.pickledelisquare.com





VIII

ABOUT



BASQUE CULINARY CENTER'S BCCINNOVATION

BCCInnovation's mission is to generate applied knowledge about gastronomy and culinary experience with the aim of transferring it to both haute cuisine professionals and to the gastronomy value chain and society as a whole.

Another of its objective is support for the creation of new initiatives and business projects in the sector.

Networking is a fundamental premise for the development of the BCCInnovation technological center.

PROJECT GASTRONOMÍA

Project Gastronomía aims to face food system challenges of the future through gastronomy and address these challenges in ways that are humanistic, sustainable, healthy, and delicious. We do this by sharing and creating images of the future through conversations, network creation and practical actions to empower stakeholders to enact change. We aim for a healthier and more sustainable future, with a systems-thinking approach: from farm to table.





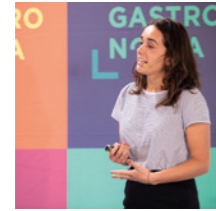
IX

APPENDIX

BIOGRAPHIES OF OUR INVITED
SPEAKERS & FOOTNOTES



BIOGRAPHIES OF OUR INVITED SPEAKERS



Blanca del Noval BCCInnovation

Blanca del Noval is a chef researcher at the BCulinaryLAB, where she explores and develops products through techniques and products like fermentation and wild plants. Incorporating sustainability as the core of every research and development, Del Noval uses new techniques to transform “food waste” into products with gastronomical value.

Del Noval received her undergraduate degree in Gastronomy and Culinary Arts at the Basque Culinary Center. Since then, she had worked at renowned restaurants in the world, such as IndeWulf (Belgium) and Central (Peru).

BCulinary LAB is part of BCCINNOVATION, research, and development department at Basque Culinary Center. A pioneer faculty and research center driven dedicated to promoting the socioeconomic potential of gastronomy through education, research, and innovation.



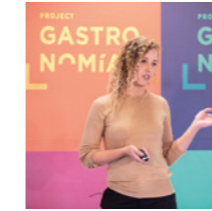
Sonia Gaztambide Sáenz, MD & Ph.D. Hospital Universitario de Cruces

Sonia Gaztambide, MD & Ph.D. is the head of the endocrinology and nutrition service at the University Hospital of Cruces and the professor of medicine at UPV-EHU. She is a member of the Endocrinology, Metabolism, Nutrition and Renal Diseases research group at IIS Biocruces Bizkaia. Additionally, Gaztambide is a member of CIBERDEM and CIBERER, and participated in CIBERER's di@bet.es study.

Dr. Gaztambide has worked in the field of neuroendocrinology and diabetes with a particular focus on complications, genetic aspects, and education. She is a national representative in D.E.S.G. (Education group of the European Association for the Study of Diabetes). She has published more than 100 articles and 200 national and international communications, book chapters, and research projects.

Dr. Gaztambide received her Ph.D. in medicine from the University of the Basque Country (UPV-EHU), with a specialization in endocrinology and nutrition. She completed her basic clinical training with at University Hospital in Cardiff (Wales, Dr. Scanlon), Massachusetts General Hospital in Boston (USA, Dr. Klibanski), and Anderson Clinic in Houston (USA, Dr. Sherman).

Dr. Gaztambide is currently President of the Foundation of the Spanish Diabetes Society and a member of Jakiunde. She was previously the president of the Spanish Diabetes Society, vice-president of the Spanish Society of Endocrinology and Nutrition.



Magdalena Górška BSH Home Appliances

Magdalena Górška is part of the Corporate Innovation team at BSH. They specialize in cognitive technologies, which includes projects related to AI, natural language processing, computer vision, and data science as applied to the area of cooking.

Górška has a significant background in robotics. She graduated from the faculty of Mechatronics and previously worked with smart homes and artificial intelligence for companies like Samsung.

In addition, Górška researches brain-computer interfaces as part of her Ph.D. at Warsaw University of Technology. She has performed part of her research at the Knowledge Engineering and Discovery Research Institute based in the Auckland University of Technology.



F. Xavier Medina, Ph.D. Universitat Oberta de Catalunya

F. Xavier Medina is a co-director and professor of Food & Nutrition Department at the Health Sciences Faculty at the Universitat Oberta de Catalunya (UOC). He is the director of the UNESCO Chair on Food, Culture, Development at the same university, and the lead researcher (PI) of the FoodLab, an interdisciplinary group in food, nutrition, society and health.

Previously, Medina led the Projects on Mediterranean Cultures, Universities, and Research at the European Institute of the Mediterranean (IEMed) of Barcelona (1991-2009). He has been awarded various prizes and distinctions, such as the Andrés de Irujo prize granted by the Basque Government for his doctoral thesis and five-time recipient of the GormandBooks prize.

Medina holds a doctorate in social anthropology from the Universitat de Barcelona. He serves as the president of the International Commission on the Anthropology of Food and Nutrition (ICAF) and is a councilor of the Food Council of Catalunya (Ministry of Agriculture and Food, Autonomous Government of Catalonia). He is also a member of Eusko Ikaskuntza, The Society for Basque Studies.



BIOGRAPHIES OF OUR INVITED SPEAKERS



Aitor Moreno Fernández de Leceta, Ph.D Ibermática

Aitor Moreno Fernández de Leceta is the director of the Department of Smart Systems & Management at Ibermática. He manages projects related to the implementation of control systems based on neuronal networks, genetic algorithms, diffuse logic systems and expert systems through big data analysis (data mining), and relevant information spotting (semantics, ontology and linked data).

Moreno Fernández de Leceta is involved in the management of European and National R&D projects in AI implementation. He has worked as an analyst on PeopleSoft and SAP in Cegasa Internacional. He's a specialized professor in BigAnalysis for the graduate program in Big Data and Business Intelligence at Deusto University and Ph.D. in Artificial Intelligence.



Prof. José M. Ordovás Tufts University

Prof. José M. Ordovás is a professor of nutrition and a senior scientist at the USDA-Human Nutrition Research Center on Aging at Tufts University in Boston, where he also is the Director of the Nutrition and Genomics Laboratory. He is also a professor of genetics and pharmacology at Tufts University. Ordovás is a senior collaborating scientist at the National Center for Cardiovascular Research (CNIC) and IMDEA Food in Spain.

Prof. Ordovás's primary research focus is on the genetic and epigenetic factors predisposing to age-related chronic diseases (e.g., cardiovascular disease, obesity, and diabetes) and their interaction with environmental and behavioral factors with a particular emphasis on diet. He is considered a pioneer and among the most distinguished experts in gene-diet interactions pertaining to cardiometabolic traits. Ordovás has received multiple honors for his scientific achievements.

Prof. Ordovás completed his undergraduate work in Chemistry and received his doctorate in Biochemistry at the University of Zaragoza. He performed his postdoctoral work at MIT, Harvard, and Tufts.

Prof. Ordovás was a member of the Food and Nutrition Board of the National Academies and the FDA National Toxicology Center Advisory Committee. He currently serves on multiple national and international steering committees, scientific peer review committees, advisory and editorial boards.



Ramón Perisé Mugaritz

Ramón Perisé leads creativity and research projects in Mugaritz. From its R&D department, he works on projects related to gastronomy and health to the latest technologies applied to multisensory experiences. He has experimented with fermented products since 2011.

Before joining Mugaritz as an intern, Perisé was enrolled at the Escuela Universitaria de Hostelería Sant Pol de Mar. After completing his internship at Mugaritz, he became part of its kitchen team and in 2011 he began working in their R&D department. He currently participates in a great variety of projects between science, gastronomy, and art.



Nick Popovici Vita Mojo

Nick Popovici founded Vita Mojo, a SaaS platform for the restaurant industry. Vita Mojo is based on the belief of the need for personalized food based on different tastes, appetites, goals, and DNA.

The Vita Mojo platform empowers customers to personalize their experience and food around their unique needs. While behind the scenes it is focused on automating human repetitive tasks via intelligent algorithms and robotics.

Before Vita Mojo, Popovici spent eight years in finance as a portfolio manager for BlackRock and most recently for Schroders. He holds a BA in International Business & Management from Dickinson College.



BIOGRAPHIES OF OUR INVITED SPEAKERS



Diego Prado
BCCInnovation

Diego Prado is a chef researcher at BCCINNOVATION, the R&D department of the Basque Culinary Center in San Sebastian, Spain. Prado is the coordinator of BCulinaryLAB a kitchen/laboratory. BCulinaryLAB focuses on innovative creativity driven techniques and products like fermentation and wild plants. At BCulinaryLAB, Prado uses new techniques to transform “food waste” into products with gastronomical value, as part of their efforts to support sustainability.

Chilean born, Prado studied in Duoc UC in Santiago and began his career in Boragó restaurant in Santiago as a sous chef in the R&D department, Boragó is currently nº2 in Latin America’s 50 best restaurants (San Pellegrino’s 50 best restaurant list). After completing a stage at Noma restaurant in Copenhagen, he worked in his own culinary consulting studio Prado.Taller in Chile before leaving for the Basque country to hold his current position.



Pedro Luis Prieto Hontoria, Ph.D.
Fresh Business Perú

Pedro Luis Prieto Hontoria, Ph.D. is the innovation manager for Fresh Business Perú, where he develops healthy foods based on the rich Peruvian biodiversity.

He was the former director of research and the graduate programs at Universidad SEK (Chile) for four years, as well as, research professor at Universidad Internacional SEK (Ecuador). He is a member of diverse committees such as ACHIPIA Scientific Network, Chile Vive Sano Foundation (part of Revolución Saludable), and Gastronomy Advisory Committee of National Culture Council of the Chilean Government.

Dr. Prieto is an active consultant and advisor for agro-food innovation for businesses in Peru, Chile and various public programs. He is a member of evaluation panels for food innovation in different Latin American countries.

Prieto has a Ph.D. in Food, Physiology, and Health from the Universidad de Navarra. He received his graduate degree in Nutrition and Metabolism at Universidad de Navarra and an undergraduate degree in Food Science and Technology and Human Nutrition and Dietetics at Universidad San Pablo CEU.



Prof. Daniel Ramón Vidal
Archer Daniels Midland Co

Prof. Daniel Ramón Vidal is the vice-president of R&D in Health & Nutrition for Archer Daniels Midland Co (ADM). His research has resulted in over a hundred national and international patents, most of them have been transferred and are in use. He has over 150 published articles in international journals and has been awarded various awards of great prestige.

Prof. Ramón serves as the secretary of the Spanish Society of Biotechnology and member of the Scientific Committee of Microbial Resource Research Infrastructure. He is also a member of the Board of Directors of the Bio-Based Industries Joint Undertaking of the EU and the Steering Committee of the Board of Governors of Scientific Research. Additionally, he is the vice-president of the board of directors for the Spanish biotechnology companies association ASEBIO.

Prof. Ramón received his Ph.D. in biological sciences at Universitat de València. He performed his post-doctoral work in the Industrial Microorganisms section of the Department of Genetics at Wageningen University (Holland). He was previously the professor for food technology at Universitat de València and research professor at the Agrochemistry and Food Technology Institute (IATA) from the Upper Council of Scientific Research (CSIC).



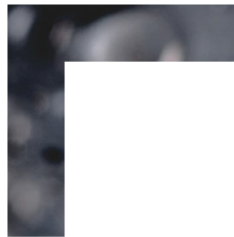
Prof. Guillermo Reglero
Instituto IMDEA Alimentación

Prof. Guillermo Reglero is a professor of food sciences of the Universidad Autónoma de Madrid. He is also a scientific researcher of the Board of Governors for Scientific Research, and research scientist of the Consejo Superior de Investigaciones Científicas (Spanish National Research Council). He is currently the director of Instituto IMDEA Alimentación (IMDEA Food Institute).

Between 2002 and 2006, Reglero was the Manager of the Food Science and Technology area for Spain’s National Technology Plan of R&D and Innovation. His line of research focuses on the design and validation of food products of specific use for health purposes.

Prof. Reglero has directed various regional, national and European projects funded both by the public and private sector. He is the author of over 250 international indexed publications, that have been quoted over 4,000 times and 3 patents.

In 2001, Prof. Reglero was awarded the Archer Daniels prize by the American Oil Chemists Society. In 2008, he received the Prize of the Spanish Gastronomy Society as the Best Researcher in Food Science. He also received the Medal of Honor for the Promotion of Invention 2015 of the García Cabrerizo Foundation.



FOOTNOTES

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