

Environmental, Social & Governance Report 2022



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About This Report

This report reflects Bluepha's commitment to society and our stakeholders, and details our progress in environment, society, and governance. The report will cover 5 topics related to our work in Governance, Products & Technology, Employee Development, Care for the Environment, and Contributions to the Community.



Report Writing Principles

Clarity Accuracy Comprehensiveness

Scope of Report

Throughout the report, "the company" or "we/us" refer to Bluepha Co., Ltd. and its wholly-owned subsidiaries (hereinafter referred to as "Bluepha"). BioFAB refers to the company's Bluepha® PHA biorefinery located in Yancheng, Jiangsu Province, and BioFAB1 refers to the first phase of BioFAB. Unless otherwise stated, this report covers the company's performance in ESG criteria during operations in the year starting from January 1, 2022, to December 31, 2022. Unless otherwise mentioned, the information and data disclosed in this report come from the company's internal statistics and related documents. The type of currency used and amounts mentioned in the report are denoted in Chinese Yuan (CNY).

Basis for Report

This report is primarily based on the United Nations' Sustainable Development Goals (SDGs) and the Global Reporting Initiative (GRI) standards, and we have provided an index for the above standards for reference. We will continue to improve the quality of reporting and disclosure of information to ensure the transparency of our performance in ESG governance. Please see the appendix at the end of this report for more information.

Language Used

This report has been prepared in two languages: Mandarin Chinese and English. If there is any discrepancy between the two versions, the Chinese version shall take precedence.

How to Obtain the Report

This report, in addition to more information, can be downloaded from Bluepha's official websites (EN: www.bluepha.bio; CN: www.bluepha.com) and Bluepha's Wechat Official Account.

Contact Information

If you have any suggestions about this report or Bluepha's ESG performances, feel free to contact us at esg@bluepha.com.

Letter From Our Founders



The year 2022 marks a significant milestone for Bluepha as the first phase of our industrial-scale facility BioFAB, BioFAB1 was successfully constructed on what was once an empty reed field. Since the day that BioFAB1 became operational, we've established closer ties with customers, business communities, the industrial chain and even the whole society through Bluepha® PHA products. Those ties help us realize that the company must explore new ways to benefit our society, and to better daily life through positive actions and forward thinking. Therefore, with a profound sense of pride, we proudly present Bluepha's very first ESG annual report.

As our very first product, Bluepha® PHA's core value is to provide a no-compromise solution to plastic pollution and climate change. However, our work did not stop there. At the same time, we released an all-new low-carbon production technology called Biohybrid™. This technology can capture carbon dioxide in the air and directly use it to synthesize Bluepha® PHA and other biomass products, contributing to carbon neutrality right at the source of biological manufacturing. As of right now, 10% of the carbon atoms in Bluepha® PHA come from carbon dioxide. We promise to continue increasing this percentage so that eventually 100% can come from greenhouse gases in the atmosphere.

With the set up of systems for Bluepha Partners, Budget Management and Quality Management, Bluepha has been able to see vast improvements in corporate governance in 2022. Our organizational structure is well-developed, operational risks have been effectively controlled, operational efficiency showed substantial improvement all while perfecting intellectual property and supply chain systems. On top of that, we have charted a clearer talent growth path for our employees, creating a work atmosphere that respects personal interests and individual development. We also put in place a total of 24 interest clubs and 169 training courses which cater to more than 90% of our employees.

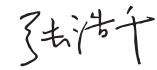
As one of the leading companies in the field of synthetic biology, we have an important responsibility to help establish an industry network and facilitate public communication. In 2022, we collaborated with industry partners to introduce "Nature Matters", a platform designed to facilitate accelerated and stable growth. Concurrently, we collaborated with Pricewaterhouse Coopers (PwC) to publish the "PHA Biodegradable Plastics Industry White Paper." Together with cooperative efforts between schools and other enterprises and the aid of insights shared within the industry, we have been able to use all these platforms to introduce the public the role of synthetic biology in driving social development.

At Bluepha, our original intention has always been to use synthetic biology to improve human life, and this goal has remained unchanged since we established the company six years ago. As the founders of Bluepha, we take pride in presenting our company's efforts and achievements in the areas of environmental and social responsibility, as well as corporate governance, in this ESG report. We believe that it is our responsibility to create innovative products and make a positive impact in the world, and we hope that our readers will share our vision and join us in working together to build a better society.

Bluepha Founders

Haoqian Zhang

Teng Li



About Bluepha



○ Corporate Introduction

Bluepha Co., Ltd (Bluepha) is a purpose-driven company dedicating to molecular and material innovation based on synthetic biotechnology.

- Mission: Eliminate humankind's dependence on petrochemicals
- Vision: One industry, one hundred products, for five billion people

We are committed to designing, developing, manufacturing, and selling bio-based molecules and materials. This includes marine degradable PHA biopolymers, implantable materials for regenerative medicine, new functional ingredients for cosmetics and probiotics, among others. Our products help our customers differentiate themselves in industries across various fields, such as consumer goods, food, medicine, agriculture, and manufacturing.

○ Corporate Values

Always Day 1

We integrate the spirit of entrepreneurship into Bluepha's DNA: Always ready to embrace change, fueled by enthusiasm and curiosity. We strive for collaborative success with our business partners, sharing achievements and risks. Through diligence and personal endeavors, everyone in Bluepha will gain growth and fulfillment.

Pursue Truth and Dare to Win

We pursue truth and pragmatically analyze problems based on the "First Principle" approach. We dare to make judgments and decisions, free from the constraints of past experiences, even in situations that demand unconventional methods.

Getting Things
Done First

The journey of innovation is paved with adversities, particularly when resources are limited. Therefore, we should always prioritize accomplishing our goals, while minimizing inefficiencies in the process.

Uphold Integrity
and Transparency

To achieve effective and clear communication, we value frankness and transparency when expressing our viewpoints, focusing on what is right rather than who is right.

Exemplify Professional
Excellence

We approach our tasks with a professional and rigorous mindset, refusing to settle for mediocrity. We are committed to continuous learning and growth, striving for excellence in our respective fields and consistently innovating to maintain our competitive edge.

Free Spirit and
Accountability

We encourage individuals to surpass the limitations set by rules and restrictions, thereby achieving boundless possibilities. However, even in the absence of guidance, we put the interests of our organization in the first place. We take full ownership of our work, embracing accountability for our conduct and the outcomes.

Our Milestones



Our Milestones

February: Bluepha® PHA resin series passed the EU's Food Contact Material tests

April: Established the Joint Probiotics Laboratory with Jiangnan University

2022

2022

June: Established the Probiotic Resources and Functional Development Joint Laboratory with Lanzhou University

July: Jointly launched the "Nature Matters (Tian-gong Kai-wu)" Bioeconomy Industry Acceleration Platform with up and downstream industrial partners, together with investment institutions

September: The Bluepha® BP350 obtained the OK biodegradable WATER certification from the TÜV Austria Group

October: Formally recognized as a "Specialized and Sophisticated" Small and Medium-sized Enterprise that produces novel and unique products in Beijing

2022

2022

November: Jointly released the "PHA Biodegradable Plastics Industry White Paper" with PwC

December: Pilot launch of the Bluepha® Biorefinery "BioFAB1"



Governance

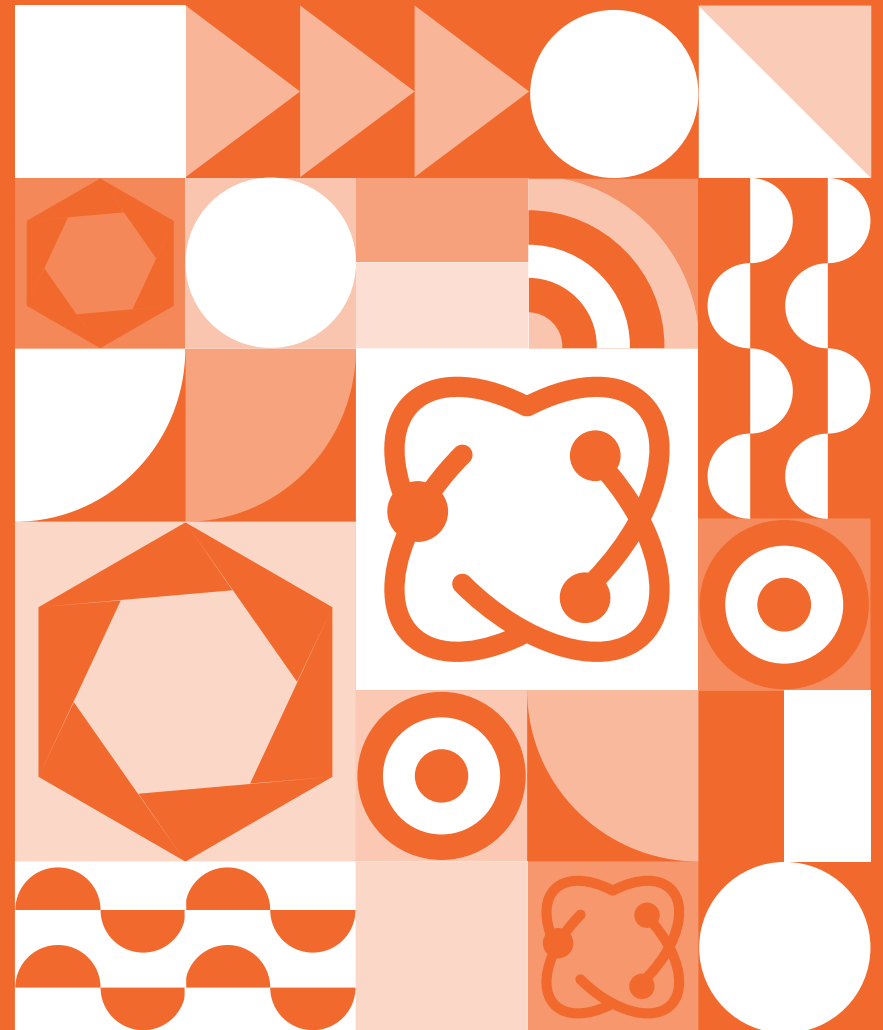


A corporation's governance is closely linked to how well that corporation can create value. At Bluepha, we attach great importance to our governance system and hope that, in addition to seeing steady growth in the company's financial operation data, we are also able to achieve growth that is mutually beneficial to society.

To meet this goal, we approached our work from the standpoints of corporate and ESG governance by introducing a Bluepha partner system and a project management structure made up of four committees to handle the daily business of the company and optimize decision-making and our work processes. With an emphasis on exercising integrity, we then established comprehensive budget, quality, and supply chain management systems in addition to other measures to control operational risks and improve compliance management.

In order to integrate ESG principles into our daily operations, we have established an ESG Committee and a Standing Committee, while taking a top-down approach to drive its implementation. We

will also continue our work with sustainability training and raising sustainability awareness among our staff to ensure that the ESG philosophy percolates throughout the entire company.



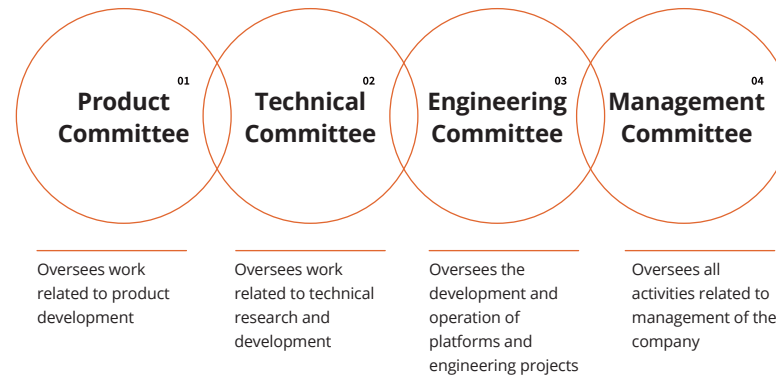
Corporate Governance

Bluepha is committed to effective corporate governance. Taking note of every aspect in the corporate governance framework, we are hard at work to improve decision-making, optimize all processes, overcome challenges, improve efficiency in the development of our business, and allow relevant parties to fully understand Bluepha's management and development.



○ Corporate Introduction

In July of 2022, Bluepha established four management committees, namely product, technical, engineering, and management, to improve our governance structure. The four committees will work together to efficiently manage all projects or operational work related to front desk service, the technology center, support center, and R&D and production platforms in the form of goals, progress, scope, quality, and budget. This way, our corporate strategy can be effectively implemented at an organizational level. Since the establishment of the 4 committees, nearly 150 work units have been effectively managed. At the end of 2022, the company identified and recognized a total of 24 outstanding work units based on results, management expertise and task difficulty.



Bluepha Partner System

The company formulated a partner system in 2022 with the purpose of ensuring the sustainability of the company's values, vision, and mission. As its name would suggest, the partner committee is made up of partners, and it is the highest decision-making body within the company. Each partner has a single vote to cast, ensuring a balance in the decision-making process wherein no single member's vote can outweigh that of another member's, regardless of whether that member is a founder, which fully reflects the collective vision of the managing partners. As of the release of this report, Bluepha has a total of six partners.

All-Hands Meetings

At Bluepha, we established a mass communication mechanism for all employees. All-hands meetings are held each month and questions from employees are collected using surveys distributed a week prior to the meeting, so all employees can make use of this opportunity to raise their questions. Regardless of scope, ranging from as small as questions about daily operations or as big as questions about the history of the company or plans for the future, all questions asked will be answered one-by-one by the two founders at each all-hands meeting.



○ Ethics and Compliance

The company advocates for a corporate culture of integrity and has a zero-tolerance policy for fraud and corruption. We encourage our employees to report any activity that violates national laws and regulations or harms the interests of the company or individuals. Employees can do so through multiple channels, such as through their superiors, the Human Resources Department, the Legal Affairs Department, Management Office, and others. Bluepha has also set up a Management Office mailbox, which provides employees with a real-name reporting channel and an appointed team responsible for accepting, investigating, and handling such reports.

Bluepha has established the following principles to enforce honest business conduct:

- Established a tool to report inappropriate conduct, with the reporting email being law@bluepha.com
- Appointment of suppliers must be approved through the signing of a confirmation letter by the recommender or referee and must undergo strict procurement audit procedures by an external organization
- All expenses totaling more than 500 yuan, and gifts (gift cards etc.) for cordial business exchanges, must be handed over to the company to be processed

○ Protecting Intellectual Property Rights

The protection of intellectual property rights is an inseparable part of fair competition. We at Bluepha are committed to respecting the intellectual property rights of others, and at the same time also pay close attention to the protection of our own intellectual property rights. We have established a comprehensive intellectual property management system and have clearly laid out the responsibilities and scope for the acquisition and maintenance of intellectual property rights.

To encourage our employees to innovate and create, we've also established an incentive system to give generous rewards to qualifying inventors.

59

New patent applications

116

New trademark applications

Patent Applications

In 2022, Bluepha had a total of 59 new patent applications, of which 37 were for new inventions, 10 were for new utility models, 11 were international PCT applications, and 1 was an application for a design patent. There were also 116 new trademark applications.

38

Patents Issued

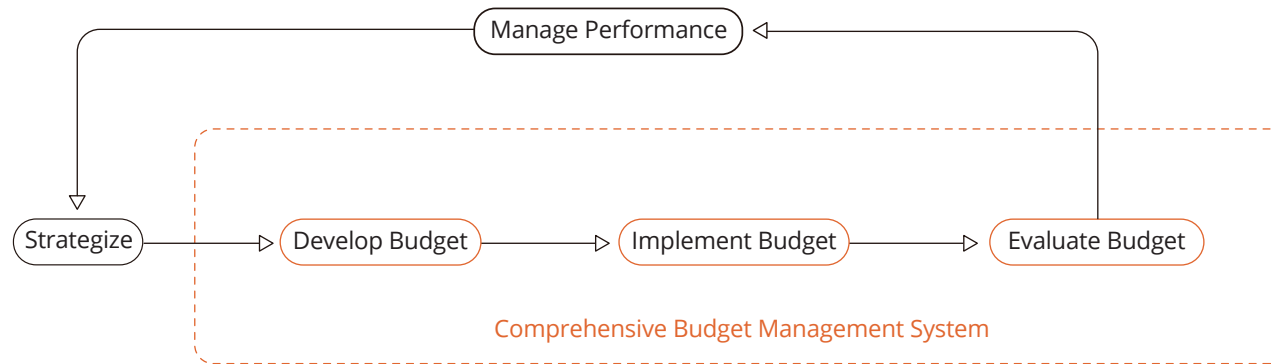
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Trademarks Issued

Patents Issued

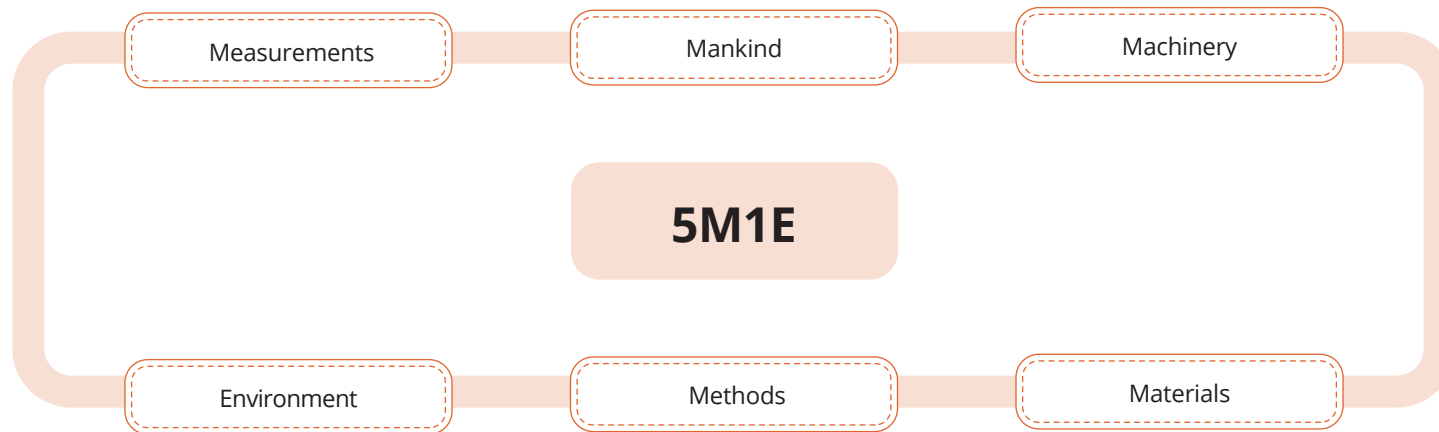
As of December 31, 2022, Bluepha has applied for a total of 86 patents and has been issued 38 patents thus far. The company has applied for 150 trademarks and has 80 trademarks currently registered.

○ Comprehensive Budget Management



To help achieve strategic goals and strengthen the company's capability to control risks, in 2022, Bluepha officially set up Comprehensive Budget Management System by combining strategic objectives, business plans and resource management. All members of the company, from executives to department heads, and from team leaders to team members, play a role in drawing up and implementing the budget. Our comprehensive budget management is an all-rounded process which takes into consideration all economic activities such as company personnel, finances, materials, as well as supply, production, and sales. Pre, during and post financial activities such as budget preparation, analysis, issuance and execution encompassing analysis, adjustment, assessment, rewards and penalties must also be taken into consideration.

○ Quality Management



Product quality is a company's lifeline and can determine a company's development and survival. On one side of this company development coin lies R&D, while on the other, production. To this end, Bluepha has established its own quality management system in the R&D and production departments respectively, so as to ensure reliable quality across the research and production processes.

Since September 2022, the laboratory operation team has initiated the establishment of a Research and Development (R&D) quality management system. This has involved creating specialized sub-teams within different departments, each led by an accountable individual, to address quality initiatives and enhance seamless communication and collaboration. To enhance the quality management awareness and ability of R&D personnel, the laboratory operation team was divided into 17 teams to attend 7 separate quality management training and experience sharing sessions. With the support of external professional quality consulting agencies, each team has conducted one-on-one on-site studies, clarified the operational content and collaborative relationships, as well as completed the planning of the quality management system. Currently, each team has completed the workflow clarification and system documentation which have met review requirements.

At BioFAB1, we have formulated strict quality management standards, controlling all stages of the process through careful monitoring from raw materials to finished products, according to six different factors or "5M1E": mankind, machinery, materials, methods, measurements, and the environment. We implement a phased verification of the results of quality activities to promptly identify any issues revealed during quality assessments. This enables us to take appropriate measures to prevent the reoccurrence of discrepancies and minimize potential losses to the greatest extent possible.

○ Supply Chain Management

Effective supply chain management plays a pivotal role in generating value through consistent delivery, cost control, and collaborative development with both upstream and downstream partners. To implement the ESG concept, we incorporate ESG practices into our supplier admission process, on-site inspection process, and performance evaluation. At the same time, green procurement is also one of our important strategies. We have drafted and released the first version of the “Ten Guidelines for Green Procurement,” giving preference to suppliers that meet requirements and providing them with a larger share of procurement and more favorable conditions. On top of that, we also adopt the localization strategy and are currently cooperating with more than 50% of local suppliers. Transparency is another important principle of ours. We adhere to the principles of openness, fairness, and impartiality in bidding and tendering, while implementing a zero-tolerance policy for any non-compliant behavior in cooperation. These measures not only improve the efficiency and stability of our supply chain, but also reflect our social responsibility pledges.

Bluepha's Ten Guidelines for Green Procurement



Environmental Management System



Animal-Free Principle



Occupational Health and Safety System



Popularization of Labor Laws



Carbon Emissions Reduction



Sustainable Technological Innovation



Water Resources Protection and Conservation



ESG Achievements Dissemination and Sharing



Zero Use of Restricted Substances



Enterprise Compliance Operations

○ Risk Management

Effective risk management and control are important guarantees for the company's strategic advancement. The company has established Three Lines of Defense, and regularly identifies and evaluates risks based on the company's current situation to develop corresponding countermeasures.

First Line of Defense Operation and Management

1

Composed of various business lines and functional departments. They are responsible for running daily operations and managing, designing and executing relevant control processes to address risks.

Second Line of Defense Risk Management

2

Composed of the four committees, finance department, and other departments involved in risk management and control. They assist in establishing the first line of defense and work on improving efforts to manage and control risks.

Third Line of Defense Independent Guarantee

3

Composed of internal audit and investigations departments. They perform independent evaluations for risk management.

ESG Governance

To enhance our resilience and ability to develop sustainably, Bluepha officially started working on our own ESG governance in January of 2022 and incorporated it into the company's development strategy. We identify key ESG risks and opportunities from a business and operational perspective, formulate material topics that are highly integrated with business development, and follow up on the implementation of the material topics based on the principle of "planning, implementation, inspection, and handling" to ensure the effective progress of the material topics.



○ ESG Committee Governance Structure

Taking into account the concerns of various stakeholders and the main functional departments, Bluepha has established an ESG committee and an ESG standing committee. The ESG committee consists of three subcommittees, each dedicated to addressing specific areas: environmental impact, social care and corporate governance. These subcommittees work collectively to promote and address relevant ESG (Environmental, Social, and Governance) issues.



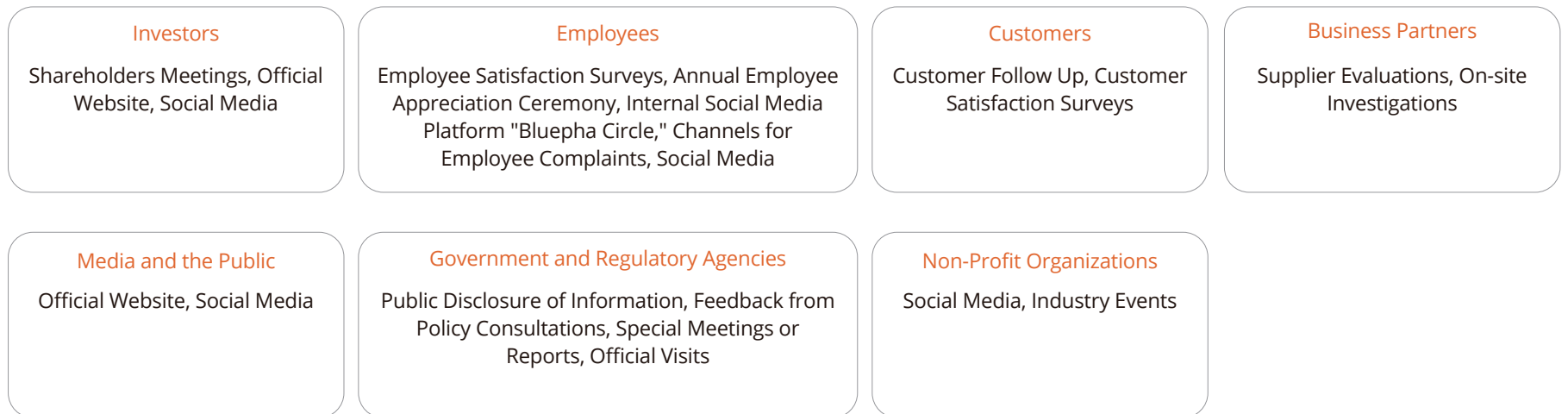
○ Identification and Confirmation of Material Topics

The company adopts ESG reporting guidelines provided by regulatory authorities, utilizes the ESG rating system of reputable third-party institutions, and takes inspiration from industry leaders to identify and compile a preliminary list of material topics. Subsequently, ESG assessors are invited to modify the material topics in the list. They will evaluate and score these material topics based on economic and social impact. The confirmation is then completed through a voting process by the entire committee during the ESG conference.

We will maintain regular communication with relevant stakeholders to understand their expectations and assessment of our ESG performance.

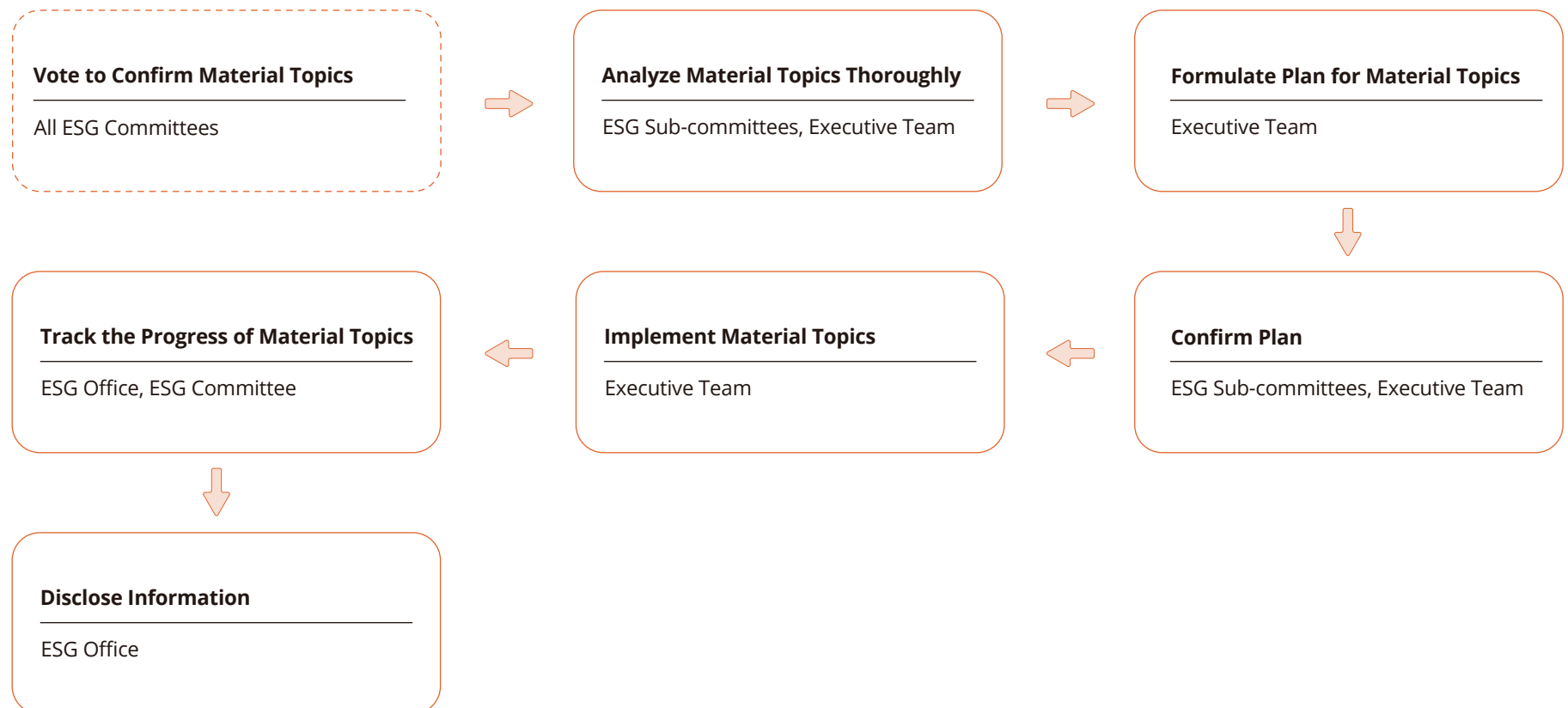


Stakeholders and Corresponding Communication Channels



○ Implementation of Material Topics

Following a vote from the ESG committees regarding the matter, the executive team will assess the performance of the ESG subcommittee chairman and align the ESG matter with employee performance. The implementation process of the material topics will be led by the accountable individuals, and the ESG office will coordinate with stakeholders to assist their efforts.



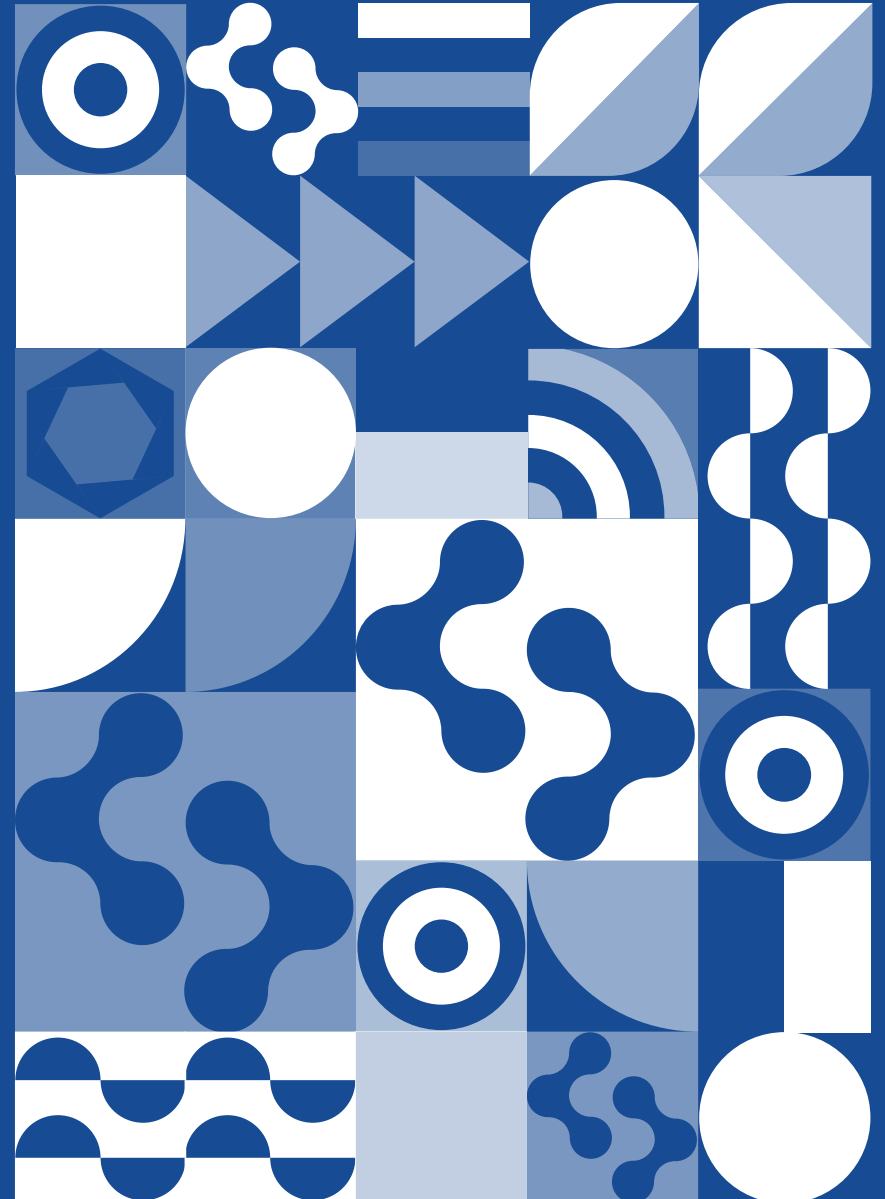
Products and Technology



For a biomanufacturing company, responsible products and production methods are the main way of establishing a good relationship with the environment and are a key factor in achieving sustainable development.

We are committed to using high-quality green manufacturing to provide products that meet the needs of society and the times, and at the same time adhere to principles of green production and follow the necessary industry regulations put into place by the national government. While relying on strong automation and digitized R&D infrastructure, we actively promote the research and development of green products in fields like cosmetics, aesthetic medicine, biodegradable plastics, and probiotics so that cities and communities can achieve sustainable development, be healthy, and have a good well-being.

In terms of climate action, we at Bluepeha have developed the Biohybrid™ technology to convert carbon dioxide in the air into biomass. With this revolutionary technological breakthrough, we have taken a solid step towards carbon neutrality.



Products



○ The Need for a More Beautiful Life and a Series of Solutions

Needs for Life in the Future: More Beauty

Humanity has yearned for beauty since the dawn of its existence. Even as early as China's Warring States period, literature describes methods not too dissimilar to today's application of makeup, like powdering one's face, drawing one's eyebrows with dark pigments, using balms to create a shine on one's lips, and adding bleach and coloring to one's hair. With the improvement of material life, people pay more attention to personal health and environmental protection. The preference for ingredients has also shifted from risky materials to green, healthy, and pure ingredients. Thus, consumers have gradually abandoned ingredients that contain health risks and have turned to greener and healthier ways of pursuing beauty. This trend is not only rational, it shows us that the future will need greener and more sustainable beauty.



The Solution: Green Materials for Cosmetics and Aesthetic Medicine

In accordance with our principle of green design and green production, we have developed a series of green materials for use in cosmetics and aesthetic medicine.

Regenerative Material for Aesthetic Medicine: PHA Injection Microspheres

PHA (Polyhydroxyalkanoate) is a kind of natural polyester in microbial cells that exists in abundance in nature and has good biocompatibility. Regardless of the scarcity of new materials or concerns about material safety, PHA would be a good choice for non-surgical aesthetic medical procedures and other beauty applications. The PHA injection microspheres have an outstanding ability to stimulate tissue regeneration, which can meet the needs of immediate filling and long-term stimulation of collagen regeneration after dermal injection.

In 2022, Bluepha established a joint venture company with Sihuan Pharmaceutical (HK00460), taking the first step in the vertical extension from upstream raw materials to the medical aesthetics industry. This cooperation integrates social resources and strives to provide a new generation of regenerative products for beauty seekers around the world.



A New Favorite in Aesthetic Medicine: Collagen

Collagen is the most abundant protein found in mammals, with 28 types found in the human body so far¹. Common collagen types include types I, II, III, and IV, of which type III collagen is structurally thin. It mainly presents in the skin of infants, and it plays a role in maintaining skin elasticity and damage repair. With age, the amount of type III collagen in the human body gradually decreases, and the epidermis will gradually become wrinkled. Collagen is traditionally extracted from animal sources, however, the skin depressions it fills pose a risk of infection and allergies.

In 2022, Bluepha became the first company in the world to successfully use synthetic biological methods to obtain full-length type III human collagen. It is expected to solve the risk of infections and allergies brought by animal-derived collagen, while reducing harm to animals.



○ The Plastic Paradox and its Solution: Bluepha® PHA

The Plastic Paradox

Currently, the annual global plastic production exceeds 360 million tons¹, where 40% of which is used for packaging but the average lifespan of packaging plastics is less than half a year. A report released by Organization for Economic Cooperation and Development (OECD) in 2022² shows that the amount of plastic waste generated globally is twice that of 20 years ago, with majority of plastic waste ultimately being landfilled, burned, or leaked into the environment, and only 9% successfully recycled. The issue of plastic pollution has garnered global attention, yet finding a solution remains a formidable challenge. We are trapped in a 'plastic paradox', where everyone is both a participant and a victim of the status quo.

The Solution: Bluepha® PHA

Bluepha is committed to providing solutions to a sustainable life for humankind by unleashing the potential of microorganisms. After several years of exploration and research, on March 1, 2023, we officially launched Bluepha® PHA. The scientific name of Bluepha® PHA is poly(3-hydroxybutyrate-co-3-hydroxyhexanoate), or PHBH, and it is a natural polymer material with plastic-like properties that can be used as a substitute for traditional plastics in all aspects of life.

Different from traditional petroleum-based plastics, Bluepha® PHA is fermented by microorganisms. The production process does not require high temperature and high pressure, nor does it involve heavy metal catalysts, so the whole process is greener. As a bio-based material, all the carbon atoms in Bluepha® PHA are derived from carbon dioxide fixed through plant photosynthesis, and finally integrated into the natural carbon cycle. More importantly, unlike most biodegradable materials that are only compostable in industrial settings, Bluepha® PHA stands out by being suitable for both industrial and household composting. Moreover, it exhibits excellent degradability in natural environments such as soil, freshwater, and the ocean.



Source: 1. Plastics - The facts 2021. Plastic Europe

2. Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options, OECD.

○ Intestinal Microplastics and its Solution: Plastic-eliminating Probiotics

Microplastics

The term “microplastics” was first introduced in the article ‘Lost at Sea: where is all the plastic?’ published in Science Magazine in 2004. In 2008, the first international microplastics seminar organized by the National Oceanic and Atmospheric Administration (NOAA) of the United States defined “microplastics” as plastic fragments with a diameter of less than 5 millimeters. Microplastics are ubiquitous, found not only in external environments such as oceans or the air, but also in the human body through food or air intake. The additives in microplastics, such as phthalate diesters, become phthalates that can stimulate the release of estrogen in the body. When these substances accumulate to a certain level in the human body, they will become “pseudohormones” and disrupt the endocrine system, affecting the reproductive system of expecting mothers and the development of fetuses, and may even cause cancer. The dangers of microplastics cannot be ignored.



The Solution to Intestinal Microplastics: Probiotics that Battle Microplastics

Bluepha started laying out its probiotics pipeline in 2021, relying on our self-developed **Synthetic Biology Operating System (Synbio OS)**. We combine modern biotechnology with Industry 4.0 technologies, such as automation and digitization, among others. Our goal is to develop a range of probiotic products with a solid scientific foundation and clear efficacy, safety, and reliability. In 2022, Bluepha teamed up with the Food and Biotechnology Institute of Jiangnan University led by Academician Chen Wei to co-develop functional probiotics that can alleviate the hazards of plastic products and provide more innovative solutions to address the health crisis caused by microplastics.



Technology



○ Biohybrid™: Biomanufacturing Technology based on the First and Third Generations of Carbon Sources

Generation Classification of Carbon Sources in Biomanufacturing

Biomanufacturing refers to the use of renewable resources as raw materials to produce energy and chemicals through biological processes. It has long been regarded as a production model that can replace the unsustainable fossil fuel economy and will be one of the most important drivers of global economic growth in the future. However, the main carbon source of this industry is currently traditional biomass such as starch and plant oil. When it grows to a larger scale, it will inevitably face the challenge of having to compete with people for food, and competing with food for land.

To address this issue, we must first understand how carbon sources are classified in biomanufacturing. With regards to environmental benefits and technique difficulties, biomanufacturing carbon sources can be divided into three generations:



Generation I

Starch, Plant Oil



Generation II

Stalk, Used Cooking Oil, Organic Sewage, Coffee Grounds



Generation III

Methane, Carbon Dioxide, Exhaust Gas

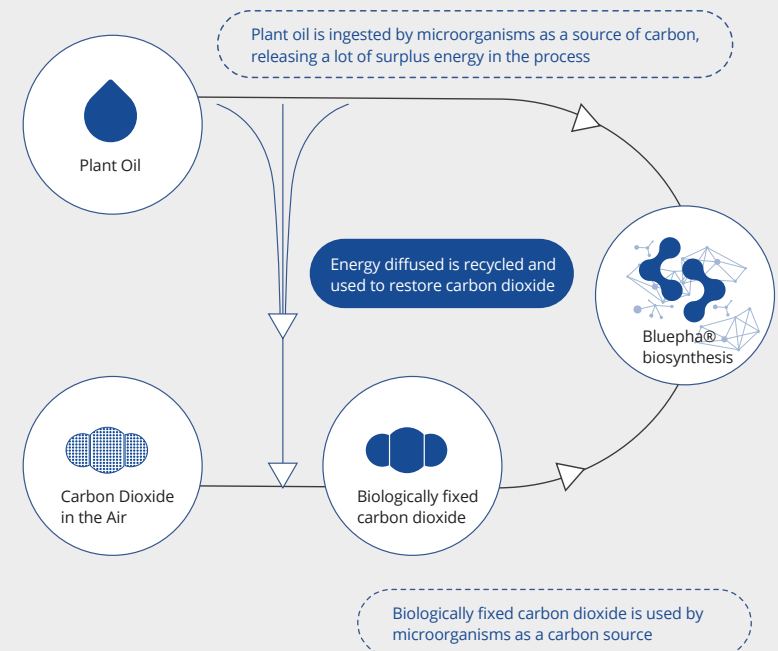
- **Carbon sources Generation I** are traditional biomass such as starch and plant oil, which are currently very easy to obtain, but are also important food sources.
- **Carbon sources Generation II** are non-food biomass, such as straw, used cooking oil, organic sewage, coffee grounds, etc. This generation is characterized by the fact that the environmental cost is significantly lower than that of the first generation, but it remains very difficult to collect, transport and process. In the future, it may take years or even decades to overcome technical bottlenecks or recycling difficulties.
- **Carbon sources Generation III** are greenhouse gases, like carbon dioxide or industrial exhaust gas. Dealing with this generation can directly contribute to carbon neutrality independent of biomass sources. However, with the current level of technology and engineering, it is very difficult to effectively utilize these carbon sources to that end.

Biohybrid™ Technology

The Biohybrid™ technology developed by Bluepha proprietary technology can simultaneously use biomass and carbon dioxide as raw materials to produce Bluepha® PHA. By imitating nature and combining machine learning with metabolic analysis, we discovered that when microorganisms consume plant oil, they produce a large amount of surplus intracellularly energy, similar to photosynthesis. This energy can efficiently drive the fixation of carbon dioxide, thereby converting carbon atoms in greenhouse gases into Bluepha® PHA.

In 2022, we successfully ran pilot trials which confirmed that Bluepha® PHA can be produced based on our Biohybrid™ technology. Experiments have shown that about **10% of the carbon atoms** in Bluepha® PHA came directly from carbon dioxide. We will continue optimizing our Biohybrid™ technology to gradually increase the proportion of carbon atoms from greenhouse gases used in Bluepha® PHA products and contribute more to the reduction of societal carbon dioxide emissions.

As a fundamental production technology, Biohybrid™ has the potential to be widely applied to almost all biological manufacturing processes in the future to produce countless chemicals and materials to meet consumer needs.



○ Our Synthetic Biology R&D Platform Supports Microbial Resources Protection

Microbial diversity is an important foundation for maintaining ecological balance and ensuring the health of human, flora and fauna. The diversity of human-coexisting microbes is constantly being destroyed with the acceleration of industrialization, which makes it dire to rescue and protect our microbial resources.

The Qinghai-Tibet Plateau is known as the "Third Pole" of the earth. With its unique ecological environment, diverse terrain, variable climate, and remote location from modern industry, it serves as a natural "microbial storage bank" abundant in rich microbial resources. Relying on the company's self-developed basic synthetic biology R&D platform, Synbio OS, Bluepha has built a powerful strain function enhancement system and ultra-high throughput functional strain screening platform. In 2022, Bluepha and the School of Public Health, Lanzhou University jointly explored the microbial resources of the Qinghai-Tibet Plateau, with the aim to develop probiotics nurtured by unique ecological environments, promote application of automation technology in ultra-high throughput probiotic screening, and maintain the diversity of microecological resources.



Employee Development



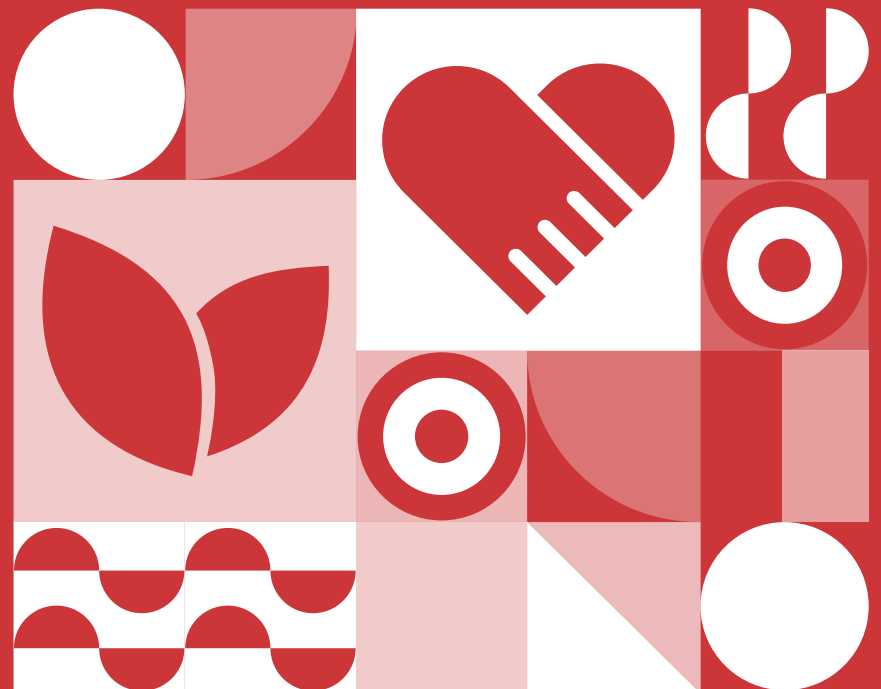
A dynamic and fast-growing team of talented individuals is Blueepha's core asset. We are committed to creating an equal, diverse, liberal, and inclusive growth environment for our employees. In addition to offering plentiful opportunities for growth and development, we also prioritize the well-being of our employees by ensuring their physical and mental health, as well as their rights and welfare.

We strictly abide by the country's labor laws and have a diverse workforce in terms of gender, age, professional background, and ethnicity. The well-being of our employees is also very important to us, which can be seen from our policies on prioritizing employee welfare, providing quality dormitory facilities, supporting the establishment of labor union, fostering a positive corporate culture, and ensuring comprehensive occupational health and safety systems.

To promote employee growth, we have launched a Two-Wing Plan as part of our career development management system to provide

personalized methods for career development for a broad variety of talented individuals. By combining online and offline training initiatives, we have established a comprehensive training system to provide employees with precise and comprehensive resource support, empowering them with the necessary tools to excel in their careers.

We remain committed to nurturing the growth and fulfillment of our employees as well as fostering a collaborative environment where everyone can collectively strive for progress and create meaningful value together.



Diversified Employment

With the development of our business, our team size is also experiencing continuous growth. Our employees have diversified professional backgrounds, ranging from engineering, science, management, literature, economics, medicine, law, and a plethora of other disciplines. There is a shared belief that biomanufacturing technology holds the potential to enhance the quality of human life, thus everyone is willing to engage in the pursuit to drive its implementation across various domains. At the same time, we are actively recruiting staff in different local offices, creating jobs and raising local incomes.

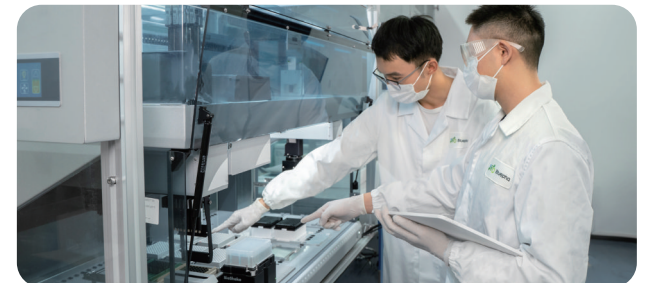


Legal Employment

Bluepha always adheres to national laws, regulations, and local regulations such as the Labor Law of the People's Republic of China, the Labor Contract Law of the People's Republic of China, and the Social Insurance Law of the People's Republic of China. We sign employment contracts with 100% of our employees, fulfill company obligations in accordance with the law, and work to protect the rights and interests of our employees. In addition, we advocate for a fair and equal working environment and are against discrimination in any form, striving to provide all our employees with equal employment opportunities.

According to national and district policies, the company provides comprehensive social insurance and housing fund contributions for all full-time employees, along with supplementary medical insurance to alleviate their healthcare burden and address any concerns they may have. As of the publication of this report, female employees account for 36.8% of our workforce with a relatively equal proportion of applications accepted for each gender. More than one-third of the employees had master's or doctoral degrees. Excluding factory employees, the proportion of R&D personnel is as high as 65%.

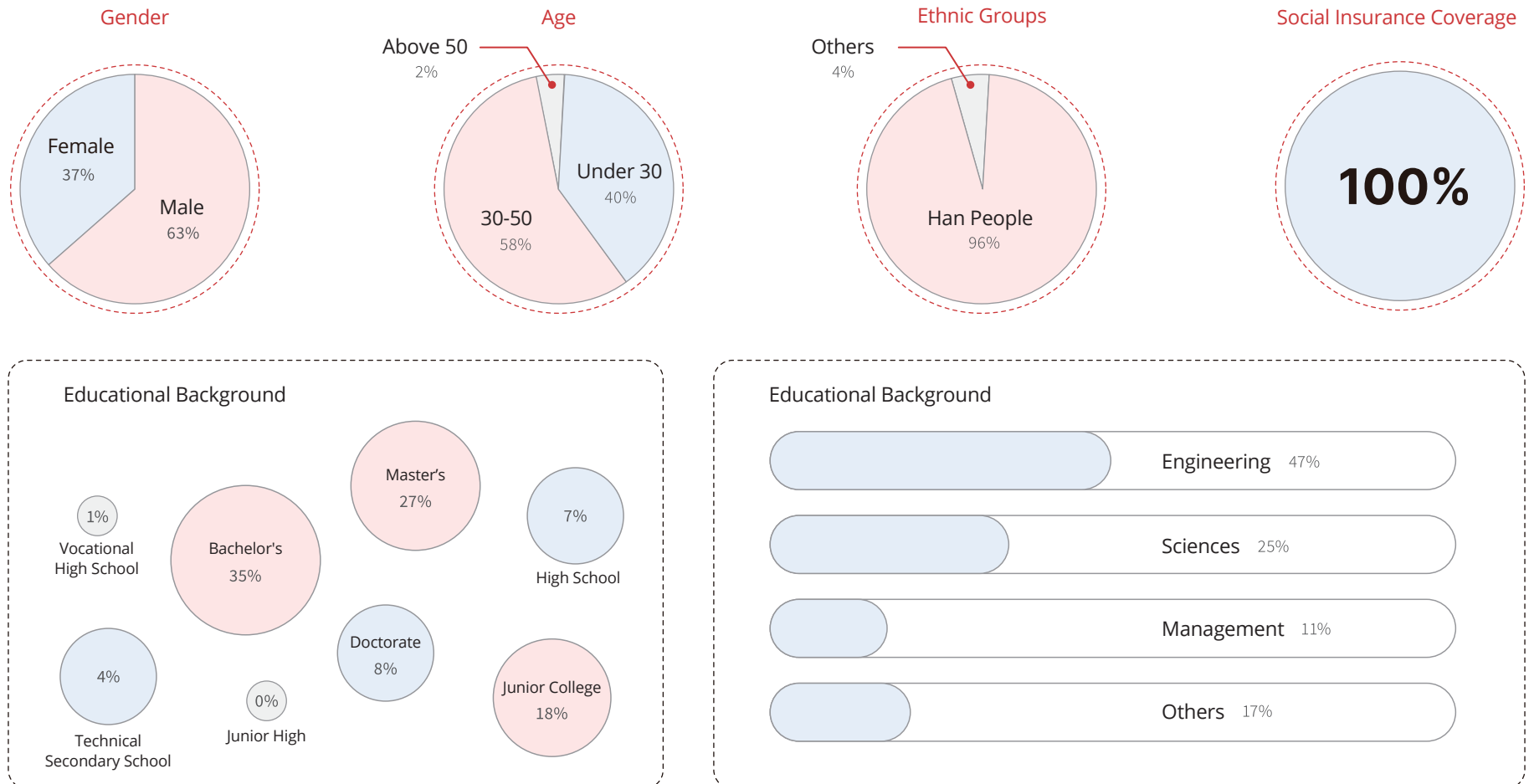
To ensure employees have the right to a good work-life balance, which also contributes to order in the workplace, we have established the "Attendance and Leave Management System" and the "Lansu Factory Attendance Rules and Regulations." These policies clearly outline provisions for paid annual leave, marriage leave, maternity leave, and other forms of leave, ensuring standardized management of employee rest and vacation. We will continue to pay attention to the well-being of our employees and strive to create a fair, inclusive, and healthy working atmosphere, and in this way both Bluepha and the employees that work to make it better can thrive.



○ Diversity

At Bluepha, we highly value equality, diversity, and tolerance. We will continue to increase the proportion of female employees and provide them with an equal workplace environment.

Bluepha Employee Statistics in 2022



Caring for Our Employees



○ Employee Benefits

The company offers a wide range of benefits that encompass material perks, personal growth opportunities, and health and wellness initiatives. In addition to comprehensive social insurance and housing fund contributions, the company also provides commercial insurance, transportation subsidies, weekday snacks, work meals, afternoon tea, holiday gifts, marriage and childbirth benefits, annual employee physical examinations, team building funds, internal promotion incentives and other benefits.

We care and pay attention to the diverse needs of our employees and try our best to cater to them. We value and honor the diverse cultures and dietary preferences of our employees, regardless of their gender, nationality, regions and countries of origin. In addition, we commemorate International Women's Day by offering special gifts to our female employees. We are committed to cultivating a gender-friendly and inclusive office environment that is comfortable and inviting for women. We respect vegetarian preferences when it comes to meal choices, and offer our employees a diverse selection of complimentary snacks and beverages on workdays. Moreover, colleagues working during the holiday season are also able to experience the nurturing and heartfelt support provided by the company. At the same time, we arrange group DIY handicraft sessions and outdoor excursions like hiking and mountaineering to create abundant opportunities for everyone to unwind and actively contribute to enhancing employee happiness.



Staff Accommodations

Due to the limited availability of rental housing in the vicinity of our factory, we have constructed high-quality employee dormitories in the local area. Our aim is to enhance the living standards of our employees and provide them with a worry-free accommodation solution.



○ Corporate Culture

Club Activities

Bluepha encourages its employees to establish and join various clubs, network with colleagues who share their interests, and enrich their leisure life. On June 16 2022, the first company club was established, and by the end of the year, a total of **24 clubs** had been established, with a total of **37 club events** having been organized thus far.

On September 23, 2023, Bluepha organized Club Day

- Number of Participating Clubs: **14**
- Employee Participation: **63%**
- Club Activities: Soccer Match, Basketball Match, Flea Market, Photography Contest, Murder Mystery Game, Gardening, Tennis, Hiking, Running, Weightlifting, Trampolining, and Rock Climbing
- According to the 2022 activity satisfaction survey, within the 13 large and small-scale activities organized throughout the year, 38.6% of participants responded that Club Day had been the "Most Satisfactory Activity", putting it at first place. Employees stated that the event was packed with variety and creativity.





Corporate Culture in BioFAB

As an advanced biomanufacturing company, we deeply understand the importance of corporate culture construction in our production facility, so we regularly hold staff meetings to convey and practice the cultural values of the company and the facility. With the introduction of our Responsibility Rewards and other incentives, employees can have model employees working alongside them to fully understand our culture. In 2022, BioFAB held a series of activities that reflect our corporate culture of Lean & Excellence, Collaboration & Sharing, Care & Appreciation, Growth & Responsibility. Activities include the housewarming ceremony for employees moving into company accommodations and the test-run ceremony to name a few. This way, we can include even more of our workforce in the corporate culture and make it even stronger.

The Labor Union

In 2022, BioFAB1 officially established a labor union and obtained a legal labor union qualification certificate.

- When the labor union was established, souvenirs were issued to all members on behalf of the company to reward and motivate staff members and to express the company's affirmation and recognition of the hard work exhibited by every employee.
- To promote physical fitness and strengthen the overall well-being of employees after the pandemic, badminton courts and table tennis tables were built on-site for employees to enjoy.



Assembling a Talented Workforce



○ Career Growth Opportunities

Career development is crucial for every employee to achieve career advancement and maximize their personal value. To that end, Bluepha launched the “Two Wings Plan” to provide employees with two growth channels: “Specialization Wing” and “Management Wing.” This plan allows them to select or adapt their developmental paths in accordance with the company’s needs and their individual strengths. Our aim is to assist employees in their ongoing growth and enable them to achieve their career aspirations and fulfill their dreams.



○ Employee Retention

Bluepha attaches great importance to employee retention and regularly reviews the employee turnover rate to provide suggestions for future employee development and retention. We have taken a series of talent retention measures:

- **Ribbon Promotion**

System for employee ID cards, with different colored ribbons granted to employees with 1, 2, 3, 5, and 10 years of tenure

- **Performance Interviews**

Face-to-face performance interviews to ensure employees acknowledge their performance evaluation results

- **Option Incentives**

System to attract and retain outstanding business and management talent

- **Internal Transfers**

Accommodate internal transfers between departments with the consent of relevant department heads and HR

- **Regular Exchanges**

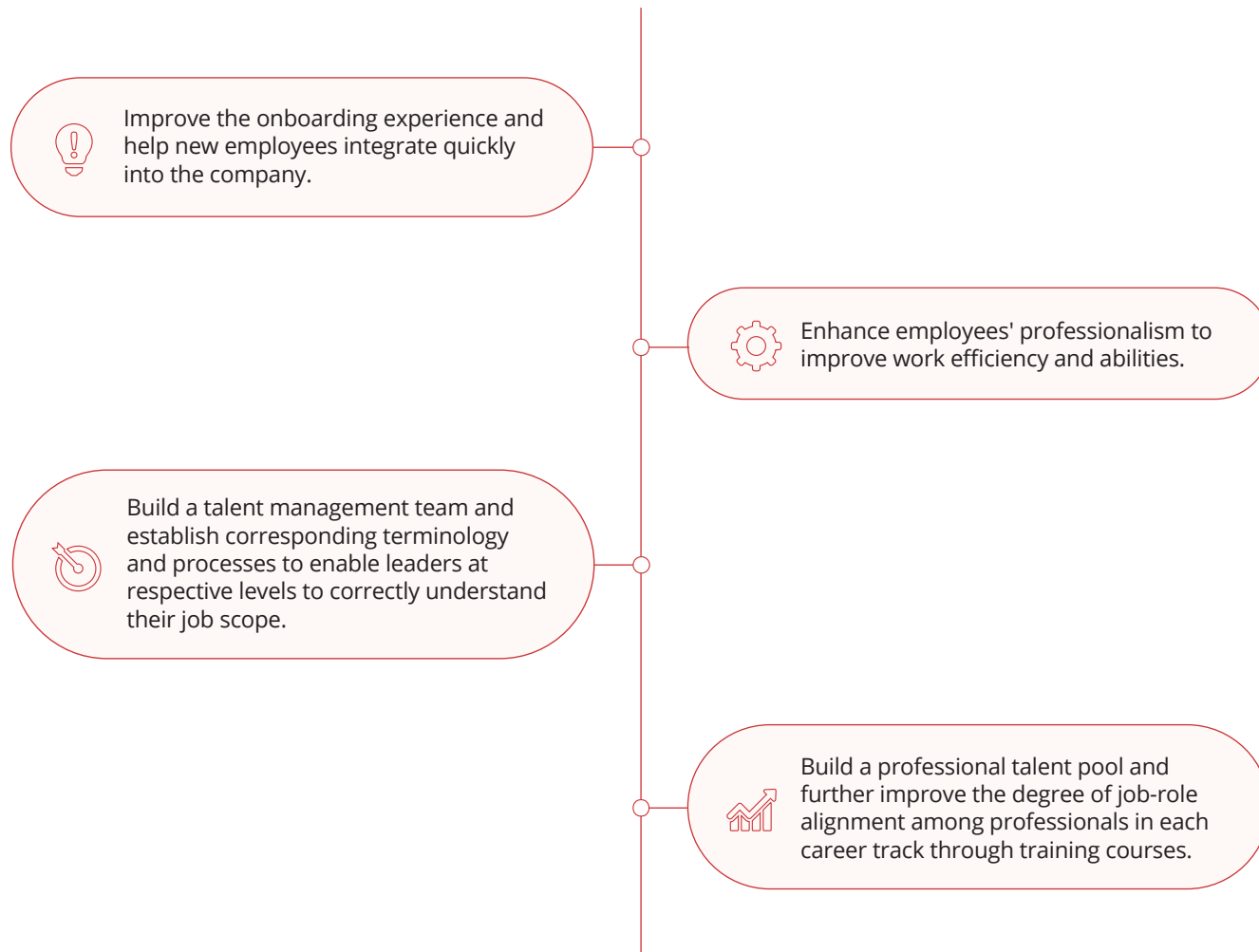
Regular one-on-one exchanges with employees to understand their goals and challenges

- **Staff Training**

Support for employees to engage in both internal and external training programs, enabling them to enhance their skills and competencies in various areas

○ Talent Growth

Bluepha places emphasis on improving employee capabilities and endeavors to foster a culture of continuous learning within the organization. On the basis of the following four main objectives, we've established a training system that is equal parts Complete, Comprehensive, and Diverse.



98.2%
Satisfaction

Onboarding and Training

In 2022, Bluepha successfully executed four stages of its onboarding and training projects, achieving an exceptional overall satisfaction rate of 98.2%.

23
Courses

General Competency Training

The company offered 23 different courses in 2022, with an average of 65 viewers per course.

6
Training Types

Training for the Management Wing

Bluepha adopted a hierarchical teaching method which includes a combination of online and offline courses, group discussions, after-school practice, group assignments, one-on-one coaching, as well as other various forms of training.

5
Specialization Courses

Training for the Specialization Wing

In 2022, Bluepha developed a total of 5 training courses for this wing with a maximum course period of 2 months and an overall satisfaction rate of 90%.



The Leadership Program for Potential Junior Managers

The Leadership Program for Potential Junior Managers had 33 colleagues participating for a period of over 180 days with an average of 17 online learning hours logged for each colleague. All participants attended 7 online activity assessments and successfully graduated. Satisfaction rate for offline participants was 91.3%.

The Leadership Program for Senior Managers

The Leadership Program for Senior Managers had 21 colleagues participating. The program consisted of 4 in-person classes, 4 online tutoring sessions, and 3 group reading sessions over a span of 8 months. Some of the management methods and tools taught in class have also been applied to daily management work.





As an automation engineer, my background in biology and hands-on experience in experimental operations were limited. However, Bluepha recognized this gap and took proactive steps to enhance our knowledge in biology through specialized training programs. Our dedicated lecturer guided us through comprehensive theoretical classes, followed by practical sessions where we performed molecular biology experiments and familiarized ourselves with various laboratory instruments and equipment. I'm impressed by Bluepha's significant investment in resources and growth opportunities for us. Thanks to this training, I can now engage in seamless communication with my biology colleagues.

@Canghai



As a seasoned professional with over a decade of experience in the Fast-Moving Consumer Goods (FMCG) industry, I had some initial concerns upon joining Bluepha for business development. Despite my background in chemical engineering, I soon realized that expertise in synthetic biology and the rapidly emerging field of biodegradable material PHA were vital for achieving success in the business. I was pleasantly surprised to find that, despite being a relatively young company, Bluepha had already implemented a comprehensive professional training system that matched those of major international corporations. A wide range of courses covering synthetic biology and polymer materials, from fundamental principles to cutting-edge technologies, were available. These courses not only offered theoretical knowledge but also provided practical experience in real production processes. They proved invaluable in enhancing my professional expertise and boosting my confidence in fulfilling my role effectively. Additionally, this robust curriculum facilitates the accelerated growth of new employees at Bluepha and establishes a solid foundation for the company's rapid development.

@Dazhao



Online Training Platform



169 new training videos were added to the platform in 2022



Annual average learning time per person was **46.5 hours**



90% of the company's employees were active learners

The screenshot displays the Blueup Online Training Platform interface. At the top, there is a navigation bar with links for 首页 (Home), 我的学习 (My Learning), 在线课堂 (Live Class), 学习社区 (Learning Community), 人才发展 (Talent Development), 知识库 (Knowledge Base), 直播中心 (Live Center), and 积分商城 (Points Mall). The main content area is divided into sections for 推荐课程 (Recommended Courses), 最热课程 (Hottest Courses), and 最新课程 (Latest Courses). Each course card includes a title, instructor name, star rating, and number of views. Below the course recommendations is the 内部讲师团队 (Internal Instructor Team) section, featuring profiles of Michael (初级讲师), 十三 (预备讲师), 墨尘 (初级讲师), and 小鹿 (初级讲师). A vertical sidebar on the right contains icons for mobile, refresh, and other functions.

Course Title	Instructor	Rating	Views
前线计划-市场	范英杰	0.0	42人浏览
前线计划-销售	Shirley 范莹	0.0	24人浏览
PHA材料物理性能第五课-PHA结...	Michael	5.0	47人浏览
PHA材料物理性能第四课-高分子...	Michael	5.0	69人浏览
【3008】Brand Design	PMO (目前暂挂办公室)	0.0	23人浏览
【B1014】四委会体系宣贯	PMO (目前暂挂办公室)	5.0	21人浏览
PHA材料物理性能第三课-高分子...	Michael	5.0	78人浏览
PHA材料物理性能第二课-高分子...	Michael	5.0	88人浏览

Name	Role
Michael	初级讲师
十三	预备讲师
墨尘	初级讲师
小鹿	初级讲师

Occupational Health and Safety

We fully recognize the importance of the work environment, health and safety to our employees. As such, we have developed comprehensive policies and processes to ensure that employees' occupational health and safety are fully taken care of, be it in the office, factory or laboratory, allowing every employee to work in a secure environment.



○ Safety in the Production Facility

We strictly abide by the Production Safety Law of the People's Republic of China, the Fire Protection Law of the People's Republic of China, the Occupational Disease Prevention and Control Law of the People's Republic of China and other relevant laws and regulations, and have refined and improved aspects of our safety management system in terms of compliance assurance, training and qualification management, risk identification and control, investigation and management of inconspicuous risks, analysis of the safety of our processes, equipment and facility management, warehouse safety management, management of shift changes, high-risk operation management, emergency response, general safety performance, and the construction of safety culture. By improving the aspects of our safety management system, we have enhanced the occupational health and safety management capabilities and safety standards of our employees during factory operations.

We attach great importance to risk identification and control. First, we grouped management, technical, job operations, and other related personnel together on a departmental basis in addition to using the likelihood exposure consequence (LEC) risk assessment method to comprehensively and systematically identify safety risk points in production processes, equipment and facilities, work environment, personnel behavior, and management systems. Next, we categorized operational activities into special and routine operations. For special operations, we have established 11 job permits and created a list of job permits. For routine operations, we conducted risk analysis according to the requirements of Job Safety Analysis (JSA) as well as implemented control measures in operational procedures and created a list of operational regulations. For technical procedures, storage tanks, and shared facilities, we used Hazard and Operability (HAZOP) tools to analyze and formed a list of process-control procedures. Our ultimate goal is to make the risk identification in facility management even more professional, make the implementation of control measures procedural, create a standardized list for procedure requirements, create an easy-to-understand form-management system, and strive to minimize occupational health and safety risks in the production process.

We have improved occupational health protection measures and the management of supplies, as well as equipped employees with a complete set of protective equipment. We have prominently displayed occupational disease hazard warning signs and integrated the safety and health of our employees in the factory into our strategic goals, creating a safer work environment.

○ Laboratory Safety

The company has established laboratory management rules and protocols for accident emergency management and prevention. It standardizes information reporting, emergency responses, accident investigation and correction processes to further streamline safety maintenance responsibilities, thereby reducing the losses and impacts of accidents on employees and the company.

In June 2022, the company initiated the "Safe Production Month" campaign, which encompassed various activities such as an inauguration ceremony, safety production videos showcase and on-site inspections. The first "Safety Knowledge" competition was also held, along with an explanation of the new version of "Safe Production Law," fire safety training, fire emergency drills and a series of safety education activities.





Care for the Environment



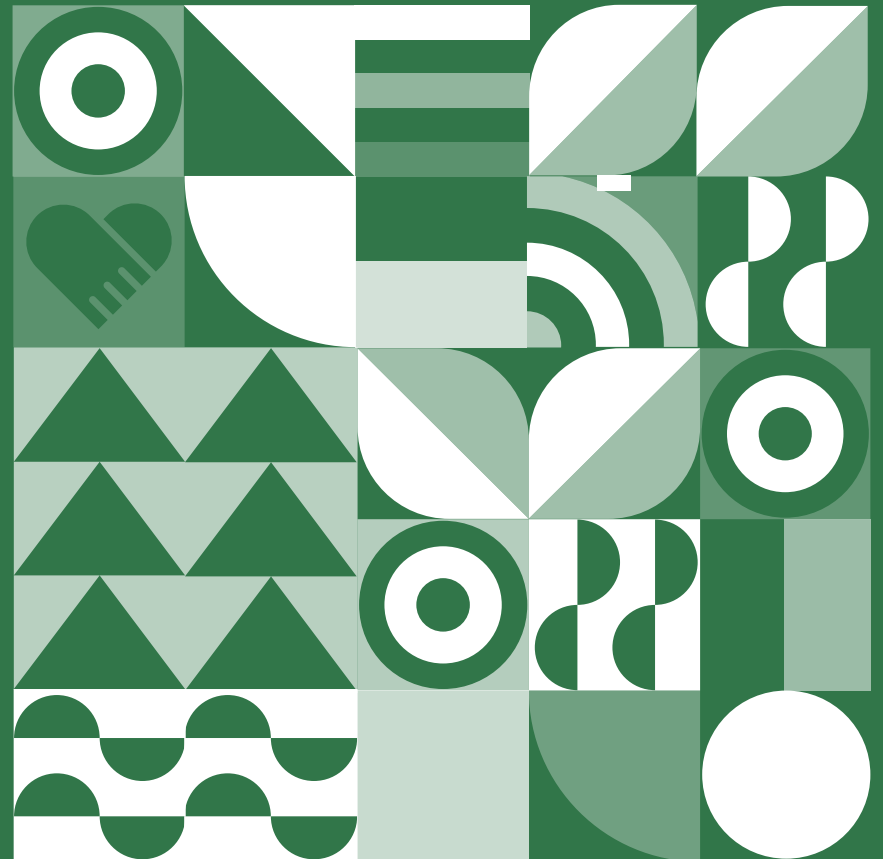
As a biomanufacturing company, we recognize the intrinsic connection between natural environment and human life. In the face of escalating ecological and climate challenges, we are incorporating green and environmentally friendly practices into our daily operations. Moreover, we continuously strive to discover even more sustainable solutions.

While strictly adhering to the various environmental protection initiatives introduced by the government, on top of those programs we have also established an internal management system for environmental protection, a mechanism for dealing with environmental emergencies, and a mechanism for standardizing management of resources and waste to ensure that our production process is green and sustainable.

Furthermore, building upon our rigorous standards for precise measurement of carbon emissions, we have implemented a cloud-based platform for managing carbon emissions digitally. This platform not only allows us to digitally monitor and analyze our

carbon emissions but also enables us to achieve even greater reductions in energy consumption.

We are fully dedicated to alleviating the burden placed upon Earth to support our needs and will spare no effort in creating a better world for humanity and its inhabitants.



Managing Our Environmental Impact



○ The Environmental Management System

We incorporate social responsibility into all aspects of the company's operations and adopt optimized production processes to minimize our impact on the environment. In line with many laws, regulations, policies, and industry standards regarding environmental protection, energy conservation and water, air, waste, soil, and noise pollution of the People's Republic of China, we have developed a comprehensive environmental management system that encompasses various procedures to ensure environmental protection. This system primarily emphasize practices related to production, waste management, leakage management, as well as maintenance, cleaning, replacement, and sampling procedures within the waste management system. Additionally, it incorporates numerous other rules and regulations to address environmental concerns effectively. With these self-imposed regulations, we can improve the way we protect the environment in every part of our process, preventing any issues before they happen, enhancing supervision of our current operations and sustainably dealing with waste after the fact, thereby minimizing environmental waste and pollution to the smallest extent possible.

To achieve sustainable production, we have established a separate EHS management department within our factory to oversee environmental management activities. This department is staffed by dedicated professionals, and we have implemented a robust system of environmental management responsibilities. The company's key leaders, department heads, and workshop supervisors also serve as the primary individuals responsible for environmental initiatives at their respective levels.

○ Environmental Risk Management

We have implemented a comprehensive system for managing environmental emergencies and have established a dedicated environmental emergency management body to oversee these efforts. Building upon environmental risk assessments and resource evaluations, we have developed contingency plans for handling unforeseen environmental incidents, and have been diligently enforcing the prescribed risk prevention and control measures outlined in the emergency plans. This includes regular examinations and maintenance of emergency facilities, equipment, and supplies to ensure that in case of emergency, all necessary components of the emergency response plan are in place, giving us the confidence necessary to effectively deal with any environmental emergency situations.

Climate Change Mitigation

Climate change is a problem that all of humanity faces. The concentration of greenhouse gases in our atmosphere has continued to rise since the Industrial Revolution, putting ecosystems in the air, marine environments, and on land under pressure. In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a Special Report on Global Warming of 1.5 °C, highlighting the pressing need for swift action to limit global warming within the 1.5°C threshold. In the climate crisis, no company can stand alone, thus we are taking action. As a socially responsible corporate entity, we are cognizant of the fact that companies must pay close attention to climate change issues and adopt measures to improve the situation, and it is our responsibility to contribute to sustainable development.

Climate Change Risks and Opportunities

Following the guidelines of the Task Force on Climate-related Financial Disclosures (TCFD), we have conducted a comprehensive analysis of the climate-related risks and opportunities that our company faces. This assessment will help us to carry out climate-related policies and formulate plans for action in the future.

Climate Change Risks

Climate Risk Factor	Type of Risk	Description of Risk	Degree of Impact
Natural Disaster	Extreme Operational Risk	Our Bluepha® PHA biorefinery is in Yancheng, Jiangsu Province, which is located close to the eastern coast. The area may be affected by extreme weather or natural disasters such as typhoons, which can heavily impact operations.	High
Climate Change	Chronic Operational Risk	Climate change may affect our supplier's production capacity and thus affect the procurement of raw materials.	Medium
Policies to Transition to a Low-Carbon Economy	Technological and Market Risk	In light of China's "30-60" decarbonization policy, the company is required to adopt a corresponding policy and undertake projects aimed at reducing greenhouse gas emissions and energy consumption. While these initiatives contribute to sustainability, they may result in higher costs.	High
Policies to Transition to Cleaner Energy	Technological and Market Risk	China has implemented additional policies to incentivize companies to transition towards cleaner energy sources, which could potentially lead to an increase in energy costs for our company.	Medium
Product Life Cycle Assessment and Carbon Footprint Requirements	Technological and Market Risk	Customers demand product life cycle assessments and carbon footprint evaluations. In response, the company has to conduct precise carbon footprint calculations, continuously optimize processes, and increase investment in research and development.	High
Higher Environmental Protection Standards	Technological and Market Risk	Due to stricter environment protection standards imposed by the government, the company must invest in new equipment for compliance, increasing production costs.	High
Mandatory Disclosure of Information	Operational and Reputational Risk	In case of a mandatory requirement to disclose information related to climate change response, the quality of the disclosed information may vary due to the company's recent establishment and the lack of historical data and standardized accounting methods.	Low

Opportunities in Climate Change

As the international community pays more attention to the impact of climate change, many countries have put forward their own “Carbon Peak” and “Carbon Neutrality” plans, while more and more enterprises and organizations have begun transitioning to a low-carbon green economy. We hope to take this opportunity to fully leverage our company's advantages in biomanufacturing, energy management, and environmental protection to help more partners achieve green, circular, and low-carbon responsible production.



○ Primary Strategies

To combat climate change, Bluepha has adopted the following strategies:

Improve Management of Energy Use and Carbon Emissions

- Encourage employees to turn off appliances when not in use
- Established a carbon emissions cloud platform pilot

Optimize Business Travel Arrangements

- Encourage the utilization of high-speed rail for long-distance business trips as a preferable alternative to air travel
- Encourage employees to share rides when taking taxis, preferably with two or more people

Work to minimize carbon emissions from each product life cycle

- Incorporate environmental impact of products into process development and technological iterations, as well as optimize processes and guiding production through scientific methods

Cloud Platform Pilot for Carbon Emission Management

In 2022, Bluepha successfully set up a pilot of its carbon emission management platform, Bluepha Carbon Cloud, to monitor Beijing R&D sites by zones. Through this platform, we can track the energy consumption and carbon emissions of each experimental area monthly. Abnormal data can be identified and addressed through supervision, while comprehensive reports on energy consumption and carbon emission management are generated to facilitate ongoing improvements in energy efficiency.



Resource Management

As a biomanufacturing company, we must acknowledge the significant resource consumption demanded by the factory. Additionally, as a research-oriented company, we prioritize the effective management of laboratory consumables. To this end, we emphasize resource management for both the factory and laboratory from multiple perspectives, such as energy utilization, water resource conservation, and optimal handling of consumables.



○ Energy Management in the Production Facility

Our office building in BioFAB follows the Jiangsu Green Architectural Design Standard for eco-friendliness and energy-efficiency, achieving 75% reduction in energy consumption. Currently, we have adopted innovative measures to improve energy efficiency and reduce environmental impact:

- Using energy-efficient LED lamps, saving **15-30%** of electricity
- Changing the frequency on our variable-flow water pumps, saving **15%** of electricity
- Adopting advanced drying technology, significantly reducing the unit product's moisture evaporation by **85%**, saving **1,319.5 metric tons** of steam per year
- Preheating the culture medium with a sprayer to improve heating efficiency, saving 35 minutes per operation and **554.5 metric tons** of steam annually
- Installing insulation layers for heating and cooling equipment to effectively reduce heat and cold loss, saving **236 metric tons** of steam per year
- Using magnetic levitation chillers, saving **231,900 kWh** of electricity per year



Water Resource Management in the Production Facility

We strive to minimize the consumption and impact on water resources. In terms of publicity, we consistently advocate for water conservation internally. In terms of production, the water resources are mainly used for manufacturing, drinking, and sanitation facilities. Despite not being located in an arid area, we closely monitor water usage and strive to improve efficiency. In addition, we have set up a water reclamation facility in the sewage station. Under full production, 200 metric tons of water can be saved daily, and the reclaimed water is used for road sprinkling, irrigation, industrial washing, and cooling, etc.



Management of Laboratory Consumables

We comprehensively optimize resource management from the factory and other office scenarios. Based on the needs assessment of various stakeholders, such as R&D, laboratory operations, and finance, Bluepha established a cloud-based management system for consumables used in the laboratory in April 2022. The system unifies the consumables management methods of our laboratories in Beijing, Shanghai, and Shenzhen. The system has effectively reduced the waste of laboratory consumables and improved the efficiency of inventory management and the accuracy of financial statistics.



Waste Management



○ Wastewater Management

The wastewater in the production facility mainly comes from the production process, exhaust gas scrubbers, equipment and workshop floor cleaning, boilers, domestic sewage, and rainwater, etc. To comply with the Water Pollution Prevention and Control Law of the People's Republic of China, we have established our own wastewater management system which designates departments and personnel to be responsible for wastewater management, sets targets for total water usage, and increases standards for the management of wastewater treatment equipment to prevent the mixing of wastewater and rainwater. In order to guarantee the normal operation of the wastewater treatment systems, we have established a monitoring channel leading out of the main drainage pipe and installed online monitoring equipment. In addition, we have established a computer control system which can control the entire wastewater treatment system through a microcomputer for automated monitoring and control of pH, COD, and wastewater flow. After treatment, wastewater that meets standards will be discharged while non-compliant wastewater will automatically be recycled back to the treatment system until it meets standards.



○ Exhaust Gas Management

We have implemented different processes to address the exhaust gas from various pollutant sources during the production process. The workshop is equipped with fully enclosed facilities and equipment, and the collection pipeline installed on the production line equipment serves as the sole exhaust outlet for the entire machine. Special pipelines and pumps are used for liquid or gas feeding, ensuring high automation and a gas collection efficiency of over 99%. Additionally, we require on-site operators to promptly cover all chemical storage containers to minimize the volatilization of volatile organic compounds.



○ Management of Solid Waste

We have implemented rationalized treatment and disposal for all solid waste in our factory, successfully achieving zero waste discharge. Solid waste mainly includes scraps, waste activated carbon, dust residue, residue from desulfurization, waste filter cloth, sludge, lab waste, waste motor oil, filters from reverse osmosis systems, and domestic waste from employees. Among them, scraps are granulated and reused, sludge is entrusted to a special solid waste disposal unit for disposal into a landfill. Residue from desulfurization (mainly sulfur), activated carbon, packaging materials, and motor oil are handed off to qualified units for disposal. Dust residue, filter cloth, reverse osmosis filters, and domestic waste are handed off to the sanitation department.

We have adopted the use of a monitoring system for the entire life cycle of hazardous waste. System-generated QR codes are now the only applicable way for hazardous waste to be disposed of in Jiangsu Province. It is mandatory to scan the QR codes for waste generation and transfer, and even facilities are assigned specific codes. This stringent coding system makes it exceptionally difficult to operate without adhering to the prescribed codes, thus ensuring strict compliance with regulations.



Contributions to the Community



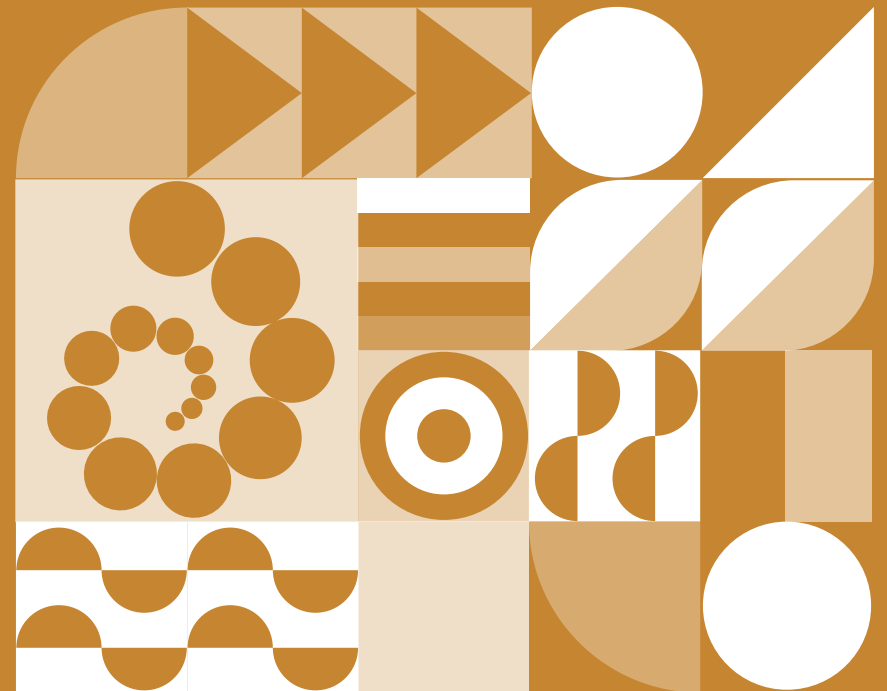
"No man is an island" is a well-known adage, and the same principle applies to our company and similar entities at the forefront of cutting-edge research and interdisciplinary work. In the rapidly evolving field of synthetic biology, fostering strong community relationships becomes paramount for the survival and growth of a company. Thus, the significance of this aspect of public relations should not be disregarded.

Hence, we have jointly launched "Nature Matters", a Biotechnology Economic Industry Acceleration Platform together with our upstream and downstream industry partners, as well as investment institutions. This platform has been established with the objective of facilitating collaborative cooperation along the industry chain and driving the industrialisation process within this field.

Additionally, in collaboration with PwC, we have jointly released the "PHA Biodegradable Plastics Industry White Paper," the first authoritative document in China thoroughly examining the PHA industry. By disseminating comprehensive knowledge and providing

insightful background information on PHA, we have significantly expanded the influence of PHA biodegradable materials within the community, receiving an enthusiastic response from both the general public and investors.

We strive to enhance the mainstream recognition of synthetic biology by sharing industry insights, and fostering deep collaborations between academia and industry. Through our open and active social engagement, we aim to breath new life into the industry with fresh perspectives and ideas.



Industry Ecosystem



○ Developing “Nature Matters”

With continuous breakthroughs in the underlying core technologies of life sciences, the modern biotechnology industry is rapidly forming and expanding. The establishment of a complete and mature industry ecosystem relies on the close collaboration among upstream, midstream and downstream participants along the industry chain. However, at present, participants in each link still face the challenge of operating independently and making individual breakthroughs. Moreover, there is a lack of an integrated platform for the consolidation of industrial resources, hindering effective communication and collaboration among stakeholders. Therefore, it is crucial to bridge this gap and facilitate cooperation, enabling more companies to achieve a seamless closed-loop from upstream research and development to end-point sales.



The bioeconomy is rapidly gaining momentum and establishing an open and innovative ecosystem is crucial for the thriving development of the biotechnology industry in this new era. As industry pioneers in the field of biotechnology, we have partnered with investors and industry collaborators to launch the "Nature Matters" bioeconomy industry acceleration platform. Our goal is to consolidate resources, foster collaborative synergy along the industry value chain, empower bioeconomy enterprises and their partners, and expedite the commercialization of biotechnology.

The journey to endless possibilities begins with the mastery of versatile skills -- and "Nature Matters" serves as the catalyst to turn that success into reality. Faced with the thriving bioeconomy industry, the "Nature Matters" platform will facilitate efficient knowledge exchange and collaborative opportunities among its members through industry summits, closed-door sharing sessions, and various other activities, fostering industry collaboration and meeting industry demands. Furthermore, the platform will take the lead in establishing industry standards and continuously deliver innovative value to the industry, creating a thriving ecosystem together.

○ Publishing the PHA Industry White Paper

The PHA industry is still in its nascent stage, and faces a lack of understanding regarding its value and technological trajectory. As a result, Bluepha partnered with PwC in 2022 to co-author the "PHA Biodegradable Plastics Industry White Paper," which was publicly released on various platforms, including the 5th China International Import Expo and the "Nature Matters" online and offline channels. This white paper aims to attract more industry stakeholders and investors to actively participate in the PHA industry, while also seeking recognition and support from government entities. It serves as a crucial reference for the industry's rapid development and future policy initiatives. Moreover, the white paper aims to enhance the public's awareness and acceptance of PHA biodegradable materials by widely disseminating the white paper's contents, thereby promoting the understanding and adoption of bio-based environmentally friendly materials.



42,000 Interactions

Event Live Broadcast Data

The cumulative number of viewers for the live stream was 14,000, with over 42,000 interactions. Among them, this session attracted more than 4,000 new viewers and generated over 20,000 new interactions.

10+ Mainstream Media Reports

Coverage by over ten renowned media outlets

Including but not limited to Global Times, Financial Network, NetEase News, Phoenix Financial, and China Economic Net.

3+ Mainstream Accounts

Shared on Mainstream Biology WeChat Official Accounts

Including the Institute of Biodegradable Materials, Bio-based Materials, and Degradable & Recyclable Center, among others.



Professor Piming Ma of Jiangnan University, an expert in the Degradable Plastics Committee of the China Plastics Processing Industry Association: "PHA-related enterprises should increase their research and investment, promote basic research and applied technology development of PHA, continuously expand their application scenarios, as well as foster collaboration and synergy with other biodegradable materials like polylactic acid. By collectively strengthening the industry's presence across various domains such as politics, industry, academia, and research, we can elevate the scale of China's degradable plastic industry and amplify its influence on the global stage."

Xinjian Ye, Chief Technology Officer of Anhui Hengxin Sustainable New Materials: "The most valuable feature of PHA lies in its ability of "environmental assimilation" - even without human intervention, it can disappear naturally in the environment, which is also its biggest difference from other biodegradable materials."

Bin Wu, founding partner of Zhongping Capital: "Global climate change has become a pressing issue, and the concept of developing green practices has bestowed upon this era a revitalised purpose. ESG has become an important indicator for more investments. Zhongping Capital's investments are long-term, green, and 'warm' investments, meaning that on top of pursuing commercial returns, our investments are made to better people's lives and create value for society."



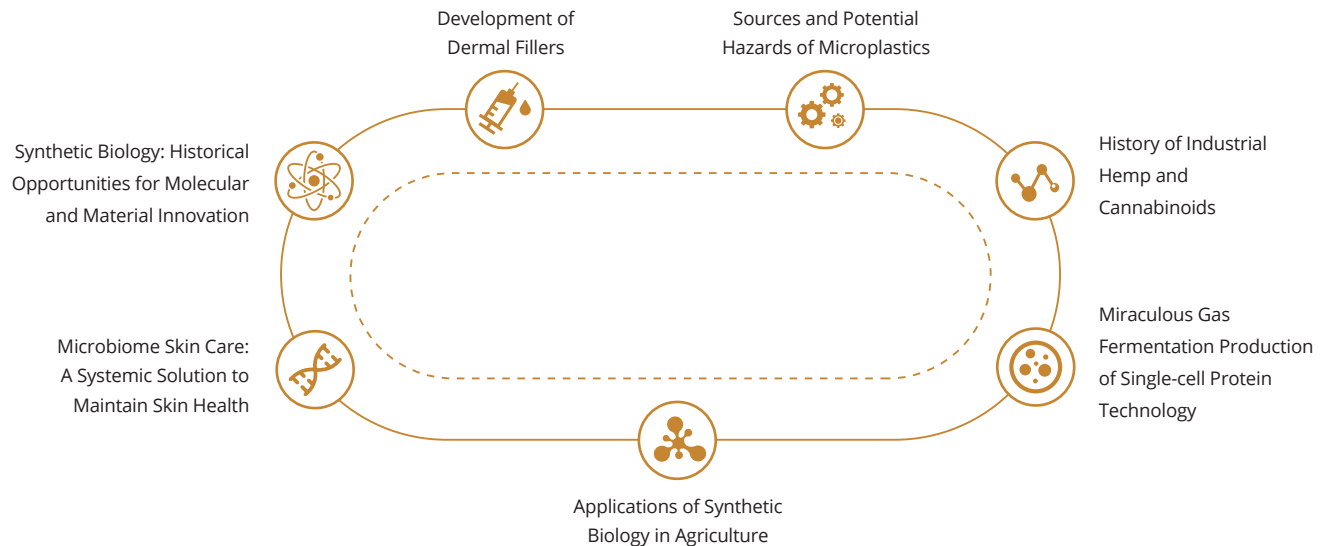
Educating the Public



○ Sharing Industry Insights

Since the beginning of the 21st century, a new round of scientific and industrial revolution marshalled by hard scientific and technological innovation has been changing the way humans produce and live. Synthetic biology, an emerging interdisciplinary field at the forefront of the advanced manufacturing technology sphere, is progressing rapidly. This field has been gaining popularity for several years in the capital markets, and related companies in the field have attracted much attention. However, at a broader level, the public still lacks a comprehensive understanding of this field.

As a leading synthetic biology company in China, Bluepha is aware of its responsibility to promote public awareness of the related technologies and products of synthetic biology while advancing the industrialization process. Thus, in 2022 Bluepha released a series of article titled "Bluepha Insights" through our WeChat Official Account to present professional knowledge in an approachable and easy-to-understand format, and share the application scenarios of synthetic biology products in daily life with readers. Throughout the year, we published a total of 7 articles, reaching an estimated tens of thousands of people.



○ Cooperation with Universities and Enterprises

As important leaders in future economic activities, start-ups hold unlimited potential and urgently require excellent entrepreneurial talent to drive development. Being one of the leading company in the field of synthetic biology, Bluepha hopes to provide inspiration and empowerment to young startup teams through our own experience, resources, and technology, and promote the transformation of scientists into entrepreneurs, so as to cultivate more innovative talent and promote the development of the synthetic biology industry.

In 2022, we had exchanges with 9 iGEM teams from top universities, providing topic suggestions for young iGEMers to meet the practical needs of the industry. At the same time, our founders shared information about our current situation, strengths and future opportunities of the synthetic biology industry with universities domestically and abroad. Additionally, we were invited to jointly offer a biotechnology entrepreneurship course with Coyote Bioscience at Academy for Advanced Interdisciplinary Studies, Peking University to provide students with entrepreneurial thinking and methodologies. Meanwhile, we cooperated with Peking University, Tongji University, and the Central Academy of Fine Arts, among others, to establish two iGEM teams, breaking the boundaries of innovation among universities and academic disciplines, and achieved excellent results.

This series of school-enterprise co-creation activities has received unanimous praise from teachers and students. Teachers stated that in the future, they will work further to promote exchange and cooperation between their universities and Bluepha, leveraging the strengths and resources of both sides to jointly cultivate high-quality, composite synthetic biology talent that meet the need of academia and industry.





Associate Professor Chong Li of Tongji University: "In our exchanges with Bluepha, they've made it possible to understand trends in the development of the synthetic biology industry as well as the demand for skilled and talented individuals among modern enterprises, so students can use their future iGEM projects to take an active role in adapting to the needs of the industry."

Lu, a student at Shanghai Jiao Tong University: "The information Bluepha shared with us really opened our eyes and inspired us to dare to step out of our ivory tower and let real needs, rules, and policies evaluate us and push us to do better."



HONORS

2015

Tsinghua University President's Innovation Challenge: Gold Prize

2016

TusStar-ADB Cleantech Startup Competition: Gold Prize

National Finals of the Startup World Cup: Top 10

2017

Future Planet Award: Sustainable Growth Winner

2018

Beijing City Outstanding Entrepreneurial Role Model

National High-Tech Enterprise (Beijing)

Beijing New Technology and New Product (Service) Certificate (for Bluepha® PHA)

Fast Company Magazine: 50 Best Innovative Companies in China

2019

Entrepreneurship Beijing, Entrepreneurship and Innovation Competition: 2nd Prize

Zhongguancun International Frontier Technology Innovation Competition, Energy Conservation & Environmental Protection and New Energy: 2nd Prize

APAC Cleantech 25

The Future Healthcare VB100 Conference: TOP 50 Synthetic Biology Enterprises

Fast Company Magazine: 50 Best Innovative Companies in China

HONORS

2020

- Tsinghua x-lab: Star of the Year
- Zhongguancun: Golden Seed Enterprises
- L'Oréal: BIG BANG Beauty Tech Startup Challenge
- Singapore Management University, The 10th Lee Kuan Yew Global Business Plan Competition: Top 4 in the Final
- National Key Technologies R&D Program of China: "Synthetic Biology" Key Special Project
- Green Chemistry and Chemical Engineering Innovation and Entrepreneurship Contest, SCIP+ Entrepreneurial practice group: 1st prize
- CB Insights: The World's 50 Most Noteworthy Synthetic Biology Enterprises

2021

- National High-Tech Enterprise (Shenzhen)
- *MIT Review*: 50 Smart Companies
- HICOOL Global Entrepreneurship Competition: 1st prize
- Venture 50 and Investment Ventures in Hard Technology 50
- CYZONE: China's Top 100 Future Unicorns

2022

- Cleantech: Global Top 100 Clean Technology Enterprises
- *Fortune*: China's Most Influential Social Entrepreneurship Company
- Joined the United Nations Global Compact
- Beijing "Specialized and Sophisticated" Small and Medium-sized Enterprise that Produces Novel and Unique Products
- BEYOND Awards: Impact Award, Sustainable Innovation Award
- Shanghai United Media Group & JIEMIAN: REAL 100 Innovators
- Xiangguang Award: Top 10 Social Enterprises of the Year

- China Insights Consultancy: "Shining Star" Enterprise
- *China STAR Market Daily*: Pioneer to the Star
- Geekpark: InnoForce 50
- Ernst & Young Global Limited & Fudan University: The Most Promising Enterprises Award
- Deloitte China: Rising Star

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Feedback Form

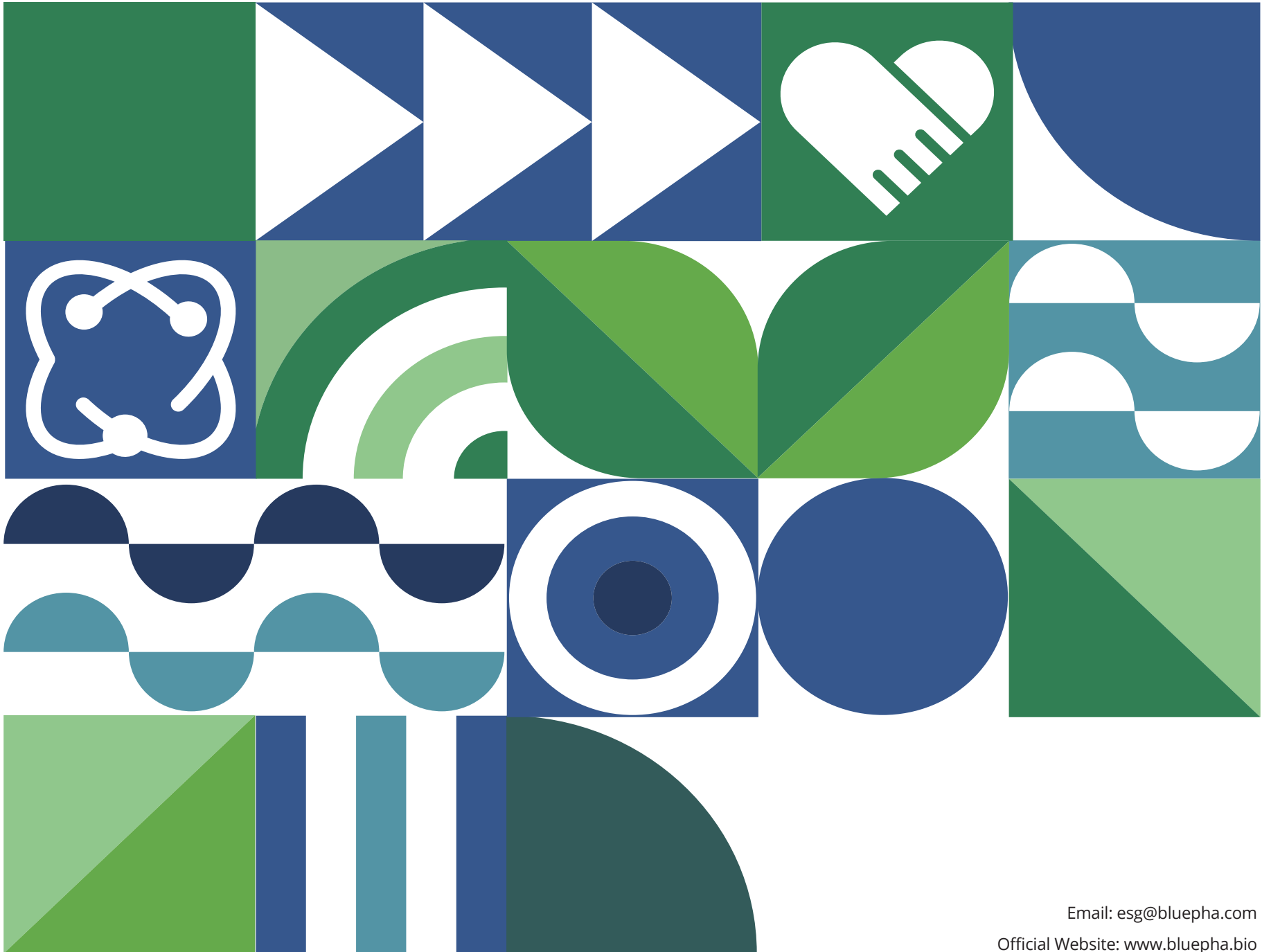
Your valuable insights and recommendations are greatly appreciated as we strive to enhance our ESG efforts and elevate the standard of ESG governance. We kindly request your assistance in responding to the following questions, as your contribution will significantly contribute to our ongoing endeavors in ESG.

[Click here to provide us with your feedback](#)

- **Your overall assessment of Bluepha's ESG report.**
- **Do you think this report reflects the significant impact of the company's ESG issues?**
- **What do you think about the clarity, standardization and completeness of the information, data and indices made public in this report?**
- **Which aspect of the report are you most satisfied with?**
- **What specific aspects would you like to delve deeper into?**
- **Do you have any suggestions for our future reports?**

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