

# SYN BEE



Funded by the European Union under the Grant Agreement No 10100509.  
Views and opinions expressed are however those of the author(s) only  
and do not necessarily reflect those of the European Union or European  
Innovation Council and SMEs Executive Agency (EISMEA).  
Neither the European Union nor the granting authorities can be held  
responsible for them.



## Grant Agreement: 101100509

DOC. REFERENCE	D1.2. Report from the interviews
WORK PACKAGE No	1 – SWOT Analysis
RESPONSIBLE	Delft University of Technology – TU Delft
AUTHOR(S)	Sindhu Naik (TU Delft)
REVIEWER(S)	All Partners
DATE	15 <sup>th</sup> December 2023
STATUS	DRAFT
DISSEMINATION LEVEL	CONFIDENTIAL

VERSION	DATE	RESPONSIBLE	DESCRIPTION
Version 1.0	06/12/2023	TU Delft	First Version for Review



**Table of Contents**

**Contents**

I. Executive Summary ..... 3

II. Interview Reports ..... 5

    1. Interview Report: Liene Briede – RTU Innovation Vice-Rector ..... 5

    2. Interview Report: Sheref Mansy – Professor of Chemistry, University of Alberta ..... 7

    3. Interview Report: Donatas Staniulis – Executive Director of LithuaniaBIO ..... 9

    4. Interview Report: Girts Smelters – Exponential Technologies ..... 12

    5. Interview Report: Prof. Roel Bovenberg – DSM Biotechnology Center ..... 14

    6. Interview Report: A French Startup Spun-off from Academia ..... 17

    7. Interview Report: Mounir Benkoulouche – Biotechnology Engineer ..... 19

    8. Interview Report: Cedric Boisart – Biotechnology Expert ..... 22

III. Appendix – Consent form ..... 25

Consent Form for Interviews in the Field of Synthetic Biology Innovation Eco-systems ..... 25

    Research Project Title: SynBEE: Expanding Synthetic Biology Entrepreneurial Eco-systems ..... 25

    Lead Researcher: TU Delft ..... 25

    Study Contact Details: Dr. Sindhu Naik (s.n.naik@tudelft.nl) ..... 25

Participant Information ..... 25

    Research Purpose: ..... 25

    Research Participation: ..... 26

    Explicit Consent Points: ..... 26

Signatures ..... 28



## I. EXECUTIVE SUMMARY

As part of Work Package 1 – SWOT Analysis for the SYNBEE project, we conducted interviews with key stakeholders to gather insights into the innovation ecosystem of Synthetic Biology. Our goal was to understand the unique challenges faced by researchers and entrepreneurs across Europe in this field. We also aimed to identify aspects of Synthetic Biology that have been beneficial and supportive in their professional journeys.

In total, we interviewed eight stakeholders from various ecosystems. Unfortunately, we were unable to engage certain groups, such as investors, as they did not perceive immediate benefits in participating. However, we are optimistic that as SYNBEE gains more visibility through planned activities, we will attract a wider range of stakeholders to engage with our mission in the coming months.

All individuals were asked to sign a consent form in accordance with the GDPR compliance and research conducted with human subjects. The consent form template can be found in the appendices section of this report.

Below is a summary of the key insights and findings from the interviews conducted with these eight individuals. These discussions with various stakeholders across Europe reveal a multifaceted landscape shaped by regulatory frameworks, collaborative dynamics, educational programs, and cultural perceptions in the field of Synthetic Biology.

### **1. Regulatory Challenges and Opportunities:**

Across Europe, notably in countries like France, Latvia, and Lithuania, the regulatory environment, particularly concerning GMOs and novel foods, poses significant challenges. Startups and researchers note these regulations often impede the pace of innovation and market accessibility. Some countries, like the Netherlands, show more flexibility, potentially creating a more conducive environment for synthetic biology advancements.

### **2. Collaboration Dynamics in Research and Industry:**

Stakeholders, including researchers and startup founders, highlight varying degrees of collaboration effectiveness within Europe. Academic competition and confidentiality issues in



France and broader Europe sometimes hinder extensive collaboration. The effectiveness of public-private partnerships and academia-industry collaborations is mixed. While there are successful examples, challenges in aligning goals and intellectual property rights are common.

### **3. Educational Focus and Skill Development:**

There's an emphasis on the need for practical, industry-aligned training. Stakeholders from Latvia and other parts of Europe highlight gaps in project management, entrepreneurship, and technical skills like fermentation in current educational programs. Programs like iGEM are positively influencing synthetic biology education by fostering practical skills and entrepreneurial mindsets among students.

### **4. Funding, Investment, and Entrepreneurship:**

A general consensus exists on the need for more supportive funding mechanisms, especially for startups in synthetic biology. The lack of venture capital and business angels in Europe, as compared to the U.S., is seen as a significant barrier to the growth of startups. The entrepreneurial culture in the biotech sector needs nurturing. Stakeholders suggest that combining technical expertise with business acumen is crucial for the success of startups.

### **5. Cultural and Public Perception:**

Public skepticism and cultural resistance to GMOs and synthetic biology, particularly in France and other parts of Europe, influence the industry's growth and acceptance. This aspect significantly affects market dynamics and the introduction of innovative products. There is a need for greater public education and awareness initiatives to enhance understanding and acceptance of synthetic biology applications.

### **6. Global Comparison and Market Dynamics:**

Comparisons with non-European markets like the U.S. and Asia highlight Europe's more conservative approach to synthetic biology. Stakeholders express concerns that Europe might lag in global competitiveness due to regulatory stringency and slower market access. The potential for relocation of European startups to more flexible markets is noted as a risk, pointing to the need for Europe to create a more attractive and supportive ecosystem for synthetic biology ventures.



## Conclusion

The interviews collectively underscore the complexity of the synthetic biology landscape in Europe. Addressing regulatory challenges, enhancing collaborative frameworks, bridging educational gaps, fostering entrepreneurship, and reshaping public perception are key to unlocking the full potential of this field. The insights call for a concerted effort to create a more integrated, flexible, and innovation-friendly environment across European countries.

## II. INTERVIEW REPORTS

### 1. INTERVIEW REPORT: LIENE BRIEDE – RTU INNOVATION VICE-RECTOR

#### Introduction:

Liene Briede, the Vice-Rector for Innovation at Riga Technical University (RTU), offers her expert insights into Latvia's innovation ecosystem. With her extensive involvement in the Science and Innovation Center of RTU and roles in both the European Innovation Council and the Latvian Startup Association, Briede is well-positioned to provide a comprehensive view on the state of innovation in Latvia, particularly in biotechnology and life sciences.

#### **Q1: Could you provide your perspective on the innovation ecosystem in Latvia, especially in biotechnology and life sciences?**

A1: The ecosystem is something already existing, not something you build from scratch. In Latvia, we focus on identifying and aligning with biotechnology approaches. We established a new study program in biotechnology, combining life sciences from the University of Latvia and engineering from RTU. This approach fosters new collaborations and opportunities for innovation.



**Q2: Do you believe there are ample opportunities for Latvian entrepreneurs to collaborate with mid-sized industries for growth and market entry?**

A2: In Latvia's small market, we mostly have mid-sized and small companies. Biotechnology is emerging as a new direction, overlapping with various sectors like green tech and health tech. Understanding the technology and applicable markets is crucial. Health tech, with its global potential, could be a specific market focus for Latvian biotechnologies.

**Q3: What are the challenges behind Latvia's innovation ecosystem lagging, despite a high number of entrepreneurs?**

A3: One major reason is the low investment in research and development from the industry side. There's a lack of readiness to integrate innovations into business. Another challenge is the local market's responsiveness to validate new ideas. We need to shift our strategy to be more action-driven at a European scale, rather than focusing solely on local discussions.

**Q4: Would exploring collaboration opportunities with leading European countries benefit Latvian startups?**

A4: European collaboration is common through projects like Horizon Europe. However, there's a need for more tangible work with the industry. Projects should not only involve universities and research institutions but also integrate industry players to enhance the innovation ecosystem.

**Q5: Do Latvian universities support startups, and should they collaborate with European universities for grants and global cooperation?**

A5: Yes, we plan to enhance this capacity. While we focus on the local industry, we also aim to join them in different projects for global exposure. We're targeting global companies for research development collaborations, not just as sales offices but as partners in value creation.

**Q6: What key recommendation would enhance Latvia's innovation ecosystem?**

A6: We need to reassess the European innovation market and acknowledge disparities among countries. Creating specific programs for widening countries often leads to forced collaborations. Instead, the focus should be on integrating ecosystems at a European scale,



supporting excellence, and providing strategic advice to governments. Europe should act as a wise investor, promoting geographic integration in projects and changing the mindset about how we perceive and interact with different countries in the innovation field.

**Conclusion:**

Liene Briede's insights highlight the complexity and potential of Latvia's innovation ecosystem, emphasizing the need for strategic actions, interdisciplinary collaboration, and a shift in the European approach to fostering innovation. Her perspective sheds light on the challenges and opportunities within Latvia and broader Europe, advocating for a more integrated, inclusive, and collaborative approach to advancing biotechnology and life sciences.

## 2. INTERVIEW REPORT: SHEREF MANSY – PROFESSOR OF CHEMISTRY, UNIVERSITY OF ALBERTA

**Introduction:**

Professor Sheref Mansy, a distinguished chemist at the University of Alberta, shares his insights from his time in Europe, particularly in Italy, where he delved into the fields of bioinorganic chemistry and protocells. His journey from Ohio State University to his current position has been marked by significant achievements and a deep understanding of the synthetic biology landscape.

**Q1: How did you find the innovation ecosystem of Europe while being in Italy?**

A1: I felt quite embedded in the European system while I was there. I had Harmenise as a foundation grant, but that was only one piece of the puzzle.

**Q2: Have you pursued funding and grants, particularly for artificial cell biology, within biotechnology in Europe?**

A2: I didn't feel like there were big hurdles for this. Timing of ideas is crucial, but I found my kind of research, more aligned with origins of life and protocells, was more easily fundable in Europe than in North America.





**Q3: So, your observations are about Europe in general, not just Italy?**

A3: Europe in general.

**Q4: What makes collaboration between academia and industry easier in synthetic biology?**

A4: It's a bit difficult for me as I don't have much experience in it. Synthetic biology is more easily pitchable to companies. I had mixed feelings about the successful collaboration with the industry; it was not as positive as I thought it would be.

**Q5: Did personal or external factors, like government policies, influence your decision to move to Canada?**

A5: It was a mix of personal preference and departmental focus. I'm more in the biochemistry chemistry realm, and we lacked resources in Italy. Plus, the peculiarities of the academic system in Italy can be frustrating, but the level of students is high.

**Q6: Are Americans more open to collaborations compared to Europeans?**

A6: Europeans are collaborative, but often you feel embedded in big groups, unlike in North America where there's a sense of having your own small army and individual philosophies.

**Q7: Is the academic training in research high quality, especially for entrepreneurship and business planning?**

A7: There are resources available, at least in Trento. Students who were interested in startups pursued them successfully. However, bureaucracy and barriers in Italy seem large, making it less attractive.

**Q8: Do you encourage students' entrepreneurial endeavors, like patenting ideas or pursuing startups?**

A8: I would love something like that. I always tell students I am available for such endeavors. I think we can be good advisors, as justifying our ideas in grants is not all that different from raising money for startups.

**Q9: How can academia better support students transitioning to industry, fostering entrepreneurship?**

A9: Some countries make this path easier. I heard that France offers opportunities for small startup grants.

**Q10: How about the opportunities in Italy?**

A10: Italy has opportunities, but it is niche and more accessible to those who know how to deal with the government. It's challenging for expat students.

**Q11: What changes in Europe could have influenced your decision to stay instead of moving to Canada?**

A11: I've never desired to be in the industry or have a startup. But I admit that doing something new, like collaborating with industry or a startup, sounds fun. I wish Italy had some of the opportunities other countries have.

**Q12: Why did you choose Canada over other European destinations?**

A12: It largely has to do with the culture of the lab. I missed the North American approach to how universities and groups are run. I wanted to re-experience that.

**Conclusion:**

Professor Sheref Mansy's reflections provide a candid look into the complexities and opportunities within Europe's innovation ecosystem. His experiences highlight the differences in academic and research environments between Europe and North America, shedding light on the varied approaches to collaboration, funding, and the entrepreneurial spirit in the realm of synthetic biology and related fields. His journey underscores the nuanced choices and preferences that shape a scientist's career path in the global research landscape.

### 3. INTERVIEW REPORT: DONATAS STANIULIS – EXECUTIVE DIRECTOR OF LITHUANIA BIO

**Introduction:**

Donatas Staniulis, the Executive Director of LithuaniaBIO, shares his insights into Lithuania's burgeoning life science sector. LithuaniaBIO represents a diverse array of companies and



institutions in diagnostics, health technologies, and biotechnology, playing a pivotal role in new product development, technology transfer, and commercialization.

**Q1: Could you elaborate on your role with LithuaniaBIO and its connection to the innovation ecosystem?**

A1: As the executive director, I oversee an association uniting over 130 life science entities. We bring together major companies, SMEs, startups, academic institutes, and universities. My previous experience at ThermoFisher Scientific Baltics provided me with a corporate perspective, and now I'm more involved in the broader Lithuanian ecosystem.

**Q2: What are the strengths of Lithuania's ecosystem in fostering innovation and supporting startups?**

A2: We have a robust life science ecosystem with strong academia-industry ties. Many startups emerge from the academic sector, especially in biotech and synthetic biology. Our small country size facilitates easy networking and problem-solving. Key strengths include our universities' programs in genetic engineering and synthetic biology, and Lithuania's contribution to CRISPR-Cas9 technology. Being part of the EU also aligns us with European regulations, providing a competitive advantage.

**Q3: Is there sufficient internal funding in Lithuania through industrial partnerships?**

A3: While we can always use more funding, especially for commercialization and scaling up, Lithuanian entities can apply for various EU grants. The challenge lies in securing funding for scaling up and building facilities. Local resources may be limited, but global outreach is possible with a compelling idea.

**Q4: Do students need additional training in innovation and business planning?**

A4: Yes, more opportunities like 'sandboxes' are needed for students to develop and test their ideas. Accelerators provide essential training in commercialization aspects. However, the initial steps in starting a business can be daunting, especially for scientists who prefer to focus on their research.

**Q5: Is there a need for interdisciplinary studies integrating entrepreneurship into the curriculum?**



A5: Integrating entrepreneurship into university programs is valuable. For example, Vilnius University offers diverse programs where students from different faculties can collaborate. Such initiatives foster connections and entrepreneurial thinking early on.

**Q6: How do government regulations affect collaboration in Lithuania?**

A6: Regulatory improvements are always needed, particularly in funding for collaborations. There are programs supporting joint ventures, but bureaucracy can be a challenge. The government's pace in aligning with EU changes and public perception issues like GMOs also impact collaboration.

**Q7: What is the public perception of synthetic biology and GMOs in Lithuania?**

A7: Public hesitation is similar to the response to COVID vaccines; there's a spectrum of acceptance. About 10% might be resistant, while a significant portion would be open to scientific innovations. However, GMOs are generally not seen as a sign of quality and are approached with caution.

**Q8: How well do startups collaborate with industries in Lithuania?**

A8: We strive to build connections through networking events and collaborations with both local and international partners. Initiatives like the Life Science Baltic conference facilitate startup participation and potential investor connections. However, there is no single platform for such collaborations.

**Q9: Are policymakers responsive to synthetic biology initiatives, and how does this impact the ecosystem?**

A9: While there are experts in government organizations, there's no specific branch for synthetic biology. Communicating ideas and suggestions is straightforward, but bureaucratic processes slow down the implementation of changes.

**Q10: Is engaging with the government for public education and proposing initiatives feasible?**

A10: We have close collaborations with the government, particularly with the economics and innovation ministry. There's a new strategy aiming to reach 5% of our GDP by 2030 in life



sciences. However, funding remains a significant challenge despite easy communication and acceptance of ideas.

**Q11: Who should lead public education on topics like GMOs and renewable energy?**

A11: Public education should be a collaborative effort between policymakers and scientists. Policymakers can provide platforms, while content should come from scientific and business communities. However, more communication and involvement are needed from businesses in translating scientific achievements into public understanding.

**Q12: Could nonprofit organizations aid in public engagement with science?**

A12: Various organizations work with children and students, but more events are needed to increase awareness of scientific technologies. These should be supported by funding and should occur more frequently than just a few times a year. We're trying to make these events accessible online and broaden their reach.

**Conclusion:**

Donatas Staniulis's perspective paints a picture of a vibrant and collaborative life science ecosystem in Lithuania, underpinned by strong academia-industry ties and a forward-thinking approach to innovation. Challenges like funding for scaling up and public perception of new technologies remain, but the strategic initiatives and collaborative efforts underway indicate a promising future for biotechnology and synthetic biology in Lithuania.

## 4. INTERVIEW REPORT: GIRTS SMELTERS – EXPONENTIAL TECHNOLOGIES

**Introduction:**

Girts Smelters, representing Exponential Technologies, shares his expert insights into the synthetic biology landscape in Latvia and across Europe. His organization focuses on revolutionizing R&D through data science platforms, enhancing the transition from idea to product.

**Q1: What is your perspective on synthetic biology innovation in Latvia and Europe?**



A1: Synthetic biology in Latvia is in an early maturation stage. In Europe, while public funding is available through schemes like Horizon Europe, collaboration and structuring project applications are complex. In the U.S., venture capital is more readily available for synthetic biology startups, offering a distinct advantage.

**Q2: Is there a designated system for funding in Europe, and how does it compare to the U.S.?**

A2: There isn't a designated system per se. In Europe, you need to navigate various partnerships and organizations. The key difference lies in the availability of venture capital; it's much larger in the U.S., leading to more funded startups in biotech and synthetic biology.

**Q3: Have you noticed changes in the European deep tech startup space?**

A3: I haven't followed closely enough to note specific changes in synthetic biology. However, European deep tech startups, in general, are gaining more attention from VCs than before.

**Q4: What challenges do startups face in finding talent?**

A4: The main challenge is the lack of programs that combine business skills with biotech education. Bioengineering or biology isn't as 'popular' as other tech fields, making it harder to attract students. This affects the availability of talent prepared for roles in startups.

**Q5: How effective is collaboration between academia, industry, and government for startups?**

A5: In Latvia, top-down initiatives encourage collaboration between academia and industry. Programs like innovation vouchers support innovation, but there's a clash of cultures between academia and business. Successful collaboration requires understanding and aligning different mindsets.

**Q6: How does collaboration work outside the Baltic area?**

A6: The challenges in collaboration aren't unique to the Baltics. Researchers everywhere struggle to rewire their thinking for commercialization. Bridging the gap between academic research and business operations is globally challenging.

**Q7: Do regulatory environments impact innovation in synthetic biology?**



A7: My experience is more with computing biology, which isn't heavily regulated. In synthetic biology, regulations mainly concern products consumed by humans. I'm more concerned with upcoming AI regulations, which might soon impact synthetic biology.

**Q8: What government policy could ideally boost innovation and growth?**

A8: A program incentivizing large companies to collaborate with smaller teams would be beneficial. For startups, securing pilot projects with large corporations significantly attracts venture capital and funding. Government incentives for such collaborations could be transformative.

**Conclusion:**

Girts Smelters' insights reveal the complexities and opportunities in the European synthetic biology landscape. Challenges in funding, talent acquisition, and collaborative cultures are evident, but there are also potential solutions and strategies for growth. Smelters highlights the need for government initiatives to bridge the gap between startups and larger corporations, emphasizing the importance of support systems to foster innovation in this rapidly evolving field.

## 5. INTERVIEW REPORT: PROF. ROEL BOVENBERG – DSM BIOTECHNOLOGY CENTER

**Introduction:**

Prof. Roel Bovenberg, a renowned figure in synthetic biology and cell engineering, currently serves as a Senior Science Fellow at DSM Biotechnology Center in Delft, NL, and as an honorary professor at the University of Groningen. His extensive expertise spans microbiology, biochemistry, genetics, and synthetic biology, focusing on sustainable production and innovation in the field.

**Q1: What are the current strengths of synthetic biology in the Dutch innovation ecosystem?**



A1: The strength lies in the practice of synthetic biology. It's being actively undertaken within company settings and to some extent in universities, though its visibility is relatively low.

**Q2: Have you noticed an increase in awareness and involvement in synthetic biology recently?**

A2: While synthetic biology is not highly visible, there is a growing awareness among people. The field is mostly practiced within companies, with some initiatives at universities.

**Q3: What are the primary challenges in synthetic biology that need focus right now?**

A3: The challenges include working on core scientific and technological developments in synthetic biology. Identifying key research groups and pioneers, both in companies and academic institutions, is crucial, as currently, it's not well-defined or visible.

**Q4: Are visibility and communication barriers between academia and startups hindering collaboration?**

A4: Yes, visibility and communication are issues. The initial focus of synthetic biology was on new design methodologies for cell factories. The field has since expanded, leading to confusion. This affects how synthetic biology is perceived and implemented.

**Q5: Is gene editing technology like CRISPR-Cas9 part of synthetic biology?**

A5: Yes, gene editing technologies like CRISPR-Cas9 are part of synthetic biology, including the toolbox development around it.

**Q6: How easy is it to collaborate academically through networks like SynCellEU?**

A6: Collaborating through such networks is not difficult. Opportunities in the Netherlands and Europe are good, and even easier in the United States and Asia.

**Q7: What's the industrial perspective on academia-industry collaborations?**

A7: These collaborations generally work well and bring diverse groups together. Success depends on the chemistry and dynamics between participants. I've seen both successful follow-up collaborations and less effective ones.

**Q8: How does the evolving nature of the industry affect ongoing projects?**





A8: Industries might lose interest in projects over time due to changing situations. It's crucial to design projects robustly, with multiple topics of interest, and manage expectations from the start.

**Q9: Does DSM offer programs to assist startups?**

A9: DSM doesn't have specific activities for startups. Our interaction with startups is through joint programs, where they can indirectly benefit from our experiences.

**Q10: Does DSM actively seek innovative project ideas for collaborations?**

A10: We do, but more from a venturing perspective. We interact with startup companies globally, either initiating contact or responding to approaches, to explore potential collaborations.

**Q11: How accessible are policymakers for advocating sensitive biological research?**

A11: It's challenging to gauge the effectiveness of advocacy with policymakers. You interact and share input, but it's hard to see how it translates into new policies or programs.

**Q12: How can communication with government experts in synthetic biology be improved?**

A12: Improving communication is difficult. The term 'synthetic biology' isn't well understood, and discussions often occur under the broader umbrella of biotechnology.

**Q13: Is there public fear or lack of awareness regarding synthetic biology?**

A13: I'm not sure about the current public perception. Initially, there were concerns, leading to safety studies, but legislation was deemed sufficient. Public understanding may have evolved since then.

**Q14: Does DSM consider societal acceptance when evaluating new projects?**

A14: Societal acceptance is always a priority in evaluating projects. It's crucial to consider consumer groups, geographies, and other factors in product and process development.

**Q15: Is there an advocacy effort within DSM for raising societal awareness?**

A15: Advocacy involves many parties, including DSM's public affairs and regulatory teams. Collaborations with industry peers and organizations like EuropaBIO are common.



**Q16: What could enhance the synthetic biology innovation ecosystem in Europe?**

A16: Initiatives like the Biotech Booster program in the Netherlands are beneficial. They encourage startup activities and provide opportunities to use synthetic biology for new products and services. Improving the infrastructure for production and the translation of knowledge into applications is key.

**Conclusion:**

Prof. Bovenberg's insights reveal the dynamic nature of synthetic biology in Europe, particularly in the Netherlands. While synthetic biology is practiced within companies and academia, visibility remains a challenge. Collaborations between academia and industry are productive but dependent on the dynamics between participants. Prof. Bovenberg emphasizes the importance of societal acceptance, effective advocacy, and robust infrastructure to advance synthetic biology and meet global challenges.

## 6. INTERVIEW REPORT: A FRENCH STARTUP SPUN-OFF FROM ACADEMIA

**Introduction:**

This interview features insights from a French startup that originated from academia, specializing in bioinformatics services for the industry and research institutions. Founded in 2018, the startup focuses on industrial microbiology and has been supported by various organizations and funding bodies, demonstrating a keen understanding of the synthetic biology (SYNBIO) ecosystem in Europe.

**Q1: What are the main strengths of the European SYNBIO ecosystem in R&D?**

A1: The European SYNBIO ecosystem excels in academic research and technology transfer. Notable centers like VTT in Finland and DECHEMA in Germany contribute to high-level scientific and engineering research. Berlin and Paris are emerging as hotspots for startups in this field.

**Q2: What's the main strength of the French SYNBIO ecosystem in R&D?**

A2: The French ecosystem is bolstered by hubs like Paris Saclay and Genopole. The Toulouse Biology Institute and INSA Toulouse are producing excellent students, contributing significantly to R&D in France.

**Q3: How collaborative is the SYN BIO community in Europe?**

A3: The European SYN BIO community benefits from initiatives like Pathfinder, which finance projects. In France, organizations like BPI and CIR (Credit import recherche) provide substantial research funding.

**Q4: What are the barriers to SYN BIO development in Europe compared to Asia or the US?**

A4: Europe faces a shortage of venture capital funding and business angels, making it challenging for startups to secure initial funding. However, some large companies, like L'Oréal, are beginning to invest in biotech startups.

**Q5: What risks threaten the development of SYN BIO in Europe?**

A5: Regulatory hurdles, especially around GMOs, are impeding SYN BIO development. The focus on the method of product creation, rather than the product's properties or toxicity, is restrictive for the industry.

**Q6: Are there initiatives supporting SYN BIO innovation in France?**

A6: BPI France effectively supports innovation, including SYN BIO, although there's no specific organism dedicated to SYN BIO.

**Q7: What solutions can help Europe overcome regulatory hurdles in SYN BIO?**

A7: Regulations should focus on product properties, not just genetic engineering methods. The industry needs more biosourcing and environmental impact studies, rather than a blanket ban on GMOs.

**Q8: Is regulation tougher in France compared to the rest of Europe?**

A8: The regulatory environment in France is similar to the rest of Europe.

**Q9: How is GMO/SYN BIO perceived in Europe?**



A9: There's a cultural preference for natural processes. GMO is often associated with big chemical companies, creating resistance towards this technology. The industry needs to reassess its approach to genetic engineering.

**Q10: What's the level of public-private partnership in SYN BIO research in Europe?**

A10: The culture of public-private partnerships is growing in France and is more established in Nordic countries. Financing such partnerships can be challenging for startups, as they're expected to invest significantly.

**Q11: What skills are needed in SYN BIO for working in a startup?**

A11: European students are well-trained in genetic engineering and biochemistry. However, skills in systems biology are lacking. Startups need individuals with a holistic approach to physiology modeling, crucial for partnership projects.

**Q12: Are entrepreneurial skills important for startups when recruiting?**

A12: Adaptation, resilience, and willingness to learn are key entrepreneurial skills. Current training focuses on technical expertise but lacks in fostering creativity, risk-taking, and management skills. Soft skills and team collaboration are equally important.

**Conclusion:**

This French startup's journey from academia to the commercial sector provides a unique perspective on the challenges and opportunities within the European SYN BIO ecosystem. Despite facing regulatory and funding hurdles, the startup recognizes the strengths in academic research and technology transfer across Europe. The interview highlights the need for a more nuanced regulatory approach, greater support for startups, and a shift in educational focus to include entrepreneurial and management skills.

## 7. INTERVIEW REPORT: MOUNIR BENKOULOUCHE – BIOTECHNOLOGY ENGINEER

**Introduction:**

Mounir Benkoulouche, a biotechnology engineer and microbial and enzymatic engineering PhD holder, shares his experience in the synthetic biology (SYN BIO) ecosystem in Europe. His



background includes a stint at EnobraQ, where he worked on converting CO<sub>2</sub> into useful bioproducts. Currently, he is a co-founder of a startup leveraging *Saccharomyces cerevisiae* yeast for producing polyphenols, aiming to tap into the unexploited diversity of these compounds.

**Q1: What are the main strengths of the European SYN BIO ecosystem in R&D?**

A1: The European ecosystem excels in academic research and technology transfer. Renowned institutes like VTT, DECHEMA, and Génopole contribute to its success. France, in particular, is skilled in marine biotechnology. Industrial biotechs like Fermentalg and Global BioEnergies have matured significantly, showcasing the depth of experience in the sector.

**Q2: What is the level of collaboration in the European SYN BIO community?**

A2: Collaboration is still being structured, facilitated by European networks and programs like Horizon/CBE-JU. Congresses and programs like Horizon enable connectivity and knowledge sharing among European universities and industries.

**Q3: What barriers could hinder the development of SYN BIO in Europe compared to Asia or the US?**

A3: Europe tends to follow risk management strategies, which can be limiting. The US and China have more ambitious initial investments and less regulatory hurdles, giving them an edge. In Europe, interactions with industry are weaker, and there's a need for better communication between academic networks and industry.

**Q4: What are the main risks affecting long-term SYN BIO development?**

A4: Regulatory difficulties in Europe are a major barrier. Many EU players are relocating to more flexible markets like the USA and Asia. Europe needs to find a balance between ethical considerations and market accessibility.

**Q5: Are there public regulatory policies in France supporting SYN BIO innovation?**

A5: I'm not aware of specific policies in France aimed at supporting SYN BIO.

**Q6: Are there countries where regulations have favoured SYN BIO development?**



A6: In the biocontrol and bio-stimulant market, many companies are moving to the US due to easier regulatory processes for field testing.

**Q7: What regulatory challenges do you anticipate, and how might they be addressed?**

A7: We're currently working on our first regulatory file. A potential solution could be a centralized European platform providing standardized regulatory information for various markets.

**Q8: How can public-private partnerships be encouraged?**

A8: Collaboration requires alignment in terms of intellectual property and technology transfer. Lantana Bio has successfully collaborated with universities like Copenhagen and Zurich, even publishing together in 'Nature Catalysis'.

**Q9: What funding mechanisms have you used for these partnerships?**

A9: We've utilized the European Horizon project for funding collaborations. Other forms of collaboration include co-supervising students and exchanging equipment under Material Transfer Agreements (MTAs).

**Q10: What training in synthetic biology is available in Europe?**

A10: iGEM has significantly impacted synthetic biology education in Europe. European teams have been successful in this competition, leading to joint master's programs between universities and engineering schools.

**Q11: Are students ready to create a company or work in a startup?**

A11: Engineering school students receive training in management and entrepreneurship, making them more adaptable. Collaborations between engineering schools and universities can be beneficial.

**Q12: What additional skills should students have?**

A12: Practical workplace skills like time management are essential. For entrepreneurship, knowledge in administrative, social, and legal aspects is crucial, which is often learned outside of traditional education.

**Conclusion:**



Mounir Benkoulouche's insights provide a comprehensive view of the European SYN BIO ecosystem, highlighting its strengths in academic research and industrial biotechnology. He points out the need for improved regulatory frameworks and stronger industry-academia collaborations to foster innovation. The role of educational programs like iGEM in nurturing talent and the importance of entrepreneurial skills in the biotech sector are also emphasized. His experience illustrates the dynamic nature of the SYN BIO field in Europe and the challenges and opportunities it presents.

## 8. INTERVIEW REPORT: CEDRIC BOISART – BIOTECHNOLOGY EXPERT

### Introduction:

Cedric Boisart, with over 20 years of experience in industrial biotechnology, shares his comprehensive insights into the synthetic biology (SYN BIO) ecosystem in Europe. His background in computer science, bioinformatics, and experience in various biotech startups and industrial roles equip him with a nuanced understanding of the field.

### Q1: What are the strengths of the European SYN BIO ecosystem in R&D?

A1: Europe boasts strong research centers and esteemed professors across various countries, contributing to its R&D prowess. Key centers like TBI, Paris, Portugal's DTU, and Switzerland's ETH and EPFL stand out. National funding arms like France's BPI and Germany's BMBF play crucial roles, but the field lacks global success stories to drive it forward.

### Q2: How collaborative is the European SYN BIO community?

A2: Collaboration within Europe's SYN BIO community is evolving, supported by European networks and programs like Horizon/CBE-JU. However, academic competition and issues of confidentiality hinder extensive collaboration. Collaborations with large corporates are also challenging due to the 'not invented here' syndrome.

### Q3: What barriers hinder SYN BIO research in Europe?



A3: Regulatory challenges and a lack of entrepreneurs significantly impede SYN BIO growth in Europe. Additionally, the presence of too many intermediaries and limited funding, especially in areas requiring substantial R&D resources, are major hurdles.

**Q4: What initiatives support SYN BIO innovation in France?**

A4: I'm not aware of any specific regulations or initiatives currently in place in France to support SYN BIO innovation.

**Q5: What are the regulatory challenges in Europe for SYN BIO?**

A5: GMO regulations are a significant challenge, leading many companies to relocate outside Europe. Food tech development is slowed down by Novel Food regulations. Countries like Singapore and the USA offer more regulatory flexibility, particularly in genome editing technologies.

**Q6: How can academia-industry collaborations be improved in Europe?**

A6: Intellectual property is a major debate in academia-industry collaborations. Public-private consortia like TWB and ACIB are effective models. However, aligning public and private sector expectations and reducing intermediary involvement is crucial for better collaborations.

**Q7: What skills do biological engineering students need to work in startups?**

A7: Students are generally well-trained in molecular biology and enzymology. However, there's a notable shortage of fermentation experts. Project management and entrepreneurial skills are also lacking for those with purely academic backgrounds.

**Conclusion:**

Cedric Boisart's perspective highlights the strengths and challenges within the European SYN BIO ecosystem. While Europe is home to top-notch research centers and experts, it faces significant barriers in terms of regulatory environment, funding, and entrepreneurship. Collaborative efforts between academia and industry need to be streamlined, focusing on effective public-private models and reducing bureaucratic hurdles. The training of students in synthetic biology also requires a more practical and entrepreneurial approach,





emphasizing skills like fermentation and project management to better prepare them for industry challenges.



### III. APPENDIX – CONSENT FORM

## CONSENT FORM FOR INTERVIEWS IN THE FIELD OF SYNTHETIC BIOLOGY INNOVATION ECO-SYSTEMS

**RESEARCH PROJECT TITLE:** SYNBEE: EXPANDING SYNTHETIC BIOLOGY  
ENTREPRENEURIAL ECO-SYSTEMS

**LEAD RESEARCHER:** TU DELFT

**STUDY CONTACT DETAILS:** DR. SINDHU NAIK (S.N.NAIK@TUDELFT.NL)

### PARTICIPANT INFORMATION

Thank you for considering participating in our research project. Before you decide whether to participate, we want to ensure you have all the necessary information. Please read the following carefully.

#### RESEARCH PURPOSE:

SynCelleU as part of TU Delft is actively involved in the SYNBEE project, which has received a grant from the European Commission's Horizon Europe research and innovation program under the European Innovation Ecosystem (EIE) funding scheme. SYNBEE is coordinated by eureKARE in Paris, France, and kicked-off in March. SYNBEE's goal is to enhance key



aspects within the innovation ecosystems of synthetic biology in Europe. This involves improving policies and regulations, developing supportive infrastructures, and fostering a culture that promotes innovation and entrepreneurship.

The purpose of this study is to gather your valuable perspective that will assist us in identifying strengths, weaknesses, opportunities, and threats (SWOT analysis) within the European synthetic biology community. The interview questions will cover various aspects, including research and development, funding and investment, regulatory frameworks, education and training, industry-academia collaborations, and more. We aim to gather insights from key stakeholders like yourself to create a SWOT analysis of the field.

### RESEARCH PARTICIPATION:

Your participation in this study is entirely voluntary. If you choose to participate, you will be asked to engage in an interview with the research team. The interview will be recorded for transcription purposes to create accurate records of the conversation. Your participation is essential for the success of this study. You have the right to withdraw at any time without providing a reason by contacting Dr. Sindhu Naik.

### EXPLICIT CONSENT POINTS:

Please carefully read the following points and indicate your consent by ticking the appropriate boxes:



PLEASE TICK THE APPROPRIATE BOXES	Yes	No
<b>A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICIPANT TASKS AND VOLUNTARY PARTICIPATION</b>		
1. I have read and understood the study information dated [12/10/2023], or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	<input type="checkbox"/>	<input type="checkbox"/>
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	<input type="checkbox"/>	<input type="checkbox"/>
3. I understand that taking part in the study involves being recorded either on the teams meeting platform or audio only for the purpose of transcription of the interview.	<input type="checkbox"/>	<input type="checkbox"/>
<b>B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)</b>		
4. I understand that taking part in the study involves the risk of being identified with possible quotations (anonymised) used to create a SWOT analysis.	<input type="checkbox"/>	<input type="checkbox"/>
5. I understand that taking part in the study also involves collecting specific personally identifiable information (PII) [Name and workplace identifiers]. This information will be anonymised [quotes in the report] and will only be accessible to the study team, but has the potential risk of my identity being revealed.	<input type="checkbox"/>	<input type="checkbox"/>
6. The interview data will be stored securely using a TU Delft network drive, and will be deleted once the project is completed. I understand that these measures will be taken to minimize the threat of a data breach and protect my identity in the event of such a breach.	<input type="checkbox"/>	<input type="checkbox"/>
<b>C: Research Publication, Dissemination, and Application</b>		



PLEASE TICK THE APPROPRIATE BOXES	Yes	No
7. I understand that after the research study, the de-identified information I provide will be used for SWOT analysis report submitted to the European commission	<input type="checkbox"/>	<input type="checkbox"/>

## SIGNATURES

By signing below, I acknowledge that I have read and understood the information provided in the Participant Information and Explicit Consent Points. I voluntarily agree to participate in the research project and consent to the collection, processing, and management of my data as described.

**NAME OF PARTICIPANT [PRINTED]          SIGNATURE          DATE**

I, as the researcher, have accurately read out the information sheet to the potential participant and ensured that they understand the details of their consent.

**RESEARCHER NAME [PRINTED]          SIGNATURE          DATE**

Study contact details for further information: Dr. Sindhu Naik (Email: s.n.naik@tudelft.nl)

