SYNBEE

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II. Executive Summary

The current landscape for entrepreneurship education in Europe is fragmented, in the most developed synthetic biology ecosystems there are a lot of existing programs, leaving plenty of choice for students but that is not the case everywhere. The rise of online programs gives an opportunity for regional innovation ecosystem leaders to coordinate hybrid pathways for students mixing online programs with in-person community activities locally. These leaders can be a catalyzer, linking up talented students with laboratories, programs, grants, investors, and mentors.

Mentorship is very effective in the early stages of startup development and is very appreciated by all the students participating in training.

Program managers should define their key performance indicators considering the long-term benefits of these programs and should include more women in their programs to increase the talent pool.

III. Introduction

Synthetic biology (SynBio) is a rapidly growing field with potential for a wide impact from healthcare to environmental issues. Europe is at the forefront of this growth, investing significantly in SynBio research and innovation. The SYNBEE project is key to understanding this progress, specifically focusing on how innovation in this field is supported and developed across Europe.

Entrepreneurial education is one of the keys to unlocking Europe's potential to become the best place to set up a SynBio business in the future, leading to economic growth, job creation and a strong competitive advantage. SynBio innovations are creating new, potentially transformative capabilities, with improved performance and sustainability. Development of SynBio will therefore also impact supply chains, reducing Europe's dependence on its commercial partners in the long term (see references: McKinsey Global Institute, 2020). Europe

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is also a central place for the development of AI technologies, which could enable greater progress in the field of SynBio in Europe in the near future.

The opportunity offered by world-class academic research, talent, and strong industry can lead to greater societal impact if more research is taken to the industrial stage. While a number of programs, accelerators and incubators are already educating students, PhD and post-docs across Europe, these programs are not always accessible to those located in moderate and emerging ecosystems (as defined by the SYNBEE SWOT analysis, Naik S. 2024, see references) which are often focused on academic excellence. Long-term efforts with a culture shift are necessary to accelerate the commercialization of scientific research in the field of synthetic biology.

The consortium members of the SYNBEE program have published multiple reports, a SWOT analysis, a matrix of best practices and a roadmap for universities with recommendations to enhance support for entrepreneurs.

The work presented here has been developed after running a 12-week online training program for students around entrepreneurship in SynBio as well as 24 interviews with students, academics, community leaders and startup program managers.

This paper will analyze why it is important to expose science students to entrepreneurship, the different formats a training program can take to nurture the student's ability to become an innovator, and share recommendations for ecosystem leaders developing new programs.

This white paper is meant to guide ecosystem leaders across Europe who want to develop a SynBio community and create education opportunities for students and innovators in their region.

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IV. FINDINGS

1. IMPROVING SCIENCE STUDENTS' EXPOSURE TO ENTREPRENEURSHIP WILL OPEN NEW DOORS FOR THEM

1.1 DISPARITIES IN ACCESS TO THE SYNBIO INDUSTRY EXIST BETWEEN COUNTRIES AND UNIVERSITIES

The SynBio ecosystem across Europe shows significant disparities in access to industry resources, such as industry networks, financing, or laboratories to develop proof of concept and scale-up, which considerably affects the entrepreneurial pathways of students in science. While some regions possess robust integration between academic and industrial sectors, others have not reached that stage yet, creating an uneven playground for emerging entrepreneurs (see references: Naik S., 2024 SYNBEE SWOT Analysis).

For example, the Netherlands have successful academia-industry synergies, showing a strong business propensity with remarkable integration between both sectors. This collaborative environment fosters innovation and provides students with the essential industry exposure needed to turn their research into market-ready products.

However, many European regions still struggle with this integration. The European landscape is fragmented, with pockets of excellence where resources and collaboration are abundant (see references: Naik S., 2024 Matrix of best practices), and larger areas where support and connections remain sparse. This disparity is also caused by regulatory and cultural barriers that inhibit collaboration between academia and industry, particularly in Southern and Eastern Europe. In these regions, the lack of industry connections and support can leave students isolated and limit their opportunities to apply their research to real-world settings. For example, we spoke to researchers at Imperial College London who told us that entrepreneurship was encouraged in the institution with support available through courses and incubation programs. On the other hand, a PhD student in a German University told us that he had to wait until the end of his PhD before he could set up a business, because his faculty did not allow him to set up a business during his studies.

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Institutional challenges also play a significant role in the entrepreneurial ambitions of science students. Universities, in their effort to protect intellectual property (IP), and manage resources effectively, often create bureaucratic and financial hurdles for student entrepreneurs. To overcome these issues, technical founders, very often coming from academia, require better information about IP. These processes, while necessary for maintaining academic integrity, can inadvertently slow the progress of science innovators and make their entrepreneurial journey more complex.

The negotiation of IP rights and equity can be particularly complex. According to the SYNBEE SWOT analysis (see references: Naik S., 2024), navigating IP policies can be challenging for students, potentially impacting their ability to commercialize their innovations effectively. To address this, universities should provide clearer guidelines and support structures to help students manage these legal and financial aspects more smoothly. There should also be more support for IP negotiations from outside the university ecosystem to prevent conflict of interest.

In addition, the disparity in entrepreneurial support across Europe exacerbates the situation. This lack of uniformity creates a fragmented ecosystem where opportunities for entrepreneurial education and industry collaboration are not equally distributed. Students in less developed regions face additional challenges, lacking access to the same level of resources and support available to others in more advanced ecosystems.

The cultural attitude towards entrepreneurship also varies widely. The US, for example, has a strong culture of creating companies among both students and professors. In contrast, many European institutions maintain a more conservative approach, focusing primarily on academic research. This cultural difference can influence the willingness of students and faculty to engage in entrepreneurial activities.

To bridge these gaps, Europe needs a more cohesive approach. Developing mobility programs for students and researchers, promoting international collaboration, and standardizing support mechanisms can help level the playing field. Institutions could adopt more flexible policies that encourage entrepreneurship and reduce administrative barriers. By providing clearer guidelines on IP and equity arrangements, universities can empower students to pursue their entrepreneurial ambitions without the fear of being disadvantaged.

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Creating support networks and mentorship programs is also essential. Programs like Nucleate, which help students realize that entrepreneurship is a viable option, can assist students in navigating the complexities of starting a business. These programs provide resources (business knowledge, access to networks) and guidance (mentoring) needed to succeed. By fostering a supportive environment that encourages innovation and removes obstacles, science students can transition their innovations from the laboratory to the market, enhancing Europe's competitive edge in SynBio.

1.2 PhD PROGRAMS ARE HEAVILY FOCUSED ON ACADEMIC RESEARCH AND NOT ENOUGH ON COMMERCIALIZATION OPPORTUNITIES

PhD programs in Europe are renowned for their academic excellence, but this focus often leaves little room for venture creation and entrepreneurial training. These traditional ways, while promoting fundamental scientific understanding, can limit the potential for innovation and hinder the commercialization of groundbreaking scientific discoveries. To fully benefit from the potential of SynBio, it is essential to integrate entrepreneurship education into PhD programs.

Europe could achieve greater success in research commercialization by adapting their support of PhD students. The existing academic culture tends to prioritize publications and theoretical contributions over practical applications, which has contributed to Europe's academic excellence and visibility, but leaves little room for students to develop their entrepreneurial spirit. Shifting this focus to balance academic achievements with practical innovation can open new opportunities for translating research into impactful solutions.

The experience of students who had innovative ideas during their doctoral or postdoctoral studies but could not develop them due to a lack of support, highlights the need for a cultural shift in academia. Encouraging students to pursue entrepreneurial endeavors requires a supportive environment that values innovative applications as much as academic achievements. Simplifying IP policies and providing clear guidelines can also help PhD students navigate the legal aspects of starting a business. When students develop something

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in relation to their research, they sometimes use university resources (for example time, equipment, journal subscriptions…) which adds complexity around IP ownership later-on. Therefore, universities should consider implementing changes to better support student entrepreneurs, ensuring that policies are clear and navigable.

To address these challenges, universities could adapt PhD curricula to include comprehensive entrepreneurial training. This could involve incorporating modules on business development, IP management, and startup financing into the curriculum (See content recommendations in 2.4). Providing mentorship from industry professionals and facilitating internships within biotech companies can offer students invaluable real-world experience. These practical experiences can equip students with the skills needed to translate their research into viable business ventures.

Beyond entrepreneurship, better financial literacy could benefit academics when managing funding for their research projects. Incorporating financial education into PhD programs can better prepare students for the entrepreneurial challenges they may face, particularly managing grants and financial planning.

Fostering a culture that celebrates entrepreneurial achievements can significantly boost students' motivation to pursue entrepreneurial paths. Universities could benefit from recognizing and rewarding successful entrepreneurial efforts and showcase these achievements through university platforms and events. Highlighting the success stories of student entrepreneurs can inspire others to follow similar paths and reinforce the value of entrepreneurship within the academic community. It can also be used to attract prospective students who are interested in entrepreneurship and innovation.

1.3 Learnings from existing startup education programs

In our research we had the opportunity to speak to program managers and participants in several programs, in Europe and globally. Some programs we looked at were focusing on venture creation and supporting existing startups while others were focusing on the ideation

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phase. SYNBEE consortium member TU Delft also compiled a comprehensive list of initiatives and programs to grow SynBio innovations (see references Naik S. 2024).

One of the key outcomes described by the researchers, and university staff members, we interviewed was that students become more self-confident with their business skills after participating in a startup program. Entrepreneurship training can improve the students' and early career researchers' performance in the long term, whether they decide to start a venture, join academia or industry.

The Invention to Innovation program, based in Canada, has trained more than 500 people since 2015. The more recently launched PERIscope Commercialisation Award at the University of Sydney has put 13 researchers on a path to commercialize and license their technology. The participants in these trainings report that it helped them pivot their approach to the problem they were solving, develop their empathy, and see the world differently, making them more agile in their career.

The two most important issues students faced when developing their ideas were access to laboratory space to build their proof of concept and access to funding (mainly to fund laboratory activities and legal fees to protect their intellectual property). Some of the PhD students we interviewed were able to use their institutions' lab space to develop their projects but that could lead to conflicts around IP ownership, depending on the country and university rules. Some European programs like IBISBA were able to respond to this issue but the funding was limited in time and is no longer available for new projects. AgroParisTech's InnLabs is a great model which gives students, alumni, and external startup founders, access to labs to develop their technology, as well as scientific expertise, and business support. There are five InnLabs in total, each one focused on a specific theme (Biotech, Farming, Food, Forest, Regional development) and anchored in different regions of France. AgroParisTech's InnLabs are now supporting more than 75 startups. Since 2019, startups coming out of AgroParisTech have raised more than 200M €, the majority of which were supported by InnLabs. The model could be replicated across Europe with the right level of government support and subsidies.

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EXPERIENCE WITH THE SYNBEE TRAINING PROGRAM

As part of the SYNBEE project we ran a 4-month program between February and May 2024. Toulouse White Biotechnology oversaw: student and facilitator recruitment, day-to-day program management, operations, and reporting. It took around three months to plan the program. All the experts running the sessions were volunteers, excited to support a publicly funded program. However, we advise program managers to have a budget for speakers, as more and more experts now charge for this kind of collaboration.

Toulouse White Biotechnology organized twelve sessions in total, with a staff member always present to moderate the discussion and deal with technical issues. Sessions were held at 6:30 PM CET during weekdays to avoid conflict with university lectures and allow students from other European time zones to participate as well.

The course content included: intellectual property protection, SynBio market outlook, EU regulations, personal branding, and access to funding as well as hands-on sessions with students asking for specific support on their projects. Participants also had the opportunity to meet two entrepreneurs at different stages of their careers and ask them questions about the life of a startup founder in SynBio. Some of the workshops have been made publicly available with the consent of the expert featured and accessible on the SYNBEE Website. About half of the students had a clear project in mind that the program helped them work on, while the other half took this program as an opportunity to open their horizons.

Effectively, the SYNBEE Training program could be described as a pre-accelerator. It was not set up to get projects to an investment phase at the end of the program, but it helped students clarify their perspective, better understand the feasibility of their project and improve their self-confidence around their ability to start a business in the future.

The training program was free for students, which led to a drop in attendance for the least motivated students after a few sessions. This was not a big issue as we had many motivated students who participated in the weekly calls, but program managers should be prepared for this kind of behavior.

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2. Developing a training program on entrepreneurship for science students as a local ecosystem leader

2.1 Types of training programs in entrepreneurship available for SynBio students

There are many opportunities to join training programs in entrepreneurship for science students around Europe. In the Netherlands and in France, for example, many cities run training programs for their local entrepreneurs like Yes Delft or Lyon Startup. These programs are not necessarily focused on science or deep tech but are still beneficial in terms of soft skills development, access to angel investor networks or non-dilutive funding. For example, SYNBEE pitch competition and TWB Start me up! winner, InLux Biotech, also participated in the Lyon Startup program and won 10,000€ in the local pitch competition.

For SynBio innovations we can divide the type of training programs offered to students who want to start a business into three categories: introductory entrepreneurship courses, deep tech accelerators/incubators and industry specific accelerators/incubators.

2.1.1 Entrepreneurship 101 courses for scientists

These courses are often offered in Universities and Business Schools, either through the school's startup incubator or as an elective. They are great at opening up the students' perspective, improving their self-confidence and making them consider entrepreneurship as an option. In terms of content, they often focus on design thinking methods, customer discovery and value proposition design, developing empathy and pitching. To upskill their startup founders, AgroParisTech, has partnered with several accelerators and incubators since launching, such as 21st by CentraleSupélec and Quest for Change, the incubator network of the Grand Est region in France. Quest for Change provides training on business strategy and marketing, while AgroParisTech provides the technical training.

The outcome of this type of course is often improvement in the students' soft skills and a better understanding on the student's part of what entrepreneurship entails (see references: Duval-Couetil N. et al., 2021).

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2.1.2 SPECIFIC TRAINING FOR DEEP TECH STARTUPS

These courses are offered within universities targeted at PhD and academics to put them on a research commercialization path. The content tends to include intellectual property management, market research, and regulation, as well as mentoring from investors and ecosystem leaders.

The outcome of this type of course is often an improvement in soft skills from the students and an increase in the number of patents. They also change the way researchers work with their teams in the laboratory and can even transmit this to the early career academics they supervise (see references: Park, A. et al, 2022). Deep Tech startups are often taking a "technology push" approach rather than the more publicized "market pull" strategy. Training programs specifically made for academics are good at teaching founders to talk to their target audience and research the different applications to their technology. Launched in 2024 at the University of Sydney, the PERIscope Commercialisation Award is an initiative that takes scientists out of the lab for three months and finances the salary of a researcher to replace them. For three months, their mission is to find licensing applications for their technology by having conversations with industry, investors and mentors, opening up their network. The organizers found that the fact that researchers came from different disciplines made the cohort great at supporting each other. Similar results were found in the Canadian program Invention to Innovation where the researchers participating in the program helped each other by providing feedback on the different projects and using these insights to improve theirs.

2.1.3 SPECIFIC TRAINING FOR DEEP TECH IN INDUSTRIES

These courses can mix the type of startups and technologies, but their goal is to help startups understand the value chain of the sector they are targeting. This type of program is best for founders who are new to the business environment and need to understand the actors in the market they are looking to address. Many startups fail because they are not able to integrate their technology into an existing industry. For SynBio startups, the most common training programs are for food technology, pharmaceutical applications (e.g. Paris-Saclay Cancer Cluster Onco-entrepreneur program), or environmental sustainability. The content focuses on exploring the value chain of the sector, understanding the different actors, legal requirements such as clinical trials, and access to industry experts and investors.

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The three categories discussed above can have some cross-over in the topics, for example around pitching, fundraising, intellectual property management, and product market fit. Entrepreneurs can also participate in several of them depending on their needs and the cost associated with the programs.

The main benefit of these training programs is that they equip entrepreneurs with frameworks and tools to start building and developing their business. They often also provide mentorship and sometimes even access to funding (both dilutive and non-dilutive). For some investors, participation in some of these programs can attest to a certain level of commitment and business knowledge if the program is recognized, like Y Combinator, for example.

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2.2 Laboratories to develop SynBio innovations

Students we interviewed all found the training programs they participated in beneficial, as it improved their self-confidence and gave them a better understanding of what starting a business looks like. However, for those who had a project they wanted to develop, the training programs did not give them access to the laboratories and equipment they needed to develop their proof of concept and/or scale-up their results. While some early career academics, such as PhD students, or post-docs are able to use their university equipment to conduct their experiments, it can lead to conflicts around IP ownership between the inventor and the faculty.

Mature ecosystems in Europe have resources for students and entrepreneurs to develop their proof of concept. However, these initiatives are not distributed equally on the territory. For example, AgroParisTech has opened five InnLabs. AgroParisTech InnLabs are thematic incubators for innovators to develop their products, with access to laboratories, academic expertise, mentorship and masterclasses. To develop their proof of concept or scale up their technology, founders can also work with an industrial biotech demonstrator like Toulouse White Biotechnology or Genopole.

The other issue student-founders face after training programs is access to funding to develop their proof of concept. Some countries can offer non-dilutive funding (see references: Chukas, 2024) but sometimes require a personal investment from the founders themselves, a challenge for students. Some European funded programs like IBISBA or SUPERBIO have been successful at giving access to laboratories across Europe to develop the technologies, reducing the financial risk for startups. However, these programs, being limited in budget and in time, will not have the same impact in the future. To keep the doors of the laboratories open for innovators, EU countries and the European Union need to keep investing in these highly effective funding schemes.

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2.3 Development opportunities for local innovation ecosystems in SynBio

Since the COVID-19 pandemic in 2020, many programs have been running online. This allows programs access to more experts and founders that live far from the traditional epicenters of innovation. The iGEM Startup program now runs across three time zones and supports 80 founders across the globe. These online programs represent a substantial opportunity for SynBio community leaders present in moderately developed ecosystems. Local leaders should act as a regional catalyzer, linking up their communities to these opportunities. Online programs can sometimes lack community feeling and mutual support startup founders provide to each other. Local communities could benefit greatly from online programs creating a hybrid approach to training.

Students who want to start a business sometimes struggle to find cofounders with skillsets different from theirs. Local communities are in a perfect position to act as a matchmaker and serve as a platform for passionate SynBio innovators to meet each other and collaborate.

There is a possible model for local SynBio clusters, where they would run on the ground in-person community events and incubate startups, while their members participate in online programs. They could support their communities to find grants and funding to integrate incubators and laboratories dedicated to support entrepreneurs such as Planet B.io in the Netherlands, Toulouse White Biotechnology or Genopole in France. Local SynBio communities are key to link up training programs, investors and grant providers and laboratories.

SYNBEE Day could be the annual catch-up for all community leaders, universities, program managers, incubators, and program demonstrators to work together on orientating startups towards the right partners.

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2.4 Creating a training program

Community leaders who want to create a training program for their community can take inspiration from the interviews we conducted. We will focus on two types of programs (See 2.1): Entrepreneurship 101 courses for scientists and specific training for deep tech startups (with or without an industry focus).

2.4.1 Program format and length

For an introductory program to business concepts, part-time is the preferred mode for students especially if they are still doing their master's degree or their PhD. The feedback we received from program managers is that these introductory programs should last between 3 and 6 months with several workshops every week. There needs to be some time in between check-ins with the founders for them to integrate and apply what is shared in the workshops. Program managers prefer an online format for convenience and wider reach, but local ecosystem leaders could get more engagement from student founders by creating in-person programs.

For more advanced programs, where founders have committed to their business, the training can be much longer. Developing a product in the laboratory can take several years, and while the workshop content part of the program can be concentrated during the first few months, founders need continuous support as they go through challenges, whether they are relative to the industry or business in general. The program would therefore need to include mentoring as well as regular check-ins with the founders.

The PERIScope Commercialisation Award team at the University of Sydney had open office hours for founders to come ask their questions as they were going through their market exploration. For the entire length of the program, the program manager was meeting with at least 2 to 3 founders a day, out of the 13 participants in the program, proving the importance of this kind of service for the founders.

Ecosystem leaders who are interested in launching an advanced deep tech program should work collaboratively with laboratories and universities where founders could develop their technologies while building their business.

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2.4.2 Content

For Entrepreneurship 101, the program managers we interviewed highlighted the importance of business tools such as SWOT Analysis, value proposition, business model canvas, stakeholder interviews, stakeholder mapping, strategic marketing and market segmentation, and methods like design thinking, lean startup and the Vianeo method (mostly popular in France). Helping students develop their financial literacy is also essential. The Invention to Innovation program in Canada takes a practical approach by getting students to analyze reports from publicly listed companies. Indeed, a strong focus should be put on students having a startup project (even if it is a mock project) for them to actively use these tools and methods. Alternatively, students who do not have a project could acquire these business skills with startup internships or case studies from startups as part of their training. For example, program managers could work with local startups and get their students to work on financial planning, market research or stakeholder mapping.

For specific training for deep tech startups (within industries or not), founders need to have as much exposure as possible to real life entrepreneurs, industry specialists and get support from intellectual property lawyers if they want to patent their technology.

For intellectual property protection, a 90-minute workshop is a good introduction, so that founders consider these issues. However, to patent their technology they will need more hands-on support. This is also true for other regulatory aspects such as clinical trials or food safety regulations.

2.4.3 Considerations

These recommendations are general and stem from the experience with the SYNBEE Training program and the feedback received from interviewees. Program managers need to work with their students and startup community to identify the gaps in business skills when setting up their program. Each cohort provides an opportunity for program managers to iterate, adapt and improve their training program. Collecting feedback and having in-depth conversations with the community is essential to make sure the program actually helps the students.

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3. Further recommendations for SynBio ecosystem leaders who want to develop education programs

3.1 Programs need to lead to a wide range of pathways

Education programs on entrepreneurship in SynBio can significantly enrich the diversity of career pathways available for students. These programs reflect the interdisciplinary and dynamic nature of the field and offer unique opportunities to apply scientific knowledge and foster innovation. Venture creation is not the only successful path after participating in an entrepreneurship training program. While it is easier for innovation ecosystem leaders to measure the success of their training programs by counting the number of startups created or the amount of money raised by the founders, the impact of training programs goes beyond these two metrics.

A study on commercialization postdoctoral fellowships (see references: Thomas J, Maine E. et al. 2024) showed that after participating in their fellowship, the students have become industry champions, translational scientists or venture founders. These pathways are also not fixed, and graduates seem to move between them, depending on their life stages. Those that did not create startups were most likely to stay involved in the community and provide mentorship to current students.

The role of entrepreneurship programs for student founders is to give them the keys to be able to create businesses in the future, and to act as innovation experts, whether it is in industry or in university laboratories. The impact of these programs also goes beyond the students' experience, affecting the people they will train in the future as well, whether it is in a company or in an academic setting.

The lack of pressure to create a startup at the end of the program helps attract a wider pool of people and brings more diversity into the ecosystem.

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3.2 Work on engaging more women in the programs

At University, women represent a large share of the graduates in Biotech, however only a fifth of C-suite positions in biotech companies are held by women (see references: Nat Biotechnol, 2023). One university biotech startup incubator manager we interviewed confirmed these figures: while 75% of their graduates are women, only 25% of the startups they support are women-led. Bringing more gender diversity into their cohorts is a strong focus for many program managers. When asked what practical steps to improve the gender balance in their program, a majority of those interviewed said that quotas would be counterproductive. The focus for ecosystem leaders should be placed on attracting more female founders.

In our interviews we identified that programs with the highest share of women are ones that have objectives beyond venture creation. For example, half of the students participating in the iGEM competition are women, which then leads to half of the teams in the iGEM startup program to be female led. The competition gives a confidence boost for women to take the leap into venture creation. Entrepreneurial education courses like the Invention to Innovation program in Canada, or the entrepreneurship course, also seem to attract more women because they offer other career opportunities which can appear less risky for them.

In other sectors like tech, specific acceleration programs exist for women, like Willa in France, which also produced a study on the state of investment for female-led startups. They found that women tend to start a business much later than men, usually after 10 years of experience. This could explain why fewer female students participate in startup programs. (see references: Willa, Roland Berger, France Digitale, 2023).

In academia and industry, we have recently seen the rise of community groups focused on mentoring and uplifting women in SynBio such as WISB, Women in Synthetic Biology supported by SynBioBeta, Potter Clarkson and the Industrial Biotechnology Innovation Centre. This type of community is very effective at providing role models for younger women which are important to drive more female students towards entrepreneurship.

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3.3 Build a strong mentor support network for your community

Students who were working on a startup project in SYNBEE programs benefited from the support of mentors. Their feedback was very positive, saying they appreciated being challenged by industry experts, and opening new doors in their research.

Mentorship is a crucial component in the development of students and young professionals in SynBio. Mentorship can provide guidance, support, and valuable insights, helping students navigate the complexities of their academic and professional journeys.

Formal mentorship programs within universities, accelerators, and incubators can ensure that all students have access to experienced mentors. These programs should pair students with mentors who have relevant expertise in academia, industry, or entrepreneurship. Regular meetings and structured mentorship activities facilitate meaningful interactions and knowledge exchange. The Mentorship Program at Stanford University's Bio-X initiative is a good example of how structured mentorship programs can effectively connect students with faculty and industry experts.

Industry mentors can offer practical advice on the applications of SynBio in the commercial sector, providing insights into market needs, business strategies, and regulatory environments. Partnerships with biotech companies and industry associations can facilitate these mentorship opportunities. For example, the MIT-Broad Foundry connects students with industry leaders to work on real-world SynBio projects, illustrating how industry mentorship can be integrated into university curricula.

Entrepreneurial mentors are invaluable for students interested in starting their own companies. These mentors can guide students through developing a business plan, securing funding, and scaling operations. Universities can create entrepreneurial mentorship networks that include successful alumni, venture capitalists, and business leaders. Harvard University's Innovation Lab, which offers mentorship from successful entrepreneurs and investors, demonstrates how entrepreneurial support can be structured to foster startup growth.

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Peer mentorship can also be highly effective in fostering a supportive academic community. Senior students and postdocs can mentor junior students, offering advice based on their recent experiences.

Given the interdisciplinary nature of SynBio, cross-disciplinary mentorship is essential. Mentors from fields such as computer science, engineering, and biotechnology can provide diverse perspectives and expertise, helping students develop a holistic understanding of their projects. Building global mentorship networks can provide students with international perspectives and opportunities. Universities should encourage participation in international conferences, exchange programs, and global research collaborations.

To improve the mentorship experience, both for mentors and mentees, program managers could create opportunities for mentors to upskill, for example communication skills, cultural competency, and strategies for providing constructive feedback. Universities can offer workshops as part of their professional development initiatives, ensuring that mentors are well-prepared to guide their mentees.

Leveraging technology can enhance mentorship by facilitating virtual meetings, online resources, and mentorship platforms. These tools can connect students with mentors regardless of geographical constraints, making mentorship more accessible in regions with less active ecosystems. Platforms like MentorNet or JOGL which offers online mentorship networks, demonstrate how technology can support mentoring relationships.

Recognizing and rewarding the contributions of mentors can encourage more experienced professionals to engage in mentorship. Universities can establish awards and incentives for outstanding mentors, highlighting their impact on student success. Public recognition of mentors through university events and publications can also promote a culture of mentorship, as seen in the Mentor of the Year awards at institutions such as Johns Hopkins University.

Continuous evaluation of mentorship programs is essential to ensure they meet students' needs and achieve desired outcomes. Implementing feedback mechanisms that allow mentees to provide input on their mentorship experiences can help universities improve programs and address any challenges that arise.

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V. CONCLUSIONS

In our research we tried to explore the different ways SynBio community leaders around Europe could develop entrepreneurial training programs in their regions. These programs are a good way to foster new ideas, connect bright minds and develop the attractiveness of the region for SynBio companies. When creating a training program community leaders need to clearly identify the needs and the level at which they want to be supporting innovators and entrepreneurs. The impact of entrepreneurial education goes beyond venture creation and makes graduates more agile in their career, whether they chose to pursue a role in academia or in industry.

Entrepreneurial training is important to grow the SynBio ecosystem, but it can only work if there is also financial support available for entrepreneurs to access laboratories to develop their technology. Depending on the country, publicly and privately funded initiatives exist to provide this support, but they are often limited in time and sometimes hard to find for entrepreneurs.

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