

Setting up for success in bioenterprise

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Traditionally, bioenterprise has been dominated by drug development and medical technology. Today, we are experiencing an unprecedented surge in opportunities for life scientists of all backgrounds, and many are joining the sector from other areas. Hear from stakeholders across the bioenterprise community about how you can make the most of it.

What do bioenterprise and bioentrepreneurship mean?

Robert Hess, an angel investor, defines bioenterprise as any biological science applied to real-world problems with a connection to commercial enterprise. Similarly, Rana Lonnen, Managing Director at dRx Capital, includes a wide variety of biotechnology, ranging from biomedical research to crop science. She also highlights the fluid role of technology: it can influence or draw from biological phenomena, thus aligning with the typical characteristics of life science underpinning bioenterprise. By contrast, pure software or databases usually align more closely with patterns found in high-tech.

Alongside technical aspects, the meaning of entrepreneurship is closely tied to an entrepreneur's motivation and drive. To Jun Axup, Chief Science Officer and Partner at IndieBio, entrepreneurship is about "creating positive change in the world". It allows "individuals to create their own path and do what is most meaningful to them". From this perspective, bioentrepreneurship offers tremendous opportunity. To Jaleh Daie, Partner at Aurora Equity, it is the future: "Whether you look at health, agriculture, food, fibre, biofuels, biomaterials, they are all part of the bio economy. To me, the 21st century is the century of biology and we're only 20 years into it!"

Why should people care about bioenterprise and consider it as a career path?

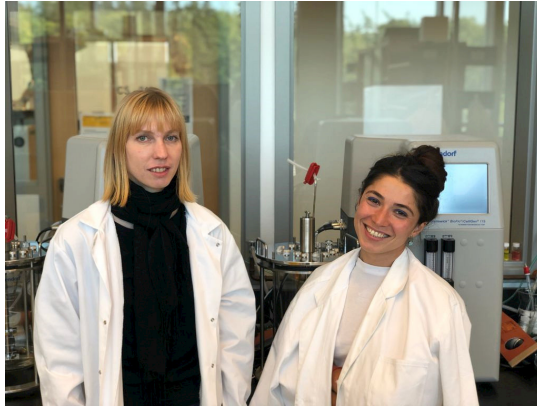
Jun Axup points out two problems with academia: a narrow research focus that results in papers rather than applicable science and an oversupply of smart and capable PhD graduates who cannot find academic positions. Entrepreneurship is an opportunity to pursue your interests outside the lab and bring your science into the real world. To Robert Hess, it is a matter of balance: "Bioenterprise can address problems that academic routes cannot and vice versa."

Jaleh Daie's career shows that you may not need to choose. Finding success as a research scientist at major universities and as an investor, she asserts that others can follow her path. Research into entrepreneurship supports her views. In 2011, Maria Theresa Larsen at Copenhagen



Julie Kring, Co-Founder and CEO of Khepra. BS in biochemistry, IndieBio alumna: "We've invented a new kind of chemical reactor that breaks down biopolymers found in nature. These can be used as alternatives to petrochemicals. To me, bioenterprise is now the Silicon Valley of the 90s. I chose to become a bioentrepreneur because I was born into the reality of climate change. To me, the best way to solve the problem are novel technologies. Read papers! That's where the idea for our company came from. It's about finding ways to apply what's already there in the research base." <https://www.linkedin.com/in/julie-k-70425689>

Business School summarized tentative evidence “that industry involvement and orientation in public science are complementary to what we think of as traditional academic endeavors”. Several studies reviewed found “the strongest (and sometimes only) evidence of a complementary relationship in biomedicine and the life sciences”. Jaleh Daie advises anyone considering this option to pursue academia first. It is easier to move from academia or academic science to business than vice versa.



Khorcheska Batyrova, Co-Founder and CEO of OzoneBio. PhD in biotechnology, IndieBio alumna: “We’re converting wood-derived feedstocks into bionylon using bio catalysis. To me, bioentrepreneurship means resilience and hard work. I chose to become a bioentrepreneur because academia sucks. I think there’s more of a future in bioentrepreneurship. If you’re an ambitious and talented scientist, start-ups might be a great working environment for you.” Visit OzoneBio online at: <http://ozonebio.ca/> or on YouTube: <https://youtube.com/RDLEFttN60Q>

Is there any cross-over between the skillsets of a bench scientist and a bioentrepreneur? What skills would a scientist need to learn?

From her experience as a scientist, entrepreneur and investor, Rana Lonnen has identified numerous skills that transfer well from science to entrepreneurship. Scientists ask questions and experiment; they are curious and inquisitive: “Products are built in a lean way nowadays. Experiment and fail fast.” Scientists are analytical and lack fear; they are used to changing, trying and optimizing. They also bring credibility to the room and want to tell the truth, resulting in clout and transparency with customers, investors and staff.

Robert Hess adds experience managing people and raising funds in some cases, and communicating complex topics. Rana Lonnen cautions that scientists used to

publishing do need to learn to communicate at the right time, for example, considering intellectual property and other business needs. She also recommends expanding your network and acquiring fundamental business knowledge, for example, on financial statements, product positioning or business strategy: “It’s ok to ask a lot of people for a lot of help.”

Most importantly though, scientists need to shift their mindset. In Jaleh Daie’s experience, “the skillsets may not be that different, but the execution, the mental models are.” Robert Hess agrees that moving into bioenterprise requires moving from individual merit and hard work to cooperation, “from living in an organisation to creating it.”

What are the benefits of undertaking training in bioenterprise? What careers are available for graduates of such programmes?

Formal training in bioenterprise is not essential. In a suitable environment, with suitable mentors, your bioenterprise might thrive without. Training can help you grow as an entrepreneur and avoid costly mistakes, and open up further career paths. There are three common routes: an incubator or accelerator, an MBA programme, or a specialist programme like a master’s in bioscience enterprise.

An incubator or accelerator will at minimum require a business idea. Jun Axup explains that it can provide you with a network of fellow entrepreneurs, mentors and alumni, hands-on help to avoid mistakes, labs, equipment and co-working space. “By sharing the cost and being in close proximity to other companies, we help companies move fast to accomplish great leaps in science and business milestones.”

There are considerable differences between succeeding as a corporate manager and as an entrepreneur. If you choose an MBA programme, it is worth evaluating its strengths in entrepreneurship education. Rana Lonnen advises that an MBA programme will not only expand your network, but also teach you how to make better decisions. Graduates typically pursue a range of business careers that may include entrepreneurship.

Specialist degree programmes typically cover both business and science. Like an MBA programme, they will usually not require a business idea. If you do have one, many can help you get a head start during your time on the programme, while running little risk: independent of your idea’s success, you will gain both the experience and a degree. Graduates, for example, of the MPhil in bioscience enterprise (MBE) at the University of Cambridge are often valued for their sector expertise. Beyond venture creation, their careers may include

investment, consulting, corporate innovation, business development and executive roles in the life sciences sector.



Max Jamilly, Co-Founder of Hoxton Farms. DPhil in synthetic biology, MPhil in bioscience enterprise: “We make real cell-based animal fat without the animals, for plant-based meat. To me, bioentrepreneurship means building cool things with biology. It means doing important science to solve problems. I chose to become a bioentrepreneur because I really wanted to use my research to solve problems. It’s also great fun. If you’re considering leaving academia for bio-entrepreneurship, you can have a huge impact in unconventional spaces like food-tech.” <https://hoxtonfarms.com>

How can we foster greater bioentrepreneurship among young scientists?

Diverse life experiences, knowledge and confidence in both biology and entrepreneurship help foster success in bioenterprise. Such experiences may also foster useful traits like creativity and an eye for entrepreneurial opportunities.

Jaleh Daie emphasizes early education in creating mental flexibility and optionality for later life: “Send them to a summer camp focused on science. Go to the zoo, go to botanical gardens. When you go out into the forest, take a book on birds. Biology is fun, but students don’t necessarily know that. Why do so many Americans choose to become entrepreneurs? It’s because they learn to be an entrepreneur as children – they sell cookies and lemonade. Let them do little businesses. The joy of making a living and making a profit is so powerful.”

For university students, Jun Axup is a “huge advocate for internships, professional development, and hobbies outside the lab to help diversify career options. Specifically for entrepreneurship, start a campus entrepreneurship group, take some business classes, and go to start-up events and chat with people.”

Rana Lonnen encourages scientists to look beyond the lab: “People in academia face peer pressure to pursue academia and leaving may be considered a failure. This is a huge misconception. Joining industry is hard and you need to prepare. Vice versa, industry can have pre-conceptions about academia and scientists’ abilities. Share stories with entrepreneurs, industry people, and others.”

What is required for a bioenterprise to succeed?

Jun Axup re-emphasizes other contributors’ advice: “The biggest element is for founders to shift from a scientist mindset to an entrepreneurial mindset.” In her experience, this has two components: shifting your focus from the science or technology to a product that solves customers’ problems and ongoing experimentation, at which scientists tend to excel. “The most successful entrepreneurs are hungry to test their ideas rapidly and inexpensively to find what product their customers really want.”

For Robert Hess, success depends on a bioenterprise’s niche: What are its limiting factors? Raising funds, with the necessary credibility and clout towards investors? Convincing customers to adopt your product? Nevertheless, Rana Lonnen summarizes some common themes she considers as an investor: a functional team with expertise, scientific confidence, humility to learn and dedication; customers’ unmet need and willingness to pay; strategy and business model; and room for an exit.



Genine Winslow, CEO, President, and Founder of Chameleon Biosciences Inc. MSc in cell and molecular bio-immunology, Berkeley SkyDeck alumna: “I’ve developed a new technology to deliver genes to treat people suffering from severe genetic diseases. To me, bioentrepreneurship means tenacity, willingness to risk it all, good connections who are willing to stick up for you, good communication

skills, a solid science background, and you have to be good at what you do. When you hear no, you need to get over it and move on. People should choose bioenterprise because it's a way to do science, always be challenged, and potentially contribute to society in a positive way. It's one of the most rewarding things I've done." <https://chameleonbiosci.com>

Are there any challenges biobusinesses face specifically that are not found in other sectors?

Compared to other sectors, biotech companies tend to be high risk and, if successful, high reward. Contributors to this article identified several challenges for typical bioenterprises, most prominently among biomedical ventures:

- A requirement for (clinical) trials, as one bad result may kill your venture. You need to de-risk, and add milestones and backup options.
- Running out of cash, due to high development costs and long timescales. You need to stay lean, consider funding at each milestone, and communicate value to investors at each step.
- Communicating complex ideas to a general audience, including investors and customers.

The issue is not clear-cut, though. As Robert Hess mentions, challenges may be analogous in deep tech. On the other hand, Jaleh Daie points out that the typical biomedical model will only apply to a small proportion of agri-tech ventures. Many agritech ventures will be closer to typical characteristics in other sectors.

How important are partnerships and relationships for success, and how can you foster them?

In Rana Lonnen's words, "building a venture is about the network." Your network will provide you with opportunities, for example, new customers, collaborators and inspiration. It will help you save money, with advice, expertise and introductions. Your network can also enhance your credibility: You can add people who believe in you and spend time on you to your slide deck for investors, while the network can help build your brand and reputation.

Jun Axup highlights the importance of relationships within your venture: "At the early stages, every cofounder and employee will shape the entire direction and culture of your company." To foster connections she recommends: "be genuine, open, and curious. Start by building friendships, not business partners, and you will find magical things happen." ■

Further Reading, Listening and Learning

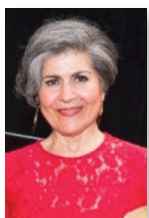
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Dr Jun Axup is Chief Science Officer and Partner at IndieBio, a leading life science accelerator. She advises companies, runs scientific programming, makes investment decisions and builds community. She holds a PhD in chemical biology and has co-founded two companies. <https://www.linkedin.com/in/junaxup>



Dr Jaleh Daie is Partner at Aurora Equity and Chairman of the AgFood Tech Special Interest Group at Band of Angels. Her career in agriculture and food spans academia, business, government, philanthropy and NGOs. She has served the administration of three US presidents, is an inductee of Women in Technology Hall of Fame and is the first female chairman of a crop science department. <https://www.linkedin.com/in/jalehdaie>



Dr Robert Hess is an angel investor and a member of the Life Science Angels and Band of Angels. He serves as Co-Chair of the Device and Digital Health Screening Committee and of the Digital Disruption Special Interest Group, respectively. He holds a PhD in molecular biophysics and a JD and has worked as a patent attorney. <https://www.linkedin.com/in/roberthesspatent>



Dr Rana Lonnen is an investor and Managing Director at dRx Capital, Novartis's healthcare technology venture fund. She holds a PhD in molecular biology and an MBA, was previously Founder and Chief Scientific Officer of a UK-based biotech and was previously a Wellcome Trust-backed academic and entrepreneur. <https://www.linkedin.com/in/rana-lonnen-01b88514>