

Cork Bio-Makerspace

Executive Summary

Cork city produces over a thousand graduates of science each year, nearly 400 in the Life Sciences. However, we are losing an increasing number to emigration, long-term unemployment and ennui in irrelevant employment. A significant fraction of our population is employed within the life sciences, yet Cork county is known for its scepticism towards biotechnology and its distrust of the industries that bring employment and wealth to Cork. Additionally, our city centre is, in places, lacking in amenities and exciting opportunities to inspire children and students to consider careers in STEM (Science, Technology, Engineering and Mathematics), at a time when global investment in these career paths is ever-increasing.

To resolve these challenges, we propose the creation of a “bio-makerspace”, a proven social, entrepreneurial and educational structure that will make Life Sciences more appealing and accessible to Cork citizens of all ages. By providing an innovative space to interact with the sciences, we will encourage children and students to consider careers in STEM, and will encourage Cork residents to reconsider any pre-existing scepticisms towards the environmentally sound and high-value industry that brings such investment to our City.

Additionally, by providing a low-cost way to access high-value equipment, mentorship, and peer support, the Cork BioMakerspace will create a low-risk space for good ideas to develop into commercial ventures, creating employment and attracting further investment from “new-wave” biotechnology to Cork. By driving local entrepreneurship, in a city with an existing strong focus and educational context in the Life Sciences, we propose to make Cork a “Carbon Valley”; a global hub for the next wave of bio-technologies.

The Bio-Makerspace will operate on a member-fee basis for individuals and a bench-fee or small capital stake for businesses. Regular open events (free and paid) will introduce participants of all ages and backgrounds to science and biotechnology. Guest lectures, conventions and bio-hackathons will attract international participation and media attention.

The Cork Biomakerspace has already secured a central, visible location in which to establish the open laboratory, and has received pledges of high-value equipment and resources outside the normal capital reach of start-ups in Ireland or elsewhere. We have pioneered early relationships with local business, education and community. Our founding membership has the profile and wide-ranging skillset to make Cork Biomakerspace a strong cultural anchor for STEM and Biotech in Cork.

Preamble

Creative centres for bioscience and technology are appearing around the world, especially in the EU and US. These centres provide space for people with or without training in biotechnology, with a host of different backgrounds, to share resources, experience and time to make their ideas come to life in ways that would be impossible otherwise.

In the US, the highly celebrated “flagship” bio-makerspaces “Genspace” (NY), “Biocurious” (CA), “CounterCulture Labs” (Oakland) and “Berkeley Biolabs” (CA) offer space for creative or SME teams to exploit recent advances in biotechnology, leading to projects such as air-sampling high-altitude balloons, glow-in-the-dark houseplants, lab equipment as cheap as kitchen utilities, and genetic tests people can perform at home.

EU bio-makerspaces include Copenhagen’s Biologigaragen, Paris’ La Paillasse (whose founder, Thomas Landrain, recently gave an inspiring speech at the “Synbio Future” conference held in the County Council conference rooms), Manchester Madlab, Berlin’s “Space Agency”, and Graz’s “Open Biolab”. In the EU, where regulatory restrictions are often forbidding, creativity takes a different route, leading to projects like self-inking pens that need feeding, water-snails selectively bred to survive on other planets, and semiconductor chips that can be printed with skin-pigments.

In Ireland, last year’s flagship exhibit at Science Gallery, TCD, explored the theme of synthetic biology, an important and rapidly accelerating field of research that is culturally affiliated with the bio-makerspace movement. As part of the exhibit, a “community biolab” was established within the gallery space, attracting footfall in the thousands, and hosting numerous creative events both paid and free. This exhibit, likely incorporating the biolab experience, is now touring globally.

The Opportunity for Cork

What we propose is to take advantage of a rare opportunity for Cork City, to encourage a world-class bio-makerspace and SME accelerator space in the City-centre. This will inspire and attract creative and intelligent members from home and abroad. These members and makers may use the space for fun, for education, for outreach, or to create small enterprises that may outgrow their origins, and establish elsewhere in the City or County.

The opportunity for Cork is multifaceted: Ireland has the most welcoming regulatory atmosphere for biotechnology in Europe, and this has lead already to a strong cluster of innovative biotechnology and biopharmaceutical firms establishing in the City and County. As biotechnology undergoes yet another phase of strong growth and evolution, Ireland, and Cork, stand to gain another wave of investments if a welcoming environment is created. Irish regulation of

biotechnology is responsible but permissive towards amateur experimentation and SME founders, which puts us strongly ahead of our European counterpart labs.

Due in part to the already healthy biotechnology cluster that arose from the previous wave of biotechnology growth, Cork already has a strong skill-base in the critical areas of microbiology, plant science and bio/pharma. Courses run out of UCC and CIT continue to generate world-class scientists and bioengineers, but as the economy continues to lag EU-wide, we are losing this talent, who seek more exciting work abroad. According to figures from the HEA, Cork produces three hundred and thirty nine graduates each year in the Life Sciences, as well as forty-seven postgraduate Masters and Doctorate level graduates. Of these, only sixty-six percent of graduates find employment in Ireland, of whom thirty-one percent do not find their employment relevant to their training; eight percent fewer than their emigrant cohort.

This is not only an Irish problem, but a sign of change and struggle in the sciences, as younger scientists find that funding, self-determination, and career opportunity is lacking. Our Cork bio-makerspace can provide an exciting space for these talented graduates to explore work that interests them, keeping and developing their skills, professional connections, and creative output in Cork.

Finally, this Summer will see some of the brightest and most innovative founders in the biotechnology field of Synthetic Biology come to Cork to take part in “Synbio Axlr8r”, an unprecedented three-month intensive accelerator program based in UCC’s bio-innovation laboratories. After this three month period, these international teams may choose to establish permanently in Cork, creating employment and fostering a culture of innovation and entrepreneurship, if it is clear to them that the costs will be minimal during their first stage of growth, and if a culture of creativity in biotechnology is flourishing in the City. We believe that creating a vibrant bio-makerspace will help to attract these and other high-potential companies to make Cork their home and their base in the EU.

Founding Plan

To establish the bio-makerspace, we have successfully solicited partnership and support from CIT and UCC, who will be donating an impressive range of equipment to outfit the bio-makerspace labs. Cork City Council have provided us the use of *Grattan House*, a central location within a short walk of UCC, the City Center, conveniently located across from Cork Educate Together and near a number of other schools. We have also established verbal partnership with Cork Educate Together for a STEM education programme which we hope to extend to other schools in due course. Local businesses have begun offering provisional support, including proposed donation of routine consumables and equipment as advanced as Mass Spectrometers.

The most valuable resource for a project of this scope and ambition is the founding membership, who bring skill, enthusiasm and further connections to the growing Biomakerspace. Our founding group, numbering over ten committed and skilled individuals, already bears remarkably diverse skillsets and social ties. Members who have committed to founding Cork Biomakerspace will bring skill in Biotechnology, Food and Beverage Science, Nutrition and Human Health, Environmental Monitoring, Regulatory Compliance, Science Communication, Community Management, Social Media, Networking Infrastructure, Hardware and Software Engineering, Education and Design. Established connections in mainstream and alternative education streams, interest-based communities and societies, existing commercial groups, and emerging online communities dedicated to areas of focus will be instrumental in attracting a vibrant and diverse membership.

Once the lab is prepared for use, licensing with the Environmental Protection Agency can be pursued for work with non-hazardous biotechnological agents. As the EPA have previously licensed the operation of a low-overhead lab established by a core founder, and as the EPA have verbally encouraged the establishment of a communally-licensed lab for hobbyists and educators in the past, it is expected that they will support the launch of Cork Biomakerspace as a public embassy for accessible and responsible biotechnology.

Finally, once established, the Cork Bio-Makerspace will be well-positioned to attract teams graduating from the Synbio Axlr8r programme, or iGEM teams from Cork or Galway, as well as numerous pet projects currently conducted off-books or after-hours in academic or industrial labs around Cork. By gathering these teams of specialists and technologists together, we believe that inspiration will lead to its natural outcome, and Cork will benefit from a source of entrepreneurship, collaborative learning, and cultural diversity as yet unseen in Ireland.

While figures for employment are difficult to project, based on observations of similar projects overseas we feel that a city with Cork's talent-base, combined with the unique opportunities co-occurring with the desired launch of the bio-makerspace, could lead to the attraction and creation of between three and five companies within two years, creating opportunities for employment for between fifteen and twenty-five skilled persons. This trend of job creation would be expected to continue as more persons make use of the bio-makerspace facilities and community to create ventures based on unique research enabled by this model. As these companies grow, they may produce further employment and help to support the further growth of their place of origin.

Sustainability

In order to sustain the activity hosted by an innovative space like this, ongoing funds will be necessary to pay for on-site management, maintain equipment, purchase consumables and pay for utilities.

Early supplementary revenue streams being investigated include membership fees, workshops (many of which can commence immediately), formalised tutorials for the large biology student cohort in Cork, high-value plant (e.g. orchid) micro-propagation, biological analyses or tests (non-medical), and “bench-fees” for start-up companies wishing to use the space for their work.

Ongoing funding may take the form of alternative arrangements for start-ups including minor equity-deals, merchandising, lab-ware manufacture, sale of locally produced bio-reagents (which are routinely sold at significant mark-up), and potentially low-tier bio-banking for non-medical and unregulated samples. All of these streams could be more efficiently handled as start-ups in which the community biolab will keep a small, low-input equity stake.

Timing

With Cork City Council ready to provide a dedicated, central location for the Biomakerspace, a passionate, impatient team ready to build in the equipment and resources donated by local academia, and a dedicated company founded to act as the legal entity behind the Biomakerspace, this project is already well underway.

The challenge for the Biomakerspace that now remains is to arrange, prior to the opening of the built labs, funding for the initial skeleton staffing required. The time-sensitivity of this seed-funding challenge is immediate and problematic, and we are now actively seeking partnership to permit the Biomakerspace to open doors, acquire licensing, welcome participation, and begin the next phase of achieving a more self-sufficient mode of operation.

Once this seed funding is secured, on-site management can immediately begin, members and start-ups can begin supporting the ongoing operation of the Cork Biomakerspace, and partnerships with schools, societies and local unions can be pursued.

Requirements

The Cork Biomakerspace project has rapidly attracted equipment, consumable resources, passionate personal commitments, and a dedicated building to host the Biomakerspace labs. Additionally, we have several candidate companies who we believe we can attract to set up in the biomakerspace when their term in the UCC labs rented for Synbio Axlr8r ends.

The immediate requirement for the Biomakerspace project at this stage is seed funding, to permit the passionate and experienced team behind the Biomakerspace to outfit and beautify the lab building, to pursue licensing, to open the doors and to begin offering events, workshops and educational partnerships.

After our immediate funding, our ongoing funding is planned to phase through state and private grant support, membership and event fees, bench-rental for start-ups, and ultimately to draw increasingly from the ongoing support of successful member-created start-up companies. In this way, the Biomakerspace is hoped to create a balance between the successful financial model of business accelerators and the successful social model of the global Makerspace movement.

Closing

The changing nature of work in the biotechnology sector is a common theme of conferences, publications and personal accounts in the industry of late; a regular comparison is drawn to the IT industry as a model for the future of biotechnology. Strong indicators suggest that an upheaval is underway, and that smaller start-ups are key. Increasingly, these start-ups are starting out in smaller incubation, acceleration and co-working spaces dedicated to small biotech or to community biotechnology.

For Cork, this means that in order to ensure an ongoing vibrancy in the field, we must anticipate strong competition against our existing staple biopharma industry and move to make our city welcoming to newer modes of development and employment. It is widely recognised that bio-makerspaces are an important part of this model, particularly in Europe where small start-ups face strong instrumentation and regulatory hurdles, and where lab-space leasing is seldom offered affordably.

This Biolab will offer such an affordable co-working space, both for casual or amateur members and for the companies they may choose to create upon developing something with high potential. It will generate interest and excitement in an industry agreed upon by the US and UK governments as one of the key growth areas in the coming decade, encouraging students and ongoing learners to study informally and potentially up-skill in the field. It will provide a place for people to explore and learn about the technology that is already a key part of food, medicine, and clothing production around the world, and help them to audit or to trust those technologies; especially important as their city plays host to ever more biotechnology firms and research groups.

By supporting the creation of this bio-lab, the council will be supporting the growth of Cork as a global destination for talent, investment and employment in this critical industry.

Contact

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