In collaboration with WEgate

SCIENTISTS AND ENTREPRENEURS:

WOMEN TACKLING GLOBAL PROBLEMS
FOREWORD

This panel discussion brought into the spotlight women scientists who are very often the overlooked entrepreneurs in the women entrepreneurship ecosystem. Enabling their voice to be heard is particularly important to our WEgate community (https://wegate.eu) an initiative partly funded by the European Commission, that is focused on supporting women across Europe to develop and grow their businesses. It is of utmost importance that we work together on scaling up gender diversity in the university spinout ecosystem and that we promote concrete actions in the field. Female academic entrepreneurship is recognized as one of the key pillars of intervention of WEgate and we are delighted to support women engaged in entrepreneurship and innovation.

MSc Gabriela K. Bogoeska – Executive director
Foundation for Management and Industrial Research and WEgate Community Coordinator

This event, inspired by the Promoting EDI in University Spinout Companies project undertaken as part of the EPSRC Inclusion Matters portfolio, is a great example of the collective work underway to support women in innovation and entrepreneurship.

Too few women researchers in the UK are leading spinout companies. This matters to the progression of women researchers who are missing out on entrepreneurial opportunities, but it also matters to UK research and innovation that needs diversity to thrive. Everyone’s contributions and skills are critical to the ability to tackle the many current and emerging challenges we face both nationally and globally. Identifying the systemic barriers as well as the enabling factors that exist for women scientists, engineers and mathematicians in the spinout process is vital to increase the participation of women researchers in STEM disciplines in university spinouts and to support new businesses and growth. Only by recognising everyone can we realise the full economic and societal benefits from commercialisation of research and innovation.

Dr Paula Bailey – Head of Equality, Diversity and Inclusion (EDI)
Engineering and Physical Sciences Research Council, UKRI
The value of academic entrepreneurship cannot be overstated: there are so many great ideas flourishing in the academic world that the rest of the world cannot wait to embrace and build further on. In general, we need to better harness Europe’s academic excellence – but in particular, we need to harness that scientific brilliance from women entrepreneurs. The lack of women-led spin-outs is real, and the consequences are severe. We must work hard to overcome the existing barriers to women entrepreneurship, and one key factor is really to promote and highlight female entrepreneur role models – to encourage young, talented women, to believe that anything is possible and promote risk-taking. The value of networking and knowledge exchange is another success factor.

At the EIB, we understand that gender smart investment is smart from a financing perspective: more diverse teams are key to successful businesses, as our study on Funding women entrepreneurs: How to empower growth points out.

We have to act, and we have to act fast, bringing gender smart investment into the mainstream and encouraging more women to join the digital and tech sectors, where they currently are underrepresented. This very much starts with education. For example, digital innovation poses the risk of widening inequalities and making them harder to bridge. Thus, the role of universities in promoting female entrepreneurs is crucial for a more gender balanced future, a future where we are all equally represented and empowered to turn our ideas into commercial values. At the EIB, and notably in my Innovation Finance Advisory team, we understand the challenges and are providing advisory support to improve the access of finance for women entrepreneurs and fund managers.

Shiva Dustdar – Head of Division, Innovation Finance Advisory
European Investment Bank (EIB)

“"It is undeniably important to have role models from very early on, long before the undergraduate/postgraduate stage; to know women who are leading businesses.""

Dr Ola Hekselman, CEO and co-founder of Solveteq
INTRODUCTION

By Professor Simonetta Manfredi

The Centre for Diversity Policy Research and Practice at Oxford Brookes University Business School has led a project, working in collaboration with the University of Oxford, the International Labour Organisation and other partners, to investigate the causes for the under-representation of female scientists and engineers as founders of University spinout (or spin-off) companies in the UK.

Key findings from our project Women and Spinouts: A Case for Action (www.brookes.ac.uk/research/units/obbs/projects/women-and-spinouts), highlighted that only 13% of university spinout companies in the UK have been founded or co-founded by women. These companies tend to be smaller and are less likely to receive large innovation grants which in turn limit opportunities for female founders to scale up and expand their businesses. The lived experiences of female founders suggest a perception of gender bias in the investors community which is highly male dominated. On a more positive note however, the female founders who took part in our research and early career researchers, who represent the pipeline of future spinouts founders, emphasised the importance of making role models more visible to inspire and encourage more female scientists and engineers to engage with academic entrepreneurship.

We are grateful to the WEgate community for the opportunity of bringing into focus the work of female scientists and entrepreneurs, as part of the 2021 WEgate Summit. Science and innovation are key to advance progress in our societies and to tackle global challenges such as the Covid-19 pandemic and the need to shift to a green economy. Science combined with entrepreneurship can make a powerful contribution to economic growth, especially as

1 Spinouts or spin-off companies are defined as registered companies set up to exploit intellectual property that has originated from within a Higher Education Provider such as a University. https://www.hesa.ac.uk/data-and-analysis/business-community/ip-and-startups
part of the post-pandemic recovery. Scientific entrepreneurship though needs to be more gender diverse to ensure that women’s talent is nurtured and recognised. The quality of knowledge and innovation also stands to benefit from increased gender diversity, as excellence is brought about by a broader and more inclusive set of ideas and perspectives.

What follows is an edited version of an on-line panel discussion that was part of the WEgate summit. Participating in the Summit were a number of female scientists and entrepreneurs, who represent a range of scientific disciplines, spanning chemistry, biology, engineering and virology. They have set themselves ambitious goals to tackle global challenges, and have chosen to become entrepreneurs to ensure their inventions and discoveries can actually be taken to market, to benefit people and society as a whole. As you can see, despite their different backgrounds, career histories and fields of interest, each of them was motivated to step out of the traditional boundaries of academic life driven by the common purpose of tackling global challenges.

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**Investors, particularly, are interested in your product, but it’s the numbers they’re really looking at. What’s the return on investment?**

Dr Olivia Champion, co-founder of BioSystems and Entech Nutrition

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2 The full panel discussion can be viewed [https://youtu.be/S_Sp2FPGHh4](https://youtu.be/S_Sp2FPGHh4)
Dr Olivia Champion

CO-FOUNDER OF BIOSYSTEMS AND ENTECH NUTRITION

https://biosystemstechnology.com/news
www.entecnutrition.com/post/top-entrepreneurs

I did a PhD in molecular microbiology at London School of Hygiene & Tropical Medicine. When we needed rapid model hosts to screen bacterial strains for mechanisms of virulence, it became apparent there was no standardised supplier of insect larvae for research purposes. So I set up BioSystems Technology to sell standardised larvae, with sales across 19 countries worldwide in the main to academic researchers and companies working on antibiotics. Having learnt more about the various needs for insect applications in the Agri-tech sector (such as using insect ingredients in animal feed) I have since founded Entech Nutrition. This company is still at the R&D phase, focusing on IP, though beginning already to rake in investment.

Dr Ola Hekselman

RESEARCH FELLOW AT IMPERIAL COLLEGE LONDON, CEO AND CO-FOUNDER OF SOLVETEQ

www.imperial.ac.uk/enterprise/staff/techcelerate/participants/cohort-two/dr-ola-hekselman-solveteq/

I am originally from Poland. I completed two postdocs over four years after my chemistry PhD at the University of St Andrews in Scotland, focused around developing next generation materials for lithium-ion batteries. I realised I wanted to combine my professional passion – batteries – with my personal one – innovative ways of recycling and protecting the environment. There was little research in this field at the time, but upon meeting Professor David Payne at Imperial College who was leading a project on recycling lead acid batteries, I was able to undertake a more practical, hands-on approach to this field of research, with the ability to apply the findings in practice. Rather than simply publishing the results I patented them, and with the help of the Technology Transfer Office I was able to start commercialising it. We incorporated Solveteq as a spinout and should be operating it in a matter of weeks.
Dr Chiraz Ennaceur  
CEO AND CO-FOUNDER OF CORROSIONRADAR  
www.corrosionradar.com

I did my first degree in Civil Engineering in Tunisia. After graduating my interests revolved around innovation and I did a PhD in France in Mechanical Engineering, developing new technology for non-destructive testing, such as X Rays – to see inside things on an industrial scale such as bridges and other structures. After completing a postdoc in Amsterdam I realised I wanted to do something ‘applied’. Upon moving to the UK I led various research groups at the Welding Institute for a decade. I wanted to do my own venture (having left France and its then-unfavourable economy behind me), and realised there was a huge need for automating asset management. I joined with Cranfield University to help make technology to monitor and predict failure mechanisms in safe-critical assets for the energy sector. From this IP created at Cranfield was born CorrosionRADAR, a spinout with a full team that has taken multiple rounds of investment. We aim to support energy transition to greener sources while ensuring these new sustainable sources are running safe.

Dr Fanya Ismail  
CEO AND FOUNDER OF SOL-GEL MATERIALS AND APPLICATIONS  
https://sol-gel.co.uk

I am Kurdish – I moved to the UK in mid 90s – 5 years later I won a scholarship from the Royal Society of Chemistry. During my PhD at Manchester University I worked on a technology called ‘SolGel’, using sand extracts to make new materials for chemical and bio sensors. After this I moved to academia, but left my lecturer job after my twins were born (I am a mother of three), as the demanding world of academia wasn’t easy to balance with family life. But after taking exams in law I set up my own consultancy firm and worked with foreign investors, my eyes were opened to the business world. When the twins were grown a little more, I wanted to look for opportunities focused on product-driven business rather than service-based. Looking back into my old sector, I carried out research for a year on the landscape globally – identifying gaps, who’s doing what, what opportunities there are. I started networking in industry and carrying out research, before setting up a new tech platform in 2017 to tackle plastic pollution and toxic chemicals in industry. For the last four years SolGel has been the only technology in the world that is 100% free of plastic and microplastic.

“ In my life I never had a room where the decision maker was a woman in my business career so far.”  
Dr Fanya Ismail, CEO and founder of Sol-Gel Materials and Applications
Professor Linda King

PRO VICE-CHANCELLOR FOR RESEARCH AND GLOBAL PARTNERSHIPS AT OXFORD BROOKES UNIVERSITY.
CO-FOUNDER OF OXFORD EXPRESSION TECHNOLOGIES

https://oetltd.com

I have been lucky to have a dual track career. I followed the traditional academic route of DPhil, postdoc, reader, professor, before becoming a Head of Department and joining the academic leadership team at Oxford Brookes.

But I have also been able to develop and apply my research in insect virology, which has proved useful in biotechnology and medicine. In the last 15 years, particularly, for gene therapy and developing vaccines. My husband (also an insect virologist) and I patented our ideas for simplifying the process, so now anyone with a lab can develop these proteins. Seven years later we were finally able to ‘spin out’, though at the time, Brookes wasn’t used to the practice, and it took a lot of time to get funding. Since then, we have collaborated with Public Health England to help develop a vaccine for CCHF virus and our technology helped Novavax develop their COVID vaccine. My husband now runs the spin out company, while I have retained my role at Brookes.

Maria Lundqvist

The panel discussion was also joined by Maria Lundqvist from the Innovation Finance Advisory team at the European Investment Bank (EIB) to give an ‘investor’s eye view’ on how Europe and EIB can support and enable female academic innovation.

www.eib.org

An economist by training, I did my studies partly in Sweden, partly in Tokyo and partly in Oxford. For the past six years, I have been based in Luxembourg working for the European Investment Bank. The Innovation Finance Advisory division, where I currently work, is dedicated to advising start-ups, scale-ups and SMEs, helping them to structure their business models and improve their bankability. We are contributing to policy and financial instrument development, market intelligence and ecosystem building. We also advise candidates for the European Innovation Council. Personally, I work with innovative sectors and technologies within the digital economy, for example deep tech, artificial intelligence, blockchain, quantum technologies, and other areas linked to sustainability, climate change, diversity and inclusion. Here particularly, gender is at the forefront of our efforts, a cross-cutting theme in everything we do. If half of the population isn’t fairly represented, the opportunity gap will continue to widen – and inequality will grow.

“ If the investors’ side made similar efforts to facilitate these professional networks – bringing science to finance and finance to science – then ‘not speaking the language’ would become much less of an issue.”

Maria Lundqvist, Innovation Finance Advisory Team, EIB
In 2020, the EIB invested €14.4 billion into innovation and skills, to support the development of new products and processes, promote R&D and training/upskilling, improve connectivity, and adopt and disseminate emerging technologies.

Challenges for women entrepreneurs and scientists – innovation is difficult to finance, even more challenging for an entrepreneur and harder still for a woman entrepreneur. Venture capital financing in particular is much needed to absorb the risks related to new, young, innovative companies, but there are many hurdles, and gender biases persist.

Sector bias also distorts investment in female companies. Investors look towards funding women in ‘traditionally feminine’ fields – so others (e.g. scientists, those in advanced sectors, entrepreneurs) have to compete harder for their funding. It is a problem of perception.

There is little support and it is limited to the early stages (seed and start-up stage) which leaves female founders with little support for what comes after (growth capital, scaling up the business).

At the same time there is a lack of women making investment decisions. Female investors are three times more likely to fund other women but only make 10% of investors3.

WHAT DOES THE EIB DO ABOUT THIS?
Beyond the ethical implications, investing more equally is also pure ‘smart economics’; empowering women is vital to enhance business productivity and to catalyse economic growth, social cohesion and social justice. It is also proven than women tend to focus more on impact-related business, meaning that tackling global challenges such as climate change and empowering female entrepreneurs could go hand in hand.

It is necessary to bridge the funding gap for female-led businesses across the life-cycle (from early stages through to commercialisation and beyond). The Bank supports early-stage spinouts alongside the EIC (European Innovation Council), and through our subsidiary, the European Investment Fund. At scale-up and commercialisation we also offer a venture debt / quasi equity type of financing.

The European Investment Bank is the EU’s bank and the world’s largest multilateral lender. Its priority areas are innovation (€14.4 billion in 2020), environment (€16.8 billion), infrastructure (€15 billion) and SMEs (€30.6 billion).

The views expressed in these article are those of the authors and do not necessarily reflect the views of the European Investment Bank.


www.brookes.ac.uk/women-and-spinouts
However, our support goes beyond financing – such as investment matchmaking, market intelligence, and collaborating with fund managers and other investors to tackle the gender bias. Gender is a cross-cutting theme in everything we do, now more than ever.

**LOOKING TO THE FUTURE: ‘TREATING THE CAUSE, NOT THE SYMPTOMS’**

Policy plays an important role – countries with more gender-equal priorities and governance requirements have more female-led companies.

There is a knowledge gap still to bridge – investors can be trained in how to avoid biases, seeing the potential in female-led companies and seeing it just as a ‘company’ rather than a ‘female company’.

Innovative financing instruments could potentially be tailored for female-led spinouts, such as co-investment programs/platforms, tech transfer funds or even gender bonds. Much to be explored further.

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**OUR ENTREPRENEURS’ RESPONSE**

Many of the points and issues raised by Maria tally with our entrepreneurs’ own experiences, and what they could or couldn’t do in the confines of their academic roles.

**ON FUNDING:**

Chiraz: ‘I went through different funding routes, and in that time I never interacted with a woman either pitching for investment or as an investor herself. Surely we can see more of that. To encourage women to go through that path should not start merely from university. More work should be done with young girls, when entrepreneurship could be introduced a lot earlier on as a viable career path. From that stage things would probably get easier (to develop, rather than inculcate, entrepreneurial spirit).’
Olivia: On the subject of funding, what’s important is the support and upskilling to create a financial model (or at least access to people who can do that for you) as it’s quite a daunting task. Investors, particularly, are interested in your product, but it’s the numbers they’re really looking at. What’s the return on investment? In the early stages, when there’s a lot of risk associated, it’s quite hard to show the return. Sometimes you need several rounds of investment over multiple years before you can show it. That can be a barrier to all of us, but in particular women, who may not have financial expertise or access to it.

ON THE IMPORTANCE OF ROLE MODELS:  
Ola: It is undeniably important to have role models from very early on, long before the undergraduate/postgraduate stage; to know women who are leading businesses, seeing how it looks, grasping the realities (the good as well as the bad) but also having support along the way. Many scientists have no business knowledge – I was lucky to have help in this regard, but it was really about the knowledge I gained from building networks and asking for support. We are often in male-dominated environments; the urge to appear professional and show you ‘know’ what you’re doing can deter you asking men for help. So lots of us find it easier to reach out to and speak openly with women. Female investors do indeed invest in women. Our responsibility going forward is to support other women as well. Men do it intuitively, but for women it’s important to inculcate that (while we’re still in the minority).

Fanya: As a mother of two 13-year-old girls, rather than ‘training’ them to be risktakers, you train them to be independent – how to find their way no matter what they want to do. Whatever comes up in their mind, train them how to find the answer. It can start from something simple like homework: as opposed to just giving them the answers, you can encourage them to work out a way to do it themselves. This will serve them well in any career. From independence, risk taking can naturally grow out of, as well as soft skills like risk-assessment – it isn’t about recklessly jumping into a situation blind, but weighing up the circumstances and learning to manage the pros versus the cons. In my life I never had a room where the decision maker was a woman in my business career so far. To change that, we need to train girls from very young how to find their way in life independently.

Chiraz: Adding to Ola’s point, networking is important – for me it all started from Enterprise Wise, an initiative run by Cambridge Business School. It was simply two weekends of female academics and industry professionals supporting and encouraging the idea of setting up your own business. I did this and resigned straight away! Two weekends were all it took. Programmes like that, to foster women with ideas who need a ‘push’, show us role models of women who’ve gone before us. For my 12-year-old daughter, ‘doing her own business’ and working in the green energy sector is utterly central in her (early) career aspirations – because she is seeing her mum do it in action. I am doing my part, going to talk to schools about it, having little girls come to the company to see women in these roles. But we need more.

ON THE LINE BETWEEN ‘THEORETICAL’ AND ‘APPLIED’ SCIENCE, AND THE DIVISION BETWEEN TRADITIONAL ACADEMIA AND INDUSTRY:  
Linda: Traditionally Brookes has a knowledge exchange pathway for spinouts, and a leadership pathway. But what we’ve found recently is that people don’t always fit neatly into one pathway or another. So how do we accommodate the ‘hybrid’ pathway some academics take between academia and a broad knowledge exchange? Will that create more opportunities for people to ‘dip’ into industry? There isn’t currently anything we would fund/promote ourselves, though we have lots of schemes that do support enterprise (one exclusively for women). From a university perspective we work with them as undergraduates, postgraduates and PhD level to build skills and knowledge. We are trying to build more support and development for entrepreneurship, but they are still not integral to the curriculum, just lying on the periphery.

www.brookes.ac.uk/women-and-spinouts 11
Olivia: As an example, BioSystems was only the second ever spinout from Exeter University. Before that, there was just no interest at all in spinning out – it was almost discouraged. But when the Research Excellence Framework (REF) changed how Universities were assessed (adding ‘impact’ to the existing metrics of publications and grant income), spinouts suddenly became more important, and BioSystems was Exeter’s vital case study in 2021. Several Universities, however, haven’t caught on to how this new metric will affect them. As spinning out has become such an important metric for universities, there ought to be a more formalised industrial route. There are support systems academics in their publishing, but not in industry. We shouldn’t forget how high-risk the process is, either. To start a spinout necessitates leaving your job, and statistics show that 90% start-ups fail. The risks for women, naturally, are compounded – many are already juggling academic careers with homemaking. And start-up companies usually drain money in the early stages.

ON POTENTIAL SUPPORT TO RESOLVE THESE ISSUES:

Linda: In our latest spinout colleagues have the option of taking a secondment, which can help to take away risk. Staff in permanent roles, and postdocs who were involved, can go into the company for 2 years. They are then free to come back to academia if they wish, regardless of how successful the company is. For those who stay, the Higher Education Innovation Funding (HEIF) provides support packages to upskill them in running a business. People can choose how exactly they use that funding. Things are moving in the right direction, but there is a lot more to do. Impact Case Studies from the REF were an absolute game changer – Universities are gradually catching up. Integrating support and opportunities into programmes is key. At Brookes, our PhD students could be given 3-month placements to go into industry and work outside their field of study. Research council funded PhD schemes already do that. But that’s a relatively small number. It should be done at that point, rather than leaving it to mid-career.

Ola: I benefitted from an entrepreneurial fellowship. Having support from an early point is useful – as a scientist and academic, stepping outside and speaking to industry and investors after 10 years in academia, I could barely talk about ‘cash flow’, ‘business projections’ etc. There is support for this sort of thing, which is great, but it would be useful if it was developed for later stage research instead of earlier stage. Because we generate IP as we go as postdocs – this is the biggest asset you have spinning out. Timing is an issue – more senior academics just don’t have time (no matter how much they might want to). Those of us who catch the entrepreneurial bug later in life have to play catch up, to get with the language and the jargon. At Imperial we had small entrepreneurial programmes, but the entrepreneurial fellowship I was awarded let me stay but not in a postdoc role, and meant I could pay consultants who helped me with the business side of things. That bridge was critical – it would be great to have that more widely.

ON ‘GOING IT ALONE’ – PURSUING ACADEMIC ENTREPRENEURSHIP WITHOUT UNIVERSITY SUPPORT:

Fanya: My start-up was ‘all from scratch’, as I had left my lecturer job long ago to raise my twins. But I planned accordingly, thinking for a couple of
years before committing myself (and my family) to the journey. Through networking, I came across the Enterprise Europe Network (currently known as Innovate UK Edge). I explained my (broad) vision to the south-east manager, who met with me several times to give it a unique shape and USP. Only then did we start considering funding. I got a £5000 grant to hire the facilities needed to test the theory, a test which thankfully worked but burned through the grant. I knew next to nothing about writing grant applications, and enlisting a university for help would mean surrendering my IP, so I turned to my family. They put enough funds together to get me my own facilities, but even then, it would take 2 years to finalise licensing and insurance, as well as scouting potential customers, before I was finally ready to go in 2017. However, I created and optimised the product in 9 months, and got private equity investors on board not long after. We raised £500,000 over the lockdown, and winning not just the Women in Innovation award (and its £50,000 prize money) but also the Diamond prize in Switzerland gave us a healthy dose of publicity and a cash prize CHF 150,000. Right now we’re working on commercialising, and are in talks about commercial investment (as opposed to equity investment).

**Linda:** A full enterprise centre and bio-innovation hub open not only to Brookes spinouts, but also the wider community, is on the horizon – Oxfordshire Local Enterprise Partnership is helping to fund as part of COVID recovery. Currently there are two small companies.

**Maria:** Accessing digital innovation hubs is important, not just for the facilities but also as a way to build up networks. A grant scheme to pay the rent of these places could be useful. Regarding networking, if investors made similar efforts to facilitate these professional networks – bringing science to finance and finance to science – then ‘not speaking the language’ would become much less of an issue. There is definitely a role to be played there, from our perspective.

**Olivia:** 9 out of 10 start-ups fail. Women in particular can put pressure on themselves to ‘do it all’. Resilience is important but so is being flexible, and moving as circumstances adapt. Particularly in a post-COVID and -Brexit world.

**Fanya:** Your company infrastructure must be strong. Don’t take any investment that is offered immediately. Assess first if you actually need it, and see where it would take you. Keep an eye on your product; that is what will make the journey.

**Chiraz:** Women have everything prerequisite to be entrepreneurs. Running a company is no less stressful, or demanding, then running a company, and many women prove themselves capable of doing both. We are risk-taking and persevering by our nature. Entrepreneurship however is a lifestyle, and it is important that your family understand and support you on this journey.

**Ola:** We generate IP as we go as postdocs – this is the biggest asset you have spinning out.

**Linda:** We must harness these ideas and concepts in the development of programmes that are underway. All the way from undergrad, postgrad, through to postdoc, and early researcher stages. Perhaps it is time to put entrepreneurship at the heart of our training programmes.

**SOME FINAL ADVICE…**

We are trying to build more support and development for entrepreneurship, but they’re still not integral to the curriculum, just lying on the periphery. 

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Professor Linda King

www.brookes.ac.uk/women-and-spinouts
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Dr Chiraz Ennaceur

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