



UCL Business PLC

# ANNUAL REPORT 2017



# BRINGING INNOVATION TO LIFE



**£10,873**

Million in turnover



**12**

Proof of concept projects  
funded with £878,349



**58**

New patent applications



**258**

Active licences



**67**

Spinouts created



**74**

Equity holdings



**237**

Patent families



**34**

Drug discovery projects  
in development



CONTENTS	PAGE
> MESSAGES	4
> ABOUT US	6
> OUR ROUTE TO MARKET	8
> BIOMEDICAL SCIENCES	10
> PHYSICAL SCIENCES/ENGINEERING	11
> PROOF OF CONCEPT	12
> FINANCIALS	14
> FIND OUT MORE	15

“WE COULD NOT  
HAVE DONE THIS  
WITHOUT UCLB.  
THEIR ADVICE,  
GUIDANCE AND  
EXPERTISE WAS  
INVALUABLE.”

**Professor Bobby Gaspar**  
Chief Scientific Officer, Orchard Therapeutics

“UCLB’S SUPPORT  
HAS BEEN  
INVALUABLE  
IN HELPING  
US TO SECURE  
INVESTMENT  
AND SPINOUT A  
COMPANY.”

**Professor Tony Kenyon**  
Nanoelectronic & Nanophotonic Materials, UCL  
Founder, INTRINSIC

# CENGİZ TARHAN

MANAGING DIRECTOR



## TACKLING SOME OF MANKIND'S MOST CHALLENGING ISSUES

I am delighted to present UCLB's 2017 Annual Report. In an age when the only constant is change, nowhere is this more apparent than here at UCLB.

While achievement and performance are important to us, we benchmark everything we do against the contribution we make to society and the world around us. It is this focus that underpins the work of our team.

From innovative software to novel therapies tackling some of mankind's most challenging health issues, the talent and hard work of the university's researchers continue to inspire us here at UCLB.

For example, we hold technology patents for diagnosing apoptosing retinal cells (DARC), a simple eye test that could help solve the biggest global cause of irreversible blindness – glaucoma. This affects 60 million people across the world, with 1 in 10 suffering total sight loss in both eyes.

In clinical trials, this pioneering diagnostic – developed by researchers at UCL and the Western Eye Hospital, and funded by the Wellcome Trust – allows doctors to see individual nerve cell death in the back of the eye, so they can start treatments before sight loss begins. The test also has potential for early diagnosis of other degenerative neurological conditions, including Parkinson's, Alzheimer's and multiple sclerosis.

Chirp, a UCLB spinout company, partnered with Chicago-based toy company Hijnx to create toys based on the Netflix original and popular series, Beat Bugs. The toy company uses Hijnx Alive, powered by Chirp, to create products that are inspired by and react to the music-centric series.

Another UCLB spinout, Autolus Ltd., a clinical-stage biopharmaceutical company focused on the development and commercialisation of next-generation engineered T-cell therapies, recently closed on a US\$80 million (£59 million) Series C financing, which follows on from a £70 million Series A and B financing.

The funds will enable Autolus to establish clinical proof of concept for three key programmes and build on its advanced cell programming technologies.

In 2018, I'm looking forward to celebrating UCLB's 25th anniversary and reflecting on some incredible achievements over that time.

It's been an amazing journey so far, so here's to the next 25 years being as thrilling and successful as the last.



# DAVID HUNTER

CHAIRMAN



INVESTMENT FUNDS PROGRESS WELL: MORE THAN £20M COMMITTED TO 28 PROJECTS

Approaching 2018, the year of UCLB's 25th anniversary, we are provided with an opportunity to mark some of the fine achievements of the past year.

We continue to thrive, as our financial performance and ongoing projects demonstrate. Turnover reached well over £10m, up from last year's £9m. From that, we distributed around £2m to the university's academics and inventors, with a further £1.4m going to the university itself. I'm pleased to say that, once again, our portfolio has shown impressive evolution and we estimate its value to be in excess of £196m.

As well as our financial performance, it's been another incredibly productive year for the UCLB team across our biomedical sciences and physical sciences/engineering portfolios. For example, we had around 65 proof of concept projects ongoing, more than 140 projects in patenting, 67 equity holdings in spinout enterprises and 316 licences in place.

The two investment funds are progressing well: the UCL Technology Fund has invested in 22 projects so far with a total commitment of £14m, and the Apollo Therapeutics Collaboration (with the University of Cambridge, Imperial College London, GlaxoSmithKline, Johnson & Johnson and AstraZeneca) has invested in six projects with £7.7m committed.

We're saying a fond farewell to one of our non-executive directors, Dr Gill Samuels, CBE, DSc, who has been a board member for a decade now. She has rightly been described as one of the most significant scientists of her generation. On behalf of everyone at UCLB, I'd like to thank Gill for her time and service.

I hope you enjoy reading about UCLB's journey this year. Please do not hesitate to get in touch if you'd like to know more about any aspect of our work.

# ABOUT US

## HOW WE CAN HELP YOU?

Here at UCL Business (UCLB) we bring innovation to life. The UCLB team is responsible for technology development and commercialisation transactions for the university. As such we help to market truly world-leading, world-changing innovations; ideas that have a real and positive impact on people's lives.

In fact, we were one of the very first technology commercialisation companies. Today we're one of the top technology transfer organisations – particularly in the field of healthcare - supporting the research of the academics at one of the UK's top research-led universities, UCL, as well as its partner NHS Trusts.

We work with staff across...

- University College London Hospital
- Moorfields Eye Hospital
- Great Ormond Street Hospital for Children
- the Royal Free London Hospital

...to support exceptional research and clinical practice for positive social health and economic benefit.

In addition, we've a track record and reputation for independence, best practice, adding value and, of course, for identifying, protecting and nurturing the most promising novel ideas.

So from technology transfer, intellectual property (IP) licensing and protection to company incubation and investment, we successfully bridge the gap between lab and market, between the expertise and innovations of UCL's academics and industry, for the good of all.

## OUR VISION –

Our vision is 'To help support and commercialise research from UCL and NHS trusts associated with UCL for the benefit of humankind in its widest sense.'

This supports UCL's Grand Challenges of increasing our positive impact on and contribution to:

- Global Health
- Sustainable Communities
- Intercultural Interaction
- Human Wellbeing.

The ultimate objective of the research and innovation we undertake at UCL is focused on our Grand Challenges; against which UCLB benchmark all we do.

## HOW WE DO IT –

### **We deliver the complete commercialisation solution**

We can provide you with a total, end-to-end capability. This ranges from IP protection, patent registration and support for the creation of new businesses, through to the licensing and sale of technologies to industry partners.

You can rely on our highly experienced, expert business managers and project management team to work with you every step of the way, right from your technology's earliest stages. Via proof of concept studies and market research we'll steer your novel idea to a position where its potential can be fully realised.

At that point, we'll help ensure your IP is protected and determine whether licensing or forming a spinout company is your best route to market. Our expertise ranges from identifying and negotiating with possible licensing partners to developing and delivering the complete structure – the people, plan and funding - that a new and sustainable spin-off enterprise needs.

ALL THE SUPPORT YOU NEED, ALL AT THE RIGHT TIME

### **Invention disclosure**

The academics at UCL and our associated institutions create many commercially promising ideas. Our role is to carefully select those with the best chance of commercial success and help develop and launch them.

### **Proof of concept**

Transforming an idea into a proven innovation, so that its performance and commercialisation potential can be realised, takes experience, expertise and funding. We can provide you with all three and more.

### **Patenting**

Any IP you create along with your technology is a valuable asset. So our patent team will identify the strategy that offers the best protection for it while managing the essential legal formalities.

### **Project management**

Expert project management enables you to concentrate on research and development while we take care of the business, ensuring commercial strategy can be incorporated from the start. We will take your project through the regulatory process, providing expertise and support.

### **Internal and external funding**

We can find the funding that's the best fit for your project. We can access significant sources from within UCL, the UCL Technology Fund, our own organisation and beyond - such as research councils and venture capitalists.

### **Marketing and negotiations**

When there's likely to be a choice of routes to market for your innovation, we've vast experience of identifying the best exit point for it, whether that be licensing, joint venture or the creation of a new, spin-out enterprise.

### **Licensing**

If licensing your technology is deemed the best route to market, our business managers will find industry partners that could benefit from it, negotiate agreements and provide you with comprehensive advice and support facilities.

### **Spinouts**

We've a successful track record for creating successful spinout businesses in key new industries. So if your technology could be better served by forming a new company, we'll establish, brand, fund, manage, promote and incubate it. And we're there for the long term, usually retaining a stake in the new enterprise.

### **Social enterprise**

If you want to start a social enterprise arising from your research - to address social or environmental needs, reinvest profits into the community or back into the business - start with us. We were the first technology transfer organisation to appoint business managers for social enterprise. Our pioneering spirit in this field continues.

### **ADDING THE VALUE THAT ADDS UP TO SUCCESS**

We believe it's not enough to simply deliver a technology transfer solution - it's the value we add at every stage that delivers the difference. This level and quality of support ensures more of UCL's novel ideas, innovations and technologies make the transition into marketable products and services for societal benefit and impact.

### **UCL IN OVERVIEW –**

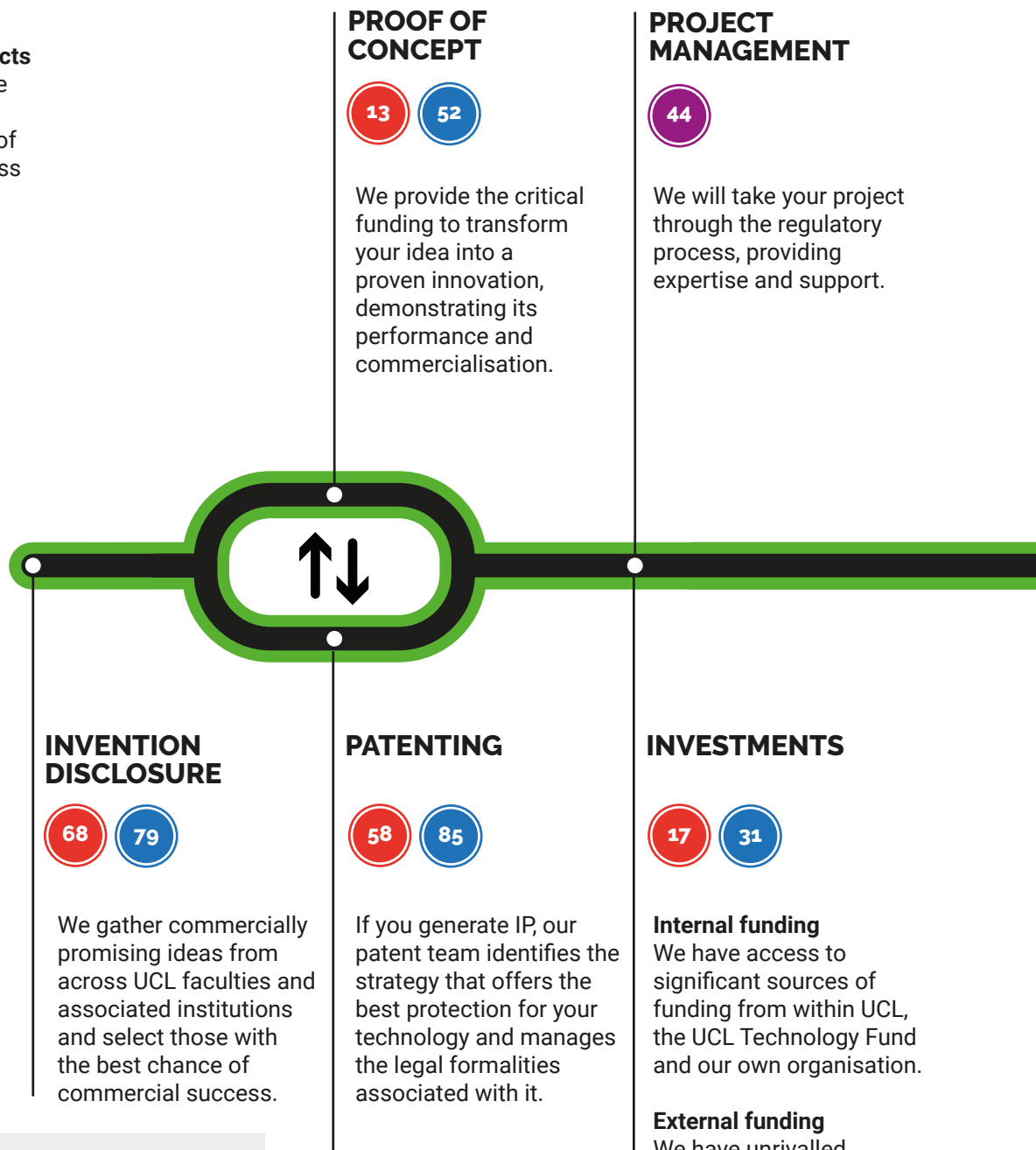
#### **Building an exciting future on the firm foundations of our past**

- launched in 1826 as London University
- the first university established in the capital, to be secular and admit women
- 29 Nobel Prize winners and three Fields Medalists amongst our alumni and current and former staff
- deep roots in medicine, healthcare and medical technology - played key roles in many important breakthroughs, from the discovery of the structure of DNA to the discovery of hormones
- part of UCL Partners, integral to the world's largest academic health science centre
- a world's leading multidisciplinary research university, ranked highly in national and international league tables
- first technology transfer company founded in 1993, became UCL Business PLC (UCLB) in 2006.

# OUR ROUTE TO MARKET

## Number of active projects

This diagram shows the number of our active projects at each stage of the development process as of July 2017.



## KEY

UCLB activity

## Total number of active projects per phase

Engineering, Physical Sciences, Arts & the Built Environment

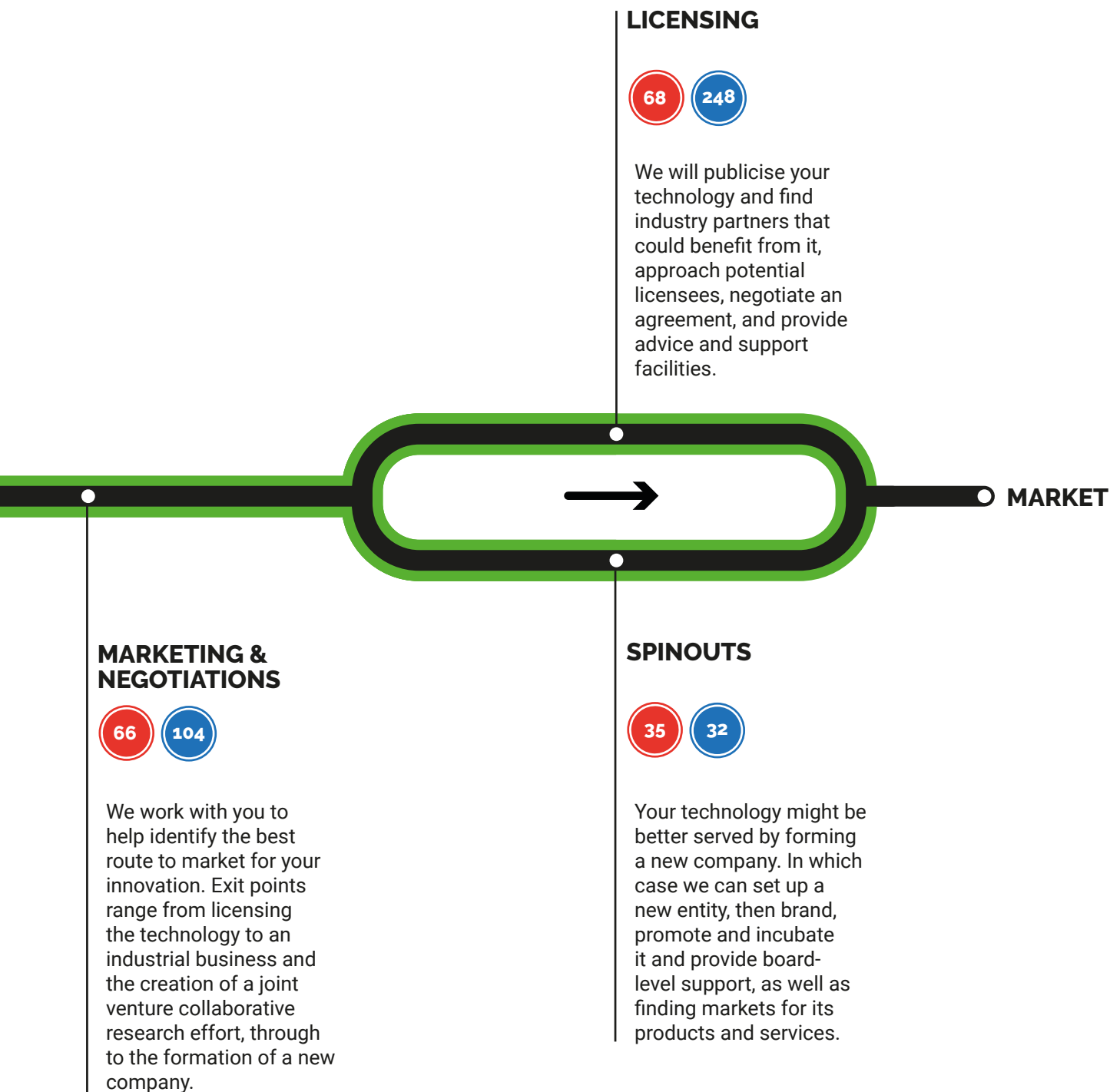
Biomedical Sciences

Project Management



Great Ormond Street Hospital for Children  
NHS Foundation Trust







# IT'S IN THE BLOOD

Haemophilia A, also called factor VIII (FVIII) deficiency or classic haemophilia, is a global health problem. As an X-linked disorder, it tends to impact males – approximately one in every 5,000 born have a genetic disorder caused by a missing or defective clotting protein, factor VIII.

People living with the disease are not able to efficiently form blood clots and are at risk of excessive bleeding from modest injuries. This can, potentially, endanger a sufferer's life. Those with severe haemophilia often bleed spontaneously into their muscles or joints.

Currently, the standard of care for the 43% of haemophilia A patients who are severely affected is a prophylactic regimen of factor VIII infusions three times a week. But even with this treatment, many patients still experience microbleeds and spontaneous bleeding events that result in progressive joint damage.

## GENE THERAPY PROGRAMME SHOWS GREAT PROMISE

An investigational gene therapy programme for severe haemophilia A, originally licensed by UCLB to BioMarin Pharmaceutical Inc., has already shown great early promise. The gene therapy, BMN 270, is based on research from the laboratory of Professor Amit Nathwani and his team at UCL, in collaboration with researchers at St. Jude Children's Research Hospital.

BioMarin presented positive interim data from an open-label phase 1/2 clinical trial of BMN 270 at the XXXII International Congress of the World Federation of Hemophilia (WFH). This showed that patients had an improved and sustained clotting function.

## ABOUT GENE THERAPY

Gene therapy is increasingly being talked about with regard to overcoming some of mankind's most challenging diseases. At its simplest, gene therapy is a treatment designed to alter a genetic problem by adding a corrected copy of the defective gene. The functional gene is inserted into a vector – containing a DNA sequence code for a specific protein – that

acts as a delivery mechanism, providing the ability to deliver the functional gene to cells. The cells can then use the information to build the functional protein that the body needs, potentially reducing or eliminating the cause of the disease.

Currently, the gene therapy for the treatment of haemophilia A is still at the clinical trial stage. However, the adeno-associated virus (AAV) approach to gene therapy, as used in the treatment above, has already been advanced at UCL in the treatment of haemophilia B, so the technology has shown evidence to be both safe and effective, correcting bleeding for greater than four years in a continuing clinical trial.

## FDA APPROVAL AND GLOBAL PHASE 3 PROGRAMME

In October, the U.S. Food and Drug Administration (FDA) granted valoctocogene roxaparvovec (the BMN 270 gene therapy mentioned above) breakthrough therapy designation. This programme facilitates and expedites development and review of new drugs to address unmet medical needs in the treatment of serious conditions. BioMarin expects to initiate enrollment of a global phase 3 programme before the end of the year.



# SYSTEMWIRE LTD

In the financial services industry, traders in equity, interest rate, energy and foreign exchange derivatives are exposed to significant market and credit risk during the period between a transaction being agreed and its confirmation. Given the huge value of transactions that pass through the major financial centres across the world every day, the ability to shorten the time taken to validate a trade has significant risk reduction and cost-saving benefits.

As a result, it became apparent that there was a need to develop a methodology by which these financial instruments could be efficiently traded using e-commerce technologies. In the late 1990s, this led to the creation of the Financial products Markup Language (FpML), an open-source XML standard for sharing information on, and dealing in, financial derivatives and structured products.

FpML can be applied in various ways, and researchers in the Department of Computer Science at UCL, led by Professor Anthony Finkelstein, recognised that a toolkit called xlinkit, which they had developed to check the consistency of distributed web content, had the potential to be of significant use in this application. The underpinning research was protected by a patent application in the summer of 1999 and a spinout company, Systemwire Ltd, was established in the spring of 2002 to provide a commercial implementation of the research. Systemwire's platform enabled automated trade matching and business rule validation in a manner that worked 'off the shelf' with the FpML standard.

In 2004, Message Automation, a London-based specialist in financial trading systems, acquired Systemwire in an equity-based transaction, with Professor Finkelstein joining its board. The Systemwire platform was then integrated into Message Automation's Validator product suite, and over the decade post-acquisition, the Validator offering was adopted by a wide variety of financial institutions such as HSBC, Lloyds Banking Group, Nomura Credit Suisse, Deutsche Bank and the Royal Bank of Canada. This clearly demonstrated the wide industrial applicability of the underpinning UCL research.

The commercial relevance of the Systemwire solution was further reinforced when, in the spring of 2017, Message Automation itself was acquired by Broadridge Financial Solutions Inc. in an asset purchase transaction. Broadridge was seeking to extend its regulatory and compliance capabilities for capital markets firms and investment managers, and Message Automation's solutions are enabling Broadridge to achieve this.

# SYSTEMWIRE

# PROOF OF CONCEPT

Proof of concept (PoC) funds are an integral part of the commercialisation process, so monitoring progress on each project, along with its impact and success, is essential. PoC funds can be used to support the pre-commercialisation development of promising technologies emerging from UCL.

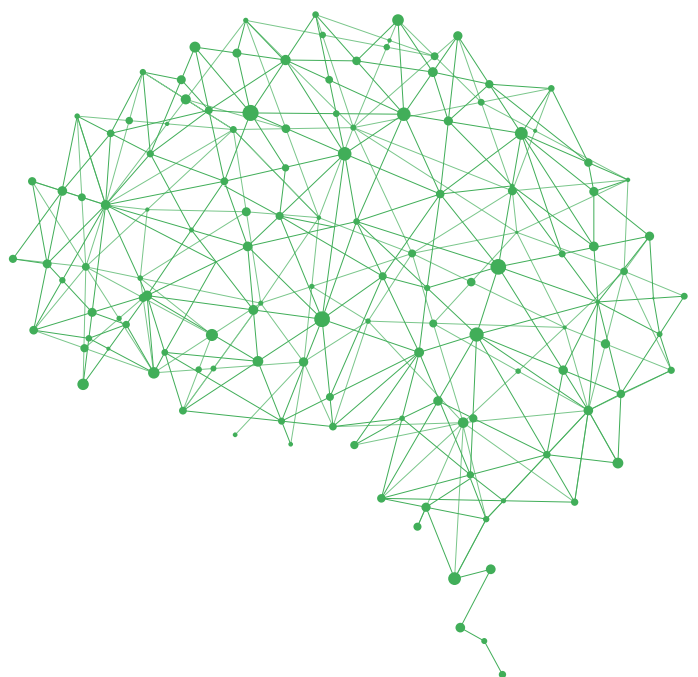
Each technology requires a different strategy to take it to market, from generating data to supporting the commercialisation, producing prototype devices or undertaking pre-clinical activities. There are various funds available to support PoC projects and this analysis is of the Higher Education Innovation Fund (HEIF) scheme only, which ran from 2004 to 2017.

During this time, HEIF invested a sum of £5m into 192 technologies (circa. £415k p/a). This resulted in 16 spinouts being assisted in their creation or created outright, 39 licences being secured and 33 PoCs, instrumental in securing additional funding to further develop the technologies. This represents a 44% success rate in terms of total number of PoCs and a 39% success rate for every £1 of investment. There are 34 projects that remain active and the success of these is, therefore, yet to be established.

Early stage investment of £640k from PoC funds has led to a further £30m being secured in translational or other funding. Therefore, each £1 of PoC invested has leveraged £41 of translational and other funding over the course of 2.4 years, on average.

In terms of spinouts and licences, the timing is around the same – approximately two years from investment of the PoC to the licence being secured or the spinout being created. £506k was invested in spinouts and £930k on securing licences. £31k has been invested per spinout and £24.7k per licence. Eight of the PoCs included in the licence count went on to assist in the creation of a spinout, therefore these are included in both the spinout and licence data.

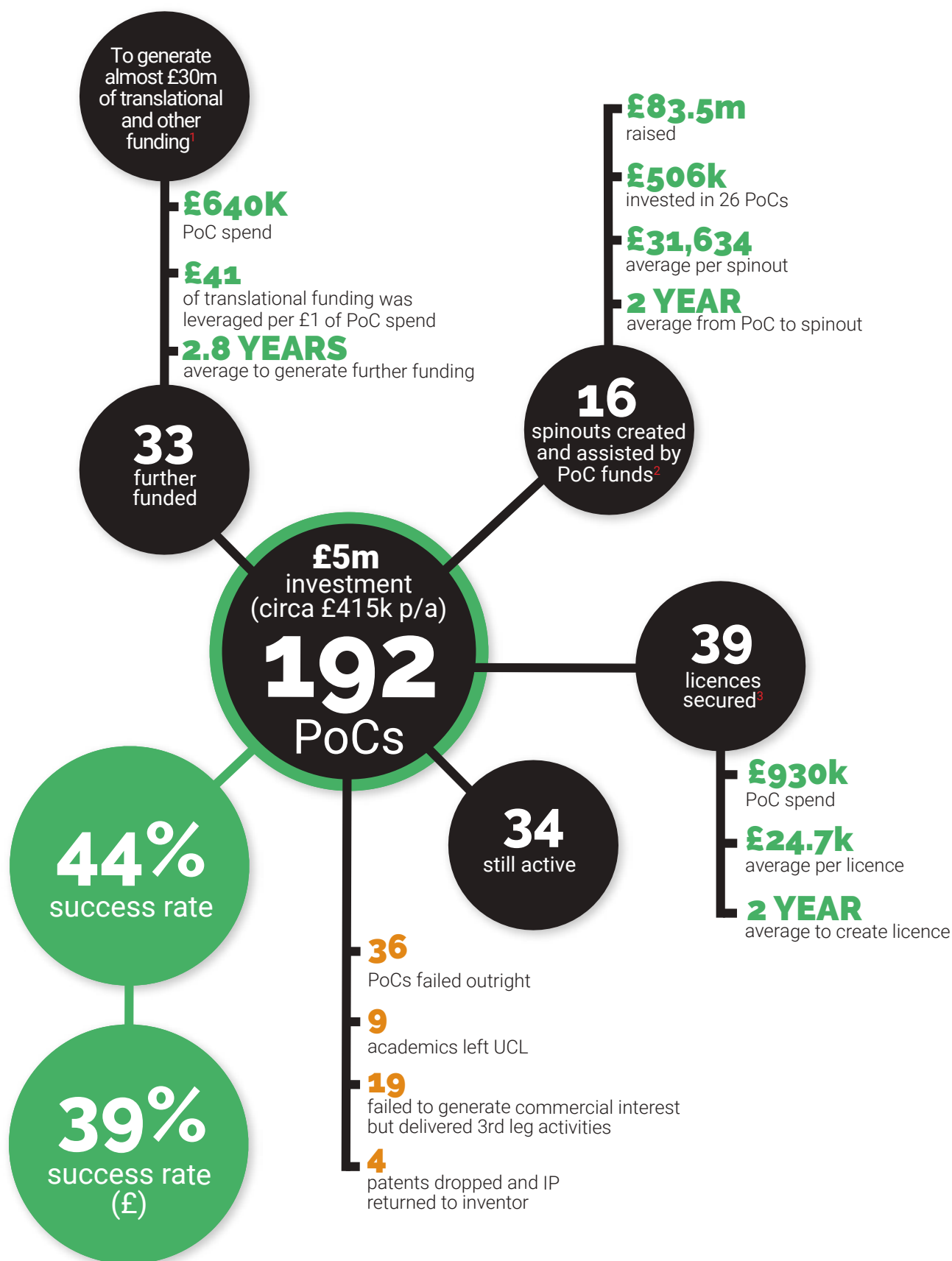
As with any PoC investment, it is accepted that these are high-risk, early stage investments and some will inevitably fail. Of the £5m invested: 36 PoCs failed outright at the PoC stage; 19 PoCs were successful but were unable to secure any further commercial interest; nine PoCs were mid-project when the academic involved left UCL; and four PoCs ended with the patent being dropped and the intellectual property being returned to the inventor.





# UCL HEIF Proof of Concept Programme Managed by UCLB

## 2004 – 2017 outcomes



1. Funding secured through UCLB facilitation

2. Some spinouts received more than one PoC

3. Some licences were granted to the spinouts created

# UCLB GROUP ACTIVITY

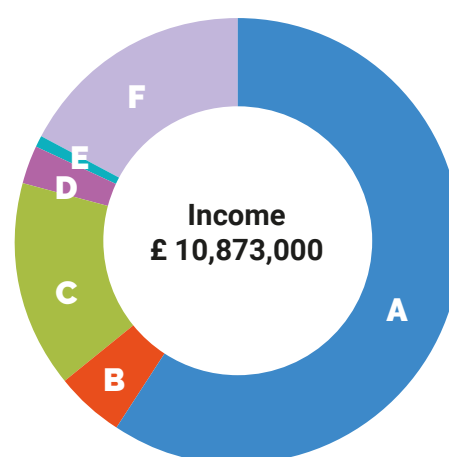
## SUMMARY RESULTS

### INCOME ANALYSIS FOR 2016/17 –

A	Royalties and intellectual property income
B	Spin-out exit
C	Services to UCL
D	Research and proof of concept funding
E	Interest
F	Other

(£'000)

6,462
545
1,620
306
84
1,856
<b>10,873</b>

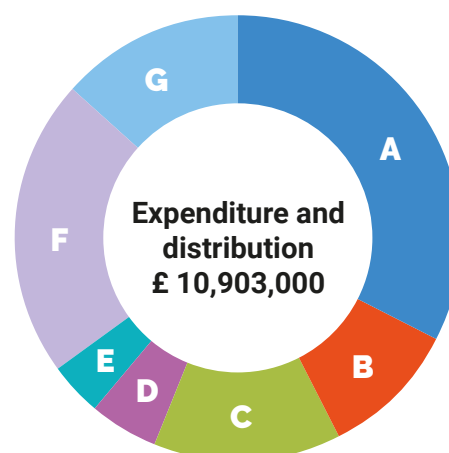


### EXPENDITURE ANALYSIS FOR 2016/17 –

A	Staff costs
B	Research and consultancy
C	Patent costs
D	Premises
E	Other

(£'000)

3,557
1,107
1,477
535
419
<b>7,095</b>



### DISTRIBUTION FOR 2016/17 –

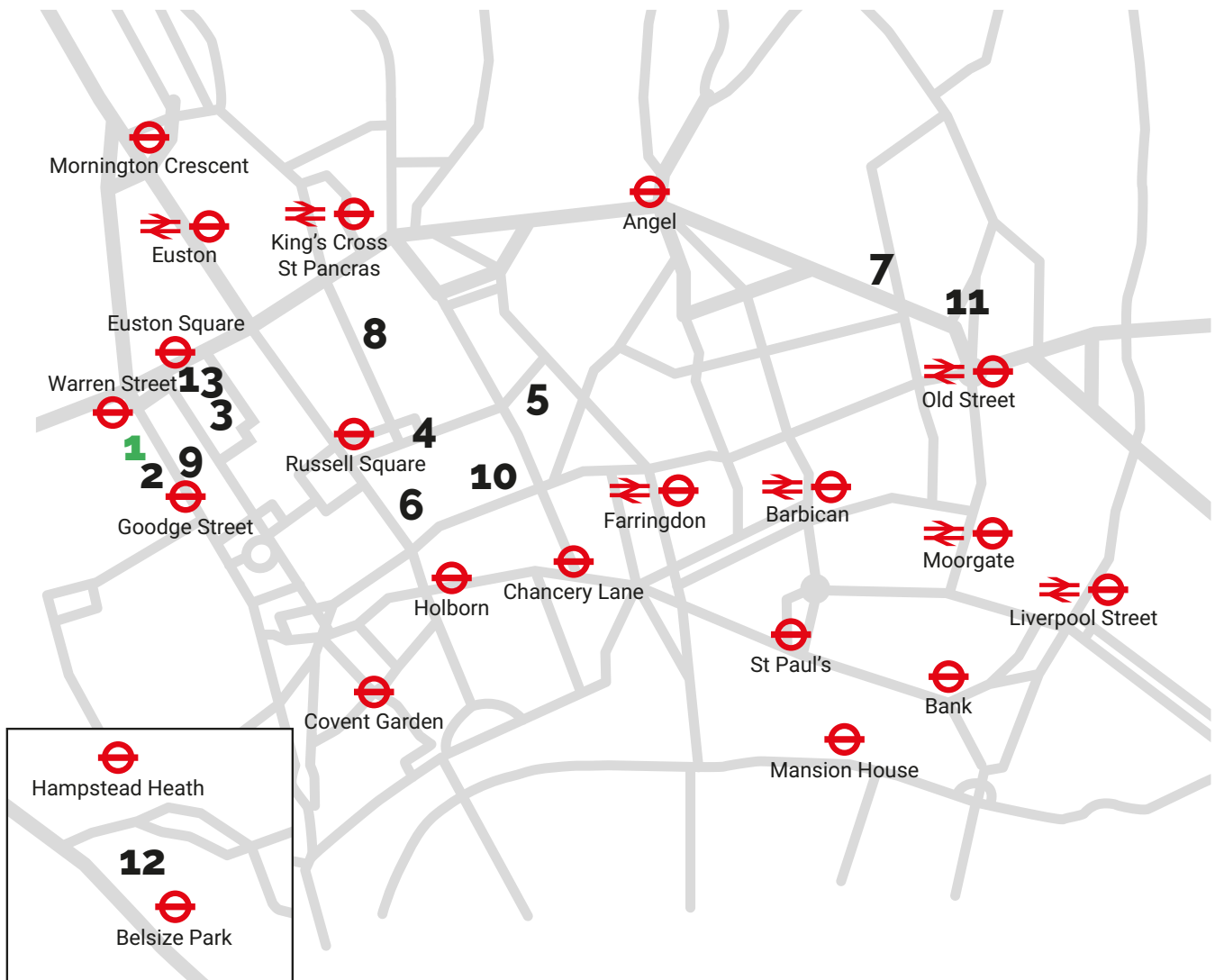
F	Distributions to academics and inventors
G	Distributions to UCL

2,359
1,449
<b>3,808</b>

The above figures exclude the values of investments and loans impaired during the year.

Full sets of accounts are available from:  
H Rothera,  
Director of Finance,  
UCL Business PLC,  
97 Tottenham Court Road,  
London,  
W1T 4TP.

# FIND OUT MORE




## Locations


1. **UCL Business PLC** & UCL Consultants
2. UCL Innovation and Enterprise
3. University College London (UCL)
4. UCL Institute of Child Health
5. UCL Eastman Dental Institute
6. UCL Institute of Neurology
7. UCL Institute of Ophthalmology
8. UCL School of Pharmacy

## Partner Hospitals

9. UCL Partners
10. Great Ormond Street Hospital for Children
11. Moorfields Eye Hospital
12. Royal Free London
13. University College London Hospitals

## CONTACT DETAILS –

 +44 (0)20 7679 9000

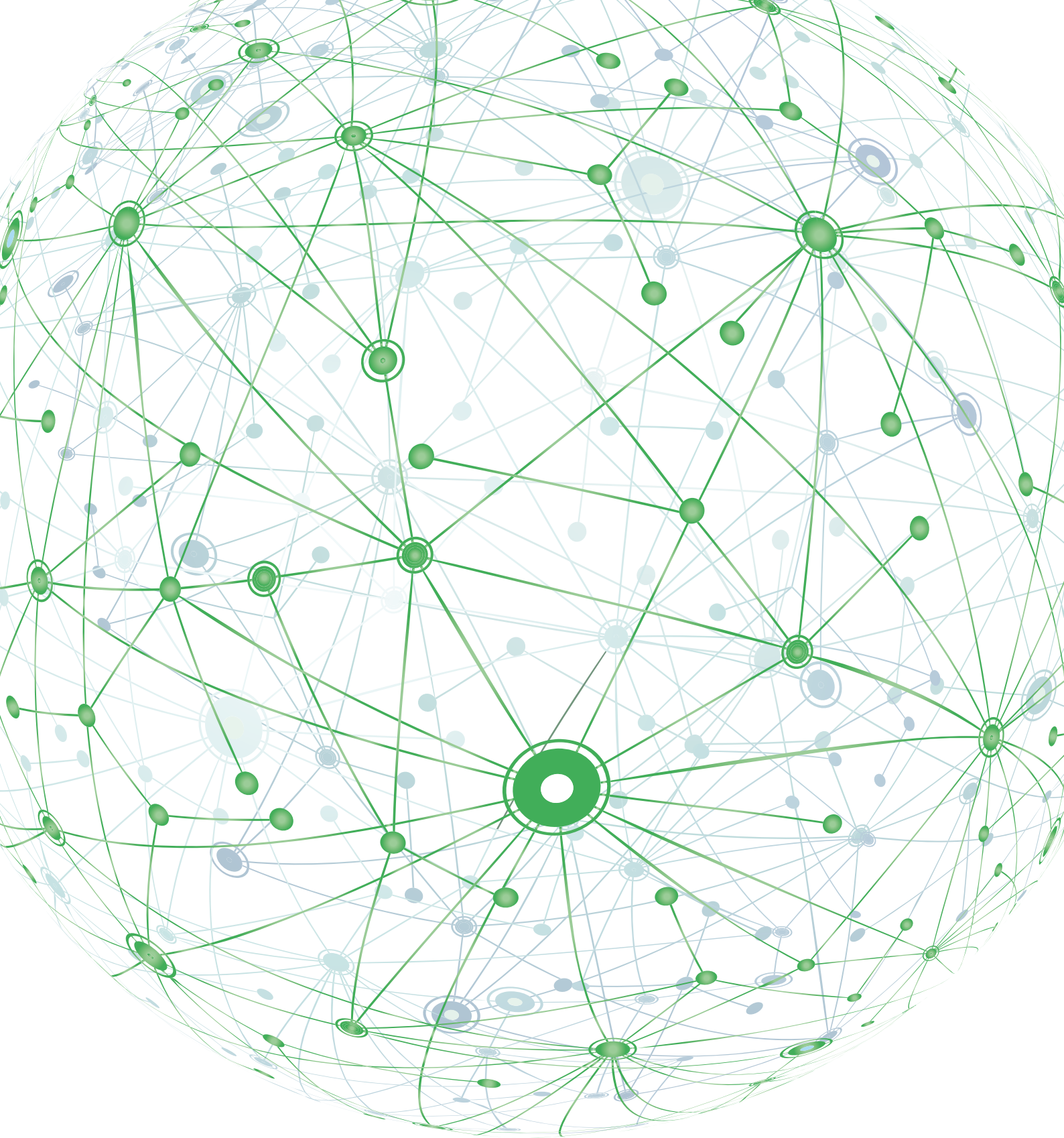
 +44 (0)20 7679 9838

 [marketing@uclb.com](mailto:marketing@uclb.com)



## UCL Business PLC

The Network Building  
97 Tottenham Court Road  
London W1T 4TP  
[www.uclb.com](http://www.uclb.com)



**UCL Business PLC**

T. +44 (0)20 7679 9000

F. +44 (0)20 7679 9838

E. [info@uclb.com](mailto:info@uclb.com)

[www.uclb.com](http://www.uclb.com)

Registered in England and Wales No. 02776963