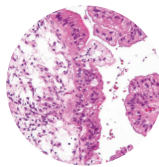


TVG



Cambridge Raman



Nandi Proteins



Elute Intelligence



Pulsiv Solar

news from the frontier

October 2020

2020
to date

February

Cambridge Raman wins EUR140,000 EU grant

March

TVG starts COVID 19 research and announces strong progress
AqualnSilico spins out
Elute Intelligence launches COVID 19 reader

April

Excscientia AI COVID 19 work with Diamond Light Source and Scripps Research

May

Molendotech raises £425,000
Excscientia raises \$60m and enters SRI collaboration

June

Frontier IP collaboration with Cambridge to tackle gum disease
TVG announces strong progress on COVID 19

July

Fieldwork announces Bosch collaboration
Celerum supports development for PlanSea
Pulsiv progress update
AqualnSilico wins EU grant to commercialise software
Cambridge Raman Imaging completes £250,000 fundraising
Frontier IP raises £2.3m

August

UK government Future Fund invests £250,000 in Pulsiv

September

Elute Patent Reader launched
Fieldwork wins Innovate UK continuity grant
UK government Future Fund invests £360,000 in Nandi Proteins
Fieldwork announces Bonduelle Collaboration.

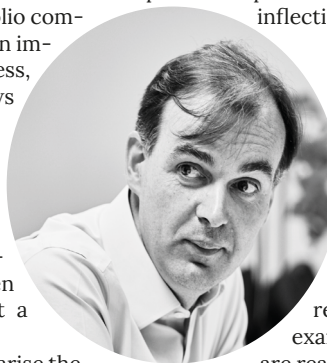
REFLECTIONS ON INFLECTION: A WELCOME FROM NEIL

Welcome to the first of our quarterly newsletters where we are as a business, particularly as several intended to keep you abreast of the latest developments of our portfolio companies are now reaching their inflection points.

To us, strong news flow is an important indicator of strong progress, and, over the past year, our news flow has picked up significantly.

Equally important, the news itself is more momentous: equity fund raisings are bigger and more frequent; there has been a step up in quantity and quality of the industrial collaborations achieved. Given this weight of news, we thought a regular update would be useful.

The aim is to round up and summarise the key events and to provide further context about



Inflection points

Inflection points mark significant and favourable changes in a company's progress. Companies can experience several as they mature: inflection points can be industrial, such as when a technology steps outside the lab and starts to gain commercial traction, or financial, when recognised via investment rounds, for example, or an IPO. When these points are reached, we will review our options and strive to build value for all our stakeholders.

BONDUELLE AND BOSCH COLLABORATE WITH FIELDWORK

Fieldwork Robotics has won strong industry interest in its flexible fruit and vegetable harvesting robot technology. It signed collaboration agreements with two world leaders in their respective fields – Bonduelle and Bosch.

The company is to start work on a cauliflower harvesting robot as part of a three-year project with Bonduelle. Bonduelle is one of the world's largest vegetable producers with operations in more than 100 countries. It will provide specialist crop expertise and access to facilities. The move follows extensive work already undertaken by Fieldwork with one of the UK's biggest soft fruit growers on a raspberry harvesting version of the robot.

The company is the second in our portfolio after Pulsiv Solar to announce a collaboration with Bosch. Bosch will be optimising Fieldwork's robot arm technology and software to increase picking speed and reduce cost.

Fieldwork completed its first equity funding round at the start of this year, raising a total of £316,000, to accelerate development and scale up of its technology. Innovate UK has also supported the company with grant funding.

COVID-19 has heightened interest in automated crop picking and the Bonduelle relationship shows the technology's multi-crop potential.



THE VACCINE GROUP'S COVID-19 AND OTHER VACCINES ARE MAKING STRONG PROGRESS

The Vaccine Group has made significant progress this year in developing vaccines to tackle COVID-19. The first three candidates have now moved into animal trials in the US and data is expected this year. A further two prototype vaccines are also under development.

The risk from animal reservoirs of COVID-19 has not garnered much attention despite cat data and mink culling pointing to this being a real issue, aside from the origins of the disease in bats.

Vaccines and zoonotic disease prevention more widely have moved front and centre in healthcare with the COVID outbreak. Valuations have moved up as a result.

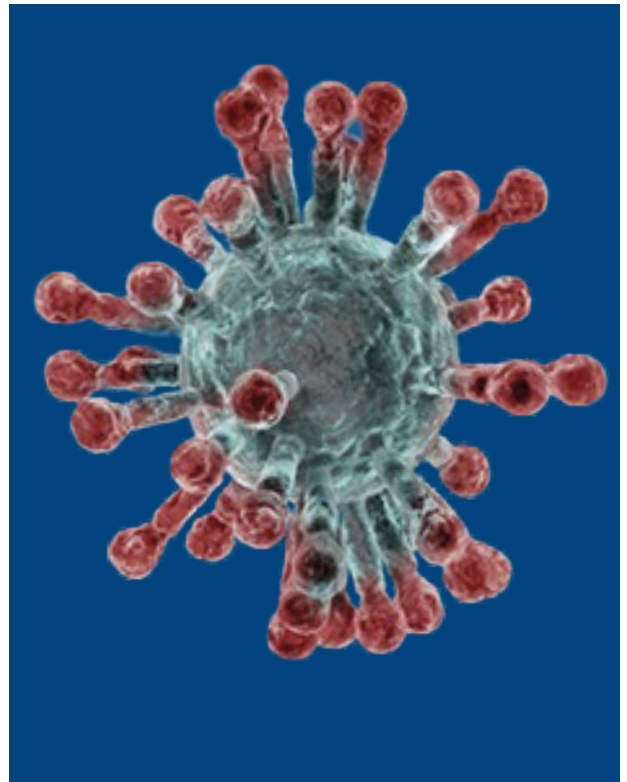
Earlier this month, it announced that it was part of an 18-month three-way collaboration with The Pirbright Institute and ECO Animal Health Group to develop a vaccine to combat porcine reproductive

and respiratory syndrome virus, a disease causing significant economic harm in pigs.

Existing projects continue to move forward too. Vaccines based on its novel herpesvirus-based platform to tackle bovine tuberculosis and African Swine Fever are now ready for animal trials. US government-funded work on vaccines for Lassa fever and Ebola is progressing well, and new IP potential has emerged from rabbit trials of a bovine mastitis vaccine.

TVG raised £680,000 in January in its first equity funding round. To date, more than £9 million in grant funding has also been awarded by the UK, US and Chinese governments to TVG and its international partners.

TVG will consider its next steps carefully based on the next phase of data, but clearly has enormous upside potential.



NANDI PROTEINS' INNOVATIVE TECHNOLOGY MOVES CLOSER TO COMMERCIALISATION

Nandi Proteins' innovative process control technology to create new protein-based ingredients to replace chemical additives, fats and other substances in food is moving closer to full commercialisation.

The technology is now ready to undergo large-scale trials in food production plants following work with several major industry partners to validate the strength of its intellectual property. If these are successful, then full commercial roll out is likely to follow.

The work has been recognised by the UK government's Future Fund, which has invested £360,000 into the company as part of a £720,000 convertible loan, with its funding matched by Nandi shareholders Frontier IP and Shackleton Finance. The money will allow Nandi to meet the commercial and technical milestones it now has to complete.

Nandi has already announced it is collaborating with Devro, a leading ingredient supplier to Kerry Foods Group.

The company is also leading an industry consortium to develop gluten replacements in bread as part of work backed by Innovate UK and the charity Coeliac UK. The project's partners include AB Mauri, the ingredients division of AB Foods, and Agrii, a subsidiary of Origin Enterprises.

Plant-based opportunities

Nandi is also exploring opportunities in plant-based foods to replace those traditionally made with meat. Many of these foods are processed and, for example, use chemical emulsifiers. Nandi's natural vegetable protein based ingredients have the potential to become replacements. The vegetarian/vegan/flexitarian market is emerging as the strongest growth segment of the food sector but will be reliant on better ingredients to fuel further expansion. This could be a major value opportunity for Nandi, and the segment is less risk averse than traditional food producers.

EXSCIENTIA BEHIND FIRST AI-CREATED DRUG TO ENTER HUMAN CLINICAL TRIALS

Exscientia achieved a major landmark for AI-driven drug discovery earlier this year when one of its candidates became the first drug created by artificial intelligence to enter human clinical trials. The move, part of a joint development with Sumitomo Dainippon Pharma, was described as a "critical milestone" by The Financial Times. The company is also helping

in the fight against COVID-19. It has teamed up with the UK's national synchrotron Diamond Light Source and Scripps Research to identify potential treatments.

A \$60 million Series C fund-raising in May was led by a new investor Novo Holdings and supported by existing shareholders Evotec, Bristol Myers Squibb and GT Healthcare.

New collaborations included an agreement worth up to EUR240 million with Bayer AG to identify potential cardiovascular and oncology treatments, and deals with SRI International focused on a high-value oncology target, and Blue Oak Pharmaceuticals.

Exscientia also appointed former Allergan Chief R&D officer Dr David Nicholson, as chairman.





MAJOR MULTINATIONAL FUNDS PULSIV TO EXPLORE POTENTIAL FOR NEW PRODUCTS

A major multinational is funding design work from Pulsiv Solar with a view to incorporating our portfolio company's technology into a new product line.

Pulsiv is also engaged in discussions with a number of other large multinational companies about a wide range of further industrial applications for its technology. This improves the energy efficiency of the power converters used in a host of everyday devices, such as televisions, mobile phones and computers.

The step up in industrial engagement follows the company successfully developing a series of demonstration products which showed the technology not only improves energy efficiency, but has the potential to reduce costs. These included an LED driver to demonstrate mains

power conversion, a power tool battery charger, and a solar microinverter for use with photovoltaic solar cells.

Bosch has already been working with Pulsiv to optimise the design of a solar microinverter.

Industrial validation has been matched by government validation: the UK government's Future Fund has invested £250,000 as part of a £500,000 convertible loan. Its funding was matched by existing Pulsiv shareholders, Frontier IP and University of Plymouth Enterprise Limited.

Future funding

The company is currently in discussions with investors to raise further funding, which, if successful, would be at a significant premium to the current book value at which it is held by the Group.

ELUTE INTELLIGENCE COMMERCIALLY LAUNCHES PATENT READER AFTER USER GROUP SUCCESS

Elute Intelligence has launched the first commercial product based on its novel software tools able to intelligently search, compare and analyse unstructured text-based information across many complex documents.

The company's technology was also demonstrated at the British Army's Warfighting Experiment, an initiative to explore emerging technologies suitable for rapid exploitation by the military.

The Elute Patent Reader allows users to identify relevant patents and understand why they are relevant within minutes of starting a search. At launch, they were able to search from more than 70 million patents in major jurisdictions, including the United States, China and the European Union.

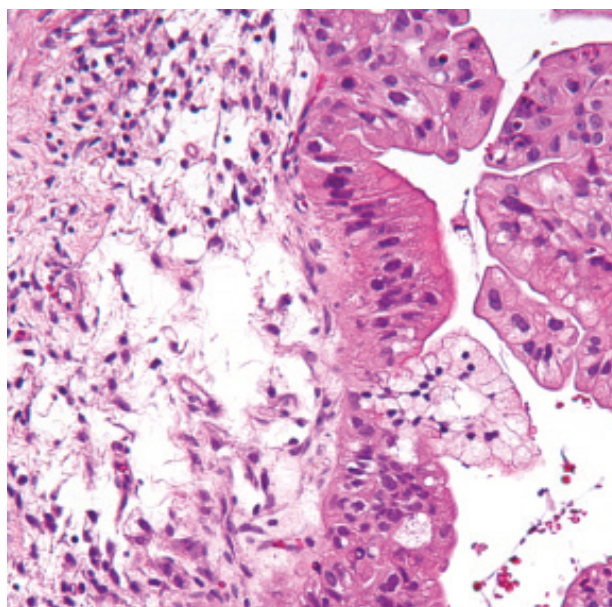
The move followed a successful pilot with a user group comprising

patent-rich multinationals, high-tech SMEs, and professional IP service providers, such as lawyers, which was established to support the software's development.

The Patent Reader is only one of many potential applications for Elute's technology.

The software tools work by mimicking the way people read, a very different approach to conventional keyword or Boolean search technologies. Elute also launched a COVID-19 document reader, available for free to researchers.

Elute was created from an existing business CFL Software and included complementary intellectual property developed by Frontier IP. Existing customers of CFL Software included universities admissions service UCAS, academic institutions, commercial researchers and lawyers.



CAMBRIDGE RAMAN RAISES £250,000 FOR ULTRAFAST GRAPHENE LASERS

Cambridge Raman Imaging successfully completed its first equity funding round, raising £250,000 from external investors to support development of its graphene-based ultrafast laser technology. It follows the award of a EUR140,000 grant earlier this year from the EU Graphene Flagship.

Initial applications for the lasers are for use in medical microscopes to diagnose and track tumours.

The microscope will generate near real time digital images of fresh tissue samples

using Raman spectroscopy to differentiate healthy and diseased tissue to show the extent of tumours, their response to treatment and to let surgeons see if a cancer has been removed.

The Politecnico di Milano has recognised the company's wholly owned Italian subsidiary as an official spin out, a move which opens up access to facilities and further funding opportunities, Ultrafast and medical lasers specialist Dr Matteo Negro has joined as Chief Technology Officer.

MOLENDOTECH'S £425,000 EQUITY FUNDING

Molendotech has stepped up development of its novel rapid testing technology for bacteria after completing a £425,000 equity fund raise in May supported by new and existing investors.

It is expanding the range of applications for the technology, developing a novel method to detect specific pathogenic bacteria, and exploring

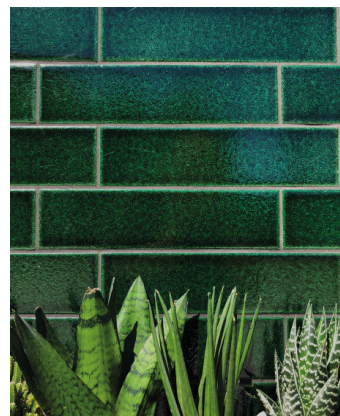
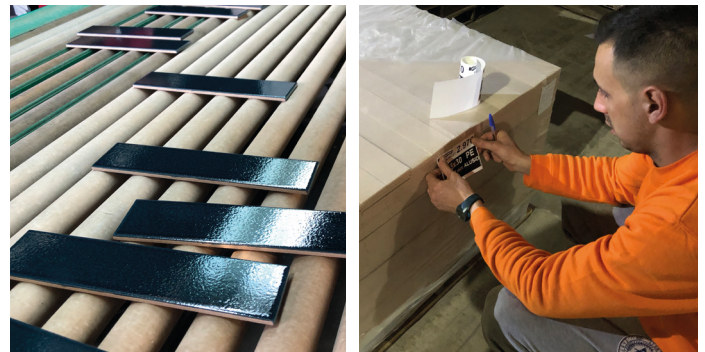
new markets, such as the food industry. A collaboration with G's Group, a leading fresh produce company, is already working on tests to detect different levels of bacteria on produce and in water.

Palintest, a subsidiary of FTSE 100 group Halma plc, has already launched a commercial kit to detect faecal bacteria in water.

ALUSID PILOTS VOLUME PRODUCTION ON INDUSTRY STANDARD EQUIPMENT

FROM 4,000M² A YEAR ...

TO 1,000M² A DAY



Left: Alusid's plant in Preston, Lancashire where the company's tiles and architectural surfaces are hand made using a batch process -- the Sequel range sold by Parkside Architectural tiles demonstrates the quality of the results.

Right: scale up to volume production; tiles being pressed, conveyed into the kiln; the glazed tiles emerging from the kiln before being packed onto a pallet

Alusid is moving towards a transformational year after successfully demonstrating that tiles based on its innovative technology can now be manufactured at volume.

The company completed a successful pilot programme earlier this year, making more than a 1,000m² of tiles in a day using industry-standard tile-making equipment, with the work funded by last year's £1.3 million fund raise.

Before the success of the pilot, the company's production capacity was previously limited to 4,000m² a year at its Preston facility, where tiles were hand made using a batch process.

The move to volume manufacturing gives a clear opportunity to scale the company up and added distribution should see rapid acceleration in

growth. Alusid is in advanced discussions with a major industry player, although progress has been slowed by the COVID-19 outbreak.

The company creates beautiful, premium quality tiles and architectural surfaces by recycling industrial waste ceramics, glass and other materials much of which would otherwise end in landfill. Tiles are made from a minimum of 95 per cent recycled content and usually contain more.

Customers include COS, part of H&M, Christian Dior, Nando's, Harrods, Selfridges, Amazon UK and Pret-a-Manger. Its Sequel range is exclusively distributed by Parkside Architectural Tiles, the commercial arm of Topps Tiles. Earlier this month, Sequel Vibe was named Wall Tile of the year in this year's prestigious awards from The Tile Association.

UNIVERSITY OF CAMBRIDGE AND FRONTIER IP COLLABORATION TO TACKLE GUM DISEASE

A collaborative project between Frontier IP and the University of Cambridge to tackle gum disease has been awarded a £52,891 grant by the National Biofilms Innovation Centre (NBIC).

The collaboration builds on the work of Dr Ioanna Mela, a Postdoctoral Research Associate at the University, into DNA nanostructures and their potential as drug delivery vehicles that can penetrate and disrupt biofilms.

Biofilms are films of microorganisms that grow on surfaces such as animal and plant tissue, minerals and metals. They include dental plaque, pond scum and many others.

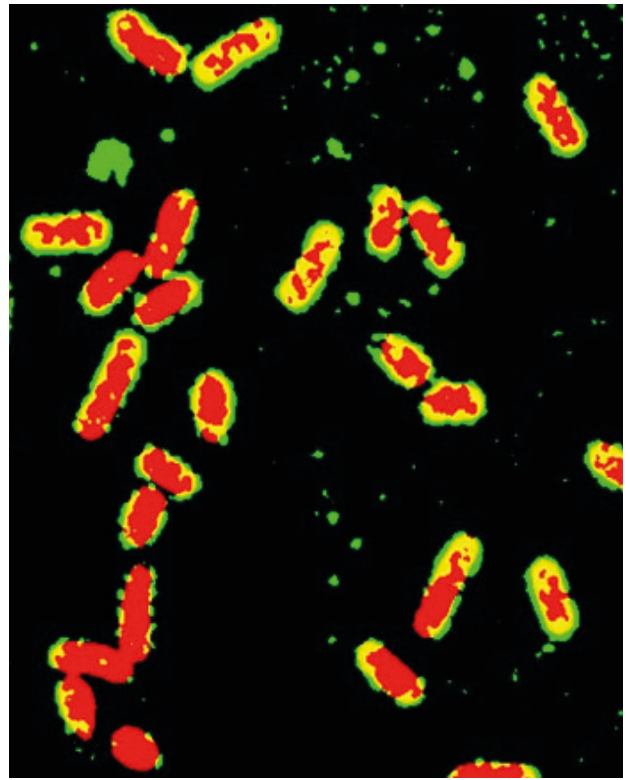
The NBIC proof of concept grant is supporting an eight-month project to explore the potential of origami-like DNA nanostructures to disrupt the dental plaque biofilms formed by *P.gingivalis*, the bacterium responsible for gum disease. The

project will also seek to identify at least one DNA nanostructure to take forward into commercial development in partnership with industry.

As part of her previous work on creating DNA nanostructures, Dr Mela identified the possibilities of DNA origami for improving the efficacy of antibiotics. This could result in lower doses of antibiotics being given and eventually hinder the potential growth of antibiotic resistance.

Frontier IP identified the potential of Dr Mela's work for use against *P.gingivalis* and the funding source, and is working on the commercialisation of the technology as part of the project. Work to date has progressed well.

The Group strongly believes in the benefits of identifying innovative technology at a very early stage to better understand and shape its commercial potential through engagement with industry partners.



NEW SPIN OUT AQUAINSILICO WINS EU EIT GRANT TO COMMERCIALISE SOFTWARE

AquaInSilico, the newest member of the Frontier IP portfolio, has been awarded a EUR60,000 grant to further develop its digital tools to optimise wastewater treatment.

The company, whose incorporation was announced in March, won the grant from the European Institute of Innovation and Technology (EIT) RawMaterials. The funding will go towards a collaboration with a leading European environmental, water and waste management group to develop more effective and environmentally friendly ways to remove phosphorus from wastewater. The recovered phosphorus can then be sold for use in fertilisers.

Current phosphorus extraction methods use chemicals to bind to the phosphorus and precipi-

tate it. However, it is difficult and expensive to break the connection between the binder and the phosphorus. AquaInSilico, a spin out from NOVA University, NOVA School of Science and Technology, designs models based on a biological approach to remove the phosphorus instead.

The technology is based on deep knowledge of biological and chemical processes and how they unfold in different operating conditions. Removing phosphorus is only one potential application; others span the oil, brewing pulp, paper, steel, food processing and waste recovery sectors. Frontier IP holds a 29 per cent equity stake in the firm.

The EIT is a body of the European Union under Horizon 2020, the EU Framework for Research and Innovation.

FRONTIER IP TAKES INSPIRATION FROM NATURE AND INCREASES STAKE IN CELERUM

Insects, fish and birds could have a major impact on how humans improve the operational efficiency of logistics and supply chains, among other complex scientific, engineering and industrial challenges.

Growing commercial interest in what is called nature-inspired computing (NIC) has led Frontier IP to increase its stake

in Celerum, a spin out from Robert Gordon University in Aberdeen, from 10 per cent to 33.8 per cent.

The company is developing software that helps companies improve their planning and scheduling, as well as responding to unforeseen events in real time. Co-founder Professor John McCall has more than 25

years' experience in NIC and developing software algorithms based on natural processes and behaviours. For example, ants are extremely good at finding the best routes to food; NIC digitally mimics how they do so to solve human problems. Other examples are based on how birds and fish behave in flocks and schools.

