Science and Engineering at work...
Current St Asaph Business Park Opto Electronics & Photonics Cluster…. Still going strong
The OpTIC Technology Centre

Incubation Centre

Technology Centre
and R&D

Business Centre

Approx 120 employees
3 Business Groups commercially operated independent facility

- University owned commercial entity Glyndwr Innovations Ltd.
  - Business and Conference Centre
  - Incubation Centre
  - Own in house, commercially focused technical support team
    - Engineering Design, Optical component fabrication, Metrology and assembly facilities
Business Centre

28,000+ Visitors / Year

• Conference Room
• Boardroom
• Meeting Rooms
• ‘The Street’

A business focused venue for up to 120 delegates. Suitable for seminars, exhibitions, training courses, international conferences etc.

Our on-site restaurant can provide a full catering service
Incubation Centre

24 Units – Office / Laboratory
Shared Office Desks
Virtual Offices
Focused on technology/innovation

Business Support & Funding
Finance Wales Regional Office
18 companies
Low risk/all inclusive
Some Statistics....

• The OpTIC centre is the place of work for 142 people
• 41 of 50 past companies incubated within OpTIC are still in business (82%)
• 5 successful companies spun out into immediate local area (~70 tech jobs)
• Research groups of 4 Universities on site –
  – Swansea University
  – Huddersfield University
  – Cardiff University
  – Glyndwr University
• Fully commercially self funded as an SME
How it works....
A TECHNOLOGY company is playing a major role in the fight against cancer and aims to crack a drugs market worth £11bn.

ADC Biotechnology, based at Optic Glyndwr in St Asaph, is developing new methods to speed up, simplify and significantly lower the production costs for some of the latest anticancer drugs—termed Antibody-Drug Conjugates (ADCs).

The aim is to increase the affordability of ADCs so more patients can access potentially life-changing treatments.

The firm has invested more than £1.1m into expanding its laboratory operation at the Denbighshire science facility and taken on two new staff to increase its technical team to six.

As a result, its bosses say St Asaph is now a ‘key battleground’ in the fight against the killer disease.

ADC Bio's patented 'Lock-Release' technology results in fast and robust conjugation and drug purification processes, and following two rounds of funding totalling more than £5m, they are confident of capitalising on the ADCs market, particularly in the US.

Often described as ‘magic bullet’ therapy, ADCs combine the high-binding specificity of an antibody with ultra-toxic drug payloads targeted to the antibody through a linker group.

The system acts as a targeting system for tumour-specific antigens, delivering the drug specifically to cancer cells before entering and degrading internally, resulting in cell death.

The impact on healthy cells is minimised and patients experience fewer side effects.

With combined annual sales and production of ADCs drugs predicted to hit the £2bn mark in 2016—the anticancer drug sector is growing at a similar rate to that of the overall pharmaceutical market.

ADC Bio’s chief executive officer Charlie Johnson and his team are planning to build on momentum gained in recent years with the approval of two ADCs for Hodgkin Lymphomas (ADCs) and one of the new forms of breast cancer (Radoxyla).

Johnson said: ‘The global ADC market opportunity and the progress of ADCs has significant implications for the future of the industry. At the end of 2013, we are significantly ahead of the forecast for 2014, which is not a coincidence. It’s because of the work that ADCs have been doing for the last 15 years to develop and test ADCs in trials and provide insights into the best way to use them.

‘The number of ADCs in trials and preclinical development has dramatically increased over the past 18 months and limited capacity in the ADC space is translating into surging demand for outsourced ADC process and purification development and testing.’

‘The capabilities include specialist protein handling, HPLC, ELISA and flow cytometry, along with development and scale-up of the ADC space.'
A BUSINESS has developed "world-leading" technology that will transform the renewable energy sector.

Acuity Products, based at Glyndwr University's OpTIC Centre in St Asaph, produces innovative ultrasound equipment which monitors the manufacture of underwater power cables used on windfarms.

Commercial director Tony Hepton says the "explosive growth" of the industry in the region is bringing major benefits, not only in terms of jobs for offshore contractors but for smaller firms in the supply chain.

At a cost of £1m per kilometre, the cables will remain on the seabed for up to 25 years. Electrical failures or damage run to several millions of pounds in cost to repair, so assuring their condition prior to deployment is vital.

Acuity - which also has an office in Manchester - has come up with a way of resolving the issue. Ultrasound uses the team's years of knowledge and expertise in the military and medical arenas to convert electrical signals extracted from algorithms that pass on information about the health status of the cable layers during manufacture.

"Ensuring the quality of the cable before it goes into the water requires expertise of the highest order," said Tony, from Rhyl.

"We have developed a world-leading solution for using ultrasound technology to monitor the hugely expensive power cables as they are being made in factories throughout Europe, the USA and Asia."

"They have to lie on the seabed for up to 25 years without an electrical failure, since the cost of lifting them out of the water using ships hired in especially to repair them can run to many millions of pounds for even the simplest repair, so this is a critical part of the process."

He added: "In terms of UK projects such as the East-West connector between Ireland and North Wales, we have been instrumental in scanning these cables looking for fundamental weaknesses in construction."

"You might liken it to a pregnancy - today it is highly unlikely for any woman not to attend her 12 week scan just to assure herself that all is going well. Our hope is that one day all cables will be made this way."

Commercial director Tony Hepton was formed in 2008 to bring together the expertise of the various founders in order to commercialise a unique, novel and effective approach to detecting micron level flaws in high voltage electrical cable.

"The offshore wind sector is booming as renewable energy becomes more and more of a factor in the UK and across the globe. We look forward to playing a part in that growth."
St Asaph firm aims to make flexible smartphone screens

Chris Kelsey talks to Steve Kelly, the chief executive of St Asaph-based technology company SmartKem

Steve Kelly founded advanced technology company SmartKem in 2008, and he is building on his own experience of working in the field of material science, based in various parts of the UK, including Scotland.

His background is in building teams and bringing new technology to market. Several colleagues joined the company early on to help develop the organic material technology, which has applications in consumer electronics, particularly smartphones. The second benefit, Mr Kelly says, is that "you can make the screens from this very light, soft plastic, it's not just unbreakable but allows for a larger battery and extended battery life."

Mr Kelly is looking towards commercialisation of the product within two to three years. SmartKem, he says, is currently at the early revenue stage, with some revenues coming into the business from development agreements with manufacturers based in Asia. "It's a great goal for the people who sell phones to have a smartphone that is easier to cover with a one-week battery life," he said.

"We anticipate that with the first generation of this technology we will get a doubling of battery life. The screen is the biggest drain on the battery, so if the screen draws less power the battery life is longer."

"We work with an eco-system of partners, including two fabrication partners in China. This allows us to make prototypes, organic thin-film transistors. We make them and test them here and then take them to Asia.

"We're a materials-based company. What we do is develop the materials and electronics and make them ready for the market. The story is the recipe to our customers in Asia."

"Mr Kelly says he has a two to three-year target for commercialisation. "The president of Samsung electronics has forecast that flexible displays will be the engine of growth for 2020.

"In short, all consumer mobile devices will use flexible displays. That's one billion smartphone, so it's no niche market but a mainstream one. It's intended to be a mainstream manufacturing platform for their consumer products."

"The technology enables us to make screens cost the global economy £15m every year."

"The company has 14 staff, mostly on the payroll but including a few consultants. The workforce includes nine "very talented PhD students," Mr Kelly says. He was attracted to setting up the business at the Optic Technicum in St Asaph.

St Asaph is a very strong activity," he said. "If you have to be a technology centre of excellence for Europe, the UK and perhaps beyond, you have to be an international company."

SmartKem's ownership is currently shared between Finance Wales and Mr Kelly's family. Born in Lincolnshire, Mr Kelly, 49, spends much of his time attending to customers and investors in Asia. Of possible exit strategies, he says he will make a decision when the company is at "significant revenue potential."

Although his work is with smartphones, he admits to switching his off at weekends when he takes time out to relax with his young family.
MC DIAGNOSTICS LTD

• Incorporated June 2006
• 3 owner directors each investing £100,000
• SMARTCymru award of £130,000
• Business angel funding totaling £250,000 during a 4 year development period.
• The business was to develop and license a new automated molecular biology platform targeted at tissue matching for transplantation, with the first licensee already identified.
Progress

• 4 people involved in the initial development phase
• Prototype instrument and test kits made within 2 years
• First product to market 2010 with CE marking
• Headcount started to increase from 4 to 13 over the next 6 years.
Progress

- Initial space requirement for development 500sq ft.
- Increase in space requirement to 1000ft as manufacturing began
- Further increases in manufacturing capacity has doubled size to 2000ft.
- The OpTIC model of 500ft units available on short term lease enabled relatively low risk expansion – as and when needed rather than 3 to 5 years in advance, making it cost effective – and cash effective.
Current situation

• We have a profitable, cash generating small organization with approx. £2m pa turnover, which is debt free.

• We have licensed two other applications of the technology which will come to market 2017/18 and will drive further growth either through the manufacturing operation or via royalties on worldwide sales.
"OpTIC is an excellent incubation facility and provides a thriving environment for young technology companies to grow according to their needs. One of the main advantages of OpTIC is that a wide range of support facilities are easily available in one location, allowing companies the chance to use them when required and reducing the difficulties which face all small businesses in meeting rapidly-changing demands. The working atmosphere at OpTIC is collegiate and relaxed which fosters good inter-company contacts between the resident companies. LML certainly benefited from being in OpTIC in the first few years of our operation."

Dr. Nadeem Rizvi, Managing Director, Laser Micromachining Limited

I would highly recommend start-up companies to locate their business at OpTIC. I did consider renting space elsewhere but when all associated costs are taken into account OpTIC is good value for money, there is only one monthly bill and I can concentrate on my business. Another advantage is that you only pay for the space you need and our footprint has expanded in line with business needs. Furthermore, the fact that there is no lengthy lease to sign up to made all the difference to me as an SME.

The premier location and facilities are superb, restaurant, reception, goods in/out and you can never underestimate the benefits of interacting with like minded people. Basically it’s a great place for new and growing businesses!

Peter Maguire, Managing Director, MC Diagnostics
UPS2 Drum Diamond Turning (IKC to SME)
SPACE RACE

Uni scientists win battle to make optic for the world’s biggest telescope

Giant eye on the sky... Uni scientists win battle to make optic for the world’s biggest telescope

Project Manager Tony Fox-Leonard said: "The specifications for the E-ELT primary mirror segments issued by ESO were demanding on the impossible. The technical challenge of developing such optics was a significant achievement for the optical manufacturing industry of the UK."

He added: "The specifications for the E-ELT primary mirror segments issued by ESO were demanding on the impossible. The technical challenge of developing such optics was a significant achievement for the optical manufacturing industry of the UK."

The additional requirement to manufacture hundreds of such optics over a timescale of 10 months, is a reassessment of how large optics will be manufactured. It is a truly defining moment and a testament to the University’s position as a leader in science, engineering and research."

"I would like to extend my thanks to all my colleagues at ESO and the University for their support in making this project possible," he said.

The University of St Andrews is one of the leading universities in the world and is renowned for its world-class facilities and research. The University’s expertise in optical science and technology is widely recognised, and it has a long history of collaboration with the European Southern Observatory (ESO)."
Introduction

• Glyndŵr Innovations is a wholly owned subsidiary of Wrexham Glyndwr University
• The **Precision Optical Systems Group** at GIL formed following the successful delivery of ESO-ELT prototype segments
• The group offers optical system design, fabrication of large precision optics and associated opto-mechanical design services.
Precision Optical Systems

• Three core capabilities offered commercially both externally and to incubator clients

precision polishing  surface metrology  engineering design
Engineering Design Support services

- Specialist Engineering Team –
- Offering Support Services in -
  - Mechanical Design
  - Opto-Mechanical Design
  - FE analysis
  - Optical and mechanical systems integration
Optical Systems – Design to manufacture example

- Design of complete systems from concept to finish
  - Concept
  - Optical Design
  - Structure and mounts
  - FE and Thermal analysis
  - Actuation
  - Build
  - Test

- Application
System build and Integration

On site team to support clients engineering design, build and integration requirements

- Offer a system design and build service to incubating companies and industry
- Experience in handling and mounting of optics and integration of optics into assemblies
- Knowledge of build and commissioning of systems
Metrology

- Team with > 60 years of cumulative experience in system design and optical metrology
- Fully equipped metrology lab
- Bespoke instruments for large optics
- Bespoke software for stitching interferometry and non-contact profilometry
Specialised Environment facilities

- Access to clean room facilities on demand
- Experience in clean integration of large optics for cryogenic application
Examples of industrial Projects

JPAS Camera Plano-Convex window
680mm plano-convex entrance window for the JPCAM, the large 1,200 Mega-pixel cryogenic camera, for the J-PAS Telescope.

In addition to the high precision polishing and wide-spectrum coating, the window was required to be integrated into its cryogenic frame in a cleanroom environment and verification of its compliance to the challenging vacuum and leak testing criteria.

Ultra-Lightweight Ground Imaging telescope

The team has designed and built a complete ultra-lightweight special purpose telescope for an airborne ground observation system used on a HAPS UAV.

The project required the opto-mechanical design of a lightweight structure including the use of composites and other lightweight materials. It also required the design and fabrication of lightweight optics.

The instrument is designed to withstand a wide temperature variation.

Prototyping included assembly, alignment and both performance and survival testing of the instrument over its specified environmental envelope.
Why Incubator Facilities Work?

- Business support for Technical personnel
  - A great idea doesn’t run a business
- Large company feel/environment
- Expensive technical facilities on hand
- Grant funding streams and investment partner contacts
- Multi Sector interaction and peer support
Future Plans

• Center for Photonics Expertise (CPE)
  – Potential WEFO funded project currently in BP stage

• UKSA Incubator program –
  – Looking to increase this area of activity in phase 2 of this round

• “Gwiliwr” – HAPS platform telescope system
  – Marketing, Product launch and manufacture
Centre for Photonics Expertise (CPE)
Ultra lightweight high altitude ground Imaging systems

Current application for phase 2a funding with partners Qinetiq and Airbus...
A flagship Business Innovation facility offering a range of services to local businesses.

- Part of the global Fab Lab network;
- Provides access to technical and academic expertise;
- Access to cutting edge equipment and training, e.g. rapid prototyping, additive manufacturing (3D printing);
- Home to the pioneering Enterprise by Design programme;
- University Graduate Start Up support delivered here;
- Fab Fridays scheme
• Opening Academic year 2017/18
• Expected to create 700 jobs and bring together hi-tech industry and scientific research partnerships in the low carbon, energy, environment and ICT sectors.
• **M-SParc** will provide space for businesses of all sizes, from start-ups to large corporate companies.
• Facilities will include laboratories, incubation and grow on space as well as an Open Innovation area.
• Virtual tenancies available in the run up to the opening of the building.
Discussion Points

Qu. 1 – What are the top 5 challenges in attracting new client?

Qu. 2 - List the top 5 barriers to incubating businesses success?

Qu. 3 – What are the top 5 move on challenges facing growing businesses?