CSconnected: Careers Conference

26th April 2023
10:00am - 12:30pm
USW, Cardiff

csconnected.com

The event is designed for delegates whose roles include providing skills and employment support and career advice.
With speakers and panelists from our industry, education, training and skills partners; the intention of the conference is to equip attendees with the required knowledge to guide and steer people into semiconductor related career paths.

Outline Agenda:

- 10:30 am Opening Welcome - CSconnected
- 10:45 am Industry Session - Industry partners based in Wales
- 11:10 am Education Session - Further and Higher Education partners
- 11:30 am Stem Outreach - CSA Catapult
- 11:40 am Q&A Panel - Your opportunity to speak!
- 12:15 pm Wrap up & Closing Remarks
- 12:30 pm Close

connected · Gyrfa Cymru Careers Wales · Llywodraeth Cymru Welsh Government · Working Wales #changeyourstory

ABOUT THE INDUSTRY

WHAT ARE COMPOUND SEMICONDUCTORS

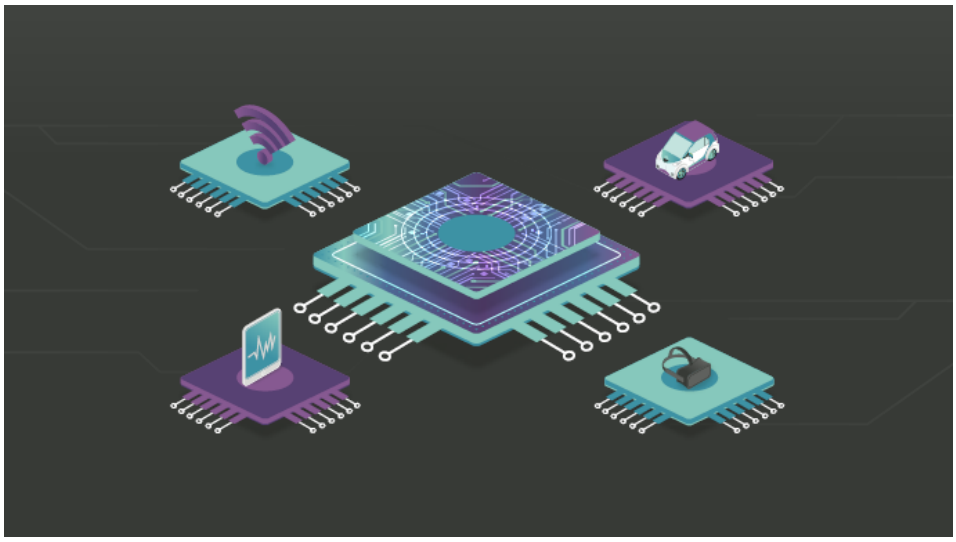
You may be more familiar with Silicon which has been the backbone of the electronics revolution from the 1960s. Being a single element from the periodic table, Silicon has a limited set of properties. CS have superior properties to Silicon enabling many new and innovative technologies and devices such as:

- Power (power electronics for electric vehicles)
- Speed (radio frequency for 5G and RADAR)
- Light (photonics for optical fibre communications)

Compound semiconductors are a complex combination of different elements from the periodic table each with unique properties such as Indium (In), Gallium (Ga), Aluminium (Al), Nitrogen (N), Arsenic (As) and Phosphorous (P).

COMPOUND SEMICONDUCTORS ARE EVERYWHERE

Compound Semiconductors are essential materials to modern and novel technologies such as 5G, driverless cars, the Internet of Things (IoT), Artificial Intelligence (AI).



OUR IMPACT

NEW ENTITY IN THE REGION

Siemens established a Power Electronics Innovation Hub at CSA Catapult in Newport, Wales

STRENGTHENING SUPPLY CHAIN

40% growth in UK supply chain at KLA in 2022

IN NUMBERS

$1B

The Cluster represents private & public investment of around $1B

2,400

Cluster organisations train and support more than 2,400 highly skilled semiconductor specialists

$600M

Cluster organisations contribute more than $250M to the Welsh economy with annual sales of $600M

Source: Annual Report: Compound Semiconductor Cluster in South Wales (published by the Welsh Economy Research Unit)

LEVERAGING CUTTING-EDGE FACILITIES

Expansion: New KLA facility underway to include 25,000 sq ft of R&D cleanrooms in Newport, Wales

New CS fab facility at ICS, Cardiff University including 1,500 m2 cleanroom with dedicated end-to-end processing of CS wafers up to 8-inches in diameter

Construction of new centre for integrative semiconductor manufacturing (CISM) at Swansea University, comprising more than 4,000m2 clean room, research and office facilities

R&D ACTIVITIES

200mm (8”) VCSEL epiwafer

IQE has developed the world's first 200mm (8”) VCSEL epiwafer, supported by CSconnected SIPF

3-J solar cell fabrication process

MicroLink successfully demonstrated 3-J solar cell fabrication process in Wales, supported by CSconnected SIPF

Young People are Vital in Securing Wales' Success in the Tech Industry

Business News Wales interviewed Chris Meadows, Director of CSconnected, to discuss the importance of skills in the semiconductor sector.

Chris Meadows is the director of CSconnected, the world's first compound semiconductor cluster which is based in Wales. Following a childhood passion for technology, Chris secured an apprenticeship at BT which paved the way for his successful career.

Now, a leader in his field, he talks about why getting young people into the sector is essential to securing Wales' economic progress and how the Welsh Government's Young Person's Guarantee has an important part to play.

Wales' position as a global competitor in compound semiconductors has CSconnected thinking strategically about how it can introduce young people into the sector and future-proof its businesses.

Chris reminisces about his own introduction to the industry, explaining: "I came into the sector as a young person myself. I was a Graduate Apprentice at BT's global research and development headquarters, gaining experience in areas including semiconductor technologies, which ignited my passion and laid the foundations for where I am today. I was really excited to be at the forefront of this emerging technology."

Chris is passionate about semiconductors and their role in advancing Wales' economy. He says:

"I can't think of any other industry which has made such a rapid advancement over the past 50 years. Globally, it's already a $500 billion a year industry, which is forecast to grow to a trillion by 2035.

"With ongoing technological advancements surpassing the practical capacities of silicon semiconductors, new materials that operate similarly, but have much higher levels of performance are in demand. In Wales, we had companies that were already creating this. We realised that such concentrated expertise in designing and producing these compound semiconductors was something unique to Wales that didn't exist anywhere else in the world.

"Wales' reputation for compound semiconductor technology is very strong. For a relatively small nation, we're well represented in the sector and are well-known at international conferences because of our global market production."

Chris emphasises the importance of training and employing young people in order to capitalise on this success and continue growing the sector in Wales.

"It's never been more important to give young people opportunities to enter our industry, which is why we're supporting the Welsh Government's Young Persons Guarantee by working with colleges and universities to develop courses which build that knowledge and boost an interest in our work.

"In Wales, we have many career and educational pathways including apprenticeships, BTEC courses and graduate programmes, including master's degrees and doctoral training in compound semiconductors.

"There are jobs out there, and within the cluster expansions are happening. There are more than 2,000 in Wales currently employed in semiconductors, but this will likely increase to 5,000 over the next five years. There are so many exciting roles within the high-tech sector that enables gaming, automotive and healthcare technologies – it's in everything.

"We need more young people to enter the industry. Because it's such a growing sector, there is a need for enthusiasm and fresh ideas to build on what we already have. Many of the companies within the cluster are already involved in apprenticeship programmes, internships, work experience and looking at recruiting locally. We have a large number of graduates within the cluster organisations too."

The cluster also has a rich history of recruiting talented young people and upskilling from within to form sustainable organisations.

Chris says, *"I know of many people who joined our industry 20-30 years ago who are now members of the senior management teams in these companies. We are a world leader in the area of a high-tech product, and we want to maintain that position for the next few decades. We need to make sure that young people are coming in to keep that momentum going."*

As part of Welsh Government's Young Person's Guarantee, Business Wales Recruit and Train offers a wide range of support to help employers create opportunities for young people and adults to enter the workplace, including Apprenticeships and Jobs Growth Wales+.

Visit https://businesswales.gov.wales/skillsgateway/ to find out more.

Coleg Penybont
Bridgend College

About us

Bridgend College is a Further Education (FE) College supporting more than 7,500 students and employing over 750 members of staff across our four campuses in Bridgend, Pencoed, Queens Road and Maesteg.

From small beginnings in 1923, we have grown to become a large education provider and major employer in the area, offering an extensive range of courses across a number of vocational areas and levels.

Our courses range from GCSEs to Honours Degrees and we offer part-time and full time study opportunities, as well as short hobby and leisure courses through our Community College. We offer a portfolio of higher education programmes, working in partnership with Cardiff Metropolitan University and as a collaborative partner of the University of South Wales. We also offer higher education courses awarded by Pearson and CPCAB.

We work closely with businesses and employers. We want businesses to thrive in a buoyant, resilient local economy, and be able to access quality talent pipelines right on their doorstep. Our bespoke training and flexible opportunities can help organisations drive economic success and achieve growth.

Contact: Debra Watkins - Careers & Employment Coach
Email: djwatkins@bridgend.ac.uk

www.cymoedd.ac.uk

eal Part of the Enginuity Group

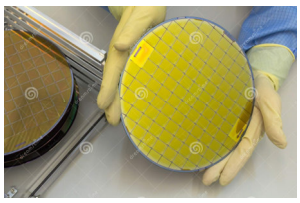
Pearson BTEC

City & Guilds

MAKE uk The Manufacturers' Organisation

Cardiff and Vale College
Coleg Caerdydd a'r Fro

Cardiff & Vale College supporting the Compound Semiconductor Sector as one of our priority sectors



As the largest college group in Wales and in the top 5 in the UK we support approximately 33k learners and apprentices

Learners follow a range of practical and theory sessions in the College's industry specific workshops working alongside qualified and experienced staff to gain industry recognised qualifications

Courses are designed to meet the need of employers and covers a wide range of disciplines including:

- Electrical / Electronic Engineering
- Mechanical Engineering and
- Advanced Manufacturing / Automation and Industrial Control

Courses are available from Level 2 to Level 5 including HNC/D qualifications with units designed to meet the needs of the automated semiconductor manufacturing systems and Engineering Council specification for Level 3 and 6.

As an Apprentice you will develop your job-specific skills through a combination of on the job learning and college-based training. As part of your time at work you will develop your professional skills each week, learning from experienced colleagues and through hands-on experience in the workplace. There are many exciting Engineering and Technician opportunities in the sector, such as:

- Fabrication equipment Eng. / Technician
- Assembly and test equipment Eng. / Technician
- Facilities Eng. / Technician
- Process engineering Eng. / Technician
- Calibration Eng. / Technician

City Centre Campus Dumballs Road, Cardiff Bay, CF10 5FE
Campws Canol Y Ddinas Heol Dumballs, Bae Caerdydd, CF10 5FE
www.cavc.ac.uk 02920 250 250

INVESTORS IN PEOPLE | Silver Until 2021

The College Merthyr Tydfils' Electronic Engineering

Here at The College Merthyr Tydfil we offer three different Level 3 Engineering programmes that offer progression into the world of Compound Semi-Conductors;

- Precision Engineering
- Renewable and Intelligence Engineering
- Computer Aided Engineering

Each of these programmes offer units that allow for our students to have the basic understanding of electronics and the products that rely on Compound Semi-conductors

We also offer support and guidance for students wanting apprenticeships including a day release apprenticeship for students to achieve their BTEC Level 3

Unit 40: Industrial Robot Technology

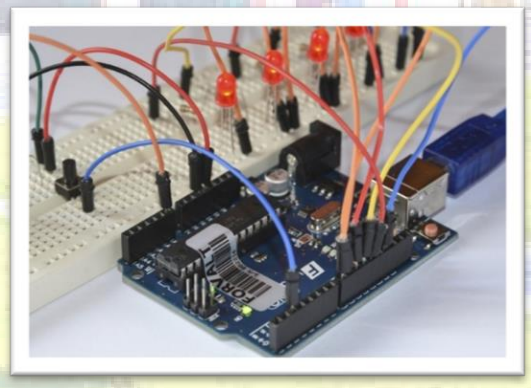
Unit 40 Focuses on the Design, Operation and programming of Industrial Robots and with Compound Semi-Conductors at the heart of these modern-day products our students are able to not only progress onto the understanding of compound semi-conductors but also the machines they control.

Unit 114: Environmental Engineering and Sustainability

Unit 114 is at the forefront of our Advanced Manufacturing department due to the Demand for the rapidly growing clean energy market. Our Students learn the entire process from life cycle analyses on all products to the programmes and attributes of Solar, Wind and Hydro. Compound semiconductors are fundamental in the generation of renewable energy and with high efficiency will significantly reduce the loss of energy in the process.

Unit 56: Electrical and Electronic Principles in Engineering

Unit 56 is what the modern world relies on. Electrical and electronic devices – from mobile telephones to jet aeroplanes, these devices have had an enormous impact on the way we live today. W ithout early engineers such as Faraday and Lenz, who studied the then new concept of electricity, many of the inventions we now take for granted would not have been developed. For learners wishing to follow an electrical/electronic programme, this unit is an essential building block that will provide the underpinning knowledge required for further study of Compound Semiconductors.



Brandon Jones 01685726414 Bjones@merthyr.ac.uk www.merthyr.ac.uk

ENGINEERING

Engineering is the practical and creative application of science and maths. Your new mobile phone and laptop? Electronic engineers had a hand in making it. The car you travel in? Automotive engineers made that possible.

Engineers are instrumental to everyday life; from the phones we use to the aeroplanes we travel in. The sector is diverse, highly skilled and well paid.

ELECTRICAL ENGINEERS IN WALES CAN EARN AN AVERAGE OF £44,700 A YEAR

PROBLEM SOLVING

Our electrical and electronic laboratories allow you to learn by designing, building, programming, and testing solutions to solve real problems. Our close links with businesses will also mean you learn the latest techniques and skills that engineering employers want.

WHAT NEXT? »

Many of our engineering learners go on to study at universities across the UK including Coleg Gwent. Whether you're wanting to study a broad context, study a specialty or want to put what you've learned into action in the workplace, Coleg Gwent will support you to make it in your chosen career.

STATE-OF-THE-ART FACILITIES

Our fantastic suite of new facilities and refurbished workshops complements our up-to-date curriculum with materials technology including; carbon fibre composites, motorsport, manufacturing, aeronautical facilities and a fleet of electric vehicles.

At Blaenau Gwent Learning Zone, you'll also find the Dennison Advanced Materials Centre (DAMC), the first of its kind in Wales.

Coleg Gwent

Please note: courses may be subject to change and cancelled if deemed not viable to run.

Established in 1965, Newport & District Group Training Association (NDGTA) is one of Wales' premier providers of apprenticeships in the engineering sector. Based in Cwmbran, we have a well-equipped training school that comprises CAD suites, mechanical, electrical, robotic and hydraulic/pneumatic workshops as well as classrooms to deliver NVQ levels 2 & 3 courses; BTEC Level 3, HNC Level 4 and HND Level 5.
NDGTA provides services, many of them bespoke, to a wide range of engineering customers amongst whom are IQE, KLA, Microchip and Nexperia.

For Further information contact Diane Purslow on 01633-833940 or by e-mail: diane.purslow@ndgta.org.uk

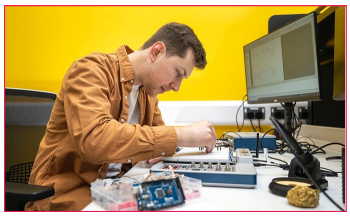
Cardiff School of Technologies

Undergraduate, Postgraduate and Degree Apprenticeships

Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

Launched in 2018, the Cardiff School of Technologies offers cutting-edge undergraduate and postgraduate degrees and research opportunities in various technology-related disciplines. Our undergraduate portfolio includes:

·Business Information Systems
·Computer Games Design and Development
·Computer Science
·Computer Security
·Computing with Creative Design
·Data Science
·Electronic and Computer Systems Engineering
·Robotics Engineering
·Software Engineering



Some of our undergraduate courses also feature pathways specifically focusing on areas including web technology, augmented and virtual reality, network security, robotics, artificial intelligence, data analytics and mobile computing. This diverse portfolio affords our learners the opportunity to specialise in key areas of interest whilst ensuring that all our graduates leave with the skills and experience necessary to embark on their chosen career paths.

We support local business and public sector organisations through our portfolio of Bachelor-level Degree Apprenticeships in Applied Data Science, Applied Cyber Security and Software Engineering.

Our postgraduate offering includes Master of Science courses in:

·Advanced Computer Science,
·Advanced Computer Security
·Data Science
·Information Technology Management
·Robotics and Artificial Intelligence
·Technology Project Management

Cardiff School of Technologies degrees are designed to prepare students and apprentices for a career shaping the future of technology. From day one, we encourage our learners to adopt a growth mindset, strengthening their ability to learn autonomously. Using ourstate-of-the-art dedicated labs, students can put theory into practice and gain the skills that they need to succeed in an evolving digital world.

CARDIFF SCHOOL OF TECHNOLOGIES
YSGOL DECHNOLEGAU CAERDYDD
CardiffMet | MetCaerdydd

The Cardiff University **Compound Semiconductor Physics MSc** has been designed to deliver thorough training and practical experience in compound semiconductor theory, fabrication, applications, and integration with silicon technology.

The programme is jointly delivered by the School of Physics and Astronomy and the Institute for Compound Semiconductors (ICS). The ICS is an exciting new development at the cutting edge of compound semiconductor technology. The Institute has been established as a founding member of the Compound Semiconductor Cluster to capitalise on the existing expertise at Cardiff University and to move academic research to a point where it can be introduced reliably and quickly into the production environment. It is a unique facility in the UK, and aims to create a global hub for compound semiconductor technology research, development and innovation.
Our flexible curriculum contains a robust set of required modules and a number of cutting-edge elective modules, which include the latest results, innovations and techniques and are designed to incorporate the most effective teaching and learning techniques.
As part of the course students will undertake a 3 month summer project which will be based either in the School of Physics and Astronomy, within the ICS, or in placement with one of our industrial partners. We have strong, long-established industrial links with companies and are therefore in a unique position to be able to offer a portfolio of theoretical, practical, fabrication and applications-centred projects in both academic and industrial placement environments.

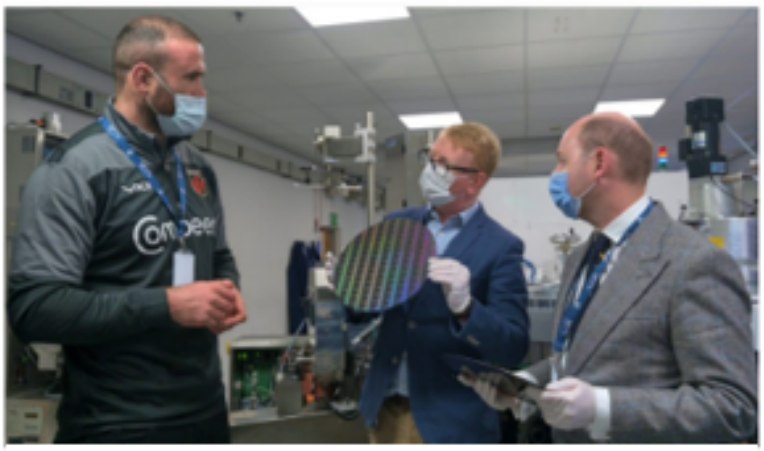
Distinctive features

- Cardiff University's unique position at the forefront of compound semiconductor technology will provide you with the opportunity to develop experience and build contacts with a range of leading companies and organisations.
- Our specialist elective modules are delivered by expert scientists, who deliver their courses based on their research expertise and current research portfolio.
- We offer a range of specialist modules that give you the opportunity to tailor the programme to suit your interests and ambitions.
- Central to the design of this programme is the opportunity to take ownership of real theoretical or practical projects. You will have acquired a full year's worth of practical research experience by the time you complete your MSc, greatly enhancing your CV and prospects for employment or further study.
- You will be trained in the practical use of the LabVIEW programming environment. Recognised by industry this will serve as a solid foundation for preparing for the National Instruments (NI) Certified LabVIEW Associate Developer (CLAD) examination.
- We currently offer the opportunity to take the CLAD examination for free as an extra-curricular activity, supported by our certified academic staff. CLAD status is industrially recognised and indicates a broad working knowledge of the LabVIEW environment.
- We encourage a "research group" atmosphere within which you'll be given the opportunity to work together, across disciplines, to enhance each other's learning and be a vital part of our thriving, international scientific community.

https://www.cardiff.ac.uk/study/postgraduate/taught/courses/course/msc-compound-semiconductor-physics

Swansea University – the place to start your career in semiconductors

Prof. Owen Guy, Centre for Integrated Semiconductor Materials (CISM), Swansea University



Jamie Roberts discusses Semiconductors with Swansea University Professors

Semiconductors are everywhere! We rely on semiconductors - they are in everything from our smartphones, kitchen appliances, and cars all the way through to the supercomputers that support our weather reporting, energy sector and countless other areas of our economy.

Semiconductors, essential components of electronic devices, are the enabling technology for mega-trends including AI; Internet-of-Things; 5G, 6G, Communications; Electric Vehicles; Quantum Computing; Cybersecurity; Consumer Electronics (smartphones, displays); High-Performance-Computing; and Power Electronics.

Wales hosts a thriving semiconductor industry, with Europe's first Compound Semiconductor cluster, which contributes $1billion annually to the Welsh economy.

Welsh semiconductor companies predict growth of 2000 jobs over the next few years in South Wales, with high skilled, well-paid jobs.

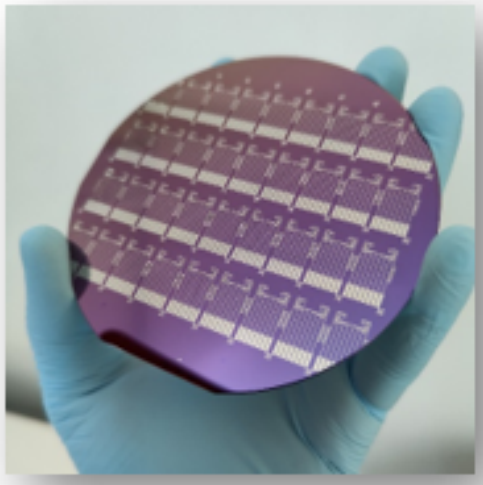
Swansea University offers the perfect start to a career in semiconductors, with related degree courses in Electrical Engineering, Physics and Chemistry.

At our brand new £50 million facility - the Centre for Integrative Semiconductor Materials (CISM) – Swansea offers semiconductor research projects and specialised short courses.

Swansea University's new CISM Facility

These practical courses teach students how to fabricate and test semiconductor devices and use the latest Virtual Reality and holographic training techniques.

Swansea University has close links with all the Compound Semiconductor Cluster companies and can help support your transition into the industry – in Wales and throughout the world!



Semiconductor chips made at Swansea University

Swansea University
Prifysgol Abertawe

University of South Wales
Prifysgol De Cymru

DEGREE APPRENTICESHIPS & NETWORK75

WORK-BASED LEARNING AT USW

USW offer a wide range of full and part time courses which are suitable for careers within the Semiconductor Industry. These courses can be viewed at **southwales.ac.uk**

Our Degree Apprenticeship and Network75 courses offer the opportunity for students to undertake a whole host of combined work and study routes within the growing Semiconductor industry such as:

Engineering
Electrical & Electronic, Semiconductor

Digital
Software Engineering, Cyber Security, and Data Science

Business
Business & Management, Logistics & Supply
Chain Management, HR, and Marketing

Accounting
Accounting & Finance

WHAT OUR STUDENTS SAY:

"I am very happy that I chose to complete the Degree Apprenticeship. The modules of the degree tied in perfectly with my work role, and completing the apprenticeship opens up a myriad of opportunities within the company."
Gareth Davies, BSc Semiconductor Technologies graduate

WHAT OUR COMPANIES SAY:

"We now have students right across the business, which is a testament to the success of the programme . It's a perfect opportunity to train the student in the specific practical skills required at the same time as they're studying the related theories at University."
Carolyn Short, SPTS Technologies

The Professional Academyis a work-based learning academic support service at the University of South Wales. We encompass Degree Apprenticeship and Network75 study routes that combine work-based learning with studying a degree qualification part time.

Visit **professionalacademy.southwales.ac.uk**for more information.

One click Then it all clicks

#openthinking

Knowledge hub

Find out more:

open.ac.uk/business/knowledge-hub

The Open University
Y Brifysgol Agored
Wales Cymru

Partneriaeth Sgiliau Prifddinas Ranbarth Caerdydd | Cardiff Capital Region Skills Partnership

The Cardiff Capital Region Skills Partnership (CCRSP) brings employers and stakeholders together across South East Wales to promote strategic and collaborative decision making.

For more information visit
www.ccrsp.co.uk

Contact us via email:
RegionalSkillsPartnership@newport.gov.uk

Mae Partneriaeth Sgiliau Prifddinas-Ranbarth Caerdydd yn dod â chyflogwyr a rhanddeiliaid at ei gilydd ledled De Ddwyrain Cymru i hyrwyddo penderfyniadau strategol a chydweithredol.

I gael rhagor o wybodaeth ewch i
www.ccrsp.co.uk

Cysylltwch â ni dros e-bost:

RegionalSkillsPartnership@newport.gov.uk

CATAPULT
Compound Semiconductor Applications

Compound Semiconductor Applications (CSA) Catapult is focused on bringing compound semiconductor applications to life in three key areas: the road to Net Zero, future telecoms and intelligent sensing. CSA Catapult is a Not for Profit organisation headquartered in South Wales. It is focused on three technology areas: Power Electronics, RF & Microwave and Photonics. As well as the three technology areas, CSA Catapult is also working in Advanced Packaging for these high-power innovations.

The next wave of emerging applications will have an enormous impact on our lives. Compound semiconductors will enable a host of new and exciting applications in the electrification of transport, clean energy, defence and security and digital communications markets.

CSA Catapult exists to help the UK compound semiconductor industry grow and collaborates across the UK and internationally. One of our key objectives is to support the industry with a steady supply of skilled labour. We do this through STEM interventions and engagement at a variety of levels. We understand that we need to inspire the next generation, demystify the world of semiconductors and compound semiconductors and educate people about the variety of well-paid careers that they could access here in Wales.

We are developing school resources for secondary school teachers which will introduce key Electronic and Electrical Engineering concepts. We host an undergraduate internship programme that is coordinated by the UK Electronics Skills Foundation, and sponsor PhD studentships. We are always happy to host school visits and can offer career insight days where learners will have an opportunity to speak with engineers, learn about the different pathways into the industry and understand the working environment. We are fortunate to have a diverse workforce – so learners are able to see that engineering is a career for everyone. Please get in touch at skills@csacatapult.org.uk for further information.

Compound semiconductors are at the core of our daily lives

IQE is the leading global supplier of compound semiconductor wafer products to the semiconductor industry enabling an intelligently connected, low carbon world

Who are IQE?

Who We Are
IQE is the leading supplier of compound semiconductor wafer products and advanced material solutions to the global semiconductor industry. IQE is essential to technology growth markets, as the only compound semiconductor epitaxy foundry with a global footprint and proven ability to manufacture at scale.

Our Vision
IQE's vision is to be the best advanced semiconductor materials solutions company in the world. Being best means delivering outstanding quality, service, technology and value such that we become the first choice supplier for all our customers.

Contact Details

www.iqep.com / www.iqep.com/careers/

TalentAcquisitionTeam@iqep.com

Strategically positioned

World's only pure play epitaxy foundry

- Unmatched global footprint
- Strategically positioned in global ecosystem

Technology and IP

- 30+ years expertise and industry know how
- Broadest scalable technology portfolio
- Forefront of compound semiconductor material innovation and trends Industry leading IP portfolio

Strategy and Markets

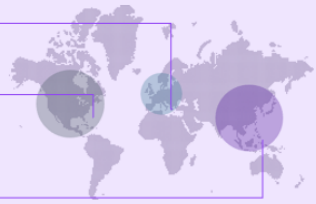
Market led and scalable operations to deliver world leading capabilities, enabling the world to **connect**, **power**, **sense** and **display** across three key verticals:

- **Smart connected devices**
- **Communications infrastructure and Security**
- **Automotive and Industrial**

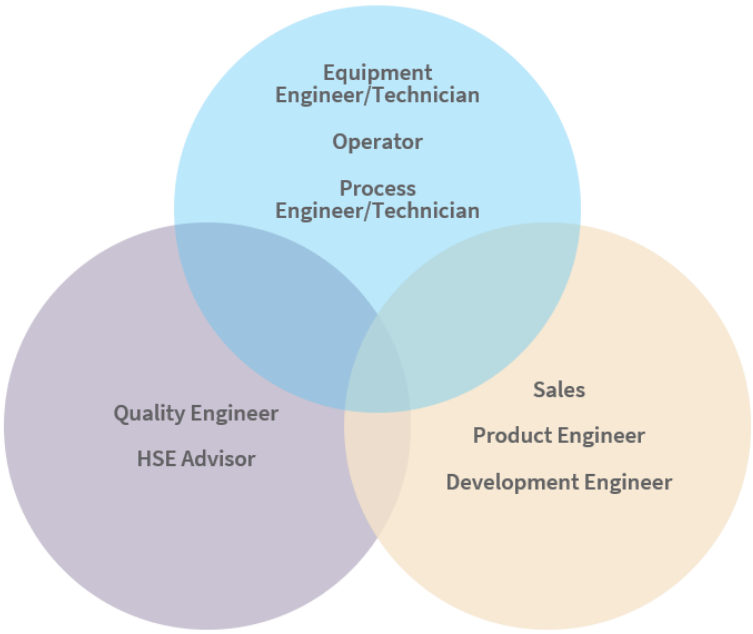
Unique international reach in industry

685 employees, operations across 3 continents

Europe	Cardiff Newport Milton Keynes
North America	Massachusetts North Carolina Pennsylvania Washington
Asia	Taiwan



STEM Role Opportunities



Skills

- Cleanroom experience
- Knowledge of MOCVD
- Epitaxy knowledge
- COSHH experience

Education

- HNC/HND in engineering
- Physics, Chemistry or Semiconductor Degree
- NEBOSH Qualification

Role Shortages

- Process Engineer
- Product Engineer
- Development Engineer

KLA is a global leader in advanced processing systems, inspection and metrology, and computational analytics.

KLA
Keep Looking Ahead

KLA Corporation (NASDAQ: KLAC)
Company Info

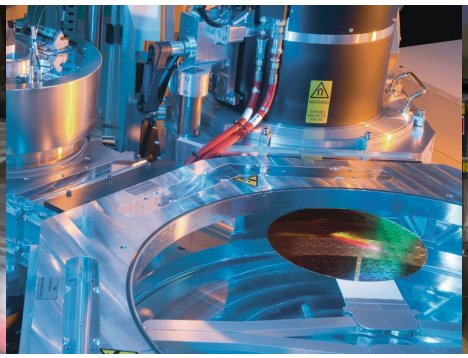
- 5th largest semiconductor equipment supplier in the world
- Sales in YE Jun 2022 = US$9.2Billion
- >12,000 employees worldwide
- ~700 employees in Newport

2020

2022 ROSPA President's Award

INVESTORS IN PEOPLE™
We invest in people Gold
Rydym yn buddsoddi mewn pobl Aur

Expanding to new 200,000sq.ft site in Imperial Park, Newport, in 2024



In Newport, South Wales, KLA manufactures processing equipment, used by our customers to turn semiconductor wafers into the chips which power and control every electronic device you own.

Early Career Options

- School work experience, college placements and internships •

Apprenticeships – electrical/mechanical (BTEC/HNC/HND)

- Network 75 scheme – business support degrees
- Graduate Development Scheme

For more details contact: Tracey.Bradley@kla.com

Microchip Caldicot delivers a competitive advantage for customers through miniaturising electronic circuits, enabling wireless connectivity and custom/complex power modules with a track record of successful designing, developing next generation miniaturised electronic modules and pioneering power modules. https://www.microchip.com/aps Microchip Technology Inc. HQ is a leading provider of smart, connected and secure embedded control solutions. The company serves more than 120,000 customers across industrial, automotive, consumer, aerospace and defence, communications and computing markets.

Flexible, Lightweight Solar Power Using Compound Semiconductors

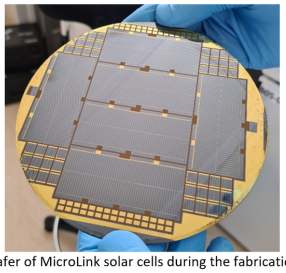
MicroLink Devices manufactures flexible, lightweight solar cells for aerospace applications. The company performs all of the processes from semiconductor wafer growth, cell processing and test right through to array assembly. MicroLink Devices UK Ltd has been set up to bring those processes to the UK, and this is what the company is currently engaged in.

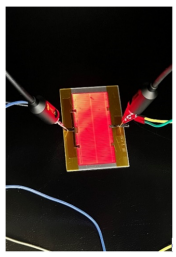
The highest efficiency photovoltaic solar cells use compound semiconductors. Silicon dominates the terrestrial market, but the higher efficiencies of compound semiconductor cells offer advantages to certain applications, typically those where weight is a factor. The MicroLink Devices solar cell not only offers the highest power-to-weight ratio but also has a flexibility lacking in standard solar cells.

In August 2022, the Airbus stratospheric unmanned aerial system, Zephyr, shattered its own world record for persistent flight by spending over two months at altitudes up to 70,000ft. Power for the aircraft is provided by compound semiconductor multi-junction solar cells developed by MicroLink Devices Inc., based in Chicago, USA. These cells were chosen specifically because they are lightweight and flexible. This is achieved by a process called Epitaxial Lift-Off (ELO), which removes the thin material layers of the solar cell from the rigid substrate on which they were initially formed. This produces cells with a power-to-weight ratio five times greater than conventional germanium-based multi-junction cells. For Zephyr, the reduction in weight from the solar cells increases the payload of the aircraft, while the flexible cells can be easily shaped over the contours of the wings.

Space is another market where the properties of the cells offer advantages. Here, weight is a critical factor, with launch costs on the order of £3,000 per kg of payload. The flexible nature of the MicroLink cells makes them more robust during transit, launch and handling. It also means that they could, for example, be rolled up to conserve launch space and then unfurled once in position.

Currently, the technical knowledge within MicroLink Devices UK Ltd includes semiconductors and material physics, alongside process, test and assembly engineering. It is anticipated that the company will generate future opportunities for careers such as manufacturing technicians, research scientists and process development engineers. Candidates with knowledge of the design, fabrication or testing of compound semiconductor devices will be especially attractive.





Left: A wafer of MicroLink solar cells during the fabrication process.
Right: Finished solar cell emitting red light under test.

Routes into engineering (Wales)

Where am I now?

LEVEL 1

- GCSE (D-G)
- Engineering Learning Programme Level 1 (LP1)
- WJEC Level 1 Vocational Award in Engineering (Technical Award)

LEVEL 2

- Learning Programme Level 2
- Foundation Apprenticeship: Engineering, IT, construction, built environment, manufacturing
- Pathway to Apprenticeship
- GCSE/IGCSE A*-C: Maths, English/ Welsh, science, D&T (engineering design)
- Welsh Baccalaureate Intermediate
- BTEC Level 2 / NVQ 2
- WJEC Level 2 Vocational Award in Engineering (Technical Award)

LEVEL 3

- Learning Programme Level 3
- Apprenticeship
- AS level: engineering design
- A level: Maths, physics, engineering design
- Welsh Baccalaureate Advanced
- TEC/NVQ/WJEC Level 3 Engineering

Further education

Advanced / Higher Apprenticeship

- Combine workplace training with study
- Typically 3 to 4 years
- Can include vocational qualifications or a degree
- Available in a variety of industries:
  - Aerospace
  - Advanced manufacturing
  - Built environment
  - Civil
  - Construction
  - Computing and digital
  - Electrical and electronic
  - Mechanical
  - Software

Higher National Certificate (HNC) / Diploma (HND)

- Vocational higher education qualifications, often taken whilst in employment
- Typically 1 to 2 years

Foundation Degree (FD)

- Usually undertaken as a part time qualification whilst in employment
- Typically 2 years
  Further learning to Bachelor's level required for IEng registration

Higher education

Degree Apprenticeship

- Combine workplace training with studying towards Bachelor's or Master's degree
- Typically 3 to 6 years
- Available in a variety of industries

University Degrees

- In general engineering, a specific field of engineering, computer science, manufacturing or technology
- Accredited by the Engineering Council

Bachelor's Degree (BEng / BSc)

- 3 to 4 years
- Can be followed by a 1-year MEng/ MSc to register as a Chartered Engineer

Master's Degree (MEng / MSc)

- 4 to 5 years
- Can lead straight to registration as a Chartered Engineer (CEng)

Employment

Progressing to...

- Engineering Technician (EngTech) or ICT Technician (ICTTech)
- Incorporated Engineer (IEng)
- Chartered Engineer (CEng)

Professional Registration

Useful subjects for engineering:

- maths, science (triple)
- physics, computing, design & technology, electronics, chemistry

Other relevant subjects:

- geography, art & design, creative media, languages, psychology

Apprenticeships: www.careerswales.gov.wales/apprenticeships
Degrees and Degree Apprenticeships: www.ucas.com

neon
Brilliant Inspiration

CS connected

DRIVING TOMORROW'S TECHNOLOGIES

CSconnected is home to the world's first compound semiconductor community

csconnected.com