



Clinical Innovation Accelerator (CIA)

Canolfan Technoleg Gofal Iechyd





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Foreword

Welcome to the Clinical Innovation Accelerator (CIA)

The Clinical Innovation Accelerator is hosted by Cardiff University at the Heath Park Campus on the University Hospital of Wales (UHW) site. CIA benefits from its long-standing partnerships with its regional health boards and trusts, working together with industry and other private and public sector organisations to accelerate the translation of clinical innovation. In addressing clinical need and the challenges of the provision of healthcare this leads to improvements in healthcare whilst delivering wider economic and societal benefits through industry growth in the region.

Cardiff's acknowledged, consistent track record of the exploitation and impact of its research underpins its commitment to further establish strategic and collaborative partnerships with major private and public sector organisations and also to support the development and growth of the thriving SME cluster in Wales, particularly in the "medtech" sector. Cardiff University's commitment to innovation is exemplified by its investment in its Innovation Campus in the City Centre and, in the present context, by its Clinical Innovation Partnership and the joint venture between Cardiff University and Cardiff and Vale University Health Board in the acquisition of the Cardiff Medicentre.

Professor Ian Weeks OBE

Dean of Clinical Innovation and Director, Clinical Innovation Hub, Cardiff University.

Rhagair

Croeso i Cyflymu Arloesi Clinigol

Cynhelir Cyflymu Arloesi Clinigol gan Brifysgol Caerdydd yng Nghampws Parc y Mynydd Bychan ar safle Ysbyty Athrofaol Cymru. Mae Cyflymu Arloesi Clinigol yn elwa ar ei bartneriaethau hirsefydlog â'r byrddau iechyd rhanbarthol a'r ymddiriedolaethau, gan weithio gyda'r diwydiant a sefydliadau preifat a chyhoeddus eraill i gyflymu'r gwaith o drosi arloesi clinigol. Wrth fynd i'r afael ag anghenion clinigol a heriau darparu gofal iechyd, mae hyn yn arwain at welliannau mewn gofal iechyd ac yn sicrhau manteision economaidd a chymdeithasol ehangach drwy dwf yn y diwydiant yn y rhanbarth.

Mae enw da cyson Prifysgol Caerdydd, sydd wedi ei chydabod yn eang am ddefnydd ac effaith ei hymchwyl, yn sail i'w hymrwymiad i sefydlu rhagor o bartneriaethau strategol a chydweithredol gyda sefydliadau mawr yn y sector preifat a chyhoeddus yn ogystal ag ategu datbwygiad a thwf y clwstwr Busnesau Bach a Chanolig ffyniannus yng Nghymru, yn enwedig yn y sector 'technoleg feddygol'. Dangosir ymrwymiad Prifysgol Caerdydd i arloesi drwy ei buddsoddiad yn ei Champws Arloesi yng Nghanol y Ddinas ac, yn y cyddestun presennol, drwy ei Phartneriaeth Arloesi Clinigol a'r fenter ar y cyd rhwng Prifysgol Caerdydd a Bwrdd Iechyd Prifysgol Caerdydd a'r Fro wrth gaffael Medicentre Caerdydd.

Rhagair gan yr Athro Ian Weeks OBE

Deon Arloesi Clinigol a Chyfarwyddwr yr Hwb Arloesi Clinigol, Prifysgol Caerdydd.

In the following pages we give an overview of our capabilities, expertise and partnerships as a key part of Wales' thriving "medtech" environment, to illustrate how we can support you and work with you in the development of your ideas to improve both the health and wealth of the population through clinical innovation and economic growth.

In 2018, Cardiff University's Clinical Innovation Accelerator (CIA) joined as a leading partner in the pan-Wales Accelerate programme. Funded by the European Regional Development Fund and Welsh Government, the £24 million programme offers enterprises, businesses and start-ups bespoke support that translates innovative ideas into new technology, products, and services for the health and care sector. The aim of the programme is to create lasting economic value that improves the health and wellbeing of people in Wales. CIA has direct access to clinicians, clinical researchers and patients throughout Wales. Through these connections, CIA offers academic and clinical expertise and improved diagnostics linked to precision medicine.

Welcoming Accelerate, Professor Ian Weeks, Dean of Clinical Innovation at Cardiff University said: "The need for collaborative partnerships between universities, the health service and industry is well-recognised as a potential game-changer in creating improvements in the health and care of the population as well as providing an opportunity for economic development."

Ar y tudalennau a ganlyn, rydym yn rhoi golwg gyffredinol ar ein galluoedd, ein harbenigedd a'n partneriaethau fel rhan allweddol o amgylchedd 'technoleg feddygol' ffyniannus Cymru, i ddangos sut gallwn eich cynorthwyo chi a gweithio gyda chi i ddatblygu eich syniadau i wella iechyd a chyfoeth y boblogaeth drwy arloesi clinigol a thwf economaidd.

Yn 2018, ymunodd Cyflymu Arloesi Clinigol Prifysgol Caerdydd fel partner blaenllaw yn y rhaglen Cyflymu ar gyfer Cymru gyfan. Wedi ei chyllido drwy Gronfa Datblygu Rhanbarthol Ewrop a Llywodraeth Cymru, mae'r rhaglen sy'n werth £24 miliwn yn cynnig cymorth pwrpasol i fentrau, busnesau a busnesau newydd droi syniadau arloesol yn dechnoleg, yn gynnyrch neu'n wasanaethau newydd ar gyfer y sector iechyd a gofal. Nod y rhaglen yw creu gwerth economaidd sy'n para, a fydd yn gwella iechyd a llesiant pobl yng Nghymru. Mae gan Cyflymu Arloesi Clinigol fynediad uniongyrchol at glinigwyr, ymchwilwyr clinigol a chleifion ledled Cymru. Drwy'r cysylltiadau hyn, mae Cyflymu Arloesi Clinigol yn cynnig arbenigedd academiaidd a chlinigol yn ogystal â diagnosteg gwell yn ymwneud â meddygaeth fanwl.

Wrth groesawu Cyflymu, dywedodd yr Athro Ian Weeks, Deon Arloesi Clinigol ym Mhrifysgol Caerdydd: "Mae'r angen am bartneriaethau cydweithredol rhwng prifysgolion, y gwasanaeth iechyd a'r diwydiant yn cael eu cydnabod yn eang fel newidiwr posibl i wella iechyd a gofal y boblogaeth yn ogystal â rhoi cyfle i ddatblygu'r economi."

Overview

The Clinical Innovation Accelerator has been established within Cardiff University, School of Medicine alongside the Clinical Innovation Partnership between Cardiff University and Cardiff and Vale University Health Board.

The CIA is a key element of the University's Clinical Innovation strategy with many of the latter's aims aligning with those of Accelerate.

The Clinical Innovation Partnership enables us to draw on academic and clinical expertise utilising the strengths of Cardiff University and Cardiff and Vale University Health Board. Cardiff University is a research intensive Russell Group University with over 6,600 staff members ranked 5th in the UK for research excellence and 2nd for the impact of its research.

The University is also ranked 3rd in the UK for converting its research into successful companies and has been in receipt of 7 Queen's Anniversary Prizes most of which relate to health.

Trosolwg

Mae Cyflymu Arloesi Clinigol wedi ei sefydlu yn Ysgol Meddygaeth Prifysgol Caerdydd ochr yn ochr â'r Bartneriaeth Arloesi Clinigol rhwng Prifysgol Caerdydd a Bwrdd Iechyd Prifysgol Caerdydd a'r Fro.

Mae Cyflymu Arloesi Clinigol yn elfen allweddol o strategaeth Arloesi Clinigol y Brifysgol, gyda llawer o nodau'r strategaeth yn cyd-fynd â nodau Cyflymu Arloesi Clinigol.

Mae'r Bartneriaeth Arloesi Clinigol yn ein galluogi i ddefnyddio arbenigedd academiaidd a chlinigol gan ddefnyddio cryfderau Prifysgol Caerdydd a Bwrdd Iechyd Prifysgol Caerdydd a'r Fro. Mae Prifysgol Caerdydd yn Brifysgol Grŵp Russell sy'n canolbwyntio'n ddwys ar ymchwil, gyda mwy na 6,600 o aelodau o staff. Mae hi yn y 5ed safle yn y Deyrnas Unedig o ran rhagoriaeth ymchwil ac yn 2il o ran effaith ei hymchwil.

Mae'r Brifysgol hefyd yn y 3ydd safle yn y Deyrnas Unedig o ran trosi ei hymchwil i gwmnïau llwyddiannus ac mae hi wedi cael 7 Gwobr Pen-blwydd Teyrnasiad y Frenhines gyda'r rhan fwyaf yn ymwneud ag iechyd.

Cardiff and Vale University Health Board is one of the largest NHS organisations in Europe. It employs approximately 14,500 staff supporting a population of almost half a million people, providing primary and community care and Public Health on a regional basis, acute services through the University Hospital of Wales and Children's Hospital, and tertiary care across Wales and often the UK with specialist treatment and complex services such as neuro-surgery and cardiac services.

This gives us access to many unique state of the art facilities and resources in healthcare and the development of wealth creation opportunities, which enabled the purchase of the Medicentre that houses SMEs and provides space and support to new businesses in the Life Science sector. We have extensive collaborations with Industry across the healthcare spectrum from SMEs to major global companies.

This environment has recently led to Cardiff being acknowledged as a centre of Excellence for Precision Medicine. Additionally our team of dedicated innovation specialists in the CIA can help businesses to develop new projects and future products and services enabling co-production with direct input from healthcare and research specialists.

Bwrdd Iechyd Prifysgol Caerdydd a'r Fro yw un o'r sefydliadau GIG mwyaf yn Ewrop. Mae'n cyflogi oddeutu 14,500 o staff sy'n gwasanaethu poblogaeth o bron i hanner miliwn o bobl, gan ddarparu gofal sylfaenol a chymunedol ac Iechyd y Cyhoedd ar sail ranbarthol, gwasanaethau aciwt drwy Ysbyty Athrofaol Cymru a'r Ysbyty Plant, a gofal trydyddol ledled Cymru (a'r Deyrnas Unedig gyfan, yn aml) drwy driniaethau arbenigol a gwasanaethau cymhleth fel niwro-lawfeddygaeth a gwasanaethau cardiaidd.

Mae hyn yn rhoi mynediad i ni at nifer o gyfleusterau ac adnoddau unigryw o'r radd flaenaf, gan gynnwys mynediad at arloesi ym maes gofal iechyd a datblygu cyfleoedd i greu cyfoeth, a alluogodd brynu'r Medicentre sy'n gartref i fusnesau bach a chanolig ac sy'n darparu lle a chymoth i fusnesau newydd yn y sector Gwyddorau Bywyd. Mae gennym gydweithrediadau helaeth â Diwydiant ar draws y sbectrwm gofal iechyd, o fusnesau bach a chanolig i gwmnïau byd-eang mawr.

Yn ddiweddar mae'r amgylchedd hwn wedi arwain at gydnabod Caerdydd fel canolfan Ragoriaeth ar gyfer Meddygaeth Fanwl. Yn ogystal, gall ein tim o arbenigwyr arloesi ymroddedig yn Cyflymu Arloesi Clinigol helpu busnesau i ddatblygu prosiectau newydd a chynnyrch a gwasanaethau yn y dyfodol, gan alluogi cydgynhyrchu gyda mewnbwn uniongyrchol gan arbenigwyr gofal iechyd ac ymchwil.



Accelerate will enable us to build on the current infrastructure to increase the workforce capacity and capability and to facilitate translation for health, wealth and job creation.

The innovation eco-system that Accelerate will provide will enable us to give support, advice and to develop a wider range of innovative projects and ideas that will incorporate the Life Science industries, health boards, trusts and HEIs across the whole of Wales. In doing so we will support patient and health economic benefit and address unmet clinical needs.

Bydd Cyflymu yn ein galluogi i adeiladu ar y seilwaith cyfredol hwn i gynyddu capasiti a gallu'r gweithlu a chyflymu'r gwaith trosi ar gyfer iechyd a chyfoeth a chreu swyddi. Bydd yr eco-system arloesi y bydd Cyflymu yn ei darparu yn ein galluogi i roi cyngor,

cymorth a datblygu amrywiaeth ehangach o brosiectau arloesol a syniadau a fydd yn ymgorffori'r diwydiannau gwyddorau bywyd, byrddau iechyd, ymddiriedolaethau a sefydliadau addysg uwch ar draws Cymru gyfan. Wrth wneud hynny, byddwn yn ategu buddiannau economiadd o ran effaith, cleifion ac iechyd ac yn rhoi sylw i anghenion clinigol nad ydynt yn cael eu diwallu.

What we do – National & International Collaborations

The CIA can facilitate collaborations with clinical, academic or industrial partners due to its access to a wide network of healthcare innovators/entrepreneurs. This could be the gateway to leading Welsh University academics and facilities as well as University Health Boards' and Trusts' patients, facilities and personnel.

- The CIA team is hosted by the School of Medicine and research across the School is conducted five broad research themes: Cancer, Immunology, Infection & Inflammation, Mind, Brain and Neuroscience, Population Health and Biosystems. Our close association with world class academics in these areas facilitates connections with cutting edge research in these areas.
- The team also has strong cross disciplinary links across the University, in particular the Schools of Engineering, Bioscience, Pharmacy, Computer Science, Business and Architecture.
- Cardiff and Vale UHB and Cardiff University are linked through the Clinical Innovation Partnership
- There is a close relationship between Welsh Wound Innovation Centre (WWIC) and Cardiff Innovation Accelerator through Professor Keith Harding, who is the Director of WWIC and, together with Professor Ian Weeks, is a co-PI of the Accelerate programme.
- CIA work closely with a network of clinicians with a range of specialties. Accelerate support can be used to enable clinicians to dedicate time to research projects.

Ein gwaith – Cydwethrediadau Cenedlaethol a Rhyngwladol

Gall Cyflymu Arloesi Caerdydd hwyluso cydwethrediadau gyda phartneriaid Clinigol, Academiaidd neu Ddiwydiannol drwy fynediad at rwydwaith eang o entrepreneuriaid / Arloeswyr gofal iechyd. Gallai hyn gynnwys mynediad at gleifion, cyfleusterau a staff Prifysgolion Cymru, Byrddau Iechyd Prifysgol ac Ymddiriedolaethau.

- Cynhelir tim Cyflymu Arloesi Caerdydd gan yr Ysgol Meddygaeth, ac mae Ymchwil ar draws yr Ysgol yn cynnwys pum thema ymchwil eang: Canser, Imiwnoleg, Heintiau a Llidiau, y Meddwl, yr Ymennydd a Niwrowyddoniaeth, Iechyd y Boblogaeth a Biosystemau. Mae ein cysylltiad agos ag academyddion o safon rhyngwladol yn y meysydd hyn yn hwyluso cysylltiadau ag ymchwil arloesol yn y meysydd hyn. Mae gan y tim gysylltiadau trawsddisgyblaethol cryf ar draws

y Brifysgol, yn enwedig yr Ysgolion Peirianeg, Biowyddoniaeth, Fferylliaeth, Cyfrifiadureg, Busnes a Phensaerniaeth.

- Mae Bwrdd Iechyd Prifysgol Caerdydd a'r Fro a Phrifysgol Caerdydd wedi eu cysylltu drwy'r bartneriaeth Arloesi Clinigol
- Mae perthynas agos rhwng Canolfan Arloesi ym maes Gwella Clwyfau a Cyflymu Arloesi Caerdydd drwy'r Athro Keith Harding, sef Cyfarwyddwr y Ganolfan Arloesi, ac, ynghyd â'r Athro Ian Weeks, mae'n Brif Archwilydd ar y cyd ar y rhaglen Cyflymu. is a co-PI of the Accelerate programme.
- Mae Cyflymu Arloesi Caerdydd yn gweithio'n agos gyda rhwydwaith o glinigwyr gydag amrywiaeth o arbenigeddau. Gellir defnyddio cymorth Cyflymu i alluogi clinigwyr i neilltuo amser i brosiectau ymchwil.



What we do –

Advice & Guidance

On the first Thursday of every month, a Multidisciplinary Team (MDT) of Clinical Innovation experts meets and looks to provide invited presenters with access to wide-ranging advice from a panel of 40+ experts, including regulatory compliance and intellectual property experts.

We can also provide advice about relevant funding opportunities.

What we do –

Experienced Support

Within the CIA, we have a team of dedicated specialists with wide ranging expertise in biomedical and clinical research (including governance, clinical trials (CTIMP and non-CTIMP) and health economics) and translating innovations (IP, technology transfer, funding applications, project management and business networks).

Our team members come from diverse research backgrounds with specific experience in *vitro* diagnostics/point of care tests, drug discovery, wound healing, mental healthcare, physiotherapy/sport science and clinical genomics (see individual biographies below).

We are familiar with medical devices and the associated *in vitro* and *in vivo* testing, governance and regulations.



Ein Gwaith – Cymorth Profiadol

O fewn Cyflymu Arloesi Caerdydd, mae gennym dim o arbenigwyr ymroddedig gydag arbenigedd eang mewn ymchwil biofeddygol a chlinigol (gan gynnwys llywodraethu, treialon clinigol (CTIPM ac fel arall) ac economeg iechyd) a throsi arloesi (IP, trosglwyddo technoleg, ceisiadau am gyllid, rheoli prosiectau a rhwydweithiau busnes).

Daw aelodau ein tim o gefndiroedd ymchwil amrywiol, gyda phrofiad penodol mewn diagnosteg in vitro / profion Pwynt gofal, Darganfod cyffuriau, Gwella clwyfau, Gofal iechyd meddwl, Ffisiotherapi/ gwyddorau chwaraeon a Genomeg glinigol (gweler bywgraffiadau unigol isod). Rydym yn gyfarwydd â dyfeisiau meddygol a'r profi, llywodraethu a rheoliadau in vitro ac in vivo cysylltiedig.

Ein Gwaith –

Cyngor ac Arweiniad

Ar ddydd Iau cyntaf pob mis, mae Tim Amlddisgyblaeth o Arbenigwyr Arloesi Clinigol yn cyfarfod ac yn ceisio darparu mynediad i gyflwynwyr a wahoddwyd at gyngor eang gan banel o 40+ o arbenigwyr, gan gynnwys cydymffurfriad rheoleiddiol ac arbenigwyr eiddo deallusol.

Gallwn hefyd roi cyngor ynghylch cyfleoedd cyllido perthnasol.



Facilities

Cardiff University provides access to cutting edge facilities and technical expertise. For example:

Central Biotechnology Service (CBS)

An ISO 9001:2015 and GCLP certified Technology Facility that provides high quality research service and offers expertise in Genomics and Bioinformatics, Proteins and Diagnostics and Cell Analysis/Imaging, to Cardiff University researchers and external organisations.

The team of scientific and technological experts work deliver a comprehensive service including experimental design advice, sample preparation, data generation and data analysis.

In addition to this wide range of standard services, CBS also offer academic consultancy, space for hosting companies, provision of access to laboratory facilities, technical support and access to wider Cardiff University resources for customers from across the research community, including businesses and universities.

Cyfleusterau

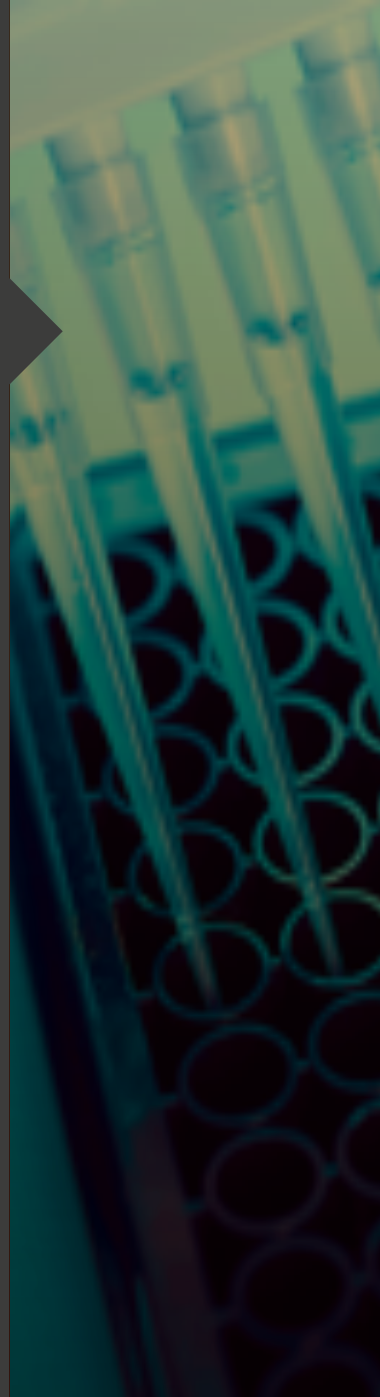
Mae Prifysgol Caerdydd yn darparu mynediad at gyfleusterau arloesol ac arbenigedd technegol. Er enghraifft:

Gwasanaeth Biotechnoleg Canolog (CBS)

Cyfleuster Technoleg wedi ei ardystio gan GCLP ac ISO 9001:2015 sy'n darparu gwasanaeth ymchwil o safon uchel ac sy'n cynnig arbenigedd mewn Geneomeg a Biowybodeg, Proteinau a Diagnosteg, Dadansoddi / Delweddu Celloedd, i ymchwilwyr Prifysgol Caerdydd a sefydliadau allanol.

Mae'r tim o arbenigwyr gwyddonol a thechnolegol yn darparu gwasanaeth cynhwysfawr, gan gynnwys cyngor dylunio arbrofol, paratoi samplau, cynhyrchu data a dadansoddi data.

Yn ogystal â'r amrywiaeth eang hwn o wasanaethau safonol, mae CBS hefyd yn cynnig gwasanaeth ymgynghori academiaidd, lle i gwmnïau, darparu mynediad at gyfleusterau labordy, cymorth technegol a mynediad at adnoddau ehangach Prifysgol Caerdydd i gwsmeriaid o bob rhan o'r gymuned ymchwil, gan gynnwys busnesau a phrifysgolion.



PETIC

The Wales Research and Diagnostic PET Imaging Centre (PETIC) is a state of the art research centre of excellence in PET Imaging and GMP tracer production using its bespoke scanners and cyclotron. It is proud to have secured ISO9001:2015 accreditation and is dedicated to providing first class specialist scientific services.

The facility provides researchers and clinicians with the ability to detect malignant tissue and track the effect of drugs with unprecedented sensitivity. The Centre is keen to engage with university researchers and industry to develop and test new drugs and tracers.

PETIC

Mae Canolfan Ymchwil a Delweddu PET Diagnostig Cymru (PETIC) yn ganolfan ragoriaeth ymchwil o'r radd flaenaf mewn Delweddu PET a chynhyrchu olrhain GMP gan ddefnyddio ei sganwyr pwrpasol a cyclotron. Mae'n falch o fod wedi sicrhau achrediad ISO9001:2015 ac mae'n ymroddedig i ddarparu gwasanaethau gwyddonol arbenigol o'r radd flaenaf.

Mae'r cyfleuster yn rhoi'r gallu i ymchwilwyr a chlinigwyr sylwi ar feinwe malaen ac olrhain effaith cyffuriau â sensitifrwydd na welwyd mo'i debyg o'r blaen. Mae'r Ganolfan yn awyddus i ymgysylltu ag ymchwilwyr prifysgolion a diwydiant i ddatblygu a phrofi cyffuriau ac olrhainwyr newydd.



Cardiff University BIOBANK

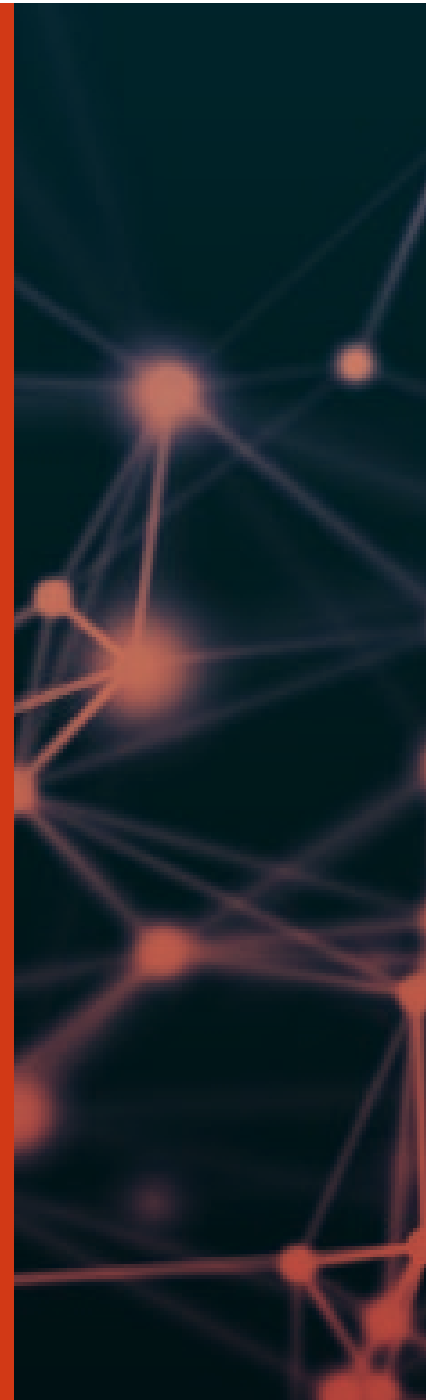
A centralised biobanking facility sited at the University hospital of Wales, offering high quality human biosamples for research undertaken for patient benefit to academic and commercial organisations. It holds established collections from a number of different disease areas and is looking to initiate new collections not already established within the facility.

Cardiff University Brain Research Imaging Centre (CUBRIC)

The centre brings together world-leading expertise in brain mapping with the very latest in brain imaging and brain stimulation in health and disease through advanced imaging and cognitive methods.

As a hub for neuroscience, CUBRIC houses multiple imaging facilities under one roof. CUBRIC plays a pivotal role in the global endeavour to better understand the causes of neurological and psychiatric conditions such as dementia, schizophrenia and multiple sclerosis, so as to yield vital clues for the development of better treatments.

Research in the Centre allows the team to undertake cutting-edge methods research and apply this to key psychological and clinical questions. The research facilities at CUBRIC include one of Europe's most powerful brain scanners, as well as a purpose-built environment for patients and volunteers taking part in medical research and clinical trials.



BIOBANK Prifysgol Caerdydd

Cyfleuster bio-banc canolog wedi ei leoli yn Ysbyty Athrofaol Cymru, sy'n cynnig biosamplau dynol o ansawdd uchel ar gyfer ymchwil er budd cleifion i fudiadau academiaidd a masnachol. Mae wedi sefydlu casgliadau o nifer o wahanol feysydd clefyd ac mae'n ystyried cychwyn casgliadau newydd nad ydynt wedi eu sefydlu yn y cyfleuster yn barod

Canolfan Ymchwil Delweddu'r Ymennydd Prifysgol Caerdydd (CUBRIC)

Mae'r ganolfan yn dwyn ynghyd arbenigedd blaenllaw yn y byd ym maes mapio'r ymennydd gyda'r ddelwedd ddiweddaraf o ran delweddu ar yr ymennydd ac ysgogi yn yr ymennydd mewn iechyd ac afiechyd drwy ddefnyddio delweddu lefel uwch a dulliau gwybyddol.

Fel canolbwynt ar gyfer y niwrowyddorau, mae CUBRIC yn gartref i sawl cyfleuster delweddu dan un to. Mae CUBRIC yn chwarae rôl ganolog yn yr ymdrech fyd-eang i geisio deall yn well beth sy'n achosi cyflyrau niwrolegol a seiciatrig fel dementia, sgitsoffrenia a sglerosis ymledol, er mwyn rhoi cliwiau hanfodol ar gyfer datblygu triniaethau gwell.

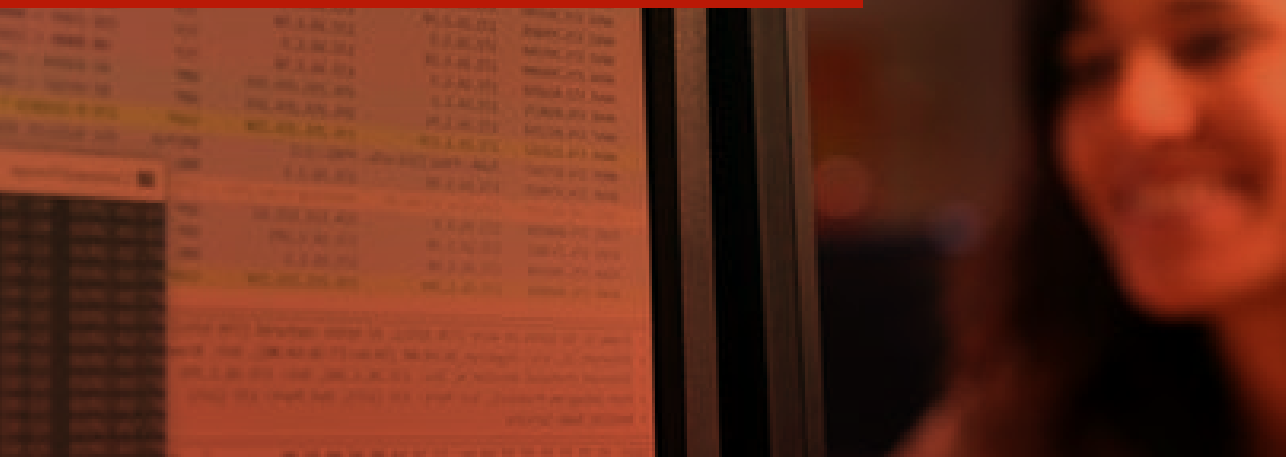
Mae gwaith ymchwil yn y Ganolfan yn galluogi'r tîm i wneud ymchwil i ddulliau arloesol a'i gymhwyso i gwestiynau seicolegol a chlinigol allweddol. Mae'r cyfleusterau ymchwil yn CUBRIC yn cynnwys un o sganwyr ymennydd mwyaf pwerus Ewrop, yn ogystal ag amgylchedd pwrpasol ar gyfer cleifion a gwirfoddolwyr sy'n cymryd rhan mewn ymchwil feddygol a threialon clinigol.

Medicines Discovery Institute

Part funded by the European Regional Development Fund through the Welsh Government's Sêr Cymru scheme, the Medicines Discovery Institute aims to translate fundamental discoveries in disease processes and the identification of molecular targets into new drugs..

According to the NHS, currently almost half of all adults in the UK take prescription drugs either as a prevention or treatment. The Medicines Discovery Institute provides a centre of excellence, translating research expertise into new treatments for use in the healthcare environment. Their main research aim is to deliver modern drug discoveries to improve established treatments, either with new approaches to old targets or by developing innovative approaches through new targets.

For other facilities, see <https://www.cardiff.ac.uk/research/explore/research-facilities>



Y Sefydliad Darganfod Meddyginiaethau

Gyda nawdd rhannol gan Gronfa Datblygu Rhanbarthol Ewrop drwy gynllun Sêr Cymru Llywodraeth Cymru, nod y Sefydliad Darganfod Meddyginiaethau yw trosi darganfyddiadau sylfaenol mewn prosesau clefydau a nodi targedau moleciwlaidd i gyffuriau newydd.

Yn ôl y GIG, mae bron i hanner yr holl oedolion yn y Deyrnas Unedig yn cymryd cyffuriau presgripsiwn naill ai fel ataliad neu driniaeth ar hyn o bryd. Mae'r Sefydliad Darganfod Meddyginiaethau yn ganolfan ragoriaeth sy'n trosi arbenigedd ymchwil i driniaethau newydd i'w defnyddio yn yr amgylchedd gofal iechyd. Ei brif nod ymchwil yw cyflwyno darganfyddiadau cyffuriau modern i wella triniaethau sydd wedi ennill eu plwyf, naill ai gydag agweddau newydd tuag at yr hen dargedau neu drwy ddatblygu dulliau arloesol drwy dargedau newydd.

Ar gyfer cyfleusterau eraill, gweler <https://www.cardiff.ac.uk/research/explore/research-facilities>

Who can apply?

Accelerate is open to organisations who are developing healthcare innovations leading to patient benefit and economic development in Wales. Innovations could take the form of new technologies, products, processes or services. Examples of Innovations could include:

- Diagnostics
- Medical devices
- Therapeutics
- Enabling technologies
- Apps & Digital tech (algorithms)
- Systems and Services
- New Processes or procedures or a change of practise

Pwy all wneud cais?

Mae Cyflymu yn agored i fudiadau sy'n datblygu arloesi mewn gofal iechyd sy'n arwain at fudd i gleifion a datblygu economaidd yng Nghymru. Gallai arloesi fod ar ffurf technolegau, cynnyrch, prosesau neu wasanaethau newydd. Gallai enghreifftiau o Arloesi gynnwys:

- Diagnosteg
- Dyfeisiau meddygol
- Therapiwteg
- Technolegau galluogi
- Apiau a thechnoleg (algorithmau) digidol
- Systemau a Gwasanaethau
- Prosesau neu weithdrefnau newydd neu newid ymarfer



The support is open to Academia, Industry and Healthcare professionals.

Eligibility is dependent on the ability to show economic development in Wales as a result of the support. For example being registered as, or collaborating, with a Welsh company or one with a registered address would qualify. Accelerate can assist in the development of applications and collaborations.

It is anticipated that each party in a collaboration will contribute to the project. This can include in-kind contributions such as staff time.

Mae'r cymorth yn agored i'r byd academiaidd, diwydiant a gweithwyr proffesiynol gofal iechyd.

Mae cymhwysedd yn dibynnu ar y gallu i ddangos datblygiad economaidd yng Nghymru o ganlyniad i'r cymorth. Er enghraifft, byddai cwmni wedi ei gofrestru yng Nghymru, neu gydweithredu â chwmni o'r fath, neu un gyda chyfeiriad cofrestredig, yn gymwys. Gall Cyflymu gynorthwyo'r gwaith o ddatblygu ceisiadau a chydweithrediadau.

Rhagwelir y bydd pob un sy'n rhan o gydweithrediad yn cyfrannu at y prosiect. Gall hyn gynnwys cyfraniadau ymarferol fel amser staff.

What we Offer

- **Support** for "Pilot" and "Platform" projects
 - Pilot awards 6-12 months and < £20K
 - Platform awards 12-18 months and < £150K
 - Access to future funding opportunities/initiatives
- **Clinical input** - Accelerate support can enable clinicians to dedicate time to research projects.
- **Human resource** - Clinical Innovation fellows, project management, business management, cost benefit analytics and research technologist assistance
- **Collaborations** - Industry/Academic/Clinical partners
- **Advice & Guidance** - A Multidisciplinary Team (MDT) of Clinical Innovation experts, including devices and intellectual property experts
- **Connections** to leading Welsh University, University Health Boards and Trusts - patients, facilities and personnel

How to apply for Accelerate

Accelerate operates as a collaborative innovation model and provides a mechanism for clinicians, industry and academia to collaborate in addressing health challenges and translate solutions through an integrated approach.

Accelerate will work closely with the team to plan the proposed project/collaboration to maximise the clinical and economic outputs. If the project is within scope, the Accelerate team will send an Expression of Interest (EOI) form which will initiate this process.



Sut mae gwneud cais am Cyflymu

Mae Cyflymu yn gweithredu fel model arloesi cydweithredol ac yn darparu mecanwaith i glinigwyr, y diwydiant a'r byd academiaidd gydweithio i fynd i'r afael â heriau iechyd a throsi atebion drwy ddull integredig.

Bydd Cyflymu yn gweithio'n agos gyda'r tîm i gynllunio'r prosiect/cydweithio arfaethedig i wneud y mwyaf o'r allbynnau clinigol ac economaidd. Os yw'r prosiect o fewn cwrpas, bydd tîm Cyflymu yn anfon ffurflen Datgan Diddordeb a fydd yn cychwyn y broses hon.

Beth all Cyflymu ei gynnig

- **Cymorth** i brosiectau "Peilota" a "Llwyfannu"
 - Gwobrau Peilot 6-12 mis a < £20,000
 - Gwobrau platform 12-18 mis a < £150,000
 - Mynediad at gynlluniau/cyfleoedd cyllido yn y dyfodol
- Mewnbwn clinigol – Prynu allan a denu amser ymchwil a datblygu staff y GIG mewn nwyddau
- Adnodd dynol – cymrodwr Arloesi Clinigol, rheoli prosiectau, rheoli busnes, dadansoddi cost a budd a chymorth technolegeg ymchwil
- Cydweithrediadau - Diwydiant/Academaidd/Partneriaid clinigol
- Cyngor ac Arweiniad - Tîm Amlddisgyblaethol o arbenigwyr Arloesi Clinigol, gan gynnwys dyfeisiau ac arbenigwyr eiddo deallusol
- Mynediad at brifysgolion blaenllaw yng Nghymru, Byrddau Iechyd Prifysgol ac Ymddiriedolaethau – cleifion, cyfleusterau a phersonél



A close-up photograph of a female scientist in a laboratory. She is wearing a white lab coat over a striped shirt and blue nitrile gloves. She is focused on her work, using a black and white pipette to transfer liquid into a small vial held in her other gloved hand. The background is slightly blurred, showing laboratory equipment and a red rack of test tubes. The overall lighting is warm and orange-toned.

Case Studies Astudiaethau Achos

Case study: **Educating RiTTA**

Project duration: 18 months

Accelerate partner(s):

**Cardiff University, Velindre NHS Trust,
Watson IBM & Meridian IT UK**

Project overview:

To support cancer patients, carers and families in a way that offers empowerment, advice and independence for their care choices. The key areas of improvement were the lack of resources to support having good quality conversations anytime, anyplace and anywhere.

Patients, carers and families often struggled to access helpful, high quality information to support their choices and decisions about their emotional, psychological and physical wellbeing. Through the person-centred design thinking process, Velindre, in conjunction with Pfizer Oncology and IBM Watson, have developed the world's first artificial intelligence enabled virtual assistant trained in oncology to proof of concept.

In Phase I, RiTTA is currently trained to answer a small number of intents that demonstrate its capability. Intents are subcategories where a patient's question could fall, that could range from breast cancer, practical admin, definitions etc.

Astudiaeth achos: **Educating RiTTA**

Hyd y prosiect: 18 mis

Partneriaid:

**Prifysgol Caerdydd, Ymddiriedolaeth GIG
Felindre, Watson IBM a Meridian IT UK**

Trosolwg o'r prosiect:

Cynorthwyo cleifion canser, gofalwyr a theuluoedd mewn ffordd sy'n cynnig grym, cyngor ac annibyniaeth o ran eu dewisiadau gofal. Y meysydd gwella allweddol oedd diffyg adnoddau i ategu sgysrsiau o safon, unrhyw bryd ac yn unrhyw le.

Roedd cleifion, gofalwyr a theuluoedd yn aml yn cael trafferth cael gafael ar wybodaeth ddefnyddiol o safon uchel i ategu eu dewisiadau a'u penderfyniadau am eu llesiant emosiynol, seicolegol a chorfforol. Drwy'r broses o feddwl am ddyluniad sy'n canolbwyntio ar yr unigolyn, mae Felindre, ar y cyd â Pfizer Oncology ac IBM Watson, wedi datblygu cynorthwyydd rhithwir wedi ei alluogi gan ddeallusrwydd artifisial cyntaf y byd, sydd wedi ei hyfforddi mewn oncoleg i brofi cysyniad.

Yng Ngham I, mae RiTTA wedi ei hyfforddi ar hyn o bryd i ateb nifer fach o fwriadau sy'n dangos ei allu. Mae bwriadau'n is-gategoriâu lle gallai cwestiwn claf ddisgyn, a allai amrywio o ganser y fron, gwaith gweinyddol ymarferol, diffiniadau ac ati.

Accelerate's involvement:

For Phase II, Accelerate is supporting the delivery of the the technical development, scale up, deployment and evaluation of RiTTA. This will involve dedicating the time, care and resources required to develop relevant training sets to educate RiTTA in answering a wider range of patient concerns and questions. RiTTA will be developed for pilot in breast, lung and palliative care based on around 100 – 150 intents.

The intents will address many of the FAQs patients, carers and families ask about living with cancer. This critical process will be informed by clinicians, patients, academics and industrial partners.

"Accelerate has provided us with a platform for collaborations with local companies and Universities and provides support to access specialist clinical expertise essential for the development of RiTTA. This should ultimately allow the NHS in Wales to unlock this important innovation and spread wide-scale adoption to transform health and care services in Wales."

Phil Webb

**Associate Director of Planning
Performance and Innovation at
Velindre NHS University Trust**

Cyfraniad Cyflymu:

Ar gyfer Cam II, mae Cyflymu yn ategu gwaith datblygu technegol, uwchraddio, defnyddio a gwerthuso RiTTA. Bydd hyn yn cynnwys neilltuo amser, gofal ac adnoddau sydd eu hangen i ddatblygu setiau hyfforddi perthnasol i addysgu RiTTA i ateb amrywiaeth ehangach o bryderon a chwestiynau cleifion. Bydd RiTTA yn cael ei ddatblygu ar gyfer cynllun peilot mewn gofal y fron, yr ysgyfaint a gofal lliniarol yn seiliedig ar oddeutu 100 – 150 o fwriadau.

Bydd y bwriadau'n rhoi sylw i lawer o'r cwestiynau cyffredin mae cleifion, gofalywyr a theuluoedd yn eu gofyn am fyw gyda chanser. Bydd clinigwyr, cleifion, academyddion a phartneriaid diwydiannol yn cyfrannu at y broses allweddol hon.

"Mae Accelerate wedi rhoi llwyfan i ni gydweithio gyda chwmnïau lleol a Phrifysgolion ac mae'n darparu cymorth i fanteisio ar arbenigedd clinigol arbenigol sy'n hanfodol ar gyfer datblygu RiTTA. Yn y pen draw, dylai hyn alluogi'r GIG yng Nghymru i ddatgloi'r arloesi pwysig hwn a lledaenu mabwysiadu ar raddfa eang i weddnewid gwasanaethau iechyd a gofal yng Nghymru."

Phil Webb

**Cyfarwyddwr Cyswllt Cynllunio
Perfformiad ac Arloesi yn
Ymddiriedolaeth Prifysgol GIG
Felindre.**

Case study: Cultech

Project duration: **18 months**

Accelerate partner(s):
Cultech Ltd and Cardiff University

Project overview:

Cultech Ltd is a Welsh company specialising in the manufacture of innovative nutritional supplements, particularly probiotics. Their work has led to the generation of preliminary findings suggesting that a probiotic nutritional supplement may reduce weight gain, inflammation and cognitive decline linked to a western style high-fat diet and impact upon Alzheimer's Disease (AD).

These findings support the growing body of evidence demonstrating the involvement of the gut-brain-axis in the development of AD, and suggest the possibility of a probiotic-based approach to preventing AD development.

The company requires the support of academic expertise to validate and translate these early findings into meaningful outcomes along the evidence driven pipeline towards potential human studies.

Astudiaeth achos: Cultech

Hyd y prosiect: **18 mis**

Nod y prosiect:
Cultech Ltd a Phrifysgol Caerdydd

Trosolwg o'r prosiect:

Mae Crochtech Ltd yn gwmni o Gymru sy'n arbenigo mewn gweithgynhyrchu atchwanegiadau maethol arloesol, yn arbennig profiotigau. Mae eu gwaith wedi arwain at gynhyrchu canfyddiadau rhagarweiniol sy'n awgrymu y gallai atchwanegiad maethol profiotig ostwng enillion pwysau, lliid a dirywiad gwybyddol sy'n gysylltiedig â deiet braster uchel gwledydd y gorllewin ac effaith ar Glefyd Alzheimer.

Mae'r canfyddiadau hyn yn ategu'r corff cynyddol o dystiolaeth sy'n dangos cyfranogiad yr echel-perfedd-ymennydd yn natblygiad Clefyd Alzheimer, ac yn awgrymu'r posibilrwydd o ddull gweithredu probiotig er mwyn atal datblygiad Clefyd Alzheimer.

Mae'r cwmni angen cymorth arbenigedd academiaidd i ddilysu a throsi'r canfyddiadau cynnar hyn yn ganlyniadau ystyrllon ar hyd y biblinell dystiolaeth sydd wedi ei sbarduno tuag at astudiaethau dynol posibl.

Accelerate's involvement:

Accelerate is supporting the validation and extension of work into a novel refined AD mouse model, by bringing Cardiff University academics and researchers together with the team at Cultech Ltd.

The findings from this study will enable an in-depth assessment of the impact of probiotics on AD progression.

An important outcome would be the identification of potential plasma/faecal biomarkers for use in future human clinical trials.

Cyfraniad Cyflymu:

Mae Cyflymu yn ategu'r gwaith o ddilysu ac ymestyn gwaith i fodel llygoden Clefyd Alzheimer newydd wedi ei fireinio, drwy ddod ag academyddion ac ymchwilyr Prifysgol Caerdydd at ei gilydd gyda'r tîm yn Cultech Ltd.

Bydd canfyddiadau'r astudiaeth hon yn galluogi asesiad manwl o effaith probiotigau ar ddilyniant Clefyd Alzheimer.

Canlyniad pwysig fyddai nodi biofarcwyr plasma/carthol posibl i'w defnyddio mewn treialon clinigol dynol yn y dyfodol.



Case study: Transforming Eye Care Services in Wales: Evaluating Digital Virtual Clinics Delivered by High Street Optometrists

Project duration: 24 months

Accelerate partner(s):

**Cardiff University, Cardiff and Vale
University Health Board, Optometry
Wales and community optometry
enterprises**

Project overview:

There is insufficient capacity in secondary care to assess and manage eye care patients in Wales. In December 2019, nearly 115,000 patients in the R1 category (risk of irreversible sight loss if patient target date is missed) were waiting for a hospital eye appointment in Wales. 38% of those patients exceeded their target date.

Demand on eyecare services is increasing through an ageing population and increased risks linked to other diseases, particularly diabetes. The application of digital technology to tackle unmet clinical needs has seen growing prominence in health and social care, delivering substantial improvements in prudent care.

This project aims to alleviate unsustainable pressures on current ophthalmology services through digital innovation. With Welsh Government support, Cardiff and Vale University Health Board have developed a service framework in which registered high street optometrists assume the management of designated high-risk eye patients.

Astudiaeth achos: Trawsnewid Gwasanaethau Gofal Llygaid yng Nghymru: Gwerthuso Rhith Glinigau Digidol a ddarperir gan Optometryddion y Stryd Fawr

Hyd y prosiect: 24 mis

Partneriaid:

**Prifysgol Caerdydd, Bwrdd Iechyd
Prifysgol Caerdydd a'r Fro, Optometreg
Cymru a'r gymuned**

Trosolwg o'r prosiect:

Nid oes digon o gapasiti mewn gofal eilaidd i asesu a rheoli cleifion gofal llygaid yng Nghymru. Ym mis Rhagfyr 2019, roedd bron i 115,000 o gleifion yn y categori R1 (risg o golli golwg yn ddi-droi'n-ôl os collir dyddiad targed y claf) yn disgwyl am apwyntiad llygaid mewn ysbyty yng Nghymru. Roedd 38% o'r cleifion hynny wedi mynd ymhellach na'u dyddiad targed.

Mae'r galw am wasanaethau gofal llygaid yn cynyddu drwy boblogaeth sy'n heneiddio ac yn cynyddu'r risg sy'n gysylltiedig â chlefydau eraill, yn enwedig diabetes.

Mae defnyddio technoleg ddigidol i fynd i'r afael ag anghenion clinigol heb eu diwallu wedi cael amlygrwydd cynyddol mewn iechyd a gofal cymdeithasol, gan sicrhau gwelliannau sylweddol mewn gofal darbodus.

Nod y prosiect hwn yw lleihau'r pwysau anghynaliadwy ar wasanaethau offthalmoleg ar hyn o bryd drwy arloesi digidol. Gyda chymorth Llywodraeth Cymru, mae Bwrdd Iechyd Prifysgol Caerdydd a'r Fro wedi datblygu fframwaith gwasanaeth lle mae optometryddion cofrestredig y stryd fawr yn ymgymryd â'r gwaith o reoli cleifion llygaid risg uchel a ddynodwyd.

Accelerate's involvement:

Accelerate is supporting Cardiff academics, Optometrists, and Cardiff & Vale UHB staff to evaluate a revolutionary clinical model to facilitate specialised eye care services in community settings. Through a series of novel pilot services, Accelerate will help manage up to 9000 designated patients across 5 domains of care: New Glaucoma Referrals, Follow up Glaucoma Referrals, Wet Age Related Macular Degeneration, Diabetic Retinopathy and Unscheduled Eye Casualty.

Skilled Optometrists in community practices will use state-of-the-art imaging technology, dedicated software and electronic patient records to enable diagnosis by acute care ophthalmologists viewing digital data uploaded from remote locations.

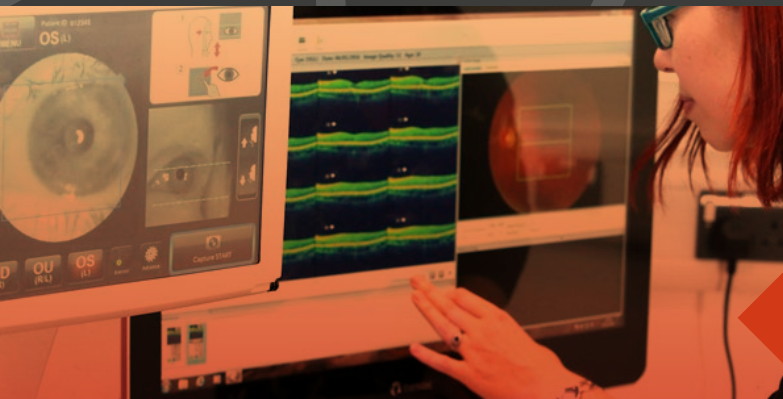
Complex cases will be referred to acute services for appropriate care. Evaluation of pilot data by Cardiff academics will include comparisons with usual care along with patient and practitioner experiential and outcome measures and health economics appraisals. Findings will inform sustainable rollout of shared care ophthalmic services, pan Wales

Cyfraniad Cyflymu:

Mae Cyflymu yn cynorthwyo academyddion Caerdydd, Optometryddion a staff Bwrdd Iechyd Prifysgol Caerdydd a'r Fro i werthuso model clinigol chwyldroadol i hwyluso gwasanaethau gofal llygaid arbenigol mewn lleoliadau cymunedol. Drwy gyfres o wasanaethau peilot newydd, bydd Cyflymu yn helpu i reoli hyd at 9000 o gleifion dynodedig ar draws 5 parth gofal. Atgyfeiriadau glawcoma newydd, atgyfeiriadau dilynol glawcoma, dirywiad macwlaidd sy'n gysylltiedig â henaint, retinopathi diabetig ac anafiadau annisgwyl i'r llygaid.

Bydd Optometryddion medrus mewn practisau cymunedol yn defnyddio technoleg delweddu o'r radd flaenaf, meddalwedd pwrpasol a chofnodion electronig am gleifion er mwyn i offthalmolegwyr gofal aciwt wneud diagnosis drwy edrych ar ddata digidol sy'n cael ei lwytho i fyny o bell.

Cyfeirir achosion cymhleth at wasanaethau aciwt ar gyfer gofal priodol. Bydd gwerthuso'r data peilot gan academyddion Caerdydd yn cynnwys cymariaethau â gofal arferol ynghyd â mesurau profiad a chanlyniadau ar gyfer cleifion ac ymarferwyr a gwerthusiadau economeg iechyd. Bydd y canfyddiadau'n llywio'r gwaith o gyflwyno gwasanaethau offthalmig rhannu gofal, ledled Cymru.



Case study: The Future of Sustainable Operating Theatres An Innovation Case Study

Project duration:
10 months and 18 months

Accelerate partner(s):
Cardiff University, Cardiff and Vale University Health Board, University of Wales Trinity Saint David, Cenin Renewables, Medtronic, Nuaire and BIPVco

Project overview:

There is a need for buildings to transition towards a zero-carbon environment. Hospital buildings and operating theatres use a relatively large amount of energy and produce large quantities of waste. Hospitals produce more than 5 million tons of waste each year. The operating theatre environment contributes ~20-30% of a hospital's carbon footprint. Good environmental conditions for medical staff and patients are also important, and must consider issues including comfort, cleanliness and cross infection.

A project to design and build a sustainable, future theatre is not only pioneering in terms of its intent, but further addresses the real need to move towards a healthier and sustainable Wales.

Case study: Dyfodol Theatrau Llawdriniaethau Cynaliadwy Astudiaeth achos arloesi

Hyd y prosiect:
10 mis a 18 mis

Accelerate partner(s):
Prifysgol Caerdydd, Bwrdd Iechyd Prifysgol Caerdydd a'r Fro, Prifysgol Cymru y Drindod Dewi Sant, Cenin Renewables, Medtronic, Nuaire a BIPVco

Trosolwg o'r prosiect:

Mae angen i adeiladau drawsnewid i fod yn amgylcheddau carbon sero. Mae adeiladau ysbytai a theatrau llawdriniaethau yn defnyddio llawer iawn o ynni ac yn cynhyrchu llawer iawn o wastraff. Mae ysbytai'n cynhyrchu mwy na 5 miliwn tonnell o wastraff bob blwyddyn. Mae amgylchedd theatrau llawdriniaethau yn cyfrannu ~20-30% o ôl troed carbon ysbytai. Mae amodau amgylcheddol da i staff meddygol a chleifion yn bwysig hefyd, a rhaid ystyried materion fel cysurwch, glendid a thraws heintio.

Mae prosiect i ddylunio a datblygu theatr gynaliadwy yn y dyfodol nid yn unig yn arloesi o ran ei fwriad, ond yn rhoi sylw pellach i'r angen gwirioneddol i symud tuag at Gymru iachach a chynaliadwy.

Accelerate's involvement:

Accelerate is supporting the delivery of this project which brings together collaborators with a wide range of expertise from theatre practitioners, to designers and sustainability build experts.

The initial phase has been to establish the scope and project delivery plan. Moving into the next phase has shifted the focus to the designing and construction of the theatre. The design will be focused around the specific needs of a general operating theatre, but incorporate a low energy design, efficient mechanical services for heating, cooling, ventilation and lighting, and building integrated renewable energy generation and energy storage.

It will also consider waste handling and minimising waste production, including those of anaesthetic gases. This has been facilitated by bringing theatre staff together to focus on architectural construction, design features and ergonomics, and, anaesthetics and waste. The subsequent design, construction and evaluation will be overseen by a dedicated project officer, who will facilitate the delivery of tangible outcomes.

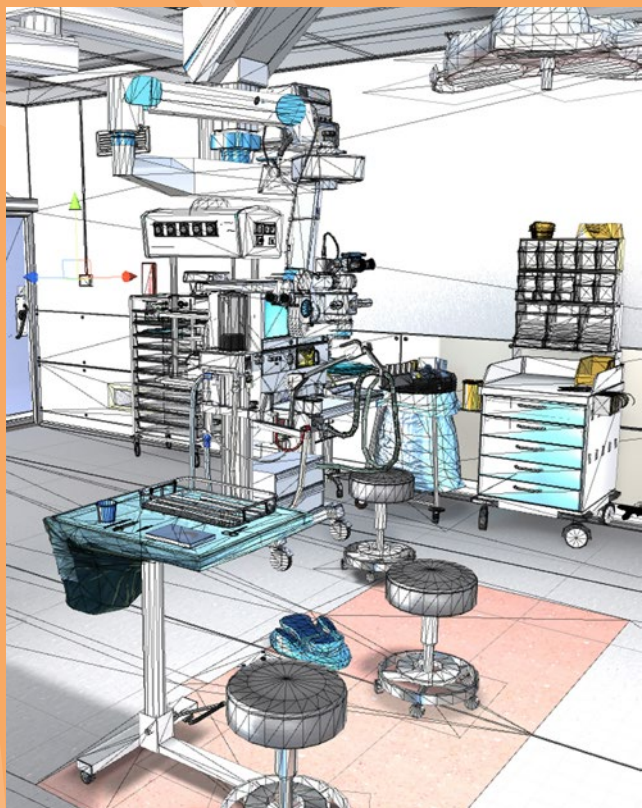
Cyfraniad Cyflymu:

Mae Cyflymu yn ategu'r gwaith o gyflawni'r prosiect hwn sy'n dod â chydweithredwyr ynghyd ag amrywiaeth eang o arbenigedd gan ymarferwyr theatrau, dylunwyr ac arbenigwyr adeiladu cynaliadwyedd.

Y cam cyntaf oedd sefydlu cwmpas a chynllun cyflawni'r prosiect. Mae symud

i'r cam nesaf wedi symud y ffocws i gynllunio ac adeiladu theatrau. Bydd y dyluniad yn canolbwyntio ar anghenion penodol theatr llawdriniaethau gyffredinol, ond yn cynnwys dyluniad ynni isel, gwasanaethau mecanyddol effeithlon ar gyfer gwresogi, oeri, awyru a goleuo, a chynhyrchu ynni adnewyddadwy integredig a storio ynni. Bydd hefyd yn ystyried trin gwastraff a lleihau gwastraff, gan gynnwys nwyon anesthetig.

Mae hyn wedi cael ei hwyluso drwy ddod â staff theatrau at ei gilydd i ganolbwyntio ar adeiladu pensaernïol, nodweddion dylunio ac ergonomeg, ynghyd ag anestheteg a gwastraff. Bydd y gwaith dylunio, adeiladu a gwerthuso dilynol yn cael ei oruchwyllo gan swyddog prosiect penodol, a fydd yn hwyluso'r gwaith o gyflawni canlyniadau pendant.



Case study: Exploring a Therapeutic Approach for Adenomatous Polyposis Syndromes in 3D Intestinal Organoid Cell Models - An Innovation Case Study

Project duration: 18 months

Accelerate partner(s):
Cardiff University and Cellesce

Project overview:

Familial Adenomatous Polyposis and MUTYH-Associated Polyposis (FAP and MAP) are inherited syndromes that predispose patients to adenomatous polyps and a high risk of colorectal cancer.

Trials of therapeutic agents have so far been largely ineffective, with standard treatment is particularly invasive i.e. a colectomy followed by regular, upper gastrointestinal surveys of the duodenum.

This project responds to the need for a robust platform to transform drug screening and enable a targeted therapeutic approach. Organoids are 3D, multi-cellular clusters derived from patient biopsies that recreate the spatial organisation and biology of the original patient's tissue. They are in effect 'mini-organs' providing a 3D model more relevant to human pathology than 2D cell lines.

Case study: Archwilio Ymagwedd Therapiwtig at Syndromau Polypedd Chwyddol mewn Modelau Celloedd Organoid Perfeddol 3D - Astudiaeth achos arloesi

Project duration: 18 mis

Accelerate partner(s):
Cardiff University and Cellesce

Trosolwg o'r prosiect:

Mae Polypedd Chwyddol Etifeddol a Polyposis Cysylltiedig â MUTYH (FAP a MAP) yn syndromau etifeddol sy'n golygu bod rhagduedd i gleifion ddatblygu polypau chwyddol a risg uchel o ganser y colon a'r rhefr.

Mae treialon asiantau therapiwtig wedi bod yn aneffeithiol i raddau helaeth hyd yn hyn, gyda thriniaeth safonol yn arbennig o fewnwithiol h.y. colectomi ac yna archwiliadau gastroberfeddol uchaf rheolaidd yn y dwodenwm.

Mae'r prosiect hwn yn ymateb i'r angen am blatfform cadarn i drawsnewid sgrinio cyffuriau a galluogi ymagwedd therapiwtig benodol. Mae organoidau yn glystyrau aml-gellog 3D sy'n deillio o fiopsïau cleifion sy'n ail-greu trefniant gofodol a bioleg meinwe wreiddiol y claf. Maent, i bob pwrpas, yn 'fini-organau' sy'n darparu model 3D sy'n fwy perthnasol i batholeg ddynol na llinellau celloedd 2D.

Accelerate's involvement:

Accelerate is supporting a collaboration between Cardiff University academics (Inherited Tumour Syndrome Research Group) and Cellesce, a Welsh BioTech company, to establish an in vitro, pre-clinical organoid model of FAP and MAP syndromes.

Cellesce has developed a patented bioprocess for the expansion of human derived organoids at scale, aimed at high throughput compound screening in the pharmaceutical industry and for academic research.

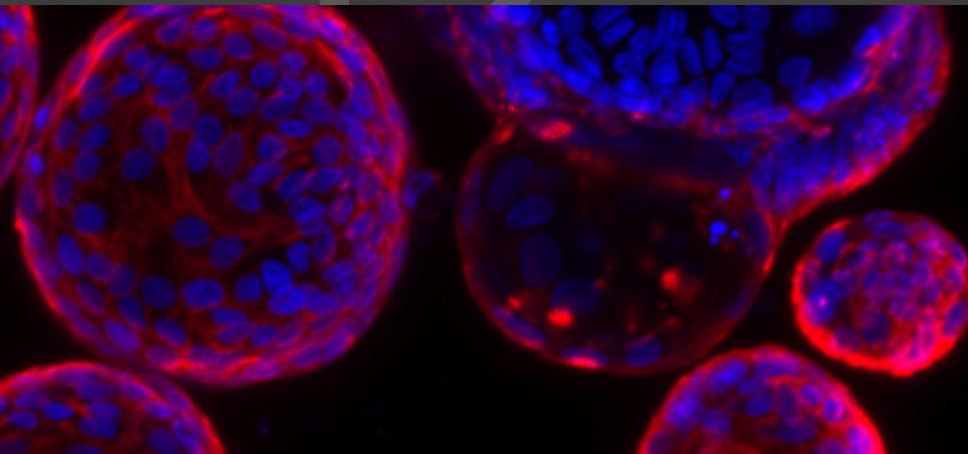
Accelerate backing will enable the collaborators to generate new 3D intestinal organoids, derived from FAP and MAP patient tissues, and grow them at scale for commercialisation. This work will underpin the validation of the organoid model as an effective platform for drug screening for both inherited and sporadic intestinal cancers.

Cyfraniad Cyflymu:

Mae Cyflymu yn cynorthwyo proses o gydweithredu rhwng academyddion Prifysgol Caerdydd (Grŵp Ymchwil Syndromau Tiwmorau Etifeddol) a Cellesce, cwmni BioTech o Gymru, i sefydlu model organoid cyn-glinigol in vitro o syndromau FAP a MAP.

Mae Cellesce wedi datblygu biobroses dan batent ar gyfer ehangu organoidau sy'n deillio o bobl ar raddfa, gyda'r nod o sgrinio cyfansawdd mewn bwn uchel yn y diwydiant fferyllog ac ar gyfer ymchwil academiaidd.

Bydd cymorth Cyflymu yn galluogi'r cydweithredwyr i gynhyrchu organoidau perfeddol 3D newydd, sy'n deillio o feinweoedd cleifion FAP a MAP, a'u tyfu ar raddfa i'w masnacheiddio. Bydd y gwaith hwn yn sail i ddilysu'r model organoid fel llwyfan effeithiol ar gyfer sgrinio cyffuriau ar gyfer canserau coluddol etifeddol ac ysbeidiol.

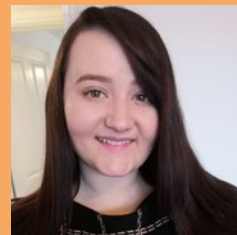




Meet the team
Cwrdd â'r tîm

Meet the team

Cwrdd â'r tîm





Professor Ian Weeks

OBE PhD DSc CChem FRSC
FRCPath FLSW

Ian is Dean of Clinical Innovation for Cardiff University based in the School of Medicine (of which he was Dean of Medicine and Head of School from 2017-2020) in the College of Biomedical and Life Sciences.

He has undertaken research, development and manufacturing of biochemical diagnostic tests for human disease for over thirty years in academic, NHS and commercial environments. He has authored over 130 publications, books and patents and has established a number of successful start-up companies. Technologies invented by Ian and colleagues have been incorporated into clinical diagnostic platforms that have been used to undertake billions of clinical diagnostic tests worldwide.

He is Director of the University's Clinical Innovation Hub that has been established as a centre to stimulate collaboration between the University, healthcare providers, industry and other organisations in order to address challenges in current healthcare provision. Ian is a Fellow of the Royal Society of Medicine, the Royal Society of Chemistry, the Royal College of Pathologists and the Learned Society of Wales. He was awarded a Senior Doctorate (DSc) by Cardiff University in 2009 and an OBE for services to knowledge transfer and medical innovation in 2020.

Yr Athro Ian Weeks OBE

OBE PhD DSc CChem FRSC
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Mae Ian yn Ddeon Arloesi Clinigol ar gyfer Prifysgol Caerdydd yn yr Ysgol Meddygaeth (roedd yn Ddeon Meddygaeth ac yn Bennaeth yr Ysgol yno rhwng 2017 a 2020) yng Ngholeg y Gwyddorau Biofeddygol a Bywyd.

Mae wedi cynnal ymchwil, datblygu a gweithgynhyrchu profion diagnostig biocemegol ar gyfer clefydau dynol am dros ddeng mlynedd ar hugain mewn amgylcheddau academiaidd, GIG a masnachol. Mae wedi ysgrifennu dros 130 o gyhoeddiadau, llyfrau a phatentau ac wedi sefydlu nifer o gwmnïau llwyddiannus. Mae technolegau a ddyfeisiwyd gan Ian a chydweithwyr wedi cael eu hymgorffori yn y llwyfannau diagnostig clinigol a ddefnyddiwyd i gyflawni biliynau o brofion diagnostig clinigol ledled y byd. Ef yw Cyfarwyddwr Hwb Arloesi Clinigol y Brifysgol sydd wedi cael ei sefydlu fel canolfan i ysgogi cydweithrediad rhwng y Brifysgol, darparwyr gofal iechyd, y diwydiant a sefydliadau eraill er mwyn rhoi sylw i heriau yn y ddarpariaeth gofal iechyd bresennol.

Mae Ian yn Gymrawd yn y Gymdeithas Feddygol Frenhinol, y Gymdeithas Gemeg Frenhinol, Coleg Brenhinol y Patholegwyr a Chymdeithas Ddysgedig Cymru. Dyfarnwyd Uwch Ddoethuriaeth iddo gan Brifysgol Caerdydd yn 2009 ac OBE am wasanaethau i drosglwyddo gwybodaeth ac arloesi meddygol yn 2020.



Professor Keith Harding

CBE FRCGP FRCP FRCS FLSW

Keith has had a longstanding interest in wound healing. He was appointed as the first Director of the Wound Healing Research Unit in 1991. From September 2013 to December 2018 he was Dean of Clinical Innovation at Cardiff University and in 2014 was appointed as Medical Director of the Welsh Wound Innovation Centre.

He is the Editor-in-Chief of the International Wound Journal. He was the First President of the European Pressure Ulcer Advisory Panel, First Recorder of the European Wound Management Association and is a Past President of the European Tissue Repair Society.

He was awarded the CBE in the New Year Honours list in January 2013 for Services to Medicine and Health Care. In 2013 he was awarded £4.2 million to set up the Welsh Wound Innovation Initiative part of which has enabled the setting up of the first Wound Healing Centre in the World. In 2018 he was appointed as a Senior Clinical Research Director at the A Star Institute in Singapore and is part of a SG\$ 28 million wound programme grant.

Yr Athro Keith Harding

CBE FRCGP FRCP FRCS FLSW

Mae Keith wedi bod â diddordeb mewn gwella clwyfau ers amser maith. Fe'i penodwyd yn Gyfarwyddwr cyntaf yr Uned Ymchwil ym maes Gwella Clwyfau ym 1991. Rhwng mis Medi 2013 a mis Rhagfyr 2018 roedd yn Ddeon Arloesi Clinigol ym Mhrifysgol Caerdydd, ac yn 2014 fe'i penodwyd yn Gyfarwyddwr Meddygol Canolfan Arloesi ym maes Gwella Clwyfau Cymru.

Ef yw Prif Olygydd The International Wound Journal. Ef oedd Llywydd cyntaf Panel Cyngori Ewrop ar Wlserau Pwysau, Cofiadur Cyntaf Cymdeithas Rheoli Clwyfau Ewrop a bu hefyd yn Llywydd Cymdeithas Atgyweirio Meinweoedd Ewrop. Cafodd y CBE yn Rhestr Anrhydeddau'r Flwyddyn Newydd ym mis Ionawr 2013 am wasanaethau i Feddygaeth a Gofal Iechyd.

Yn 2013 dyfarnwyd £4.2 miliwn iddo i sefydlu Cynllun Arloesi ym maes Clwyfau Cymru, sydd wedi galluogi sefydlu'r Ganolfan Gwella Clwyfau gyntaf yn y byd. Yn 2018 fe'i penodwyd yn Uwch Gyfarwyddwr Ymchwil Clinigol yn yr A Star Institute yn Singapore, ac mae'n rhan o grant rhaglen clwyfau sy'n werth SG\$ 28 miliwn.



Barbara Coles MPhil, BSc(Hons) Clinical Innovation Hub Manager

Barbara is the Clinical Innovation Hub (CIH) Manager in the School of Medicine, Cardiff University. She supports overall project management activities, strategic development and implementation for CIH, providing the main link between Cardiff University and the Accelerate partners. Barbara actively supports initiatives in the Clinical Innovation Partnership between Cardiff University and Cardiff and Vale University Health Board, this a crucial pipeline for clinical innovation activities and projects.

Barbara completed her MPhil at Cardiff University with a research career spanning the electrophysiology of potassium channels in Alzheimer's, nitric oxide in vasodilation and coagulation and inflammation (peritoneal and sepsis). As a PRINCE 2 practitioner, project management has included UTA Wellcome awards and as the Outputs Administrator for Research Excellence Framework (REF 2014), School of Medicine.

Barbara is the Project Manager for the Clinical Innovation Accelerator (CIA) within the School of Medicine, Cardiff University. Supported by a dedicated team of 17, CIA specialises in the adoption of clinical or patient focused innovative projects by providing support through NHS, academic and enterprise expertise, collaboration and engagement. The team's wide-ranging scientific knowledge combined with clinical, health, business, legal, industrial and academic expertise enables extensive scoping, exploration with maximisation of project potential and development to transform health and patient care whilst supporting Welsh economic growth.

Barbara Coles MPhil, BSc(Anrh) Rheolwr yr Hwb Arloesi Clinigol

Barbara yw Rheolwr yr Hwb Arloesi Clinigol yn yr Ysgol Meddygaeth ym Mhrifysgol Caerdydd. Mae hi'n cynorthwyo â gweithgareddau cyffredinol rheoli prosiectau, datblygu strategol a gweithredu ar gyfer yr Hwb Arloesi Clinigol, gan ddarparu'r prif gyswllt rhwng Prifysgol Caerdydd a phartneriaid Cyflymu. Mae Barbara yn cynorthwyo mentrau yn y Bartneriaeth Arloesi Clinigol rhwng Prifysgol Caerdydd a Bwrdd Iechyd Prifysgol Caerdydd a'r Fro, sy'n biblinell hollbwysig ar gyfer gweithgareddau a phrosiectau arloesi clinigol.

Cwblhaodd Barbara ei MPhil ym Mhrifysgol Caerdydd gyda gyrfa ymchwil yn cwmpasu electroffisioleg sianeli potasiwm mewn clefyd Alzheimer's, ocsid nitrig mewn faslediad, ceuliad a llid (peritoneol a sepsis). Fel ymarferwr PRINCE 2, mae gwaith rheoli prosiectau wedi cynnwys gwobrau UTA Wellcome ac fel Gweinyddwr Allbynnau Fframwaith Rhagoriaeth Ymchwil (REF 2014) yr Ysgol Meddygaeth.

Barbara yw rheolwr prosiect Cyflymu Arloesi Clinigol yn yr Ysgol Meddygaeth ym Mhrifysgol Caerdydd. Gyda chymorth tîm ymroddedig o 17, mae Cyflymu Arloesi Clinigol yn arbenigo mewn mabwysiadu prosiectau arloesol clinigol neu gymunedol drwy ddarparu cymorth drwy'r GIG, arbenigedd academaidd a mentergarwch, cydweithio ac ymgysylltu. Mae gwybodaeth wyddonol amrywiol y tîm ynghyd ag arbenigedd clinigol, iechyd, busnes, cyfreithiol, diwydiannol ac academaidd yn arwain at gwmpasu helaeth, edrych ar ffyrdd o wneud y gorau o botensial prosiect a datblygiadau i drawsnewid iechyd a gofal cleifion, gan ategu twf economaidd Cymru.



Dr Corinne Squire

Deputy Director of the Cardiff Clinical Innovation Partnership

Corinne is Deputy Director of the Cardiff Clinical Innovation Partnership and Manager of the South East Wales Academic Health Science Partnership, working at the interface of academia and NHS to stimulate new partnerships between research organisations and the commercial sector.

Corinne studied for her degree and PhD in Biochemistry at Cambridge University with short term placements at Liverpool University and Harvard Medical School Genetics Department. She subsequently worked in academic research in Cambridge University and has industrial experience in Biotech both with small spin out company in Cambridge and a larger biotechnology company in Denmark.

She has experience in Biochemistry, Molecular Biology & Chemistry. Prior to her current role, Corinne worked in Technology Transfer at Cardiff University and Translational Research with the Severnside Alliance.

Dr Corinne Squire

Dirprwy Gyfarwyddwr Partneriaeth Arloesi Clinigol Caerdydd

Corinne yw Dirprwy Gyfarwyddwr Partneriaeth Arloesi Clinigol Caerdydd a Rheolwr Partneriaeth Gwyddor Iechyd Academaidd De Ddwyrain Cymru, sy'n gweithio ar ryngwyneb y byd academaidd a'r GIG i ysgogi partneriaethau newydd rhwng sefydliadau ymchwil a'r sector masnachol.

Astudiodd Corinne am ei gradd a'i PhD mewn Biocemeg ym Mhrifysgol Caergrawnt gyda lleoliadau tymor byr ym Mhrifysgol Lerpwl ac Adran Geneteg Ysgol Feddygol Harvard. Yn dilyn hynny, bu'n gweithio mewn ymchwil academaidd ym Mhrifysgol Caergrawnt ac mae ganddi brofiad diwydiannol mewn Biotechnoleg, gyda chwmni deillio bychan yng Nghaergrawnt a chwmni biotechnoleg mwy yn Nenmarc.

Mae ganddi brofiad mewn Biocemeg, Bioleg foleciwlaidd a Chemeg. Cyn iddi gael ei chyflawni ar hyn o bryd, bu Corinne yn gweithio ym maes Trosglwyddo Technoleg ym Mhrifysgol Caerdydd ac Ymchwil Trosi gyda Chyngghair Glannau Hafren.



Dr James Kinsey-Jones

Business and Commercial
Development Manager

James has a PhD in Neuroendocrinology from Kings College London. Following this, he worked on a number of translational research projects as a postdoctoral researcher.

Before joining us, James was part of the Innovations Team of the Wellcome Trust. Through this work, James helped researchers and organisations across the world to transform great ideas, discoveries and inventions into treatments, products and cures for disease. Investing in a wide range of technologies including drug discovery, vaccines, medical devices and platform technologies, James worked closely organisations including Biotech, Pharma, Academia and NGOs. He has also worked in Business Development roles in Tech Transfer and Biotech.

James is the Business and Commercial development manager for the Accelerate programme at the Clinical Innovation Accelerator; leading efforts to identify and develop opportunities for collaboration with industrial partners. Working to build key relationships to enable potential collaborations across Accelerate stakeholders. James also provides input into the development of various projects.

Dr James Kinsey-Jones

Rheolwr Datblygu Masnachol a
Busnes Cyflymu Arloesi Clinigol

Mae gan James Doethuriaeth mewn Niwroendocrinoleg o Goleg y Brenin, Llundain. Yn dilyn hyn, bu'n gweithio ar nifer o brosiectau ymchwil trosi fel ymchwilydd ôl-ddoethurol. Cyn ymuno â ni, roedd James yn rhan o Dîm Arloesi Ymddiriedolaeth Wellcome.

Drwy'r gwaith hwn, bu James yn helpu ymchwilywyr a mudiadau ledled y byd i drawsnewid syniadau, darganfyddiadau a dyfeisiadau gwyh yn driniaethau, cynnyrch a ffyrdd o wella clefydau. Gan fuddsoddi mewn amrywiaeth eang o dechnolegau gan gynnwys darganfod cyffuriau, brechiadau, dyfeisiau meddygol a thechnolegau llwyfan, gweithiodd James yn agos â sefydliadau Biotechnoleg, Fferylliaeth, y byd academiaidd a chyrrff anlywodraethol. Mae hefyd wedi gweithio ym maes Datblygu Busnes gyda Throsoglwyddo Technoleg a Biotechnoleg.

James yw rheolwr datblygu Busnes a Masnachol y rhaglen Cyflymu yn Cyflymu Arloesi Clinigol; gan arwain ymdrechion i ganfod a datblygu cyfleoedd cydweithio gyda phartneriaid diwydiannol. Gweithio i greu cysylltiadau allweddol er mwyn galluogi cydweithio posibl ar draws rhanddeiliaid Cyflymu. Mae James hefyd yn cyfrannu at ddatblygu prosiectau amrywiol.



Dr Ceri Morris

Senior Innovation Fellow

Ceri completed her BSc in Biochemistry and Physiology and PhD in Molecular Biology at Cardiff University. She has a broad research background applying innovative technology to a wide spectrum of bioscience fields from medical diagnostics to environmental toxicology.

Before joining the Accelerate team, Ceri gained experience in the translation of research in both Academia and Industry.

She was a Senior Scientist/Project Manager and Biological Safety Officer for a Welsh Biotech company for ten years where she managed scientists working on in vitro diagnostics and delivered on major projects. She is the Human Tissue Officer for the Clinical Innovation Hub and has an understanding of the governance required to work with the NHS. She has written successful funding applications, patents and academic publications.

During her career, she has worked with a wide network of academics (from many disciplines), clinicians and representatives from SMEs and Global companies while translating research and growing a diverse research portfolio. Ceri's current role includes engaging with Industry, clinicians and academics to identify and co-develop new projects in line with Accelerate policies.

Dr Ceri Morris

Uwch Gymrawd Arloesi Cyflymu Arloesi Clinigol

Cwblhaodd Ceri ei BSc mewn Biocemeg a Ffisioleg a PhD mewn Bioleg Foleciwlaidd ym Mhrifysgol Caerdydd. Mae ganddi gefndir ymchwil eang mewn cymhwysio technoleg arloesol i sbectrwm eang o feysydd biowyddoniaeth o ddiagnosteg meddygol i wenwyneg amgylcheddol.

Cyn ymuno â thîm Cyflymu, cafodd Ceri brofiad o drosi ymchwil yn y byd academiaidd a diwydiant. Roedd hi'n Uwch Wyddonydd / Rheolwr Prosiect a Swyddog Diogelwch Biolegol i gwmni Biotechnoleg yng Nghymru am ddeng mlynedd, lle bu'n rheoli gwyddonwyr a oedd yn gweithio ar ddiagnosteg in vitro, a chyflawnodd waith ar brosiectau mawr. Hi yw Swyddog Meinweoedd Dynol y Ganolfan Arloesi Clinigol ac mae ganddi ddealltwriaeth o'r llywodraethu sydd ei angen i weithio gyda'r GIG. Mae hi wedi ysgrifennu ceisiadau llwyddiannus am nawdd, patentau a chyhoeddiadau academiaidd.

Yn ystod ei gyrfa, bu'n gweithio gyda rhwydwaith eang o academyddion (o lawer o ddisgyblaethau), clinigwyr a chynrychiolwyr o fusnesau bach a chanolig a chwmnïau byd-eang wrth drosi gwaith ymchwil a datblygu portffolio ymchwil amrywiol. Mae rôl Ceri ar hyn o bryd yn cynnwys ymgysylltu â diwydiant, clinigwyr ac academyddion i ganfod a datblygu prosiectau newydd ar y cyd yn unol â pholisïau Cyflymu.



Dr Andrew Cuthbert

Senior Innovation Fellow

With 35 years' experience in academia and NHS services, Andrew has supported clinical innovation through a range of attributes. After a PhD in carcinogenesis and cancer genetics (Brunel) he took a fellowship at King's College London to investigate polygenic risk factors in autoimmune diseases, particularly Crohn's disease, identifying new biological insights in disease aetiology. After 18 years in research labs he re-trained and studied for a Masters in Genetic Counselling (Manchester), during which he worked in NHS neuropsychiatry services (Cardiff), gaining invaluable experiences patient care.

Andrew worked as a genetic counsellor and researcher for 12 years, firstly for the West Midlands Familial Cancer Service, specialising in bowel cancer syndromes. Working with surgical MDTs, histopathology and bowel screening services his team established improved regional care pathways to improve screening, diagnosis and follow-up for Lynch Syndrome and Familial Polyposis patients. Andrew also joined a NICE guideline development group to produce national guidelines for hereditary breast cancer care, having previously worked as a systematic reviewer for NICE. In 2014 he returned to his passion for mental healthcare.

Now based Cardiff, he works in psychiatric genetic counselling at the MRC Centre for Neuropsychiatric Genomics, running a clinical MDT for neuropsychiatry, genomics and NHS mental health services. The MDT and its academic links provided the foundation to establish a Knowledge Transfer Partnership (Innovate-UK) with the charity Cerebra. The project translates high quality evidence in genomics and neurodevelopmental psychiatry into improved information for families and health professionals, and enhanced access to services for children with rare developmental disorders.

Dr Andrew Cuthbert

Uwch Gymrawd Arloesi Cyflymu Arloesi Clinigol

Gyda 35 mlynedd o brofiad yn y byd academiaidd a gwasanaethau'r GIG, mae Andrew wedi cynorthwyo arloesi clinigol drwy amrywiaeth o nodweddion. Ar ôl cael PhD mewn carsinogenau a geneteg cancer (Brunel), cymerodd gymrodoriaeth yng Ngholeg y Brenin yn Llundain i ymchwilio i ffactorau risg polygenig mewn clefydau awto-imiwn, yn enwedig clefyd Crohn, gan nodi mewnwelediad biolegol newydd ym maes achosog afiechydon. Ar ôl 18 mlynedd mewn labordai ymchwil, ailhyfforddodd ac astudiodd ar gyfer Gradd Meistr mewn Cwnsela Genetig (Manceinion), ac yn ystod y cyfnod hwnnw, bu'n gweithio mewn gwasanaethau niwroseciatreg y GIG (Caerdydd), gan sicrhau profiadau amhrisiadwy o ofal cleifion.

Gweithiodd Andrew fel cwnselydd genetig ac ymchwilydd am 12 mlynedd, yn gyntaf ar gyfer Gwasanaeth Cancer Teuluol Gorllewin Canolbarth Lloegr, gan arbenigo mewn syndromau cancer y coluddyn. Drwy weithio gyda Thimau Amlddisgyblaethol llawfeddygol, histopatholeg a gwasanaethau sgrinio'r coluddyn, sefydlodd ei dim lwybrau gofal rhanbarthol gwell i wella sgrinio, diagnosis a gwaith dilynol ar gyfer Syndrom Lynch a chleifion Polypedd Teuluol. Ymunodd Andrew â grŵp datblygu canllawiau NICE hefyd i gynhyrchu canllawiau cenedlaethol ar gyfer gofal cancer y fron etifeddol, ar ôl gweithio fel adolygydd systematig ar gyfer NICE. Yn 2014, dychwelodd at brif faes ei frwdfrydedd dros ofal iechyd meddwl.

Mae'n gweithio yng Nghaerdydd ar hyn o bryd, ym maes cwnsela genetig seiciatryddol yng Nghanolfan MRC ar gyfer Genomeg Niwroseciatrig, sy'n rhedeg tim amlddisgyblaethol clinigol ar gyfer niwroseciatrig, genomeg a gwasanaethau iechyd meddwl y GIG. Rhoddodd y tim amlddisgyblaethol a'i gysylltiadau academiaidd y sylfaen i sefydlu Partneriaeth Trosglwyddo Gwybodaeth (Innovate-UK) gyda'r elusen Cerebra. Mae'r prosiect yn trosi tystiolaeth o ansawdd uchel ym maes genomeg a seiciatreg niwroddatblygiadol i wella gwybodaeth i deuluoedd a gweithwyr iechyd proffesiynol, a gwell mynediad at wasanaethau i blant ag anhwylderau datblygiadol prin.



Dr Corinne Nguyen

Senior Innovation Fellow

Corinne brings extensive experience in innovation and commercialisation of research, with a keen interest in Life Sciences. She values collaboration and over the last decade has developed a varied professional network within the Life Science Ecosystem in Wales.

Corinne's role within the Clinical Innovation Accelerator includes engaging with companies, researchers and clinicians to scope, co-develop and facilitate the delivery of Accelerate projects.

Corinne has specific expertise in Intellectual Property, Technology Transfer, translational funding and project management. Before joining Accelerate, Corinne worked at the Life Sciences Hub as Project Manager of the Life Sciences Bridging Fund, a £3.1m proof of concept scheme from Welsh Government. She also worked in Technology Transfer at Cardiff University and as a patent examiner at the UK Intellectual Property Office. Corinne holds a PhD in chemistry and started her career as a postdoctoral researcher in drug discovery, working closely with industry and participating in a large multidisciplinary EU project. Corinne is originally from Montpellier (France) and a graduate of the "Ecole Nationale de Chimie de Montpellier". Having a longstanding interest for languages, she is fluent in French and English, and also enjoys practising Spanish. A great combination with her love of travelling.

Dr Corinne Nguyen

Uwch Gymrawd Arloesi

Mae Corinne yn cynnig profiad helaeth o Arloesi a Masnacheiddio ymchwil, gyda diddordeb brwd mewn Gwyddorau Bywyd. Mae hi'n gwerthfawrogi cydweithio, ac yn ystod y degawd diwethaf mae hi wedi datblygu rhwydwaith proffesiynol amrywiol yn yr Ecosystem Gwyddorau Bywyd yng Nghymru.

Mae rôl Corinne yn Cyflymu Arloesi Clinigol yn cynnwys ymgysylltu â chwmnïau, ymchwilwyr a chlinigwyr i gwmpasu, cyd-ddatblygu a hwyluso'r gwaith o gyflawni prosiectau Cyflymu.

Mae gan Corinne arbenigedd penodol mewn Eiddo Deallusol, Trosglwyddo Technoleg, arian pontio a rheoli prosiectau. Cyn ymuno â Cyflymu, bu Corinne yn gweithio yn yr Hwb Gwyddorau Bywyd fel Rheolwr Prosiect y Gronfa Pontio Gwyddorau Bywyd, cynllun profi cysyniadau gan Lywodraeth Cymru a oedd yn werth £3.1 miliwn. Bu hefyd yn gweithio ym maes Trosglwyddo Technoleg ym Mhrifysgol Caerdydd ac fel archwilydd patentau yn Swyddfa Eiddo Deallusol y Deyrnas Unedig. Mae gan Corinne PhD mewn Cemeg, a dechreuodd ei gyrfa fel ymchwilydd ôl-ddoethurol mewn darganfod cyffuriau, gan weithio'n agos gyda'r diwydiant a chymryd rhan mewn prosiect aml-ddisgyblaeth mawr gan yr Undeb Ewropeaidd. Yn wreiddiol, daw Corinne o Montpellier (Ffrainc) a graddiodd o "Ecole Nationale de Chimie de Montpellier". Mae ganddi ddiddordeb hirhoedlog mewn ieithoedd, mae hi'n rhugl yn Ffrangeg a Saesneg, ac mae hi hefyd yn mwynhau ymarfer ei Sbaeneg. Mae'n gyfuniad gwyach



Mr Michael Davies

Health Economist

Michael is the Health Economist on the Accelerate programme. He provides advice on the evaluation of clinical innovations and the economics of new products and processes. He has a masters' degree in Health Economics from City University, London and an executive MBA from Cass Business School. He is also a qualified and experienced project and programme manager. He worked in the NHS and health sector in England for over 27 years. More recently he was the programme director of a university masters' programme in health care management, where he taught health economics, leadership, management, and theories of change.

His research interests are the economics of clinical innovation and service transformations. In particular, the adoption and spread of technologies and new products and processes in health care systems. His areas of work include, Welsh eye care services, Welsh renal services, the development of biomarkers and more generally, precision medicine.

Mr Michael Davies

Economegydd Iechyd

Michael yw'r economegydd iechyd ar y rhaglen Cyflymu. Mae'n rhoi cyngor ar werthuso arloesi clinigol ac economeg cynhyrchion a phrosesau newydd. Mae ganddo radd meist'r mewn economeg iechyd o Brifysgol y Ddinas, Llundain, ac MBA gweithredol o Ysgol Fusnes Cass. Mae hefyd yn rheolwr prosiectau a rhaglenni cymwys a phrofiadol. Bu'n gweithio yn y GIG ac yn y sector iechyd yn Lloegr ers dros 27 o flynyddoedd. Yn fwy diweddar, ef oedd cyfarwyddwr rhaglen meistri prifysgol mewn rheoli gofal iechyd, lle dysgodd economeg iechyd, arweinyddiaeth, rheolaeth a damcaniaethau am newid.

Ei ddiddordebau ymchwil yw economeg arloesi clinigol a thrawsnewidiadau gwasanaethau. Yn benodol, mabwysiadu a lledaenu technolegau a chynnyrch a phrosesau newydd mewn systemau gofal iechyd. Mae ei feysydd gwaith yn cynnwys gwasanaethau gofal llygaid Cymru, gwasanaethau arenol yng Nghymru, datblygu biofarcwyr ac yn fwy cyffredinol, meddygaeth fanwl.



Dr Leanne Sawle

Innovation Fellow

Leanne is a Chartered Physiotherapist, with a multi-disciplinary background in sport and exercise science, teaching/ lecturing, R&D, project management and clinical research. Her clinical research sits in the field of novel orthotic development and chronic pain management in athletes, and her clinical practice background focuses primarily on athletic rehabilitation.

Following an early career in teaching, Leanne moved into clinical lecturing and research supervision. She also spent several years as the R&D lead and lead sports clinician within an orthotics company, working closely with universities, industrial partners and high-performance clients. This involved clinically leading and managing innovative projects, supervising research associates as well as problem solving the orthotic management of patients with conditions ranging from neurological disability to chronic pain.

Before joining CIA Leanne also worked in Cardiff University's School of Engineering, coordinating the UK-wide multi-disciplinary OATech+ Network, and the Musculoskeletal Biomechanics Research Facility. Leanne currently sits on the NICE Adoption and Impact Reference panel.

Dr Leanne Sawle

Cymrawd Arloesi Cyflymu Arloesi Clinigol

Mae Leanne yn Ffisiotherapydd Siartredig, gyda chefnidir amlddisgyblaethol ym maes gwyddorau chwaraeon ac ymarfer corff, addysgu/darlithio, ymchwil a datblygu, rheoli prosiectau ac ymchwil clinigol. Mae ei hymchwil clinigol yn rhan o faes datblygiadau newydd orthotig a rheoli poen cronig mewn athletwyr, ac mae ei chefnidir mewn ymarfer clinigol yn canolbwyntio ar adsefydlu mewn athletau yn bennaf.

Yn dilyn gyrfa gynnar ym myd addysg, symudodd Leanne i faes darlithio clinigol a goruchwylio ymchwil. Treuliodd sawl blwyddyn hefyd fel yr arweinydd ymchwil a datblygu a'r prif glinigwr chwaraeon mewn cwmni orthoteg, gan weithio'n agos gyda phrifysgolion, partneriaid diwydiannol a chleientiaid perfformiad uchel. Roedd hyn yn cynnwys arwain a rheoli prosiectau arloesol yn glinigol, goruchwylio cymdeithion ymchwil yn ogystal â datrys problemau o ran rheoli cleifion orthoteg gydag anhwylderau yn amrywio o anabledd niwrolegol i boen cronig.

Cyn ymuno â Cyflymu Arloesi Clinigol, bu Leanne hefyd yn gweithio yn Ysgol Beirianneg Prifysgol Caerdydd, gan gydlyn y Rhwydwaith OATech+ amlddisgyblaethol ledled y Deyrnas Unedig, a Chyfleuster Ymchwil Biomecaneg Cyhyrysgerbydol. Mae Leanne ar hyn o bryd yn aelod o banel Cyfeirio Effaith a Mabwysiadu NICE.



Sue Bevan

Innovation Fellow

Sue is our clinical innovation specialist here at Accelerate-Cardiff University, her role is around developing and managing relationships with Industry, 3rd Sector, Clinical and Academic partners. Sue continually supports the promotion of clinical innovation, working with various industry partners from micro to large multi nationals. Sue has skills and experience gained in her role with South East Wales Academic Health Science Partnership SEWAHSP to establish successful working relationships with key collaborators.

Sue has a varied background having served in HMAF, before working in BBC Wales, and then qualifying as an Independent Financial Advisor specialising in Ethical investment, Sue then went on to work in the University of South Wales and Bristol university before joining SEWAHSP where she was responsible for identifying potential opportunities for the development of projects and collaborations, and to forge successful working relationships with a wide range of HEI's, NHS, Government, 3rd sector and the Business Community staff, liaising with a range of senior staff to facilitate and negotiate required assistance and buy-in to various projects and opportunities. Sue has a BA Hons in Management and Business, and is qualified as a PRINCE2 project manager.

Sue Bevan

Cymrawd Arloesi Cyflymu Arloesi Clinigol

Sue yw ein harbenigwr arloesi clinigol yma yn Cyflymu-Prifysgol Caerdydd. Ei rôl yw datblygu a rheoli cysylltiadau gyda diwydiant, y trydydd sector, a phartneriaid clinigol ac academiaidd. Mae Sue yn cefnogi'n barhaus y gwaith o hyrwyddo arloesi clinigol, gan weithio gyda gwahanol bartneriaid yn y diwydiant o ficro gwmnïau i rai amlwladol mawr. Mae gan Sue sgiliau a phrofiad yn ei rôl gyda South East Wales Academic Health Science Partnership SEWAHSP i sefydlu cysylltiadau gweithio llwyddiannus gyda chydweithredwyr allweddol.

Mae gan Sue gefndir amrywiol, ar ôl gwasanaethu yn HMAF, gweithio yn BBC Cymru, ac yna cymhwyso fel Cynghorydd Ariannol Annibynnol yn arbenigo mewn buddsoddi moesegol. Yna, aeth Sue i weithio ym Mhrifysgol De Cymru a Phrifysgol Bryste cyn ymuno â SEWAHSP lle'r oedd hi'n gyfrifol am ganfod cyfleoedd posibl i ddatblygu prosiectau a chydweithrediaid, ac i feithrin cysylltiadau gwaith llwyddiannus gydag amrywiaeth eang o sefydliadau addysg uwch, y GIG, y Llywodraeth, y trydydd sector a staff y gymuned fusnes, gan gysylltu ag amrywiaeth o staff lefel uwch i hwyluso a negodi cymorth angenrheidiol ac ymuno â gwahanol brosiectau a chyfleoedd. Mae gan Sue BA Anrhydedd mewn Rheoli a Busnes, ac mae wedi cymhwyso fel rheolwr prosiect PRINCE2.



Suhair Jawad MPhil, BSc

Senior Administrative Office

Suhair has MPhil in Physiology from Cardiff University. She has a BSc in Chemistry. She is accredited PRINCE 2 Practitioner. Suhair completed the Leadership & Business Administration Programme, Cardiff Business School, 2019. Suhair is the Senior Administrative Officer for Accelerate Programme at Cardiff Innovation Accelerator (CIA). Suhair works closely with the Project Manager and CIA team regarding project delivery. She is responsible for the delivery of all of the administrative aspects of Accelerate project within CIA. Suhair responsibilities include; indicator returns, audit and governance, claim submissions and evidencing, project monitoring, Accelerate meetings, Huddle maintenance, Smartsheet maintenance, timesheets. Suhair is the main link between the CIA and the other Accelerate partners', including the LSHW, in relation to all admin and communication aspects.

Suhair has excellent experience in conducting clinical trials (CTIMP & Non CTIMP) and research projects. She was the Study Site Coordinator of the Common Cold Centre & Healthcare Clinical Trials, Cardiff University. Suhair was the main link between Cardiff University, pharmaceutical companies, and NHS Ethics Committees. She worked closely with many commercial organisations of the like of GSK, Pfizer, Proctor & Gamble, Novartis, etc. and with worldwide contacts across the USA, Europe and New Zealand. Suhair had effectively managed over 50 clinical trials. The outcome of many of these trials was so successful that they have led to the development of new medicines and publications in scientific journals. Prior to joining the CIA, Suhair was the Quality Assurance Team leader for Centre for Medical Education, School of Medicine, Cardiff University. She worked closely with the General Medical Council (GMC) and was responsible for all Quality Assurance aspects concerning evaluation process and programmes validation.

Suhair Jawad MPhil, BSc

Uwch Swyddog Gweinyddol Cyflymu Arloesi Clinigol

Mae gan Suhair MPhil mewn Ffisioleg o Brifysgol Caerdydd. Mae ganddi BSc mewn Cemeg. Mae hi'n Ymarferydd PRINCE 2 achrededig. Cwblhaodd Suhair Raglen Arwain a Gweinyddu Busnes yn Ysgol Fusnes Caerdydd yn 2019. Suhair yw Uwch Swyddog Gweinyddol Rhaglen Cyflymu yn Cyflymu Arloesi Caerdydd. Mae Suhair yn gweithio'n agos gyda'r Rheolwr Prosiect a thim Cyflymu Arloesi Caerdydd ynghylch cyflawni'r prosiect. Hi sy'n gyfrifol am gyflawni holl agweddau gweinyddol y prosiect Cyflymu yn Cyflymu Arloesi Caerdydd. Mae cyfrifoldebau Suhair yn cynnwys: ffurflenni dangosyddion, archwilio a llywodraethu, cyflwyniadau hawlio a thystiolaeth, monitro prosiectau, cyfarfodydd Cyflymu, cynnal a chadw Huddle, cynnal a chadw Smartsheet, Amserlenni. Suhair yw'r prif gyswllt rhwng Cyflymu Arloesi Caerdydd a'r partneriaid Cyflymu eraill, gan gynnwys LSHW, mewn perthynas â'r holl agweddau gweinyddol a chyfathrebu.

Mae gan Suhair brofiad rhagorol o gynnal treialon clinigol (CTIMP ac eraill) a phrosiectau ymchwil. Hi oedd Cydlynnydd Safle Astudio'r Ganolfan Annwyd Cyffredin a Threialon Clinigol Gofal Iechyd ym Mhrifysgol Caerdydd. Suhair oedd y prif gyswllt rhwng Prifysgol Caerdydd, cwmnïau fferyllol a Phwyllgorau Moeseg y GIG. Bu'n gweithio'n agos gyda nifer o sefydliadau masnachol fel GSK, Pfizer, Proctor & Gamble, Novartis ac ati, a chyda chysylltiadau ledled Unol Daleithiau America, Ewrop a Seland Newydd. Mae Suhair wedi rheoli dros 50 o dreialon clinigol yn effeithiol. Roedd canlyniad llawer o'r treialon hyn mor llwyddiannus fel eu bod wedi arwain at ddatblygu meddyginiaethau newydd a chyhoeddiadau mewn cylchgronau gwyddonol. Cyn ymuno â Cyflymu Arloesi Caerdydd, Suhair oedd arweinydd y Tim Sicrhau Ansawdd ar gyfer y Ganolfan Addysg Feddygol yn Ysgol Meddygaeth Prifysgol Caerdydd. Bu'n gweithio'n agos gyda'r Cyngor Meddygol Cyffredinol ac roedd hi'n gyfrifol am yr holl agweddau ar Sicrhau Ansawdd a oedd yn ymwneud â'r broses werthuso a dilynys rhaglenni.



Julie Hayward

Senior Administrative Officer

Julie is the Senior Administrative Officer for the Clinical Innovation Hub and the Accelerate programme. Julie is responsible for the administration of the Clinical Innovation Hub Multidisciplinary Team meetings and recording metrics. For the Accelerate programme, Julie's responsibilities include all project orders, HR administration, expense claims, conference coordination and organisation, and signposting new contacts.

Julie has a BSc Econ Joint Honours Degree (2.1) in Geography and Social Policy from Swansea University. Before joining the Clinical Innovation Hub, Julie's previous roles with Cardiff University were the Administrative Officer for the Sêr Cymru Life Sciences Research Network Wales and before that a Fieldworker collecting data for the Strengthening Families Project.

Julie Hayward

Uwch Swyddog Gweinyddol

Julie yw Uwch Swyddog Gweinyddol yr Hwb Arloesi Clinigol a'r rhaglen Cyflymu. Mae Julie yn gyfrifol am weinyddu cyfarfodydd tîm aml-ddisgyblaethol yr Hwb Arloesi Clinigol ac am gofnodi mesuriadau. Ar gyfer rhaglen Cyflymu, mae cyfrifoldebau Julie yn cynnwys holl archebion prosiectau, gweinyddu Adnoddau Dynol, hawliadau treuliau, cydlynw a threfnu cynadleddau, ac atgyfeirio cysylltiadau newydd.

Mae gan Julie radd BSc Econ (2.1) cydanrhydedd mewn Daearyddiaeth a Pholisi Cymdeithasol ym Mhrifysgol Abertawe. Cyn ymuno â'r Hwb Arloesi Clinigol, bu Julie yn Swyddog Gweinyddol Rhwydwaith Ymchwil Gwyddorau Bywyd Sêr Cymru ym Mhrifysgol Caerdydd, a chyn hynny roedd yn weithiwr maes a oedd yn casglu data ar gyfer y Prosiect Cryfhau Teuluoedd.



Megan Wiggins LLB PgDip LPC (Sol) Contracts (Legal) Officer

Megan is a qualified Solicitor of the Senior Courts of England and Wales who completed postgraduate studies at Cardiff University before qualifying. Prior to joining Cardiff University in the contracts team within Research and Innovation Services, Megan worked at both national and international law firms in private practice.

Megan studied International Law at Utrecht University in the Netherlands whilst completing her law degree at Aberystwyth University. Megan is currently studying for a Masters in Law from Nottingham Trent University in the area of legal research and advanced professional studies with a view to completing a PhD in law.

Megan is a staunch supporter of Cardiff University especially in fundraising for research and innovation. She has completed three Cardiff Half Marathons in order to raise funds for Cardiff University research. Megan has also gained experience as a researcher for the United Nations, department of economic and social affairs.

Megan provides advice and support for the contractual aspects of the Accelerate project. Megan works closely with the Accelerate team to provide project management, training and guidance. Megan works on a variety of projects funded by the European Regional Development Fund and Welsh European Funding Office. She brings a wealth of experience from many different projects.

Megan Wiggins LLB PgDip LPC (Sol) Swyddog Contractau Cyfreithiol

Mae Megan yn gyfreithiwr cymwys yn Uwch Lysoedd Cymru a Lloegr a gwblhaodd astudiaethau ôl-radd ym Mhrifysgol Caerdydd cyn cymhwyso. Cyn ymuno â Phrifysgol Caerdydd yn y tim contractau o fewn Gwasanaethau Ymchwil ac Arloesi, bu Megan yn gweithio mewn cwmnïau cyfreithiol cenedlaethol a rhyngwladol mewn practis preifat.

Bu i Megan astudio Cyfraith Ryngwladol ym Mhrifysgol Utrecht yn yr Iseldiroedd wrth gwblhau ei gradd yn y gyfraith ym Mhrifysgol Aberystwyth. Ar hyn o bryd mae Megan yn astudio ar gyfer gradd Meistr yn y Gyfraith ym Mhrifysgol Nottingham Trent ym maes ymchwil cyfreithiol ac astudiaethau proffesiynol uwch, gyda golwg ar gwblhau PhD yn y gyfraith. Mae Megan yn cefnogi Prifysgol Caerdydd yn frwd, yn enwedig o ran codi arian ar gyfer ymchwil ac arloesi. Mae hi wedi cwblhau tri Hanner Marathon Caerdydd er mwyn codi arian ar gyfer ymchwil Prifysgol Caerdydd. Mae Megan hefyd wedi cael profiad fel ymchwilydd ar ran y Cenhedloedd Unedig, yn yr adran materion economaidd a chymdeithasol. Mae Megan yn darparu cyngor a chymorth ar gyfer agweddau cytundebol ar brosiect Cyflymu. Mae Megan yn gweithio'n agos gyda thim Cyflymu i ddarparu gwaith rheoli prosiectau, hyfforddiant ac arweiniad.

Mae Megan yn gweithio ar amrywiaeth o brosiectau a noddir gan Gronfa Datblygu Rhanbarthol Ewrop a Swyddfa Cyllid Ewropeaidd Cymru. Mae'n dod â chyfoeth o brofiad o nifer o wahanol brosiectau.



Mia Brace

Project Support Officer

Mia's main role is to support the project managers and team members in the planning and co-ordination of projects. Mia often attends project meetings alongside the project managers to record and produce minutes for these meetings. Mia is supporting the Transforming of Eye Care Services in Wales Project by collating PREM's data and reproting via a database that she has produced.

Mia began this role in December 2019 as a work experience placement. At the start of February 2020, Mia acquired a 3-month contract in this role, which is likely to be extended until September when she will begin studying at Cardiff University for a BSc Honours Degree in Operating Department Practice.

Mia Brace

Swyddog Cymorth Prosiect

Prif rôl Mia yw cynorthwyo rheolwyr y prosiect ac aelodau'r tîm i gynllunio a chydlynw prosiectau. Mae Mia yn aml yn mynd i gyfarfodydd prosiect ochr yn ochr â rheolwyr prosiectau i gofnodi a chynhyrchu cofnodion ar gyfer y cyfarfodydd hyn. Cyn bo hir bydd Mia yn cynorthwyo Prosiect Trawsnewid Gwasanaethau Gofal Llygaid yng Nghymru drwy gasglu data PREM a'i fwydo i gronfa ddata mae hi wedi ei chreu. Mae Mia hefyd yn helpu'r Swyddog Gweinyddol gyda hawliadau treuliau a thaflenni amser.

Dechreuodd Mia yn y swydd hon ym mis Rhagfyr 2019 fel lleoliad profiad gwaith. Ar ddechrau Chwefror 2020, cafodd Mia contract 3 mis yn y rôl hon, sy'n debygol o gael ei ymestyn tan fis Medi pan fydd hi'n dechrau astudio ym Mhrifysgol Caerdydd am Radd Anrhydedd BSc mewn Ymarfer Adran Weithredu.



Martyna Olewinska BA (Hons) **Interior Architecture** **Senior European Finance** **Administrator**

Martyna has years of experience working on European Commission funded projects like Horizon 2020 and ERDF (European Regional Development Funds). She has joined ACCELERATE project as a Senior European Finance Administrator. As part of her current role, she is responsible for the completion of CIA's financial quarterly claims and manages its audit and verification processes. She supports the team with the financial management of the collaboration projects and advises on funding terms and conditions from Welsh European Funding Office.

Martyna studied Interior Architecture at Cardiff Metropolitan University where she gained experience of project budget management. She has joined Research and Innovation Services at Cardiff University to support academic research and development. She is fluent in both English and Polish languages.

Martyna Olewinska BA (Hons) **Interior Architecture**

Uwch Weinyddwr Cyllid
Ewropeaidd Cyflymu Arloesi
Clinigol

Mae gan Martyna flynyddoedd o brofiad yn gweithio ar brosiectau a ariennir gan y Comisiwn Ewropeaidd fel Horizon 2020 ac ERDF (Cron Datblygu Rhanbarthol Ewropeaidd). Mae hi wedi ymuno â'r rhaglen Cyflymu fel Uwch Gweinyddwr Cyllid Ewropeaidd. Fel rhan o'i rôl, mae hi'n gyfrifol am gwblhau hawliadau chwarterol ariannol CIA ac yn rheoli eu prosesau archwilio a gwirio. Mae hi'n cefnogi'r tîm gyda rheolaeth ariannol y prosiectau cydweithredu ac yn cynghori ar delerau ac amodau cyllid gan y Swyddfa Cyllid Ewropeaidd Cymru. Astudiodd Martyna Bensaerniaeth Fewnol ym Mhrifysgol Fetropolitan Caerdydd lle enillodd brofiad o reoli cyllideb prosiect.

Mae hi wedi ymuno â'r gwasanaethau ymchwil ac arloesi ym Mhrifysgol Caerdydd i gefnogi ymchwil academiaidd a datblygu. Mae hi'n rhugl yn Saesneg a Phwyleg.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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To find out more about the programme, please email:

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AccelerateCIA

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