Foreword

The Institute of Cardiovascular & Medical Sciences (ICAMS) is one of seven Research Institutes at the University of Glasgow. It was set up in August 2010. This is our fifth annual report and describes the achievements of the Institute over the 2016 calendar year.

The vision of ICAMS is to be a world leader bridging the gap between cutting-edge cardiovascular science and state-of-the-art medicine through excellence in research and teaching. The mission of ICAMS is to enhance human health through research into the fundamental mechanisms of cardiovascular disease and associated metabolic disorders and to advance discoveries leading to improved diagnosis and treatment of cardiovascular and related diseases. ICAMS is committed to excellence in undergraduate and postgraduate teaching, to training the future world leaders in cardiovascular science and medicine and to empowering its staff to carry out and support these endeavours to the highest possible standards.

The research strategic priorities in 2016 were:
• Vascular Pathophysiology & Therapy
• Heart Research
• Diabetes, Metabolic Disease and Renal Disease
• Stroke
• Genetics, Genomics & Systems Medicine

Our upward trajectory continues to grow and 2016 has been another successful year at every level. In 2016, the Institute held 464 active research grants or contracts, with a total value to the Institute of £56.1 million. We also won 105 new grants resulting in more than £10 million coming to the Institute. Our academic staff published 519 peer-reviewed journal articles. We had 123 postgraduate research students registered with the Institute in 2016: 114 PhD Students and 9 MD Students. Our student and fellows cohort is truly international with representation from every continent.

The Institute of Cardiovascular Sciences had a total of 216 staff members by the end of 2016; 67 Research only, 54 Research & Teaching, 27 Technical Staff, 13 Management, Professional and Administrative, and 1 Operational Staff Member. We also have over 264 Honorary members of staff and visiting professors, including our 2016 Visiting Professors, C. Weyand from Stanford and D. Harrison from Vanderbilt.

Our discovery science unravelling mechanisms of pulmonary hypertension, hypertension, atherosclerosis, arrhythmias, cardiac hypertrophy, aortic aneurysms and stroke, together with clinical studies defining new approaches in the diagnosis and treatment of coronary microvascular disease, heart failure, stroke and diabetes have been published in the highest impact cardiovascular journals, with many appearing in the top 5% of journals. These contributions, together with the excellence training our young scientists and clinical researchers, places ICAMS amongst the best cardiovascular research institutes globally. Our successes over the past year certainly reflect this.

It is a pleasure to share with you, in the following pages, some ICAMS highlights during 2016

Professor Rhian Touyz
Director of the Institute of Cardiovascular & Medical Sciences
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1. Strategy and Research Priorities

1.1 Mission

Our mission is to enhance human health through research into the causes of cardiovascular disease and to advance and implement discoveries leading to improved prevention, diagnosis and treatment of these diseases.

1.2 Institute Structure

Institute of Cardiovascular & Medical Sciences

Learning & Teaching Committee
Remit: Management of students
Chair: Dr S Nicklin

Athena SWAN Committee
Remit: To ensure equal career opportunities
Chair: Dr J Logue

Network for Early Career Researcher Development
Remit: To provide a supportive framework for early career researchers
Chair: Dr A Bradshaw

Health & Safety Committee
Remit: To manage health and safety
Chair: Dr W K Lee

Operations Committee
Remit: To manage facilities and operations
Chair: Dr W K Lee

Leadership & Executive
Remit: To provide high level leadership and to manage, implement and deliver Institute, College and University Strategies
Chair: Prof R Touyz
Director: Prof J McMurray
Deputy Director: Prof G Smith
Deputy Director: Ms Jillian Blair
Head of Administration: Dr A Bradshaw

BHF Centre of Research Excellence in Vascular Science and Medicine
Directors: Profs R Touyz and C Delles

Scientific Steering Committee: Research & Management
Remit: To cascade University and College information, develop scientific strategies and drive research excellence.
Chair: Prof R Touyz
Membership: Senior staff

Research & Knowledge Transfer (R&KT) Committee
Remit: To manage R&KT and impact activity.
To Oversee Research Excellence Framework-related activities
Chair: Prof G Smith

Open Forum
Remit: To cascade University, College & Institute policies, procedures and information.
Chair: Prof R Touyz & Executive
Membership: All staff

Research Themes

Research Sub-Themes
1.3 Institute Committees

EXECUTIVE COMMITTEE

- Prof Rhian Touyz
- Prof Godfrey Smith
- Prof John McMurray
- Ms Jillian Blair

OPERATIONS COMMITTEE

- Chair: Professor Andrew H. Baker
  - Teaching and Learning: Dr Stuart Nicklin
  - Postgraduate Research (PGR): Professor Eleanor Davies
  - Finances: Ms Jillian Blair
  - Health & Safety: Dr Wai Kwong Lee
  - Web & Communications: Mrs Sandra MacDonald
  - Internationalisation: Dr Christopher Loughrey
  - Athena SWAN: Professor Rhian Touyz
  - Young Investigator Network (YIN): Dr Scott Johnstone
  - Mentoring: Professor Rhian Touyz
  - BHF Centre of Excellence: Mrs Karen Trofimova
  - Clinical/NHS: Dr Robert Lyndsay

SCIENTIFIC STEERING COMMITTEE

- Chair: Professor Rhian Touyz
  - Vascular: Professor Rhian Touyz, Professor Christian Delles, Professor Tomasz Guzik, Professor Mandy MacLean
  - Cardiac: Professor Colin Berry, Professor John McMurray, Professor Godfrey Smith, Professor George Baillie
  - Metabolic Disease/Diabetes: Professor Naveed Sattar, Professor John Petrie
  - Stroke: Professor Jesse Dawson
  - Kidney: Professor Patrick Mark
  - -Omics: Professor Sandosh Padmanabhan

RESEARCH, KNOWLEDGE EXCHANGE & IMPACT COMMITTEE

- Chair: Professor Godfrey Smith
  - Professor George Baillie
  - Professor Naveed Sattar
  - Professor John McMurray
  - Professor Joanne Mountford

1.4 Research Priorities

Research is the prime activity of the Institute and forms the central core around which all our other activities take place. In order to achieve our objectives we need to further support our areas of strength, but also concentrate more effort and resources on the areas identified as demonstrating potential to be fields of research excellence.

Our Research Themes:

- Cardiac Research
- Vascular Research
- Metabolic Disease & Diabetes Research
- Renal Research
- Stroke Research
- -Omics Research

1.5 Research Themes

CARDIAC RESEARCH

Our cardiac research incorporates basic biology, integrative physiology, and translational and clinical research. Our groups have a diverse range of technical expertise including electro-physiology (basic and clinical), pharmacology (experimental and clinical), physiology (experimental and clinical), imaging (echocardiography, CT, MRI), epidemiology and clinical trials.

Our Principal Investigators are internationally recognised, work done into the mechanisms of disease, including arrhythmias, congenital heart disease, coronary heart disease, pulmonary hypertension, heart failure and public health. Our clinicians work in tertiary care NHS hospitals in Greater Glasgow and Clyde Health Board and also in the Golden Jubilee National Hospital, which hosts the West of Scotland Heart and Lung Centre and the National Services in Adult Congenital Heart Disease, Advanced Heart Failure and Pulmonary Vascular Disease.

Theme Leaders: Professors George Baillie, Colin Berry, John McMurray and Godfrey Smith

METABOLIC DISEASE & DIABETES RESEARCH

The collective expertise within Metabolic Disease & Diabetes Research Theme spans a full range from molecular and biomarker "-omic" techniques through clinical investigation to population-level epidemiology, clinical trials and cardiovascular endpoint adjudication. We are leading in establishing disease-specific bio resources linked with routinely-acquired anonymised data from the National Health Service in Scotland. As a group of established Principal Investigators and emerging young researchers, we encourage and foster collaborations within the Institute, the University of Glasgow, nationally and internationally.

Our aims:

- To better understand the mechanisms of cardiovascular and metabolic diseases affecting people with the conditions covered by our clinical specialties (i.e. diabetes, endocrine conditions), and the implications for the wider population – including groups defined by ethnicity, gender and deprivation.
- To understand the pathways and processes linking obesity and physical inactivity to cardiovascular and metabolic diseases in order to develop better strategies to prevent and treat obesity, and alleviate its metabolic and vascular complications.
- To the knowledge obtained via our research and use it to develop new cardiovascular therapies and to target existing therapies more effectively.

Theme Leaders: Professors John Petrie and Naveed Sattar
RENAL RESEARCH

Patients with chronic kidney disease (CKD) have a greatly increased risk of premature cardiovascular disease. This risk is not explained by conventional cardiovascular risk factors such as smoking, high cholesterol or diabetes. For patients with kidney failure requiring dialysis, the risk of cardiovascular disease is even higher, between five and twenty times that of someone of a similar age from the general population with normal kidney function. Receiving a successful kidney transplant improves cardiovascular outcomes as well as quality of life, but does not normalise the risk back to baseline. The Renal Research Theme is developing strategies to reduce this risk and improve outcomes for patients with CKD. We use a number of targeted approaches to address this problem.

These include:

• Laboratory studies of blood vessels to see the effect of CKD on blood vessel function.
• Imaging studies of the heart, kidneys, blood vessels and brain to examine sites of cardiac and vascular damage to establish new targets for treatment to reduce cardiovascular risk in CKD.
• Collecting blood and urine samples in cohorts of patients with or at risk of CKD to develop biomarkers of cardiovascular disease which have highest utility in CKD.
• Undertaking clinical trials of interventions aiming to reduce cardiovascular risk in CKD.
• Interrogating health care data to identify patterns of cardiovascular disease and stroke in patients with CKD.

We are interested in the effect of all grades of CKD on cardiovascular risk. This includes the effect of mild CKD on high blood pressure and heart function. Similarly, by studying the heart and blood vessels in patients with kidney failure we aim to improve the understanding of cardiovascular disease in patients needing dialysis or with a kidney transplant and offer new avenues for treatment.

Theme Leaders: Dr Patrick Mark

STROKE RESEARCH

Our stroke research groups focuses on translational and clinical research into the causes and treatment of stroke. Our Principal Investigators are internationally recognised researchers and hold substantial government, charitable and commercial funding. We have a strong track record of delivering large and high quality clinical studies. Our Principal Investigators have played key roles in shaping the modern approach to treatment. Our clinical research activities include co-ordination of the Virtual International Stroke Trials Archive (VISTA), Central Adjudication of Modified Rankin Scale scores (CARS), microRNA profiling in ischaemic stroke, development and validation of novel biomarkers, vascular cognitive impairment, upper limb rehabilitation and we run a number of large scale acute and prevention trials. We have in house data management and bio statistical support. Preclinical research uses animal models exhibiting stroke-associated co-morbidities and a transient model of occlusion with recanalization. Research is focused around identification of novel treatments targeting mitochon-
dria (in collaboration with the MRC Mitochondrial Biology Unit, Cambridge) or polytherapy approaches through miRNA modulation. Through links with colleagues in INP we have access to state of the art small animal MRI.

We also have a large number of UK and foreign post graduate taught and research students.

We are co-located between the BHF Glasgow Cardiovascular Research Centre, the Queen Elizabeth University Hospital (opened in 2016) and the Glasgow Royal Infirmary. This provides access to state-of-the-art imaging facilities and we admit patients from the whole West of Scotland area.

Theme Leader: Dr Jesse Dawson

OMICS RESEARCH

Omics encompasses research fields that use data-intensive methods to map genes, proteins and small molecules, their interactions and their regulation with the ultimate aim of understanding complex biology and disease processes. Traditionally, genes and proteins have been analysed individually, but with the emergence of Omics technologies capable of measuring gene sequence variation, expression and other biomarkers on a global scale this is now the era of high-dimensional biology. Omics naturally leads to big data and navigating and analysing the resulting information deluge is a key challenge for the research community requiring sophisticated bioinformatics, data-science and statistical expertise.

Some of the technologies that have attained a level of maturity in the Omics arena are listed below.

• Genomics - the systematic study of an organism's genome and differences in DNA sequence between individuals.
• Proteomics - the study of all expressed proteins in a cell, tissue or organism and aims to characterise information flow within the cell and the organism, through protein pathways and networks. The proteome is a dynamic reflection of both genes and the environment and is thought to hold special promise for biomarker discovery.
• Metabolomics - the study of global metabolite profiles in a cell, tissue or organism. The metabolome is the final downstream product of gene transcription and is closest to the phenotype of the biological system studied.
• Transcriptomics - the study of the transcriptome—the complete set of RNA transcripts that are produced by the genome, under specific circumstances or in a specific cell—using high-throughput methods, such as microarray analysis.
• Glycomics - the study of the structure and function of carbohydrates (sugars) in biological systems
• Lipidomics - the study of cellular lipids

The Omics theme is an evolving and growing collaboration of researchers who use Omics technologies in their research, with the aim to share methods and solutions across themes, assist new researchers into the Omics arena and facilitate the development of an interdisciplinary environment to accelerate discovery science into clinical applications.

Theme Leaders: Professor Sandosh Padmanabhan
Institute of Cardiovascular & Medical Sciences (ICAMS)

Research Themes

BHF CoRE in Vascular Science & Medicine

2. BHF Centre of Research Excellence

2.1 Overview

In 2014 the British Heart Foundation invested £3 million to establish ICAMS as a BHF Centre of Research Excellence in Vascular Science & Medicine (BHF CoRE Glasgow). The BHF CoRE Glasgow within ICAMS is one of six BHF Centres of Research Excellence. The key aim is to find new and innovative ways to fight heart disease. The overall scientific strategy of the BHF CoRE focuses on vascular dysfunction as a root cause of cardiovascular disease. In addition to pioneering research, the CoRE offers selected clinicians fully-funded PhD programmes in Vascular Biomedicine, post-doc researchers a unique chance to shadow doctors in various clinics around Glasgow, as well as runs 3 CoRE facilities in Myography & Imaging, Clinical Trials and Vascular Phenotyping.

The BHF Centre of Research Excellence in Vascular Science & Medicine operates alongside our research themes.

RESEARCH AXES AND PROJECTS

Our current research portfolio includes:
- Immune Dysregulation in Hypertension and Vascular Dysfunction
- Redox Biology, Vascular Signaling and Cardiovascular Disease, including CADASIL
- Microvessels, Heart Disease and Pulmonary Hypertension
- Small Vessel Disease of the Brain

The 4th axis was added over the past year as a new theme. The research focuses on both pre-clinical models and clinical studies of small vessel disease of the brain, building on the current research in this area conducted by Prof Keith Muir (neurology) and David Stott. By formalising links between these clinical researchers and basic scientists (Dr Work), and offering some seed-funding and administrative support, the REA will provide a platform to advance research in this field. Within the 4 research axes, a number of new projects have been initiated, new collaborations have been formed, preliminary data have been generated and preparations for new grant funding are in progress.

2.2 BHF Centre of Research Excellence in Vascular Science & Medicine

To receive this grant was an outstanding achievement. 2016 has been a very exciting and productive year for our Centre of Excellence. Highlights include research advances, initiation of new training programmes, creation of new core facilities, and partnering with international vascular networks.

The Scientific Framework of the BHF CoRE Glasgow:

RESEARCH ADVANCES

Already we have progressed our research which aims to unravel the mysteries behind cardiovascular diseases such as high blood pressure, vascular dementia, stroke, and heart disease, by finding out what causes small and large arteries to become inflamed. Numerous specific projects studying genes, molecules, animal research and patients are also well under way.

TRAINING THE NEXT GENERATION OF SCIENTISTS

Providing the next generation of cardiovascular researchers with a strong training in laboratory and clinical research, from bench-to-bedside, and from bedside-to-bench, is a priority for us.

We have launched two new unique training programmes in the BHF CoRE Glasgow:
- 3 year fully-funded PhD in vascular biomedicine for medical doctors.
- The Clinical Observership Programme – the opportunity for PhD scientists to shadow senior clinicians for 5 weeks.

During 2016, five more clinicians were recruited and began their PhD training, completing the Centre’s total of 7 Clinical Research Fellows. All 7 CRFs have started their PhD project and some of the recruitment for clinical studies started towards the end of the year. Additionally, 1 post-doc – Dr Adam Harvey - successfully completed the first round of the Clinical Observership Programme during the second half of 2016. The programmes are proving to be very successful and with time we will expand them.

CORE FACILITIES

The BHF CoRE Glasgow has established 3 Core facilities, all of which are available for use by all researchers. The 3 Core Facilities are:
- Non-invasive clinical vascular phenotyping.
- Myography and imaging Core to assess vascular function and structure in human models of cardiovascular disease.
- Clinical Trial Core.

PARTNERSHIPS

The BHF Centre of Excellence in Vascular Science and Medicine is now linked to a number of other key vascular organisations in Europe and North America. These established links provide us the opportunity for collaboration on a scientific level, event organisation, sharing of resources, reagents and protocols and opportunities for new grant funding.

CANADIAN VASCULAR NETWORK

In particular, we have established collaborative links with the Canadian Vascular Network, with the goal of enriching common scientific goals and enhancing training opportunities through student and professorial exchanges.

In November 2016, Professors Touyz, Delles, Guzik and Berry travelled to Montreal, Canada to attend the Canadian Vascular Network’s AGM 2016. The BHF CoRE delegates really enjoyed learning about the excellent science that is being conducted through the CV network and it was especially exciting meeting the fantastic and enthusiastic fellows and scholars. The ultimate goal of these partnerships is to obtain new funding that will allow development of the proposed projects.
CAMBRIDGE BHF CENTRE OF RESEARCH EXCELLENCE

Over 2016 our collaboration with The Cambridge BHF CoRE has developed further. Members of our Centre attended the Cambridge CoRE Annual Meeting in April 2016 (detailed below) and it proved an extremely useful opportunity to identify areas for future closer collaboration between the two CoREs. Most strikingly, we were impressed by the high quality of the research and the considerable overlap in research interests between the Glasgow and Cambridge centres. These range from pulmonary hypertension to cerebral small vessel disease and provide an excellent potential for further collaboration.

VASCULAR PRIMER

In 2015, we initiated the chapter outline and began gathering contributions for the compilation of a “Vascular Primer” handbook, initially designed to function as a basic science handbook for the recruited Clinical Research Fellows. As this project developed, in Nov 2015 the BHF CoRE, Cambridge received a request from Springer to develop this handbook into a textbook for publication. During 2016, the CoRE expanded the scope of the handbook to include international contributions from our partners and it is set for publication in 2018.

EVENTS

BHF Centre of Excellence Researchers at ‘Gavinburn is Science-ational’

On 2nd March 2016, a group of researchers from the BHF Centre of Excellence lead by Jonathan Noonan (John McMurray, Colin Berry and Mandy MacLean) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

BHF Cambridge Centre for Cardiovascular Research Excellence Annual Meeting, Monday 11th April 2016

Professors Tom Guzik and Christian Delles attended the BHF Cambridge Centre for Cardiovascular Research Excellence Annual Meeting on 11th April 2016 to represent the Glasgow BHF Centre of Research Excellence. Thanks were extended to Nick Morrell and Martin Bennett for their hospitality. The meeting took place in the Moller Centre and saw a number of presentations generated interesting discussion and the board members provided constructive feedback. Following the talks, the board members enjoyed a wide variety of poster presentations from the Clinical Research Fellows (Daniele Kerr, Alan Cameron) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

BHF Centre of Excellence Researchers at ‘Glasgow Science Festival Innovates – Kelvingrove Museum’

On 11th-12th June 2016, a group of researchers from the BHF Centre of Research Excellence lead by Daniele Kerr, Alan Cameron and Pasquale Maffia portrayed the importance of studying cardiovascular disease running a ‘science stall’ with hands-on activities for children.

External Scientific Advisory Board meeting, 29th March 2016

The BHF Centre of Research Excellence (BHF CoRE) hosted a meeting of the external scientific advisory board (ESAB). The board were invited by the Director of the CoRE, Prof Rhian Touyz, to appraise and give constructive criticism regarding progress to date. The ESAB comprised Prof Victor Dzau (Chair); President of the National Academy of Medicine; Prof Marc Pfeffer, Harvard Medical School; Prof Robert Kass, Columbia University Medical School; Prof Morris Brown, Queen Mary University of London. Unfortunately one other board member, Prof Mark Greager, was unable to attend. The meeting consisted of an overview of the CoRE, the progress, new initiatives, training programmes and future plans. In addition, PIs funded through the award, gave scientific presentations. These included: Immune Dysregulation and Vascular Function Axis (Tom Guzik, Pasquale Maffia, Iain Midnines, Naveed Sattar); the Redox Biology, Vascular Signalling and CVD Axis (Rhian Touyz, Christian Delles); the Microvessels, Heart and PAH Axis (John McMurray, Colin Berry and Mandy MacLean). All presentations generated interesting discussion and the board members provided constructive feedback. Following the talks, the board members enjoyed a wide variety of poster presentations from the Clinical Research Fellows (Daniele Kerr, Alan Cameron) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

BHF Centre of Excellence Researchers at ‘Glasgow Science Festival’

On Friday 30th September 2016, a group of researchers from the BHF Centre of Excellence lead by Jonathan Noonan (John McMurray, Colin Berry and Mandy MacLean) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

BHF Centre of Excellence Researchers at ‘Explorathon 2016’

On Friday 30th September 2016, a group of researchers from the BHF Centre of Excellence lead by Jonathan Noonan (John McMurray, Colin Berry and Mandy MacLean) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

2016 BHF Centre of Research Excellence Annual Symposium – CARDIOVASCULAR TARGET IDENTIFICATION AND DRUG DISCOVERY, 18th July 2016 at Imperial College London.

Professor Colin Berry and his team at the BHF CoRE were key contributors to the CE-MARC 2 clinical trial, whose results are now available in the Journal of the American Medical Association, 29th August 2016

The research we are doing at Glasgow was recognised, with good levels of interest during the three poster sessions and the award of a poster prize to Charlotte, for her poster entitled ‘RunX1 Deficiency Protects Against Adverse Cardiac Remodelling Following Myocardial Infarction’.

CE-MARC 2 study published in the Journal of the American Medical Association, 29th August 2016

Professor Colin Berry and his team at the BHF CoRE were key contributors to the CE-MARC 2 clinical trial, whose results are now available in the Journal of the American Medical Association, 29th August 2016

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The randomised trial looked at the effect of care guided by Cardiovascular Magnetic Resonance. Myocardial Perfusion Scintigraphy, or NICE Guidelines on Subsequent Unnecessary Angiography Ratescan and can be accessed free online here.

BHF Centre of Excellence Researchers at ‘Explorathon 2016’

On Friday 30th September 2016, a group of researchers from the BHF Centre of Excellence lead by Jonathan Noonan (John McMurray, Colin Berry and Mandy MacLean) who have recently commenced their PhD within the CoRE, and students of the ICAMS Vascular Theme. This gave the opportunity for both junior and senior researchers to discuss their research with the board members.

BHF Centre of Excellence Researchers at ‘Glasgow Science Festival’, 2016

Over 1000 people in 2 days, with 11 researchers involved, 14 kg of clay used, 300 gift boxes distributed and over 250 ‘1 like it’ stickers on the evaluation boards.

2016 BHF Centre of Research Excellence Annual Symposium – CARDIOVASCULAR TARGET IDENTIFICATION AND DRUG DISCOVERY, 18th July 2016 at Imperial College London.

Lorraine Work, Charlotte McCarron and Angela Bradshaw attended and presented posters. There was a strong technological and translational focus to the meeting, with talks from academic scientists, clinicians and industrial scientists based in London as well as from further afield. The research we are doing at Glasgow was recognised, with good levels of interest during the three poster sessions and the award of a poster prize to Charlotte, for her poster entitled ‘RunX1 Deficiency Protects Against Adverse Cardiac Remodelling Following Myocardial Infarction’.

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BHF Scotland Tour ICAMS BHF CoRE – October 2016

Members of the BHF Scotland fundraising team and a BHF Supporter recently visited the BHF CoRE for a behind the scenes look at some of the interesting heart research currently ongoing within ICAMS. They were able to take a whistle stop tour which included MRI, the 3rd and 4th floor labs and an up close look at some vascular smooth muscle cells. Dr Guto Montezano kindly provided a researcher’s perspective and explained how vital the state-of-the-art equipment is to our research.

AWARDS

BHF Centre of Research Excellence Small Grant awardees – May 2016

The BHF Centre of Research Excellence (CoRE) congratulated the 2016 Small Grant award recipients. The CoRE has provided seed funding to support research across ICAMS with a high likelihood of grant success in the near future. The objective of this award is to provide seed funding to generate essential pilot data for grant applications that have a high likelihood of grant success. This year 13 applications were peer-reviewed, representing multiple disciplines and approaches. Three grants listed here were selected for this year’s funding round:

- Determination of the translational potential the SHRSP for studies of small vessel disease/cerebral microvascular disease – Dr Lorraine Work.
- Development of a SMART stent for cardiovascular disease – Dr John Mercer.
- Using neuroimaging to describe the pathophysiology of cognitive decline in heart failure – Dr Jane Cannon.
3. General Information

3.1 Funding

In 2016, the Institute of Cardiovascular & Medical Sciences held 464 active research grants or contracts with a total value to the Institute of £56.1 million.

The top five funders, by value of active projects were:

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<th>Funder</th>
<th>Proportioned total number of awards</th>
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<tr>
<td>British Heart Foundation</td>
<td>£14,396,368</td>
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<tr>
<td>Medical Research Council</td>
<td>£9,267,956</td>
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</tr>
<tr>
<td>European Commission</td>
<td>£7,896,776</td>
<td>49</td>
</tr>
<tr>
<td>Wellcome Trust</td>
<td>£6,049,268</td>
<td>14</td>
</tr>
<tr>
<td>National Institute for Health Research</td>
<td>£4,410,053</td>
<td>24</td>
</tr>
</tbody>
</table>

During 2016, the Institute was awarded 105 new projects, with £10 million coming to the Institute.

The largest funders for new awards, by value were:

<table>
<thead>
<tr>
<th>Funder</th>
<th>Proportioned total number of awards</th>
<th>Total number of awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellcome Trust</td>
<td>£3,776,552</td>
<td>6</td>
</tr>
<tr>
<td>British Heart Foundation</td>
<td>£1,684,992</td>
<td>7</td>
</tr>
<tr>
<td>Medical Research Council</td>
<td>£1,543,036</td>
<td>15</td>
</tr>
<tr>
<td>Scottish Executive Health Department</td>
<td>£504,294</td>
<td>11</td>
</tr>
<tr>
<td>Stroke Association</td>
<td>£336,169</td>
<td>4</td>
</tr>
</tbody>
</table>

Appendix 6.3 contains a list of new grants awarded in 2016 on which Institute members were investigators. The funding stated is the amount that has come to the University of Glasgow which, for some grants, may be less that the total amount awarded. The list does not include any grants which are confidential in nature.

ICAMS: ACTIVE GRANTS 2015

ICAMS: NEW GRANTS 2015

3.2 Publications

Members of the Institute of Cardiovascular & Medical Sciences published a total of 519 manuscripts and numerous books and book chapters during 2016. The full lists of publications are contained in Appendices 6.4 and 6.5. Thomson Reuters have consistently named Professors John McMurray and Naveed Sattar and Dr Bill Mullen as highly cited researchers.

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Journal</th>
<th>Paper Title</th>
<th>Times cited</th>
<th>FWCI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Mark Petrie</td>
<td>New England Journal of Medicine</td>
<td>Coronary-artery bypass surgery in patients with ischemic cardiomyopathy</td>
<td>50</td>
<td>54.96</td>
</tr>
<tr>
<td>Prof Naveed Sattar</td>
<td>JAMA: Journal of the American Medical Association</td>
<td>Efficacy and tolerability of evolocumab vs. ezetimibe in patients with muscle-related statin intolerance: the GAUSS-3 randomized clinical trial</td>
<td>45</td>
<td>49.46</td>
</tr>
<tr>
<td>Prof Naveed Sattar</td>
<td>New England Journal of Medicine</td>
<td>Coding variation in ANGPTL4, LPL, and SVEP1 and the risk of coronary disease</td>
<td>43</td>
<td>47.26</td>
</tr>
<tr>
<td>Prof Peter Langhorne</td>
<td>Lancet</td>
<td>Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): a case-control study</td>
<td>34</td>
<td>37.37</td>
</tr>
<tr>
<td>Prof Dame Anna Dominiczak</td>
<td>Hypertension</td>
<td>An Expert Opinion from the European Society of Hypertension-European Union Geriatric Medicine Society Working Group on the management of hypertension in very old, frail subjects</td>
<td>16</td>
<td>34.59</td>
</tr>
</tbody>
</table>

* Field-Weighted Citation Impact (FWCI)

# of citations received by a document expected # of citations for similar documents

Similar documents are ones in the same discipline, of the same type (e.g. article, letter, review) and of the same age. An FWCI of 1 means that the output performs just as expected against the global average; for example, 1.48 means 48% more cited than expected.

5.1% of ICAMS papers are in the top 1% most highly cited papers worldwide

21.6% of ICAMS papers are in the top 10% most highly cited papers worldwide

13.6% of ICAMS papers are in the top 5% most highly cited papers worldwide

ICAMS researchers are cited 3.4 times more than the worldwide average
4. Sharing Knowledge

4.1 Global Partnerships

The Institute of Cardiovascular & Medical Sciences strives to achieve a global impact in terms of cutting edge cardiovascular science and state-of-the-art medicine. In order to realise this goal, we share knowledge through collaborations with academics and partners in 35 countries across the world:

Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Denmark, Egypt, Finland, France, Germany, Greece, India, Ireland, Israel, Italy, Japan, Kuwait, Malaysia, Netherlands, New Zealand, Norway, Poland, Russia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, United Kingdom, United States of America

4.2 Investing in the Future

The Institute of Cardiovascular and Medical Sciences is committed to training the leaders of the future by providing supervision of postgraduate research students, postgraduate taught courses and support and mentorship to early career researchers.

4.3 Postgraduate Research

The Institute provides a vibrant and supportive environment for postgraduate research students, who come from a wide variety of professional backgrounds and disciplines. In 2016, there were 123 postgraduate research students registered in the Institute of Cardiovascular and Medical Sciences: 114 students were studying for Doctorate of Philosophy (PhD), 9 for Doctorate of Medicine (MD). During 2016, 19 students were awarded doctorates: 16 PhD, 3 MD, current PhD students are listed in Appendix 6.6 and current MD students are listed in Appendix 6.7.

4.3.1 Awarded Postgraduate Research Degrees

**DOCTORATE OF MEDICINE (MD)**

- Stephen Crawley, Thesis: “Cardiac resonance imaging in the diagnosis and determination of outcome of pulmonary hypertension”
- Jamie Layland, Thesis: “Utility and safety of invasive (Fractional Flow) and non-invasive (Cardiac Magnetic Resonance Imaging) diagnostic test in patients with NSTEMI”
- Chih Wong, Thesis: “Heart failure in young adults”

**DOCTORATE OF PHILOSOPHY (PHD)**


Andrew Allan, Thesis: “Examination of myocardial electrophysiology using novel panoramic optical mapping techniques”

Abdulaziz Alqadi, Thesis: “Studies of antihypertensive drug persistence and adherence in the Glasgow Blood Pressure Clinic”

Lin Deng, Thesis: “The role of noncoding RNA in the development of pulmonary arterial hypertension”


Crawford Halliday, Thesis: “The Role of MicroRNA-21 in a Mouse Model of In-Stent Restenosis”

Helen Heathcote, Thesis: “The regulation of AMP activated protein kinase by vascular endothelial growth factor”

Christopher Lavery, Thesis: “Exploring the Role of miR-34a in regulating adipose inflammation during obesity”


Kirsten Munro, Thesis: “Stabilising suppressor of cytokine signalling 3 (SOCS3) protein levels to limit neointimal hyperplasia”

Katrin Nather, Thesis: “Investing angiotensin in cardiac remodeling and the counter-regulatory actions of angiotensin - (1-9)”

Ana Perez, Thesis: “Fatigue and dyspnoea in heart failure: insights from two large randomised clinical trials”

Hannah Stepto, Thesis: “Development of adenoviral and miRNA eluting stents”

Nicola Walsh, Thesis: “Comparison of the modes of action of Apremilast and Roflumilast”

Zichu Yang, Thesis: “Regulation of prostate cancer cell function by activators of AMP-activated protein kinase”
4.5 Postgraduate Teaching

In the 2016-2017 term, the Institute launched a new course, Ergogenic Aids for Exercise Performance. The focus of this course, run by Dr Stuart Gray, is on cutting edge and novel research in this burgeoning area of science, designed to investigate the evidence supporting some of the many ergogenic aids for exercise performance that are currently being used.

We had 144 registered PGT students in the 2015-2016 academic year and 157 registered PGT students in the 2016-2017 academic year. This represented an increase of 13 (9%) students on the previous year. In 2016/17 we had 31 international students, with the MSc (Med Sci) Clinical Pharmacology programme attracting the highest number of international students:

<table>
<thead>
<tr>
<th>Programme</th>
<th>Home</th>
<th>International</th>
<th>Total</th>
<th>Change Since 2015-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Stratified Medicine &amp; Pharmacological Innovation</td>
<td>37</td>
<td>0</td>
<td>37</td>
<td>+2</td>
</tr>
<tr>
<td>MSc Sport &amp; Exercise Science and Medicine (Distance Learning)</td>
<td>15</td>
<td>16</td>
<td>31</td>
<td>+15</td>
</tr>
<tr>
<td>MSc (Med Sci) Clinical Pharmacology</td>
<td>4</td>
<td>22</td>
<td>26</td>
<td>+1</td>
</tr>
<tr>
<td>MSc Sport &amp; Exercise Science &amp; Medicine</td>
<td>20</td>
<td>6</td>
<td>26</td>
<td>-3</td>
</tr>
<tr>
<td>MSc (Med Sci) Cardiovascular Sciences</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>-3</td>
</tr>
<tr>
<td>MRes Integrative Mammalian Biology</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>-15</td>
</tr>
<tr>
<td>MSc Clinical Trials &amp; Stratified Medicine</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>+4</td>
</tr>
<tr>
<td>MRes Translational Medicine</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>MSc (Med Sci) Diabetes</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>-2</td>
</tr>
</tbody>
</table>

4.4.1 Trainees at ICAMS – a growing international team

ICAMS is home to many students and post-doctoral fellows from over…...countries, including: USA, Canada, Brazil, Singapore, Malaysia, Greece, Spain, France, Italy, Ireland, Germany, Poland, …… Such internationalisation in ICAMS provides a rich and exciting environment for networking and collaborations. Many of our international post-doctoral fellows move on to successful research careers in their home countries.

Feedback

“There were very interesting lectures with lecturers who engaged well. All topics were relevant and I feel they will all be beneficial for future practice. Assessments were fair and gave good opportunity to show what we had learnt” MSc Sport & Exercise Science and Medicine

“I enjoyed this postgraduate taught Masters programme a lot. I am also satisfied with the level of the courses, they challenge us but still keep it on an understandable level. Most of our teachers were very good both in explaining and keeping us interested. I appreciated the interactive lectures most.” MSc (Med Sci) Clinical Pharmacology

“The quality of research that is being done here in Glasgow is astounding and inspiring to be a part of. Thus my lecturers are absolute experts in their field and are on the cutting edge of Diabetes and Cardiovascular research.” MSc (Med Sci) Diabetes

“Having the chance to do the mini projects during our first year has been really useful. Not only do you get a chance to see how you mesh with the people and the supervisor of the lab before choosing where to do your PhD, it also exposes you to the wide variety of research that is ongoing throughout the institute. It has pushed me to learn new techniques and find interests in areas I had not experienced before.” MRes Translational Medicine
4.6 Early Career Researchers

At the Institute of Cardiovascular and Medical Sciences (ICAMS) our vision is to create a successful and vibrant research institute built on well-funded and internationally recognized research with outstanding training and learning opportunities. The Institute provides numerous opportunities for trainees and researchers to present and interact with each other through educational and career-focused events.

ICAMS organises Advances in Research (AIR) sessions, which gives students and young researchers the opportunity to share their progress and ideas with their Institute peers.

The Network for Early Career Researcher Development (NERD) is jointly organised with the Institute of Infection, Immunity & Inflammation (III), to bring together early career researchers (ECRs) from the two Institutes. This network welcomes ICAMS & IIIs postdoctoral researchers and research fellows (clinical and non-clinical), technical staff and lecturers. NERD aims to provide support, information and advice, foster collegiality, facilitate collaboration & sharing of resources, and strives to better understand the challenges facing ECRs whilst advocating for their needs to senior management. This is achieved through regular workshops, information sessions, mock grant panels, career planning, writing skills sharing, and networking sessions with clinicians and industry. For more information see: glasgow.ac.uk/colleges/mvls/supportforresearch/nerd

The Interdisciplinary Research Network (IRN) creates a cross-disciplinary network of early career fellows/new lecturers which meet on a monthly basis to discuss ways in which to collaborate. This exciting initiative includes around 100 researchers from within the colleges of MVLS and Science & Engineering. As part of the BHF Centre of Excellence Award, the Clinical Experience Programme was created for non-clinical cardiovascular scientists, where the aim is to contextualise basic science by providing a five week programme of activity to encompass the widest possible range of clinical experience in cardiovascular medicine. ICAMS also provides funding for early career researchers to participate in workshops and courses run by the Staff Development Service, such as the Principal Investigator training programme and grant writing courses.

4.7 Educational Events

The Institute of Cardiovascular and Medical Sciences (ICAMS) hosts regular educational meetings. Over 2016, there were numerous presentations by invited speakers as well as seminars and symposia.

Guest Lectures in 2015 included:

- RhoA signalling in vascular physiology and diseases (Dr Gervaise Loiand, Université de Nantes)
- Hypoxia, vascular protection and angiogenesis in ischemic cardiovascular diseases (Professor Stephane Germain, UMR5 Inserm)
- ‘Novel’ treatments for right ventricular electrical and mechanical dysfunction in pulmonary artery hypertension (Professor Edward White, Leeds University)
- The crossroads of inflammation and arrhythmia following myocardial infarction. (Dr Crystal M. Rippinger, UC Davies Health System)
- Immune aging as a risk factor for inflammatory disease (Professor Connie Weyand, Stanford University)
- Macrophages in coronary artery disease – metabolic control of inflammatory effector functions (Professor Connie Weyand, Stanford University)
- New inhibitors and substrates of angiotensin-converting enzyme: The A to H on ACE (Professor Edward Sturrock, University of Cape Town)
- Reprogramming and cardiac identity (Professor Amanda Fisher, Imperial College London)
- Novel pathways to regulate vascular disease (Professor Graeme Nixon, University of Aberdeen)
- Pathogenic mechanisms of small vessel diseases of the brain: the example of CADASIL (Dr Anne Joutel, Inserm Paris)
- Dendritic cells in atherothrombosis: of mice and man (Professor Erik Beissen, Maastricht University)

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  - New inhibitors and substrates of angiotensin-converting enzyme: The A to H on ACE (Professor Edward Sturrock, University of Cape Town)
  - Reprogramming and cardiac identity (Professor Amanda Fisher, Imperial College London)
  - Novel pathways to regulate vascular disease (Professor Graeme Nixon, University of Aberdeen)
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**READING PARTY AT THE BURN**

Students taking the BSc (Med Sci) Clinical Medicine Intercalated Degree attended a reading party at The Burn, in Glen Esk, Angus on 9th-11th March 2016. The Specialist Courses attending were Cardiovascular Studies, Women’s and Children’s Health and, for the first time this year, Clinical Neurosciences. Several ‘Science Without Borders’ students also joined. The Specialist Course Co-ordinators Drs Tony Workman, Dyllys Freeman and Debbie Dewar contributed to a two day programme of work aimed at broadening the students’ view of science in medicine and enhancing transferable skills. Sessions included a debate on the culpability of the interested parties in the MMR immunisation controversy, and discussion about the dos and don’ts of publishing data via conferences or papers. Other sessions included Stress tests and exercises in critical and lateral thinking. There was also time to enjoy a walk to the nearby Rocks of Solitude. Feedback from the students was excellent – they felt they learned a lot and it was a good way to de-stress before their final exams.

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**BHF 4 YEAR PHD STUDENT CONFERENCE**

The 4th Annual BHF 4 Year PhD student conference was held at the University’s Western Infirmary Lecture Theatre in April 2016. The conference was organised by a group of ICAMS BHF PhD Students led by Emma Low (3rd year PhD student) and was attended by around 130 BHF PhD students from nine institutions across the UK, including Cambridge, Oxford, UCL and Edinburgh. A warm welcome from Prof Rihan Tsuyuz and James Cant (Director of BHF Scotland) was followed by a lively day of talks, poster presentations, and networking. The conference provided the opportunity to learn about the huge diversity of cardiovascular research being undertaken by BHF PhD students. The standard of the presentations was excellent. Prize were awarded to Abigail Robertson (University of Manchester) for the best oral presentation and to Caturn Davidson (University of Edinburgh) for the best poster. A very entertaining and enlightening keynote lecture was delivered by Prof Matthew Walters, entitled “Mind Altering Drugs, Exotic Animals, a Cockroach and a Vibrator – Life as a Stroke Doctor”. Students were intrigued to find out that a new drug based on the anticoagulant properties of vampire bat saliva is currently being tested for clinical efficacy in stroke patients. The conference ended on a high with traditional Scottish ceilidh in the Glasgow University Union. The meeting was a great success and the feedback has been excellent. The organisers would like to thank their sponsors, especially the BHF for their generous financial support.
5. Using Knowledge

5.1 Knowledge Exchange

The Research and Knowledge Transfer (R&KT) Committee was started in 2014 with the aim of maximising interactions within ICAMS, with the College of MVLS and externally. The R&KT Committee aims to develop collaborative research that has potential towards impact case studies, develops and organises public engagement activities, and encourages engagement with industry.

5.2 Public Engagement Activities

**BHF SCOTLAND SUPPORTERS CONFERENCE**

We had a wonderful day showing BHF supporters our research. We were especially grateful to the BHF for the Award of BHF Fundraising Group of the Year 2016. Lauren Fleming one of the BHF 4 Year PhD students and member of the fundraising group picked up the award on our behalf from Brian Burnett.

Participants were given a tour of the BHF CGCRC and saw some of our research in action. Thanks to Dr Kenneth Mangion, Dr Guto Montezone, Dr Francisco Rios, Hannah Martin and Lisa McArthur. Also to Peter, Anastasiya & Emma who escorted our guests. Following lunch there were Awards for Inspirational people and also fundraising Hero.

**WORLD HYPERTENSION DAY**

The theme for the 2016 World Hypertension Day was “Know Your Numbers” with a goal of increasing high blood pressure (BP) awareness in all population around the world. Hypertension tends not to cause any symptoms but is the leading risk factor for stroke and myocardial infarction, it is the ‘silent killer’. Approximately one third of adults worldwide have hypertension but over half of these are unaware that they have it. Furthermore, of those who are aware that they are hypertensive, only half take action to control this.

At the University of Glasgow, the World Hypertension Day 2016 event held at One A The Square to increase awareness of hypertension and encourage the public and staff to know their blood pressure and to take the necessary steps to reduce their cardiovascular risk. The event was organised by Prof Rhian Touyz, Prof Sandosh Padmanabhan and Dr Linsay McCallum who were helped by a team of volunteers from the Institute of Cardiovascular and Medical Sciences, Glasgow Blood Pressure Clinic and the Glasgow Clinical Research Facility.

Cardiovascular health advice was given and blood pressure was measured in 200 individuals. Over a quarter of adults screened had blood pressure greater than the current target of 140/90 mmHg and they were offered appropriate advice on the next steps.
The second Café with Heart was held in Byres Road Waterstones Café. Professor John McMurray gave an excellent presentation and led a stimulating question and answer session about heart failure. The event was well-attended by the general public and we were also pleased to have the company of Nina Coy, the West of Scotland Regional Fundraising Co-ordinator for the British Heart Foundation. Prof. McMurray spoke very passionately about how much heart failure treatments have changed from when he was a medical student to the present day. He illustrated how clinical research has played a huge part in this and discussed some of the very large trials that he has been involved in during his very successful career. This was followed by a fantastic discussion which ranged from a topical debate on randomised versus observational clinical trials, ethical reporting of scientific literature in the media and the prevalence and causes of heart failure locally in Glasgow and how they compare to the rest of the UK and the world. The discussion even touched upon the impending Valentine’s Day and led to a discussion of a very rare and newly discover type of reversible heart failure, “Takotsubo Cardiomyopathy”, informally known as “broken heart syndrome”. Nina also raised awareness of how fundraising for the British Heart Foundation is spent predominantly on new research; some of this right here in Glasgow.

Overall, the evening was successful with good feedback received from the audience.

Researchers at the University of Glasgow hosted the third session of Café with Heart this month in Waterstones Byres road. At this session Dr Jesse Dawson gave a fascinating talk on Stroke in Scotland which was well received by a fantastic audience. He discussed the tell-tale signs of an individual having a stroke, FAST (Face, Arms, Speech, Time), and the great need for new stroke therapies due to the limited treatments currently available. He emphasised that diagnosing the type of stroke was vital before any treatment could begin due to the associated risks with the clot busting drug, tissue plasminogen activator (tPA). Physically removing the clot in ischemic stroke requires very skilled personnel which unfortunately, at present, is restricted in the UK. Jesse also discussed current clinical trials involving the cooling of stroke patients by infusion of cold saline due to the known neuroprotective effects of hypothermia. The results from these studies are expected very soon. The evening was well attended with great audience participation. The Café with Heart team would like to thank Dr Dawson for sharing his expertise and representatives from three big stroke research funders; Chest, Heart and Stroke, the Stroke Association and BHF for attending and providing further information to our audience.

As part of the BHF ‘Social Science’ programme, BHF Scotland are holding Science cafes at all the major Party Political conferences in Scotland. ICAMS’ ‘Café with Heart’ organisers were invited to pilot these at the SNP conference at the SECC. Our event was called ‘Hearts and Minds: a discussion about Vascular Dementia’. It was hosted by Prof Mandy MacLean and the speaker was Prof Matthew Walters. Representing the BHF four-year student internship students were Anastasiya Strembitska and Lisa McArthur.

Prof Walters described the progress of clinical care, new methodologies and equipment available at stroke units, such as stents and catheters that allow the fraction or removal of large clots from cerebral vessels, restoring blood flow to the brain after ischemic stroke. These new techniques increase patient’s recovery, allowing one in five people who would not normally recover to live a normal life. Another intervention that improves survival and the life quality of stroke patients is tissue plasminogen activator. However it was discussed why this only achieves optimal effectiveness within the first four and a half hours following a stroke.

The rising incidence of vascular dementia in the aging population in Scotland was highlighted. While minor head injuries are thought to be a cause of vascular dementia in athletes, cardiovascular disease is the main risk factor for the development of vascular dementia in the public. There is currently a lack of effective treatments for this condition highlighting the importance of prevention and further research in this area.

Later, David McColgan stated “The event went better than I could imagine and the feedback has been incredible. So many people came along to the (BHF) stand today to share their thoughts on the event”. The evening was attended by a fantastic audience who were keen to engage in the discussion on cardiovascular risk, lifestyle and prevention of stroke and vascular dementia.

Thirty students from St Benedicts High & Linwood High Schools came to the Institute. Staff presented their research in 10-minute quick fire sessions. Dr James McLaren, Clinical Research Fellow – “GLASVEGAS Study”; Nikivi Duncan, Research Assistant - “MRC Funded Delirium Study”; Dr Tony Workman, Senior Lecturer – “Human Cardiac Arrhythmia”; Dr Katarzyna Brooksbank – “Clinical Trials in the Institute”; Dr Anna White, Clinical Research Fellow – “Clinical Diabetes – a view from the bench”. Later on they made their way up to the Davidson Building, where Dr Niall McQuaid gave them a practical demonstration on “Beating heart cells and taking a look at calcium levels inside using a laser scanning confocal microscope”. Dr Angela Bradhaw and Dr Stacy Robertson gave a sessions on viruses and the students got to make their own virus which went down very well. Lorna McCartney from Linwood High School made a post on Facebook following the visit, “Thank you for a fantastic afternoon. What a great, inspirational experience for our young people!”
6. Appendices

6.1 Members of the External Scientific Advisory Board

Professor Victor J. Dzau is one of the most influential physician scientists, and leaders in medicine worldwide. He is the Chancellor for Health Affairs and James B. Duke Professor of Medicine at Duke University and the President and CEO of Duke University Health System. Dr Dzau was previously the Hersey Professor of Theory and Practice of Medicine and Chairman of Medicine at Harvard Medical School’s Brigham and Women’s Hospital and the Chairman of Department of Medicine at Stanford University. Dr Dzau has made a significant impact through his pioneering research in cardiovascular medicine, his founding of the discipline of Vascular Medicine, and recently his leadership in Healthcare innovation. His work on the renin angiotensin system (RAS) paved the way for the contemporary understanding of RAS in cardiovascular disease and the development of RAS inhibitors as therapeutics. Dr Dzau pioneered gene therapy for vascular disease and was the first to introduce DNA decoy molecules to block transcriptions as gene therapy in vivo. He pioneered the concept of preemptive gene therapy for myocardial protection. Importantly, his seminal work on stem cell “paracrine mechanism” and the use of microRNA in direct reprogramming provide novel insight into stem cell biology and regenerative medicine.

Among his honours and recognitions are the prestigious Gustav Nylin Medal from the Swedish Royal College of Medicine; the Max Delbruck Medal from Humboldt University, Charité and Max Planck Institute; the Commemorative Gold Medal from Ludwig Maximilian University of Munich and Frey-Wette Foundation; the Inaugural Halter Award from the Medical Research Council of South Africa; the Potz Prize from the European Academy of Sciences and Arts; the Ellis Island Medal of Honor of USA; the Novartis Award for Hypertension Research; the Distinguished Scientist Award from the American Heart Association (AHA) and a 2010 AHA Research Achievement Award for his contributions to cardiovascular biology and medicine. He is elected to the American Academy of Arts & Sciences, European Academy of Sciences & Arts, and the Institute of Medicine of the National Academies. He has received 6 honorary doctorates.

He serves on the Council of the Institute of Medicine, the board of directors of Research America and the board of health governors of the World Economic Forum. He is also Chair elect of the Association of Academic Health Centers. He has chaired the NIH Cardiovascular Disease Advisory Committee as well as the Council of Atherosclerosis, Thrombosis and Vascular Biology of the American Heart Association, and has served on the Advisory Council to the Director of NIH.

Professor Stephen O’Rahilly MD FRS graduated in Medicine from University College Dublin in 1981 followed by an internship at the Mater Hospital. From 1982-1991 he undertook postgraduate training in general medicine and endocrinology and in diabetes research in London, Oxford and Harvard. In 1991 he established his own laboratory in University of Cambridge at Addenbrooke’s Hospital where he was a Wellcome Trust Senior Fellow in Clinical Science. In 1996 he was appointed to a newly created Chair of Metabolic Medicine and in 2002 was appointed to the Chair of Clinical Biochemistry and Medicine at the University of Cambridge. He is also the Director of the Institute of Metabolic Science Metabolic Research Laboratories. His research has been concerned with the elucidation of the basic causes of Type 2 diabetes and obesity at a molecular level. His work has uncovered several previously unrecognised genetic causes of these diseases including some that are amenable to specific treatment. He has won many awards for his work including the Society for Endocrinology Medal, the European Journal of Endocrinology Prize, the Novartis International Award for Clinical Research in Diabetes, the Heinrich Weland Prize, the Rolf Luft Award, the Feldberg Prize, the Society for Endocrinology Dale Medal and the InBev Baillet-Latour Prize for Health. He was elected to the Academy of Medical Sciences in 2000, to the Royal Society in 2003 and to the US National Academy of Sciences as a Foreign Associate in 2011. While maintaining a large research laboratory he continues to be actively involved in clinical practice and the teaching of clinical medical students.
Professor David Eisner (B.A. Cambridge, Natural Sciences, 1976; D.Phil Oxford, Physiology, 1979). He spent the period 1980-1990 in the Department of Physiology at University College London. From 1990-1999 he was Professor of Veterinary Biology at Liverpool University before moving to University of Manchester as Professor of Cardiac Physiology in October 1999. He was appointed to the BHF Chair in Cardiac Physiology in 2000.

He has received the Pfizer Prize for Biology (1985), the Wellcome Prize in Physiology (1988) and given the QR Murphy Lecture at the University of Wisconsin (1990), the Reimer Lecture of the International Society for Heart Research (2008), the Dorothy Wedgwood Lecture for Young People (2008) and the Dorothy Wedgwood Lecture for Young People (2008) and the Reimer Lecture of the International Society for Heart Research (2008), the Dorothy Wedgwood Lecture for Young People (2008) and the Peter Baker Memorial Lecture (2010). He has been elected a Fellow of the Academy of Medical Sciences and to Honorary Fellowship of the Royal College of Physicians. He serves on the editorial boards of Basic Research in Cardiology, Cell Calcium and Experimental Physiology. He is a Senior Consulting Editor of Circulation Research. He is the Editor in Chief of The Journal of Molecular and Cellular Cardiology. Until July 2000, he was Chairman of the Editorial Board of The Journal of Physiology. He was previously International Secretary of the Physiological Society and Chair of the British Society for Cardiovascular Research. He is the President of the Federation of European Physiological Societies (FEPS) and president-elect of the International Society for Heart research (European Section). He chairs the International Scientific Programme Committee for the 2013 meeting of the International Union of Physiological Sciences (IUPS). He has served on panels for the Research Assessment Exercise (RAE) in 2001 and 2008 and is on a panel for REF2014.

His research is focused on calcium regulation in the myocardium. Much of his work has concentrated on the basic mechanisms that regulate the amplitude of the systolic calcium transient and, in particular, the properties of the sarcoplasmic reticulum. His recent work had also shed light on the relationship between abnormalities of Ca regulation and the genesis of arrhythmias.

Professor Marc Pfeffer is currently the Dzau Professor of Medicine at Harvard Medical School. He is Senior Physician in the Cardiovascular Division at the Brigham and Women’s Hospital in Boston, and Director of the Cardiovascular Grand Rounds Program. He also serves as Medical Director of Partners Research and Education Program.

A noted researcher, Dr Pfeffer, along with his late wife, Dr. Janice Pfeffer, and Eugene Braunwald MD, is credited with introducing the concept that angiotensin-converting enzyme inhibitors (ACEIs) could attenuate ventricular remodelling following myocardial infarction and that this use would result in a prolongation of survival and other clinical benefits. Since this initial discovery, he has had a principal role in several practice-changing clinical trials such as SAVE, CARE, HEART, VALIANT, CHARM, and PEACE. He is currently a leading investigator in TOPCAT, TREAT, ALTITUDE and ELIXA.

In addition to his role as researcher, Dr Pfeffer plays an active role in the academic development of trainees and junior faculty collaborating in trials. As the leader of Partners Research and Education Program (PREP), he has developed networks of community-based physicians who enjoy making meaningful contributions to clinical investigation.

Dr Pfeffer is Senior Associate Editor of Circulation and is a member of the Editorial Board of several other prominent journals.

An internationally recognised expert in the field of cardiology, he was, in 2006, recognised by Science Watch as having the most ‘Hot Papers’ (highly cited) in all of clinical medicine. He is the recipient of the William Harvey Award of the American Society of Hypertension, the Okamoto Award from Japan’s Vascular Disease Research Foundation and the Clinical Research Prize of the American Heart Association. Dr. Pfeffer is an Honorary Fellow of the Royal College of Physicians and Surgeons of Glasgow.
6.2 Honouring Staff

ATHENA SWAN BRONZE AWARD

The Institute of Cardiovascular and Medical Sciences was awarded an Athena SWAN Bronze award. The Athena SWAN Charter recognises commitment to advancing women’s careers in science, technology, engineering, maths and medicine (STEMM) employment in academia. The University of Glasgow is committed to promoting equality of opportunity in all its activities and aims to provide a work, learning, research and teaching environment free from discrimination and unfair treatment. University of Glasgow is a Bronze Institutional award holder. The Institute of Cardiovascular and Medical Sciences is committed to pursuing the ideals of the Charter, ensuring that all staff are afforded the same career opportunities and representation regardless of gender, race, religion, or intersectionality. Our application was submitted in November 2015 and can be found online at: www.gla.ac.uk/media/media_441946_en.pdf

PROFESSOR RHIAN TOUZY RECIPIENT OF THE DISTINGUISHED SCIENTIST AWARD

ICAMS Director, Professor Rhian Touyz has received a Distinguished Scientist Award from the American Society of Hypertension (ASH). Professor Touyz received The Irvine Page award for her world-leading work in the area of hypertension, specifically into the molecular, cellular and vascular biology of hypertension. The purpose of the ASH Distinguished Scientist Award is to honour a scientist or physician for outstanding achievements in the field of hypertension. Only one ASH Distinguished Scientist Award is given each year. Professor Touyz said: “I feel truly honoured and humbled to be the recipient of the Irvine Page award of the American Society of Hypertension. Dr Page was a pioneer in hypertension research and a giant in cardiovascular medicine. It is with tremendous pride that I receive this honour and follow in the footsteps of so many previous eminent awardees. This award also recognises the outstanding contributions of all my lab members, past and present.” As part of her award Prof Touyz delivered a 30 minute lecture during the Awards Session at the ASH Annual Meeting.

LIFETIME ACHIEVEMENT AWARD FOR DAME ANNA

Professor Dame Anna Dominiczak, Regius Professor of Medicine, Vice-Principal and Head of College of Medical, Veterinary and Life Sciences, won the Lifetime Achievement Award at the Herald Inspiring City Awards. Professor Dominiczak received the award for her work in life sciences and the precision medicine industry.

She said: “I was delighted to receive the Lifetime Achievement award. It is always an honour to be recognised for one’s achievements, but this award also belongs to the team I work with in life sciences and precision medicine at the University of Glasgow.”

PROFESSOR NAVEED SATTAR NAMED AS FELLOW OF THE ACADEMY OF MEDICAL SCIENCES

ICAMS Professor Naveed Sattar was among the 47 world-leading UK researchers, and one of three from MVLS to be elected to the prestigious fellowship of the Academy of Medical Sciences. Founded in 1998, the Academy of Medical Sciences is the independent body in the UK representing the diversity of medical science. The Fellows have been elected for their contribution to medical research and healthcare, the generation of new knowledge in medical sciences and its translation into benefits to society. Professor Naveed Sattar, Professor of Metabolic Medicine, remains clinically active and has published extensively in diabetes, cardiovascular disease, obesity, and inflammatory conditions contributing to several clinical trials, biomarker and epidemiological studies and national and international guidelines. He is known for his ability to challenge dogma and to cross link between disease areas in novel and clinically informative ways. Professor Sattar said: “Of course it’s nice to be recognised by the Academy and join many respected UK colleagues who are already members. We all strive to do research which changes clinical practice in a positive way and improves health and, therefore, if this fellowship election is recognition for such achievements, then I am delighted.”

PROFESSOR PETER LANGHORNE, CHAIR OF UK STROKE FORUM

Professor Peter Langhorne took over as Chair of the UK Stroke Forum Conference in December 2016. This conference is the largest multi-disciplinary stroke event in the UK attracting over 1,400 delegates from the UK and beyond. It incorporates a broad multi-disciplinary group of professionals (and stroke survivors) who work across the stroke care pathway from hyper-acute stroke medicine to long-term reintegration and community care. Peter will chair the UK Stroke Forum Coalition of over 30 organisations committed to improving stroke care in the UK and contributing to this annual conference. The photo shows him presenting an award to the outgoing Chair Professor Avril Drummond. www.stroke.org.uk/professionals/what-uk-stroke-forum
Ellanor Whiteley

THREE ICAMS ACADEMICS NAMED HIGHLY CITED RESEARCHERS

ICAMS Academics, Professors John McMurray and Naveed Sattar and Dr Bill Mullen were named Highly Cited Researchers in 2016 by Thomson Reuters. To achieve this honour, academics must write the greatest number of papers designated by Essential Science Indicators as Highly Cited Papers. They were ranked among the top 1% most cited researchers within their subject. Professor John McMurray, Professor of Medical Cardiology, has been at the forefront of cardiovascular research for many years, with an expertise in successfully treating heart failure patients with effective drugs, which scientists at the University of Glasgow have played a key role in testing. Professor Naveed Sattar, the Professor of Metabolic Medicine, researches diabetes and heart disease, as well as autoimmune disease and specific pregnancy complications. Dr Bill Mullen is a member of the Biomarkers & Systems Medicine Group working on new methods of identifying the early warning signs of serious illnesses such as coronary artery disease.

DIVERSITY HERO OF THE YEAR: DR CHARLOTTE MCCARROLL

The University of Glasgow’s Dr Charlotte McCarrroll has been named as Diversity Hero of the Year at the inaugural Diversity Awards organised by The Herald and GenAnalytics in association with Bank of Scotland. More than 300 guests gathered at the Radisson Hotel for the awards ceremony which showcased the companies, organisations and individuals that are making a real difference to their communities and businesses by putting equality and diversity at the heart of their actions and in the workplace.

Dr McCarrroll was nominated for the award by Professor Rhian Touyz, Director of the Institute of Cardiovascular and Medical Sciences. Rhian said: “I put Charlotte forward for this award in recognition of the tremendous efforts and tireless work she has done to promote equality and diversity in the University of Glasgow, in large part through her own personal experiences.

“Charlotte qualified as a veterinary surgeon from the University of Glasgow in 2008 with a distinction/honours award and in 2014 she obtained her PhD. She is currently completing a post-doctoral fellowship in the Institute of Cardiovascular and Medical Sciences (ICAMS), with the goal of developing her own research group as an independent investigator. Charlotte has an outstanding track record and she is on a trajectory of growth and success.”

LAUREN WILLS – WINNER OF 3 MINUTE THESIS COMPETITION

ICAMS BHF 4 year PhD student, Lauren Wells won the 3 minute competition (3MT) in the College of MVLS heat against 18 other presenters. The 3MT is an academic competition developed by The University of Queensland (UQ), Australia for research students. The competition allows only 3 minutes of oration with one unanimated slide which challenges students to present their ideas and research discoveries concisely to a non-specialist audience. Lauren’s talk “How to mend a broken heart” concentrated on her study into post-translational modification of the Beta2-adrenergic receptor in the laboratory of Professor George Baillie. Judges scored on the categories of Comprehension, Engagement and Communication Style. Lauren scored highly in all, being the eventual winner. Lauren will represent the College of MVLS in the University 3MT final.

ELLANOR WHITELEY: IMPACT IN 60 SECONDS 2016 – BEST INDIVIDUAL ENTRY WINNER!

Congratulations to Ellanor Whiteley (above far right), PhD student from ICAMS working with Prof George Baillie for winning the College’s prestigious “Impact in 60 seconds” competition with her short film about her work on phosphodiesterase 10A (PDE10A). www.gla.ac.uk/colleges/mvls/researchimpact/competitions/impactin60seconds2016/videos/
6.3 Research Awards (proportioned value)

New grants >10k awarded in 2016 on which Institute members were investigators. The funding stated is the amount that has come to the University of Glasgow which, for some grants, may be less than the total amount awarded. The list does not include any grants which are confidential in nature.

The Scottish Genomes Partnership, Scottish Executive Health Department, £2,220,878, PI: Prof Sandosh Padmanabhan.

EPSRC Centre for Multiscale soft tissue mechanics with application to heart & cancer, Engineering & Physical Sciences Research Council, £1,261,553, CoPIs: Prof Colin Berry and Prof Godfrey Smith.

Materials exploitation of the biointerface to control MSC quality and niche phenotype, Biotechnology and Biological Sciences Research Council, £464,926, CoPI: Dr Joanne Mountford.

Improving assessment, prediction and understanding of the short, medium and longer term neuropsychological consequences of stroke, Stroke Association, £419,022, PI: Dr Terence Quinn, CoPIs: Prof Peter Langhome, Professor Kennedy Lees, Prof Matthew Walters.

Women’s reproductive health and its relation to diabetes and cardiovascular health, Medical Research Council, £407,867, CoPI: Prof Naveed Sattar.

Coronary Artery Disease in Heart Failure with Preserved Ejection Fraction, Scottish Executive Health Department, £299,647, PI: Prof John McMurray, CoPIs: Prof Colin Berry, Dr Ross Campbell, Dr Christopher Rush, Prof Rhian Touyz.

Targeting intracellular pathways to dissect mechanisms of cerebrovascular disease, British Heart Foundation, £272,181, PI: Dr Tom Van Agtmaal.

Antihypertensive as repurposed treatments for mood disorders: a Scottish national linkage and UK Biobank investigation, Scottish Executive Health Department, £250,896, CoPI: Prof Sandosh Padmanabhan.

Glasgow Oxygen Level Dependent (GOLD) imaging in acute stroke: further development of the technology incorporating Oxycyte, an efficient oxygen carrier, Aurum Biosciences Ltd, £225,535, CoPI: Prof Kennedy Lees.

Role of alternative pathway of triglyceride synthesis in determining insulin sensitivity in muscle of individuals at risk of type 2 diabetes, Diabetes UK, £200,906, PI: Dr Jason Gill, CoPIs: Dr Dylis Freeman, Dr Ian Salt, Prof Naveed Sattar.


Investigate the role of anti-TGFβ and anti-Gremlin-1 in pulmonary hypertension, UCB Biopharma Srl, £184,070, PI: Dr David Welsh.

Be-Optical, European Commission, £179,105, PI: Prof Godfrey Smith.

Towards metabolic assessment of myocardial viability using oxygen17 MRI, British Heart Foundation, £168,203, CoPI: Prof Colin Berry.

CORE SNBTS Agreement – Tissue and Cellular Therapies Theme Group, Scottish National Blood Transfusion Service, £155,000, PI: Dr Joanne Mountford.

NIH DOHaD mechanisms Glasgow, National Institutes of Health, £154,416, CoPI: Prof Naveed Sattar.

Adrenoceptor-subtype antagonism profiles with anti-arrhythmic potential in human atrial myocytes, British Heart Foundation, £152,580, PI: Dr Antony Workman, CoPIs: Dr Rachel Myles, Prof Godfrey Smith.

British Society for Heart Failure (BSHF) Research Fellow, British Society for Heart Failure, £100,000, PI: Prof John McMurray.

Data Lab, The Data Lab, £97,590, CoPI: Prof Colin Berry. Cancer chemotherapeutics and the vasculature – endothelial effects of VEGF inhibition In Vivo in man, Scottish Executive Health Department, £86,584, PI: Dr Niran Lang, CoPI: Dr Alan Cameron, Prof Rhian Touyz.

Role of miR96 in Pulmonary Arterial Hypertension, United Therapeutics Corporation, £79,000, PI: Prof Mandy MacLean. Associations of blood biomarkers with cardiovascular disease and related cardiometabolic outcomes and risk prediction in the clinical setting: UK biobank, Chest, Heart & Stroke Scotland, £73,064, PI: Prof Naveed Sattar, CoPI: Dr Paul Welsh.

EPSCR-IAA: Tracking biomarkers of heart attacks using a fast statistical simulator based on heart modelling and in vivo MRI, Engineering & Physical Sciences Research Council, £46,378, CoPI: Prof Colin Berry.

RADOX: Radical reduction of oxidative stress in cardiovascular diseases, European Commission, £42,662, PI: Prof Rhian Touyz.

COCHRANE Stroke Group, Scottish Executive Health Department, £36,000, PI: Prof Peter Langhome.

The UPBEAT RCT mother-child study, Stratifying and treating obese pregnant women to prevent adverse pregnancy, perinatal and longer term outcomes, Action Medical Research, £35,336, PI: Dr Paul Welsh, CoPI: Prof Naveed Sattar.

Assessing outcomes in stroke patients with atrial fibrillation using the Scottish Stroke Care Audit, Pfizer Limited, £29,000, PI: Dr Terence Quinn.

The role of ASK-1 inhibition on in vivo and in vitro animal models of pulmonary hypertension, Gilead Sciences Inc, £26,310, PI: Dr David Welsh, CoPI: Prof Andrew Peacock.

Reversal of T2DM to normal glucose tolerance using non-surgical weight management with low-energy liquid diet and long-term maintenance, within routine NHS care: study extension, Diabetes UK, £26,040, CoPI: Prof Naveed Sattar.

Investigation of novel protein pathways which regulate vascular smooth muscle cell phenotype in neonatal hyperplasia, Medical Research Council, £24,305, PI: Dr Simon Kennedy.

SNBTS funding of new lectureship, Scottish National Blood Transfusion Service, £20,000, PI: Dr Joanne Mountford.

Carnegie Centenary Professorships, Carnegie Trust for the Universities of Scotland, £20,000, PI: Prof Peter Langhorne.

In-silico quantification of metabolites, lipids and lipoproteins measured by NMR spectroscopy, Wellcome Trust, £15,172, CoPIs: Dr Naomi Rankin, Prof Naveed Sattar, Dr Paul Welsh.

6.4 Publications


Publications


Publications


Publications


Publications


187. Huntor-Rina MF. The use of ratiometric fluorescence measurements of the voltage sensitive dye Di-4-ANEPPS to examine action potential characteristics and drug effects on human induced pluripotent stem cell-derived cardiomyocytes. Toxicological Sciences 2016;149:1481-1488.


Publications


Publications


355. Pollock A, et al. An algorithm was developed to assign GRADE levels of evidence to comparisons within systematic reviews. Journal of Clinical Epidemiology 2016;70:100-110.


Publications


Publications


463. Touyz, R. Lower is better in hypertension, but how low should blood pressure be targeted? Journal of the American Society of Hypertension 2016;10(8):621-622.


468. Turner M, et al. Stroke patients admitted within normal working hours are more likely to achieve process standards and to have better outcomes. Journal of Neurology, Neurosurgery and Psychiatry 2016;87:138-143.


Publications


6.6 PHD STUDENTS

Faris Fahad A Aba Alkhayl
Maram Hussein Abduljabbar
Emma Louise Aitken
Nasser Mohammed Aldekhail
Cherry Alexander
Noor Alfailakawi
Husain Alghaiga
Nora Hassan Alharbi
Faridah Alkandari
Tarek Almabrouk
Nasser Abdulbasit Almalaik
Tahani Al-Rammah
Amaal Faraj Alrehaili
Safiaa Mohammed M Alsanosi
Bushra Ali A Alsfouk
Mohammed Abdulghaffar Bazuhair
Ahmed Naziha Beir.""