TRINITY BIOMEDICAL SCIENCES INSTITUTE

Biochemistry and Immunology, Bioengineering, Medicine, Organic Chemistry, Pharmacy and Pharmaceutical Sciences

A progress report on Ireland's premier Biomedical Sciences research laboratories 2014
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INTRODUCTION

Welcome to the first progress report of the Trinity Biomedical Sciences Institute (TBSI). TBSI is the biggest single strategic alignment of research in Trinity College Dublin’s history, creating for the first time an activity in the biomedical sciences on an internationally competitive scale. Our aim is to perform outstanding scientific research, integrating with our colleagues at St James’s Hospital, that will ultimately give rise to better patient care, in diseases such as cancer, inflammatory and infectious diseases and neurological disorders. Five Schools in Trinity have come together in an interdisciplinary environment where frontier research is being carried out. We are creating real impact – educational, scientific, societal and economic. Occupancy began in 2011 and was the biggest movement of researchers into one building ever undertaken in Trinity. TBSI is also an important element in the Innovation Alliance with UCD. We present progress on fundamental discoveries, new postgraduate education programmes to extensive commercial activities, realising benefits to students, scientists, the wider community and hopefully in the longer term, patients. I congratulate the scientists in TBSI for their achievements to date, and look forward with great anticipation to the next phase of development in TBSI.

Professor Luke O’Neill
Academic Director

I am delighted to present with the Academic Director, this first progress report for TBSI, along with my fellow external Board members, Jackie Hunter PhD CBE (Chief Executive BBSRC) and Annette Doherty OBE (GSK Senior Vice President and Royal Society of Chemistry Council). TBSI has got off to a truly remarkable start, with progress on all fronts from outstanding biomedical discovery to new post-graduate education programmes to extensive commercial activities, realising benefits to students, scientists, the wider community and hopefully in the longer term, patients. I congratulate the scientists in TBSI for their achievements to date, and look forward with great anticipation to the next phase of development in TBSI.

Tom Lynch
Chair of TBSI Board
Chair of ICON and Amarin

TBSI SNAPSHOT
MAY 2014

119 Non-exchequer-funded jobs created in TBSI since 2012
7 Nature publication (2011 - 2013)
35,005 Citations
€36m Raised in research funding
1043 Total number of undergraduates being educated in TBSI

78 PhDs Graduated, 40% into industry
76 Companies engaged with TBSI scientists
3 Spinouts in TBSI: Opsona, Trino and Trimod
28 PCTs/ Patents
7 Visits from Nobel Laureates
€1.8m From the Wellcome Trust to run five exhibitions with the Science Gallery
**VISION**

TBSI is an environment where innovative and interdisciplinary approaches are leading to scientific discoveries of biomedical importance, which in partnership with industry, will give rise to better patient care.

**VITAL STATISTICS**

<table>
<thead>
<tr>
<th>Principal Investigators that currently have labs in TBSI</th>
<th>Total number of researchers</th>
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</thead>
<tbody>
<tr>
<td>Biochemistry &amp; Immunology</td>
<td>65</td>
</tr>
<tr>
<td>Pharmacy and Pharmaceutical Sciences</td>
<td>24</td>
</tr>
<tr>
<td>Bioengineering</td>
<td>15</td>
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<tr>
<td>Chemistry</td>
<td>9</td>
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<tr>
<td>Medicine</td>
<td>9</td>
</tr>
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</table>

| Total space TBSI use for research and teaching          | 520                         |
| Value of equipment in TBSI                              | €10m                        |
|                                                        | 21,000 m²                   |
The participating Schools are the School of Biochemistry and Immunology, School of Chemistry, School of Medicine, School of Engineering (Bioengineering), and The School of Pharmacy and Pharmaceutical Sciences and they carry out research programmes in a state-of-the-art facility designed to maximise interaction and facilitate co-operation. The infrastructure at TBSI allows our researchers to continue to perform at the highest level and is copper-fastening Trinity’s place as a leading international scientific university. TBSI has established core technologies of the highest standard, including NMR, transgenics, fluorescent activated cell sorting, confocal microscopy and transmission electron microscopy. We have clusters of investigators working together in particular areas of strength including:

- Immune mechanisms of disease
- Bioengineering and Medical Devices
- Pharmaceutical and medicinal chemistry
- Protein structure and function

We have established three centres in TBSI – Centre for the Study of Immunology - Dublin (CSI), Centre for Cancer Drug Discovery (C2D2) and the Centre for Medical Device Technologies (CMDT). We are also supporting spin out companies, and are working with several pharmaceutical and medical device companies. TBSI also houses all of our preclinical training in our medical degree. We aim to foster a spirit of interaction and exploration on the frontiers of biomedical research, such that truly ground-breaking discoveries can be made, allowing bigger challenges to be tackled and providing international leadership.

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**THE ADDED VALUE IN TBSI**

One Institute
Biomedical Sciences Development

**Three Centres**
Centre for Cancer Drug Discovery
Centre for the Study of Immunology
Centre for Medical Device Technologies

**Five Schools**
BioEngineering
Chemistry
Biochemistry and Immunology
Medicine
Pharmacy and Pharmaceutical Sciences
Trinity is in the top 1% of Universities in the world in Immunology (3rd in the world based on citations per paper), Pharmacology and Toxicology, Engineering, Clinical Medicine, Molecular Biology, Chemistry, Biology and Biochemistry. TBSI has over 240 major publications to date in high-ranking journals, such as:

- Nature
- Nature Medicine
- Nature Neuroscience
- Lancet
- J Exp Med
- J Physiol
- Biochemical Journal
- Angew Chem Int
- J Biol Chem
- Structure
- Small
- J Immunol
- Angew Chem
- J Org Chem
- J Am Chem Soc
- Chem Commun
- Nature
- Nature Immunology
- Nature Medicine
- Nature Neuroscience
- Lancet
- J Exp Med

Most notably there have been seven publications in Nature and two publications in Science, with five of these having TBSI investigators as lead. There have also been 57 interdisciplinary publications between the participating Schools and reflecting the collaborations occurring between occupants in the different disciplines.

Led by Professor of Biochemistry, Luke O’Neill, researchers in TBSI have made a breakthrough in our understanding of the inflammatory process which may be of direct relevance to diseases such as septic shock and rheumatoid arthritis. A ‘metabolic shift’ occurs during inflammation which generates a molecule called succinate that drives inflammation forward. The work is a major collaboration with 10 centres, including MIT and Harvard, and also involved Prof Cormac Taylor, Conway Institute UCD, reflecting the innovation alliance between Trinity and UCD. Funding was largely from the European Research Council and Science Foundation Ireland and the findings were published in Nature.

Luke O’Neill

Led by Professor of Chemistry, Thorri Gunnlaugsson, and Professor of Chemical Biology, Clive Williams, the interdisciplinary collaboration between the two research teams has resulted in the generation of libraries of novel luminescent compounds that can be conjugated to gold nanoparticles, or be used as stand-alone molecules, that can target cancer cells. Funded by several agencies the work has shown that many of these systems can be used either as cellular imaging agents that emit at long wavelength, or that they have a dual function, as theranostic agents where they act as imaging and therapeutic agents.

Thorri Gunnlaugsson and Clive Williams
Bright SA et al Chem Commun 2013, 49, 8522-8524
Professor Kingston Mills and colleagues have made novel discoveries around the protective influence of Vitamin A against the damaging immune responses that lead to inflammatory bowel disease (IBD). These diseases include Crohn’s disease and Ulcerative Colitis and affect over two million people in Europe and more than 15,000 in Ireland. The research was published in the leading medical journal The Journal of Experimental Medicine. Mielke LA et al. J Exp Med. 2013 Jun 3;210(6):1117-24. doi: 10.1084/jem.20121588.

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Martin Caffrey
Membrane proteins are very important targets for many drugs and seeing the shape of them is very useful for drug discovery. Dr Dianfan Li of Professor Martin Caffrey’s group, has led the research to determine the crystal structure of one such protein diacylglycerol kinase from E. Coli at high resolution using state-of-the-art X-ray crystallographic techniques and X-ray synchrotron sources, leading to a greater understanding of how this enzyme functions at a molecular level. The findings are likely to attract considerable attention, in part because they help explain almost half a century of work on this paradigmatic membrane protein. The findings were published in Nature.


Danny Kelly
The long bones in our body are formed via a cartilaginous intermediary (a process known as endochondral ossification - the replacement of cartilage with bone). During normal skeletogenesis, channels within the developing cartilage play a key role in facilitating endochondral ossification. Inspired by this developmental feature, Prof. Daniel Kelly’s lab have recently shown that it is possible to use adult stem cells to tissue engineer cartilage grafts with a similar channelled architecture to that observed during long bone development. Burke DP and Kelly DJ. PLoS One. 2012;7(7):e40737. doi: 10.1371/journal.pone.0040737.

ORLA HARDIMAN
Orla Hardiman and colleagues have shown that Motor Neurone Disease and some neuropsychiatric diseases are genetically linked. People with Motor Neurone Disease are six times more likely than controls to have another family member who committed suicide, and four times more likely to have a family member who had a psychotic illness such as schizophrenia. The team have shown that 8% of those with MND carry a variant of a gene called C9orf72, and that these patients display a characteristic pattern of change in brain imaging possibly linked to neuropsychiatric disease.


IS MOTOR NEURON DISEASE LINKED TO NEUROPSYCHIATRIC DISORDERS?

IS VITAMIN A CRITICAL IN THE PREVENTION OF INFLAMMATORY BOWEL DISEASE?

CAN WE ‘SEE’ THE SHAPE OF MEMBRANE PROTEINS?

IS VITAMIN A CRITICAL IN THE PREVENTION OF INFLAMMATORY BOWEL DISEASE?
WHAT GENES GO ROGUE IN ECZEMA?

padraic fallon

Professor Padraic Fallon, Chair of Translational Immunology in the School of Medicine at Trinity, has led an International research project which identifies a new genetic mutation that helps explain the development of eczema.

“We have identified a new gene mutation that leads to atopic dermatitis (AD) in mice, and have taken that work further to demonstrate that a variant of the human gene is associated with AD in patients” said Prof. Fallon.


PAPERS IN NATURE.COM

Succinate is an inflammatory signal that induces IL-1α through HIF-1α

doi:10.1038/nature11986

Metabolism of inflammation limited by AMPK and pseudo-starvation

doi:10.1038/nature11862

Mechanism of Trypanosoma brucei gambiense resistance to human serum

doi: 10.1038/nature2516

Structural insights into electron transfer in cco3-type cytochrome oxidase

doi:10.1038/nature11182

Structure and function of an irreversible agonist-β2 adrenoceptor complex

doi:10.1038/nature09665

Crystal structure of the β2 adrenoceptor – Gs protein complex

doi:10.1038/nature10361

Viral immune modulators perturb the human molecular network by common and unique strategies

doi:10.1038/nature12889
JOBS CREATED IN TBSI

TBSI is a major employer in the Pearse Street area of Dublin. Most notably TBSI investigators have created 119 new jobs which are being funded from non-exchequer sources (including industrial collaborations and funding from the European Union FP7 programme and the Wellcome Trust). Importantly these jobs are mainly at the highly qualified post-graduate and post-doctoral levels.
ANNE MOLLOY
Anne Molloy received €250,000 from Axis Shield Diagnostics Ltd to explore the relative utility of different cobalamin biomarkers in assessing vitamin B12 deficiency in older persons.

DANNY KELLY
Key PI in SFI Center AMBER (€58 million with €23m from industry)
AMBER is a Science Foundation Ireland-funded centre that provides a partnership between leading researchers in materials science and industry. It is jointly hosted in Trinity College Dublin (by CRANN and the Trinity Centre for Bioengineering (TCBE)), in collaboration with University College Cork and the Royal College of Surgeons in Ireland (RCSI). The centre will deliver internationally leading materials research that will be industrially and clinically informed with outputs including new discoveries and devices in ICT, medical device and industrial technology sectors.

ORLA HARDIMAN
Contracts with Elan, Merck, Biogen and Novartis totalling €700,000
The Academic Unit of Neurology has received funding from Merck Serono and Novartis to establish and develop clinical and translational research programmes in neurodegeneration and multiple sclerosis. Elan Corporation has provided funding to support a post-doctoral clinical research fellowship in neuroimaging.

RICHARD REILLY
Contracts with Cochlear, Vitalograph and eMed technologies totalling €390,000
Cochlear are providing funding for a PhD studentship to investigate objective measures for electrophysiological changes in auditory processing in Cochlear Implant users. Vitalograph Ltd is providing funding towards a PhD studentship to investigate bioacoustics as an objective measure for quantifying use of respiratory-based medication.
Cochlear: €140,000 (signed)
Vitalograph Ltd: €50,000 (signed)

TBSI is helping 76 companies in their efforts to develop new products in biomedicine. Companies are coming to TBSI because of the excellence of our scientists and their ideas. The work is currently generating a total of €2.2m in contracts. Notable examples include...

PATENTS / Pcts / INVENTION DISCLOSURES

EXAMPLE – JOHN GILMER, US PATENT GRANTED IN JULY 2013: ‘ASPIRIN PRO-DRUGS’
A TCD patent filing on aspirin prodrugs from the Gilmer group in the TBSI was granted in several countries last year, including the USA. Aspirin prodrugs are inert compounds that produce aspirin following absorption from the intestinal tract. They have lower intestinal side effect potential than aspirin but it turns out they also have unexpected pharmacological properties including an ability to inhibit tumour cell recruitment of platelets and tumour cell invasion. The original patent was licensed to Solvotrin Therapeutics which won the EI commercialisation award for innovation in the Life Science Sector in 2010. Solvotrin and TCD have since made joint filings on applications of the technology in familial hyperlipidimia.
COMPANIES IN TBSI

OPSONA THERAPEUTICS
Area: innate immunity – targeting Toll-like receptors (TLR2)
Total funds raised – €65m to date (€35m in 2013 – one of the largest in Europe)
Large consortium of investors, including Novartis, Amgen, Baxter, Roche and Fountain
Currently running a Phase II trial with OPN305 in kidney transplant

TRIMOD THERAPEUTICS
Founded in 2011 by Kingston Mills
Area – cancer immunotherapy (TLR activator plus kinase inhibitor)
Total funds raised – €1m (currently raising a further €10m)

TRINO THERAPEUTICS
Founded in 2012 by Neil Frankish and Helen Sheridan
Area – inflammatory bowel disease
Total funds raised in 2013 – €9m
Investors – Fountain, Wellcome Trust, Enterprise Ireland, Growcorp
TBSI is providing an environment to train the brightest young people from Ireland and over 30 countries (including the UK, France, Germany, Italy, Holland, Sweden, Poland, USA, Brazil, India, Pakistan and Australia). Ireland can now offer through TBSI a workplace where our brightest and best can have an impact on the world. In addition we are training people to solve problems, creating a brain gain by attracting leading international talent and creating a boost for industry.

POST DOC AND POST GRAD ASSOCIATIONS
- Annual postdoc day
- European Researchers Night
- Various social events
- Entrepreneur day

M.Sc. in Bioengineering
The MSc in Bioengineering aims to provide engineers and scientists with the education and creative skills needed to practice in the medical devices industry in Ireland and focus on important clinical needs. Now, in addition to the award winning MSc in Bioengineering programme, students can opt for the MSc in Bioengineering with specialisation strands. All four streams lead to the award of the MSc in Bioengineering and consist of compulsory core modules and optional modules.

- MSc in Bioengineering – General
- MSc in Bioengineering – with specialisation in neural engineering
- MSc in Bioengineering – with specialisation in tissue engineering
- MSc in Bioengineering – with specialisation in medical device design

M.Sc. in Immunology
This MSc in Immunology includes study of immunological processes and mechanism, how they contribute to disease and how they might be manipulated therapeutically. By focusing on the molecules, cells, organs and genes of the immune system, their interaction and how they are activated and regulated, students will develop a deep understanding of the pathological processes underpinning immune mediated disease and how they might be controlled. From a practical perspective the course involves in-depth instruction in modern methodologies used in immunology/biomedical research, including the fundamentals of molecular and cellular biology. Students will also be trained in experimental design, data handling and basic research skills. The masters course aims to provide students with a well-balanced and integrated theoretical and practical knowledge of Immunology, and to highlight the progress and intellectual challenges in this discipline. The following modules are mandatory, and make up the taught component of the course:

- Basic Immunology
- Immunological Technologies
- Communicating Science/Critical Analysis: How to read and evaluate scientific literature
- Computational and Comparative Immunology
- Genes and Immunity
- Pathogen Detection and Evasion
- Clinical Immunology
- Immuno-technologies and diagnostics tests
- Parasite Immunology
- Tumour Immunology
- Global Infectious Diseases
- Immuno-therapeutics and product development

In addition, students will be required to submit a dissertation based on a research project conducted in one of the Immunology groups located within or affiliated to The School of Biochemistry and Immunology.
PRIZES

TBSI has some of the best researchers in Ireland, as can be seen from Prizes recently won.

Notable Examples

1. Luke O’Neill
   Royal Irish Academy Gold Medal for Life Sciences

2. Christopher Davitt
   ‘The best Strategic and Innovative Thinking’ prize at Accenture Leaders of Tomorrow 2013

3. Kingston Mills
   Winner Royal Academy of Medicine in Ireland Doctor Awards in Oncology, Scientist of the Year, Irish Laboratory Awards, Best Bioscience lab, Best Research Lab, Lab of the year.

4. Aoife Kelly
   First prize Irish Society of Gastroenterology

5. Fintan Geoghan
   Best project Innovation Academy Entrepreneurial workshop

6. Keith O’Brien
   Best oral presentation, Irish Association of Cancer Research 2013

7. Rebecca Coll
   First prize International Endotoxin and Innate Immunity Society meeting 2012

8. Adnan Khan
   Best talk Woods Hole Immunoparasitology Meeting, Woods Hole

9. Orla Hardiman
   Best presentation of medical research and best presentation of women in science, European Science TV and News Media Awards 2013

10. Danny Kelly
    2012 Perren Award of the European Society of Biomechanics

11. Fergus Poynton
    The European Conference on the Spectroscopy of Biological Molecules Student Award

12. Rebecca Coll
    First prize International Endotoxin and Innate Immunity Society meeting 2012

13. Adnan Khan
    Best talk Woods Hole Immunoparasitology Meeting, Woods Hole

14. Orla Hardiman
    Best presentation of medical research and best presentation of women in science, European Science TV and News Media Awards 2013

15. Danny Kelly
    2012 Perren Award of the European Society of Biomechanics

16. Fergus Poynton
    The European Conference on the Spectroscopy of Biological Molecules Student Award
PROMINENT VISITORS

Craig Venter
An American biologist and entrepreneur. He is a pioneer in the fields of genomics (sequencing the human genome) and synthetic biology.

James Watson
1962 Nobel Prize in Physiology or Medicine

Jean-Marie Lehn
1987 Nobel Laureate in Chemistry

Professor Sir John Walker
1997 Nobel Laureate in Chemistry

Professor Anne Glover
CBE FRSE FRSA FSB FAAM, Chief Scientific Advisor to the EU President

Kris Balderston
Special representative for Global Partnerships Office of the Secretary of State (USA)

COREPER
TBSI welcomed COREPER (27 Ambassadors from Brussels) on a visit on 11th April.

Mark Ferguson
Director General of SFI

Sean Sherlock TD
Minister of State, Department of Enterprise, Jobs & Innovation and Department of Education & Skills with responsibility for Research & Innovation

Richard Bruton TD
Minister for Jobs, Enterprise and Innovation.

Kerri-Ann Jones
Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs (USA)

Board of European Investment Bank
Visit to TBSI on 29 April 2013

Governor Deval Patrick of the Commonwealth of Massachusetts

Dr. Helga Nowotny
President, European Research Council

Jules Hoffmann and Peter Doherty
2011 Nobel Prize in Physiology or Medicine. Luke O’Neill and Peter Doherty, 1996 Nobel Prize in Physiology or Medicine

Professor Anne Glover
CBE FRSE FRSA FSB FAAM, Chief Scientific Advisor to the EU President

Governor Deval Patrick of the Commonwealth of Massachusetts

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Governor Deval Patrick of the Commonwealth of Massachusetts
TERRIFYING TALES
Luke O’Neill and Mathias Senge hosted this TBSI event. A lasting impression on 200 primary school children and their parents on Tuesday, October 25 during an extraordinary evening of spooky stories, ghoulish drama enactments and arts and crafts.

VISITS FROM TRINITY’S PEARSE STREET NEIGHBOURS
TBSI was happy to welcome Trinity’s Pearse Street Neighbours on several occasions. Betty Ashe (Chairperson) visited on European Researchers’ Night. Luke O’Neill and Mathias Senge hosted this TBSI event. A lasting impression on 200 primary school children and their parents on Tuesday, October 25 during an extraordinary evening of spooky stories, ghoulish drama enactments and arts and crafts.

EUROPEAN RESEARCHERS’ NIGHT
Discover Research Night, held on 27th September 2013. The event was part of an EU initiative (held concurrently in 300 cities across Europe). Members of the public were welcomed to TBSI to get a taste of what goes on behind the scenes. Members of the public interacted with the TBSI community who delighted and stimulated the imagination of all participants from school children and their families, to visitors to Dublin and the local community.

NEWSTALK SCIENCE SLOT
Luke O’Neill has a weekly science slot on the Pat Kenny show on Newstalk where he discusses the latest breakthroughs in biomedical research and other topics.

1. Mathias Senge at ‘Terrifying Tales’
2. Trinity’s Pearse Street Neighbours’ visit

PUBLIC LECTURE SERIES
The School of Biochemistry and Immunology organised talks for the general public on a range of topics.

- Oct 3rd 2012
  Professor Luke O’Neill
  The science of inflammation – the prospect of new treatments for arthritis, diabetes, heart disease, Alzheimer’s disease and cancer.

- Oct 30th 2012
  Dr Richie Porter
  Human metabolism and the weighty subject of obesity

- Nov 21st 2012
  Dr Gavin Davey
  Why stem cells?

- Dec 12th 2012
  Professor Cliona O’Farrelly
  Hepatitis C virus: Deadly, dangerous or docile?

- Jan 16th 2013
  Dr Jean Fletcher
  Why do people get Multiple Sclerosis?

- Feb 6th 2013
  Dr Colm Cunningham
  Dysfunction, depression, delirium: what happens when the brain gets inflamed?

- Feb 27th 2013
  Professor Kingston Mills
  Vaccines - are they good for you?

- Mar 20th 2013
  Dr James Murray
  Cannibalism, cancer and chemotherapy

- April 10th 2013
  Professor Andrew Bowie
  Exploiting the enemy: what we can learn from the virus-host arms race.

- May 1st 2013
  Dr Derek Nolan
  Neglected diseases: a poor man’s burden, a rich world’s fight

- Oct 16th 2013
  Professor Amir Khan
  ‘The Ageing Brain’ An exploration into Parkinson’s, Alzheimer’s and other neurodegenerative diseases

- Nov 13th 2013
  Professor Gavin Davey
  ‘Picturing the Molecules of Life’
HIGHLIGHTS FROM 2013

TBSI is a beacon of scientific excellence, attracting leading companies, researchers and thought leaders to Ireland.

HIGHLIGHTS

1. At least 50 major events, including visits from US State Department, Chief Scientific Advisor to the EU, Biocnect, Coreper I (27 Ambassadors from Brussels)

2. €1.8m grant from the Wellcome Trust in association with the Science Gallery to run five exhibitions on biomedical themes – ‘FatLab’, ‘Obesity’

3. Visits from at least 12 large pharma companies and many other industrial contacts

4. €3.8m Marie Curie PhD training network on Dopamine Neuron Research awarded to Biochemistry and Immunology

5. Joint Trinity / Indian Institute of Science symposium on Chemistry and Chemical Biology, June 2013

POST-DOC SOCIETY:

The post-doc society was delighted to host the visit of the Nobel laureate James Watson to TBSI in April. Prof. Watson gave a lecture and also participated in a Q&A session with TBSI postdocs where he gave an engaging and inspiring account of his career and work leading to the discovery of the structure of DNA.

The society organised a series of seminars in 2013. These included presentations from post-docs from the various disciplines in TBSI and also from early career PIs. The seminars were followed by a pizza and beer reception. These seminars provided a great opportunity for post-docs to learn more about the scope of research in TBSI, to meet each other on a more social level and will help foster future collaborations within the institute.

2ND IRISH NMR MEETING AND LAUNCH OF TBSI NMR FACILITY

On 16th April, directly following the Annual TBSI Symposium, the Institute held the “TBSI NMR Facility Opening / 2nd Irish NMR Meeting”, which celebrated the official launch of the 800 MHz and 400 MHz NMR spectrometers. The 800 MHz unit contains the strongest magnetic field in ROI and NI, and as a core facility, will provide world-class capabilities for structural investigations in chemistry, materials, biology, and medicine.

Over seventy participants, coming from all corners of the island (unprecedented), joined in scientific discussions. Along with research talks from practically all of the NMR-related academic groups in Ireland and NI, Professors Göran Karlsson (Swedish NMR Centre), Christina Redfield (Univ of Oxford), and Philip Williamson (Univ of Southampton) gave state-of-the-art plenary lectures.

ENTREPRENEUR DAY DEC 3RD 2013

A half-day event aimed to educate and inspire would-be science entrepreneurs, at which distinguished speakers discussed their own stories and provided advice. Speakers from industry included Henning Steinhagen, Senior Vice President and Head of Global Drug Discovery at Grunenthal, and Martin Welschof, Chief Executive Officer of Opsona Therapeutics, which is one of Ireland’s most successful companies working in Immunology. Speaking as venture capitalists were Ena Prosser of the Irish venture capital fund Fountain Healthcare, and Jan Adams of EMBL Ventures, Heidelberg. Seamus Mulligan, one of Ireland’s most successful entrepreneurs in therapeutics, also spoke, before Barry McMahon, Director of Trinity’s Innovation Academy, and Niamh McGuinness, an Innovation Academy Ambassador, held a panel discussion.

1. TBSI hosts visit from Dr. James Watson in April 2013
2. 2nd Irish NMR Meeting
3. Launch of TBSI NMR Facility
4. Metabolism and Metabolic Diseases Symposium

4. Post Doc Reception
5. Transition Year Visit
The TBSI Annual Symposium 2013 entitled ‘Metabolism and Metabolic diseases’ took place on Monday, April 15th. The Provost (Patrick Prendergast) launched the meeting by welcoming everybody and by giving them an introduction to the workings and goals of the Institute. The theme of the Symposium was “Metabolism and Metabolic Diseases”. The presentations were:

1. An inspirational lecture by Gregory Petsko (Brandeis University, Massachusetts, USA) on synuclein and its role in Parkinson’s disease.
2. A substantive performance from Grahame Hardie (University of Dundee, Scotland, UK) on the targeting cancer cell growth via the major metabolic sensor, AMPK kinase.
4. Paul Browne (TBSI) gave an insightful discourse on haematological cancers and informed us about current and novel strategies to treat them.
5. Isabel Rozas (TBSI) spoke on her group’s state-of-the-art work designing and testing anti-depressants.
6. Anne Molloy (TBSI) gave a moving tribute to the work of the late John Scott (TBSI) with whom she worked for many years. The lecture covered the genesis of his interest in the field of folate and vitamin B12 metabolism, and the significant discoveries he made to it. Recognition was also given to the long-standing and highly productive collaboration between Scott and Donald Weir (Emeritus School of Medicine, Trinity) via a presentation of a silver salver to Prof. Weir by Richard Porter.
7. Another long-term collaborator of John Scott and Anne Molloy was Lawrence Brody (NHGRI (NIH), Maryland, USA) who gave a powerful lecture on hunting down metabolic disorders associated with genetic polymorphisms.
8. Patrick J. Stover (Cornell University, New York, USA) enlightened us with his latest data on dysfunctional carbon one/folate metabolism and causation of neural tube defects.
9. Our final lecture was given by Michael Murphy (MBU, University of Cambridge, UK) who spoke on the role of intracellular control reactive oxygen species production as a cause of neurodegenerative diseases and ageing.

The Annual Symposium dinner for speakers and guests was held in the 1592 restaurant in Trinity College and we were delighted that John Scott’s son and daughter, Martin and Rachel were able to attend.
FUTURE GOALS

TBSI has made great progress to date and has broad ambitions. TBSI will continue to promote Ireland as a home of leading biomedical research, support the development of research in Irish industry, attract globally-leading researchers to Ireland, win significant non-exchequer funding - a profit generator for Irish research, enable job creation through spin-outs and licenses and provide employment in Ireland for our best and brightest.

Our specific goals for the next period are as follows:

1. Further outstanding discoveries, with more inter-disciplinary discoveries being made.
2. We aim to win further funding from the European Commission’s Horizon 2020 programme - three Advanced and three Starter ERC grants - leadership and/or participation in five Horizon 2020 programmes.
3. An €10m application to the Wellcome Trust for a Strategic Center Award in Immunology.
4. We expect a further two spinout companies to emerge, in the areas of therapeutics and medical devices.
5. Opsona Therapeutics will be completing its clinical trial for kidney transplant.
6. We will continue the upward trend in training PhD and MSc students, with the current year-on-year 10% growth in numbers continuing.
7. Increased engagement with industry – we are aiming to complete at least 2 major contracts with companies, setting up new collaborations.
8. With the Science Gallery we will be running two major exhibitions for the general public – Fat Lab and Blood.
9. TBSI will host Discover Research Night for Trinity in 2014.
10. We are holding a major conference in July 2014, with the Weizmann Institute, one of the world’s leading biomedical sciences research institutes. Over 20 of the Weizmann’s scientists will be coming to Dublin to discuss progress in research on Cancer and Inflammation. Five Nobel Laureates will be speaking at this conference which promises to be an unique event.