The BREAST-PREDICT Research programme is now mid-way through its fourth year, and has entered a period of maximum productivity. A wide variety of high-quality and impactful outputs are emerging from the core collaborative elements of the programme.

The novel collaborative approach of the Centre has opened key lines of communication between research leaders in multiple disciplines from institutions across Ireland. We have also been successful in supporting the career progression of our research team; indeed, multiple team members have progressed from postdoctoral roles to academic positions during the programme. Of particular note is that these new independent investigators continue to be linked with BREAST-PREDICT, thereby extending its reach.

Particularly rewarding has been the active participation of BREAST-PREDICT investigators in ongoing public–patient interaction (PPI) events, such as the UCD Patient Voice in Cancer Research. Increased two-way dialogue between researchers and patients can only serve to hasten progress in the most important areas of breast cancer research. From the researcher’s perspective, especially those whom do not have a direct day-to-day interaction with patients, these events are inspiring and ‘re-fire the coals’ to combat this challenging disease.

BREAST-PREDICT has now established itself as the leading cancer research programme in Ireland covering the continuum of basic to clinical research. I am keen to continue the momentum gained and am working hard, along with my other colleagues, to ensure that this progress is not dissipated upon the current planned end of the programme in September 2018. We are now into the final third phase of our exciting project and this is when the fruits of our labour start ripening. Keep up the good work!

Professor William Gallagher
Director, BREAST-PREDICT

Scientific Advisory Board

BREAST–PREDICT are regularly advised by our independent scientific advisory board (SAB) which previously included seven leading international scientists in the oncology field. At the end of Year 3, four new members with different areas of expertise were brought on board, in addition to the original seven: Prof. Robert Coleman, University of Sheffield, a medical oncologist with expertise in clinical cancer research; Prof. Anne–Lise Børresen–Dale, University of Oslo, with expertise in the molecular analysis of breast cancer; Prof. Klaus Pantel, University Medical Center Hamburg–Eppendorf, whose research focuses on liquid biopsies and circulating tumour DNA; and Dr. Pernette Verschure, Swammerdam Institute for Life Sciences, Amsterdam, with expertise in the area of breast cancer epigenetics.

On 20th September 2016, we held our third annual SAB meeting, attended by 45 researchers and 5 SAB members. This was an excellent meeting, with talks from 14 team members, and 19 posters. We also held a moderated poster session, with Ben Doherty claiming the prize for his work on ADAM22 as a predictive marker in endocrine-resistant breast cancer. The SAB are satisfied with progress to date, and provided useful feedback to plan for the next two years of our research programme.

Moving onwards and upwards

Congratulations to former BREAST–PREDICT research fellows Dr. Triona Ní Chonghaile, Dr. Stephen Madden, and Dr. Simon Furney who have recently progressed to senior academic appointments within Royal College of Surgeons. Well done also to Dr. Sonja Khan who left BREAST–PREDICT at the end of April 2017 to start an exciting new opportunity as Lecturer in Clinical Research at the Clinical Research Facility at NUI Galway.

BREAST–PREDICT Investigator Dr. Norma O’Donovan will be leaving her position as Programme Leader in the Targeted Therapies for Cancer Group in DCU in May 2017. We would like to take this opportunity to thank Norma for her significant contribution to the BREAST–PREDICT research programme, and we wish her the very best of luck in her future endeavours. Bioinformatics researcher Dr. Simon Furney has also been appointed as a new Funded Investigator within BREAST–PREDICT, and he will supervise a one-year MSc position within his Genomic Medicine group in RCSI.

The BREAST–PREDICT team also welcome a number of recent additions including Dr. Jamie Madden, a postdoctoral fellow who joined the epidemiology group in RCSI in October 2016; and Dr. Napur Mukherjee, a postdoctoral fellow in the Targeted Therapies for Cancer Group in DCU who joined the team in July 2016 working on WP4 activities.

Welcome to our new members
New treatments in the pipeline for Triple Negative Breast-Cancer

Exciting new research carried out by PhD student Naoise Synnott, Professor Joe Duffy, and Professor John Crown at St Vincent’s University Hospital and UCD, has identified a potential novel treatment for triple negative breast cancer (TNBC). This aggressive subtype of breast cancer lacks three important biomarkers namely, estrogen receptor, progesterone receptor and HER2, meaning that it cannot be treated with targeted therapies such as hormone therapy (e.g. tamoxifen) or Herceptin. This makes this type of cancer the most difficult to treat, with chemotherapy being the only current form of treatment for these patients. Resistance of the tumour to chemotherapy is common, with high rates of relapse following this systemic treatment. Thus, there is a huge unmet need for additional treatment options for patients with TNBC.

Now, the BREAST-PREDICT team have identified a treatment that specifically targets p53, a gene which is responsible for driving breast cancer growth, and is the most frequently altered gene in breast cancer. In particular, it is altered in almost all cases of TNBC. In a study recently published in the International Journal of Cancer and funded by both BREAST-PREDICT and the Clinical Cancer Research Trust, the team have shown that a new drug, known as APR–246, which acts by correcting or neutralising the mutant form of p53, can inhibit the growth of TNBC cells grown in the laboratory. Importantly, the St Vincent’s/UCD group now hope that APR–246 can be tested in clinical trials in patients with TNBC.

Another study emerging from BREAST-PREDICT and co-funded by the RATHER project, an EU-funded Consortium focused on difficult-to-treat breast cancer subtypes, also focuses on new therapies for TNBC, particularly on the role of a protein called CDK7. This protein was found to be present at high levels in TNBC, and patients with high CDK7 were more likely to experience a relapse following standard treatment. This study showed that treating TNBC cells in the laboratory with an inhibitor of CDK7 impeded their growth, both alone and in combination with other treatments. The researchers proposed this drug as a novel therapeutic strategy for this aggressive cancer type, particularly in combination with existing treatments, to improve their efficacy. Further research on this novel therapy is ongoing within the BREAST-PREDICT team.

These ground-breaking studies demonstrate the value of BREAST-PREDICT in bringing together laboratory scientists and oncologists to accelerate the translation of research from the laboratory to the clinic.

BREAST-PREDICT researchers Prof. Leonie Young and Dr. Damir Vareslija recently published their work in the prestigious journal JAMA Oncology, in collaboration with researchers from the University of Pittsburgh. This study examined the molecular changes that take place in breast cancer cells if they spread to the brain. Approximately 12-25% of TNBC patients with brain metastases, and 20-25% of primary tumours which were HER2-negative at diagnosis became HER2-positive following metastasis to the brain, a finding which has not been previously documented. The results of this study may have immediate clinical implications for this subset of patients, as their tumours could be treatable with HER2-targeting agents, which are already widely used in breast cancer treatment. The authors have recommended that patients who develop brain metastases should be monitored for these changes, to ensure that they receive the most appropriate treatment.

Do Statins improve breast cancer outcome?

Statin drugs are widely used for the reduction of blood cholesterol levels and prevention of cardiovascular disease. Some recent studies have suggested that these drugs may have other affects in the body; such as a potential treatment for breast cancer. The results of these previous studies do not always agree, and to date it is not clear whether women could benefit from starting statin therapy after a breast cancer diagnosis.

To try and answer this question, PhD student Amelia Smith, member of the BREAST-PREDICT epidemiology team led by Professor Kathleen Bennett, analysed information from over 4000 Irish breast cancer patients, including the medications they receive to determine whether women who started statin treatment after a breast cancer diagnosis were more or less likely to die from breast cancer. This information was provided by the National Cancer Registry of Ireland (NCRI) and the HSE Primary Care Reimbursement Services (PCRS). Amelia’s research found that starting statin therapy did not cause a significant reduction in deaths due to cancer. However, the potential effect of statin therapy on breast cancer remains interesting and is being pursued in further studies.

Since launch, the BREAST-PREDICT team have published over 80 research articles, including 51 original articles, at an average impact factor of 6 (highest 12.6) and 26 review articles, at an average impact factor of 9.4 (highest 55.9).
Floating point numbers

The team took part in fundraising events throughout the year, including the Relay for Life, a 24-hour community awareness event, and the Colour Dash, a 5k family fun run, all aimed at raising funds and awareness and providing support for cancer survivors and their families. BREAST-PREDICT PhD student, Michelle Lowry, is also running the ‘Marathon in a Month’ challenge, to raise funds for the Irish Cancer Society and get back to fitness after knee surgery.

A group of friends from Co. Mayo organised a pink-themed Valentines Party, to support a friend recently diagnosed with triple negative breast cancer, and to raise funds for BREAST-PREDICT research. The group succeeded in raising over €6,000, which they travelled to UCD to present to BREAST-PREDICT and the Irish Cancer Society.

Additional funding is a key aspect to ensure the sustainability of the BREAST-PREDICT Centre beyond October 2018. Since launch, we have leveraged over €20 million from external sources, comprising €16 million through academic grants, and €4.3 million from industry sources. In Year 3 we leveraged €4.5 million in total exchequer and non-exchequer funding. In terms of industry engagement, we actively collaborate with a number of companies including Bayer, Carrick Therapeutics, Eisai, and Pfizer.

Basic Research

Members of the BREAST-PREDICT team recently received approval in principle for the H-SYS ‘Human as a system’ Centre, a €45 million bid which was led by Prof. Walter Kolch, with Prof. Jochen Prehn as deputy. This massive collaborative effort involves 11 BREAST-PREDICT team members, and covers research programmes within the area of Oncology (with Prof. William Gallagher as Spoke Lead and Bryan Hennessy as deputy spoke lead), Nutrition and Skin. This application involves collaboration with 22 companies, representing a 25% budget contribution from industry partners (€15 million). While approved in principle, Science Foundation Ireland and the H-SYS team now need to petition the Irish government for the budget to support this application, the results of which will be known by December 2017.

Prof. William Gallagher recently led an institutional application with UCD under the SFI-HRB-Wellcome Trust Institutional Strategic Support Fund. This initiative involves a €1.1 million investment (with matched funding of €1.1 million from the university) across key strategies within Personalised & Translational Medicine and One Health. As part of this initiative, the university will fund three schemes (a) Clinical Primer scheme (b) Mid-career Stimulus and Diversification scheme and (c) Networks of Excellence scheme. Particular emphasis will be placed on interdisciplinary research and on research that translates into real benefit for patients and society.

Former BREAST-PREDICT Research Fellow Dr. Triona Ni Chonghaile was recently awarded €149,900 from Breast Cancer Now, in collaboration with BREAST-PREDICT Funded Investigator Dr. Darran O’Connor, for a project aimed at ‘Determining the role of the epigenetic reader bromodomain protein 3 in invasive lobular carcinoma’. This award was based on previous research carried out by BREAST-PREDICT PhD student Louise Walsh.

Dr. Darran O’Connor also received a Career Development Award (€498,463 direct costs) from Science Foundation Ireland to develop a prototype decision support tool for Her2+ breast cancer (HER CHOICE). The project began in October 2016 and builds on work carried out during the BREAST-PREDICT programme, focusing on Her2+ patients.

BREAST-PREDICT Investigators Dr. Alex Eustace & Prof. Bryan Hennessy were also awarded €237,000 from Breast Cancer Now as part of their Catalyst Awards programme, for a project entitled: ‘Development of a personalised therapy approach for patients with ERBB-family mutated breast cancer’. The application was based on research initially funded under BREAST-PREDICT.

Fundraising

This year marks the 30th Anniversary of the Irish Cancer Society Daffodil Day. As well as funding important cancer research in Ireland, this annual fundraising event is critical to ensure vital funds are raised for a number of Irish Cancer Society services such as the nurse-line; the night-nurse service, and volunteer drivers. The BREAST-PREDICT team attended the event launch in Croke Park in February, to chat to the fundraising teams and raise awareness of their research activities. On Daffodil Day, 24th March, members of the BREAST-PREDICT team in UCD Conway Institute held a bake-sale and raffle on the day and raised a massive €9,14. Thanks to all who donated!

The UCD Patient Voice in Cancer Research Committee has recently been established within UCD, centred on establishing public and patient involvement in cancer research initiative. Importantly, in addition to cancer researchers (and several BREAST-PREDICT members), this committee also includes a number of cancer patients and survivors; members of the cancer nursing community; and representatives from the Irish Cancer Society. Events to date have centred on developing a “roadmap” for patient involvement in research studies.

In April 2017, a panel discussion was held in UCD focused on patient involvement in clinical trials in Ireland. This well-attended event was led by Dr. Robert O’Connor, Head of Research in the Irish Cancer Society, Eibhlin Mulroe, CEO of Cancer Trials Ireland; and Dr. Derek Mitchell CEO of IPOSSI, and gave patients and the public an insight into cancer trials in Ireland, and how to get involved. All attendees also had the opportunity to learn about and participate in a crowd-sourcing session detailing how tumour samples are scored by a pathologist at initial cancer diagnosis, and how this result informs on future treatment decisions for each patient.

Support Fund. This initiative involves a €1.1 million investment (with matched funding of €1.1 million from the university) across key strategies within Personalised & Translational Medicine and One Health. As part of this initiative, the university will fund three schemes (a) Clinical Primer scheme (b) Mid-career Stimulus and Diversification scheme and (c) Networks of Excellence scheme. Particular emphasis will be placed on interdisciplinary research and on research that translates into real benefit for patients and society.
On 19th October 2016, we hosted a public research showcase in the UCD Conway Institute to mark the 3rd annual Cancer Week Ireland and invited three of our new SAB members to present at this event.

Prof. Robert Coleman kicked off the symposium with a highly engaging keynote lecture on the bone microenvironment in breast cancer; this was followed by Prof. Anne-Lise Børresen-Dale, who presented on ‘Multilevel molecular analyses in breast cancer: gauging inter- and intra-tumor heterogeneity and elucidating its role in treatment response’; and finally, Dr. Pernette Verschure discussed the epigenetics research ongoing in her group.

As part of the event, we also held our second BREAST-PREDICT elevator pitch award aimed at encouraging early-stage researchers to interact with other team members within the Centre to “pitch” a 5 minute, 5 slide BREAST-PREDICT spin-out idea, with the winner being awarded €5000 in consumables to carry out a mini-project. We had three high calibre finalists presenting at this event, with the winner being Dr. Damir Vareslija for his project ‘profiling the epigenome roadmap in breast cancer brain metastases’ which will involve input from WP1, 3 and 5.

On 1st February 2017, we held our first seminar of the year in RCSI. Prof. William Gallagher, a research fellow from UCD Systems Biology Ireland, kicked off the event by presenting his research on ‘Integrative approaches for the identification of genetic dependencies in cancer’; followed by Dr. Andrew Sims from the University of Edinburgh Cancer Research Centre who gave a fantastic presentation focused on integrating gene expression data to stratify breast cancer patients.

The BREAST-PREDICT team are committed to supporting the career development of all of their team members, at every stage of their careers. We would like to acknowledge the recent achievements of some of our team members on the national and international cancer research stage.

Congratulations!

To Professor William Gallagher, who was the inaugural recipient of the Irish Association of Cancer Research (IACR) Cancer Research Medal at the annual IACR Conference held in Kilkenny on 22nd–24th February 2017. This prestigious award recognises his significant contribution to the cancer research community in Ireland throughout his career. Accepting his award, Professor Gallagher thanked his peers and mentors, and gave his perspective on the cancer research ecosystem in Ireland, in his talk ‘Cancer (Research) in Ireland: Past, Present and Future’.

To BREAST-PREDICT PhD students Lisa Dwane (RCSI) and Killian O’Brien (NUIG, left) who were given the opportunity to orally present their work at the American Association for Cancer Research Annual Conference in Washington DC. The AACR is one of the largest cancer conferences in the world and to be invited to present is an amazing achievement, and testament to the quality of their research.

To BREAST-PREDICT PhD student Michelle Lowry, from TCD, who was given the opportunity to orally present her research on drug resistance in breast cancer at the International Society for Extracellular Vesicles (ISEV) Conference in Toronto, Canada. Michelle was also presented with the ISEV Junior Scholarship Award. Out of 620 abstracts submitted, Michelle is one of 25 researchers to receive this award this year and she is the first recipient in Ireland.

On 11th April 2017, BREAST-PREDICT hosted a joint seminar in the UCD Conway Institute as part of the Conway CLASS seminar series. Prof. Simak Ali from Imperial College London presented his cutting-edge research on developing new approaches for the treatment of ER-positive breast cancer, while world-renowned clinical trials expert Prof. Martine Piccart of the Université Libre de Bruxelles and Institut Jules Bordet, former head of the EORTC, imparted her research on new understanding and emerging therapies for the HER2+ subgroup of breast cancers.

In terms of upcoming events, in September 2017, BREAST-PREDICT, along with the UCD Conway Festival Organising Committee, have invited Dr. Andrea Califano, Chair of Systems Biology at Columbia University, to speak at the Conway Festival. Dr. Califano’s group integrates computational and experimental approaches to identify master regulators of cell physiology and disease processes, particularly cancer.

Members of our team will also attend the Irish Cancer Society’s National Conference for Cancer Survivorship 2017, ‘Living Well with Cancer’, taking place in Dublin in September 2017, to inform cancer survivors and clinicians about our research. This is a national conference for cancer survivors, those who care for them, health care professionals, staff and volunteers from cancer support services.

BREAST-PREDICT are also involved in the 1st European Alliance for Personalised Medicine Congress; ‘Personalising Your Health: A Global Imperative’, taking place in Belfast in November 2017. Prof. William Gallagher will chair a mini-Symposium on breast cancer: ‘Dealing with complexity head-on to better personalise treatment’. Speakers include Prof. Joe Duffy (St. Vincent’s University Hospital), Prof. Fergus Couch (Mayo Clinic), Ivana Sestak (Queen Mary University, London), and Jan-Willem Van de Loo (European Commission).

Further details on all upcoming events can be found on our website.