Dr. Colin Clarke, Ph.D.

Principal Investigator, National Institute of Bioprocessing Research and Training, Dublin, Ireland, and Associate Professor, University College Dublin, Dublin, Ireland

Colin Clarke holds a MSc and PhD in Bioinformatics from Cranfield University, UK. He leads the Bioinformatics and Data Analytics Laboratory at the National Institute of Bioprocessing Research and Training, Dublin, Ireland and is an Associate Professor in the School of Chemical and Bioprocess Engineering at University College Dublin. The goal of Colin’s systems biology research is to enhance our understanding of CHO cell factories to enable more efficient production. Colin’s team also have an active research programme focussed on harnessing big data technologies for biopharmaceutical manufacturing. He was awarded the Martin Sinacore Outstanding Young Investigator Award at Cell Culture Engineering in 2014 and selected as the Young Leader of the Year at the 2017 Irish Laboratory Awards.

**Talk Title: Understanding Biopharmaceutical Manufacturing at Single Cell Resolution**
Dr. Pawel Kalinski, PhD

Professor and Vice-Chair for Translational Research in the Department of Medicine, Director of Cancer Vaccine and Dendritic Cell Therapies, and a Co-Leader of the Tumor Immunology & Immunotherapy Program of the Roswell Park Comprehensive Cancer Center, Buffalo, NY.

Pawel Kalinski, MD, PhD is Professor and Vice-Chair for Translational Research in the Department of Medicine, Director of Cancer Vaccine and Dendritic Cell Therapies, and a Co-Leader of the Tumor Immunology & Immunotherapy Program of the Roswell Park Comprehensive Cancer Center in Buffalo, NY. Dr. Kalinski obtained MD (1991) from the Medical University of Warsaw, Poland, and PhD (Immunology; 1998) from the University of Amsterdam in the Netherlands. Before joining Roswell in 2017, Dr. Kalinski was a tenured Professor of Surgery and the Founding Director of the ImmunoTransplantation Center of the University of Pittsburgh Cancer Institute (2000-2017).

The research of Dr. Kalinski addresses: 1) Cell-based immunotherapies of cancer with focus on dendritic cell (DC) therapies; and 2) Therapeutic reprogramming of tumor microenvironments (TME) to enhance local infiltration of immune cells and enhance the therapeutic effectiveness of immune checkpoint inhibitors (ICI) and other cancer treatments. Dr. Kalinski has authored over 130 scientific publications and developed multiple INDs and investigator-sponsored clinical trials in these areas. He has extensive experience building and leading Team Science programs and collaborative projects within P01s, SPOREs and R01s.

His work has been funded by multiple grants from the National Cancer Institute (NIH/NCI), Department of Defense Congressionally-Directed Medical Research Program (CDMRP), philanthropy, biotech and pharma partners. He has served on Boards of Directors and Editorial Boards of several professional organizations and scientific journals, and as a scientific consultant and reviewer for multiple grant-funding agencies and scientific journals in the United States and Europe.

**Talk Title: Sensitizing Cold Tumors for the Therapeutic Efficacy of Immune Checkpoint Inhibitors**

We developed a combinatorial chemokine-modulating (CKM) strategy, involving TLR3 ligands, IFNa and COX2 blockers, which selectively induces CTL attractants (CXCL9, CXCL10 and CCL5), but suppress Treg attractants, such as CCL22, in the TMEs of multiple cancer types. Our alternative strategy is intratumoral (i.t.) injection of "type-1-polarized" dendritic cells (DCs) which selectively attract CTLs, NK and Th1 cells, but not Tregs.

Importantly for the feasibility of using systemic CKM infusions to activate multiple lesions of patients with disseminated tumors, CKM induces CTL attractants preferentially in tumor lesions, abrogating their intrinsic heterogeneity, but not in healthy tissues. Local or systemic CKM application or i.t. DC therapies are effective in promoting intratumoral accumulation of the spontaneously arising tumor-specific CTLs, showing strong therapeutic synergy with PD-1/PD-L1 blockade in several nominally-PD1-resistant mouse tumor models.

The antitumor effectiveness of the CKM/anti-PD-1 therapies is further enhanced by systemic vaccination with a specialized DC vaccine (aDC1s), which selectively enhances the expression of CXCR3 and CCR5 (receptors for CXCL9, CXCL10 and CCL5) on tumor-specific CTLs, facilitating their homing to the CKM-treated tumors.
Our ongoing clinical trials in advanced colon, breast, prostate and ovarian cancers evaluate the immunologic effectiveness of the CKM in functionally reprogramming the TME and its clinical activity, when combined with PD1 blockade and/or aDC1 vaccines.

Dr. Gerald Linette, MD, PhD
Professor of Medicine and Medical Director, Sean Parker Institute of Cancer Immunotherapy at the Perelman School of Medicine, University of Pennsylvania, Philadelphia

Gerald P. Linette, MD, PhD is currently Professor of Medicine and Medical Director, Sean Parker Institute of Cancer Immunotherapy at the Perelman School of Medicine, University of Pennsylvania. His primary interest is the development of cellular immunotherapies including dendritic cells for melanoma and other solid tumors. His research laboratory is located within the Center for Cellular Immunotherapies at Penn and is focused on human tumor neoantigen discovery for solid tumors.

Dr. Linette is a graduate of the Medical Scientist Training Program, Georgetown University School of Medicine. He completed training in Internal Medicine and Molecular Oncology at Washington University/Barnes Hospital in St. Louis followed by fellowship in Hematology-Oncology at Massachusetts General Hospital/DFCI. Dr. Linette is board certified in Internal Medicine and Medical Oncology.
Dr. Phillip Low, PhD

Presidential Scholar for Drug Discovery and the Ralph C. Corley Distinguished Professor of Chemistry, Purdue University

Dr. Philip S. Low is the Presidential Scholar for Drug Discovery and the Ralph C. Corley Distinguished Professor of Chemistry at Purdue University. Dr. Low has devoted over >45 years to exploring novel drugs for treatment of human diseases, characterizing the structure of the human red blood cell membrane, and defining signal transduction pathways in plants. He has published >450 scientific articles and has >75 US patents/patents pending. Eight drugs stemming from his research are undergoing human clinical trials in the areas of: i) tumor-targeted drugs for the imaging and therapy of cancer, ii) a new therapy for malaria, iii) a novel treatment for sickle cell disease, iv) tumor-targeted fluorescent dyes for image-guided surgery of cancer, and v) novel imaging and therapeutic agents for inflammatory and autoimmune diseases. Six companies (Endocyte Inc., OnTarget Laboratories Inc., Novosteo Inc., Umoja Biopharma Inc., ErythroCure Inc. and MorphImmune Inc.) have been founded to commercialize these discoveries. Dr. Low has received an NIH MERIT Award, the American Chemical Society's Award for Cancer Research (Sosnovsky Award), the American Association for Cancer Research’s (AACR) Award for Outstanding Chemistry in Cancer Research, both of Purdue's awards for outstanding research (McCoy and Sigma Xi Awards), the University's highest career achievement award (Morrill Award), and numerous other National and International awards. Dr. Low received his B.S. in Chemistry from Brigham Young University (1971) and his Ph.D. in Biochemistry from UCSD (1975).

**Talk Title: Ligand-targeted Immunotherapies for Cancer**

Also, in an effort to manipulate the endogenous immune system in the TME, we have developed targeting ligands that enable highly specific drug delivery to tumor-associated macrophages, regulatory T cells, myeloid derived suppressor cells, and cancer-associated fibroblasts in vivo. By exploiting these ligands to deliver different immune activators or inhibitors specifically to the desired immune cell type, we have found that we are able to reprogram the activities of these cells within the TME.
Dr. Sandro Matosevic, PhD

Assistant Professor, Purdue University, West Lafayette, IN

Sandro Matosevic, Ph.D. is assistant professor in the Department of Industrial and Physical Pharmacy at Purdue University. His lab studies immunotherapy of solid tumors using engineered natural killer cells, immunometabolic reprogramming and innate immunity.

Talk Title: Reprogramming of Natural Killer Cells as Immunotherapies for Solid Tumors
Associate Research Professor, Indiana University School of Medicine

Dr. Fabiana Perna is a physician-scientist focused on the pathogenesis and treatment of hematological disorders. She holds a full-time faculty position as an independent investigator in the Department of Hematology/Oncology of the Indiana University School of Medicine. She completed clinical training as hematologist under the mentorship of Drs. Bruno Rotoli and Lucio Luzzatto, leading hematologists in Italy. In 2008, she joined the laboratory of Dr. Stephen Nimer at Memorial Sloan Kettering Cancer Center. During that time she contributed investigating the role of several recurring epigenetic mutations in leukemogenesis, while completing a PhD program. These studies were published on several high-impact scientific journals and she was awarded an American Italian Cancer Foundation fellowship, the Clinical fellowship of Memorial Sloan Kettering Cancer Center, the Translational Research Training in Hematology and a competitive ASH Scholar Award in the clinical/translational category. At the end of 2012, Dr. Perna joined the laboratory of Dr. Michel Sadelain, Director of the Center for Cell Engineering at Memorial Sloan Kettering Cancer Center, where she worked as a senior research scientist. Given the exciting times in cancer immunotherapy and her previous expertise in myeloid malignancies, she developed a compelling platform, which integrates proteomics and transcriptomics to unbiasedly identify suitable targets for Chimeric Antigen Receptor (CAR) T cells (Perna F et al., Cancer Cell 2017), supported by a Technology Development Fund from MSKCC of $500K. She is the co-inventor of three patents recently licensed to Takeda pharmaceuticals.

She is also a member of the IU Melvin and Bren Simon Cancer Center that recently earned the NCI Comprehensive Cancer Center designation and holds a joint appointment as an Associate Professor in the Dept. of Biochemistry and Molecular Biology of IUSM.

The goal of the Perna lab is to develop precision immunotherapy by investigating the cancer cell surface proteome. By mining composite high-throughput expression data in genetic models and primary patient samples with a pipeline that Dr. Perna established for CAR target discovery, targets identified will be integrated into a personalized therapeutic platform, taking into account patient genetic mutational background. The lab has an expertise in virally expressing key genetic and epigenetic mutations in primary cells and performing large scale multiomic studies, including cell surface-specific proteomic studies followed by label-free and multiplexed targeted Mass-Spectrometry analysis, single-cell RNA-seq analysis and human xenograft in immune-deficient mice. They want to investigate how essential genetic and epigenetic determinants of hematologic malignancies shape the cell surfaceome, thus providing targets for promoting leukemogenesis and use of precision immunotherapy.

Talk Title: The Surfaceome of Hematologic Malignancies

The remarkable success of CD19-Chimeric Antigen Receptor (CAR) T cells in patients with B cell acute lymphoblastic leukemia (ALL) and non-Hodgkin lymphomas has prompt the development of CAR T cells for treating MM. One of the most important determinants of the success of CAR T-cell therapy is the choice of the target antigen; an ideal target should be highly expressed on all tumor cells, on cancer stem cells, in most patients and absent in normal counterparts and most tissues and organs of the whole body, as previously defined (Perna F et al. Cancer Cell 2017). BCMA is the first surface target utilized to generate CAR T cells for patients with RRMM who have undergone prior treatments. BCMA is a transmembrane glycoprotein belonging to the tumor necrosis factor receptor superfamily, found in late memory B cells and plasma cells and important in the survival of malignant plasma cells. Multiple clinical trials demonstrate impressive results with the ability of anti-BCMA CAR T cells to induce deep responses in highly pretreated RRMM, however, despite this, remissions are not sustained and the majority of patients eventually relapse. One of the mechanisms of resistance lies in the antigen loss or downregulation with the emergence of BCMAlow or BCMA-subclones. To limit the risk of antigen escape, alternative cell surface targets are currently under pre-clinical or clinical investigations with the purpose of developing rescue or combinatorial therapeutic strategies.

We have unbiasedly analyzed the expression of twenty one promising immunotherapeutic MM targets including CD138, CD19, SLAMF7, ITGB7, CD38, CD229, CD56, CD47, GPRC5D, TACI, IGF1R in more than 1,800 primary patient samples from three independent large datasets. We identified the targets with the highest level of expression in all patients, in relapsed patients compared to newly diagnosed patients and in patients with low expression of BCMA.
By stratifying the MM patient population based on R-ISS (Revised-International Staging System), cytogenetics and number of gene drivers we found that the MM targetable cell surfaceome depends on genetics and we defined the targets highly associated with high-risk status. These data may inform rational design of precision CAR therapy for specific subsets of MM that are genetically-defined. On the safety side, in order to determine whether targeting any of these candidate antigens might cause major toxicity in clinical trials, we annotated their expression in a large panel of normal tissues and organs of the whole body in addition to normal plasma cells and hematopoietic stem/progenitor cells. The Perna lab aims to investigate how essential genetic and epigenetic determinants of hematologic malignancies shape the cell surfaceome, thus providing targets for promoting malignant transformation and use of precision immunotherapy.

Dr. Cliona Rooney, PhD

Professor and Thomas J. Rosenbalm, M.D. Presidential Endowed Chair, Baylor College of Medicine, and member of the Center for Cell and Gene Therapy (CAGT) and Bone Marrow Transplant/Stem Cell Transplant Program at Texas Children's Cancer Center, Houston, TX

Dr. Rooney received her PhD in immunology from Cambridge University, UK in 1981 and completed two postdoctoral fellowships working on the immunology and molecular biology of Epstein-Barr virus (EBV). In 1990, She joined the faculty at St Jude Children’s Research Hospital, where children receiving T-cell-depleted hematopoietic stem cell transplantation had a high incidence of developing fatal EBV-associated lymphoma. There she evaluated the use of EBV-specific T-cells (VSTs) to prevent and treat this disease. EBVSTs proved safe and highly effective and led us to extend VST therapy to other post-transplant viral infections, and to the EBV+ malignancies that occur in immunocompetent individuals.

She is currently developing strategies that render therapeutic T cells resistant to inhibition by the tumor microenvironment. These include the use of a dominant-negative TGFβ receptor, a constitutively active IL-7 receptor, and an inducible caspase 9 suicide gene. All of these are, or have been, in clinical trials. We have also evaluated VSTs as hosts for chimeric antigen receptors (CARs), so that CAR-VST activation and expansion can be induced by endogenous viruses, viral vaccines or oncolytic viruses, via their T-cell receptor.
Since June of 2016, she has been the Co-Director of the graduate program in Translational Biology and Molecular Medicine (TBMM). Each student has both a basic science mentor and a clinical mentor and their thesis is devoted to translational research. She also is the Direct the Translational Research Laboratories (TRL) of the Center for Cell and Gene Therapy where 15 principal investigators are developing range of cell therapy products.

**Talk Title: Tumor Immunotherapy with Virus-Specific T-Cells**

Unlike tumors, virus infected cells and potently activate innate and adaptive immunity and induce massive expansion of virus-specific T-cells (VSTs). We therefore asked if viruses could expand VSTs if they are genetically modified to express a tumor-specific CAR. First we found that CD19.CAR-VSTs expanded after infusion into patients who received stem cell transplantation for high risk B-ALL only if they experienced virus reactivation. We therefore replaced a random virus reactivation with deliberate vaccination. We infused varicella zoster virus (VZV)-specific T-cells (VZVSTs) modified with a GD2.CAR into patients with relapsed osteosarcoma, and evaluated the response of the T-cells to vaccination with the live attenuated VZV vaccine, ZOSTAVAX. Infused VZVSTs expanded in response to VZV vaccination and produced an increase in the frequency of T-cells specific for non-viral tumor antigens (epitope spreading) that may produce additional anti-tumor activity. Two patients treated at the highest dose level of $1 \times 10^8$ cells per m$^2$ had stable disease and one remains disease free after tumor resection and a rank ligand inhibitor. We continue to modify this trial in an attempt to increased anti-tumor activity.

**Dr. Yoon Yeo, PhD**

Professor of Industrial & Physical Pharmacy and Biomedical Engineering, and Associate Department Head, Purdue University, West Lafayette, IN

Dr. Yoon Yeo is a Professor and Associate Department Head of Industrial and Physical Pharmacy at the College of Pharmacy with a joint appointment in Biomedical Engineering and a Showalter Faculty Scholar at Purdue University. She received her B.S. in Pharmacy and M.S. in Microbial Chemistry at Seoul National University in Korea, and her Ph.D. in Pharmaceutics at Purdue University, West Lafayette, USA. She obtained post-doctoral training at the Massachusetts Institute of Technology and returned to Purdue to join the faculty in 2007. Her research focuses on nanoparticle surface engineering for drug delivery to solid tumors, intracellular delivery of peptide antibiotics, anion-resistant non viral gene vectors and functional biomaterials for immunomodulation.
Talk Title: **Nanoparticle Engineering for Chemoimmunotherapy of Cancer**

Immune checkpoint blockade aims to rekindle host immune responses against cancer by interfering with cellular...development of cancer chemoimmunotherapy.

Dr. XingXing Zang, PhD

Professor and the Louis Goldstein Swan Chair at the Albert Einstein College of Medicine, Bronx, New York

Dr. XingXing Zang is a Professor and the Louis Goldstein Swan Chair at the Albert Einstein College of Medicine. His laboratory has been at the forefront of discovery and functional dissection of new immune checkpoints, with the objective of applying new knowledge to the development of new therapeutic strategies for cancer, autoimmune disorder, infection, transplant rejection, and metabolic diseases. Dr. Zang graduated from Shanghai Jiao Tong University School of Medicine, received his PhD from the University of Edinburgh, and did postdoctoral training with James Allison at the University of California at Berkeley and Memorial Sloan-Kettering Cancer Center.

Talk Title: **New Immune Checkpoints: From Discoveries to Clinical Trials**