NEW METRIC FINDS OXCAM PUBLICATIONS HIGH-ImpACT

According to a new metric released by The Office of Portfolio Analysis at the NIH, first-author research articles published by OxCam students have a higher impact than the average NIH-funded publication. The new metric, the relative citation ratio (RCR), is a value that accounts for the number of citations an article receives compared to publications in the same field, and represents a measurement of an article’s significance in that field. To read more about the calculations behind the RCR, refer to the group’s recent publication in PLoS (Hutchins, Yuan, Anderson & Santangelo, 2016).

In the figure to the right, the relative impact of first-author OxCam research publications is plotted on the x-axis. Each OxCam publication has a percentile ranking of influence compared to the average NIH-funded publication in its field. There are many more publications in the high-percentile bins, indicating that this measure OxCam students produce more than their fair share of high-impact research.

ANNUAL WORKSHOP: GOOD SHOW, OXFORD!

**JUNE 2016** — This year’s Annual Workshop, hosted by the University of Oxford, was an outstanding event and many thanks go to Professor Sarah Rowland-Jones and her administrative team, Zoe Stockdale and Karen Poxon, for their hard work.

Distinguished guest speakers included Professor Dame Frances Ashcroft, Professor Elizabeth Robertson, Professor Alison Noble, Dr. Herbert Geller, Professor Constantin Coussios, Professor Dave Stuart, Regius Professor Sir John Bell, and Professor Chas Bountra. Speakers focused on a diverse range of topics from communication to grant writing and vaccine design to drug delivery.

Many scholars had the opportunity to participate in this year’s “Research Vignettes,” an activity aimed at honing communication skills to describe one’s research in the most concise and effective manner. The following students were each given 90 seconds to present their research and then take a single follow-up question: Monica Kasbekar (Class of 2012), Alex Weiss (Class of 2012), Huayu Ding (Class of 2012), Davis Vigneault (Class of 2013), Kailan Sienna-Davidson (Class of 2012), Shaunna Beedie (Class of 2012), Steven Witte (Class of 2012), Adam Rolt (Class of 2012), Joanna Cross (Class of 2012), Christie Campla (Class of 2013), and Leland Taylor (Class of 2013).

The following scholars provided more in-depth scientific presentations: Ian Goldlust (Class of 2012), Anna Lopata (Class of 2012), Eva Archer (Class of 2012), Mathias Bellaiche (Class of 2014), Brennan Decker (Class of 2012), Kirk Reardon (Class of 2015), Jakob Seidlit (Class of 2015), Dr. Liana Falcone (Class of 2013), and Jeffrey Lienert (Class of 2014). Scholar Anita Gola (Class of 2013) also gave an extended scientific presentation, alongside her Oxford mentor, Professor Adrian Hill, titled “T-Cell Inducing Vaccines: Malaria and Ebola.”

As an expert in vaccine development, Professor Hill began the lecture with a background on efforts to create a viable malaria vaccine. Although the RTS,S vaccine developed by GSK completed a phase III trial with promising results, the vaccine did not induce the high concentration of antibodies required for universal protection especially in younger infants. In response to evidence that a more cellular immune response can provide the needed protection, Professor Hill turned his attention toward the impact of cytotoxic CD8+ T-cells. The Jenner Institute has, over the years, developed a strong vaccine platform involving heterologous prime-boost vaccinations, utilizing recombinant Adenoviruses and Modified Vaccinia Ankara (MVA) viral vectors expressing antigens of interest from various diseases, such as Ebola or malaria.

Anita has picked up this thread of research to elucidate how these viral vectors can be utilized in a prime and target approach. In recent years, there has been an increased appreciation of tissue-specific immune responses, and her lab has translated a similar concept by developing a vaccine platform that enables the targeting of protective tissue-resident CD8+ T-cells to the required organ or tissue of need. The novel prime and target vaccination, utilizing heterologous vaccination routes of viral vectors or nanoparticles, results in unprecedented protection in pre-clinical models of liver-stage malaria, which will soon be translated to future clinical trials. The prime and target vaccination strategy is not only a significant improvement over previous regimens, but also emphasizes the importance of tailoring vaccine design for localized, pathogen-specific immune responses.

Related articles “Workshop: Industry Panel” pg. 2 and “Familiar Faces” pg. 3.

RECOGNITION AND AWARDS

In recognition for her outstanding commitment and dedication to graduate training, Professor Alison Noble was the recipient of the 2016 Outstanding Mentor Award. Awards for Best Poster Presentation were given to Leland Taylor (Class of 2013) and Sam Katz (Class of 2015). The following student awards were generously supported by the International Biomedical Research Alliance: Steve Witte (Class of 2012) received the Innovation Award for Novel Solutions in Biology or Medicine, Michael Chen (Class of 2012) received the Gregory Paul Lenardo Basic Science Award for Discoveries in Cellular and Molecular Biology, and Brennan Decker (Class of 2012) received The Translational Award for Advances in Medical Science.
NEW SCHOLARSHIPS = NEW OPPORTUNITIES

We are always grateful for the dedication of the International Biomedical Research Alliance towards the success of our programs. This year, we were delighted to learn that the Alliance's continued efforts to assist in the training and success of our scholars resulted in four scholarships for the Class of 2016 (pictured above):

The El-Hibri Biomedical Research Scholarship was introduced in 2015. Mr. and Mrs. Fuad El-Hibri have continued their support of the program by once again donating $10,000 toward the success of an incoming scholar. This year, the award went to Class of 2016 scholar Michael Fernandopulle. During his time in the program, Michael will work with Dr. Michael Ward (NINDS & Prof. Peter St George-Hyslop (University of Cambridge) on elucidating the mechanism of transgenerational epigenetic inheritance, along with its role in neurologic disease.

The Certara Biomedical Research Scholarship was introduced this year by Certara, a biosimulation and regulatory writing consultancy, whose mission is to enable the optimization and increase the predictability of the most crucial R&D, regulatory, and payer decisions. The recipient of this $10,000 scholarship, Class of 2016 scholar David Morse, is concentrating his research on drug delivery and nanomedicine with a focus on oncology in the labs of Dr. Craig Thomas (NCATS) and Prof. Tuomas Knowles (University of Cambridge).

The John A. Cozzi Biomedical Research Scholarship was donated by Mrs. Edith Cozzi in memory of her husband, John. This $10,000 scholarship was presented to Class of 2016 scholar Benjamin Badger. Ben is conducting his research in the labs of Dr. Toren Finkel (NHLBI) and Prof. Andrea Brand (University of Cambridge), and aims to delve into the fundamental biology of development that underlies morphogenesis and tissue homeostasis.

The WCG Biomedical Research Scholarship is a $10,000 scholarship that was awarded for the first time this year thanks to the WIRB-Copernicus Group (WCG). WCG is the world's largest provider of regulatory and ethical review services for human research. OxCam Class of 2016 scholar Lindsey Rosen was awarded the scholarship to support her investigation of the mechanisms of immune tolerance and autoimmunity to elucidate what leads to autoantibody production and its pathogenesis with Dr. Steve Holland (NIAID) and Prof. George Hollander (University of Oxford).

Scholars were considered for laboratory scholarships based upon their previous achievements, the belief that their research project will have a meaningful impact, and the specific research interests of the organizations, foundations, and individuals sponsoring scholarships.

INDUSTRY VS. ACADEMIA? YOU PICK

“Raise your hand if you are planning to go into academia? Now raise your hand if you are planning to go into industry?” These questions sparked the panel discussion on “Academia vs. Industry” organized by the University of Oxford in collaboration with Dr. Steven Chatfield (pictured left), a member of the International Biomedical Research Alliance Board of Directors. Workshop attendees welcomed the three panelists, Dr. Chatfield, Professor Adrian Hill (pictured center), and Dr. Ted Fjällman (pictured right).

All three panelists emphasized the increased necessity of partnerships between academia and industry, particularly in early-stage vaccine development. Dr. Chatfield recommended that new PhD graduates are better served to begin their careers in smaller biotech companies, and that regulatory science is an option for those who have gained experience in the pharmaceutical industry. Dr. Fjällman, CEO of Prokarium, explained his non-traditional path from agricultural research, through strategy consulting, to industrial vaccine development, and emphasized his appreciation that industry offers more ways to measure success. Professor Hill, Director of the Jenner Institute, described the demands of the vaccine market and suggested that leadership in vaccine development requires significant experience beyond formal PhD training.

The panelists agreed that partnership building is becoming an easier task, but increased organizational complexity requires scientists to take on varied roles. They advised that it might take longer for a young scientist to achieve his/her goals than initially assumed; the young leader must become the prime mover behind any new vision, and assemble the team to realize that vision.

LASKER LESSONS: THE MANY PATHS TO LEADERSHIP IN SCIENCE

This year marked the second year for the Lasker Lessons in Leadership series, a collaborative event designed to provide our scholars with engaging and informative interactions with a diverse array of experienced leaders in science. Each event has a presentation from our keynote speaker, followed by a panel discussion moderated by a current GDP scholar. After these formal sessions, the speakers engage in more intimate discussions with our scholars and further explore the topic of the day.

Despite their varied backgrounds, all of this year’s speakers seemed to agree that there is no shortcut on the path to leadership and that leaders need to balance their priorities as experts, communicators, and motivators:

JANUARY - “Communication” - featured Dr. Linda Fried as our keynote speaker. Panels were Dr. Michele Hogan, Dr. Linda Huynh, and Dr. Tom Wynn.

MARCH - “Leadership in Medicine and Public Health” - featured Dr. Craig Thompson as our keynote speaker. Panels were Dr. Christina Annunziata, Dr. Marshall Fordyce, and Dr. John Niederhuber.

NOVEMBER - “Leadership and Career Paths” - featured Dr. Jeremy Nathans as our keynote speaker. Panels were Dr. Karen Midtun, Dr. Hari Shroff, and Dr. Kathy Zoon.

Christie Campla (Class of 2013) moderated the panel discussion. Dr. Fried’s presentation focused on the idea that “scientists need leaders, good ones” and “leadership is developed in every single step of what you do.”

Dr. Thompson was particularly apt with his personal anecdotes about leadership and his message that we should lead by example; he spent part of a day parking cars at Memorial Sloan Kettering, in order to better understand the employees who performed this task on a daily basis.

Scholars were considered for laboratory scholarships based upon their previous achievements, the belief that their research project will have a meaningful impact, and the specific research interests of the organizations, foundations, and individuals sponsoring scholarships.

*Created in 2005 by a group of forward-thinking individuals interested in supporting unique and creative models for doctoral education and research at the NIH, the International Biomedical Research Alliance is a 501(c)(3) organization whose only mission is to support the NIH Oxford-Cambridge Scholars Program.
We are happy to highlight Dr. Vanja Lazarevic, an NIH investigator who is enthusiastic about graduate training and eager to support scholars in an interdisciplinary and collaborative program. Dr. Lazarevic has been conducting research at the NIH for over 5 years and is currently a principal investigator in the Experimental Immunology Branch of the National Cancer Institute. We reached out to Dr. Lazarevic and she was excited to share some details about her current research (below):

In my laboratory, we use biochemical and genetic approaches to elucidate how transcription factors regulate differentiation, activation and functional plasticity of lymphocytes during an immune response. Dysregulated expression of immune-associated genes is a leading cause of many inflammatory and autoimmune diseases. One of our goals is to understand how the transcription factor T-bet, the master regulator of type 1 inflammatory responses, shapes the development of immunopathology and organ-specific autoimmunity.

We have demonstrated that T-bet expression in autoreactive CD4+ TH cells is necessary for the pathogenesis of autoimmune encephalomyelitis, a model of multiple sclerosis. We have discovered that T-bet promotes the functional plasticity of CD4+ TH17 cells and controls their ability to disrupt the blood brain barrier and recruit innate myeloid cells to the central nervous system (CNS). Interestingly, T-bet expression in autoreactive TH17 cells alone is insufficient to generate pathology in the CNS, indicating that the pathogenesis of autoimmune encephalomyelitis hinges upon additional T-bet-expressing innate immune cell subset(s). Through cell type-specific deletions of T-bet, we aim to uncover T-bet-activated transcriptional networks in other immune cells necessary for the development of autoimmunity. Such research may ultimately lead to the generation of novel therapies against immune-mediated pathologies.

Once again, the Annual Workshop provided an excellent opportunity to welcome back some of our exceptional alumni to share their experiences and advice with current scholars. This year, we were joined by OxCam alumni Dr. Sonya Hanson (Oxford/NINDS, Class of 2009 - pictured left) and Dr. Molly Perkins (Oxford/NIAID, Class of 2005 - pictured right).

In 2013, after working collaboratively with 4 separate PIs for her PhD research, Dr. Hanson graduated from the OxCam program and moved on to her current position as a postdoctoral fellow at Memorial Sloan Kettering Cancer Center in the lab of Dr. John Chodera. During her presentation, Dr. Hanson highlighted her current work and some of the interesting approaches they are taking; including recruiting gamers to contribute their computing power to run molecular simulations of kinase structures, which are a key to computational drug design. This work has motivated Dr. Hanson to explore the potential benefits of expanding cross-discipline collaborations between experts in the fields of IT and biomedical research in order to address the infrastructure and management challenges surrounding “Big Data.”

Dr. Perkins completed her PhD in 2011; she spent some time in academia following the completion of her doctoral degree, but has since transitioned to industry, working as a T-cell immunologist at Bluebird Bio. As a manager in the Immunotherapy Group, her current work in cancer drug development is a natural extension from her PhD research. During her talk, she shared with our students some of the advantages she has experienced while working in industry. Dr. Perkins didn’t see the direct impact that her research was having while she was in academia; in industry, she can more immediately see an impact because her lab’s directive is “will this drug work in a patient.”

After their talks, both Dr. Hanson and Dr. Perkins took some time to speak with students and catch up with their colleagues at the Workshop. After learning about their recent successes, we look forward to hearing about their future endeavors.

NOTABLE EVENTS

The OxCam Program welcomes Dr. Steve Holland as the new Scientific Director for NIAID. Dr. Holland mentored OxCam alumna Dr. Liana Falcone (Class of 2013) and is currently mentoring Class of 2016 Scholar, Lindsay Rosen. We look forward to working with Dr. Holland in his new capacity as Scientific Director of NIAID.

Congratulations go out to Dr. Karen Berman (NIMH) and Dr. Jake Liang (NIDDK). Both Dr. Berman and Dr. Liang are mentors to current GDP scholars and were recently appointed to the National Academy of Sciences. Dr. Berman is mentoring Class of 2013 scholar Angela Ianni and Dr. Liang is mentor to Class of 2012 scholar Adam Rolt and first year scholar, Class of 2016, Samantha Tilson.

Hematopoietic Stem Cells (HSCs) are the holy grail of hematopoietic regenerative medicine, as they have the power to engraft a patient’s bone marrow and reconstitute the entire blood program. Given the number of congenital bone marrow and blood disorders that have bone marrow transplants as a last resort treatment, the prospect of generating a patient’s own, genetically-corrected HSCs at the bench, and then transplanting them back, holds a great amount of promise.

To date however, few have been able to create these blood cells outside of the body, and those that have, have done so by transfecting some potentially oncogenic factors into the cells. Likewise, culturing these cells outside of their bone marrow home (even if they’ve been taken from healthy donors) is extremely difficult, as we don’t understand all the cues that keep these cells in their self-renewal state within the bone marrow.

This is where my project with the labs of Catherine Porcher and Roger Patient at the University of Oxford and André Larochelle at the NIH (NHLBI) comes into play.

At Oxford I focused specifically on studying the ways in which the embryo creates blood stem cells in the developing aorta and comparing this to previous methods, which have been designed to create blood in a dish in the lab. By characterizing the cells more fully, we confirmed what has been recently reported and long suspected: hematopoietic progenitors produced in vitro resemble more closely cells arising in the yolk sac than those in the intra-embryonic aorta, which contains the targeted developing HSC population.

Armed with this developmental biology focus and expertise, I have transferred to the NIH, where the lab is focused on research to eventually drive gene therapies for patients with inherited blood disorders. My aim is to continue exploring important pathways involved in the generation of blood stem cells during development, and mimicking those pathways outside of the body, to produce life-saving blood stem cells for patients in the clinic. Currently, I am exploring silk as a biomaterial scaffold to try to mimic the developing niche where HSCs arise. I am also looking into other specific pathways present in the developing embryo that have not yet been studied in vitro.
A FOND FAREWELL

The following students have successfully submitted their theses and are moving on to the next phase in their careers. Whether they are returning to medical school or taking research positions in academia or industry, we wish them the best of luck in all of their future endeavors:

Eva Archer “Simian Immunodeficiency Virus infection of CD4+ T cell subsets and its impact on B cell responses in early infection”
Mentors: Rick Koup (NIAID) & Paul Kellam (Cambridge)

Shaunna-Leigh Beedie “An investigation of thalidomide derivatives for clinical use”
Mentors: William Figg (NCI) & Neil Vargesson (Aberdeen)

Elizabeth Brickley “The life course epidemiology of severe malarial anemia”
Mentors: Patrick Duffy (NIAID) & Angela Wood (Cambridge)

Michael Chen “Insights into the G-quadruplex unwinding mechanism of DHX36”
Mentors: Adrian Ferre-D’Amare (NHLBI) & Shankar Balasubramanian (Cambridge)

Joanna Cross “Investigation of the neurological, cognitive and behavioural defects in Smith-Lemli-Opitz syndrome”
Mentors: Forbes Porter (NICHD) & Frances Platt (Oxford)

Brennan Decker “Genomic approaches to prostate cancer tumourigenesis and susceptibility to breast cancer”
Mentors: Elaine Ostrander (NHGRI) & Douglas Easton (Cambridge)

Huayu Ding “Visual computation in starburst amacrine cell dendrites”
Mentors: Jeffrey Diamond (NINDS) & Michael Hastings (Cambridge)

Liana Falcone “Intestinal inflammation in chronic granulomatous disease: reactive oxygen species interact with the microbiome at the intestinal barrier”
Mentors: Steve Holland (NIAID) & Clare Bryant (Cambridge)

John Ferdinand “The biological role of the TNF super family ligand TL1A and its receptor DR3”
Mentors: Richard Siegel (NIAMS) & Aymen Al-Shamkhani (Southampton)

Richard Gieseck “Elucidating mechanisms of hepatic fibrosis using murine models and human induced pluripotent stem cells”
Mentors: Tom Wynn (NIAID) & Ludovic Vallier (Cambridge)

Lucas Glover “Examining the contribution of dentate gyrus granule cells and ambiguity toward the stress response and behaviour of the rodent”
Mentors: Heather Cameron (NIMH) & David Bannerman (Oxford)

Ian Goldlust “No cell left behind: Targeting residual ovarian cancer spheroids”
Mentors: Craig Thomas (NCATS) & James Brenton (Cambridge)

Michael Gormally “Chemically targeting the cancer cell at the DNA interface”
Mentors: Craig Thomas (NCATS) & Shankar Balasubramanian

Sabrina Heman-Ackah “Alpha-Synuclein in Parkinson’s disease: Molecular pathogenesis and development of genome engineering-based silencing approaches”
Mentors: Alan Koretzky (NINDS) & Matthew Wood (Oxford)

Jessica Hostetler “Identification of novel Plasmodium vivax blood-stage vaccine targets”
Mentors: Rick Fairhurst (NIAID) & Julia Rayner (Cambridge)

Stefano Iantorno “Genome plasticity and genetic exchange in Leishmania tropica”
Mentors: David Sacks (NIAID) & Matt Berriman (Cambridge)

Andrew Ishizuka “Pre-clinical and clinical evaluation of the malaria vaccines ‘PFRH5-VLP’ and ‘PFSPZ’ vaccine”
Mentors: Robert Seder (NIAID) & Adrian Hill (Oxford)

Monica Kasbekar “Discovery of a selective small molecule inhibitor of the Mycobacterium tuberculosis fumarate hydratase”
Mentors: Craig Thomas (NCATS) & Chris Abell (Cambridge)

Leah Katzenelzick “Characterization of dengue viruses using antigenic cartography”
Mentors: Stephen Whitehead (NIAID) & Derek Smith (Cambridge)

Niall Lally “Neural and cognitive mechanisms underpinning novel treatments for depression”
Mentors: Carlos Zarate (NIMH) & Jonathan Roiser (University College London)

Jason Murray “Lost in translation: Studies of the initiation, elongation, and termination of protein synthesis in eukaryotes”
Mentors: Thomas Dever (NICHD) & Venki Ramakrishnan (Cambridge)

Catherine Nezich “Insights into Parkin-mediated mitochondrial quality control and its role in biased segregation of pathological mitochondrial DNA”
Mentors: Richard Youle (NINDS) & Ian Holt (Cambridge)

Daria Nikolaeva “Towards the development and evaluation of a transmission-blocking vaccine for Plasmodium falciparum malaria”
Mentors: Carole Long (NIAID) & Simon Draper (Oxford)

Ariane Richard “Studies of genetic variation in the tumour necrosis factor cytokine and receptor superfamilies in autoimmunity and autoinflammation”
Mentors: Richard Siegel (NIAMS) & Kenneth Smith (Cambridge)

Adam Rolt “Development of inhibitors of hepatitis C virus”
Mentors: T. Jake Liang (NIDDK) & Andrew Stachulski (Liverpool)

Jenna Shapiro “Hydrogel substrate effects on protein kinase A and osteogenesis”
Mentors: Constantine Stratakis (NICHD) & Michelle Oyen (Cambridge)

Kailan Sierr-Davidson “Single cell transcriptional analysis of malaria-specific T lymphocytes following vaccination and protection in humans”
Mentors: Robert Seder (NIAID) & Helen McShane (Oxford)

Malcolm Sim “The influence of HLA-C and KIR on natural killer cell function”
Mentors: Eric Long (NIAID) & Daniel Altman (Imperial)

Christopher Toepfer “The role of myosin regulatory light chain phosphorylation in cardiac health and disease”
Mentors: Jim Sellers (NHBLI) & Michael Ferenczi (Imperial)

Madhvi Venkatesh “Structural studies of signal transduction in bacterial chemotaxis and metabolism-related cancer targets”
Mentors: Srijan Subramaniam (NCD) & Judith Armitage (Oxford)

Steven Witte “Long non-coding RNAs and super-enhancers: cell-specific regulators of the immune response”
Mentors: John O’Shea (NIAMS) & Allan Bradley (Cambridge)

MESSAGE FROM THE PROGRAM SCIENTIFIC DIRECTOR

It’s been an exciting year for the NIH Oxford-Cambridge Scholars Program. This is my fifth year serving as the program’s Scientific Director, and it’s been a true honor to help guide it alongside a small but dedicated group of colleagues who have donated countless hours of their “free” time to develop it into one of the premier graduate training programs in the country. I particularly want to thank Drs. Elaine Ostrander (NHGRI), Jim Sellers (NHBLI), & Ted Pierson (NIAID), and Rick Fairhurst (NIAID) who serve as the Director of Admissions, Program Dean, Scientific Deputy Director, and MD/PhD Program Director, respectively. I also want to welcome Drs. Mariana Kaplan (NIAMS), John Schiller (NCI), and Craig Blackstone (NINDS), who recently joined the NIH OxCam Executive Committee to advise current and future students in developing collaborative projects in their respective institutes. Finally, I want to thank all of the students in the GPP that inspire me every day with their abundant enthusiasm for scientific discovery. No job is more fulfilling than watching a scientific career blossom. I wish everyone a wonderful holiday season and a productive 2017 filled with many high-impact papers.

Tom Wynn (NIAID)