POSTDOC RESEARCH DAY
Dec 2, 2019
09:00 - 17:30
Pharmaceutical Sciences Building
Vancouver Campus, UBC
UBC Postdoctoral Association Executive

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Panelists

Theresa Grieco, PhD
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Friderike Moon, PhD
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Science World

Conny Lin, PhD
Policy and Legislative Analyst
College of Pharmacists BC

Sherry Wang, PhD
Project Team Leader
Genome Sciences Centre

Stefanie Vogt, PhD
Research Scientist
AbCellera

Judges

Noriko Okamoto, PhD
Research Associate,
Botany

Debashish Mukherji, PhD
Research Associate,
Quatum Matter Institute

Angela Wild, PhD
Research Associate,
Cellular & Physiological Sciences

Jennifer Klenz, PhD
Senior Instructor,
UBC

Rachel Wilson, PhD
Lecturer,
Botany

Emilisa Frirdich, PhD
Research Associate,
Microbiology & Immunology

Feng Lui, PhD
Research Associate,
Chemistry

Tom Hunter, PhD
Faculty Lecturer,
Asian Studies

Mark Vessey, PhD
Associate Professor
English

Thank you to all our presenters & attendees!
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Participants can expect an interactive and engaging 45-minute discussion with the members of the UBC PDA, Dr. Daniel Anstett (PDA President) and Dr. Shreyas Patankar (Executive member) to discuss information and resources available to postdocs at UBC and to discuss issues relevant to the postdoc community.

The UBC PDA wants to hear from you! As the independent organization working to represent all UBC postdoctoral fellows and advocate on their behalf, the PDA would love to hear about your life postdoc-ing! Should we have more coffee parties or pub crawls? Are you satisfied with your professional development opportunities? How about that extended benefits package? Come chat with the PDA exec team and help us prepare an advocacy agenda that represents you!
Josef Penninger, MD

From Haploid stem cells to blood vessel engineering

Director, Life Sciences Institute, UBC
Professor, Dept of Medical Genetics, UBC
Canada 150 Research Chair in Functional Genetics
Professor of Genetics, University of Vienna
Honorary Professor, Chinese Academy of Medical Sciences
Guest Professor, Medical University of Vienna
Adjunct Professor, Dept of Immunology, University of Toronto

Biography

Josef Martin Penninger, born in Gurten, Austria, is an Austrian geneticist and the Canada 150 Research Chair in Functional Genetics. Dr. Penninger is currently the Director of the Life Sciences Institute (LSI) at the University of British Columbia. He studied medicine at the University of Innsbruck in Austria. From 1990 to 1994 he worked as post-doctoral fellow at the Ontario Cancer Institute, thereafter until 2002 at the Department of Immunology and Medical Biophysics at the University of Toronto. As Principal Investigator of Amgen, his independent lab contributed to the development of the antibody Denosumab for bone loss and also found the first connection for RANKL to mammary gland development in pregnancy and breast cancer. In 2002, he moved to Vienna, Austria to start and develop the Institute of Molecular Biotechnology of the Austrian Academy of Sciences, which is now the largest and most successful institute of the Academy based on high impact publications and the number of European Research Council grants received.

Dr. Penninger envisions to recreate this environment at the LSI to nurture and train the best and brightest young minds of UBC scholars. His major accomplishments include pioneering insights into the molecular basis of osteoporosis, breast cancer and metastasis, and he has published extensively in several multidisciplinary scientific journals, with over 60 publications in Cell, Nature, and Science. He has received numerous awards including the Wittgenstein Prize of the Austrian Federal Government, the Descartes Prize for Research, the Ernst Jung Prize for Medical Excellence, the Innovator Award of the US Department of Defense, and most recently the Austrian Cross of Honor for Science and Art First Class.
# Oral Presentations

## Research Session 1

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– Dr. Victoria Hemming, Forestry |
| 2    | 09:30 – 09:45 | *Machine Learning CADx process for classification of sub-cm Lung nodules in the PanCan study*  
– Dr. Rohan Abraham, BC Cancer Research Centre |
| 3    | 09:45 – 10:00 | *A premalignant cell-based model for functionalization and classification of PTEN variants*  
– Dr. Jesse Chao, Cell & Physiological Sciences |

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Who to trust? How to derive improved quantitative judgements from experts for models and decisions

Victoria Hemming, PhD
Forestry

Expert judgement is required in every scientific domain, particularly when critical decisions are imminent and the data are absent, uninformative or incomplete. While expert judgement can be remarkably good, experts can be easily biased by a range of mental shortcuts, which can lead to poor judgements. In this talk, I ask whether we should (and can) avoid expert judgement completely, and if not, how can we derive the best possible judgements from experts to inform critical assessments and decisions? Acknowledging that we are not yet at a stage where we can avoid expert judgement, I focus on how we can improve expert judgement via the application of structured elicitation protocols. These protocols treat the collection of expert judgement with the same principles that we expect for the collection of empirical data (transparency, repeatability, empirical control). I discuss how these protocols claim to improve judgements, and then demonstrate using two very diverse case studies the extent to which improvements were observed from the application of a structured elicitation protocol (the IDEA protocol) I show that simple steps can be taken to substantially improve the quality of judgements derived by experts. Furthermore I outline how these protocols can be practically applied in the context of even the most resource poor disciplines.
Lung Cancer screening trials have demonstrated significant mortality reduction. Low-Dose Computed Tomography (LDCT) screening can frequently discover many small nodules in at risk participants. However classification of these, sub-cm nodules as cancerous or benign is a challenging task even for expert clinicians.

In this work we use machine learning (ML) techniques to differentiate, cancerous (clinically confirmed) and benign nodules (>5 years of follow-up). Data for this study is drawn from a screening study (PanCan) from which we selected 613 distinct nodules (141 cancerous, and ~size matched 472 benign).

We analyzed texture and shape features (~170) that are extracted from the nodule with and without perimeter transition pixels to control for perimeter effects. Features were also extracted from the ring of parenchyma surrounding the nodule to account for tumour effects on surrounding tissue. From the equivalent location in the opposite lung, parenchyma characteristics were extracted which we used to normalize nodule texture features in an effort to reduce scanner bias.

Preliminary results for machine learning classification have shown model accuracies of up to 80% (feature selection and classification algorithm dependent). Radiomic feature data can be combined with patient demographic variables such as age, sex, and smoking status, increasing classification accuracy slightly to 81%. When normalized by the opposite lung, 58% of texture features showed improved classification ability. Others have shown that nodule area/volume alone is a good classifier; for this data set it gave 65% accuracy.
A premalignant cell-based model for functionalization and classification of PTEN variants

Jesse Chao, PhD
Cell & Physiological Sciences

As sequencing technologies become more efficient and economical, we are identifying sequence variations in the population faster than ever. For disease-associated genes, it is imperative that we can differentiate a sequence variant as either benign or pathogenic such that the appropriate therapeutic interventions or surveillance can be implemented. PTEN (Phosphatase and TENsin homolog) is a frequently mutated tumor suppressor that has been linked to the PTEN hamartoma tumor syndrome. While the domain structure of PTEN and the functional impact of a number of its most common tumour-linked mutations have been characterized, there is a lack of information about many recently identified clinical variants. To address this challenge, we developed a cell-based assay that utilized a premalignant phenotype of normal mammary epithelial cells lacking PTEN. We measured the ability of PTEN variants to rescue the spheroid formation phenotype of PTEN-/MCF10A cells maintained in suspension. As a proof of concept, we functionalized 47 missense variants using this assay, only 18 of which have clear classifications in ClinVar. We utilized a machine learning model trained with clinical data to classify the variants as benign or pathogenic based on our functional scores. Our model predicted with high accuracy that loss of PTEN function was indicative of pathogenicity. We also determined that the pathogenicity of certain variants may have arisen from reduced stability of the protein product. Overall, this assay outperformed computational predictions, was scalable and had a short run time and could be an ideal alternative for annotating the clinical significance of cancer-associated PTEN variants.
Diversity dynamics across scales

Antonin Machac, PhD
Biodiversity

Global diversity dynamics remain controversial. It has been suggested that the dynamics are expansionary, such that the number of species across regions and clades increases constantly. However, some have argued the opposite, namely that species numbers stay largely unchanged most of the time, following equilibrial dynamics. My presentation will demonstrate how these two positions can be reconciled, employing novel evidence, derived from molecular data, museum collections, and remote sensing. Specifically, my presentation will show how the dynamics of diversity in mammals and birds (15,000+ species) change across elevations, latitudes, islands and continents. The results indicate that the dynamics, together with the ecological controls governing them, change systematically with spatial, temporal, and phylogenetic scale. The concept of scale-dependent dynamics may then resolve the original controversy. I will also demonstrate how it can more broadly advance our understanding of the processes that generate diversity, with implications for evolutionary theory, biodiversity management and conservation.
Modification of heart channel proteins via stress signalling

Omid Haji-Ghassemi, PhD
Biochemistry

The beating of our hearts is a complex biochemical event. A key component of muscle contraction is a small ion known as calcium. Just prior to muscle contraction, calcium rushes into the heart cells and triggers the contraction. Thus, having the right amount of calcium at the right time is critical for our regular heart rhythms, and too much or too little calcium can be fatal. The different compartments within the heart muscle cell are separated by membranes, which form barriers for many molecules. The calcium ions must pass through special channel proteins that can open and close, thus determining the amount and timing of calcium release. When we experience stress our hearts pump faster, and whole bunch of stress signalling happens in our heart muscle cells. The stress signals modify ion channels by adding a little ‘tag’ to it, which makes it easier to open, allowing for a more efficient movement of calcium. This tagging, which is known as ‘phosphorylation’, is beneficial when it comes to doing exercise. However, when the tagging is excessive, it can directly contribute to heart rhythm disorders. We recently captured a very detailed 3D atomic structure of an enzyme that adds a phosphorylation tag to two different ion channel proteins, and uncovered how genetic mutations can alter the behaviour of the enzyme, which may lead to cardiac arrhythmia. Finally, we found when one tag has been added another is more likely, which can lead to amplification of the stress signal.
Firm Demographics and the Great Recession

Peifan Wu, PhD  
Vancouver School of Economics

My research focuses on firm dynamics in macro economy. I focus on cross-sectional variations of firm behavior, as well as the aggregate feedback effects.

Summary for non-experts: this research points out how important the start-ups are for the aggregate economy. With both empirical exercise and theoretical derivations, we found that young firms critically contribute to the growth and recovery of the aggregate economy.

This piece of research talks about how firm demographics have an impact on the aggregate economy. The last U.S. recession stands out not only for its depth, but also for the rather slow recovery that followed it. What is less well known is that the number of productive units -- establishments -- also dropped substantially, while it kept growing in the occasion of the prior recessions. This was mostly due to the entry margin, which contracted like never before. Did such dynamics contribute to slowing down the recovery? We address this question by means of a general equilibrium business cycle model with heterogeneous firms and endogenous entry and exit. Once calibrated to match unconditional average firm-level and aggregate dynamics, we subject the model to different combinations of aggregate shocks. We found that recessions characterized by a sizeable drop in entry rates stand out along two dimensions: (1) The response of output is hump-shaped, meaning that output can diverge from trend for years following a negative mean-reverting shock; (2) The recovery of output, employment and, notably, productivity, is substantially slower.
Is it worth it? Building opposition alliances in electoral autocracies

Elvin Ong, PhD
Public policy & Global affairs

Electoral authoritarian regimes, a form of hybrid regime that combines the democratic façade of elections with autocratic manipulation and repression, are now one of the most common regime types in the world. A few contemporary examples include Putin's Russia, Erdogan's Turkey, Maduro's Venezuela, and Hun Sen's Cambodia. The existing social science literature indicates that forming opposition pre-electoral alliances significantly enhances the chances of opposition victory against these incumbent autocrats. But opposition parties frequently find it difficult to make the costly compromises necessary for forming such alliances. When do opposition parties undertake the difficult task of building pre-electoral alliances?

In this talk, I argue that public episodes of regime vulnerability, when combined positive perceptions of inter-party complementarity, motivate opposition party leaders to build alliances. Clearly vulnerable incumbent autocrats open the opposition's door to electoral victory, while mutual recognition of the complementarity of each other's strengths and weaknesses incentivize inter-party coordination towards victory. I illustrate this novel theory through a comparative historical analysis of 1980s autocratic Philippines under Ferdinand Marcos and South Korea under Chun Doo Hwan. Specifically, I triangulate empirical evidence from the secondary literature, newspaper reports, Congressional hearing transcripts, and declassified foreign policy documents from the Central Intelligence Agency, Department of State, and the National Security Council in the Ronald Reagan era. These findings not only contribute to the existing literature on pathways towards democratization, but also suggests potential mechanisms for resisting democratic erosion.
Stem cell-niche interactions regulate signalling micro environment and innate immune response in Drosophila

Rohan Khadilkar, PhD
Cell & Physiological Sciences

Stem cells possess the ability to self renew or to differentiate into mature cell types. Maintaining the balance between self renewal and differentiation is highly crucial for maintaining tissue homeostasis and organismal development. Stem cells reside at a specialized structure called as the niche in the context of a complex three dimensional tissue/organ. The niche plays an instructive role and helps in maintaining stem cell homeostasis. Owing to its genetic tractability and functional parallels to the vertebrates, Drosophila (fruit fly) has been widely used as a model organism to understand pertinent biological problems. Using Drosophila lymph gland (blood cell producing organ) as the system of analysis, the study elucidates how stem cell - niche communication mediated by two modes namely intercellular and cell-extracellular matrix communication are important for regulating blood stem cell differentiation. During physiological challenges like infection or parasite infestation, the signalling micro-environment in the stem cell niche ecosystem undergoes changes that triggers infection- induced hematopoiesis. Since the primary function of the hematopoietic system is to mount an effective immune response, the talk will focus on how stem cell-niche interactions are important for inducing immune activation in flies.
New solar power conservation architecture for renewable energy systems

Emanuel Serban, PhD
Engineering

The solar systems with the issues of power generation variability can result in grid instabilities. In addition, the leakage current pollutants in solar systems, can result in safety hazards. The proposed architecture eliminates the grid instabilities by integrating an energy storage (lithium-ion battery) converter rated at 10% of the main solar converter. A further exploration of the proposed architecture reveals extended solar power production over the existing systems. For example, at sun rise and sunset, the system is capable to harvest more solar energy by operating at low voltage.

The integrated energy storage converter becomes a valuable asset that allows more functionalities:

a) Power smoothing for eliminating the grid instabilities
b) Elimination of internal dissipative components
c) Extension of solar energy harvesting by using a harmonic controller to extend the voltage operation by 4%.

The research continues for safety compliance in order to reduce effect of pollutants on leakage current in solar systems. An interesting control strategy is proposed at the modulation level which reduces the pollution of the leakage current to 250% less than the traditional method.

The evaluation results demonstrate the solar-energy storage architecture's performance for high energy production and safety compliance.

The advantages of the new architecture lead to higher performance, safe and grid friendly systems ready for the next generation of solar power solutions.
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Dr. Doris Chow, Ophthalmology and Visual Sciences |
| 3      | What does it take to be (come) an inclusive teacher?  
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3D Bioprinted human cardiac tissues for toxicity screening applications

Marita Rodriguez, PhD
Engineering

Unexpected adverse cardiac outcomes are the leading causes of clinical trial discontinuation and drug recall. This can largely be attributed to the poor predictive nature of animal models used in preclinical experiments. Thus, there is a clear need for new and robust experimental models that better imitate the human cardiac myocyte and predict drug effects in the clinic. With this goal in mind, members of the Walus Lab at UBC are using lab on printer (LOP) bioprinting technology to produce physiological three-dimensional heart tissue structures from human stem cell derived cardiac cells. The ultimate goal for these models is to replace animals for safety and efficacy screening of drugs in preclinical trials.
Eyes as a window to global motion perception: A validation of an oculomotor tracking task to assess motion sensitivity in depth

Doris Chow, PhD
Ophthalmology and Visual Sciences

The public often perceives motor paralysis as the major consequence of spinal cord injury (SCI). However, among SCI survivors, devastating cardiovascular impairments [e.g. blood pressure (BP) dysregulation] are among the leading causes of disability and death. Without surprise, the individuals with SCI rank autonomic recovery at a much higher priority than being able to walk again. While the majority of SCI research is focused on more overt consequences of SCI (e.g. motor recovery), the invisible cardiovascular impairments are unfortunately understudied.

The individuals with upper-thoracic or cervical SCI suffer from highly unstable BP. While transitioning from supine to upright position, systolic BP can drop even below 50mmHg (a condition called orthostatic hypotension), which can lead to ischemic stroke. Astonishingly, in the same individual within same day, systolic BP can abruptly rise up to 300mmHg in response to daily stimuli (e.g. full bladder or bowel routine) This condition called autonomic dysreflexia, can lead to cerebral hemorrhage, seizures and even death. Because these BP fluctuations are very rapid, current pharmacological options to manage BP are undesirable as they are slow-acting and exert prolonged effects.

We developed a fast-acting and non-invasive therapy to modulate BP in a rat SCI model. Using electrical stimulation, delivered transcutaneously via conventional electrodes, we were able to not just treat, but also prevent autonomic dysreflexia in rats with upper-thoracic SCI. Our results suggest that transcutaneous spinal cord stimulation is arguably a reliable, non-invasive, immediately-acting and clinically-adaptable therapy for potentially fatal cardiovascular consequences of SCI.
What does it take to be (come) an inclusive teacher?

Angelica Araujo de Melo Maia, PhD
Education

As a coordinator of the Brazilian Government Program for Initial Teacher Education (hereon Pibid) in the area of English as an Additional Language at my university department in Brazil, I supervised the work of teacher candidates (hereon TCs) in an elementary school in a capital city of the state of Paraíba from 2014 to 2017. At that school, one of the TCs‘ tasks was to give support to students with disabilities who were included in regular classes. The postdoctoral research project I am developing at UBC focusses on data generated during that period and this paper addresses the theme of inclusive teacher preparation guided by two questions: a) In a teacher preparation practicum context, what are possible strategies to allow TCs to develop a caring and inclusive attitude towards their students? b)How do TCs represent the impact of those strategies on their professional development? I looked at two Pibid program reports of activities conducted in 2015 and 2016, and at reflective journals written by ten TCs. I tried to identify the types of strategies proposed to foster an inclusive teacher identity, and I analyzed the effects of those strategies on candidates‘ professional development. The findings point out some powerful strategies to prepare teachers who value learner diversity and who can establish caring relationships, such as: articulating theory and practice through ongoing discussions and journaling, asking TCs to adapt/modify materials in teams, to connect with students with disabilities and to understand their needs, trying to contribute to a meaningful learning process.
Non-invasive chronic spinal stimulation as multi-session therapy to improve cardiovascular function after spinal cord injury

Kiran Pawar, PhD
Department of Medicine, ICORD

Spinal cord injury (SCI) is a devastating condition which results not only in paralysis but also in blood pressure and heart rate dysfunctions that permanently impact the quality of life. Majority of individuals with cervical or high-thoracic spinal cord injury suffer from disrupted function of the heart and blood vessels. A major health concern in this population is unstable and rapid increase in blood pressure known as autonomic dysreflexia. This condition is caused by daily routine activities such as full bladder or medical procedures, and can lead to cerebral hemorrhage, seizures, or even death.

We have shown that rapid blood pressure fluctuations can be controlled by a fast-acting and clinically relevant spinal cord stimulation via electrodes positioned over the skin in rats with SCI. Furthermore, we showed that similar episodes of high blood pressure can be controlled by electrical stimulation in an individual with SCI. Most recently we have demonstrated that noninvasive stimulation, when delivered on daily (5 days per week) and alternate days (3 days per week) can reduce the severity of high blood pressure episodes.
The green wave of medicine: Exploring the anti-inflammatory potential of Canadian hemp to treat inflammatory bowel disease

Dustin Heeney, PhD
Food Science

Inflammatory bowel disease (IBD) is a group of chronic intestinal diseases known as ulcerative colitis and Crohn’s disease. IBD is largely driven by a drastic increase in oxygen concentration in the intestine and creation of harmful reactive oxygen species, free radicals and other inflammatory molecules. Recently, Canada has seen an increase in prevalence of IBD including in children and geriatric populations, severely limiting these patients’ quality of life. Current treatment methods rely on expensive antibody based anti-inflammatory drugs which have undesirable side-effects in a large portion of patients. Current evidence suggests bioactive compounds found in Cannabis plant extracts (e.g. cannabidiol) could have potential for treatment of IBD and specifically reduce the effects of reactive oxygen species on colon cells. In this project, we will first profile 23 Canadian hemp cultivars for free-radical scavenging potential. We will then investigate the benefits of Cannabis sativa (hemp) seed extracts for their anti-inflammatory potential in models of the human intestine (colon cell culture) and in models of chemically induced colitis in mice. We suggest that components of hemp seed extract will reduce inflammation of the intestine through neutralization of reactive oxygen species. A better understanding of the mechanism of action imbued by components of Cannabis on intestinal tissue will translate into improved treatment options for the millions suffering from IBD.
Animals link ecosystems through resource movement

Chelsea Little, PhD
Zoology

Individual plants and animals are often the unit of study in ecology (and other fields of science). We examine their traits, growth, and behaviour, and how they interact with other individuals of their own or other species. But we can think bigger: what about the effects individuals have on whole ecosystems? By moving as part of their daily foraging routes, dispersing, or migrating, animals link multiple ecosystems in space. In this presentation, I will focus on the consequences of movement by herbivores and carnivores on resource cycling. Herbivores often forage in high-productivity patches, however they may use other habitat types for different purposes, for example to escape predators. When herbivores excrete nutrients that they have consumed in high-productivity patches into low-productivity patches that they use for sleeping, breeding, or other activities, this represents a nutrient subsidy at the landscape level. Carnivores, on the other hand, typically have larger home range sizes; their population densities are lower, however their excretions may have higher concentrations of nutrients, and because they travel greater distances they may link more isolated ecosystems. Overall, animal-vectored movement of nutrients is particularly important for ecosystems because it represents one of the only ways to transport nutrients against natural gradients created by elevation, gravity, and wind. In an era of animal population declines and habitat loss/fragmentation, it will be crucial to consider the potential disruption of these cross-ecosystem exchanges – and the potential establishment of new ones – as we try to predict the stability and functioning of ecosystems.
Lightning Talk #7  11:50 - 11:55

Architectural clients in the era of consumer empowerment

Christina Gray, PhD
Architecture

One architectural maxim suggests that behind each great architect is a great client. This paper pressures a singular sense of architectural authorship by examining the role of the architectural client within narratives around architectural production. Specifically, this paper examines the case of Sydney and Frances Lewis who, as owners of the Best Products Company, were an integral part of the architectural production of their company during the 1960s and 1970s. In working closely with a range of differing architects including most notably James Wines, Venturi and Scott Brown, and Hardy Holzman Pfeiffer Associates, the Lewises presented themselves as playing a pivotal role in the architectural output of their company.

Within the context of a particularly vital period in retail history that saw a dramatic rebalancing between the roles of consumers and producers, the Lewises were presented as prosumers, or producing consumers. After having studied the architectural production of the Best Products Company solely through the archival lens of the clients, this research aims to foreground the ways in which the Lewises projected their power as clients working within the particular structures of their family-run business to influence the architecture they commissioned. The Lewises developed modes of narrating their architectural production in ways that began to overlap with the ways in which shoppers were expected to use the retail spaces that were being designed. Far from being an idiosyncratic historical outlier, this case study becomes a harbinger for broader changes in the role of the American consumer as retail space was being significantly re-shaped. Through this example, we can begin to trace ways in which the strengthening role of the consumer was trickling into architectural production at the margins, complicating singular models of architectural creation.
Vitamin C-induced epigenomic remodelling as a preventive therapy for leukemic transformation

Sarah Grasedieck, PhD
Michael Smith Laboratories

Mutations in genes that either encode or affect the function of epigenetic regulators are frequent early events in aging-related clonal hematopoiesis and were found to precede leukemic transformation in longitudinal patient studies. Correspondingly, the majority of acute myeloid leukemia (AML) patients shows genome-wide alterations in chromatin methylation. Recent work, including our own, identified gains in cytosine methylation at gene regulatory enhancer elements in response to isocitrate dehydrogenase (IDH) and ten-eleven translocation dioxygenase (TET) mutations to directly affect myeloid differentiation in murine models. Strikingly, we have found that vitamin C, which is a co-factor for TET enzymes, can reverse this phenotype and thereby re-initiate expression of key myeloid genes in vitro. These findings suggest that TET and IDH mutations actively contribute to the block of differentiation that is a hallmark of AML and can be readily reversed by a known, low-cost and non-toxic molecule.

As a next step, we will explore whether and to which extent we can restore the normal DNA methylation landscape in patient-derived leukemic cells that were transplanted into immunocompromised mice through vitamin C treatment, both individually and in combination with demethylating AML therapies. Considering that TET and IDH mutations can be detected in elderly individuals using routine diagnostic techniques, we would further like to explore the potential of high dose vitamin C treatment to restore cytosine methylation homeostasis in affected cells with the ultimate goal to delay or prevent the transformation towards myeloid malignancy.
Plants as alternative for fossil fuels

Lisanne de Vries, PhD
Wood Science

Hotter than ever (pun intended): there is an urgent need to change our fossil-based economy into a bio-based economy. In this bio-based economy, the sun, wind and water currents could be leveraged as renewable energy sources. Similarly, plant biomass could be a promising resource for materials and chemicals. This biomass consists mainly of 3 different components or polymers: cellulose, hemicellulose and lignin. Cellulose and hemicellulose are sugars that bacteria and fungi use as energy source (just like we, humans, do) or raw materials for other products, such as ethanol (think of how yeast is used to brew your beer). Lignin on the other hand is of value for the bio-based economy as we can use this plant polymer for the production of different kinds of important chemicals. At the moment however, it is difficult to extract the cellulose and hemicellulose from the plant because of the presence of lignin. Lignin works as some kind of glue for the plant, providing it the strength it needs (trees usually do not fall over that easily, for instance). Therefore, we genetically engineered plants such that the extraction of these polymers is easier and leads to chemicals that are of higher value. We did so by modifying the lignin composition and amount. As a result, we're a step closer to reducing our dependency on fossil fuels.
Measuring workplace attitude towards disabled employees

Jon Breen, PhD
Occupational Science & Therapy

Attitudes toward people with disabilities (PWDs) are more negative in the workplace than in other social situations. These negative attitudes have been found to have a significant and damaging effect on the employment success of PWDs. Having a means to measure these attitudes will allow employers to determine the value of various training interventions and of longer term disability-related equity strategies.

During my PhD program, I developed the Co-Worker Acceptance of Disabled Employees (CADE) Scale to measure these attitudes. I engaged 21 Subject Matter Experts from North America, Great Britain and Australia, to provide input on its scope and detail. This resulted in a 20-item questionnaire. Each item within the questionnaire describes a workplace scenario that compares PWDs to other employees. For example, Item #8 asks respondents to rate their level of agreement or disagreement with the statement that “Employees with disabilities are more likely than others to miss work.”

My postdoctoral research has focused on generating reliability and validity evidence for the CADE Scale. I have conducted an initial validation study, with 288 respondents completing the survey. Results provided additional evidence of both reliability and validity. These results have also supported my hypothesis that disability is typically perceived by others within an affect-driven framework of difference.

I am currently working with two employers to further test the CADE Scale. We will determine whether the scale is sufficiently sensitive to measure changes in attitude toward PWDs by administering it before and after a brief disability awareness training session.
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