



# **Scientific Meeting**

## 13-14 September 2019

North Tower, Third Floor Sheraton Vancouver Wall Centre 1088 Burrard St., Vancouver, BC



nanomedicines.ca | @NMIN\_NCE

Welcome

## from NMIN'S Management Team

On behalf of the Board of Directors, Research Theme Leaders, & Administrative Centre Staff of the NanoMedicines Innovation Network (NMIN), & our generous sponsors & supporters, we are delighted to welcome you to NMIN's first Scientific Meeting at the Sheraton Vancouver Wall Centre in downtown Vancouver, British Columbia.

NMIN began its five-year term as a national Network of Centres of Excellence (NCE) on April 1, 2019. Over the next five years, we intend to connect & strengthen Canada's vibrant cross-sectoral nanomedicines community, & to further advance Canada's global lead in applying nanotechnologies to advance human health through the promotion of cutting-edge research with commercial application & the cultivation of new talent to fuel the scaling of existing & new companies in this field.

NMIN principals have developed five of the 10 nanomedicines approved for systemic use by the US FDA and/or European EMA regulatory agencies. In addition, they have established a vibrant nanomedicines industry consisting of over 20 companies engaged in nanomedicines R&D.

This event represents the Network's first scientific forum, & we welcome the opportunity to discuss nanomedicine-related state-of-the-art science, priorities in the field, & research & capacity-building investment opportunities & commercial strategies with you over the next two days.

As well as the Network's scientific leaders, who are at the forefront of this field, this meeting convenes investigators & trainees involved in 20 research projects selected for NMIN support, as well as representatives from industry & government with an interest in nanomedicines & their potential to be the dominant medicines of the future. We welcome the many stakeholders—researchers, trainees, government & industry—who have joined us for this event, & encourage you to forge new connections & opportunities to collaborate.

Our program will highlight the three themes underpinning NMIN's Research Program: Targeted Drug Delivery, Nanomedicines for enabling Gene Therapy, & Diagnostics to advance disease detection. Panel discussions will explore the commercial & funding landscapes within which our work must find its way. Workshops will offer practical, real-world insights into the challenges of IP protection, securing patents, & establishing companies. We are delighted to have Dr. Neal Boerkoel join us for dinner as our guest speaker.

This is a new Network, & we are eager to find ways to integrate those who share our vision of a future in which "smart" medicines & nanomedicine-enabled gene therapies serve to detect & cure disease more effectively & efficiently.

We are extremely grateful to the sponsors & supporters whose support has facilitated this inaugural event. Their shared commitment to NMIN's vision will be a key component of the Network's success in the years ahead.

We look forward to celebrating the launch of the Network & advancing the field of nanomedicines with you in Vancouver!



**Pieter Cullis, PhD, FRSC** Scientific Director & CEO

efflat halker



Gilbert Walker, PhD Associate Scientific Director

Riana Koyce



Diana Royce, EdD Executive Director







#### **Registration & staff contact information**

NMIN on-site contact information	
Leah Graystone, HQP and Events Coordinator	(905) 348-7170
Diana Royce, Executive Director	(905) 580-2227
Registration Desk: Junior Ballroom Foyer	
Friday, September 13	8:00 am-5:00 pm
Saturday September 14	$8.00 \text{ am}_{-}3.00 \text{ pm}_{-}$

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FRIDAY, SEPTEMBER 13, 2019   North Tower, Third Floor   Jr. Ballroom	
8:30–8:35 am Jr. Ballroom	Welcome remarks Pieter Cullis   Scientific Director & CEO, NMIN   The University of British Columbia (UBC)
8:35–9:15 am Jr. Ballroom	NMIN Overview Pieter Cullis   Scientific Director & CEO, NMIN   UBC Diana Royce   Executive Director, NMIN
9:15–10:30 am Jr. Ballroom	Nanomedicine for Enabling Gene Therapy 101 Pieter Cullis   Theme 2 & NanoCore Leader, NMIN   UBC Christian Kastrup   Theme 2 & NanoCore Co-Leader, NMIN   UBC
10:30–11:00 am	BREAK   Jr. Ballroom D
11:00 am – 12:15 pm Jr. Ballroom	Nanomedicine for Diagnostics 101 Shana Kelley   Theme 3 Leader, NMIN   University of Toronto (UofT) Gilbert Walker   Theme 3 Co-Leader, NMIN   UofT
12:15–1:15 pm	LUNCH   Jr. Ballroom D
1:15–2:30 pm Jr. Ballroom	Nanomedicine for Targeted Drug Delivery 101 Marcel Bally   Theme 1 & PharmaCore Leader, NMIN   UBC Star Li   Theme 1 Co-Leader, NMIN   UBC
2:30–3:00 pm	BREAK   Jr. Ballroom D
3:00–4:30 pm Jr. Ballroom	Scientific Priorities, Recent Discoveries and Skills & Expertise Gaps, Employment Opportunities in Nanomedicines Samuel Clarke   Precision NanoSystems Catalina Lopez-Correa   Genome British Columbia Jay Natarajan   Evonik Paul Tardi   Jazz Pharmaceuticals Sherry Zhao   Mitacs
4:30–5:15 pm Jr. Ballroom	Federal Funding Opportunities: Advancing Knowledge, Building Research Capacity         Stephen Robbins   CIHR ICR (Institute of Cancer Research) Scientific Director         Rick Warner   Deputy Director, NSERC Pacific
5:15–6:15 pm	FREE TIME
6:15–9:00 pm 7:45–8:15 pm	<b>Reception &amp; Dinner</b>   Jr. Ballroom Foyer & Jr. Ballroom D "A kaleidoscope of human diversity: a personal journey through rare disease care" <b>Guest speaker</b>   Neal Boerkoel   UBC

SATURDAY, SEPTEMBER 14, 2019   North Tower, Third Floor   Jr. Ballroom	
7:30–9:00 am	BREAKFAST   Jr. Ballroom D
9:00–9:15 am Jr. Ballroom	NMIN's Role in Enhancing Canada's Global Nanomedicines Leadership Pieter Cullis   Scientific Director & CEO, NMIN   UBC
9:15–10:30 am Jr. Ballroom	Lessons from the School of Hard KnocksEstablishing a company to protect & develop your IP: Why, When, How & Who can Help?Marcel Bally   UBCColin Ross   UBCPieter Cullis   UBCDiana Royce   NMIN (moderator)Shana Kelley   UofTKaley Wilson   Quark Venture LPEuan Ramsey   Precision NanosystemsVenture LP
10:30–10:50 am	BREAK   Jr. Ballroom D
10:50 am – 12:00 pm Jr. Ballroom	Lessons from the School of Hard Knocks (continued)
12:00–1:00 pm	LUNCH   Jr. Ballroom D
1:00–2:15 pm Jr. Ballroom	Best practices in IP identification, disclosure, protection Proven Strategies for optimizing IP patent protection & commercialization opportunities Wendy Lamson   Perley-Robertson, Hill & McDougall Lynsey Huxham   Technology Transfer Manager, UBC Diana Royce   NMIN (moderator)
2:15–2:25 pm Jr. Ballroom	NMIN Research Program: Y1 Projects, Priorities, Partnerships & Performance-based Evaluation Processes Diana Royce   Executive Director, NMIN
2:25–2:30 pm Jr. Ballroom	Closing Remarks Christian Kastrup   UBC

2019 Scientific Meeting Program





Dr. Marcel Bally

**Dr. Marcel Bally**, PhD, has focused his career on the development of much needed novel drugs, drug combinations & drug delivery systems designed for use in patients with cancer. Dr. Bally has recognized expertise pharmacology/toxicology, drug formulations & preclinical cancer models. He is qualified to conduct preclinical safety studies under Good Laboratory Practices & has completed training in Good Manufacturing Practices. His scientific works have been cited >22,000 times. He has trained >60 highly qualified personnel, many of whom now hold significant positions in industry, academia & medicine. He has co-founded multiple companies including Lipex (acquired by Northern Lipids), Inex (now Arbutus), Northern Lipids (renamed Transferra & purchased by Evonik in 2016), Celator (purchased by Jazz in 2016) & Cuprous Pharmaceuticals. To date this effort resulted in three marketed drugs (Myocet- for metastatic breast cancer; Marqibo- for relapsed ALL & Vyxeos - for high risk AML).



**Dr. Neal Boerkoel** 

**Dr. Cornelius (Neal) Boerkoel**, MD, PhD, has focused, as a physician–scientist, on genetic medicine; namely, precision medicine & precision prevention. He has characterized the genetic basis & the molecular pathophysiology of several disorders & promoted novel therapeutic interventions. Dr. Boerkoel joined the faculty of the University of British Columbia in 2006 & co-founded the Rare Disease Foundation. He was appointed director of the research laboratory of the Undiagnosed Diseases Program at NIH in 2010 & developed a scalable model for translational research & precision medicine. In 2016, he joined the faculty of the University of South Dakota Medical School & the Sanford Imagenetics program, where, as the Executive Director for Sanford Imagenetics Research Center on Genomic & Molecular Medicine & Executive Clinical Director of the Sanford Genetics Laboratories, he pioneered an approach to precision prevention. He currently practices as a medical geneticist & serves as a consultant on precision medicine.



Dr. Samuel Clarke

**Dr. Samuel Clarke**, PhD, is an expert in the development of nanoparticles for biomedical applications with more than 14 years experience in the field. He is currently Director of R&D at Precision NanoSystems Inc. where he is responsible for nanoparticle reagent and new application development for the NanoAssemblr platform. Dr. Clarke has previous experience at STEMCELL Technologies Inc. where he invented, developed and commercialized magnetic nanoparticle technologies for research and cell therapy applications. He studied fluorescent quantum dot nanoparticles for diagnostics during his post-doc at the École Normale Supérieure and PhD at McGill University.

**Dr. Pieter R. Cullis**, PhD, FRSC, FNAI (USA), is Scientific Director & CEO of the NanoMedicines Innovation Network, (NMIN) Canada's National Centre of Excellence in nanomedicines. Dr. Cullis is also Director, NanoMedicines Research Group & Professor, Department of Biochemistry & Molecular Biology, The University of British Columbia. Dr. Cullis & co-workers have been responsible for fundamental advances in the design & development of nanomedicines employing lipid nanoparticle (LNP) technology for cancer therapies & gene therapies. This work has contributed to four drugs that have been approved by regulatory agencies in the U.S., Europe & Canada.

Dr. Cullis has co-founded 10 biotechnology companies, has published over 300 scientific articles & is an inventor on over 60 patents. He also co-founded the Centre for Drug Research & Development (CDRD, also a National Centre of Excellence), in 2004 & the Personalized Medicine Initiative (PMI) in 2012. Dr. Cullis was elected a Fellow of the Royal Society of Canada in 2004 & was also awarded the Prix Galien, Canada's premier prize for achievements in pharmaceutical R&D, in 2011. In August 2018 the US FDA approved Onpattro to treat the hereditary condition transthyretin-induced amyloidosis (hATTR). Onpattro employs an LNP delivery system devised by Dr. Cullis & colleagues & is the first RNAi drug to receive regulatory approval. Similar technologies can be used to enable other gene therapies employing mRNA & gene editing constructs.

**Dr. Lynsey Huxham**, PhD, completed her doctoral work at the BC Cancer Research Centre. In 2007 she graduated from UBC with a PhD from the Department of Experimental Medicine, & subsequently started working at the University-Industry Liaison Office (UILO) at UBC, where she has continued for the past 12 years in various positions, most recently as a Technology Transfer Manager in Life Sciences. Her daily work involves the commercialization of inventions developed at UBC, which includes technology assessment, market research, licensing and negotiation, and patent drafting and prosecution.

**Dr. Christian Kastrup**, PhD, is Associate Professor in the Michael Smith Laboratories & Department of Biochemistry & Molecular Biology at the University of British Columbia. He is a member of the Centre for Blood Research & the School of Biomedical Engineering. His lab at UBC uses biochemical engineering to solve problems related to hemostasis & hemorrhage, investigating, utilizing, & mimicing the biochemistry & biophysical dynamics of blood coagulation to create innovative materials that perform new functions in blood, & to develop treatments for severe hemorrhage. He has received many accolades, including the Sir Major Banting Award from the True Patriot Love Foundation. He is Chief Scientific Officer of CoMotion Drug Delivery Systems, Inc., which is working with the Department of National Defense to develop hemostatic products for combat & surgical hemorrhage.



Dr. Pieter Cullis



**Dr. Lynsey Huxham** 



**Dr. Christian Kastrup** 



Dr. Shana Kelley

**Dr. Shana Kelley** received her Ph.D. from the California Institute of Technology & was a NIH postdoctoral fellow at the Scripps Research Institute. The Kelley research group works in a variety of areas spanning biophysical/bioanalytical chemistry, chemical biology & nanotechnology, & have pioneered new methods for tracking molecular & cellular analytes with unprecedented sensitivity. Dr. Kelley has been recognized with a variety of distinctions, including being named one of "Canada's Top 40 under 40", & a "Top 100 Innovator" by MIT's Technology Review. Shana is a founder of three molecular diagnostics companies: GeneOhm Sciences (acquired by Becton Dickinson in 2005), Xagenic Inc. (acquired by General Atomics in 2017), & Cellular Analytics (launched in 2019) & sits on the Board of Directors of the Ontario Genomics Institute & the Fight Against Cancer Trust. She is an Associate Editor for ACS Sensors, & an Editorial Advisory Board Member for the Journal of the American Chemical Society & ACS Chemical Biology. Dr. Kelley is also the Director of PRIME, a University initiative focused on next-generation Precision Medicine.



Wendy Lamson

Wendy Lamson, LL.M., has over 20 years of experience drafting and prosecuting patent applications. She is passionate about helping start-ups and mid-size companies develop broad and defendable patent portfolios. She grew the portfolio of an Ottawa-based biotech company from less than 10 patent applications to over 300. Early in her career, she was instrumental in developing a patent portfolio directed to lipid-based formulations for Celator Pharmaceuticals, a biotech company now owned by Jazz Pharmaceuticals. She now counsels start-ups and mid-size companies on best practices for optimizing protection of their intellectual property. She has published on the topic of utility and written blogs on Canadian intellectual property case law developments. She also worked in research and development for a number of years before becoming a patent agent.



Dr. Shyh-dar (Star) Li

**Dr. Shyh-dar (Star) Li**, PhD, joined Ontario Institute for Cancer Research & the Leslie Dan Faculty of Pharmacy, University of Toronto as a Principal Investigator & Assistant Professor in 2009. He is currently an Associate Professor at the Faculty of Pharmaceutical Sciences, The University of British Columbia. His research focuses on developing innovative drug delivery technologies to enhance drug therapy with a particular interest in lipid & polymer-based nanoparticles. His research has been supported by National Institutes of Health (NIH) & Canadian Institutes of Health Research (CIHR). In addition to publishing in peer-reviewed journals, his team has successfully licensed three drug delivery technologies to industry with one in phase II trials for brain cancer therapy. He serves on several research funding review panels, including Canadian Cancer Society Impact Grants, CIHR & National Cancer Institute of NIH. He is currently the Angiotech Associate Professor in Drug Delivery.

**Dr. Catalina Lopez-Correa**, MD, PhD, MBA, a is Genome BC's Chief Scientific Officer and VP Sectors. Her deep understanding of genomics has inspired leaders in science and industry to collaborate towards solving some of the world's greatest challenges. Dr. Lopez-Correa holds a Medical degree from the UPB in Colombia, a Master's degree in Human Genetics from Paris V University in France, a PhD in Medical Sciences and Genetics from the KULeuven in Belgium, and a mini MBA from McGill University in Canada. Dr. Lopez-Correa has held leadership positions at Informax, deCODE Genetics, Eli Lilly and Genome Quebec and has played advisory roles at the European Commission, Innovative Medicine Initiatives and other private and public sector entities working in the application and implementation of genomics technologies.

**Dr. Jayaganesh (Jay) Natarajan** holds a Ph.D. from Nanyang Technological University (NTU) in Singapore & been with Evonik Vancouver Laboratories (VAN) for the past 3.5 years. He currently serves as the Director of R&D at VAN. He started his professional career with Sun Pharma & was instrumental in the commercial scale up of LipoDox. He subsequently held various positions with different centers & institutes of NTU, albeit his focus always revolved around the research & development of nanomedicines, particularly lipid nanoparticles. For example, he successfully developed the first sustained release nanomedicine formulation for glaucoma therapy which is currently ongoing clinical trials. Dr. Natarajan is the author of 10 peer-reviewed papers & an inventor on two patents.

**Dr. Euan Ramsey**, PhD, is Chief Commercial Officer & Co-founder at Precision NanoSystems Inc. He was previously Manager of Business development (Oncology) for the Centre for Drug Research & Development (CDRD). He has start-up leadership experience in R&D, product development, sales & marketing, business development & raising capital (equity financing & non-dilutive), raising over \$40 million to support early R&D through late product development for life sciences equipment, & early discovery through to GLP / preliminary CMC for drug products. Dr. Ramsey completed PhD studies & post doctoral research in drug delivery & gene therapy.

**Dr. Stephen Robbins**, PhD, is Scientific Director of the CIHR Institute of Cancer Research. He joined the University of Calgary in 1996 where he is now a Professor in the Departments of Oncology & Biochemistry & Molecular Biology. He was a Scientist of the Alberta Innovates Health Solutions, Director of the Southern Alberta Cancer Research Institute, Associate Director Research for Alberta Health Services Cancer Care & held a prestigious Canada Research Chair in Molecular Genetics of Cancer for 10 years. He is the current Vice-Chair of Governing Council for the International Agency for Research & past Chair of the Canadian Cancer Research Alliance. Dr. Robbins has a long-standing interest in the biochemical circuitry that controls cellular proliferation & differentiation & how this circuitry goes awry in cancer. In his research, he has taken a more translational approach, including defining new therapies for malaria, discovering a novel class of anti-inflammatory agents & identifying new therapeutic targets for brain tumours. He is also committed to teaching & has won several related awards.



Dr. Catalina Lopez-Correa



Dr. Jay Natarajan



Dr. Euan Ramsay



**Dr. Stephen Robbins** 



Dr. Colin Ross



Dr. Diana Royce



Dr. Paul Tardi

**Dr. Colin Ross**, PhD, FRSC, seeks to integrate genetics with novel strategies to improve the safety & effectiveness of medications. He developed a novel genedelivery treatment for LPL Deficiency, a genetic disorder of lipid metabolism, one of the first gene-based therapies to receive regulatory approval. His research is now focused on non-viral approaches for gene augmentation & genome editing, & on the identification & implementation of genetic factors of drug response to better guide individualized patient treatments. He helped establish the 'Canadian Pharmacogenomics Network for Drug Safety' (CPNDS), a network of clinicians & researchers in hospitals across Canada to identify patients that have suffered severe adverse drug reactions (ADRs) with the goal of developing & implementing genotype-based predictive pharmacogenomic tests to help optimize individual drug treatment.

**Dr. Diana Royce**, EdD, is NMIN's Executive Director. She has over 30 years of experience in the post-secondary & health sectors related to public consultation & research, program implementation, strategic & operational planning, network administration, national/international partnership & public policy development, advocacy, fundraising, knowledge mobilization, communications, conference planning & meeting facilitation. She has over 15 years experience managing NCEs & holds a Doctorate in Education from the University of Toronto.

**Dr. Paul Tardi**, PhD, worked in the lab of Dr. Pieter Cullis at the University of British Columbia as an MRC fellow until entering industry in 1994 with Inex Pharmaceuticals. Dr. Tardi has 25 years of experience in the pharmaceutical industry with expertise in the areas of liposomal & nanoparticle formulation development. He was a co-founder of Celator Pharmaceuticals & was instrumental in the development of Celator's IP around low cholesterol liposomes & metal loading technology which lead to the evaluation of multiple liposomal drug combinations. He has also been involved in the process development & manufacturing of liposomal products for Phase I, II & III trials. In 2017 the liposomal formulation of cytarabine & daunorubicin (Vyxeos) was approved for treatment of secondary AML. Dr. Tardi has authored over 30 publications & has 15 issued or submitted patents related to drug encapsulation or formulation development.



**Dr. Gilbert Walker** 

**Dr. Gilbert Walker**, PhD, is Distinguished Professor & Canada Research Chair (Tier 1) in Biointerfaces at U. Toronto. His research initially focused on ultrafast solvation dynamics & charge transfer in water. He later opened a new area of research in scanned probe microscopy of surfaces & single molecules at surfaces, making a breakthrough, fundamental measurement regarding hydrophobic hydration of macromolecules & in phospholipid lipid bilayers. Combining optics & mechanics, Dr. Walker has developed techniques for chemical imaging & mechanical mapping with nanometric resolution. Finally, Dr. Walker is using metal nanoparticles as surface-enhanced Raman scattering beacons for the multimodal imaging of cancer cells & structural investigation of proteins related to Alzheimer's disease.

**Rick Warner** has managed science & technology-based projects & initiatives in British Columbia in industry, post-secondary institutes & government since 1984. Since May of 2006 he has been the Deputy Director of NSERC-Pacific, currently focusing on the delivery of NSERC's Alliance research partnership program. He previously worked at the Science Council of BC, responsible for financial assistance programs available to technology-based companies, post-secondary researchers & students. From 2000 to 2006, he held a variety of positions including Director of Technology Transfer at Vancouver Island University; curriculum development & research management at Simon Fraser University; & Managing Director at the Mitchell Odyssey Foundation. He is past Chair of the Vancouver Enterprise Forum (VEF) & of the VEF Operations Committee, & is currently a director of the Mitchell Odyssey Foundation & the Delta Chamber of Commerce.

**Dr. Kaley Wilson**, PhD, is the Director of Business Development at Quark Venture, a Vancouver based venture capital group that invests globally in health science. She is also the CEO of ARTMS Products Inc. a global leader in the development of disruptive medical isotope production technologies; an Advisor & Mentor for Ontario Bioscience's Capital Access Advisory Program (CAPP); a member of GlycoNet's Commercialization Committee & NMIN's Research Management Committee; & an Observer on the Boards of Quark Venture's portfolio companies PHEMI & Canary Medical. Dr. Wilson was previously Associate Director, Partnerships, at the Centre for Drug Research & Development & a member of the Advisory Board for the Neglected Global Diseases Initiative, a UBC-based organization dedicated to developing interventions for neglected global diseases & ensuring their delivery to those in need. She was the 2008 recipient of the Gattefosse Canada/Canadian Society for Pharmaceutical Sciences Research Award.

**Dr. Sherry Zhao**, PhD, joined the Mitacs Business Development team in 2014. As the Senior Account Manager, she works with major industry partners to support their innovation pipeline. A first-generation immigrant, she believes in the power of diversity & globalization. She serves on the UBC China Council, & as a steering committee member for NEXT leaders initiative at Business Council of British Columbia. She also has a strong passion for lifestyle wellness, particularly in educating & empowering women in such endeavors. Dr. Zhao previously worked at Genentech, a member of Roche, supporting the technology development for biopharmaceutical characterizations. She also led the largest site in Canada for Let's Talk Science, a national STEM outreach organization, as the Executive Coordinator.



**Rick Warner** 



Dr. Kaley Wilson



Dr. Sherry Zhao

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**Evonik Vancouver Laboratories (VAN)** was established in 1991 under the name Northern Lipids. It is a Contract Development and Manufacturing Organization (CDMO) that provides CMC services to biotechnology and pharmaceutical companies engaged in the development and manufacture of complex nanoparticle-based drug formulations.

VAN's range of services extends from initial formulation prototype identification, manufacturing process development & scale-up, analytical method development & validation, all the way through to sterile product manufacturing under cGMP for Phase I-II clinical trials. Unified processes and quality system allow a seamless transition of projects to Evonik Birmingham, our sister facility in Birmingham (Alabama) for late stage clinical and commercial manufacturing.

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