CMiST Inaugural Symposium

Community
& Connectivity
in the Microbiome

vivo ART

Art to Advance Science

The rapid advancement in scientific technologies and innovations could easily seem like fiction to the casual observer. It seems that each day gives us new examples in which a future could be imagined where we have the capabilities to radically transform human life in a laboratory. Embodying these concepts, and **pushing the boundaries of science are central themes present in a recently growing field of art called Bio- or Sci-art, art works created using scientific processes**. In contrast, a new type of medicine is being embraced by the medical field, which uses music, dance, and painting in the rehab and care of patients.

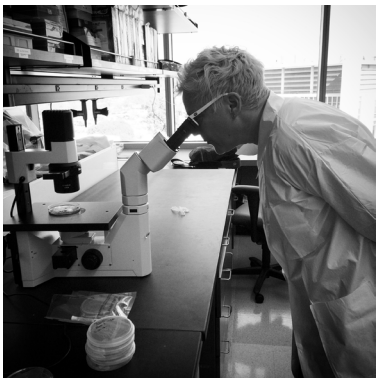
Despite these successful examples of art and science merging together, the relationship between biomedical research and art hasn't been quite as successful. Biomedical-art relationships tend to ask dynamic and existential questions, such as 'what constitutes life', 'what is a human being' and 'who are we.' While interesting, these **science-based art projects do not often include research for the sake of science.**

In addition to using bio-art as a means to communicate with the public, **it is our aim to use art to advance science through our art and science program, Vivo Art**, which is partially funded by the Kenneth Raining Foundation. Using art allows us to think outside of the box and to create hypothesis-based questions or to find answers to questions in bio-medical research that have been otherwise unsolvable using traditional scientific processes.

Radical Practices in Art & Biomedical Research

R. William DePaolo, PhD

Dr. William DePaolo, Will, Associate Professor of Medicine at the University of Washington Medical Center and recipient of the Lynn M. and Michael D. Garvey endowed chair in Gastroenterology, is the Director of CMiST (Center for Microbiome Sciences & Therapeutics). In 2004, Will received his Ph.D. in Immunology & Microbial Pathogenesis from the Feinberg School of Medicine of Northwestern University. Will then completed his postdoctoral training at the University of Chicago where he investigated the molecular pathogenesis of Yersinia pestis, the bacterium that causes bubonic plague, while concurrently developing projects investigating immune-modulation within the intestine. In 2011, Will joined the faculty at University of Southern California as an Assistant Professor in the Department of Molecular Microbiology and Immunology.



Kathy High

Kathy High (USA) is an artist / educator who collaborates with scientists and others, and considers living systems, eco-empathy and animal sentience, and the social, political and ethical dilemmas of biotechnology and medical industries. She has received awards including Guggenheim Memorial Foundation and National Endowment for the Arts. High is Professor in Arts, and oversees a lab in Center for Biotechnology and Interdisciplinary Studies at Rensselaer Polytechnic Institute, Troy, NY. She is NATURE Lab coordinator with community media organization, The Sanctuary for Independent Media. She is Vivo Art resident at CMiST (Center for Microbiome Sciences & Therapeutics), DePaolo Lab, Universit of Washington, Seattle.

"Sometimes scientists aren't so good at making science accessible to other people, but to be able to convey what you do and why it matters is vital. Kathy's images can tell a story better than any dense academic paper."

- Will for the UW Huddle

Kenneth Rainin FOUNDATION

CMiST Vivo Art is partially funded by the Kenneth Rainin Foundation.
If you are interested in supporting this novel research initiative, please contact
Amy Parker, CMiST program manager, aparker@medicine.washington.edu

Community & Connectivity in the Microbiome

This event is made possible, in part,
with support from these organizations

QIAGEN

TACONIC

PHASE GENOMICS

Speakers

Janelle Ayres, PhD

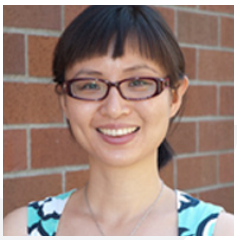
Dr. Janelle Ayres is an Associate Professor in the Nomis Center for Immunobiology and Microbial Pathogenesis at The Salk Institute for Biological Studies. She earned her Ph.D. at Stanford University in Microbiology & Immunology. Dr. Ayres works at the interface of host-microbe interactions and her pioneering research on host-pathogen interactions is redefining our definition of health. Dr. Ayres discovered that microbes (both beneficial and pathogenic) have evolved mechanisms to promote the health of their host to promote their own survival. This led to her discovery of the co-operative defense system that promotes co-operative interactions between a host and microbe rather than conflict. Promoting co-operative defenses, rather than attack, may offer novel therapeutic approaches for treating infectious diseases that are not reliant on antibiotics. She is the recipient of several awards including the Searle Scholar Award, a DARPA young faculty award, and a Ray Thomas Edward Faculty Award.

Bruce A. Vallance, PhD

Dr. Bruce Vallance completed his Ph.D. training in Gastrointestinal Inflammation at McMaster University's Intestinal Disease Research Program under the supervision of Dr. Stephen Collins and then pursued studies on disease causing bacteria at the University of British Columbia's Michael Smith Laboratories with Dr. Brett Finlay. Dr. Vallance is well recognized for his expertise in the study and modeling of IBD and enteric bacterial infections and was named the Canada Research Chair in Pediatric Gastroenterology and a Michael Smith Research Scholar in 2004. He has authored more than 130 peer-reviewed manuscripts addressing the mechanisms underlying IBD and infectious diseases.

Aaron Wright, PhD

Dr. Aaron Wright is a principal investigator and leader of the Chemical Biology and Exposure Sciences group in the Biological Sciences Division at Pacific Northwest National Laboratory, and holds a joint appointment as a research professor in the Gene and Linda Voiland School of Chemical Engineering and Bioengineering at Washington State University. His research group uses synthetic organic chemistry to develop chemical probes that when deployed in living systems enables an improved functional and mechanistic understanding of biological processes including: (a) spatiotemporal, functional, and interaction dynamics of microbes within microbiomes; (b) oxidative and conjugative metabolism in mammalian liver and lung, particularly with regard to environmental exposures and development; and, (c) the relationship between host metabolism and the gut microbiome. This research is providing a platform for future studies that evaluate individual variability and susceptibility to diseases, to understand consequences associated with xenobiotic exposures in adults and developing children, and for the future of precision medicine.



Julia Yue Cui, PhD

Julia received her B.S. degree in Chukechen Honors College, Zhejiang University in Hangzhou, China, and received her Ph.D. degree with honors at the University of Kansas Medical Center. Julia is currently an Assistant Professor in Toxicology at the University of Washington, Department of Environmental and Occupational Health Sciences. She is a recipient of the Sheldon D. Murphy Endowed Chair, and a member of Center of Ecogenetics & Environmental Health. Julia is trained as a toxicologist, specializing in using toxicogenomic and toxicoepigenomic approaches to determine the effects of environmental chemical exposure and reprogramming the gut microbiome on the transcriptional and epigenetic regulation of genes involved in drug metabolism and obesity during development.

Laura den Hartigh, PhD

Dr. den Hartigh received her Ph.D. in Molecular, Cellular, and Integrated Physiology from the University of California, Davis in 2008, with a Designated Emphasis in Biotechnology. She began her postdoctoral training in the laboratory of Dr. Dennis Wilson, D.V.M, Ph.D. at the University of California, Davis, and completed her training in the laboratory of Dr. Alan Chait, M.D. at the University of Washington. She is currently a Research Assistant Professor of Medicine in the University of Washington Medicine Diabetes Institute.

R. William DePaolo, PhD

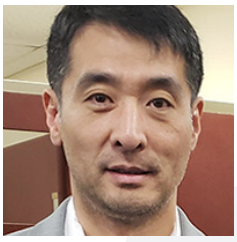
Dr. William DePaolo, Associate Professor of Medicine at the University of Washington Medical Center and recipient of the Lynn M. and Michael D. Garvey endowed chair in Gastroenterology, is Director of CMiST (Center for Microbiome Sciences & Therapeutics). In 2004, Will received his Ph.D. in Immunology & Microbial Pathogenesis from the Feinberg School of Medicine of Northwestern University. Will then completed his postdoctoral training at the University of Chicago.

Neelendu Dey, MD

Neelendu Dey, MD is a faculty member at the Fred Hutchinson Cancer Research Center and the University of Washington. He and his research lab investigate the interactions between gut bacterial metabolism, the enteric nervous system, and gut physiology. In his role as a gastroenterologist, he sees patients at the Seattle Cancer Care Alliance.

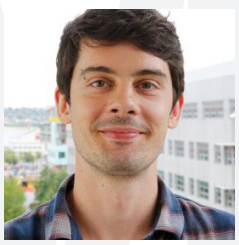
Philip Dubé, PhD

Philip Dubé is a Senior Scientist with Taconic Biosciences focusing on microbiome applications in mouse research. He earned his Ph.D. from the University of Toronto and completed postdoctoral fellowships in inflammatory bowel disease research at Vanderbilt University and Children's Hospital Los Angeles in the laboratory of D. Brent Polk. Philip's current interests include improving methods for the production and application of mouse microbiomes for basic research applications, through collaborative efforts with researchers worldwide. Philip's areas of expertise include mouse models for inflammatory and metabolic diseases, oncology and immuno-oncology.



Matthew D. Fosbrink, PhD

Matthew Fosbrink joined QIAGEN in 2009 and is currently a scientist within BRC product development. Matthew received his Ph.D. in Toxicology from University of Maryland, Baltimore where he studied cell signaling and cell cycle activation induced by complement C5b-9. After graduation, he went onto postdoctoral studies at Johns Hopkins School of Medicine where he engineered FRET-based kinase biosensors. At QIAGEN, he is the lead scientist for Targeted Microbial NGS products and Microbial DNA PCR products.



Sean Gibbons, PhD

Sean Gibbons received his Ph.D. in biophysical sciences from the University of Chicago in 2015, dual-advised by Jack Gilbert and Maureen Coleman. His graduate work focused on using microbial communities as empirical models for testing ecological theory. Gibbons completed his postdoctoral training in Eric Alm's laboratory in the Department of Biological Engineering at MIT from 2015-2018. His postdoctoral work focused on developing techniques to quantify individual-specific eco-evolutionary dynamics within the human gut microbiome. He is currently Assistant Professor at the Institute for Systems Biology, and Affiliate Faculty at the eScience Institute and the University of Washington.

Meredith A. J. Hullar, PhD

Dr. Hullar has completed her Ph.D. from Harvard University and Post-Doctoral studies in Civil and Environmental Engineering at University of Washington. She is currently a Principal Staff Scientist in the Cancer Prevention Department in the Division of Public Health Sciences at the Fred Hutchinson Cancer Research Center. Her research focuses on the role of the human microbiome in human health as influenced by the microbial metabolism of diet.

John M. Inadomi, MD

Dr. Inadomi received an undergraduate degree in biomechanical engineering from M.I.T. and an M.D. from the University of California, San Francisco. He has been on the faculty of the University of New Mexico, the University of Michigan, and the University of California, San Francisco, where he was the Dean M. Craig Endowed Chair in Gastrointestinal Medicine. Dr. Inadomi was recruited to UW Medicine in 2010 to become the fourth head of the Division of Gastroenterology in the Department of Medicine.

Ivan Liachko, PhD

Dr. Liachko received his Ph.D. at Cornell University in 2007 and has worked in the genetic/genomic research field for over 20 years. He has authored over 20 peer reviewed papers and created multiple patents specializing in the field of microbial genomics and synthetic biology. He is one of the original inventors of the Hi-C assembly and metagenomic deconvolution and has over a decade of experience in scientific management and mentorship. He has served as CEO of Phase Genomics since its founding in February 2015 and has led the company to a revenue-positive state with minimal external investment.

Jeffrey S. McLean, PhD

Dr. McLean received his Ph.D. at the University of Southern California and his MSc at the University of Guelph in Canada. Dr. McLean's research career at the Pacific Northwest National Laboratory, the J. Craig Venter Institute and now at the University of Washington School of Dentistry has been primarily devoted to developing innovative methodologies, tools and new genomic based approaches to study microbial interactions within the oral microbiome. Currently, he uses next-generation sequencing techniques to characterize the microbial processes that lead to dental diseases and to isolate genomes of oral pathogens and uncultivated novel oral phlya across human body sites to gain a better understanding of these polymicrobial diseases and pathogen transmission routes.

Stacey M. Meeker, DVM, PhD, DACLAM

Stacey Meeker is a board certified clinical laboratory animal veterinarian and primary researcher within the Department of Comparative Medicine. Stacey received her Doctorate of Veterinary Medicine from The Ohio State University and Ph.D. in Molecular and Cellular Biology at the University of Washington. Her primary research interests involve elucidating the mechanisms through which dietary nutrients, specifically vitamin D, can influence inflammatory bowel disease (IBD) and subsequent colon cancer through interactions with the host immune system as well as the gut microbiome. A deeper understanding of mechanisms through which dietary nutrients influence health and disease will potentially identify novel molecular therapeutic targets and possibly future pre- and pro- biotic therapies for IBD and colon cancer.

Samuel Minot, PhD

Sam Minot is a Staff Scientist at Fred Hutch where he studies the human microbiome and its connection to human health and disease. Sam received his Ph.D. from the University of Pennsylvania for his work with Dr. Rick Bushman studying the viruses of the human gut microbiome. After post-doctoral studies at Harvard Medical School with Dr. John Mekalanos, Sam worked in industry developing cloud-based bioinformatic tools for microbiome research. Sam joined Fred Hutch in 2017 as part of its Microbiome Research Initiative where he primarily focuses on computational analysis of metagenomic data, studying the microbiome in a broad range of topics, including cancer, vaccine response, and HIV.

Georg Seelig, PhD

Georg Seelig is an associate professor of electrical engineering and of computer science and engineering. He is also an adjunct associate professor of bioengineering. Seelig holds a Ph.D. in physics from the University of Geneva in Switzerland and did postdoctoral work in synthetic biology and DNA nanotechnology at Caltech. He received a Burroughs Wellcome Foundation Career Award at the Scientific Interface in 2008, an NSF Career Award in 2010, a Sloan Research Fellowship in 2011, a DARPA Young Faculty Award in 2012 and ONR Young Investigator Award in 2014.

Denise Chac
Graduate Student
UW School of Medicine, Pathology
M3D PhD Program
DePaolo Lab

David Clausen
PhD Student
UW School of Public Health
Department of Biostatistics
Willis Lab

Melissa Kordahi
Graduate Student
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Maria Nelson
Graduate Student
UW School of Medicine
Department of Pediatrics
Division of Pulmonology
Hoffman Lab

Benjamin Ross, PhD
Senior Fellow
UW School of Medicine
Department of Microbiology
Mougous Lab

Complementing 16S rRNA gene amplicon sequencing with estimates of total bacterial load can infer absolute bacterial species concentrations as measured by targeted assays in the vaginal microbiome

Florencia A. T.Boshier, PhD
Postdoctoral Research Fellow
Hutchinson Cancer Research Center
Vaccine and Infectious Disease Division
Schiffer Group

Oral microbiota in new-onset juvenile idiopathic arthritis

Albert Chow, MD
Fellow, Pediatric Rheumatology
UW School of Medicine
Department of Pediatrics
Division of Pediatric Rhematology

The role of vaginal microbiota in modulating the epithelial immune response to infection with C. trachomatis

Melanie Gasper, PhD
Research Scientist
Seattle Children's Research Institute
Center for Global Infectious Disease Research
Jaspan Lab

Identifying regulators of microbiome-encoded bile acid metabolism

Daniel Lachance
Graduate Student
University of Washington
Department of Molecular Engineering
Dey Lab

Gut bacterial bile acid metabolism modulates homeostatic enteric nervous system signaling

Sean Koester
Underdraduate Student
University of Washington
Dey Lab

Maternal antibiotics during pregnancy and nursing alters offspring immunity to nippostrongylus brasiliensis

Donald Nyangahu, PhD
Postdocoral Research Fellow
Seattle Children's Research Institute
Center for Global Infectious Disease Research
UW School of Medicine, Department of Pediatrics

Relationships of microbiome markers with extra-intestinal, psychological distress and gastrointestinal symptoms, and quality of life in women with irritable bowel syndrome

Yvette Rodriguez
PhD Student
UW School of Nursing
Department of Biobehavioral Nursing and Health Informatics
Heitkemper Lab

Discerning a potential role for microbiome dysfunction in adverse outcomes following comorbid mild traumatic brain injury and PTSD

Abigail G. Schindler, PhD
Research Scientist
Geriatrics Research Education and Clinical Center
VA Puget Sound Health Care System

Systems biology approach unveiled that oral PBDE exposure modulates metabolic syndrome-related aqueous metabolites in a gut microbiome-dependent manner

David Scoville, PhD
Senior Fellow
UW School of Public Health
Department of Environmental and Occupational Health Sciences
Cui Lab

Activity-based protein profiling of bile salt hydrolase activity in the gut microbiome

Regan Volk
Research Associate
Pacific Northwest National Lab
Chemical Biology and Exposure Sciences
Division of Biological Sciences

Schedule 10/1

8:15-8:45 am | Check-in

Please check-in to pick up an agenda and name tag.
Coffee, tea, and water will be available starting at 8:00 am

8:45-9:00 am | Welcome

John Inadomi, MD
Cyrus E. Rubin Professor and Division Head
UW School of Medicine
Department of Medicine, Division of Gastroenterology

9:00-10:45 am | Neighborhood watch: microbes as a first line of defense

Session chair TBD

9:00-9:45 am **Host-microbe interactions: harnessing co-evolution to treat disease**

Janelle Ayres, PhD
Associate Professor, The Salt Institute
NOMIS Center for Immunobiology and Microbial Pathogenesis
Helen McLoraine Developmental Chair

9:45-10:15 am **Ultrasmall organisms with reduced genomes that parasitize other bacteria are newly discovered players in the human microbiome**

Jeffrey S. McLean, PhD
Associate Professor, Department of Periodontics
Associate Professor, Department of Oral Health Sciences
UW School of Dentistry
Adjunct Associate Professor, Department of Microbiology
UW School of Medicine

10:15-10:30 am **Differences in excessive dietary fat influence susceptibility to the gastrointestinal pathogen, Yersinia enterocolitica**

Denise Chac | Graduate Student, DePaolo Lab

10:30-10:45 am **Panel Discussion**

10:45-11:00 am | Break

11:00-12:45 pm | Dining with your microbial neighbors

Session chair TBD

11:00-11:30 am **Characterization of the human gut microbiome and health outcomes in the Multiethnic Cohort (MEC)**

Meredith Hullar, PhD
Principal Staff Scientist
Fred Hutchinson Cancer Research Center

11:30-12:00 pm **Comprehensive 16S rDNA analysis of the saliva microbiome and its association with BMI or diet**

Matthew D. Fosbrink, PhD
Scientist BRC Product Development
BRC Product Development R&D Americas

12:00-12:30 pm **Weight loss by 10,12 CLA supplementation involves the gut microbiota**

Laura den Hartigh, PhD
Assistant Professor, Department of Medicine
Division Metabolism, Endocrinology & Nutrition
UW School of Medicine

12:30-12:45 pm **Panel Discussion**

12:45-2:00 pm | Lunch & poster session

2:00-4:15 pm | The effect of drugs on your microbial community

Session chair Chris Pope, PhD
Visiting Research Scholar
UW School of Medicine
Hoffman Lab, Department of Pediatrics

2:00-2:45 pm **Function-dependent cell and enzyme profiling of the native and chemically exposed gut microbiome**

Aaron Wright, PhD
Chemist, Team Lead
Pacific Northwest National Laboratory
Biological Systems Science

2:45-3:15 pm **Understanding the Gut-Liver Axis in Toxicological Response**

Julia Yue Cui, PhD
Assistant Professor, Department of Environmental & Occupational Health Sciences
UW School of Public Health
Sheldon D. Murphy Endowed Chair in Toxicology & Environmental Health

3:15-3:45 pm **Stochastic response of murine gut microbiota to a β-lactam antibiotic**

Sean Gibbons, PhD
Assistant Professor
Institute for Systems Biology
Washington Research Foundation Distinguished Investigator
Affiliate Faculty, eScience Institute & the University of Washington

3:45-4:00 pm **Acquired interbacterial defense systems provide fitness in the human gut microbiome**

Benjamin Ross, PhD
Senior Fellow
UW School of Medicine
Mougous Lab, Department of Microbiology

4:00-4:15 pm **Panel Discussion**

Schedule 10/2

8:45-9:00 am | Welcome

R. William DePaolo, PhD
UW School of Medicine
Associate Professor, Department of Medicine
Lynn M. & Michael D. Garvey Endowed Chair, Gastroenterology
Director, CMiST

9:00-11:00 am | Good fences make good neighbors

Session chair Andrew Johnson, PhD — Postdoctoral Fellow, DePaolo Lab

9:00-9:45 am **Intestinal E. coli pathobionts and Inflammatory Bowel Disease: Are there wolves hiding amongst the commensal sheep?**

Bruce A. Vallance, PhD
BC Children's Hospital, Investigator
CH.I.L.D. Foundation Chair in Pediatric Gastroenterology
Professor, Division of Gastroenterology,
Department of Pediatrics
University of British Columbia, Faculty of Medicine

9:45-10:15 am **Harnessing the microbiome in preclinical mouse models**

Philip Dubé, PhD
Taconic Biosciences, Inc.
Senior Scientist
Manager, Application Sciences

10:15-10:45 am **Sensing of the microbiome is critical for host-microbial symbiosis**

R. William DePaolo, PhD
UW School of Medicine
Associate Professor, Department of Medicine
Lynn M. & Michael D. Garvey Endowed Chair, Gastroenterology
Director, CMiST

10:45-11:00 am **Panel Discussion**

11:00-11:15 am | Break

11:15-1:00 pm | Microbes and malignancy

Session chair Samuel Minot, PhD
Staff Scientist, Fred Hutch Cancer Research Center
Fredricks Lab
Vaccine and Infectious Disease Division

11:15-11:45 am **Microbiome-Encoded Targets for the Prevention of Colorectal Cancer**

Neelendu Dey, MD
Assistant Professor, UW Medicine, Gastroenterology
Assistant Member, Fred Hutch Cancer Research Center

11:45-12:15 pm **Using gnotobiotic mice to evaluate diet, microbiome, and host interactions in inflammatory bowel disease and colon cancer**

Stacey M. Meeker, DVM, PhD, DACLAM — UW School of Medicine
Acting Assistant Professor
Department of Comparative Medicine

12:15-12:30 pm **Biogeography of pre-malignant colorectal lesions**

Melissa Kordahi | DePaolo Lab, Graduate Student

12:30-12:45 pm **Panel Discussion**

12:45-1:45 pm | Lunch & poster session

1:45-3:30 pm | Analyzing the community

Session chair Leandra Brettner — Graduate Student, DePaolo Lab

1:45-2:05 pm **Culture-free metagenome assembly, plasmid-host association, and strain deconvolution using Hi-C**

Ivan Liachko, PhD — Founder & CEO
Phase Genomics, Inc.

2:05-2:25 pm **TBD**

Georg Seelig, PhD — Associate Professor, Electrical Engineering
Associate Professor, Computer Science & Engineering
Adjunct Associate Professor, Bioengineering
UW Department of Electrical & Computer Engineering

2:25-2:40 pm **The Microbiome Quality Control Project: Exploring Implications for Reproducibility in Microbiome Science**

David Clausen | PhD Student, Willis Lab

2:40-2:55 pm **Reducing human DNA in complex clinical samples for metagenomic sequencing**

Maria Nelson | Hoffman Lab, Graduate Student

2:55-3:15 pm **Gene-level metagenomic analysis identifies microbial genes reproducibly associated with human disease**

Samuel Minot, PhD — Staff Scientist, Fred Hutch
Fredricks Lab
Vaccine and Infectious Disease Division

3:15-3:30 pm **Panel Discussion**

3:30-3:35 | Close

Thank you for attending and contributing to our inaugural symposium!

To our generous supporters, thank you.