



2022 metabolic IMAGING WORKSHOP

Monday, July 11 & Tuesday, July 12, 2022

2nd floor, West Conference Center
Anschutz Health Science Bldg., 1890 N. Revere Ct, Aurora 80045
University of Colorado Anschutz Medical Campus

Overview: This workshop will provide a broad overview on state-of-the-art metabolic imaging modalities and protocols including PET/CT, PET/MRI, MRI/MRS, QCT, DXA, and ultrasound. A major focus will be on explaining a broad range of imaging protocols and applications, use of contract/molecular imaging tracers, and validation of quantitative imaging biomarkers and artificial intelligence (AI), mostly in the areas of nutrition, diabetes, endocrinology. This will be expanded to a poster session and best-poster presentation on ongoing research at the Anschutz Medical Campus (AMC), as well as touring our new state-of-the-art CU Research Imaging Center (CU-RIC facilities). This symposium is a 1.5-day workshop (July 11-12, 2022). The target audience are undergraduate, graduate, postdoctoral students in biomedical sciences (medicine, bioengineering, physiology, nutrition, biology, etc) and non-imaging scientists who are interested in implementing imaging technologies into their biomedical research.

Workshop Directors:

Dr. Ed Melanson, Ed.Melanson@cuanschutz.edu (303-724-0935)

Dr. Natalie Serkova, Natalie.Serkova@cuanschutz.edu (303-724-1086)

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AGENDA

Monday July 11

- 7:30 AM Continental Breakfast
- 8:15 AM ***Welcome and Introduction***
Edward Melanson, PhD
University of Colorado Anschutz Medical Campus
- 8:30 – 10:30 AM ***Session 1: Positron Emission Tomography***
PET Technology and New Radiotracers
Timothy Degrado, PhD
University of Colorado Anschutz Medical Campus
PET Applications in Nutrition and Endocrinology
Andre' Carpentier, MD
Université de Sherbrooke, Canada
- 10:30 – 11:00 AM Coffee Break and Poster Viewing
- 11:00 AM – Noon ***Session 2: Imaging Instrumentation for Biomedical Application***
Bennet Chin, PhD
University of Colorado Anschutz Medical Campus
- Noon – 1 PM Lunch and Poster Viewing
- 1:00 – 2:30 PM ***Session 3: Computerized Tomography/ Quantitative Computed Tomography (CT)***
CT Technology
Wei Zhou, PhD
University of Colorado Anschutz Medical Campus
CT Applications: Measuring Visceral Adipose Tissue
Ann Scherzinger, PhD
University of Colorado Anschutz Medical Campus
HR-pQCT Applications: Measuring Bone Architecture and Strength
Christine Swanson, MD, MCR
University of Colorado Anschutz Medical Campus
- 2:30 – 3:30 PM ***Session 4: DXA Technology and Applications***
Wendy Kohrt, PhD
University of Colorado Anschutz Medical Campus
- 3:30 – 3:45 PM Coffee Break and Poster Viewing
- 3:45 – 4:45 PM ***Session 5: Artificial Intelligence and Deep-Learning in Imaging***
Olivier Grevaert, PhD
Stanford University
- 4:45 – 5:15 PM ***Session 6: Translation Imaging in Companion Animals and Animal Models***
Natalie Serkova, PhD
University of Colorado Anschutz Medical Campus
- 5:30 – 7:30 PM Reception (Anschutz Health and Wellness Center 3rd Floor Green Roof)

Tuesday July 12

- 7:30 AM Continental Breakfast
- 8:30 – 10:15 AM **Session 7: Ultrasound, MRI, and MRS**
Ultrasound/ Echo Technology/ Vascular Imaging and Applications
Kerrie Moreau, PhD
University of Colorado Anschutz Medical Campus
MRI/MRS Technology and New Contrast Agents
Harry Hu, PhD
University of Colorado Anschutz Medical Campus
MRI/MRS Applications in Diabetes and Endocrinology
Kristen Nadeau, MD
University of Colorado Anschutz Medical Campus
- 10:15 – 10:45 AM Coffee Break
- 10:45 – 11:00 AM Award for Best Poster Presentation
- 11:00 – 12:45 AM **Session 8: Novel Applications**
Multimodal PET, CT and MRI to investigate energetics in kidney disease
Petter Bjronstad, PhD
University of Colorado Anschutz Medical Campus
New Horizons: The Power of PET/MRI
Kirsi Virtanen, MD
University of Turku, Finland
- 1:00 PM Tour of New University of Colorado Research Imaging Center (Bioscience III)

SPEAKER BIOS

André Carpentier, MD FRCPC CSPQ FCAHS
Endocrinologist and Professor
Canada Research Chair in Molecular Imaging of Diabetes
Department of Medicine
Faculty of Medicine and Health Sciences
Centre de recherche du CHUS
Université de Sherbrooke



Dr. Carpentier is the Canada Research Chair in Molecular Imaging of Diabetes and professor and endocrinologist-lipidologist in the Departments of Medicine, Faculty of Medicine at the *Université de Sherbrooke*. He is the Scientific Director of the Centre de recherche du CHUS since December 2020. He was the director of the Province of Quebec Research Network on Cardiometabolic Health, Diabetes and Obesity (CMDO Network - <https://www.rrcmdo.ca/en/>) from 2012-2021 and is the new scientific co-lead of Diabetes Action Canada (<https://diabetesaction.ca/>). His research interests include: 1) the role of postprandial fatty acid metabolism in the development of type 2 diabetes and cardiovascular diseases; 2) the investigation of brown adipose tissue metabolism in humans; and 3) the anti-diabetic mechanisms of bariatric surgery. Dr. Carpentier has published more than 172 peer-reviewed manuscript publications cited over 15,500 times (H index 54). He is the recipient for multiple awards, including the 2011 Diabetes Young Investigator Award of the Canadian Society of Endocrinology and Metabolism, the CDA/CIHR Young Investigator Award in 2012 and the Canadian Lipoprotein Conference Physician-Scientist Award in 2014. He has been elected Fellow of the Canadian Academy of Health Sciences (FCAHS, 2015).

Olivier Gevaert, PhD
Associate Professor of Medicine (Biomedical Informatics Research) and of
Biomedical Data Science
Stanford Center for Biomedical Informatics Research (BMIR)
Stanford University



Dr. Olivier Gevaert is an associate professor at Stanford University focusing on developing machine-learning methods for biomedical decision support from multi-scale data. He is an electrical engineer by training with additional training in artificial intelligence, and a PhD in bioinformatics at the University of Leuven, Belgium. He continued his work as a postdoc in radiology at Stanford and then established his lab in the department of medicine in biomedical informatics. The Gevaert lab focuses on multi-scale biomedical data fusion primarily in oncology and neuroscience. The lab develops machine learning methods including Bayesian, kernel methods, regularized regression and deep learning to integrate molecular data or omics. The lab also investigates linking omics data with cellular and tissue data in the context of computational pathology, imaging genomics & radiogenomics.

Kirsi A. Virtanen, MD, PhD
Associate professor
Turku PET Centre
Turku University Hospital and University of Turku Kiinamyllynkatu, Finland

Kirsi Virtanen is Associate Professor in Turku PET Centre in the University of Turku. Main research interests include human adipose tissue metabolism in obesity and type 2 diabetes, by utilizing state-of-art *in vivo* imaging techniques for tissue specific metabolism. Direct evidence on functional human brown adipose tissue in adults more than 10 years ago have led the way to studies on the role of hormonal activators and their regulatory role in tissue physiology in health, obesity, and type 2 diabetes. More recently, the studies have revealed new information on meal-induced changes in brown fat function. She has authored 110 original publications, 11 reviews and 4 book chapters with more than 13 000 citations.



Petter Bjornstad
Associate Professor of Pediatrics and Medicine
Children's Hospital of Colorado

Dr. Bjornstad is an Associate Professor of Pediatrics and Medicine and principal investigator of NIH, AHA and JDRF funded studies in youth and adults with type 1 (T1D), type 2 diabetes (T2D) and obesity focusing on hormonal, metabolic, molecular, and hemodynamic mechanisms underlying the development of early kidney and heart disease. His research group focuses on integrating gold standard physiology testing, tissue-level data from biopsies with state-of-the-art PET and MR imaging to interrogate mechanisms of disease.



Bennet Chin
Professor, Radiology and Nuclear Medicine
University of Colorado Hospital
University of Colorado Anschutz Medical Campus

Dr. Chin is a nuclear medicine specialist is affiliated with the University of Colorado Hospital. He received his medical degree from University of Texas Medical Branch School of Medicine and has been in practice for more than 20 years.



Timothy Degrado, PhD
Director of University of Colorado Research Imaging Center (CURIC)
University of Colorado Anschutz Medical Campus

Tim DeGrado, Ph.D., is the Director of the University of Colorado's Research Imaging Center. Dr. DeGrado received his M.S. and Ph.D. degrees in Medical Physics from the University of Wisconsin-Madison. He completed post-doctoral training in PET radiochemistry and Nuclear Medicine at Kernforschungsanlage Juelich, Germany, and the University of Michigan, respectively. Dr. DeGrado's research interests have included metabolic imaging of myocardial energy metabolism, tumor metabolism, gene expression monitoring, neurodegeneration, radioisotope production and radiopharmacology. Dr. DeGrado joined the faculty at the University of Colorado School of Medicine in 2020.



Houchun "Harry" Hu, PhD
Professor, MRI Physicist, Department of Radiology
University of Colorado Anschutz Medical Campus

Dr. Hu is a MRI physicist who received his PhD in 2006 from the Mayo Clinic. He has worked largely in the pediatric clinical community, at children's hospitals in Los Angeles, California, Phoenix, Arizona, and Columbus, Ohio. After brief period in industry from 2019-2021, Harry joined the Radiology faculty at CU Denver in February 2022. More about Harry can be found at <https://www.linkedin.com/in/houchunharryhu>



Wendy Kohrt, PhD
Distinguished Professor, Division of Geriatric Medicine
University of Colorado Anschutz Medical Campus

Wendy Kohrt, PhD, is a Distinguished Professor of Medicine in the Division of Geriatric Medicine and the Nancy Anschutz Chair in Women's Health Research at the University of Colorado Anschutz Medical Campus. She is the Director of Research for Geriatric Medicine, Acting Director of the VA Eastern Colorado Geriatric Research, Education, and Clinical Center (GRECC), Director of the Energy Balance Assessment Core for the Colorado Nutrition and Obesity Research Center, Associate Director of the Center for Women's Health Research, and Associate Director of the Colorado Clinical and Translational Sciences Institute. She has received continuous funding from the NIH as a principal investigator since 1990 and has more than 260 research publications. Dr. Kohrt is the Director of the Colorado Specialized Center of Research Excellence (SCORE) on Sex Differences grant from the NIH Office of Research on Women's Health, and serves as Chair of the Steering Committee for the NIH Common Fund *Molecular Transducers of Physical Activity Consortium* (MoTrPAC).



Kerrie Moreau, PhD
Professor, Division of Geriatric Medicine
University of Colorado Anschutz Medical Campus

Dr. Moreau's is a Professor in the Department of Medicine, Division of Geriatric Medicine and a research health scientist in the Geriatric Research Education Clinical Center (GRECC), Denver Veterans Administration Medical Center, Denver, CO. She also is the Director of the Cardiovascular BiImaging Core at the Medical Campus. Her research evaluates the intersection of chronological and gonadal aging on cardiovascular function and structure. Her work over the past 20+ years has evaluated mechanisms by which changes in gonadal function and sex hormones in women (menopause), men (andropause) and gender-affirming hormone therapy (transgender health) alter cardiovascular aging. Her work uses a translational approach including, ultrasound imaging to assess endothelial function, large elastic artery stiffening, and cerebrovascular function, cardiac echocardiography to assess diastolic function, models of gonadal suppression and hormone therapy interventions to isolate the role of sex hormones, infusion models, and endothelial cell harvests from peripheral veins and arteries to isolate mechanisms underlying cardiovascular aging. Recently, Dr. Moreau has expanded her work to evaluate the effects sex hormones on cerebrovascular function and brain aging.



Kristen Nadeau, MD, MS
Professor of Pediatrics
University of Colorado Anschutz Medical Campus and Children's Hospital
Colorado

Dr. Nadeau is a Professor of Pediatric Endocrinology at the University of Colorado (CU). Her research focus is on reducing long-term complications of pediatric diabetes, inactivity and obesity in youth, including mechanisms of insulin resistance (IR), β -cell dysfunction, and cardiovascular (CVD), hepatic and renal disease. She was Pediatric Chair of the Pediatric Chair of the NIDDK multi-center U01 RISE study of β -cell preservation in youth and adults, a leader in NIDDK's Treatment Options for type 2 Diabetes in Adolescents and Youth (TODAY) U01 study since its inception in 2002 and Chair of the Helmsley Foundation and JDRF-funded multi-center study of metformin and insulin sensitivity in obese youth with type 1 diabetes.



Ann Scherzinger PhD, CIIP, FSIM
Professor Radiology, Radiological Sciences
University of Colorado Anschutz Medical Campus

Dr Scherzinger is a Professor in the Department of Radiology, Division of Radiological Sciences at CU, Anschutz Medical Center. Having been at AMC when the first CT arrived, she had the pleasure of introducing the first use of quantitative CT at this campus, for the measure of hepatic cysts in polycystic kidney disease. Since that time, her research has included the validation and measurement of adiposity in projects that utilize CT, MRI, MRS or PET/CT imaging techniques for local and national clinical trials.



Natalie Serkova, PhD
Professor of Radiology
University of Colorado Anschutz Medical Campus

CU AMC. Her formal education includes training in Physics at the University of Grenoble (France, BS) and Biophysics/ Biochemistry the University of Kiev (Ukraine, MSc). After completing her Ph.D. in MR Physics, University of Bremen (Germany), she did her postdoc at the UCSF and Stanford University in imaging PK/PD. She is the Deputy Associate Director of the Cancer Center and founding director of the Colorado Animal Imaging Shared Resource (AISR). Dr. Serkova's research interests are in the development of new imaging probes and image acquisition protocols for oncology/ neurooncology animal models.



Christine Swanson, MD, MCR
Division of Endocrinology, Metabolism, and Diabetes

Christine Swanson is an adult endocrinologist specializing in metabolic bone diseases and disorders of calcium/vitamin D/phosphate metabolism. She is the medical director of the new High Resolution peripheral Quantitative Computed Tomography (HR-pQCT) core on campus. Her research is focused on novel risk factors for osteoporosis, including sleep and circadian disruption.



Wei Zhou, PhD
Assistant Professor, Radiology-Diagnostics
Department of Radiology
University of Colorado Anschutz Medical Campus

Wei Zhou received his PhD in Medical Physics in the University of Texas Health Science, San Antonio and Medical Physics Residency training in Mayo Clinic, Rochester. He is currently a diagnostic physicist and assistant professor in Radiology, University of Colorado. He's the current president of Rocky Mountain chapter of AAPM. His research interests mainly focus on multi-energy CT, CT dose reduction, and X-ray image quality evaluation

