Program

University of Michigan International Workshop on Arterial Spin Labeling MRI: Technical Updates and Clinical Experience

March 9-10, 2019
Kahn Auditorium, Biomedical Sciences Research Building
University of Michigan
Ann Arbor, MI, USA
Saturday, March 9

Welcome

8:30 – 8:45 am : Welcome and Preliminary Remarks
Luis Hernandez-Garcia, University of Michigan

Invited Oral Presentations

Moderator:  Matthias van Osch

8:45.  Strategies for maximizing reliability of pseudo-continuous labeling.
David Alsop, Ph.D.
Beth Israel Deaconess Medical Center, Boston MA

9:00  Velocity Selective ASL: Circumventing the arterial transit delay
Divya Bolar, M.D., Ph.D.
University of California, San Diego

9:15  Non-contrast enhanced 4-dimensional MR angiography in cerebrovascular diseases
Lirong Yan, Ph.D.
University of Southern California

9:30  Translating ASL to the clinic
Manus Donahue, Ph.D.
Vanderbilt University

9:45  Standardization using ASL-BIDS (Brain Imaging Data Structure)
Henk(-Jan) Mutsaerts, M.D., Ph.D.
Amsterdam UMC/UMC Utrecht

10:00  Which parameters are really necessary to account for in routine ASL?
Matthias Guenther, PhD.
Fraunhofer-Mevis

10:15  ASL perfusion: To quantify or not to quantify? That's the Question
Xavier Golay, Ph.D.
UCL Institute of Neurology

Break

10:30 – 11:00 Coffee and snacks

Oral Sessions

Moderators:  David Alsop and Matthias Guenther

11:00  Metabolic and Vascular Risk Factors are Associated with Widespread Alterations in Cerebral Blood Flow
Bradley J MacIntosh, Zahra Shirzadi, Sarah Atwi, John A Detre, Sudipto Dolui, R. Nick Bryan, Lenore J Launer, Walter Swardfager
National Institute on Aging, University of Pennsylvania, University of Texas, University of Toronto
11:10: White matter oxygen delivery is impaired in both sickle and non sickle anemia syndromes
Yaqiong Chai, Adam Bush, Chau Vu, Natasha Lepore, Thomas Coates, John C Wood
Children’s Hospital Los Angeles, Stanford University

11:20: Voxelwise correlation between vascular parameters obtained with ASL and DSC as
predictor of IDH-mutation status in non-enhancing glioma
Dubbink, J.M. Kros, J.A. Hernandez-Tamames, Marion Smits
Erasmus MC, Rotterdam

11:30: Variable-density FSE with Compressed-Sensing for high-resolution multi-organ volumetric
ASL perfusion
Manuel Taso, Li Zhao, Arnaud Guidon, Daniel V. Litwiller, David C. Alsop
Beth Israel Deaconess Medical Center, Children’s National Medical Center, Washington, DC, GE
Healthcare

11:40: A Pipeline for ASL Quantification and Analysis using Inter-regional Differences and
Support Vector Machine Learning: Application to Young Onset Alzheimer’s Disease
Jack Highton, Enrico De Vita, Jonathan Schott, David Thomas
King's College London, University College London

11:50: Beyond the consensus: is sacrificing part of the PCASL scan time for measurement of
labeling efficiency and T1 of blood beneficial?
Piet Bladt, Matthias J.P. van Osch, Eric Achten, Arnold J. den Dekker, Jan Sijbers
Ghent University, Ghent, Belgium, Leiden University Medical Center, University of Antwerp, Belgium

12:00: A novel technique to improve the reliability of pseudo continuous arterial spin labeling
Matthias Günther, Praveen Iyyappan Valsala
Fraunhofer MEVIS, Bremen, Germany

12:10: Comparison of optimized pseudo-continuous arterial spin labeling protocols for cerebral
blood flow measurements
Joseph G. Woods, Michael A. Chappell, Thomas W. Okell
Wellcome Centre for Integrative Neuroimaging

12:20: Perfusion Measurement in Brain Gliomas Using Velocity-Selective Arterial Spin Labelling:
Comparison with Pseudo-Continuous Arterial Spin Labelling and Dynamic Susceptibility Contrast
Perfusion
Yaoming Qu, Doris D. Lin, Dapeng Liu, Wenbo Li, Peter C. van Zijl, Zhibo Wen, Qin Qin
Johns Hopkins University School of Medicine, Baltimore, Maryland, Southern Medical University,
Guangzhou, Guangdong Province, China

Lunch Break

12:30 – 2:00 Lunch served in the lobby

Poster Session

Moderator: Luis Hernandez-Garcia

2:00 – 3:30 Poster session: The poster session will begin with 30 second power pitches by each author
authors
1. **Non-contrast assessment of blood-brain-barrier permeability with water-extraction-with-phase-contrast-arterial-spin-tagging (WEPCAST) MRI**
   Zixuan Lin, Yang Li, Sandeepa Sur, Jinsoo Uh, Peiying Liu, Pan Su, Eboni Lance, Matthias van Osch, Hanzhang Lu
   Johns Hopkins School of Medicine, Baltimore, MD, Kennedy Krieger Institute, Baltimore, MD, Leiden University Medical Center, Leiden, the Netherlands, St. Jude Children’s Research Hospital, Memphis, TN

2. **Quantification of CBF in glioblastoma multiforme; challenges of ASL calibration in the presence of oedema.**
   Paula L.Croal, Flora Kennedy-McConnell, Benjamin Harris, Ruichong Ma, Stasya M. Ng, Puneet Plaha, Simon Lord, Nicola R. Sibson, Michael Chappell
   Oxford University Hospitals NHS Trust, University of Oxford

3. **System conditioning effects on temporal SNR and perfusion when computing GRAPPA reconstruction coefficients for accelerated EPI-based PASL imaging**
   W. Scott Hoge, Jonathan R. Polimeni
   Athinoula A. Martinos Center for Biomedical Imaging, Brigham and Women’s Hospital, Boston, MA, Massachusetts General Hospital, Charlestown, MA, Harvard-MIT Health Sciences and Technology, Massachusetts Institute of Technology, Cambridge, MA

4. **Optimization of Velocity-Selective-Inversion Arterial Spin Labeling with 3D Acquisition**
   Dapeng Liu, Wenbo Li, Peter van Zijl, Doris D. Lin, Qin Qin
   F.M. Kirby Research Center for Functional Brain Imaging, Kennedy Krieger Institute, Baltimore, Maryland, Johns Hopkins University School of Medicine, Baltimore, Maryland

5. **Impact of calibration methods and processing options on CBF quantification using ASL**
   Joana Pinto, Michael A. Chappell, Thomas W. Okell, Melvin Mezue, Andrew R. Segerdahl, Irene Tracey, Pedro Vilela, Patricia Figueiredo
   Hospital da Luz, Lisbon, Portugal, Instituto Superior Técnico, Universidade de Lisboa, Lisbon, Portugal, University of Oxford, Oxford, UK,

6. **Accurate quantification of vascular territories using super-selective PCASL - Pitfalls and solutions**
   Jonas Schollenberger, C. Alberto Figueroa, Luis Hernandez-Garcia
   University of Michigan, Ann Arbor, MI

7. **Deep Learning-based Detection of DSC-Defined Penumbral Tissue on pCASL in Acute Ischemic Stroke**
   Kai Wang, Qinyang Shou, Samantha Ma, David Liebeskind, Xin Qiao, Fabien Scalzo, Jeffrey Saver, Noriko Salamon, Danny Wang
   Shanghai Jiaotong University, Shanghai, China, University of California, Los Angeles, CA, University of Southern California, Los Angeles, CA

8. **Accelerating Stack of Spirals 3D RARE Using Rotated Spirals and Compressed Sensing Reconstruction**
   Munsch F, Taso M, Zhao L, Lebel M, Guidon A, Alsop DC
   Children’s National Medical Center, Washington, DC, United States, GE Healthcare, Boston, MA, United States,GE Healthcare, Calgary, AB, Canada, Harvard Medical School, Boston, MA, United States

9. **4D Vessel-Encoded pCASL Angiography in a Five-Minute Scan**
   S Sophie Schauman, Mark Chiew, Thomas W Okell
   University of Oxford, UK

10. **A multi-site round robin assessment of ASL using a perfusion phantom**
11. Using deep learning to map cerebral blood flow from multiple post-label delay arterial spin-labeled images
Zahra Shirzadi, Daniel Djayakarsana, Nicholas J Luciw, Chinthaka C Heyn, Maged Goubran, Bradley J MacIntosh
Sunnybrook Health Sciences Centre, University of Toronto,

12. Optimizing Arterial Spin Labeling MRI in Rat Spinal Cord Injury
Seongtaek Lee, Natasha Wilkins, Brian Schmit, Shekar Kurpad, Matthew Budde
Clement J. Zablocki Veterans Affairs Medical Center, Milwaukee, WI, Marquette University, Medical College of Wisconsin, Milwaukee, WI

13. Cerebral perfusion covariance mapping to study differences between adolescents with and without bipolar disorder
Nicholas J. Luciw, Simina Toma, Benjamin I. Goldstein, Bradley J. MacIntosh
Sunnybrook Health Sciences Centre, Toronto, Canada, Sunnybrook Research Institute, Toronto, Canada, University of Toronto, Toronto, Canada

14. Fast substitution of ASL techniques by modularity of the dynamic platform-independent framework gamma-star (γ*)
Simon Konstandin, Cristoffer Cordes, Matthias Günther
Fraunhofer MEVIS, Bremen, Germany, University of Bremen, Bremen, Germany

15. Physiological underpinnings of variations in CBF measured by pCASL MRI
Dengrong Jiang, Yang Li, Zixuan Lin, Sandeepa Sur, Peiying Liu, Cuimei Xu, Kaisha Hazel, George Pottanat, Sevil Yasar, Paul Rosenberg, Marilyn Albert, Hanzhang Lu
Johns Hopkins School of Medicine, Baltimore, MD

16. Automated subject-specific adaption of pCASL timing parameters in real time
Nora-Josefin Breutigam, Mareike Alicja Buck, Daniel Christopher Hoinkiss, Federico von Samson-Himmelstjerna, Matthias Günther
Fraunhofer MEVIS, Bremen, Germany, University of Bremen, Bremen, Germany

17. Predicting obesity history from cross-sectional cerebral blood flow with machine learning: Arterial Spin Labeling data from the CARDIA study
Zahra Shirzadi, Maged Goubran, Lenore J Launer, R Nick Bryan, John Detre, Walter Swardfager, Bradley J MacIntosh
National Institute on Aging, Maryland, University of Pennsylvania, University of Texas, University of Toronto

Coffee Break
3:30 – 3:45 : Coffee served in the lobby

Panel Discussion
3:45 – 5:00 A panel comprised of the authors of the consensus paper and industry representatives will discuss what the field has learned since the publication of the Consensus paper
Moderator: Bradley MacIntosh

5:00 Adjournment

Reception

6:00 – 8:00 Reception at the Graduate Hotel
Sunday, March 10

8:30 – 8:45 am: Quick re-cap and matters arising
Luis Hernandez-Garcia

Invited Oral Presentations

Moderator: Xavier Golay

8:45: ASL in cancer
Marion Smits, M.D., Ph.D.
Erasmus MC, Rotterdam/NL

9:00: Pediatric ASL
Esben T. Petersen, Ph.D.
Technical University of Denmark

9:15: Inferring more than just perfusion from ASL
Michael Chappell, Ph.D.
Oxford University

9:30: MR fingerprinting ASL: multiparametric assessment of brain hemodynamics
Hanzhang Lu, Ph.D.
Johns Hopkins University

9:45: Artificial intelligence and ASL
Greg Zaharchuk, MD., Ph.D.
Stanford University

10:00 ASL in the body
Danny JJ Wang, Ph.D.
University of Southern California

10:15 ASL in Alzheimer’s and Dementia
Sudipto Dolui, Ph.D.
University of Pennsylvania

10:30: New acquisition methods for ASL: what is ripe for clinical practice?
Matthias van Osch, Ph.D.
Leiden University Medical Center, NL

Break

10:45 – 11:00 Coffee and snacks

Oral Sessions

Moderators: Hanzhang Lu and Marion Smits

11:00: Estimation of time-dependent labeling efficiency in Arterial Spin Labeling within 20 seconds
Matthias Günther
Fraunhofer MEVIS, Bremen, mediri GmbH, Heidelberg, Germany, University of Bremen, Germany
11:10: Convolutional Neural Network based Automatic Planning for Pseudo-Continuous Arterial Spin Labeling
Karsten Sommer, Thomas Lindner, Kim van de Ven, Michael Helle
Philips Healthcare, Best, The Netherlands, Philips Research, Hamburg, Germany, University Hospital Schleswig-Holstein Campus Kiel, Kiel, Germany

11:20: ASL spatial heterogeneity as a cognitive group classifier in Alzheimer's disease
Zahra Shirzadi, Bojana Stefanovic, Henri JMM Mutsaerts, Mario Masellis, Bradley J MacIntosh
University of Toronto

11:30: Optimizing MRF-ASL Scan Design for Precise Quantification of Brain Hemodynamics
Anish Lahiri, Jeffrey A Fessler, Luis Hernandez-Garcia
University of Michigan, Ann Arbor, MI

11:40: Higher insular activation predicts treatment response to TMS for major depressive disorder
Tessa R. Abagis, Stephan F. Taylor, Luis Hernandez-Garcia,
University of Michigan

11:50: A Non-Invasive Hybrid PET/MR Approach for Validation of ASL in Clinical Studies
Tracy Ssali, Lucas Narciso, Justin Hicks, Udunna Anazodo, Elizabeth Finger, Mike S Kovacs, Matthias Günther, Frank S Prato, Keith St Lawrence
Department of Medical Biophysics, Western Ontario, London, Canada, Fraunhofer Institute for Medical Image Computing MEVIS, Bremen, Germany, Lawson Health Research Institute, London, Canada,

12:00: Does partial volume correction improve the repeatability of arterial spin labeling perfusion imaging?
F. Kennedy McConnell, A. Segerdahl, T. Okell, M. Mezue, I. Tracey, M. Chappell
University of Oxford, Oxford, United Kingdom, University of Oxford, Oxford, United Kingdom

12:10: Neurovascular uncoupling in schizophrenia: A bimodal meta-analysis of brain perfusion and glucose metabolism
Niron Sukumar, Priyadharshini Sabesan, Udunna Anazodo, Lena Palaniyappan
Lawson Health Research Institute, London, Ontario, Canada, University of Western Ontario, London, Ontario, Canada

12:20: Velocity Selective ASL in the Rat at 9.4T
Matthew Budde, Seongtaek Lee, Briana Meyer
Marquette University & Medical College of Wisconsin, Milwaukee, WI, Medical College of Wisconsin, Milwaukee, WI

Lunch Break

12:40 – 2:00 Lunch served in the lobby

Town Hall Meeting

2:00 Town Hall meeting : Looking toward the future. What should be included in a follow up set of recommendations?
Moderator: Luis Hernandez-Garcia

Coffee Break

3:30 -4:00: Coffee and Snacks served in the lobby
Final Remarks

4:00: Dismissal

4:15 – 5:30. Authors’ meeting.
The authors of the original consensus paper will meet to discuss a potential update publication.