— INTERNATIONAL SOCIETY FOR —
ISMRM
MAGNETIC RESONANCE IN MEDICINE

ONE COMMUNITY FOR CLINICIANS AND SCIENTISTS

ISMRM WORKSHOP ON
Advances in MR Flow

18-20 OCTOBER 2024

University of Calgary
Calgary, AB, Canada

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OVERVIEW

This workshop program will cover the latest methodological developments that are making in vivo applications feasible and reliable and will investigate how these capabilities provide new insights into clinical application. Applications in the clinical settings will be highlighted with reviews of current state-of-the-art and potential high-impact applications.

The program will feature invited scientific presentations, proffered papers, a poster session, extensive panel discussions, and a technologist hands-on session. A Young Investigator Award for which students and post-doctoral fellows are eligible will be awarded based on the quality of the presented work and presentation.

TARGET AUDIENCE

- Members of the MR Flow and Motion Quantitation Study Group
- Basic scientists and physicians using MR in cardiovascular investigations
- Clinicians (vascular, neurovascular, and cardiac surgeons; radiologists, cardiologists, neurologists)

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants should be able to:

- Identify the principal methods for evaluating cardiovascular flow;
- Compare the advantages and limitations of MR methods relative to other competitive modalities in assessing flow;
- Assess the reproducibility and reliability of flow quantitation methods and their dependence on type of acquisition;
- Describe the physiologically relevant descriptors that can be extracted from MR flow quantitation;
- List post-processing methods for providing rigorous approaches to data presentation and analysis;
- List approaches for extracting advanced flow features from in vivo measurements, such as turbulent kinetic energy, pressure drops, and flow vorticity;
- Critique the use of contrast agents in MR flow quantitation;
- Describe the use of MR flow quantitation in different organ systems and critique the clinical value of these methods; and
- Describe methodological developments that influence scan time, measurement accuracy, and clinical application.

SPEAKER UPLOAD INFORMATION (Audiovisual Preview)

Uploading presentations is available on a first-come, first-served basis. Hours are:

- Friday, 18 October 2024 07:30-08:00
- Saturday, 19 October 2024 07:30-08:00
- Sunday, 20 October 2024 07:30-08:00

PROGRAM CREDIT DESIGNATION

The International Society for Magnetic Resonance in Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The International Society for Magnetic Resonance in Medicine designates this live activity for a preliminary maximum of 7.50* *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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The International Society for MR Radiographers & Technologists (ISMRT), a Section of the ISMRM, is recognized by the American Registry of Radiologic Technologists (ARRT) as a Recognized Continuing Education Evaluation Mechanism (RCEEM). This workshop does not offer CE credits.

CERTIFICATE OF PARTICIPATION

To obtain your Certificate of Participation for this workshop, log into the ISMRM membership portal at www.ismrm.org, then click the "My Meeting Evaluations" menu option, select "View Meeting Evaluation" by the appropriate meeting name, and follow the instructions provided.

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2. Presenting CME activities that promote improvements or quality in healthcare and are independent of commercial interests.

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Aloha!

ISMRM & ISMRT Annual Meeting & Exhibition

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ABSTRACT SUBMISSION DEADLINE: 06 NOVEMBER 2024

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Day 1: FRIDAY, 18 OCTOBER 2024 *(2.0 CME Available)*		
07:30	Registration & Speaker Upload Available	
08:15	*Welcome*	Julio Garcia Flores, Ph.D. University of Calgary Calgary, AB, Canada
Session 1: Past, Present & Future of Cardiovascular Flow		
Moderators: Emilie Bollache, Ph.D. & Monisha Srabanti, Ph.D. Student		
08:20	*Recent Milestones of Flow Imaging*	Alex J. Barker, Ph.D. University of Colorado, Anschutz Medical Campus Aurora, CO, USA
08:40	*Update in 4D Flow Consensus Statement*	Malenka Bissell, D.Phil., M.D., BM, MRCPCH, FSCMR University of Leeds Leeds, England, UK
09:00	*Congenital Clinical Analysis Recommendations*	Julio Garcia Flores, Ph.D. University of Calgary Calgary, AB, Canada
09:20	Break & Speaker Upload Available	
Session 2: Large Vessels *(No CME Available)*		
Moderators: Renske Merton, M.Sc. & Thekla Oechtering, M.D.		
09:50	*State of the Art*	Daniel Giese, Ph.D. Siemens Healthcare Erlangen, Germany
10:10	*Post-Processing & Analysis*	Gilles Soulat, M.D. Sorbonne Université, Inserm, CNRS Paris, France
10:30	*Clinical Applications & Needs*	Christopher J.P. François, M.D. Mayo Clinic Rochester, MN, USA
	Proffered Papers - Oral Sessions	
	Moderators: Renske Merton, M.Sc. & Thekla Oechtering, M.D.	
10:50	*Turbulent Kinetic Energy as an Early Marker for Valvular Heart Disease: A 4D Flow MRI Retrospective Case-Control Study*	Tamara Bianchessi, M.Sc. Linköping University Linkoping, Sweden
11:00	*Increased Left Ventricular Diastolic Viscous Energy Loss with Regurgitation Severity in Bicuspid Aortic Valve: A Cross-Sectional 4D Flow MRI Study*	Shirin Aliabadi, M.Sc. University of Calgary Calgary, AB, Canada
11:10	*Evaluation of 2D-PC Flow Quantification at the Aortic Valve: GRAPPA Acceleration Versus Compressed Sensing*	Darren Lum, M.D. Stanford University Stanford, CA, USA

Session 3: Technical & Analysis Developments *(No CME Available)*		
	Proffered Papers - Oral Sessions	
	Moderators: Jeesoo Lee, Ph.D. & Leonardo Rivera-Rivera, Ph.D.	
11:20	*Assessment of Complex Flow & Turbulence in a Pulsatile Artificial Heart Using 4D Flow MRI*	Twan Bakker, M.Sc. Linköping University Linkoping, Sweden
11:30	*Modeling the Spread of Gadolinium in the Subarachnoid Space Following Lumbar Injection*	Cecilia Björnfot, M.Sc. Umeå University Umeå, Sweden
11:40	*Retrospective Correction of Background Phase Error in 2D PC-MRI with GIRF Predictions*	Michael Loecher, Ph.D. Stanford University Stanford, CA, USA
11:50	Lunch & Speaker Upload Available	
Session 4: Heart *(No CME Available)*		
	Moderators: Shirin Aliabadi, M.Sc. & Gilles Soulat, M.D.	
13:30	*State of the Art*	Emilie Bollache, Ph.D. Sorbonne Université Paris, France
13:50	*Post-Processing & Analysis*	Tino Ebbers, Ph.D. Linköping University Linkoping, Sweden
14:10	*Clinical Applications & Needs*	Ralf Felix Trauzeddel, M.D. University of Berlin Berlin, Germany
	Proffered Papers - Oral Sessions	
14:30	*Left Ventricular Diastolic Filling Flow Assessment by 4D Flow MRI with Retrospective Valve Tracking in Healthy Adults*	Jeesoo Lee, Ph.D. Northwestern University Chicago, IL, USA
14:40	*Left Ventricular Remodeling & Intracardiac Flow Changes by Myocardial Infarction*	Sungho Park, Ph.D. University of Colorado, Anshcutz Medical Campus Aurora, CO, USA
14:50	*Direct Quantification of Tricuspid Regurgitation: 4D Flow MRI vs. Conventional MRI Analysis*	Alessandra Riva, Ph.D. Istituto di Ricovero e Cura a Carattere Scientifico Policlinico San Donato San Donato, Italy
Session 5: Clinical Needs & Capabilities *(No CME Available)*		
	Proffered Papers - Oral Sessions	
	Moderators: Malenka Bissell, D.Phil., M.D., BM, MRCPCH, FSCMR & Julio Garcia Flores, Ph.D.	
15:00	*Flow Quantification in the Great Vessels for Third-Trimester Fetuses With/Without Coarctation Using 4D Flow CMR & Slice-to-Volume 3D Black Blood Imaging*	Takashi Fujiwara, Ph.D. Children's Hospital Colorado, University of Colorado Anschutz Medical Campus Aurora, CO, USA

15:10	*Improved 4D-Flow MRI Analysis of CSF Dynamics Using Background Suppressed 3D FSE*	Zaynab Yardim, M.Sc. University of Wisconsin-Madison Madison, WI, USA
15:20	*4D-Flow Imaging of CSF Dynamics Using an Ultra High-Performance Head-Only System*	Tomas Vikner, Ph.D. University of Wisconsin-Madison Madison, WI, USA
15:30	Break & Speaker Upload Available	
	Session 6: The Good, the Bad & the Ugly of 4D Flow MRI	
	Moderators: Christopher J.P. François, M.D. & Julio Garcia Flores, Ph.D.	
16:00	*Acquisition Errors & Pitfalls*	Sebastian Schmitter, Ph.D. Physikalisch-Technische Bundesanstalt Berlin, Germany
16:20	*Basic Flow Pos-Processing Errors & Clinical Pitfalls*	Thekla Oechtering, M.D. University of Wisconsin-Madison Madison, WI, USA
16:40	*Advanced Flow Parameters Errors & Pitfalls*	Vitaliy L. Rayz, Ph.D. Purdue University West Lafayette, IN, USA
17:00	*How To Implement a 4D Flow Core Lab in Clinical Workflow*	Sylvana Garcia, Ph.D. University of Wisconsin-Madison Madison, WI, USA
17:20	Discussion Panel: *The Good, the Bad & the Ugly of 4D Flow MRI*	Session Speakers & Moderators
17:50	Adjourn	

Day 2: SATURDAY, 19 OCTOBER 2024 *(4.50 CME Available)*

07:30	Registration & Speaker Upload Available	
	Session 7: Brain	
	Moderators: Ethan MacDonald, M.D. & TBA	
08:00	*State of the Art*	Anders Wahlin, Ph.D. Umeå University Umeå, Sweden
08:20	*Post-Processing & Analysis*	Leonardo A. Rivera-Rivera, Ph.D. University of Wisconsin-Madison Madison, WI, USA
08:40	*Clinical Applications & Needs*	Maria Aristova, Ph.D. Northwestern University Chicago, IL, USA

	Proffered Papers - Oral Sessions	
09:00	*CSF Flow in Chiari I Patients Before & After Decompression Surgery*	John Oshinski, Ph.D. Emory University Atlanta, GA, USA
09:10	*Cerebral Autoregulation Impairment in Parkinson's Disease Corresponds with Cognitive Decline as well as Perivascular Morphology in the Supratentorial White Matter: A 4D Flow Study*	Ashley Deane, M.Sc. University of Otago Christchurch, New Zealand
09:20	*Impact of Resolution & Acceleration on Cerebral 4D Flow Hemodynamics & Risk Indices*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand
09:30	*Confounding Effects of Bulk Patient Motion on DENSE Scans in the Brain*	Caroline Doctor, M.Sc. University of Wisconsin-Madison Madison, WI, USA
09:40	Break & Speaker Upload Available	
	Session 8: Power Pitches	
	Moderators: Mariya Pravdivsteva, Ph.D. & TBA	
	Proffered Papers - Oral Sessions	
10:10	*Scaled-Up Patient-Specific Aneurysm Models for Accurate In Vitro 4D Flow MRI*	Simon Bronkhorst-Ilavsky, B.Sc. Queen's University Kingston, ON, USA
10:15	*Measuring Intracranial Pulse Wave Velocity with a 1D Hemodynamic Model*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand
10:20	*Comprehensive Enhancement of 4D Flow MRI Data Using 4DFlowNet*	Houriehsadat Jamalidinan, Ph.D. Student University of Calgary Calgary, AB, Canada
10:25	*Establishing Hemodynamic Reference Values Using 4D Flow MRI: Development & Application of an Atlas*	Gyu-Han Lee, Ph.D Asan Medical Center Seoul, South Korea
10:30	*Highly Accelerated 4D Flow Pediatric Cardiac MRI with a Flexible Pediatric Body Array Coil*	Laura Schoeneberg, M.D., FAAP Children's Mercy Hospital Kansas City Kansas City, MO, USA
10:35	Poster Session	
	Session 9: New Clinical Applications & Quantitative Methods	
	Proffered Papers - Oral Sessions	
	Moderators: Daniel Ennis, Ph.D. & Julio Garcia Flores, Ph.D.	
11:30	*Initial Observations of Age-Independent Intracranial Pulse Wave Velocity*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand

11:40	*Rapid Measurement of Cerebral Venous Oxygenation Using EPI-Based T2-Relaxation-Under-Phase-Contrast (TRUPC)*	Yifan Gou, M.Sc. Johns Hopkins University School of Medicine Baltimore, MD, USA
11:50	*Reproducibility of Local 3D Area, Velocity, Peak Flow & Pulse Wave Velocity Measurements*	Renske Merton, M.Sc. Amsterdam University Medical Center Amsterdam, The Netherlands
12:00	*Novel Insights into Left Ventricular Flow Components in Mitral Regurgitation Patients with Preserved Ejection Fraction Using 4D-Flow Magnetic Resonance Imaging*	Monisha Srabanti, Ph.D. Student University of Calagry Calgary, AB, Canada
	Session 10: Investigating Advanced & Quantitative Methods	
	Moderators: Mohammed Elbaz, Ph.D. & Charles McGrath Ph.D.	
	Proffered Papers - Oral Sessions	
12:10	*Carotid Web Geometry as a Predictor of Vascular Dysfunction Using 4D Flow MRI*	Retta El Sayed, Ph.D. Emory University Atlanta, GA, USA
12:20	*Evaluating CSF Flow Dynamics: A Comparative Analysis of Spin Echo & Gradient Echo MRI Techniques on Highly Efficient Head-Only Gradient System*	Brock Jolicoeur, B.Sc. University of Wisconsin-Madison Madison, WI, USA
12:30	*Estimating the Importance of Respiratory, Cardiac & Slow Vasomotion Cycles for CSF Flow*	Pontus Söderström, M.Sc. Umeå University Umeå, Sweden
12:40	*MR Characteristics, 2D & 4D-PC MRI Analysis of Hemo- & Cerebrospinal Fluid Dynamics in Patients with Overcrowded Posterior Cranial Fossa Syndrome*	Olga Bogomyakova, Ph.D. International Tomography Center, Siberian Branch of the Russian Academy of Sciences Novosibirsk, Russia
12:50	Lunch & Speaker Upload Available	
	Session 11: Software Demonstration	
	Moderators: Hannes Dillinger, Ph.D. & Renske Merton, Ph.D.	
14:20	*Repeatability & Reproducibility of 4D Flow: Multi-Vendor & Multi-Software Assessment*	Thekla Oechtering, M.D. University of Wisconsin-Madison Madison, WI, USA
14:40	*Repeatability & Reproducibility of 4D Flow: Reliability & Validation*	Julia Geiger, M.D. University of Zürich Zurich, Switzerland
15:00	*Open-Source Software*	Julio Sotelo, Ph.D. Universidad de Valparaíso Valparaiso, Chile
15:20	*ML Pre-Processing*	Jeesoo Lee, Ph.D. Northwestern University Chicago, IL, USA

15:40	*Processing Challenge Introduction*	Thekla Oechtering, M.D. University of Wisconsin-Madison Madison, WI, USA
16:00	Discussion Panel	
16:30	Break & Speaker Upload Available	
Session 12: Protocol Optimization *(No CME Available)*		
Moderators: Martin Sherriff, B.Appl.Sc., MRT(MR) & TBA		
17:00	*Protocol Optomization*	Rachel Davids, B.Sc., R.T.(MR)(R) Siemens Medical Solutions USA, Inc. Chicago, IL, USA
17:20	*Protocol Optomization II*	Renske Merton, M.Sc. Amsterdam University Medical Center Amsterdam, The Netherlands
17:40	*Protocol Optomization III*	TBA
17:50	Adjourn	
17:50	Mentorship *(No CME Available)*	
19:00	Networking Dinner	

Day 3: SUNDAY, 20 OCTOBER 2024 *(1.0 CME Available)*

07:30	Registration & Speaker Upload Available	
Session 13: Abdominal *(No CME Available)*		
Moderators: Julio Garcia Flores, Ph.D.& Thekla Oechtering, M.D.		
08:00	*State of the Art*	Alejandro Roldan-Alzate, Ph.D. University of Wisconsin-Madison Madison, WI, USA
08:20	*Post-Processing & Analysis*	Oliver Wieben, Ph.D. University of Wisconsin-Madison Madison, WI, USA
08:40	*Clinical Applications & Needs*	Jeremy D. Collins, M.D. Mayo Clinic Rochester, MN, USA
	Proffered Papers - Oral Sessions	
09:00	*4D Flow MRI of Splanchnic Vasculature for Diagnosis of Severe Portal Hypertension*	Octavia Bane, Ph.D. Icahn School of Medicine at Mount Sinai New York, NY, USA

09:10	*Hemodynamic Evaluation of Portal Hypertension & Clinical Outcomes Using Spiral 4D Flow MRI*	Swathi Pavuluri, B.Sc. Icahn School of Medicine at Mount Sinai New York, NY, USA
09:20	*Intracardiac 4D Flow To Investigate Diastolic Function in People with Type 2 Diabetes*	Sungho Park, Ph.D. University of Colorado Anschutz Medical Campus Aurora, CO, USA
Session 14: Image-Based Modeling *(No CME Available)*		
Moderators: Alejandro Roldan-Alzate, Ph.D. & Oliver Wieben, Ph.D.		
09:30	*Cardiovascular Simulations Based on 4D Flow*	Vitaliy L. Rayz, Ph.D. Purdue University West Lafayette, IN, USA
09:50	*4DflowVP-Net: Learning Velocity-to-Pressure Mapping from High-Fidelity CFD Simulations in Stenotic Flows*	Amir Amini, Ph.D. University of Louiville Louiville, KY, USA
10:10	*Computational Diagnostic Tools & Role 4D Flow MRI Data in Patients with Cardiovasular Diseases*	Zahra Keshavarz-Motamed, Ph.D. McMaster University Hamilton, ON, Canada
	Proffered Papers - Oral Sessions	
10:30	*In Vitro 4D Flow MRI for Testing Endovascular Intracranial Aneurysm Treatment*	Mariya Pravdivtseva, Ph.D. University Medical Center Schleswig-Holstein Schleswig-Holstein, Germany
10:40	*Construction & Manufacturing of an MRI-Ready Neating Heart Model Phantom*	Moritz Wiegand, B.Sc. Institute of Computer-Assisted Cardiovascular Medicine Berlin, Germany
10:50	*Enhancing 4D Flow Imaging in Carotid Arteries Using Super-Resolution Deep Learning Models*	Aitor Zubillaga-Unsain, Ph.D. Student Centro de Investigacion Cooperativa en Biomateriales San Sebastian, Spain
11:00	Break & Speaker Upload Available	
Session 15: Advanced Acquisitions & Acceleration Techniques		
Moderators: Sebastian Schmitter, Ph.D. & TBA		
	Proffered Papers - Oral Sessions	
11:30	*Extended, Open-Source Hard & Software Rotational Phantom for the Evaluation of Phase-Contrast MRI Sequences*	Hannes Dillinger, Ph.D. Physikalisch-Technische Bundesanstalt Berlin, Germany
11:40	*4D Flow MRI Using 3D Radial Balanced SSFP at 0.6T*	Charles McGrath, M.Sc. Eidgenössische Technische Hochschule Zurich, Switzerland
11:50	*20-Fold Accelerated Cardiovascular Phase-Contrast MRI Using Channel-Shift CNN*	Chi Zhang, Ph.D. Stanford University Stanford, CA, USA

Session 16: Machine Learning Applications		
Moderators: Amir Amini, Ph.D. & TBA		
	Proffered Papers - Oral Sessions	
12:00	*Radial PC-MRI Combined with Neural Network-Based Reconstruction for the Assessment of Neurovascular Flow & Local Pulse Wave Velocity*	Adrian Duckert, M.Sc. University of Greifswald Greifswald, Germany
12:10	*Potential & Challenges of Generative Adversarial Networks for Super-Resolution Intracranial 4D Flow MRI*	Oliver Welin Odeback, Ph.D. Candidate Karolinska Institutet Stockholm, Sweden
12:20	*Fast & Robust Deep Learning Reconstruction for Highly Accelerated 4D Flow MRI*	Sohaib Ayaz Qazi, Ph.D. Linköping University Linkoping, Sweden
12:30	Closing Remarks	
12:35	Lunch & Adjourn	

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AT TODAY'S WORKSHOP!

Simon Bronkhorst-Ilavsky, B.Sc.

Ashley Deane, M.Sc.

Adrian Duckert, M.Sc.

Retta El Sayed, Ph.D.

Brock Jolicoeur, B.Sc.

Renske Merton, M.Sc.

Sungho Park, Ph.D.

Swathi Pavuluri, B.Sc.

Mariya Pravdivtseva, Ph.D.

Katharina Vellguth, Dr. Ing.

Moritz Wiegand, B.Sc.

Zaynab Yardim, M.Sc.

Aitor Zubillaga-Unsain, Ph.D. Student

Posters

POSTER	TITLE	AUTHOR
1	*Increased Left Ventricular Diastolic Viscous Energy Loss with Regurgitation Severity in Bicuspid Aortic Valve: A Cross-Sectional 4D Flow MRI Study*	Shirin Aliabadi, M.Sc. University of Calgary Calgary, AB, Canada
2	*Assessment of Complex Flow & Turbulence in a Pulsatile Artificial Heart Using 4D Flow MRI*	Twan Bakker, M.Sc. Linköping University Linkoping, Sweden
3	*4D Flow MRI of Splanchnic Vasculature for Diagnosis of Severe Portal Hypertension*	Octavia Bane, Ph.D. Icahn School of Medicine at Mount Sinai New York, NY, USA
4	*Turbulent Kinetic Energy as an Early Marker for Valvular Heart Disease: A 4D Flow MRI Retrospective Case-Control Study*	Tamara Bianchessi, M.Sc. Linköping University Linkoping , Sweden
5	*Modeling the Spread of Gadolinium in the Subarachnoid Space Following Lumbar Injection*	Cecilia Björnfot, M.Sc. Umeå University Umeå, Sweden
6	*Scaled-Up Patient-Specific Aneurysm Models for Accurate In Vitro 4D Flow MRI*	Simon Bronkhorst-Ilavsky, B.Sc. Queen's University Kingston, ON, USA
7	*Cerebral Autoregulation Impairment in Parkinson's Disease Corresponds with Cognitive Decline as well as Perivascular Morphology in the Supratentorial White Matter: A 4D Flow Study*	Ashley Deane, M.Sc. University of Otago Christchurch, New Zealand
8	*Initial Observations of Age-Independent Intracranial Pulse Wave Velocity*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand
9	*Impact of Resolution & Acceleration on Cerebral 4D Flow Hemodynamics & Risk Indices*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand
10	*Measuring Intracranial Pulse Wave Velocity with a 1D Hemodynamic Model*	Sergio Dempsey, M.Sc. Auckland Bioengineering Institute Auckland, New Zealand
11	*Extended, Open-Source Hard- & Software Rotational Phantom for the Evaluation of Phase-Contrast MRI Sequences*	Hannes Dillinger, Ph.D. Physikalisch-Technische Bundesanstalt Berlin, Germany
12	*Confounding Effects of Bulk Patient Motion on DENSE Scans in the Brain*	Caroline Doctor, M.Sc. University of Wisconsin-Madison Madison, WI, USA
13	*Radial PC-MRI Combined with Neural Network-Based Reconstruction for the Assessment of Neurovascular Flow & Local Pulse Wave Velocity*	Adrian Duckert, M.Sc. University of Greifswald Greifswald , Germany
14	*Carotid Web Geometry as a Predictor of Vascular Dysfunction Using 4D Flow MRI*	Retta El Sayed, Ph.D. Emory University Atlanta, GA, USA
15	*Flow Quantification in the Great Vessels for Third-Trimester Fetuses With/Without Coarctation Using 4D Flow CMR & Slice-to-Volume 3D Black Blood Imaging*	Takashi Fujiwara, Ph.D. Children's Hospital Colorado, University of Colorado Anschutz Medical Campus Aurora, CO, USA

Posters

POSTER	TITLE	AUTHOR
16	*Rapid Measurement of Cerebral Venous Oxygenation Using EPI-Based T2-Relaxation-Under-Phase-Contrast (TRUPC)*	Yifan Gou, M.Sc. Johns Hopkins University School of Medicine Baltimore, MD, USA
17	*Comprehensive Enhancement of 4D Flow MRI Data Using 4DFlowNet*	Houriehsadat Jamalidinan, Ph.D. Student University of Calgary Calgary, AB, Canada
18	*Evaluating CSF Flow Dynamics: A Comparative Analysis of Spin Echo & Gradient Echo MRI Techniques on Highly Efficient Head Only Gradient System*	Brock Jolicoeur, B.Sc. University of Wisconsin-Madison Madison, WI, USA
19	*Establishing Hemodynamic Reference Values Using 4D Flow MRI: Development & Application of an Atlas*	Gyu-Han Lee, Ph.D Asan Medical Center Seoul, South Korea
20	*Left Ventricular Diastolic Filling Flow Assessment by 4D Flow MRI with Retrospective Valve Tracking in Healthy Adults*	Jeesoo Lee, Ph.D. Northwestern University Chicago, IL, USA
21	*Retrospective Correction of Background Phase Error in 2D PC-MRI with GIRF Predictions*	Michael Loecher, Ph.D. Stanford University Stanford, CA, USA
22	*Evaluation of 2D-PC Flow Quantification at the Aortic Valve: GRAPPA Acceleration Versus Compressed Sensing*	Darren Lum, M.D. Stanford University Stanford, CA, USA
23	*4D Flow MRI Using 3D Radial Balanced SSFP at 0.6T*	Charles McGrath, M.Sc. Eidgenössische Technische Hochschule Zurich, Switzerland
24	*Reproducibility of Local 3D Area, Velocity, Peak Flow & Pulse Wave Velocity Measurements*	Renske Merton, M.Sc. Amsterdam University Medical Center Amsterdam, The Netherlands
25	*Potential & Challenges of Generative Adversarial Networks for Super-Solution Intracranial 4D Flow MRI*	Oliver Welin Odeback, Ph.D. Candidate Karolinska Institutet Stockholm, Sweden
26	*CSF Flow in Chiari I Patients Before & After Decompression Surgery*	John Oshinski, Ph.D. Emory University Atlanta, GA, USA
27	*Left Ventricular Remodeling & Intracardiac Flow Changes by Myocardial Infarction*	Sungho Park, Ph.D. University of Colorado Anschutz Medical Campus Aurora, CO, USA
28	*Intracardiac 4D Flow To Investigate Diastolic Function in People with Type 2 Diabetes*	Sungho Park, Ph.D. University of Colorado Anschutz Medical Campus Aurora, CO, USA
29	*Hemodynamic Evaluation of Portal Hypertension & Clinical Outcomes Using Spiral 4D Flow MRI*	Swathi Pavuluri, B.Sc. Icahn School of Medicine at Mount Sinai New York, NY, USA

Posters

POSTER	TITLE	AUTHOR
30	*In Vitro 4D Flow MRI for Testing Endovascular Intracranial Aneurysm Treatment*	Mariya Pravdivtseva, Ph.D. University Medical Center Schleswig-Holstein Schleswig-Holstein, Germany
31	*Fast & Robust Deep Learning Reconstruction for Highly Accelerated 4D Flow MRI*	Sohaib Ayaz Qazi, Ph.D. Linköping University Linkoping, Sweden
32	*Direct Quantification of Tricuspid Regurgitation: 4D Flow MRI vs. Conventional MRI Analysis*	Alessandra Riva, Ph.D. Istituto di Ricovero e Cura a Carattere Scientifico Policlinico San Donato San Donato, Italy
33	*Highly Accelerated 4D Flow Pediatric Cardiac MRI with a Flexible Pediatric Body Array Coil*	Laura Schoeneberg, M.D., FAAP Children's Mercy Hospital Kansas City Kansas City, MO, USA
34	*Estimating the Importance of Respiratory, Cardiac & Slow Vasomotion Cycles for CSF Flow*	Pontus Söderström, M.Sc. Umeå University Umeå, Sweden
35	*Novel Insights Into Left Ventricular Flow Components in Mitral Regurgitation Patients with Preserved Ejection Fraction Using 4D-Flow Magnetic Resonance Imaging*	Monisha Srabanti, Ph.D. Student University of Calagry Calgary, AB, Canada
36	*4D-Flow Imaging of CSF Dynamics Using an Ultra High-Performance Head-Only System*	Tomas Vikner, Ph.D. University of Wisconsin-Madison Madison, WI, USA
37	*Construction & Manufacturing of an MRI-Ready Neating Heart Model Phantom*	Moritz Wiegand, B.Sc. Institute of Computer-Assisted Cardiovascular Medicine Berlin, Germany
38	*Improved 4D-Flow MRI Analysis of CSF Dynamics Using Background Suppressed 3D FSE*	Zaynab Yardim, M.Sc. University of Wisconsin-Madison Madison, WI, USA
39	*20-Fold Accelerated Cardiovascular Phase-Contrast MRI Using Channel-Shift CNN*	Chi Zhang, Ph.D. Stanford University Stanford, CA, USA
40	*Enhancing 4D Flow Imaging in Carotid Arteries Using Super-Resolution Deep Learning Models*	Aitor Zubillaga-Unsain, Ph.D. Student Centro de Investigacion Cooperativa en Biomateriales San Sebastian, Spain

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