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4D-Flow MRI of aortic and valvular disease

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APPENDICES

LIST OF PUBLICATIONS

1. Ramaekers MJ, Westenberg JJ, Venner MF, **Juffermans JF**, van Assen HC, Te Kiefte BJ, et al. Evaluating a Phase-Specific Approach to Aortic Flow: A 4D Flow MRI Study. *Journal of Magnetic Resonance Imaging*. 2023.
2. Perinajová R, Álvarez-Cuevas CB, **Juffermans J**, Westenberg J, Lamb H, Kenjereš S. Influence of aortic aneurysm on the local distribution of NO and O2 using image-based computational fluid dynamics. *Computers in Biology and Medicine*. 2023;**160**:106925.
3. **Juffermans JF**, Westenberg JJ, van den Boogaard PJ, Lamb HJ. Effects of Ageing on Aortic Hemodynamics Measured by 4D-Flow MRI—A Case Series. *European Heart Journal-Case Reports*. 2023:ytad130.
4. Rijnberg FM, van 't Hul LC, Hazekamp MG, van den Boogaard PJ, **Juffermans JF**, Lamb HJ, et al. Haemodynamic performance of 16–20-mm extracardiac Goretex conduits in adolescent Fontan patients at rest and during simulated exercise. *European Journal of Cardio-Thoracic Surgery*. 2023;**63**(1):ezac522.
5. **Juffermans JF**, van Assen HC, te Kiefte BJ, Ramaekers MJ, van der Palen RL, van den Boogaard P, et al. 4D Flow MRI in Ascending Aortic Aneurysms: Reproducibility of Hemodynamic Parameters. *Applied Sciences*. 2022;**12**(8):3912.
6. Rijnberg FM, Westenberg JJ, van Assen HC, **Juffermans JF**, Kroft LJ, van den Boogaard PJ, et al. 4D flow cardiovascular magnetic resonance derived energetics in the Fontan circulation correlate with exercise capacity and CMR-derived liver fibrosis/ congestion. *Journal of Cardiovascular Magnetic Resonance*. 2022;**24**(1):1-10.
7. van Hout M, **Juffermans J**, Lamb H, Kröner E, van den Boogaard P, Schalijs M, et al. Ascending aorta curvature and flow displacement are associated with accelerated aortic growth at long-term follow-up: A MRI study in Marfan and thoracic aortic aneurysm patients. *IJC Heart & Vasculature*. 2022;**38**:100926.
8. Perinajová R, **Juffermans JF**, Mercado JL, Aben J-P, Ledoux L, Westenberg JJ, et al. Assessment of turbulent blood flow and wall shear stress in aortic coarctation using image-based simulations. *Biomedical engineering online*. 2021;**20**(1):1-20.
9. Perinajova R, van de Ven T, Roelse E, Xu F, **Juffermans J**, Westenberg J, et al. A Comprehensive MRI-Based Computational Model of Blood Flow in Compliant Aorta Using Radial Basis Function Interpolation. Available at SSRN 4029428.
10. Rijnberg FM, **Juffermans JF**, Hazekamp MG, Helbing WA, Lamb HJ, Roest AA, et al. Segmental assessment of blood flow efficiency in the total cavopulmonary

connection using 4D flow MRI: vortical flow is associated with increased viscous energy loss. *European Heart Journal Open*. 2021.

11. van Hout MJ, **Juffermans JF**, Scholte AJ, Lamb HJ. 4D flow MRI of type B dissection with later retrograde progression to type A dissection in Marfan: a case report. *European Heart Journal-Case Reports*. 2021;**5**(8):ytab288.
12. Perinajová R, **Juffermans JF**, Westenberg JJ, van der Palen RL, van den Boogaard PJ, Lamb HJ, et al. Geometrically induced wall shear stress variability in CFD-MRI coupled simulations of blood flow in the thoracic aortas. *Computers in Biology and Medicine*. 2021;**133**:104385.
13. Rijnberg FM, van der Woude SF, van Assen HC, **Juffermans JF**, Hazekamp MG, Jongbloed MR, et al. Non-uniform mixing of hepatic venous flow and inferior vena cava flow in the Fontan conduit. *Journal of the Royal Society Interface*. 2021;**18**(177):20201027.
14. Rijnberg FM, van Assen HC, **Juffermans JF**, Kroft LJ, van den Boogaard PJ, de Koning PJ, et al. Reduced scan time and superior image quality with 3D flow MRI compared to 4D flow MRI for hemodynamic evaluation of the Fontan pathway. *Scientific reports*. 2021;**11**(1):1-10.
15. Ramaekers MJ, Adriaans BP, **Juffermans JF**, Van Assen HC, Bekkers SC, Scholte AJ, et al. Characterization of ascending aortic flow in patients with degenerative aneurysms: a 4D flow magnetic resonance study. *Investigative Radiology*. 2021;**56**(8):494-500.
16. **Juffermans JF**, Minderhoud SC, Wittgren J, Kilburg A, Ese A, Fidock B, et al. Multicenter consistency assessment of valvular flow quantification with automated valve tracking in 4D flow CMR. *JACC: Cardiovascular Imaging*. 2021.
17. van der Palen RL, **Juffermans JF**, Kroft LJ, Hazekamp MG, Lamb HJ, Blom NA, et al. Wall shear stress in the thoracic aorta at rest and with dobutamine stress after arterial switch operation. *European Journal of Cardio-Thoracic Surgery*. 2021;**59**(4):814-22.
18. **Juffermans JF**, Westenberg JJ, van den Boogaard PJ, Roest AA, van Assen HC, van der Palen RL, et al. Reproducibility of aorta segmentation on 4D flow MRI in healthy volunteers. *Journal of Magnetic Resonance Imaging*. 2020.
19. van Hout MJ, Scholte AJ, **Juffermans JF**, Westenberg JJ, Zhong L, Zhou X, et al. How to Measure the Aorta Using MRI: A Practical Guide. *Journal of magnetic resonance imaging: JMRI*. 2020:e27183.
20. **Juffermans JF**, Nederend I, van den Boogaard PJ, ten Harkel ADJ, Hazekamp MG, Lamb HJ, et al. The effects of age at correction of aortic coarctation and recurrent obstruction on adolescent patients: MRI evaluation of wall shear stress and pulse wave velocity. *European Radiology Experimental*. 2019 June 20;**3**(1):24.

LIST OF SCIENTIFIC ORAL PRESENTATIONS

1. **Joe F. Juffermans**, Jos J. M. Westenberg, Hans C. van Assen, Pieter van den Boogaard, Bastiaan J.C. te Kiefte, Arthur J.H.A. Scholte, Hildo J. Lamb. Hemodynamic Phenotyping of Thoracic Aortic Aneurysms. European Congress of Radiology, Annual meeting 2022. Vienna, Austria. July 13, 2022 – July 17, 2022.
2. **Joe F. Juffermans**, Savine C. S. Minderhoud, Johan Wittgren, Anton Kilburg, Amir Ese⁴, Benjamin Fidock, Hildo J. Lamb, Marcus Carlsson, Liang Zhong, Tilman Emrich, Johannes Töger, Alexander Hirsch, Pankaj Garg, Jos J. M. Westenberg. Multicenter study shows that valvular 4D-flow MRI is internationally clinical acceptable. Society for Cardiovascular magnetic Resonance, Annual meeting 2020. Orlando, USA. February 12, 2020 – February 15, 2020.
3. **Joe F. Juffermans**, Johannes Töger, Savine C. S. Minderhoud, Johan Wittgren, Anton Kilburg, Benjamin Fidock, Xiuyu Chen, Jun-Mei Zhang, Amir Ese, Hildo J. Lamb, Marcus Carlsson, Liang Zhong, Shihua Zhao, Tilman Emrich, Pankaj Garg, Alexander Hirsch³, Jos J. M. Westenberg. Multicenter consistency assessment of valvular flow quantification with retrospective automated valve tracking in 4D flow MRI. ISMRM Benelux Chapter, Annual meeting 2020. Arnhem, The Netherlands. January 24, 2020.
4. **Joe F. Juffermans**, Jos J.M. Westenberg, Pieter J. van den Boogaard, Roel van der Palen, Arno A. W. Roest, Hans van Assen, Hildo J. Lamb. Inter-examination reproducibility of phase-specific systolic aorta segmentation: 4D flow MRI in healthy volunteers. Radiology Society of North America, Annual meeting 2019. Chicago, USA. November 30, 2019 – December 6, 2019.
5. **Joe F. Juffermans**, Jos J.M. Westenberg, Pieter J. van den Boogaard, Roel van der Palen, Arno A. W. Roest, Hans van Assen, Hildo J. Lamb. Phase-specific aorta segmentation based on 4D flow MRI: Inter-examination reproducibility in healthy volunteers. European Society for Magnetic Resonance in Medicine and Biology, Annual meeting 2019. Rotterdam, The Netherlands. October 3, 2019 – October 5, 2019.
6. **Joe F. Juffermans**, Jos J.M. Westenberg, Pieter J. van den Boogaard, Roel van der Palen, Arno A. W. Roest, Hans van Assen, Hildo J. Lamb. Phase-specific Aorta Segmentation based on 4D flow MRI: Inter-examination reproducibility in healthy volunteers. 4th 4D Flow MRI Workshop. York, England. June 17, 2019 – June 18, 2019.
7. **Joe F. Juffermans**, Ineke Nederend, Pieter J. van den Boogaard, Hildo J. Lamb, Arno A. W. Roest and Jos J. M. Westenberg. Age at aortic coarctation reconstruction is correlated with aortic vessel wall stiffening: an evaluation of pulse wave velocity

and wall shear stress from 4D flow MRI. European Congress of Radiology, Annual meeting 2019. Vienna, Austria. February 27, 2019 – March 3, 2019.

8. **Joe F. Juffermans**, Ineke Nederend, Pieter J. van den Boogaard, Hildo J. Lamb, Arno A. W. Roest and Jos J. M. Westenberg. In aortic coarctation is the age at curative reconstruction correlated with aortic vessel wall stiffening: an evaluation of pulse wave velocity and wall shear stress from 4D flow MRI. 7th Dutch Biomedical Engineering Congress. Egmond aan zee, The Netherlands. January 24 2019 – January 25, 2019.
9. **Joe F. Juffermans**, Ineke Nederend, Pieter J. van den Boogaard, Hildo J. Lamb, Arno A. W. Roest and Jos J. M. Westenberg. Age of aortic coarctation correction correlates with aortic vessel wall stiffening: evaluation of wall shear stress and pulse wave velocity. ISMRM Benelux Chapter, Annual meeting 2019. Leiden, The Netherlands. January 17, 2019

CURRICULUM VITAE

The author of this dissertation was born in Leiden, the Netherlands in 1991. In 2010, he started a bachelor in Industrial Design Engineering at the Technical University of Delft (Delft, the Netherlands). During his bachelor degree, he also completed a minor in Medicine at the Erasmus University Medical Center (Rotterdam, the Netherlands). After his bachelor degree, he started a master in Biomedical Engineering at the Technical University of Delft in 2014. During his master degree, he did an internship at Philips Healthcare (Eindhoven, the Netherlands). Eventually, he completed his master's graduation project at the Leiden University Medical Center (Leiden, the Netherlands).

In 2018, the author started his PhD study at the Cardio Vascular Imaging Group (CVIG) at the Department of Radiology (supervisors: prof. dr. H.J. Lamb and dr. ir. J.J.M. Westenberg) at Leiden University Medical Center. His PhD project was part of the RADAR study on earlier recognition of aortic dissection and aneurysm rupture. The RADAR study was conducted in collaboration with the Technical University of Delft and the Maastricht University Medical Center (Maastricht, the Netherlands). During his PhD study, he developed a comprehensive aorta MRI protocol for clinical evaluation of patients and healthy volunteers. Furthermore, he also developed an imaging analysis platform to quantify morphologic and hemodynamic biomarkers of the aorta. He presented his work at multiple international conferences and received a Travel award from the Society for Cardiovascular Magnetic Resonance (2020, Orlando, United States of America) for the multicenter 4D flow study he conducted.

After his PhD study, the author started a position as Big Data Engineer at KPMG (Amstelveen, the Netherlands).

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