

Judith Zimmermann, PhD

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Education

Technical University of Munich, Department of Informatics, Dr. rer. nat. (<i>Ph.D.</i>)	2016 – 2021
Technical University of Munich, M.Sc. Biomedical Computing	2012 – 2015
Mannheim University of Applied Sciences, B.Sc. Information Technology/Medical Engineering	2008 – 2012

Research Experience

Stanford University, Radiological Sciences Laboratory (Stanford, CA) since 11/2023

Postdoctoral scholar (Advisor: Brian Hargreaves, PhD)

Advancing novel breast MRI techniques: non-contrast diffusion MRI, breast MRI in the supine position;
Translating novel MRI sequences to clinical care, leading breast MRI exams with cancer patients.
Data management of multi-site non-contrast diffusion breast MRI clinical study with > 2000 participants;

UC San Francisco, Dept. of Radiology and Biomedical Imaging (San Francisco, CA) 02/2022 – 10/2023

Postdoctoral scholar (Advisor: Nola Hylton, PhD)

Validation and reproducibility of low field 0.55 T breast MRI;
Analysis of multi-site clinical trial breast MRI data to predict treatment response (ISPY-2 trial).

Stanford University, Radiological Sciences Laboratory (Stanford, CA) 05/2019 – 05/2021

Visiting scholar, DAAD fellow (Advisor: Daniel B. Ennis, PhD)

Cardiovascular 4D-flow MRI acquisition and data analysis;
Design and engineering of an MRI-compatible pulsatile flow circuit that embeds patient-specific vessel models, specifically to study hemodynamics in aortic dissection;
Experience with novel 3D-printing technologies.

TU Munich, Dept. of Informatics and Graduate Center Bioengineering (Munich, Germany) 05/2016 – 07/2021

affiliated with: Fraunhofer Institute for Digital Medicine at Charité Berlin, German Heart Center Munich

PhD candidate (Advisors: Bjoern Menze, PhD, Anja Hennemuth, PhD)

Extensive software development (C++, Python, using MevisLab) 4D-flow MRI data processing;
Leading cardiovascular MRI exams of healthy volunteers;
Supporting congenital heart patient MRI studies concerning 4D-flow protocol questions.

Dissertation: *'Quantifying Hemodynamics in the Aorta with Four-Dimensional Flow MRI'*

Pre-doctoral positions:

TU Munich, Dept. of Nuclear Medicine (Munich, Germany) 04/2015 – 09/2015

Research associate

Assessing motion-compensation techniques for cardiovascular PET/MR imaging.

UC Los Angeles, Magnetic Resonance Research Labs (Los Angeles, CA) 09/2013 – 04/2014

Visiting graduate student researcher, completing M.Sc. thesis project

Image-based cardiac modeling for guided ventricular tachycardia ablation procedures.

TU Munich, Chair for Computer Aided Medical Procedures (Munich, Germany) 10/2012 – 07/2013

Graduate (M.Sc.) student researcher

Front-end software development (using C++) for tomographic image reconstruction.

Mannheim University of Applied Sciences, Dept. of Information Technology (Mannheim, Germany) 03/2012 – 07/2012

Research assistant, post baccalaureate

Evaluating a portable benchtop magnetic resonance imaging system (pure devices GmbH)

Heidelberg University, Chair for Computer Assisted Clinical Medicine (Mannheim, Germany) 10/2011 – 02/2012

Undergraduate student researcher, completing B.Sc. thesis project

CE-marking of a full-body radio-frequency coil for ²³Na MRI.

UC Irvine, Center for Functional Onco-Imaging (Irvine, CA) 08/2010 – 02/2011

Visiting undergraduate student, internship

Hardware development for hybrid diffuse optical tomography and magnetic resonance imaging.

Acquired funding

Siemens seed grant for pilot projects, *UCSF Dept. of Radiology and Biomedical Imaging, 2022-23* (\$ 10,000)
 DAAD scholar, *German Academic Exchange Service, 2019-20* (€ 43,000)
 Project grant, *German Heart Foundation, 2017-2020* (€ 70,000)
 Exploratory research grant, *UCLA David Geffen School of Medicine, 2013-2014* (\$ 10,000)
 Siemens Master Program (SMP) scholar, *Siemens AG, 2013 – 2015* (€ 14,000)

Awards and recognitions

Trainee Deputy Editor Fellowship, *Journal of Magn Reson Medicine, JMRI Editorial Office, May 2025-26* (1-year term)
 Junior Fellow of the International Society of Magnetic Resonance in Medicine, *ISMRM, May 2024*
 Best Poster Award, *Func. Imaging Model. Heart 11th Biennial Conference, June 2021*
 Trainee Best Abstract Award, *ISMRM Flow and Motion Study Group, August 2020*
 MICCAI Educational Award (expert panel second prize). *MICCAI Society, Boston, September 2014*
 BEST.IN.TUM Awardee (top 2% student), *Department of Informatics, TU Munich, September 2014*
 Mannheimer Modell Mittelstands Stipendium, *European Media Laboratory, 2010*

ISMRM trainee travel stipends, *ISMRM Society, 2016, 2018, 2019, 2020*
 GlaxoSmithKline foundation travel awards, *2015, 2017*
 PROMOS research travel award (visiting at UCLA), *TU Munich/Fed. Ministry Education Research, Germany, 2013*
 INTERSTIP research travel stipend (visiting at UC Irvine), *Mannheim University of Applied Sciences, 2010*

Academic Service

Mentoring: Leon Wenning, BSc student at TU Munich Informatics, 2018; Aashay Ramesh Tinaikar, MSc student at TU Munich Informatics, 2018-19; Tabitha Bandy-Vizcaino, BSc student at Stanford Mechanical Engineering, 2019; Priya Nair, PhD student at Stanford Bioengineering, 2020; Melanie Fung, ci2 summer research intern at UCSF, 2022

Teaching: Teaching assistant for C++, U Appl Sci Mannheim, 2009, 2010
 Scientific Ethics Lecture, Stanford RSL REU program, 2019-2021, 2024-25

Journal Services: *Reviewer (# manuscripts):* Eur Radiology (1), Comp Methods Biomech Biomed Eng (1), Front Cardiovasc Med (1), APL Bioengineering (1)
Editor: Trainee Deputy Editor of JMRI

Society service: ISMRM Annual Meeting Abstract Reviewer: 2023, 2024, 2025
 ISMRM Annual Meeting Session Organizer:
 “Unique Opportunities and Challenges of MRI Research Around the Globe”, Singapore, 2024
 “Junior Fellow Sessions”, Honolulu, USA, 2025 (3 sessions in main program)

Skill set

Programming skills: C, C++, Python, R, Matlab;
Software frameworks: MeVisLab, OsiriX, ParaView, itkSnap, imageJ, Inkscape, Meshmixer, GIMP, MagicDraw, LabChart, LTspice, LaTeX text editing, REDCap database development and usage, MS Office tools;
Hands-on skills: MRI scanning (patients, healthy test subjects, phantom setups); MRI-compatible flow setups; MRI phantom design and engineering; electronic circuit development; basic machining skills; 3D printing.
Att. workshops: Summer School on Multiscale Biomedical Imaging, ETH Zürich, 2015
 (selected) Medical Imaging Summer School on Deep Learning, Favignana, Italy, 2018
 Public Policy Negotiation, Stanford School of Law, 2020
 Scientific Leadership and Management Course, UCSF OCPD, 2023
 Inclusive Research Mentor/Manager Series, UCSF OCPD, 2023
 Leadership Bootcamp: Negotiation and Communication, Stanford VPGE, 2023
 Prepare for Faculty Course, Stanford OPA, 2024
 Mentoring Fundamentals, Stanford OPA, 2024
 The Art of Negotiation, Stanford OPA, 2024

Languages: German (native), English (proficient, written and verbal), French (basics), Spanish (basics)

Other Leadership and Community Service

Trainee council member, Stanford Radiological Sciences Laboratory (RSL), Stanford University since 2023
 I organize division-internal events and represent graduate students and postdocs in faculty meetings.

Postdoc leadership board member, Postdoctoral Scholar Association, UC San Francisco	2022-2023
I led community-building events serving >1200 UCSF post docs across UCSF, career seminars with invited speakers, and alumni networking events.	
Head of PhD student council, Graduate Center Bioengineering, TU Munich, Germany	2018-2019
I led the PhD student council and was actively involved in organizing regular science seminars and our annual graduate center summer school.	
Honorary first captain and sailing mentor, Blue Water Foundation (BWF), San Francisco, CA	since 2020
I serve as an honorary first captain for BWF and one-on-one sailing mentor for at risk youth. BWF is a volunteer-run organization dedicated to bringing sailing to the Bay Area youth.	
Advisory board member and software developer, Letters to a Pre-Scientist (LPS), remote	since 2013
I am responsible for software development to match students with STEM professionals. I also serve on the advisory board to the board of directors.	

Peer-reviewed full papers

(11 total, 5 as first author)

1. **Zimmermann J**, Demedts D, Mirzaee H, et al. Wall shear stress estimation in the aorta: impact of wall motion, spatiotemporal resolution and phase noise. *J Magn Reson Imaging* 48(3): 718-28 (2018). [10.1002/jmri.26007](https://doi.org/10.1002/jmri.26007)
2. Rizk J, Latus H, Shehu N, Mkrtchyan N, **Zimmermann J et al.** Elevated diastolic wall shear stress in regurgitant semilunar valvular lesions. *J Magn Reson Imaging* 50(3): 763-70 (2019). [10.1002/jmri.26680](https://doi.org/10.1002/jmri.26680)
3. **Zimmermann J**, Loecher L, Kolawole FO, et al. On the impact of vessel wall stiffness on quantitative flow dynamics in a synthetic model of the thoracic aorta. *Scientific Reports* 11:6703 (2021). [10.1038/s41598-021-86174-6](https://doi.org/10.1038/s41598-021-86174-6)
4. **Zimmermann J**, Bäuml K, Loecher M, et al. Quantitative Hemodynamics in Aortic Dissection: Comparing in vitro MRI with FSI Simulation in a Compliant Model. *FIMH. LNCS*, 12738:575-86 (2021). [10.1007/978-3-030-78710-3_55](https://doi.org/10.1007/978-3-030-78710-3_55)
5. Bäuml K, **Zimmermann J**, Ennis DB, Marsden AL, Fleischmann D. Hemodynamic Effects of Entry Versus Exit Tear Size and Tissue Stiffness in Simulations of Aortic Dissection. *CMBBE. LNCVB* 38:143-52 (2021). [10.1007/978-3-031-10015-4_13](https://doi.org/10.1007/978-3-031-10015-4_13)
6. Shit S, **Zimmermann J**, Ezhov I et al. Deep Learning Based Super-Resolution of 4D-flow MRI Data. *Front Artif Intell* 5:928181 (2022). [10.3389/frai.2022.928181](https://doi.org/10.3389/frai.2022.928181)
7. Lan IS, Liu J, Yang W, **Zimmermann J et al.** Validation of the Reduced Unified Continuum Formulation Against In Vitro 4D-Flow MRI. *Ann Biomed Eng* 51(2):377-93 (2023). [10.1007/S10439-022-03038-4](https://doi.org/10.1007/S10439-022-03038-4)
8. Hanigk M, Burgstaller E, Latus H, Shehu N, **Zimmermann J et al.** Wall shear stress in bicuspid aortic valve disease—10-year follow-up. *Cardiovasc Diagn Ther* 13(1): 38-50 (2023). [10.21037/cdt-22-477](https://doi.org/10.21037/cdt-22-477)
9. **Zimmermann J**, Bäuml K, Loecher M et al. Hemodynamic Effects of Tear Size in Aortic Dissections: Comparing Flow Magnetic Resonance Imaging with Fluid-Structure Simulations. *Sci Rep* 13:22557 (2023). [10.1038/s41598-023-49942-0](https://doi.org/10.1038/s41598-023-49942-0)
10. Hardy B, **Zimmermann J**, Lechner V et al. Comprehensive Analysis of Relative Pressure Estimation Methods Utilizing 4D Flow MRI. *IEEE Transactions on Medical Imaging* (2025). [under review] pre-print: [arXiv:2503.02847](https://arxiv.org/abs/2503.02847) [physics.flu-dyn]
11. **Zimmermann J**, Vincent J, Robb F, Daniel BL, Hargreaves BA, Moran CM. Characterizing the imaging environment for supine breast MRI. *Magn Reson Med* 95(1): 125-137 (2025). [10.1002/mrm.70029](https://doi.org/10.1002/mrm.70029)

Peer-reviewed conference contributions (abstracts and short papers)

(33 in total, 17 as first author)

1. **Zimmermann J**, Vincent J, Robb F et al. Clinical utility of supine breath-held T1-weighted breast DCE MRI. *ISMRM Workshop on Breast MRI, Las Vegas, 2025.*
2. Zhou X, **Zimmermann J**, Daniel B et al. Distortion-Free Diffusion-Weighted Imaging in the Breast Using Self-Navigated Acquisition and Subspace Reconstruction. *ISMRM Workshop on Breast MRI, Las Vegas, 2025*
3. Vincent J, Follante C, Cashen T, Giancola M, Taracila V, **Zimmermann J et al.** Advancing Breast MRI through the Development of a 60-Channel Supine Breast Coil. *ISMRM Workshop on Breast MRI, Las Vegas, 2025*
4. Jordanova KV, Lee PK, Shah P, Dashevsky BZ, Rosen EL, Zhou W, **Zimmermann J et al.** Relationship of breast density and body mass index to image quality of multi-shot echo-planar diffusion weighted imaging for in vivo breast cancer screening. *ISMRM Workshop on Breast MRI, Las Vegas, 2025.*
5. **Zimmermann J**, Daniel BL, Hargreaves BA et al. Characterizing B0 field inhomogeneity, B1+ variations, and respiratory motion for breast MRI in the supine position. *ISMRM Annual Meeting, Honolulu, 2025.*

6. **Zimmermann J**, Zhou X, Moran CJ et al. Comparison of gradient delay measurement and correction in diffusion-weighted 3D cones imaging in the breast. ISMRM Annual Meeting, Honolulu, 2025.
7. Jordanova KV, Lee PK, **Zimmermann J** et al. Image quality assessment of multi-shot echo-planar diffusion weighted imaging for in vivo breast cancer screening. ISMRM Annual Meeting, Honolulu, 2025.
8. **Zimmermann J**, Su P, Wilmes LJ et al. Initial evaluation of breast MRI protocols for cancer treatment monitoring at low field 0.55 T. ISMRM Annual Meeting, Singapore, 2024.
9. Wilmes LJ, Li W, **Zimmermann J** et al. Effects of multi-vendor gradient non-linearity correction on breast tumor ADC measurements in the ACRIN 6698 trial. ISMRM Annual Meeting, Singapore, 2024.
10. **Zimmermann J**, Carmona-Bozo J, Le NN et al. Comparison of diffusion-weighted imaging ADC metrics for early prediction of neoadjuvant treatment response in HER2-negative breast cancer. ISMRM Annual Meeting, Toronto, 2023.
11. Hardy BK, **Zimmermann J**, Burriss NS *et al.* Validation of Non-Invasive Relative Pressure Mapping by 4D Flow MRI in Aortic Dissection. ISMRM Annual Meeting, Toronto, 2023.
12. Li W, Carmona-Bozo J, Wilmes LJ, Onishi N, Liang J, Gibbs JE, Le NN, **Zimmermann J** *et al.* Image quality ranking for breast diffusion-weighted MRI in a multi-center clinical trial. ISMRM Annual Meeting, Toronto, 2023.
13. Hardy BK, **Zimmermann J**, Sotelo J et al. Imaging Regional Pressure Changes in Aortic Dissection – Non-Invasive Mapping by 4D Flow MRI. SCMR Scientific Sessions, San Diego, CA, 2023.
14. **Zimmermann J**, Carmona-Bozo J, Le NN et al. Diffusion-weighted magnetic resonance imaging for subtype-specific prediction of pathologic complete response in neoadjuvant chemotherapy. SABCS, San Antonio, TX, 2022.
15. Liang J, Wilmes L, Malyarenko D, Newitt DC, Li W, Gibbs JE, **Zimmermann J** *et al.* Correction of gradient non-linearity in multi-site multi-vendor Breast DWI: initial characterization and evaluation of effects on quantitative tumor ADC measures. SABCS, San Antonio, TX, 2022.
16. **Zimmermann J**, Bäuml K, Cork TE et al. Impact of 4D-flow MRI spatial resolution on quantitative hemodynamics in 3D-printed aortic dissection models with varying tear size. ISMRM Annual Meeting, London, 2022. [[oral presentation](#)]
17. Bäuml K, **Zimmermann J** et al. Hemodynamic effects of entry versus exit tear size, and tissue stiffness in aortic dissection. CMBBE Symposium (Virtual), 2021.
18. **Zimmermann J**, Loecher M, Cork TE et al. Evaluating ICOSA6 4D-Flow in a Compliant Aortic Dissection Model with Large Velocity Range and Complex Flow Patterns. ISMRM Annual Meeting (Virtual), 2021.
19. Loecher M, **Zimmerman J**, Middione MJ et al. Using GrOpt with Pulseseq for Easy Prototyping of Pulse Sequences with Optimized Waveforms. ISMRM Annual Meeting (Virtual), 2021.
20. Kolawole FO, Cork TE, Locher M, **Zimmermann J** et al. System for Validating MRI-based Myocardial Stiffness Estimation Techniques Using 3D-Printed Heart Phantoms. ISMRM Annual Meeting (Virtual), 2021.
21. **Zimmermann J**, Loecher M, Bäuml K et al.: In Vitro 4D-Flow and Pressure Mapping in the True and False Lumen of a Type-B Aortic Dissection Model. SCMR Scientific Sessions (Virtual), 2021
22. **Zimmermann J**, Bäuml K, Loecher M et al.: Impact of Vessel Wall Characteristics on Quantitative 4D-Flow Dynamics in Compliant 3D-Printed Thoracic Aorta Models. ISMRM Annual Meeting (Virtual), 2020. [[Study group's best abstract award](#)]
23. **Zimmermann J**, Drexler J, Nordmeyer S, A. Hennemuth: Computational metrics for quantitative characterization of vortical flow patterns based on 3D PC-MRI data. ISMRM Annual Meeting, Montréal, 2019.
24. **Zimmermann J**, Tautz L, Meierhofer C, Stern H, Menze B, Hennemuth A: Fully dimensional vessel segmentation in non-contrast-enhanced 3D PC-MRI image data. ISMRM Annual Meeting, Montréal, 2019.
25. **Zimmermann J**, Demedts D, Markl M et al.: Exploring vessel inward normal computation for 4D-flow based wall shear stress estimation in complex vessel geometries. ISMRM Annual Meeting, Paris, 2018.
26. Werner P, **Zimmermann J**, Shehu N et al.: Relative pressure gradients across the right ventricular outflow tract measured by 4D flow CMR. SCMR Scientific Sessions, Barcelona, 2018.
27. **Zimmermann J**, Mirzaee H, Hennemuth A: Software Flow Phantoms for Assessing the Image-Based Computation of Hemodynamic Parameters. EG Visual Comp. Biol. Med., Bremen, 2017.
28. **Zimmermann J**, Tautz L, Mkrtychyan N et al.: Advancing quantitative 4D flow MRI: Assessment of manual versus automatic boundary definition in the aorta. SCMR Scientific Sessions, Washington D.C., 2017.
29. **Zimmermann J**, Tautz L, Mkrtychyan N et al.: Towards wall shear stress computation in the moving aorta: Application of different tracking algorithms. ISMRM Flow Workshop, San Francisco, 2016.
30. Schneider M, **Zimmermann J**, Fenchel M et al.: Atembewegungskompensation in PET/MR: Evaluierung eines integrierten Ansatzes. DGN, Dresden, 2016.

31. **Zimmermann J**, Rashid S, Hu P et al.: Cardiac MRI derived epicardial fat maps to assist ventricular tachycardia ablation procedures for subjects with implantable devices. ISBI, New York City, 2015. [10.1109/ISBI.2015.7163980](https://doi.org/10.1109/ISBI.2015.7163980)
 32. Wetterling F, **Zimmermann J**, Blücher C et al.: A clip resonator for magnetic resonance imaging of the human finger in the confined space of a portable MRI device: improving access to non-invasive imaging technology. ESMRMB, Toulouse, 2013.
 33. Deng Z, Lin Y, **Zimmermann J**, Gulsen G: Fully Automatic Ultrasound Guided Diffuse Optical Tomography (US-DOT) System for Whole Breast Imaging. OSA BIOMED, Miami, 2012.
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