

**ALEX JONATHAN BARKER, PHD**

Business Address: Department of Radiology and Bioengineering  
 Department of Radiology  
 Children's Hospital Colorado  
 13123 East 16<sup>th</sup> Avenue, B125  
 Aurora, CO 80045

Phone: 720-777-5880  
 Email: [alexander.barker@ucdenver.edu](mailto:alexander.barker@ucdenver.edu)

Citizenship: USA  
 Websites:  
 Linked-in: [www.linkedin.com/in/alex-barker-b25054a](http://www.linkedin.com/in/alex-barker-b25054a)

**EDUCATION:**

1999	University of Colorado, Boulder, USA	B.S.	Mechanical Engineering
2008	University of Colorado, Boulder, USA	M.S.	Mechanical Engineering (Microsystems)
2008	University of Colorado, Boulder, USA	Ph.D.	Mechanical Engineering (Bioengineering Focus)
2009-2011	University Medical Center, Freiburg, Germany	Postdoc	Medical Physics, Department of Radiology

**ACADEMIC APPOINTMENTS:**

2012-2015 *Research Assistant Professor*, Department of Radiology  
 Feinberg School of Medicine, Northwestern University

2015-2018 *Assistant Professor (Tenure Track)*, Department of Radiology  
 Feinberg School of Medicine, Northwestern University

2018- *Associate Professor*, Department of Radiology & Bioengineering  
 Director of the Advanced Imaging Lab, Children's Hospital Colorado (CHCO)  
 University of Colorado, Anschutz Medical Campus

2018- *Adjunct Professor*, Department of Radiology  
 Feinberg School of Medicine, Northwestern University

**OTHER EMPLOYMENT:**

1993-1995 *Engineering Intern*, Antisubmarine Warfare Unit  
 Naval Surface Weapons Center, White Oak, Maryland

1997-1998 *Undergraduate Research Assistant*, High Temperature Systems and Materials Lab  
 Department of Mechanical Engineering, University of Colorado, Boulder

2000-2003 *Design and Process Engineer*  
 Motorola, Semiconductor Products Sector, Austin, TX

2003-2005 *Graduate Research Assistant*, Low Dimensional Lab  
 Department of Mechanical Engineering, University of Colorado, Boulder

2005-2008 *T32 & F31 NIH NRSA Pre-Doctoral Fellow*, Cardiac Flow Dynamics Lab  
 Department of Pediatrics, Section of Cardiology, The Children's Hospital, Denver  
 Department of Mechanical Engineering, University of Colorado, Boulder

2009-2011 *Fulbright and Whitaker Postdoctoral Fellow*, Medical Physics  
 Department of Radiology, University Medical Center Freiburg, Germany

**HONORS AND AWARDS:****A. Elected Society Memberships**

2015-2019 *Board, International Society of Magnetic Resonance in Medicine Flow & Motion Quantitation Study Group*

**B. International / National / Regional**

- 2001 *Asia Final Manufacturing Development Award, Motorola Semiconductor*
- 2006 *NIH National Research Service Award, Ruth Kirschstein Predoctoral Fellowship (F31)*
- 2006 *2<sup>nd</sup> Place, Best Paper, Biofluids and Imaging – American Society of Mechanical Engineers (ASME) Summer Bioengineering Conference, Amelia Island, FL*
- 2007 *2<sup>nd</sup> Place, Best Paper, Biofluids and Imaging – American Society of Mechanical Engineers (ASME) Summer Bioengineering Conference, Keystone, CO*
- 2008 *1st Place, Best Paper, Biofluids and Imaging – American Society of Mechanical Engineers (ASME) Summer Bioengineering Conference, Marco Island, FL*
- 2009 *Fulbright Scholar, Bureau of Educational and Cultural Affairs, United States Department of State*
- 2010 *Whitaker International Fellowship, The Whitaker Foundation*
- 2011 *Best Cardiac Paper, Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM)*
- 2013 *AHA National Scientist Development Grant, American Heart Association*
- 2013 *Truong et al. among Journal of Cardiovascular Magnetic Resonance most “Highly Accessed” Articles*
- 2013 *Potchen Young Investigator Award, Best Talk, Annual Meeting of the Magnetic Resonance Angiography Club*
- 2013 *Barker et. al among Circulation Editors’ Picks: “Most Read Papers on the Topic of Aortic Disease” Circulation. 2013;128:e207-e215 (doi: [10.1161/CIRCULATIONAHA.113.006096](https://doi.org/10.1161/CIRCULATIONAHA.113.006096))*
- 2013 *Barker et. al among Circulation: Cardiovascular Imaging Editors’ Picks: “Most Important Articles in Cardiovascular Imaging Science, Part II” Circulation: Cardiovascular Imaging. 2013; 6:e31-e74 (doi: [10.1161/CIRCIMAGING.113.001335](https://doi.org/10.1161/CIRCIMAGING.113.001335))*

**C. University**

- 1993-1995 *Science and Engineering Apprenticeship Program, George Washington University*
- 1995-1999 *Undergraduate Merit Scholarships (list available on request), University of Colorado, Boulder*
- 2003 *Colorado Commission of Higher Education University Fellowship, University of Colorado, Boulder*
- 2003 *Colorado Merit Award, Department of Mechanical Engineering, University of Colorado, Boulder*
- 2007 *1<sup>st</sup> Place, Best Bioengineering Presentation – Graduate Engineering Annual Research Symposium College of Engineering, University of Colorado, Boulder, CO*
- 2016 *Outstanding Teacher – Area of Scholarly Concentration, Feinberg School of Medicine, Northwestern University*

**INSTITUTIONAL SERVICE**

**A. University****B. School**

2017- *Medical Scientist Training Program, Admissions Committee*  
School of Medicine, Northwestern University

**C. Department**

1998-1999 *Student Quality Council Representative*  
Department of Mechanical Engineering, University of Colorado, Boulder

2004- 2006 *Mechanical Engineering Graduate Student Liaison*  
Department of Mechanical Engineering, University of Colorado, Boulder

2012-2018 *Management of Radiology CMR Research Informatics*  
Department of Radiology, Northwestern University

**D. Hospital**

2015- *BAV Bridge Program, Radiology Representative*  
Northwestern Memorial Hospital, Lurie Children's Hospital, and Northwestern University

**PARTICIPATION IN PROFESSIONAL SOCIETIES AND EXTRAMURAL ORGANIZATIONS****A. Professional Society Memberships**

American Heart Association (AHA)  
American Society of Mechanical Engineers (ASME)  
International Society of Magnetic Resonance in Medicine (ISMRM)  
Society of Magnetic Resonance Angiography (SMRA)

**B. Leadership and Service**

2015-2016 *Executive Planning Committee*  
2016 Society of Magnetic Resonance Angiography Annual Scientific Sessions, Chicago, IL

2015-2016 *Executive Planning Committee*  
2016 ISMRM Flow and Motion Study Group Workshop, San Francisco, CA

2015-2018 *Chair (2018), Vice-Chair (2017), Secretary (2015-2016),*  
Flow and Motion Study Group, International Society of Magnetic Resonance in Medicine

**EDITORIAL AND MANUSCRIPT REVIEW RESPONSIBILITIES****A. Manuscript Reviewer (<https://publons.com/author/1181313/alex-j-barker#profile>):**

Annals of Biomedical Engineering  
Biomechanics and Modeling in Mechanobiology  
Cardiovascular Engineering and Technology  
European Journal of Cardiothoracic Surgery  
Expert Reviews of Medical Devices  
Investigative Radiology  
Journal of Biomechanical Engineering  
Journal of Cardiovascular Magnetic Resonance  
Journal of Magnetic Resonance Imaging (**2016 Distinguished Reviewer**)

Journal of Neurointerventional Radiology  
 Magnetic Resonance in Medicine (**2015, 2016, 2017 Distinguished Reviewer**)  
 NMR in Biomedicine  
 PLoS One

### **GRANT REVIEW RESPONSIBILITIES**

Ad Hoc Reviewer, 2015 NIH NIDDK Special Emphasis Review Panel (F and K Fellowships)  
 Ad Hoc Reviewer, 2017 NIH Special Emphasis Panel (R15 Awards), ZRG1 CVRS-L (80)  
 Ad Hoc Reviewer, 2018 NIH

### **GRANT AWARDS AND CLINICAL TRIALS:**

2004- 2006      *Collaborative Seed Grant*, National Institute of Standards and Technology (NIST)  
 \$50,000, Co-PI: Barker (PI: Cage, B, NIST)

2004-2005      *Engineering Excellence Fund*, University of Colorado, Boulder  
 \$1000, Co-PI: Barker (PI: Zheng, H)

2006-2007      *NIH National Research Service Award (Educational Grant)*, Ruth Kirschstein Predoctoral Fellowship (F31)

2009-2010      *Fulbright Award (Educational Grant)*, Bureau of Educational & Cultural Affairs, US Department of State

2010-2011      *Whitaker International Scholar Award (Educational Grant)*, The Whitaker Foundation

2013-2017      *AHA National Scientist Development Grant*, American Heart Association  
 \$308,000, PI: Barker

2014-2016      *AHA Postdoctoral Award (Sponsor for Pim van Ooij, PhD)*, American Heart Association

2014-2019      *NIH K25 HL119608 Quantitative Research Career Development Grant*  
 National Institutes of Health, NHLBI  
 \$732,375, PI: Barker

2015-2017      *AHA Postdoctoral Award (Sponsor for Emilie Bollache, PhD)*, American Heart Association

2017-2022      *NIH R01 HL133504 "Role of Valve-Mediated Hemodynamics on Bicuspid Aortopathy"*  
 National Institutes of Health, NHLBI  
 \$3,329,397, Multiple-PI Grant: Barker/Fedak

### **INVITED LECTURES:**

April 2008      *"Quantitative Flow Imaging"*  
 Rocky Mountain Biomagnetic Program  
 National Institute of Standards and Technology, Boulder, CO, USA

June 2010      *"Cardiovascular Hemodynamics in 4D"*  
 Heart Institute Lecture  
 The Children's Hospital, Denver, USA

October 2010      *"Hemodynamics and the Bicuspid Aortic Valve"*  
 Cardiovascular MRI Workshop  
 Xuanwu University Hospital, Beijing, China

- October 2010      *"Intra-cardiac MR 4D blood-flow: A new functional parameter?"*  
Special Lecture: Promising Approaches in Cardiovascular Evaluation  
Annual Meeting of the European Society of Cardiac Radiology (ESCR), Prague, Czech Republic
- February 2011      *"Hemodynamics and the Bicuspid Aortic Valve: Structure and Function"*  
and *"Biofluid Kinematics: Intro to Wall Shear Stress"*  
4D Flow Workshop  
University of Oxford Centre for Clinical Magnetic Resonance Research, Oxford, UK
- March 2011        *"4D Flow Sensitive MRI: Background & Clinical Research Applications"*  
Cardiovascular Surgery Seminar  
University of Pennsylvania, Philadelphia, Pennsylvania
- September 2012    *"MRI of the Aortic Valve"*  
Accelerated Magnetic Resonance Imaging, 3<sup>rd</sup> International Workshop  
University Medical Center Freiburg, Germany
- April 2013        *"Current State of Bicuspid Aortic Valve Imaging at Northwestern Memorial Hospital"*  
Heart Valve Meeting  
Department of Cardiac Surgery, Northwestern Memorial Hospital, Chicago, Illinois
- April 2013        *"Measuring Blood Forces in the Presence of Aortic Valve Disease"*  
Fluids and Transport Seminar Series  
Department of Biomedical Engineering, Northwestern University, Evanston, Illinois
- September 2013    *"Energy efficiency and viscous losses"*  
and *"BAV research in Chicago – multi-center experience and new stratification metrics"*  
4D Flow Workshop  
University of Oxford Centre for Clinical Magnetic Resonance Research, Oxford, UK
- October 2013      *"Mapping Intracardiac Flow and Energy Loss with 4D Flow MRI"*  
41<sup>st</sup> Annual Meeting of the North American Society for Cardiovascular Imaging (NASCI)  
Atlanta, GA
- November 2013    *"Imaging valve disease with 4D Flow MRI: Experience at NMH"*  
Cardiovascular Surgery Seminar  
University of Pennsylvania, Philadelphia, Pennsylvania
- October 2014      *"Next Ten Years of Imaging: Cardiovascular MRI"*  
The Next Ten Years of Cardiovascular Treatment: Thoughts from Future Leaders in the Field  
Current Topics in Healthcare  
Northwestern Memorial Foundation, Northwestern Medicine, Chicago, Illinois
- February 2015     *"4D flow in a Small or Enlarged Aorta"*  
Too Small, Too Thick and Too Big: CMR of the Left Heart and Aorta in Congenital Heart Disease  
2015 SCMR/Euro CMR Joint Scientific Sessions, Nice, France
- June 2015        *"Genetics or Hemodynamics? The search for imaging biomarkers of bicuspid aortic valve aortopathy development"*  
Cardiac Grand Rounds  
Libin Cardiovascular Institute, University of Calgary, Alberta
- July 2015         *"How to Interpret Flow Energetics & Turbulence"*  
4D Flow Workshop  
University of Oxford Centre for Clinical Magnetic Resonance Research, Oxford, UK

- October 2015      “How imaging biomarkers predict histologic changes & could alter surgical strategy”  
Advanced Symposium on Cardiovascular Imaging  
Society of Pediatric Radiology  
Lurie Childrens Hospital, Chicago, IL
- October 2015      “4D Flow MRI mapping of regional wall shear stress”  
North American Vascular Biology Workshop  
Cape Cod, MA
- March 2016        “The wonders of 4D Flow MRI: Ready for clinical use?”  
2016 Heart Valve Society Meeting  
New York, New York
- May 2016         “Practical Challenges of MRA and Flow”  
Cardiovascular MRI: Vascular Flow & Angiography Weekend Educational Course  
2016 Annual Meeting of the International Society of Magnetic Resonance in Medicine  
Singapore, Republic of Singapore
- January 2017     “Cardiovascular Flow A – Technical Methods”  
Physician’s Pre-Conference Course  
2017 Annual Meeting of the Society of Cardiovascular Magnetic Resonance  
Washington, D.C.

**PUBLICATIONS:** (<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/40298806/?sort=date&direction=ascending>)

#### **A. PEER-REVIEWED ORIGINAL INVESTIGATIONS**

1. **Barker, A.J.**, Cage, B., Russek, S., and Stoldt, C.R., *Ripening during Magnetite Nanoparticle Synthesis: Resulting Interfacial Defects and Magnetic Properties*. Journal of Applied Physics, 2005. 98(6): p. 063528.
2. Zheng, H., **Barker, A.**, and Shandas, R., *Predicting Backscatter Characteristics from Micron- and Submicron-Scale Ultrasound Contrast Agents using a Size-Integration Technique*. IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2006. 53(3): p. 639-644.
3. Cage, B., Russek, S.E., R., S., **Barker, A.J.**, Stoldt, C., Ramachandarin, V., and Dalal, N.S., *The utility of the single-molecule magnet Fe8 as a magnetic resonance imaging contrast agent over a broad range of concentration*. Polyhedron, 2007. 26(12): p. 2413-2419.
4. **Barker, A.J.**, Lanning, C., and Shandas, R., *Quantification of Hemodynamic Wall Shear Stress in Patients with Bicuspid Aortic Valve Using Phase-Contrast MRI*. Annals of Biomedical Engineering, 2010. 38(3): p. 788-800.
5. Zhang, F., Lanning, C., Mazzaro, L., **Barker, A.J.**, Gates, P.E., Strain, W.D., Fulford, J., Gosling, O.E., Shore, A.C., Bellenger, N.G., Rech, B., Chen, J., Chen, J., and Shandas, R., *In Vitro and Preliminary In Vivo Validation of Echo Particle Image Velocimetry in Carotid Vascular Imaging*. Ultrasound in Medicine & Biology, 2011. 37(3): p. 450-464.
6. Bock, J., Frydrychowicz, A., Lorenz, R., Hirtler, D., **Barker, A.J.**, Johnson, K.M., Arnold, R., Burkhardt, H., Hennig, J., and Markl, M., *Optimized Assessment of 4D Aortic Pressure Difference Maps*. Magnetic Resonance in Medicine, 2011. 65(5): p. 1335-1345.
7. **Barker, A.J.**, Staehle, F., Bock, J., Jung, B.A., and Markl, M., *Analysis of Complex Cardiovascular Flow using Three-Component Acceleration-Encoded MRI*. Magnetic Resonance in Medicine, 2012. 67(1): p. 50-61.
8. Bürk, J., Blanke, P., Stankovic, Z., **Barker, A.**, Russe, M., Geiger, J., Frydrychowicz, A., Langer, M., and Markl, M., *Evaluation of 3D blood flow patterns and wall shear stress in the normal and dilated thoracic aorta using flow-sensitive 4D CMR*. Journal of Cardiovascular Magnetic Resonance, 2012. 14(1): p. 84.

9. **Barker, A.J.**, Markl, M., Burk, J., Lorenz, R., Bock, J., Bauer, S., Schulz-Menger, J., and von Knobelsdorff-Brenkenhoff, F., *Bicuspid Aortic Valve Is Associated with Altered Wall Shear Stress in the Ascending Aorta*. *Circulation: Cardiovascular Imaging*, 2012. 5(4): p. 457-66. (***Circulation Editors' "Most Read" articles on Aortic Disease and Circulation Cardiovascular Imaging Editors' "Most Important Articles in Cardiovascular Imaging Science"***)
10. McGarvey, J.R., Kondo, N., Takebe, M., Koomalsingh, K.J., Witschey, W.R., **Barker, A.J.**, Markl, M., Takebayashi, S., Shimaoka, T., Gorman, J.H., 3rd, Gorman, R.C., and Pilla, J.J., *Directed epicardial assistance in ischemic cardiomyopathy: flow and function using cardiac magnetic resonance imaging*. *The Annals of Thoracic Surgery*, 2013. 96(2): p. 577-85.
11. Markl, M., Brendecke, S.M., Simon, J., Barker, A.J., Weiller, C., and Harloff, A., *Co-registration of the distribution of wall shear stress and 140 complex plaques of the aorta*. *Magnetic Resonance Imaging*, 2013. 31(7): p. 1156-62.
12. Bissell, M.M., Hess, A.T., Biasioli, L., Glaze, S.J., Loudon, M., Pitcher, A., Davis, A., Prendergast, B., Markl, M., **Barker, A.J.**, Neubauer, S., and Myerson, S.G., *Aortic dilation in bicuspid aortic valve disease: flow pattern is a major contributor and differs with valve fusion type*. *Circulation Cardiovascular Imaging*, 2013. 6(4): p. 499-507.
13. Truong, U., Fonseca, B., Dunning, J., Burgett, S., Lanning, C., Ivy, D.D., Shandas, R., Hunter, K., and **Barker, A.J.**, *Wall shear stress measured by phase contrast cardiovascular magnetic resonance in children and adolescents with pulmonary arterial hypertension*. *Journal of Cardiovascular Magnetic Resonance*, 2013. 15(1): p. 81. (***JCMR "Highly Accessed" article***)
14. Harloff, A., Berg, S., **Barker, A.J.**, Schöllhorn, J., Schumacher, M., Weiller, C., and Markl, M., *Wall Shear Stress Distribution at the Carotid Bifurcation: Influence of Eversion Carotid Endarterectomy*. *European Radiology*, 2013. 23(12): p. 3361-9.
15. **Barker, A.J.**, van Ooij, P., Bandi, K., Garcia, J., Albaghdadi, M., McCarthy, P., Bonow, R.O., Carr, J., Collins, J., Malaisrie, C., and Markl, M., *Viscous Energy Loss in the Presence of Abnormal Aortic Flow*. *Magnetic Resonance in Medicine*, 2014. 72(3): p. 620-8.
16. Lamata, P., Pitcher, A., Krittian, S., Nordsletten, D., Bissell, M., Cassar, T., **Barker, A.J.**, Markl, M., Neubauer, S., and Smith, N.P., *Aortic relative pressure components derived from 4D flow cardiovascular magnetic resonance*. *Magnetic Resonance in Medicine*, 2014. 72(4): p. 1162-9.
17. Entezari, P., Schnell, S., Mahadevia, R., Rinewalt, D., Malaisrie, C., McCarthy, P., Mendelson, M., Collins, J., Carr, J.C., Markl, M., and **Barker, A.J.**, *From Unicuspid to Quadricuspid: The Impact of Aortic Valve Morphology on 3D Hemodynamics* *Journal of Magnetic Resonance Imaging*, 2014. 40(6): p. 1342-6.
18. Lorenz, R., Bock, J., **Barker, A.J.**, von Knobelsdorff-Brenkenhoff, F., Wallis, W., Korvink, J.G., Bissell, M.M., Schulz-Menger, J., and Markl, M., *4D flow magnetic resonance imaging in bicuspid aortic valve disease demonstrates altered distribution of aortic blood flow helicity*. *Magnetic Resonance in Medicine*, 2014. 71(4): p. 1542-53.
19. Mahadevia, R., **Barker, A.J.**, Schnell, S., Entezari, P., Kansal, P., Fedak, P.W.M., Malaisrie, S.C., McCarthy, P., Collins, J., Carr, J., and Markl, M., *Bicuspid Aortic Cusp Fusion Morphology Alters Aortic 3D Outflow Patterns, Wall Shear Stress and Expression of Aortopathy*. *Circulation*, 2014. 129(6): p. 673-82.
20. von Knobelsdorff-Brenkenhoff, F., Trauzeddel, R.F., **Barker, A.J.**, Gruettner, H., Markl, M., and Schulz-Menger, J., *Blood flow characteristics in the ascending aorta after aortic valve replacement--a pilot study using 4D-flow MRI*. *Int J Cardiol*, 2014. 170(3): p. 426-33.
21. Galizia, M.S., **Barker, A.**, Liao, Y., Collins, J., Carr, J., McDermott, M.M., and Markl, M., *Wall morphology, blood flow and wall shear stress: MR findings in patients with peripheral artery disease*. *European Radiology*, 2014. 24(4): p. 850-6.
22. Garcia, J., Markl, M., Schnell, S., Allen, B., Entezari, P., Mahadevia, R., Malaisrie, S.C., Pibarot, P., Carr, J., and **Barker, A.J.**, *Evaluation of aortic stenosis severity using 4D flow jet shear layer detection for the measurement of valve effective orifice area*. *Magnetic Resonance Imaging*, 2014. 32(7): p. 891-8.
23. Semaan, E., Markl, M., Malaisrie, S.C., **Barker, A.**, Allen, B., McCarthy, P., Carr, J.C., and Collins, J.D., *Haemodynamic outcome at four-dimensional flow magnetic resonance imaging following valve-sparing aortic root replacement with tricuspid and bicuspid valve morphology*. *European Journal of Cardiothoracic Surgery*, 2014. 45(5): p. 818-25.

24. van Ooij, P., Potters, W.V., Nederveen, A.J., Allen, B.D., Collins, J., Carr, J., Malaisrie, S.C., Markl, M., and **Barker, A.J.**, *A methodology to detect abnormal relative wall shear stress on the full surface of the thoracic aorta using four-dimensional flow MRI*. *Magnetic Resonance in Medicine*, 2015. 73(3): p. 1216-27.
25. **Barker, A.J.**, Roldán-Alzate, A., Entezari, P., Shah, S.J., Chesler, N.C., Wieben, O., Markl, M., and François, C.J., *4D Flow Assessment of Pulmonary Artery Flow and Wall Shear Stress in Adult Pulmonary Arterial Hypertension: Results from Two Institutions*. *Magnetic Resonance in Medicine*, 2015. 73(5): p. 1904-13.
26. Allen, B., Choudhury, L., **Barker, A.J.**, van Ooij, P., Collins, J., Bonow, R.O., Carr, J., and Markl, M., *Three-Dimensional Hemodynamics in Patients with Obstructive and Non-Obstructive Hypertrophic Cardiomyopathy Assessed by Cardiac Magnetic Resonance*. *European Heart Journal - Cardiovascular Imaging*, 2015. 16(1): p. 29-36.
27. van Ooij, P., Potters, W.V., Collins, J., Carr, M., Carr, J., Malaisrie, S.C., Fedak, P.W.M., McCarthy, P.M., Markl, M., and **Barker, A.J.**, *Characterization of abnormal wall shear stress using 4D flow MRI in human bicuspid aortopathy*. *Annals of Biomedical Engineering*, 2015. 43(6): p. 1385-1397.
28. Witschey, W.R., Zhang, D., Contijoch, F., McGarvey, J.R., Lee, M., Takebayashi, S., Aoki, C., Han, Y., Han, J., **Barker, A.J.**, Pilla, J.J., Gorman, R.C., and Gorman, J.H., 3rd, *The Influence of Mitral Annuloplasty on Left Ventricular Flow Dynamics*. *The Annals of Thoracic Surgery*, 2015. 100(1): p. 114-21.
29. Mirabella, L., **Barker, A.J.**, Saikrishnan, N., Coco, E.R., Mangiameli, D.J., Markl, M., and Yoganathan, A.P., *MRI-based Protocol to Characterize the Relationship Between Bicuspid Aortic Valve Morphology and Hemodynamics*. *Annals of Biomedical Engineering*, 2015. 43(8): p. 1815-27.
30. Stankovic, Z., Rossle, M., Euringer, W., Schultheiss, M., Salem, R., **Barker, A.**, Carr, J., Langer, M., Markl, M., and Collins, J.D., *Effect of TIPS placement on portal and splanchnic arterial blood flow in 4-dimensional flow MRI*. *European Radiology*, 2015. 25(9): p. 2634-40.
31. van Ooij, P., Semaan, E., Schnell, S., Giri, S., Stankovic, Z., Carr, J., **Barker, A.J.**, and Markl, M., *Improved respiratory navigator gating for thoracic 4D flow MRI*. *Magnetic Resonance Imaging*, 2015. 33(8): p. 992-9.
32. Allen, B.D., van Ooij, P., **Barker, A.J.**, Carr, M., Gabbour, M., Schnell, S., Jarvis, K.B., Carr, J.C., Markl, M., Rigsby, C., and Robinson, J.D., *Thoracic aorta 3D hemodynamics in pediatric and young adult patients with bicuspid aortic valve*. *Journal of Magnetic Resonance Imaging*, 2015. 42(4): p. 954-63.
33. Garcia, J., **Barker, A.J.**, van Ooij, P., Schnell, S., Puthumana, J., Bonow, R.O., Collins, J.D., Carr, J.C., and Markl, M., *Assessment of altered three-dimensional blood characteristics in aortic disease by velocity distribution analysis*. *Magnetic Resonance in Medicine*, 2015. 74(3): p. 817-25.
34. Guzzardi, D.G., **Barker, A.J.**, van Ooij, P., Malaisrie, S.C., Puthumana, J.J., Belke, D.D., Mewhort H.E.M., Svystonyuk D.A., Kang S., Verma S., Collins, J., Carr J., Bonow R.O., Markl M., Thomas J.D., McCarthy P.M., Fedak P.W.M., *Valve-Related Hemodynamics Mediate Human Bicuspid Aortopathy: Insights From Wall Shear Stress Mapping*. *Journal of the American College of Cardiology*, 2015. 66(8): p. 892-900.
35. Cibis, M., Jarvis, K., Markl, M., Rose, M., Rigsby, C., **Barker, A.J.**, and Wentzel, J.J., *The effect of resolution on viscous dissipation measured with 4D flow MRI in patients with Fontan circulation: Evaluation using computational fluid dynamics*. *Journal of Biomechanics*, 2015. 48(12): p. 2984-9.
36. Collins, J.D., Semaan, E., **Barker, A.**, P, M.M., Carr, J.C., Markl, M., and Malaisrie, S.C., *Comparison of Hemodynamics After Aortic Root Replacement Using Valve-Sparing or Bioprosthetic Valved Conduit*. *Ann Thorac Surg*, 2015. 100(5): p. 1556-62.
37. Han, Q.J., Witschey, W.R., Fang-Yen, C.M., Arkles, J.S., **Barker, A.J.**, Forfia, P.R., and Han, Y., *Altered Right Ventricular Kinetic Energy Work Density and Viscous Energy Dissipation in Patients with Pulmonary Arterial Hypertension: A Pilot Study Using 4D Flow MRI*. *PLoS One*, 2015. 10(9): p. e0138365.



38. Dyverfeldt P, Bissell M, **Barker AJ**, Bolger AF, Carlhall CJ, Ebbers T, Francios CJ, Frydrychowicz A, Geiger J, Giese D, Hope MD, Kilner PJ, Kozerke S, Myerson S, Neubauer S, Wieben O, Markl M. *4D flow cardiovascular magnetic resonance consensus statement*. Journal of Cardiovascular Magnetic Resonance. 2015. 17(1): p. 72.
39. Garcia, J., **Barker, A.J.**, Murphy, I., Jarvis, K., Schnell, S., Collins, J.D., Carr, J.C., Malaisrie, S.C., and Markl, M., *Four-dimensional flow magnetic resonance imaging-based characterization of aortic morphometry and haemodynamics: impact of age, aortic diameter, and valve morphology*. Eur Heart J Cardiovasc Imaging, 2016. 17(8): p. 877-84.
40. Trauzeddel, R.F., Lobe, U., **Barker, A.J.**, Gelsinger, C., Butter, C., Markl, M., Schulz-Menger, J., and von Knobelsdorff-Brenkenhoff, F., *Blood flow characteristics in the ascending aorta after TAVI compared to surgical aortic valve replacement*. Int J Cardiovasc Imaging, 2016. 32(3): p. 461-7.
41. van Ooij, P., Allen, B.D., Contaldi, C., Garcia, J., Collins, J., Carr, J., Choudhury, L., Bonow, R.O., **Barker, A.J.**, and Markl, M., *4D Flow MRI and T1-Mapping: Assessment of Altered Cardiac Hemodynamics and Extracellular Volume Fraction in Hypertrophic Cardiomyopathy*. Journal of Magnetic Resonance Imaging, 2016. 43(1): p. 107-14.
42. van Ooij, P., Powell, A.L., Potters, W.V., Carr, J.C., Markl, M., and **Barker, A.**, *Reproducibility and interobserver variability of systolic blood flow velocity and 3D wall shear stress derived from 4D flow MRI in the healthy aorta*. J Magn Reson Imaging, 2016. 43(1): p. 236-48.
43. Hirtler, D., Garcia, J., **Barker, A.J.**, and Geiger, J., *Assessment of intracardiac flow and vorticity in the right heart of patients after repair of tetralogy of Fallot by flow-sensitive 4D MRI*. Eur Radiol, 2016. 26(10): p. 3598-607.
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31. van Ooij, P., Potters, W., Nederveen, A., Collins, J., Carr, J., Malaisrie, S., Markl, M., and **Barker, A.J.**, *Thoracic Aortic Wall Shear Stress Atlases in Patients with Bicuspid Aortic Valve* in *In Proceedings: SCMR, 17th Annual Scientific Sessions*. 2014. New Orleans, LA.
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### **PROFESSIONAL ACTIVITIES:**

#### ***Teaching***

Spring 2004	MCEN 3027 – Engineering Measurements and Statistics	Graduate Teaching Assistant
Fall 2003	MCEN 3043 – Engineering Dynamics	Graduate Teaching Assistant
Spring 2016	2016 ISMRM Annual Educational Course, Singapore	Lecturer
Winter 2017	2017 SCMR Annual Educational Course, Washington DC	Lecturer

#### ***Trainees***

2012	<b>Krishna Bandi</b> (Medical Student, work resulted in 6 abstracts and a journal article)
2012-2016	<b>Nicolas Naro</b> (Medical Student, Area of Scholarly Concentration, Received ‘Outstanding Teacher’ award for project – Office of Medical Education; work resulted in 1 abstract and a journal article)
2012-2013	<b>Riti Mahadevia</b> (Medical Student, Awarded Outstanding Medical Student 2013 for mentored project)
2012-2017	<b>Kelly Jarvis</b> (PhD, Awarded Thomas L. Slovis Best Paper in Pediatric Radiology for 2016)
2013-2014	<b>Xi Chen</b> (MS Committee)
2013-2014	<b>Patrick Magrath</b> (MS Committee)
2013-	<b>Michal Schafer</b> (PhD Committee)
2013-2015	<b>Pim van Ooij</b> (Postdoc, Awarded AHA Postdoctoral Fellowship during mentorship period)
2012-2015	<b>Julio Garcia</b> (Postdoc, Awarded AHA Postdoctoral Fellowship during mentorship period)
2014-	<b>Emilie Bollache</b> (Postdoc, Awarded AHA Postdoctoral Fellowship during mentorship period)
2014-2015	<b>Ian Murphy</b> (Radiology Fellow, First author publication)
2015-2016	<b>Rouzbeh Ahmadian</b> (Postdoc)
2015-	<b>Ozair Rahman</b> (Medical Student, 3 <sup>rd</sup> Prize, Society of Magnetic Resonance Angiography ‘Passariello Award’)

- 2015-2016      **Brian Trinh** (Medical Student, 2016 RSNA Travel Award Recipient and Podium Presentation, First author publication)
- 2015-            **Lingzi Tashakkor** (MS Committee)
- 2016-            **Xin Shen** (MS Committee, 1<sup>st</sup> author paper)
- 2017-            **Kevin Lin** (Medical Student)
- 2017-            **Michael Scott** (M.D., PhD candidate)

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*Available on request.*