

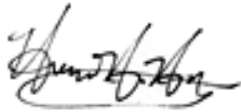
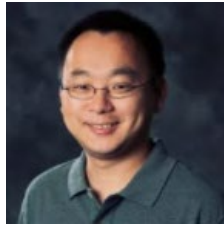
# Houchun Harry Hu, Ph.D.

**Birth Year:** 1979

**Citizenship:** USA

**Email:** [harryhhu@gmail.com](mailto:harryhhu@gmail.com)

<https://www.linkedin.com/in/houchunharryhu>



**General Expertise and Interests:** magnetic resonance imaging (MRI) physics, signal and medical image processing, data reconstruction; obesity and metabolism, pediatric imaging; abbreviated and high-value protocols.

**Language:** Mandarin Chinese (native, oral), English (fluent, written, oral)

**Computer skills:** Windows, Mac OSX, Linux, Matlab, C/C++, LaTeX

## **EDUCATION**

### **Ph.D. – Biomedical Sciences / Biomedical Engineering, 2001-2006**

**Mayo Clinic and Foundation, College of Medicine, Rochester, Minnesota.**

Cumulative GPA: 3.99

**Advisor** – Stephen J. Riederer, Ph.D.

**Dissertation title** – Performance benefits of parallel imaging, partial Fourier, and variable field-of-view techniques in fixed and continuously moving table contrast-enhanced magnetic resonance angiography.

### **Bachelor of Science – Biomedical/Biochemical Engineering, 1997-2001**

**University of Southern California, Viterbi School of Engineering, Los Angeles, California.**

Cumulative GPA: 3.99, Summa Cum Laude

## **PRESENT POSITION**

### **02/2022 – present, Professor of Radiological Sciences**

University of Colorado School of Medicine Anschutz Medical Campus

## **PAST POSITIONS**

### **11/2019 – 11/2021, Senior Clinical Scientist**

Hyperfine, Inc., Guilford, Connecticut (remotely based in Ohio and traveled 60% internationally)

### **07/2017 – 10/2019, Associate Professor, Director of Radiology Research**

Radiology, Nationwide Children's Hospital, Columbus, Ohio

**03/2017 – 04/2017, Visiting Scientist**

Singapore Biomedical Imaging Consortium, A-STAR, Singapore

**06/2014 – 02/2017, Staff MRI Physicist**

Radiology, Phoenix Children's Hospital, Phoenix, Arizona

**7/2011 – 03/2014, Assistant Professor of Radiology Research**

Radiology & Imaging Services, Children's Hospital Los Angeles, Los Angeles, California

**06/2009 – 03/2014, Assistant Professor of Research**

Electrical Engineering, University of Southern California, Los Angeles, California

**09/2006 – 06/2009, Postdoctoral Research Associate**

Magnetic Resonance Engineering Laboratory (<http://mrel.usc.edu/>),

Electrical Engineering-Systems, University of Southern California, Los Angeles, California

**Advisor** – Krishna S. Nayak, Ph.D.

Developed rapid abdominal MRI methods for fat quantification and body composition.

**07/2001 – 05/2006, Ph.D. Candidate**

Mayo Clinic College of Medicine, Rochester, Minnesota

**Advisor** – Stephen J. Riederer, Ph.D.

Developed continuously moving table whole-body MRI methods.

Developed parallel imaging techniques for contrast-enhanced MR angiography.

Validated and translated parallel imaging techniques into the Mayo Clinic practice.

## **TEACHING EXPERIENCE**

**2022 – present**

Lectured to first year, second year, and third year radiology residents at University of Colorado

Lectured for Rad-Aid

**2003 – 2006, Teaching Assistant, Mayo Clinic College of Medicine**

Lectured, corrected homework assignments, and provided tutoring to graduate students in:

Introduction to Magnetic Resonance Imaging (Fall Quarter, 2003, 2005)

Advanced Topics in Magnetic Resonance Imaging (Spring Quarter, 2004, 2006)

Laboratory Methods in Magnetic Resonance Imaging (Fall Quarter, 2003, 2005)

Digital Signal Processing for Biomedical Engineering (Fall Quarter, 2005)

2D Digital Image Processing with Matlab (Spring Quarter, 2006)

**1999 – 2001, Undergraduate Tutoring Program, University of Southern California**

Tutored freshman and sophomore students in:

Calculus, General Chemistry, Physics, Biomedical Computer Simulation Methods, Computer Programming (Matlab and C), and Linear Circuits

## **PROFESSIONAL ACTIVITIES**

***Board Certification***

**2018 – Present**, American Board of Medical Physics

*MRI Physics*

**2023 – Present**, American Board of Magnetic Resonance Safety

*MR Safety Officer and MR Safety Expert*

### **Societies**

**2001 – Present**, International Society of Magnetic Resonance in Medicine (ISMRM)

*Member, abstract reviewer, and moderator for annual scientific meetings*

*Member of Publications Committee (2012-2015)*

*Member of Young Investigator Award Committee (2014-2017)*

*Vice Chair of Young Investigator Award Committee (2015-2017)*

*Chair of Young Investigator Awards Committee (2017-2020)*

*Member of Workshop and Study Group Committee (2021-2022)*

*Member of Website Committee (2022-)*

*Vice Chair of Body MRI Study Group (2023-)*

*Annual Meeting Program Committee (2024-2027 assigned to Body MR)*

*Elected as Senior Fellow of ISMRM (2024)*

**2008 – Present**, International Society for Body Composition Research

*Member*

**2009 – 2011**, The Obesity Society

*Member*

**2023 – 2024**, Radiological Society of North America

*Co-chair, Quantitative Imaging Biomarker Alliance, Proton Density Fat Fraction*

*Subcommittee*

*RSNA Honored Educator Award (2024)*

### **Journal Review**

**2005 – Present**, Magnetic Resonance in Medicine, Journal of Magnetic Resonance Imaging

*Distinguished Reviewer*

**2016-2020** Editor's Recognition Award with Special Distinction, Radiology

**2009 – Present**, (over 420 peer reviews)

*Peer Reviewer*

Acta Radiologica

AJP- Regulatory, Integrative and Comparative Physiology

American Journal of Physiology Heart and Circulatory Physiology

American Journal of Physiology

Annals of the New York Academy of Science

Biocybernetics and Biomedical Engineering

Clinical Obesity

Computer Methods and Programs in Biomedicine

Current Medical Imaging Reviews

Diabetes  
Diabetes, Obesity, and Metabolism  
Diabetic Medicine  
Diabetology and Metabolic Syndrome  
Diagnostic and Interventional Radiology  
European Journal of Pediatrics  
European Journal of Radiology  
European Radiology  
Frontiers Neuroscience  
IEEE Transactions in Medical Imaging  
IEEE-Signal Processing Letters  
International Journal of Obesity  
International Journal of Pediatric Obesity  
Investigative Radiology  
Journal of Applied Physiology-Regulatory, Integrative, and Comparative Physiology  
Journal of the American College of Cardiology  
Journal of Big Data  
Journal of Clinical Endocrinology and Metabolism  
Journal of Comparative Biochemistry and Physiology Part B  
Journal of Endocrinology  
Journal of Imaging  
Journal of Internal Medicine  
Journal of Magnetic Resonance Imaging  
Journal of Medical Imaging  
Journal of Medicine and Life  
Journal of Pediatrics  
Journal of Pregnancy and Child Health  
Magnetic Resonance Imaging (MRI)  
Magnetic Resonance in Medicine  
Magnetic Resonance Materials in Physics, Biology and Medicine  
Malawi Medical Journal  
Medical Physics,  
Molecular Metabolism  
Nature in Medicine  
Neuroradiology  
NMR in Biomedicine  
Obesity  
Obesity Science and Practice  
Pediatric Radiology  
Pediatrics  
PLOS One  
Quantitative Imaging in Medicine and Surgery  
Radiology  
Radiology: Artificial Intelligence  
Science AAAS  
Science Advances  
Scientific Reports (Nature Publishing Group)

**NIH**

**2015 – present**, NIH (KNOD, DDK-B and EITA sections and special emphasis panels)

*Reviewer* – reviewed R and K grants

### **International**

**2015 – present**, *Ad Hoc Reviewer* for Canadian Institutes of Health Research (CIHR) grants

### **Editorial**

**05/2012 – 05/2016**, Magnetic Resonance in Medicine

*Deputy Editor*, covering areas of water-fat MRI, flow, angiography, cardiovascular imaging

**01/2018 – 7/2020**, Magnetic Resonance in Medicine

*Editorial Board Member*

**01/2017 – Present**, Journal of Magnetic Resonance Imaging

*Associate Editor*, covering areas of liver imaging and quantitative (biomarker) imaging

**01/2019 – Present**, Radiology

*Associate Editor*, MRI physics

**01/2021 – Present**, Magnetic Resonance Materials in Physics, Biology, and Medicine

*Editorial Board Member*

### **Administrative**

**07/2014 – 02/2017**, Phoenix Children's Hospital Scientific Review Committee

*Member*

(The Scientific Review Committee reviews research applications for the hospital's Institutional Review Board and makes recommendations on the scientific aspects of each application prior to their review by the IRB.)

**01/2015 – 02/2017**, Phoenix Children's Hospital Institutional Review Board

*Member*

### **Workshops**

**October 1, 2011**, The Obesity Society Workshop on Body and Organ Fat Quantification

*Chair of Organizing Committee / Lead Organizer*

**February 19-22, 2012**, ISMRM workshop on Fat-Water Imaging

*Chair of Organizing Committee*

<http://ismrm.org/workshops/FatWater12/>

**February 25-26, 2014**, NIH workshop on Exploring the Role of Brown Fat in Humans

*Member of Organizing Committee*

<https://www.niddk.nih.gov/news/meetings-workshops/2014/humanbat-2013>

**July 21-24, 2019**, ISMRM workshop on Obesity and Metabolic Disorders

*Co-Chair of Organizing Committee*

<https://www.ismrm.org/workshops/2019/ObMet/>

### ***Notable Invited Talks***

#### **December 4 – 6, 2011**

Pennington Biomedical Research Center, Baton Rouge, Louisiana  
Adiposity in Children and Adolescents: Correlates and Clinical Consequences of Fat Stored in Specific Body Depots  
“Magnetic Resonance Imaging of Brown Adipose Tissue”

#### **July 29 – August 3, 2012**

The Gordon Research Conference on In Vivo Magnetic Resonance  
“Quantitative Water-Fat MRI in Obesity”

#### **November 27, 2012**

Radiological Society of North America  
Hot Topic Session: Pediatric Radiology in the Future  
“Quantitative Chemical-Shift “Dixon” MRI: An Example of Advancing Fat Research with Imaging”

#### **December 4, 2012**

Asia-Pacific Signal and Information Processing Association (APSIPA)  
Biomedical Image Acquisition, Reconstruction and Quantitation  
“Magnetic Resonance Techniques for Fat Quantification in Obesity”

#### **March 22, 2013**

Vanderbilt University Institute of Imaging Science, Nashville, Tennessee  
“Brown Adipose Tissue: Recent Developments, Imaging, and Implications in Human Physiology”

#### **June 27, 2013**

Pennington Biomedical Research Center, Baton Rouge, Louisiana  
“Recent Advances in Quantitative MRI of Brown and White Adipose Tissue”

#### **December 13, 2013**

Lund University, Skåne University Hospital, Malmö, Sweden  
“Brown Adipose Tissue: History, Physiology, and Characterization by PET/CT and Chemical-Shift MR Techniques”

Served as the Invited Faculty Opponent to Ph.D. candidate Pernilla Peterson, M.S.  
“Quantification of Fat Content and Fatty Acid Composition Using Magnetic Resonance Imaging”

#### **March 25, 2014**

Texas Children’s Hospital and Baylor College of Medicine, Houston, Texas  
“Brown Adipose Tissue: a Brief History, Possible Physiological Relevance, and Recent Advances in Characterization by Imaging”

#### **August 29, 2015**

Arizona State University, Tempe, Arizona  
“Brown Adipose Tissue: History, Physiological Relevance, and Recent Advances in Characterization by PET/CT and MRI”

**February 2, 2015**

Philips 8<sup>th</sup> Pediatric User Meeting, Nice, France  
"Putting Spiral MRI to Work in Pediatric Neuroimaging"

**April 9, 2015**

National University Singapore, A\*STAR, Singapore.  
"Chemical-Shift Based MR Methods for Characterizing Brown Adipose Tissue (BAT) - Current Techniques"

**July 13, 2015**

Philips Virtual Pediatric User Meeting  
"3D Spiral and GraSE ASL, T1w-2D Spiral, and Multiband DTI: Preliminary Experience at Phoenix Children's Hospital"

**April 10, 2017**

Singapore Biomedical Imaging Consortium  
"Spiral, non-Gadolinium, and advanced MRI techniques in pediatric neuroimaging" the Phoenix Children's Hospital Experience."

**May 3, 2019**

Advanced Topics in Pediatric MRI – Society for Pediatric Radiology 2019 Annual Meeting.  
"High Value MRI: What does the future look like?"

**August 28, 2019**

Children's Mercy Hospital (Kansas City, Missouri), radiology noon conference  
"Accelerated and Motion Robust Pediatric MRI – Experience from Phoenix and Columbus with Non-Cartesian and Non-Gadolinium Methods."

**September 10, 2019**

GE Healthcare Master Series, Miami Beach, Florida  
"Non-Gadolinium Perfusion Imaging in Pediatrics".

**April 4, 2021**

Karachi, Pakistan, The Aga Khan University  
"Bedside Portable Brain MRI"

**ISMRM 2021, May 2021 (Educational Sessions and Didactic Talks)**

"Fat-Water MRI – Fat Quantification"  
"Chemical Shift MR Methods in Imaging Brown Adipose Tissue"

**July 11-12, 2022, University of Colorado, Colorado Nutrition and Obesity Research Symposium**

<http://cunorc.org/2022-metabolic-imaging-workshop/2022> Ed Melanson NORC  
"State-of-the-Art Body Composition and Organ Fat Quantification Methods in MRI"

***Thesis Committees (official appointments)***

(2012) **Kai-Yu Ho, Ph.D.**, "The influence of patellofemoral joint loading on patella strain and patella water content in females with patellofemoral pain." University of Southern California.

(2016) **Luke Lammers, M.S.**, “A novel computing platform for accelerated magnetic resonance spectroscopic cancer imaging.” Arizona State University

(2017) **Sudarshan Ragunathan, Ph.D.**, “Advancements to Magnetic Resonance Flow Imaging in the Brain.” Arizona State University

## **FIRST-AUTHOR REFEREED ARTICLES (in chronological order)**

### ***Full PubMed Search (“Hu, Houchun”)***

<https://pubmed.ncbi.nlm.nih.gov/?term=Houchun+Hu>

**Google Scholar Search (h-index in 2024: 48, i10-index in 2022: 132)**

<https://scholar.google.com/citations?user=7p7V95gAAAAJ&hl=en>

### ***Complete List of Published Work in NIH / NLM’s My Bibliography***

<http://www.ncbi.nlm.nih.gov/myncbi/houchun.hu.1/bibliography/48605638/public/?sort=date&direction=ascending>

### ***First Author Articles published based on work while at the Mayo Clinic***

1. **Hu HH**, Madhuranthakam AJ, Kruger DG, Huston J 3<sup>rd</sup>, Riederer SJ. Improved venous suppression and spatial resolution with SENSE in elliptical centric 3D contrast-enhanced MR angiography. *Magn Reson Med* 2004;52:761-765.
2. **Hu HH**, Madhuranthakam AJ, Kruger DG, Glockner JF, Riederer SJ. Variable field-of-view for spatial resolution improvement in continuously moving table magnetic resonance imaging. *Magn Reson Med* 2005;54:146-151.
3. **Hu HH**, Madhuranthakam AJ, Kruger DG, Glockner JF, Riederer SJ. Continuously moving table MRI with SENSE: application in contrast-enhanced MR angiography. *Magn Reson Med* 2005; 54:1025-1031.
4. **Hu HH**, Madhuranthakam AJ, Kruger DG, Glockner JF, Riederer SJ. The combination of 2D SENSitivity encoding and 2D partial Fourier techniques for improved acceleration in 3D contrast-enhanced MR angiography. *Magn Reson Med* 2006;55:16-22.
5. **Hu HH**, Campeau NG, Huston J 3<sup>rd</sup>, Kruger DG, Haider CR, Riederer SJ. High spatial resolution contrast-enhanced MR angiography of the intracranial venous system with four-fold accelerated 2D sensitivity encoding. *Radiology* 2007; 243:853-861. **Cover Issue June 2007.**
6. **Hu HH**, Haider CR, Campeau NG, Huston J, 3<sup>rd</sup>, Riederer SJ. Intracranial contrast-enhanced magnetic resonance venography with 6.4-fold sensitivity encoding at 1.5 and 3.0 Tesla. *J Magn Reson Imaging* 2008;27:653-658.

### ***First Author Articles published based on work while at USC***

7. **Hu HH**, Nayak KS. Quantification of absolute fat mass using an adipose tissue reference signal model. *J Magn Reson Imaging* 2008;28:1483-1491.
8. **Hu HH**, Nayak KS. Change in the proton T1 relaxation time of fat and water in mixture. *Magn Reson Med* 2010;63:494-501.
9. **Hu HH**, Kim HW, Nayak KS, Goran MI. Comparison of fat-water MRI and single-voxel MRS in the assessment of hepatic and pancreatic fat fractions in humans. *Obesity (Silver Spring)*. 2010;18:841-847. **Cover Issue January 2010.**
10. **Hu HH**, Smith DL, Nayak KS, Goran MI, Nagy TR. Identification of brown adipose tissue in mice with fat-water IDEAL-MRI. *J Magn Reson Imaging* 2010;31:1195-1202.



11. **Hu HH**, Nayak KS, Goran MI. Assessment of abdominal adipose tissue and organ fat content by magnetic resonance imaging. *Obesity Reviews* 2011;12:e504-515.
12. **Hu HH**, Nagy TR, Li Y, Goran MI, Nayak KS. Quantification of absolute fat mass by magnetic resonance imaging: a validation study against chemical assay. *International Journal of Body Composition Research* 2011;9:111-122.

***First Author Articles published based on work while at CHLA***

13. **Hu HH**, Chung SA, Jackson HA, Nayak KS, Gilsanz V. Differential CT attenuation of metabolically active and inactive adipose tissues --- preliminary findings. *J Comp Assisted Tomography* 2011;35:65-71.
14. **Hu HH**, Gilsanz V. Developments in the imaging of brown adipose tissue and its associations with muscle, puberty and health in children. *Frontiers in Cellular Endocrinology* 2011;2:33. doi: 10.3389/fendo.2011.00033.
15. **Hu HH**, Tovar J, Pavlova Z, Smith ML, Gilsanz V. Unequivocal identification of brown adipose tissue in a human infant. *J Magn Reson Imaging* 2012;35:938-942.
16. **Hu HH**, Hines CD, Smith DL, Reeder SB. Variations in T2\* and fat content of murine brown and white adipose tissue by chemical-shift MRI. *Magn Reson Imaging* 2012;30:323-329.
17. **Hu HH**, Börnert P, Hernando D, Kellman P, Ma J, Reeder S, Sirlin C. ISMRM workshop on fat-water separation: insights, applications and progress in MRI. *Magn Reson Med* 2012; 68:378-388.
18. **Hu HH**, Perkins TG, Chia JM, Gilsanz V. Characterization of human brown adipose tissue by chemical-shift water-fat MRI. *Am J Roentgenology* 2013;200:177-183.
19. **Hu HH**, Yin L, Aggabao PC, Perkins TG, Chia JM, Gilsanz V. Comparison of brown and white adipose tissues in infants and children with chemical-shift-encoded water-fat MRI. *J Magn Reson Imaging* 2013;38:885-896. **Cover Issue October 2013.**
20. **Hu HH**, Kan HE. Quantitative proton MR techniques for measuring fat. *NMR Biomed* 2013; 26:1609-1629.
21. **Hu HH**, Wu TW, Yin L, Kim MS, Chia JM, Perkins TG, Gilsanz V. MRI detection of brown adipose tissue with low fat content in newborns with hypothermia. *Magn Reson Imaging* 2014; 32:107-117.

***First Author Articles published based on work while at Phoenix Children's Hospital***

22. **Hu HH**, Hernando D. Direct water-fat imaging methods: chemical shift-selective and chemical shift-encoded MRI. *eMagRes* 2015; doi: 10.1002/9780470034590.emrstm1480. In: *Handbook of Magnetic Resonance Spectroscopy In Vivo: MRS Theory, Practice, and Applications*. Paul A. Bottomely and John R. Griffith, Eds.
23. **Hu HH**, Chen J, Shen W. Segmentation and quantification of adipose tissue by magnetic resonance imaging. *MAGMA* 2016;29:259-276.
24. **Hu HH**. Magnetic resonance of brown adipose tissue: a review of current techniques. *Crit Rev in BME* 2015;43:161-181.
25. **Hu HH**, Pokorney A, Towbin R, Miller JH. Increased signal intensities in the dentate nucleus and globus pallidus on un-enhanced T1-weighted images: evidence in children undergoing multiple gadolinium MRI exams. *Pediatric Radiology* 2016;46:1590-1598.
26. **Hu HH**, Pokorney A, Stefani N, Chia JM, Miller JH. Non-gadolinium dynamic angiography of the neurovasculature using arterial spin labeling MRI: preliminary experience in children. *MAGMA* 2017;30:107-112.
27. **Hu HH**, Li Z, Pokorney A, Stefani N, Chia JM, Miller JH, Pipe JG. Assessment of cerebral blood perfusion reserve with Acetazolamide using 3D spiral ASL MRI: preliminary experience in pediatric patients. *Magn Reson Imaging* 2016;35:132-140.

***First Author Articles published based on work while at Nationwide Children's Hospital***

28. **Hu HH**, Rusin JA, Peng R, Shao X, Smith M, Krishnamurthy R, Selvaraj B, Wang DJJ. Multi-phase 3D arterial spin labeling brain MRI in assessing cerebral blood perfusion and arterial transit times in children at 3T. *Clin Imaging* 2019;53:210-220.
29. **Hu HH**, Benkert T, Smith M, Jones JY, McAllister AS, Rusin JA, Krishnamurthy R, Block KT. Post-contrast T1-weighted spine 3T MRI in children using a golden-angle radial acquisition. *Neuroradiology* 2019;61:341-349.
30. **Hu HH**, McAllister AS, Jin N, Lubeley LJ, Selvaraj B, Smith M, Krishnamurthy R, Zhou K. Comparison of 2D BLADE turbo gradient- and spin-echo and 2D spin-echo echo-planar diffusion-weighted brain MRI at 3 Tesla: preliminary experience in children. *Acad Radiol* 2019;26:1597-1604.
31. **Hu HH**, Benkert T, Jones JY, McAllister AS, Rusin JA, Krishnamurthy R, Block KT. 3D T1-weighted contrast-enhanced brain MRI in children using a fat-suppressed golden angle radial acquisition: an alternative to Cartesian inversion-recovery imaging. *Clin Imaging* 2019; 10;55:112-118.
32. **Hu HH**, McAllister AS. The potential and promise of diffusion tensor MRI in predicting neurodevelopment in children. *Radiology* 2019;292:188-189.
33. **Hu HH**, Branca RT, Hernando D, Karampinos DC, Machann J, McKenzie CA, Wu HH, Yokoo T, Velan SS. Magnetic resonance imaging of obesity and metabolic disorders: summary from the 2019 ISMRM workshop. *Magn Reson Med* 2019;83:1565-1576.
34. **Hu HH**, Yokoo T, Bashir MR, Sirlin CB, Hernando D, Malyarenko D, Chenevert TL, Smith MA, Serai SD, Middleton MS, Henderson WC, Hamilton G, Shaffer J, Shu Y, Tkach JA, Trout AT, Obuchowski N, Brittain JH, Jackson EF, Reeder SB. Linearity and bias of proton density fat fraction as a quantitative imaging biomarker: a multicenter, multiplatform, multivendor phantom study. *Radiology* 2021;298:640-651.
35. **Hu HH**. Editorial for "Cardiac MRI left atrial strain associated with new-onset atrial fibrillation in patients with ST-segment elevation myocardial infarction." *J Magn Reson Imaging* 2023;58(1);145-146.
36. **Hu HH**. Editorial for "An MRI-based radiomics nomogram to predict recurrence in sinonasal malignant tumors." *J Magn Reason Imaging* 2023;58(2):532-533.

***Articles published based on work while at University of Colorado (2022- )***

37. **Hu HH**, Chen HS, Hernando D. Linearity and bias of proton density fat fraction across the full dynamic range of 0-100%: a multiplatform, multivendor phantom study using 1.5T and 3T MRI at two sites. *MAGMA* 2024; doi: 10.1007/s10334-024-01148-9.
38. **Hu HH**. Editorial Comment: Using appropriate training data in deep learning tissue and organ segmentations on CT. *AJR Am J Roentgenol.* 2024;223:e2431345.

**CO-AUTHOR REFEREED ARTICLES (in chronological order)*****Articles published based on work while at the Mayo Clinic (2003-2008)***

39. Carlson SK, Felmlee JP, Bender CE, Ehman RL, Classic KL, **Hu HH**, Hoskin TL. Intermittent-mode CT fluoroscopy-guided biopsy of the lung or upper abdomen with breath-hold monitoring and feedback: system development and feasibility. *Radiology* 2003;229:906-912.

40. Madhuranthakam AJ, Kruger DG, Riederer SJ, Glockner JF, and **Hu HH**. Time-resolved 3D contrast-enhanced MRA of an extended FOV using continuous table motion. *Magn Reson Med* 2004;51:568-576.
41. Kruger DG, Riederer SJ, Polzin JA, Madhuranthakam AJ, **Hu HH**. Dual-velocity continuously-moving table acquisition for contrast-enhanced peripheral MRA. *Magn Reson Med* 2005; 53:110-117.
42. Kruger DG, Riederer SJ, Rossman PJ, Mostardi PM, Madhuranthakam AJ, **Hu HH**. Recovery of phase inconsistencies in continuously moving table extended FOV MRI acquisitions. *Magn Reson Med* 2005;54:712-717.
43. Glockner JF, **Hu HH**, Stanley DW, Angelos L, King K. Parallel MR imaging: a user's guide. *Radiographics* 2005;25:1279-1297.
44. Carlson SK, Felmlee JP, Bender CE, Ehman RL, Classic KL, Hoskin TL, Harmsen WS, **Hu HH**. CT fluoroscopy-guided biopsy of the lung or upper abdomen with a breath-hold monitoring and feedback system: a prospective randomized controlled clinical trial. *Radiology* 2005; 237:701-708.
45. Madhuranthakam AJ, **Hu HH**, Barger AV, Haider CR, Kruger DG, Glockner JF, Huston J 3<sup>rd</sup>, Riederer SJ. Undersampled elliptical centric view-order for improved spatial resolution in contrast-enhanced MR angiography. *Magn Reson Med* 2006;55:50-58.
46. Madhuranthakam AJ, **Hu HH**, Kruger DG, Riederer SJ. Numerical equilibration of signal intensity and spatial resolution in time-resolved continuously moving table imaging. *Magn Reson Med* 2006;55:694-699.
47. Madhuranthakam AJ, **Hu HH**, Kruger DG, Glockner JF, Riederer SJ. MR angiography of the peripheral vasculature with a continuously moving table and modified elliptical centric acquisition. *Radiology* 2006;240:222-229.
48. Riederer SJ, **Hu HH**, Kruger DG, Haider CR, Campeau NG, Huston J 3<sup>rd</sup>. Intrinsic signal amplification in the application of 2D SENSE parallel imaging to 3D contrast-enhanced elliptical centric MRA and MRV. *Magn Reson Med* 2007;58:855-864.
49. Haider CR, **Hu HH**, Campeau NG, Huston J 3<sup>rd</sup>, Riederer SJ. 3D high temporal and spatial resolution contrast-enhanced MR angiography of the whole brain. *Magn Reson Med* 2008; 60:749-760.

***Articles published based on work while at USC (2008-2011)***

50. Shin T, **Hu HH**, Pohost GM, Nayak KS. Three dimensional first-pass myocardial perfusion imaging at 3T: feasibility study. *J Cardiovasc Magn Reson* 2008;10:57.
51. Makhijani M, **Hu HH**, Pohost GM, Nayak KS. Improved blood suppression in three-dimensional (3D) fast spin-echo (FSE) vessel wall imaging using a combination of double inversion-recovery (DIR) and diffusion sensitizing gradient (DSG) preparations. *J Magn Reson Imaging* 2010;31:398-405.
52. Sung KS, Lee HL, **Hu HH**, Nayak KS. Prediction of myocardial signal during CINE balanced SSFP imaging. *MAGMA* 2010;23:85-91.
53. Le KA, Ventura EM, Fisher JQ, Davis JN, Weigensberg MJ, Punyanitya M, **Hu HH**, Nayak KS, Goran MI. Ethnic differences in pancreatic fat accumulation and its relationship with other fat depots and inflammatory markers. *Diabetes Care* 2011;34:485-490.
54. Hamilton G, Smith DL, Bydder M, Nayak KS, **Hu HH**. Magnetic resonance properties of brown and white adipose tissues. *J Magn Reson Imaging* 2011;34:468-473.
55. Sharma SD, **Hu HH**, Nayak KS. Accelerated water-fat imaging using restricted subspace field map estimation and compressed sensing. *Magn Reson Med* 2012;67:650-659.
56. Casazza K, Hanks LJ, Hidalgo B, **Hu HH**, Affuso O. Short-term physical activity intervention decreases femoral bone marrow adipose tissue in young children: a pilot study. *Bone* 2012; 50:23-27.

**Articles published based on work while at CHLA (2011-2014)**

57. Gilsanz V, Chung SA, Jackson H, Dorey F, **Hu HH**. Functional brown adipose tissue is related to muscle volume in children and adolescents. *J Pediatr* 2011;158:722-726.
58. Gilsanz V, Smith ML, Goodarzian F, Kim M, Wren TA, **Hu HH**. Changes in brown adipose tissue in boys and girls during childhood and puberty. *J Pediatr* 2012;160:604-609.
59. Chalfant JS, Smith ML, **Hu HH**, Dorey FJ, Goodarzian F, Fu CH, Gilsanz V. Inverse association between brown adipose tissue activation and white adipose tissue accumulation in successfully treated pediatric malignancy. *Am J Clin Nutr* 2012;95:1144-1149.
60. Gilsanz V, **Hu HH**, Smith ML, Goodarzian F, Carcich SL, Warburton NM, Malogolowkin M. The depiction of brown adipose tissue is related to disease status in pediatric patients with lymphoma. *Am J Roentgenol* 2012;198:909-913.
61. Sharma SD, **Hu HH**, Nayak KS. Chemical shift encoded water-fat separation using parallel imaging and compressed sensing. *Magn Reson Med* 2013;69:456-466.
62. Ponrartana S, Aggabao PC, **Hu HH**, Aldrovandi GM, Wren TA, Gilsanz V. Brown adipose tissue and its relationship to bone structure in pediatric patients. *J Clin Endocrinol Metab* 2012;97:2693-2698.
63. Ho KY, **Hu HH**, Keyak JH, Colletti PM, Powers CM. Measuring bone mineral density with fat-water MRI: comparison with computed tomography. *J Magn Reson Imaging* 2013;37:237-242.
64. Reeder SB, **Hu HH**, Sirlin CB. Proton density fat-fraction: a standardized MR-based biomarker of tissue fat concentration. *J Magn Reson Imaging* 2012;36:1011-1014.
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***Articles published based on work while at Phoenix Children's Hospital (2014-2017)***

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***Articles published based on work while at Nationwide Children's Hospital (2017-2021)***

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#### **Articles published based on work while at Hyperfine (2021-2022)**

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#### **Articles published based on work while at University of Colorado (2022-2024 )**

123. Cohen CC, Harrall KK, **Hu HH**, Glueck DH, Perng W, Shankar K, Dabelea D. Association of infant feeding practices with abdominal and hepatic fat measures in childhood in the longitudinal Healthy Start Study. Am J Clin Nutr. 2023; doi: 10.1016/j.ajcnut.2023.11.011.
124. Tipirneni-Sajja A, Shrestha U, Esparza J, Morin CE, Kannengiesser S, Roberts NT, Peeters JM, Sharma SD, **Hu HH**. State-of-the-art quantification of liver iron with MRI-vendor implementation and available tools. J Magn Reson Imaging. 2024; doi: 10.1002/jmri.29526.

## **FIRST-AUTHOR CONFERENCE PRESENTATIONS**

(300+ co-author conference abstract proceedings)

### **07/2003, 11<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Application of variable field-of-view to continuously moving table MRI, abstract #1073.

### **05/2004, 12<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Application of SENSE to continuously moving table MRI, abstract #325.
- Improved venous suppression and spatial resolution with elliptical centric SENSE in contrast-enhanced MR angiography, abstract #1936.

### **10/2004, 2<sup>nd</sup> International Workshop on Parallel MRI**

- Peripheral CE-MRA with continuously moving table and SENSE

### **05/2005, 13<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Implementation of SENSE with gradient non-linearity correction in continuously moving table MRI, abstract #482.
- Spatial resolution improvement with variable field-of-view continuously moving table MRI, abstract #2311.
- Parallel imaging with partial Fourier acquisitions for fast 3D MRI, abstract #2407.

### **09/2005, 17<sup>th</sup> Annual International Workshop on Magnetic Resonance Angiography**



- The combination of 2D parallel SENSE and homodyne techniques for improved performance in 3D CE-MRA

**05/2006, 14<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- The combination of 2D SENSE and 2D partial Fourier homodyne reconstruction: achieving acceleration factors greater than the number of coils: abstract #4.
- Whole-brain 3D contrast-enhanced MR venography with robust 4 to 8-fold 2D-SENSE and sub-mm spatial resolution in approximately 60 Seconds: abstract #808.

**09/2006, 18<sup>th</sup> Annual International Workshop on Magnetic Resonance Angiography**

- 3D contrast-enhanced MR angiography of the intracranial venous system with six-fold 2D-SENSE: 1.5T versus 3.0T

**11/2006, 92<sup>nd</sup> Annual Meeting of the Radiological Society of North America**

- Whole-brain contrast-enhanced MR venography with 2D sensitivity encoding: abstract SSK15-05.

**05/2007, 15<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Six-fold 2D-SENSE accelerated intracranial contrast-enhanced MR venography – a comparison between 1.5T and 3T, abstract #2296.

**05/2008, 16<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Can MRI represent an accurate quantitative tool for assessing fat distribution in obesity research? Unsolved problems and unmet needs session in MRI.
- Rapid proton density weighted abdominal MRI at 3 Tesla with RF non-uniformity correction, abstract #1249.
- Absolute quantification of adipose tissue fat mass by MRI using a signal intensity based model, abstract #3794.

**07/2008, 8<sup>th</sup> International Symposium on In-Vivo Body Composition Studies**

- Absolute quantification of fat mass with magnetic resonance imaging, abstract #9.

**05/2009, 17<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Identification of brown adipose tissue in mice using IDEAL fat-water MRI, abstract #210.
- Tailored saturation pulses for abdominal imaging at 3 Tesla, abstract #2583.
- Apparent change in the T1 of lipids in mixture, abstract #4444.

**10/2009, 27<sup>th</sup> Annual Meeting of The Obesity Society**

- Identification of brown adipose tissue in mice using rapid fat-water MRI, abstract #125.
- Validation of fat fraction with three-dimensional IDEAL fat-water MRI against single-voxel proton MR spectroscopy in liver and pancreas, abstract #230.

**05/2010, 18<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Characterization of brown adipose tissue in mice using IDEAL fat-water MRI, abstract #749.

**10/2011, 29<sup>th</sup> Annual Meeting of The Obesity Society**

- Depiction of brown adipose tissue and its association with adiposity in pediatric patients, abstract #10-LB-P.

**05/2012, 20<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Chemical-shift MRI measurements of variations in murine brown adipose tissue fat content due to housing temperature, abstract #4090.
- Obesity-related variations in T2\* and fat content of murine brown and white adipose tissues by chemical-shift MRI, abstract #4099.
- Quantification of absolute fat mass: a validation study between chemical-shift MRI and chemical analysis, abstract #1266.
- Variations in T2\* as a potential indicator of human brown adipose tissue, abstract #1268.
- Identification of brown adipose tissue in a human infant, abstract #1270.

#### **11/2012, 98<sup>th</sup> Annual Meeting of the Radiological Society of North America**

- Characterization of human brown adipose tissue by chemical-shift magnetic resonance imaging: abstract #SSC15-02.

#### **04/2013, 21<sup>st</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Comparing brown adipose tissue in infant and teenagers by chemical-shift water-fat MRI: abstract #403.
- Quantification of lower extremity muscle fat infiltration in pediatric patients with spina bifida using water-fat MRI: abstract #1641.

#### **05/2014, 22<sup>nd</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Brown adipose tissue with low fat content in newborns with hypothermia: abstract #4272.

#### **04/2015, 53<sup>rd</sup> Meeting of the American Society of Neuroradiology**

- The reduction of flow artifacts in T1-weighted spiral spin-echo brain imaging: a preliminary study in children: abstract (electronic-poster) #135.

#### **11/2015, 101<sup>st</sup> Annual Meeting of the Radiological Society of North America**

- Assessment of cerebral blood flow change in children with a 3D pseudo-continuous arterial spin labeling pulse sequence using a distributed spiral-in/spiral-out trajectory: abstract PD245-SD-THA6.

#### **05/2018, Society of Pediatric Radiology**

- Free-Breathing Motion Insensitive 3D T1-Weighted Post-Contrast Spine and Abdominal MRI Using a Golden Angle Radial Acquisition: abstract (electronic-poster) #SCI-009 **John Caffey Poster Award – first place**
- Motion Insensitive 3D T1-Weighted Post-Contrast Brain MRI Using a Golden Angle Radial Acquisition: abstract #116
- Quantitative Multi-Delay Arterial Spin Labeling MRI in Neonates and Children: Preliminary Experience: abstract #117

#### **06/2018, 26<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Free-Breathing Motion Insensitive 3D T1-Weighted Spine MRI in Children Using a Radial Acquisition at 3 Tesla: abstract #2639
- Feasibility and Evaluation of Multi-Delay Quantitative 3D GRASE pCASL MRI in Children at 3 Tesla: abstract #3175

#### **05/2019, 27<sup>th</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Multi-site, multi-vendor, and multi-platform reproducibility and accuracy of quantitative proton-density fat fraction at 1.5T and 3T with a standardized spherical phantom: results from a study by the RSNA QIBA PDF Committee: abstract #1023

### **11/2019, 105<sup>th</sup> Annual Meeting of the Radiological Society of North America**

- Multi-site, multi-vendor, and multi-platform assessment of the accuracy of quantitative proton-density fat fraction (PDFF) at 1.5T and 3T with a standardized spherical phantom: abstract SSA22-03.

### **05/2024, 33<sup>rd</sup> Meeting of the International Society of Magnetic Resonance in Medicine**

- Linearity and bias of proton density fat fraction (PDFF) across the full dynamic range (0-100%): a multiplatform, multivendor phantom study at two sites: abstract #0835

## **BOOK CHAPTERS**

**Hu HH, Nayak KS, Goran MI.** Assessment of abdominal adiposity and organ fat with magnetic resonance imaging. In: Role of the Adipocyte in Development of Type 2 Diabetes, ISBN 978-953-307-598-3, edited by Colleen Croniger, Intech Open Access Publisher, October, 2011. <http://www.intechopen.com/articles/show/title/assessment-of-abdominal-adiposity-and-organ-fat-with-magnetic-resonance-imaging>

Heymsfield SB, **Hu HH**, Wang Z, Shen W, Jin Y. Measurement of total adiposity, regional fat depots, and ectopic fat. In: Handbook of Obesity, ISBN 978-148-221-067-5, edited by George A. Bray and Claude Bouchard, CRC Press, January, 2014. <http://www.crcpress.com/product/isbn/9781482210675>

Seiberlich N, Gulani V, Campbell-Washburn A, Sourbron S, Donea MI, Calamante F, **Hu HH** (editors). Quantitative Magnetic Resonance Imaging, Volume 1, 1<sup>st</sup> Edition. ISBN: 978-012-817-057-1. Elsevier, Academic Press, November 2020. <https://www.elsevier.com/books/quantitative-magnetic-resonance-imaging/seiberlich/978-0-12-817057-1>

**Hu HH, Cheng HS.** Magnetic Resonance Imaging (MR): Overview. 3rd edition Encyclopedia of the Neurological Sciences. 3E <https://doi.org/10.1016/B978-0-323-95702-1.00216-5>

**Hu HH, Cheng HS.** Magnetic Resonance Imaging (MR): A Brief Introduction. 3rd edition Encyclopedia of the Neurological Sciences, 3E. <https://doi.org/10.1016/B978-0-323-95702-1.00213-X>

## **SELECT COMPLETED GRANTS**

### **University of Colorado Department of Radiology Faculty Development Grant (1/1/2023-12/31/2023). \$10,000**

Linearity and Bias of MRI-Derived Proton Density Fat Fraction as a Quantitative Imaging Biomarker Across the Full 0-100% Range: A Two-Center Multivendor and Multiplatform Phantom Study

Role: *Principal Investigator*

### **NIH / NIDDK 1K25DK087931 (-01 to -05) – 04/2010 to 03/2014. (\$500,120 direct cost)**

Expanding the application of MRI for body fat studies in humans.

Role: *Principal Investigator*

### **NIH / NIDDK 1R21DK090778 – 09/2010 to 08/2013 (\$404,120 direct cost)**

Quantification of brown adipose tissue by MRI in children and teenagers.

Role: *Co-Principal Investigator*

### **NIH / NIDDK 1R01DK107579 – 12/2015 - 7/2022 (\$454,122 direct cost)**

Preventing Diabetes in Latino Families  
Role: *Co-Investigator*

**James. H. Zumberge Research and Innovation Fund – 07/2012 to 06/2013 (\$10,000).**

USC Office of the Provost  
MRI of Human Brown Adipose Tissue  
Role: *Principal Investigator*

**Phoenix Children’s Hospital Research Award – 03/2015 – 09/2016 (\$25,000 direct cost)**

Rapid 3D chemical shift spectroscopic MR imaging of tumor metabolites in children: a feasibility study  
Role: *Principal Investigator*

**State of Arizona New Investigator Award - 03/2017 – 02/2020 (\$75,000 direct cost)**

Assessment of liver and metabolic disease risks in overweight and obese youths by advanced ultrasound and MRI techniques.  
Role: *Co-Principal Investigator, was primary applicant but transferred grant to Smita Bailey, MD, due to my overlapping recruitment to Nationwide Children’s Hospital*

**Nationwide Children’s Hospital Cure Cystic Fibrosis in Columbus (C3) Pilot  
02/01/18-08/31/18 (\$10,000 direct cost)**

Magnetic Resonance Elastography of the Lung  
Role: *Principal Investigator*

**Nationwide Children’s Hospital Technology Development Fund  
01/01/18-12/31/18 (\$25,000 direct cost).**

Transforming Pediatric MRI Experience with Virtual Reality  
Role: *Co-Principal Investigator*

**AWARDS, HONORS, & OTHER ACTIVITIES**

**Elected to ISMRM Senior Fellow, 2024**

**2022 Best Faculty Presentation**, Radiology Research Symposium, CU Anschutz

**Caffey Poster Award**, 2018 Society for Pediatric Radiology

**United States Patent (7,346,383, issued March 18, 2008)** – Riederer SJ, Hu HH, Kruger DG.

Method for acquiring MRI data from variable fields of view during continuous table motion

**United States Patent (8,320,646, issued November 27, 2012)** – Hu HH, Madhuranthakam AJ,

Riederer SJ. MRI acquisition using 2D SENSE and partial Fourier space sampling

**Travel Awards**, (2004-2006) International Society of Magnetic Resonance in Medicine

**Travel Award**, (10/2004) 2<sup>nd</sup> International Workshop on Parallel MRI, Zurich, Switzerland

**Fred S. Grodin Award for Academic Excellence in Biomedical Engineering**, (05/2001)

University of Southern California

**Tau Beta Pi** and **Phi Beta Kappa** honor societies – *member*

**Eagle Scout**, (1997) Boy Scouts of America

**PROFESSIONAL REFERENCES** (available upon request)