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HIGHLIGHTS

Grant Support / Team Science

- **2 Active R01s (2019, 2022), 1 UK grant (2022)**, ~\$ 7.8 million total budget as a Principal Investigator, ~\$2.3 million indirect
- **2 Pending R01s (2023, 2% and 14%)**, ~\$ 6 million total budget as a Principal Investigator
- **Multiple MPI funding with international collaborations:** University Hospitals, Siemens Healthineers, Microsoft Quantum Team, University of Pennsylvania, Cleveland Clinic, Cardiff University (UK), University College London (UK)

Technical Translation

- 25 US patents, 2 International patents at CWRU. All patents have been licensed by Siemens
- Invention MR Fingerprinting received **FDA clearance** to become a clinical MRI scan
- Senior Member of **National Academic Inventors**
- **R01 Academic Industry Partnership** grant with Siemens supported by NIH NCI

Publication

- **57 Peer-reviewed papers, Total Citation: 6176, H-index: 37, i10-index: 65**
- **Publications in *Nature, PNAS, Radiology***
- **Book chief editor:** MR Fingerprinting for Quantitative MRI, Elsevier Inc.

University Service

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|----------------|---|----------------|
| • CWRU: | Innovation week, Inventor Panelist | 2022 |
| • SOM: | Faculty Council, BME Representative | 2022 - 2025 |
| • SOM: | Radiology, BME Faculty Search Committee | 2022, 2023 |
| • SOM: | Radiology Clinical Research Council | 2023 – present |
| • BME: | Chair, PhD Qualifying Exam | 2022 – present |
| • BME: | Graduate Education Committee | 2022 – present |

National and International Services

- NIH Emerging Imaging Technologies and Applications (**EITA**) **standing member**
- International Society of Magnetic Resonance in Medicine (**ISMRM**), ~6,000 attendees/year
 1. **AMPC committee**, Chair of the Acquisition and Reconstruction Section
 2. **Chair of Quantitative MR Study Group**, ~1,300 members
 3. **Education Committee**, establish online education program MR Academy
 4. **Junior Fellow**
- **17 invited talks in international conferences (4 keynote talks), 11 seminars, 4 grand grounds**

Mentoring

- **Mentor in three T32 training programs**
 1. **BME:** Interdisciplinary Biomedical Imaging Training Program 2 grad students
 2. **SOM:** Medical Scientist Training Program (MSTP) 1 MD/PhD
 3. **SOM:** Neonatology Training Program, Pediatrics, University Hospitals

EDUCATION

Education

B.S	Zhejiang University, Hangzhou, Zhejiang, China	08/2002-05/2007
M.S.	Marquette University, Milwaukee, Wisconsin	08/2007-05/2009
Ph.D.	Case Western Reserve University, Cleveland, Ohio	08/2009-05/2015

PhD Thesis

Title	Magnetic Resonance Fingerprinting
Thesis Advisor	Mark A. Griswold

Post-Graduate Training

Research Associate	Radiology, Case Western Reserve University, Cleveland	05/2015-03/2017
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APPOINTMENTS

Primary Appointment

Assistant Professor	Biomedical Engineering, Case Western Reserve University	09/2019-present
Research Scientist	Radiology, University Hospitals	03/2017-08/2019

Secondary Appointment

Adjunct Staff	Cleveland Clinic, Department of Imaging	03/2022-present
Assistant Professor	Cleveland Clinic Lerner College of Medicine	09/2019-present

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Junior Fellow	International Society of Magnetic Resonance in Medicine (ISMRM)	2010–present
Member	Radiological Society of North America (RSNA)	2009-present
Member	Case Comprehensive Cancer Center Case Western Reserve University	2019–present

HONORS & AWARDS (including the trainees)

Awards

Outstanding Student Scholarship	Zhejiang University	2003-2007
The Hiroyuki Fujita PhD Award	CWRU	2012
Summa Cum Laude Merit Award (top 5% abstracts)	ISMIRM	2012
Summa Cum Laude Merit Award (top 5% abstracts)	ISMIRM	2013
Best Student Oral Presentation Award	ISMIRM	2013
Summa Cum Laude Merit Award (top 5% abstracts)	ISMIRM	2014
Magna Cum Laude Merit Award (top 15% abstracts)	ISMIRM	2015
Magna Cum Laude Merit Award (top 15% abstracts)	ISMIRM	2016
I.I. Rabi Young Investigator Award (1 per year)	ISMIRM	2016
Magna Cum Laude Merit Award (top 15% abstracts)	ISMIRM	2017
Junior Fellow (15 members per year)	ISMIRM	2017
Summa Cum Laude Merit Award (top 5% abstracts)	ISMIRM	2018
Outstanding Teacher Award	ISMIRM	2018
Distinguished Reviewer	Magnetic Resonance in Medicine (MRM)	2017,2018 2019,2020

Student Awards

Summa Cum Laude Merit Award (Trainee, Siyuan Hu)	ISMIRM	2020
T32 imaging program fellowship (Trainee, James Adams)	NIH	2021
The Dean's Research Fellowship (Trainee, Walter Zhao)	CWRU, SOM	2021
Brian Werbel Memorial Fund Summer Medical Training Fellowship (Trainee, Water Zhao)	CWRU, SOM	2021
RSNA Medical Student Research Grant (Trainee, Water Zhao)	RSNA	2022
The Hiroyuki Fujita PhD Award (Trainee, Siyuan Hu)	CWRU	2022

Press Releases / News Articles / Media Appearances**Publication: News about the MR Fingerprinting paper published in *Nature***

<i>80 News stories, 33 tweeters, 6 blogs, 1 wiki page, 1 research highlight platform Worldwide</i> (including NBC, EurekAlter by AAAS, Yahoo! News, ABC, Fox 8, CBS, Cleveland News, Medical Press, Science Daily, Phys.Org) reported the MR Fingerprinting article Nature Editorial Summary "Raising the profile of NMR"		2013-2019
Nature News & Review "Sleuthing tissue fingerprinting"		2013
		2013

New Research Partnership

Nature Portfolio "Diagnostic Detectives: Magnetic Resonance Fingerprinting to Help Radiologists Solve Disease Mysteries"		2019
Magnetom World, Siemens Healthineers "MR Fingerprinting: A New Path for Clinical Quantitative MRI"		2019
Microsoft Ignite Interview, Youtube Azure Quantum – Case Western Reserve University Microsoft Ignite		2019

[University Hospitals News](#) 2021
 “First in the Country Magnetic Resonance Fingerprinting for Opioid Exposed Infants at UH Rainbow”

[University Hospitals News](#) 2022
 “Imaging Partnerships Inside and Out”

Educational/Seminar Talks

[Youtube](#) ISMRM MR Academy, Features Educational Course, 1 of 4 Physics & Engineering Courses for MRI. 2017

“Magnetic Resonance Fingerprinting”

[Youtube](#) MGH Brain Map, 2021

“MR Fingerprinting: A New Path for Clinical MR”

[Youtube](#) MRI Together: Global Workshop on Open, Reproducible, and Inclusive MR Research. “MR Fingerprinting: Challenges and Opportunities” 2021

Interviews

[European Society for Magnetic Resonance in Medicine and Biology Podcast, Spotify](#) 2022
 “MR Fingerprinting: the Path to Clinical Adoption”

[SPIE Medical Imaging Keynote Speaker Interview](#) 2023
 “Clinical Applications of Fast and Quantitative MR Fingerprinting”

Award and Funding

[Case Daily:](#) 2023
 National Academy of Inventors names eight Case Western Reserve University researchers to 2023 class of senior members

[Case Daily, Cleveland.com, Crain’s Cleveland Business, wkyc.com](#) 2023
 Case Western Reserve University awarded \$3M grant to advance MRI scan and software to analyze aggressive brain tumors more efficiently.

GRANT SUPPORT

Grant Highlights:

Current Grants Total: ~\$7.9 million total budget as Principal Investigator, ~\$2.3 million indirect

Multiple MPI grants:

- **Contact PI** on two R01, collaborating with University Hospitals, Siemens Healthineers, University of Pennsylvania, Cleveland Clinic
- **CoPI** on an UK grant collaborating with Cardiff University, University College London, University of Leeds

Multi-site collaboration:

- **Multi-site epilepsy study:** Cleveland Clinic Epilepsy Center, Thomas Jefferson University, Australia Epilepsy Project (scanning ~4,000 epilepsy patients across the nation)

Grant list

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|--|-------------------|---------------|
| 1. R01 CA269604 | 01/2023 – 01/2028 | 3.6 Calendar |
| Sponsor: National Institutes of Health / National Cancer Institute, <i>2 percentile</i> | | |
| Title: MR Fingerprinting based Quantitative Imaging and Analysis Platform (MRF-QIA) for brain tumors | | |
| Role: PI (contact) , MPI: Chaitra Badve (University Hospitals), Christos Davatzikos (U Penn) | | |
| Award Total: \$3,034,497 | | |
| Indirect Total: \$936,642 | | |
| 2. MRC W031556 | 01/2023 – 01/2025 | 0.6 Calendar |
| Sponsor: UK Research and Innovation: Medical Research Council | | |
| Title: Making the Invisible Visible: A Multi-scale Imaging Approach to Detect and Characterize Cortical Pathology | | |
| Role: MPI , Contact PI: Derek Jones (Cardiff University) | | |
| Award Total: \$1,288,714 | | |
| 3. R01 NS109439 | 01/2019 – 12/2023 | 3.1 Calendar |
| Sponsor: National Institutes of Health / National Institute of Neurological Disorders and Stroke | | |
| Title: MR Fingerprinting for Epilepsy | | |
| Role: PI (contact) , MPI: Irene Wang (Cleveland Clinic) | | |
| Award Total: \$2,937,359 | | |
| Indirect Total: \$1,108,315 | | |
| 4. Siemens Master Research Collaboration | 12/2005 - Present | 0.6 Calendar |
| Sponsor: Siemens Medical Solution, Inc. | | |
| Role: Co-Investigator | | |
| 5. R01 EB032709, (PI: Griswold MA/Grissom W) | 07/2022 – 06/2026 | 2.4 Calendar |
| Sponsor: National Institutes of Health / National Institute of Biomedical Engineering and Bioengineering | | |
| Role: Co-Investigator | | |
| 6. R21 EB029658, (PI: McGivney D) | 06/2021-03/2024 | 0.6 Calendar |
| Sponsor: National Institutes of Health / National Institute of Biomedical Engineering and Bioengineering | | |
| Title: Optimization of Magnetic Resonance Fingerprinting using Quantum Inspired Algorithm. | | |
| Role: Co-Investigator | | |
| 7. P30 AG072959, (PI: Leverenz, J.B) | 09/2021-06/2026 | 0.84 Calendar |
| Sponsor: National Institutes of Health / National Institute of Aging | | |
| Role: Co-Investigator | | |

Past Grants

- 1. R21 EB025764** 09/2018 – 12/2022 4.8 Calendar
 Sponsor: National Institutes of Health / National Institute of Biomedical Engineering and Bioengineering.
Trailblazer Award
 Title: **A Framework to Design 3D Quantitative Magnetic Resonance Fingerprinting (MRF) Scans and Reduced Patient Anxiety**
 Role: **PI**
 Award Total: \$641,146
 Indirect Total: \$241,146
- 2. R01 DK114425 (PI: Dell KM/Flask CA)** 07/2019-06/2022 0.6 Calendar
 Sponsor: National Institutes of Health / National Institute of Diabetes and Digestive and Kidney Disease
 Title: Imaging Assessments of ARPKD Kidney Disease Progression
 Role: **Co-Investigator**

Pending Grants

- 1. R01** 7/2023-7/2028 3.6 Calendar
 Sponsor: National Institutes of Health / Eunice Kennedy Shriver National Institute of Child Health and Human Development (*14 percentile*)
 Title: **Comprehensive MR Fingerprinting for Infants and Young Children at Risk of Developmental Delays**
 Role: **PI (contact)**, MPI: Pew-Thian Yap (UNC), Deanne Wilson-Costello (UH Rainbow Babies)
 Budget: \$3,403,265
- 2. R01** 7/2023-7/2028 2.4 Calendar
 Sponsor: National Institutes of Health / National Cancer Institute
 Title: **Development of Magnetic Resonance Fingerprinting (MRF) to Assess Response to Neoadjuvant Chemotherapy in Breast Cancer (*2 percentile*)**
 Role: **MPI**, contact PI: Yong Chen (University Hospitals)
 Budget: \$3,675,313
- 3. The State of Ohio Coronavirus State and Local Fiscal Recovery Fund** 12/2024-12/2026 1.2 Calendar
 Sponsor: State of Ohio
 Title: Cost-effective Novel MR Imaging Solution for Screening Vulnerable Populations Impacted by the Sequelae of COVID-19
 Role: **Principal Investigator**
 Budget: \$1,000,000

PATENTS**Invention Highlights:**

- **23 US patents, 2 Korean patents. All 25 Patents are licensed by Siemens Healthineers**
- Ten years of weekly meeting with Siemens Healthineers R&D team to translate the MR Fingerprinting to a clinical product.
- MR Fingerprinting scan received **FDA clearance** on Feb 24 2023
- MR Fingerprinting scan has become a **Siemens product scan** in many countries
- **Academic Industry Partnership grant** from NIH to accelerate the commercialization and clinical validation
- Named as a **Senior Member of National Academic Inventors** in 2023

	Patent ID	Title
1.	US 8723518 B2	Nuclear magnetic resonance (NMR) fingerprinting
2.	US 8558546 B2	Relaxometry
3.	US 8717023 B2	Relaxometry quantification self-justification fitting
4.	US 10627468 B2	Nuclear magnetic resonance (NMR) fingerprinting
5.	US 9625540 B2	Magnetic resonance fingerprinting exams with optimized sound
6.	US 9568579 B2	Magnetic resonance fingerprinting (MRF) with echo splitting
7.	US 10241174 B2	Nuclear magnetic resonance (NMR) fingerprinting
8.	US 10261154 B2	Nuclear magnetic resonance (NMR) fingerprinting tissue classification and image segmentation
9.	US 9971009 B2	Magnetic resonance imaging (MRI) with auto-detection and adaptive encodings for offset frequency scanning
10.	US 10281547 B2	Diffusion-weighted double-echo magnetic resonance fingerprinting (MRF)
11.	US 10209335 B2	Nuclear magnetic resonance (NMR) fingerprinting with singular value decomposition (SVD) compression
12.	US 9916823 B2	Gradient waveforms derived from music
13.	US 10416259 B2	Nuclear magnetic resonance (NMR) fingerprinting
14.	US 10379189 B2	Simultaneous magnetic resonance angiography and perfusion with nuclear magnetic resonance fingerprinting
15.	US 10335049 B2	Magnetic resonance fingerprinting with steady state precession (MRF-FISP)
16.	US 10614359 B2	Magnetic resonance fingerprinting (MRF) serial artificial neural network (ANN) sequence design
17.	US 10898089 B2	Magnetic resonance fingerprinting (MRF) with efficient acquisition schemes
18.	US 10136824 B2	Arterial spin labeling (ASL) with magnetic resonance fingerprinting (MRF)
19.	US 10126402 B2	Magnetic resonance imaging (MRI) with artifact-free T2 mapping
20.	US 10527698 B2	Nuclear magnetic resonance (NMR) fingerprinting tissue classification and image segmentation
21.	US 10877121 B2	System and method for magnetic resonance fingerprinting with reduced acoustic noise
22.	US 20210312626A1	System and method for determining undersampling errors for a magnetic resonance fingerprinting pulse sequence
23.	US 20150346300A1	Magnetic Resonance Fingerprinting (MRF) With Simultaneous Multivolume Acquisition

Foreign Patents

24.	KR 10-1700550	Magnetic resonance fingerprinting (mrf) using echo splitting
25.	KR 101674848 B1	Nuclear magnetic resonance (nmr) fingerprinting

BIBLIOGRAPHY

Peer Reviewed Articles

Google Scholar: <https://scholar.google.com/citations?user=bXBR25UAAAAJ&hl=en>

Total Publication:

Total Citation: **6176**, as of March, 2023

H-index: **37**

i10-index: **65**

Paper Highlights:

Nature: **Ma, D.**, Gulani, V., Seiberlich, N., Liu, K., Sunshine, J. L., Duerk, J. L., & Griswold, M. A. (2013). Magnetic Resonance Fingerprinting. *Nature*, 495(7440), 187–192.

PNAS (Proceedings of the National Academy of Sciences): Jordan, S. P., Hu, S., Rozada, I., McGivney, D. F., Boyacıoğlu, R., Jacob, D. C., Huang, S., Beverland, M., Katzgraber, H. G., Troyer, M., Griswold, M. A., & **Ma, D.***. (2021). Automated design of pulse sequences for magnetic resonance fingerprinting using physics-inspired optimization. *Proceedings of the National Academy of Sciences*, 118(40)

Young Investigator Award (I.I.Rabi YIA award in ISMRM, 1 per year): **Ma, D.**, Pierre, E. Y., Jiang, Y., Schluchter, M. D., Setsompop, K., Gulani, V., & Griswold, M. A. (2016). Music-Based Magnetic Resonance Fingerprinting to Improve Patient Comfort During MRI Exams. *Magnetic Resonance in Medicine*, 75(6), 2303–2314.

Top 10% most downloaded papers in JMRI and MRM in 2018-2019 :

- **Ma, D.**, Jones, S.E., Deshmene, A., Sakaie, K., Pierre, E., Larvie, M., McGivney D., Blumcke, I., Krishnan, B., Lowe, M., Gulani, V., Najm, I., Griswold, M.A., Wang, Z.I. Development of High-resolution 3D MR Fingerprinting for Detection and Characterization of Epileptic Lesions. *Journal of Magnetic Resonance Imaging*, 2019;49:1333-1346.
- Poorman M.E., Martin M.N., **Ma D.**, McGivney D.F., Gulani V., Griswold M., Keenan K.E., Magnetic Resonance Fingerprinting review part 1: Potential uses, current challenges and recommendations. *JMRI*. 2020; 51:675-692.
- McGivney D.F., Boyacıoğlu R., Jiang Y., Poorman M.E., Seiberlich N., Gulani V., Keenan K., Griswold M., **Ma D.***. Magnetic Resonance Fingerprinting review part 2: Technique and directions. *JMRI*. 2020; 51:993-1007.
- Mehta, B.B., Coppo, S., McGivney, D.F., Hamilton, J.I., Chen, Y., Jiang, Y., **Ma, D.**, Seiberlich, N., Gulani, V., Griswold, M.A., (2018) Magnetic Resonance Fingerprinting: A Technical Review. *Magnetic Resonance in Medicine*, Early view

Cover Image in JMRI: Ma, D., Jones, S.E., Deshmene, A., Sakaie, K., Pierre, E., Larvie, M., McGivney D., Blumcke, I., Krishnan, B., Lowe, M., Gulani, V., Najm, I., Griswold, M.A., Wang, Z.I. Development of High-resolution 3D MR Fingerprinting for Detection and Characterization of Epileptic Lesions. *Journal of Magnetic Resonance Imaging*, 2019;49:1333-1346.

Book Chief Editor, (2023) Dan Ma, Mark Griswold, Claudia Prieto. *Magnetic Resonance Fingerprinting for Quantitative MRI*. Elsevier Inc.

Papers published after 2019 (*denotes corresponding author)**-----
Manuscripts under review or under revision as of 01/2023**

1. **Ma D.***, Badve C., Sun J., Chen Y., Nayate A., Wien M., Martin D., Singer L., Durieux J., Flask C., Costello D.. Motion Robust MR Fingerprinting Scan to Image Neonates with Prenatal Opioid Exposure. (2023) *Under review at Pediatric Reserach.*
2. Hu S.Y., Chen Y, Zong X.P., Lin W.L., Griswold M.A., **Ma D.***. Improving Motion Robustness of 3D MR Fingerprinting with Fat Navigator. (2023) *Under review at Magnetic Resonance in Medicine.*
3. Qiu Z.L., Hu S.Y., Zhao W., Sakaie K., Griswold M.A., Jones D.K., **Ma D.***. Time Resolved Imaging Reconstruction Using Joint Temporally Local and Global Subspace Modeling for Diffusion MRI. (2023). *Under review at IEEE Transactions on Medical Imaging.*
4. Hu S.Y., Jordan S., Boyacioglu R., Rozada I., Troyer M., Griswold M.A., McGivney D., **Ma D.***. A Fast MR Fingerprinting Simulator for Direct Error Estimation and Sequence Optimization. (2023). *Under review at Magnetic Resonance Imaging.*
5. Zhao W., Hu Z.Y, Kazerooni A.F., Korzdorfer G., Nittka M., Davatzikos C., Viswanath S.E., Wang X.F., Badve C., **Ma D.***. Robust and Reproducible MR Radiomics using Magnetic Resonance Fingerprinting and Physics-informed Quantization. (2023). *Under review at Investigative Radiology*

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1. Su T.Y., Tang Y.Y., Choi J.Y., Hu S.Y., Sakaie K., Murakami H., Jones S., Blumcke I., Najm I., **Ma D.***, Wang I.Z. Evaluating whole brain tissue property changes in MRI negative pharmacoresistant focal epilepsies using MR Fingerprinting. *Epilepsia* (2022).
2. Afzali M., Mueller L., Sakaie K., Hu S.Y., Chen Y., Szczepankiewicz F., Griswold M.A., Jones D.K., **Ma D.***. MR Fingerprinting with b-Tensor Encoding for Simultaneous Quantification of Relaxation and Diffusion in a Single Scan. *Magnetic Resonance in Medicine.* 2022. 88(5), 2043-2057.
3. Tippareddy C., Onyewadume L., Sloan A.E., Wang G.M., Patil N.T., Hu S.Y., Sloan J.S., Boyacioglu R., Gulani V., Sunshine J., Griswold M.A., **Ma D.**, Badve C. Novel 3D magnetic resonance fingerprinting radiomics in adult brain tumors: a feasibility study. *European Radiology.* 2022.
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7. Chen, Y., Lu, L., Zhu, T., & **Ma, D.*** Technical overview of magnetic resonance fingerprinting and its applications in radiation therapy. *Medical Physics,* 2022, 49(4). 2846-2860.
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44. Hamilton, J.I., Jiang, Y., Chen, Y., **Ma, D.**, Lo, W.C., Griswold, M.A., Seiberlich, N. (2017) MR Fingerprinting for Rapid Quantification of Myocardial T1, T2, and Proton Spin Density, *Magn. Reson. Med, 77(4):1446-1458*.
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53. Barkauskas, K. J., Rajiah, P., Ashwath, R., Hamilton, J. I., Chen, Y., **Ma, D.**, ... Seiberlich, N. (2014). Quantification of left ventricular functional parameter values using 3D spiral bSSFP and through-time Non-Cartesian GRAPPA. *Journal of Cardiovascular Magnetic Resonance*, 16(1), 65.
54. McGivney, D. F., Pierre, E., **Ma, D.**, Jiang, Y., Saybasili, H., Gulani, V., & Griswold, M. A. (2014). SVD Compression for Magnetic Resonance Fingerprinting in the Time Domain. *IEEE Transactions on Medical Imaging*, 33(12), 2311–2322.
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56. Ehse, P., Seiberlich, N., **Ma, D.**, Breuer F.A., Jakob P.M., Griswold, M.A., Gulani, V. (2013) IR TrueFISP with a Golden-Ratio-Based Radial Readout: Fast Quantification of T1, T2, and Proton Density. *Magn. Reson. Med.*, 69(1):71-81.
57. **Ma, D.**, Wolf, P., Clough, A. V., & Schmidt, T. G. (2013). The performance of MLEM for dynamic imaging from simulated few-view, multi-pinhole SPECT. *IEEE Transactions on Nuclear Science*, 60(1).

Invited, Non-Peer Reviewed

1. Hu, S., Choi, J. Y., McGivney, D., Jones, S., Najm, I., Griswold, M., Wang, I., & Ma, D. (2019). Application of Magnetic Resonance Fingerprinting in Epilepsy. *Magnetom Flash*, 75, 6.
2. Ma, D., Deshmane, A., McGivney, D., Wang, I., Badve, C., Gulani, V., & Griswold, M. (2019). Tissue Segmentation and Partial Volume Estimation with Magnetic Resonance Fingerprinting. *Magnetom Flash*, 74, 10.

Book & Book Chapters

1. Ma, D. (2021). Chapter 28 - MR fingerprinting: Concepts, implementation and applications. In I.-Y. Choi & P. Jezzard (Eds.), *Advances in Magnetic Resonance Technology and Applications* (Vol. 4, pp. 435–449). *Academic Press*.
2. Ma, D. (**Chief Editor**), (2023) *Magnetic Resonance Fingerprinting for Quantitative MRI*. *Elsevier Inc.*

UNIVERSITY SERVICES**Highlights: CWRU / School of Medicine / BME Department Service**

- **BME: Chair of the PhD Qualifying Exam Committee Since 2022**
 - Organizing examiners, exam schedule, preparation sessions for students (~40 students per year)
 - Collecting feedback and discussing each student's result with examiners and the department
- **BME: Organizing Chair of the BME Adamczyk Lecture and Symposium 2023**
 - Schedule itinerary, one-on-one meetings, lecture and dinner schedules
 - Invite speakers for the half-day symposium
 - Publicize the event in social media and Case newsletters
- **SOM: Radiology Clinical Research Council, 2022-2023, Radiology**
 - Strategic Research Vision/Planning Committee Member
 - Research Education / Training Committee Member
 - MD Faculty Research Integration Committee Member
- **SOM: Faculty Council, BME Representative, 2022-2025**
- **CWRU: Inventor Panelist in the Innovation Week, 2022**

Full List:

BME	Graduate Education Committee	2019-present
BME	PhD Qualifier Planning Committee, Chair	2022-present
BME	Adamczyk Lecture and Symposium, Organizing Chair	2023
SOM	Radiology Faculty Search Committee	2022
SOM	Faculty Council, BME Representative	2022-2025
SOM	Radiology Research Council, Radiology	2022-present
SOM	Faulty Search Committee Tenure track	2023
SOM	MRF Internal Advisory Board	2021-present
CWRU	Inventor panelist in the Innovation Week	2022

PROFESSIONAL SERVICES

Service Highlights:

- **Standing member of EITA for a 4-year term** (review National Institute of Health proposal in the Emerging Imaging Technologies and Applications study section three times per year) 2023

Editorial Board Membership

Magnetic Resonance in Medicine 2021–2024

Associate Editor

Annals of Biomedical Engineering 2022–present

Manuscript Reviewer

Magnetic Resonance in Medicine (Distinguished Reviewer)
 Journal of Magnetic Resonance Imaging (Distinguished Reviewer)
 Journal of Magnetic Resonance
 Magnetic Resonance Imaging
 IEEE Transactions on Medical Imaging
 Neuroimage
 NMR in Biomedicine
 Scientific Report

NIH Study Sections/ Grant Review Committees

NIH, ZRG1 SBIB-H (31), High-end Instrumentation Grant Program 11/2019
 NIH, EITA, Emerging Imaging Technologies, and Applications 02/2020
 NIH, EITA, Emerging Imaging Technologies, and Applications 02/2021
 NIH, ITD, Imaging Technology Development 02/2023
 University of Rochester Del Monte Institute for Neuroscience Pilot Grant Program 06/2021
 The Dutch Research Council (NOW), Applied and Engineering Science (AES) grant application 12/2021

NATIONAL AND INTERNATIONAL SERVICE

Highlights: International Conference Service

- International Society of Magnetic Resonance in Medicine (ISMRM) over 6,000 attendees annually
- **ISMRM Annual Meeting Programming Committee:**
Chair of the Acquisition and Reconstruction Table (The largest table with 1/3 of the total abstracts of the year) 01/2023
 - led 16 committee members to assign ~1,700 abstracts into 15 oral sessions and 36 poster sessions.
 - **Chair of the Quantitative MR study group:** ~1,300 study group members internationally
Organizing chair of the 2023 quantitative MR study group annual meeting in 03/2023
 - 2-hour virtual meeting, including three talks and a panel discussion with five panelists.
 - Successfully invited researchers, clinicians, national biomarker standardization committee (QIBA and NPL), and representatives from three major healthcare industries (Siemens Healthineers, GE, Philips)
 - 200 attendees**Organizing chair of the 2023 quantitative MR study group business meeting in 06/2023**

Full List:

Committee Member	ISMRM Strategic Planning Committee	2017
Cutting Edge Technology	ISMRM Education Committee	2018-2021
Table Chair		
Organizing Committee	ISMRM Junior Fellow Symposium	2018
Committee Member	ISMRM Workshop On Data Sampling and Image Reconstruction Organizing Committee	2018-2020
Secretary	ISMRM Quantitative Imaging Study Group	2020
Vice Chair	(1,320 members internationally)	2021
Chair		2022
Organizing Committee	ISMRM Quantitative Imaging Study Group Meetings	2020-2023
MR Acquisition and Analysis	ISMRM Annual Meeting Program Committee (AMPC)	
Table Chair		2021-2024
(planning ~6000 abstracts /year)		
Committee Member	ISMRM Workshop & Study Group Review Committee	2022-2023
	Overseas Chinese Society for Magnetic Resonance in	2022
Committee Member	Medicine (OCSMRM)	
	OCSMRM Young Investigator Awards Selection Committee	

INTERNATIONAL AND NATIONAL INVITED TALKS

Highlights:

- 17 invited talks in international conferences, **4 keynote talks**
- 4 invited talks in national conferences and 7 imaging seminar talks
- 3 grand rounds for clinicians
- 12 scientific talks in international conferences, 4 won *Summa Cum Laude Awards*, 2 won *Magna Cum Laude Awards*, 1 won *Young Investigator Award*, and 1 won the *Best Oral Presentation award*

International

1. “Clinical Applications of Fast and Quantitative MR Fingerprinting” 02/2023
Keynote Presentation
The International Society for Optics and Photonics (SPIE Medical Imaging)
2. “AI for MR Fingerprinting” 08/2022
Overseas Chinese Society for Magnetic Resonance in Medicine Seminar
3. “MR Fingerprinting and Optimization” 04/2022
Experimental Nuclear Magnetic Resonance Conference (ENC), Florida
4. “MR Fingerprinting: Challenges and Opportunities” 10/2021
MRI Together: A Global Workshop on Open Science and Reproducibility
The European Society for Magnetic Resonance in Medicine and Biology
5. “Magnetic Resonance Fingerprinting” 08/2021
International Society of Magnetic Resonance Asia-Pacific NMR Symposium
6. “Magnetic Resonance Fingerprinting” 03/2021
Medical Physics Seminar
Hong Kong Polytechnic University (PolyU), China
7. “MR Fingerprinting: A New Path for Clinical Quantitative MR” 05/2019
Siemens Lunch Symposium
Keynote Presentation
International Society for Magnetic Resonance in Medicine, Montreal, Canada
8. “Imaging Without Gadolinium: Synthetic MRI” 05/2019
Educational Course
International Society for Magnetic Resonance in Medicine, Montreal, Canada
9. “Magnetic Resonance Fingerprinting” 09/2018
Spotlight Session, **Keynote Presentation**
World Molecular Imaging Congress (WMIC), Seattle.
10. “MR Fingerprinting: Past, Present and Future” 08/2018
Keynote Presentation
Siemens User Group Meeting, Brisbane, Australia
11. “Go Faster in Clinical Imaging: Fingerprinting” 06/2018
Educational Course
International Society for Magnetic Resonance in Medicine, Paris, France
12. “Magnetic Resonance Fingerprinting: Concept and Implementation” 03/2018
Workshop on Advanced Neuro MR: Best Practice for Technical Implementation.
International Society for Magnetic Resonance in Medicine, Seoul, South Korea
13. “The Concept of Magnetic Resonance Fingerprinting” 10/2017
Workshop on Magnetic Resonance Fingerprinting
International Society for Magnetic Resonance in Medicine, Cleveland
14. “Magnetic Resonance Fingerprinting” 04/2017
Educational Course
International Society for Magnetic Resonance in Medicine, Honolulu, HI
15. “Magnetic Resonance Fingerprinting” 10/2015
Workshop on High and Ultra-High Field Imaging
International Society for Magnetic Resonance in Medicine, Minnesota, HI
16. “Magnetic Resonance Fingerprinting” 06/2013

CSMRM-OCSMRM Joint Meeting and ISMRM Global Outreach Workshop, Hangzhou, China

17. “MR Fingerprinting: A Rapid Quantitative Approach to MRI” 04/2013
Experimental Nuclear Magnetic Resonance Conference (ENC), CA

National

1. “MR Fingerprinting for Efficient and Reproducible Quantitative Imaging” 09/2021
Medical Physics Seminar
Department of Radiation Oncology, Stanford
2. “Magnetic Resonance Fingerprinting” 07/2021
State of the art in MRI-guided Radiotherapy
American Association of Physicists in Medicine (AAPM)
3. “MR Fingerprinting” 03/2021
BrainMap Seminar at Martinos Center for Biomedical Imaging
Massachusetts General Hospital
4. “MR Fingerprinting” 07/2018
NIDDK Renal Imaging Workshop, Bethesda

Local

1. “Quantitative MR Fingerprinting for Clinical Applications” 12/2022
Cleveland Clinic Imaging Sciences Seminar
2. “MR Fingerprinting based Quantitative Imaging and Analysis for Brain Tumors” 07/2021
Cancer Imaging Working Groups Seminar
Case Comprehensive Cancer Center
3. “MR Fingerprinting: A New Path for Clinical Quantitative MR” 11/2020
BME-Radiology Seminar
Icahn School of Medicine at Mount Sinai, New York
4. “Magnetic Resonance Fingerprinting: A Flexible Framework for Quantitative MR Imaging” 04/2019
Bioengineering Seminar Series at Illinois
University of Illinois Urbana-Champaign, Champaign, IL
5. “Magnetic Resonance Fingerprinting: A Flexible Framework for Quantitative MR Imaging” 02/2019
Biomedical Engineering Seminar
Johns Hopkins University, Baltimore, MD
6. “MR Fingerprinting: A New Approach for Quantitative MR” 02/2018
Cleveland Clinic Imaging Institute Seminar
Cleveland Clinic, Cleveland, OH
7. “Magnetic Resonance Fingerprinting” 07/2015
Cedars-Sinai Medical Imaging Seminar
Cedars-Sinai Medical Center, Los Angeles, CA

Grand Rounds

1. “MR Fingerprinting for Quantitative Neuroimaging” 02/2023
Thomas Jefferson Hospital Radiology Grand Round, Philadelphia
2. “MR Fingerprinting for Fast and Quantitative Neuroimaging” 04/2022
Cleveland Clinic Epilepsy Grand Round, Cleveland
3. “MR Fingerprinting: Basics and Clinical Applications” 10/2018
Epilepsy Center Grand Rounds
University Hospitals Cleveland Medical Center, Cleveland

Conference Oral Presentations

International

1. “Using 3D High-resolution MR Fingerprinting (MRF) to Assist Detection and Characterization of Epilepsy Lesions” 06/2018
International Society for Magnetic Resonance in Medicine, Paris, France

2. "Silent MRF: Quantitative Scan with Reduced Noise Using MR Fingerprinting" 06/2018
Summa Cum Laude Award
International Society for Magnetic Resonance in Medicine, Paris, France
3. "Application of Low Rank Modeling to Fast 3D MR Fingerprinting" 04/2017
Magna Cum Laude Award
International Society for Magnetic Resonance in Medicine, Honolulu, HI
4. "Music-based Magnetic Resonance Fingerprinting to Improve Patient Comfort During MRI Examinations" 05/2016
I.I. Rabi Young Investigator Award
International Society for Magnetic Resonance in Medicine, Singapore
5. "Fast 3D MRF for Whole Brain Coverage in Less Than Three Minutes" 02/2016
Workshop on Data Sampling & Imaging Reconstruction
International Society for Magnetic Resonance in Medicine, Arizona
6. "Fast and Direct Generation of Encoding Gradients for the MRF-Music Acquisition" 05/2015
Magna Cum Laude Award
International Society for Magnetic Resonance in Medicine, Toronto, Canada
7. "Using Gradient Waveforms Derived from Music in MR Fingerprinting to Increase Patient Comfort in MRI" 05/2014
Summa Cum Laude Award
International Society for Magnetic Resonance in Medicine, Milan, Italy
8. "MR Fingerprinting: Rapid Simultaneous Quantification of T1, T2, Proton Density and Off-resonance Using a Spiral Trajectory" 05/2013
Summa Cum Laude Award
International Society for Magnetic Resonance in Medicine, Salt Lake City, UT
9. "MR Fingerprinting: Rapid Simultaneous Quantification of T1, T2, Proton Density and Off-resonance Using a Spiral Trajectory" 02/2013
Best Student Oral Presentation Award
Workshop on Data Sampling & Imaging Reconstruction
International Society for Magnetic Resonance in Medicine, Arizona
10. "MR Fingerprinting (MRF): A Novel Quantitative Approach to MRI" 05/2012
Summa Cum Laude Award
International Society for Magnetic Resonance in Medicine, Melbourne, Australia
11. "Multi-pinhole Dynamic SPECT Imaging: Simulation and System Optimization" 02/2010
International Society for Optics and Photonics (SPIE) in Medical Imaging
12. "Feasibility of Imaging the First-Pass Tracer Update in Small-Animal Multi-Pinhole SPECT" 11/2009
Radiological Society of North America (RSNA), Chicago.

TEACHING ACTIVITIES

CWRU Lecturing

School of Medicine Courses

- | | |
|--|-----------|
| 1. IBMS 456C:
Since You Were Born: Nobel Prize Biomedical Research in the Last 21 Years | 2022 |
| 2. IBMS 500:
Intellectual Property and Commercialization
Mentorship | 2022-2023 |

Biomedical Engineering Courses

- | | |
|---|----------------------------|
| 3. EBME 460: Advanced Topics in NMR Imaging,
Department of Biomedical Engineering
Audience: graduate students of BME
Creating syllabus, curriculum, and exams. Gave two weeks' lectures (20% lectures) | Spring 2019
Spring 2022 |
| 4. EBME 615: Topic Seminars for Imaging Students.
Department of Biomedical Engineering
Audience: graduate students of BME
Creating syllabus, curriculum, and exams, invite speakers. (100% lectures) | 08/2022-
04/2023 |

Teaching for International Society: Design education program, plan education sessions and curriculums

- **Chair of the Cross Cutting & Emerging Technologies Table in ISMRM Education Committee 2018-2021**
 - Established the ISMRM Complimentary Online Education Program called '[MR Academy](#)', Reviewed over 750 courses and labeled key tags to each course in nice main topics.
 - As the Chair of the Cross Cutting & Emerging Technologies table, I led a team of four members to 1) design five top educational courses in [Physics & Engineering](#) and [Machine Learning in MRI](#) categories, 2) define education difficulties and course objectives, 3) design quiz for each education course, 4) identify additional 110 education courses in the CCET category and design tags for each course
- **ISMRM Education Sessions Planning Committee 2023**
 - Organized two 4-hour educational sessions, for each session I had to:
 - 1) devise a session title, specify the skill level, provide a session overview, identify the target audience, define the educational objectives;
 - 2) create six talks that align with the session objectives, invite six primary speakers, six alternative speakers, two primary moderators and two alternative moderators.
 - 3) ensure a balanced representation of speakers' backgrounds in terms of their region, gender and degrees.
- **Outstanding Teacher Award in 2018 by ISMRM**
- Educational course titled 'Magnetic Resonance Fingerprinting' has been selected as **one of the four 'Physics and Engineering' courses for the ISMRM online Education Program (MR Academy)**

Educational Courses

½ hour courses to for International Society of Magnetic Resonance in Medicine (ISMRM)

- | | |
|---------------------------------|------|
| 1. "Imaging Without Gadolinium" | 2019 |
|---------------------------------|------|

2. “Go Faster in Clinical Imaging: Fingerprinting” 2018
Outstanding Teacher Award
3. “Magnetic Resonance Fingerprinting” 2017
Selected as one of the four “Physics & Engineering” courses for the ISMRM Online Education Program (MR Academy)

MENTORING

Mentoring Highlights:

- **Mentor in three T32 training programs**
 - Interdisciplinary Biomedical Imaging Training Program, BME, CWRU
 - Medical Scientist Training Program (MSTP), School of Medicine, CWRU
 - Neonatology Training Grant, Department of Pediatrics at Rainbow Babies & Children's Hospitals, CWRU

Mentoring Students

Senior Research Associates:

1. Stephen Devience – Founder/President at Scalar Magnetic, LLC 2020
2. Jessie Sun 2022-present

Research Associates:

1. Zhilang Qiu 2021-present
2. Joon Yul Choi 2018-2022

Graduate Students:

1. Siyuan Hu – Biomedical Engineering (Graduating in 2023) 2019-present
2. Richard Adams – Biomedical Engineering 2020-present

M.D./Ph.D. Graduate Students

1. Walter Zhao, MSTP program 2020-present
2. Christina MacAskill, MSTP program 2021

Undergraduate Students

1. Steven Zombirt – Biomedical Engineering 2021-present
2. Zheyuan Hu – Biomedical Engineering (Graduate Student at UCLA) 2021-2022

High School Students

1. Teddy Zheng (Hawken School, OH) 2021
2. Gabrielle Sudilovsky (Solon School, OH) (Undergrad in Princeton) 2017

Mentoring Committee

Thesis Committee:

1. Ryan Hall (BME) - **Committee Chair** 2020-2023
2. Yuran Zhu (BME) - **Committee Chair** 2020-present
3. Dana Wegierak (BME) - **Committee Chair** 2020-present
4. Victoria Laney (BME) 2020-present
5. Ding Zheng (BME) 2022-present
6. Tingyu Su (BME) 2021-present
7. Bolin Song (BME) 2020-present
8. Yuning Gu (BME) - **Committee Chair** 2019-2021
9. Ziwei Liu (BME) 2020-2021

Thesis Committee for Graduate Students at Other University

1. Martijn Nagtegaal (Graduate student at Delft University of Technology in Netherlands) 2022-present