Syed Murtaza Arshad

4th Year Ph.D. Candidate, Electrical & Computer Engineering

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EDUCATION

Jan 2022 – May 2025 (Expected)	**Ph.D.** Electrical & Computer Engineering *Advisors: Rizwan Ahmad, Ph.D. & Lee Potter, Ph.D.* **The Ohio State University, Columbus**, OH, US	GPA: **4.0/4.0** **Post-candidacy**
Jan 2022 – May 2024	**M.S.** Electrical & Computer Engineering, **The Ohio State University, Columbus**, OH, US	GPA: **4.0/4.0**
Oct 2015 – May 2019	**B.S.** Electrical Engineering with Honors | Gold Medalist **University of Engineering and Technology, Lahore**, Pakistan	GPA: **3.95/4.0** Rank: 1/142

WORK EXPERIENCE

May 2025 – Aug 2025	**Canon Medical Research USA, Inc. (CMRU)** *MR Feature Development Research Scientist Intern*	Cleveland, Ohio
Jan 2022 – Ongoing	**The Ohio State University** *Graduate Research Associate*	Columbus, Ohio
Jul 2019 – Dec 2021	**ICI Pakistan, Ltd.** *Electrical & Instrumentation Manager*	Sheikhupurra, Pakistan
Jun 2018 – Aug 2018	**Schlumberger, Ltd** *Electrical Engineering Intern*	Islamabad, Pakistan
Jul 2017 – Sep 2017	**Lahore University of Management Sciences (LUMS)** *Research Intern*	Lahore, Pakistan

RESEARCH INTERESTS

Image reconstruction, machine learning, deep learning, deep image priors, optimization algorithms, outlier rejection, cardiac MRI, whole-heart 4D flow imaging, real-time imaging, low-field imaging.

SKILLS

Programming Languages:	Python, MATLAB, C++
Programming Libraries:	PyTorch, NumPy, Optuna, OpenCV, TensorFlow, Scikit-learn
Relevant Courses:	Signal Processing, Machine Learning, Probability & Random Variables, Linear Mathematics, Convex & Stochastic Optimization, Stochastic Processes & Estimation, Magnetic Resonance Imaging, Medical Imaging and Processing.

PUBLICATIONS & RESEARCH WORK

Journal Articles

2025 *Title:* **EMORe: Motion-Robust 5D MRI Reconstruction via Expectation-Maximization-Guided Binning Correction and Outlier Rejection. |** GitHub Code Link

Authors: **S.M. Arshad**, L. C. Potter, Y. Liu, C. Crabtree, M.S. Tong, R. Ahmad

Journal: Under revision, submitted to *IEEE Transactions on Medical Imaging (TMI)*

Link: (Preprint) https:/arxiv.org/abs/2507.23224

2024	*Title:*	**Motion-robust free-running volumetric cardiovascular MRI. |** GitHub Code Link
	Authors:	**S.M. Arshad**, L. C. Potter, C. Chen, Y. Liu, et al.
	Journal:	*Magnetic Resonance in Medicine (MRM) 92, no. 3 (2024): 1248-1262.*
	Link:	https://doi.org/10.1002/mrm.30123
2025	*Title:*	**A multi-dynamic low-rank deep image prior (ML-DIP) for real-time 3D cardiovascular MRI.**
	Authors:	C. Chen, M. Vornehm, P. Chandrasekaran, M.A. Sultan, **S.M. Arshad**, et al.
	Journal:	Under revision, submitted to *Journal of Cardiovascular Magnetic Resonance (JCMR)*
	Link:	(Preprint) https://arxiv.org/abs/2507.19404
2025	*Title:*	**Multi-dynamic deep image prior for cardiac MRI. |** GitHub Code Link
	Authors:	M. Vornehm, C. Chen, M.A. Sultan, **S.M. Arshad**, et al.
	Journal:	*Magnetic Resonance in Medicine (MRM) (2025): 1-12.*
	Link:	https://doi.org/10.1002/mrm.70000
2025	*Title:*	**Accelerated Real-time Cine and Flow Under In-magnet Staged Exercise.**
	Authors:	P. Chandrasekaran, C. Chen, Y. Liu, **S.M. Arshad**, et al.
	Journal:	*Journal of Cardiovascular Magnetic Resonance (JCMR) 2025: 101894.*
	Link:	https://doi.org/10.1016/j.jocmr.2025.101894
2025	*Title:*	**Achieving high heart rate with in-magnet exercise Cardiac MRI.**
	Authors:	C.D. Crabtree, J. Stoner, P. Chandrasekaran, Y. Liu, **S.M. Arshad**, et al.
	Journal:	Under revision, submitted to *Journal of Cardiovascular Magnetic Resonance (JCMR)*

Peer-reviewed Abstracts

First-authored

2026	*Title:*	**Motion-robust whole-heart 5D MRI using Expectation-Maximization-Guided Binning Correction and Outlier Rejection (EMORe)**
	Authors:	**S. M. Arshad**, L. C. Potter, P. C. Chandrasekaran, et al.
	Conference:	**Selected for upcoming** *Society for Cardiovascular Magnetic Resonance* ***(SCMR) 2026*** *Annual Scientific Sessions*, **Rio de Janeiro, Brazil.**
2025	*Title:*	**EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm.**
	Authors:	**S. M. Arshad**, L. C. Potter, Xuan Lei, R. Ahmad
	Conference:	*Society for Cardiovascular Magnetic Resonance* ***(SCMR) 2025*** *Annual Scientific Sessions*, **Washington, DC.** Published in *Journal of Cardiovascular Magnetic Resonance, Vol. 27.*
	Link:	https://doi.org/10.1016/j.jocmr.2024.101509
2024	*Title:*	**Motion-robust 3D cine imaging using compressive recovery with outlier rejection.**
	Authors:	**S.M. Arshad**, L.C. Potter, C. Chen, et al.
	Conference:	*Society for Cardiovascular Magnetic Resonance* ***(SCMR) 2024*** *Annual Scientific Sessions*, **London, UK.** Published in *Journal of Cardiovascular Magnetic Resonance, Vol. 26.*
	Link:	https://doi.org/10.1016/j.jocmr.2024.100315
2023	*Title:*	**Motion artifact reduction in self-gated CMR 4D flow imaging under exercise stress.**
	Authors:	**S.M. Arshad**, C. Chen, Y. Liu, et al.
	Conference:	*International Society for Magnetic Resonance in Medicine* ***(ISMRM) 2023*** *Annual Meeting,* **Toronto, ON, Canada.** Published in *Proc. Intl. Soc. Mag. Reson. Med., Vol. 33.*
	Link:	https://doi.org/10.58530/2023/1087

Co-authored

2025	*Title:*	**Ferumoxytol-enhanced free-running 5D whole-heart CMR at 0.55 T.**
	Authors:	X. Sieber, P. Chandrasekaran, J. Varghese, Y. Liu, C. Roy, J. Yerly, **S.M. Arshad**, et al.
	Conference:	*Society for Cardiovascular Magnetic Resonance* ***(SCMR) 2025*** *Annual Scientific Sessions*, **Washington, DC.** Published in *Journal of Cardiovascular Magnetic Resonance, Vol. 27.*

	Link:	https://doi.org/10.1016/j.jocmr.2024.101341
2025	*Title:*	**Motion-Guided Deep Image Prior for Dynamic Cardiac MRI.**
	Authors:	M. Vornehm, C. Chen, M.A. Sultan, **S.M. Arshad**, et al.
	Conference:	*International Society for Magnetic Resonance in Medicine* ***(ISMRM) 2025*** *Annual Meeting,* **Honolulu, Hawai'i**. Published in *Proc. Intl. Soc. Mag. Reson. Med., Vol. 33.*
	Link:	https://submissions.mirasmart.com/ISMRM2025/Handlers/ViewTeaser.ashx?esbpgm=2906_120
2025	*Title:*	**Motion-Guided Deep Image Prior for 3D Real-Time Cine (M-DIP-3D).**
	Authors:	C. Chen, M. Vornehm, M.A. Sultan, **S.M. Arshad**, et al.
	Conference:	*International Society for Magnetic Resonance in Medicine* ***(ISMRM) 2025*** *Annual Meeting,* **Honolulu, Hawai'i**. Published in *Proc. Intl. Soc. Mag. Reson. Med., Vol. 33.*
	Link:	https://submissions.mirasmart.com/ISMRM2025/Handlers/ViewTeaser.ashx?esbpgm=9952_2770
2025	*Title:*	**Free-Running Time-Resolved 3D+t CMR at 40 Hz Under 2 Minutes using Cartesian Sampling and CMR-MOTUS.**
	Authors:	T.E Olausson, M.L. Terpstra, E. Versteeg, **S.M. Arshad**, et al.
	Conference:	*International Society for Magnetic Resonance in Medicine* ***(ISMRM) 2025*** *Annual Meeting,* **Honolulu, Hawai'i**. Published in *Proc. Intl. Soc. Mag. Reson. Med., Vol. 33.*
	Link:	https://submissions.mirasmart.com/ISMRM2025/Handlers/ViewTeaser.ashx?esbpgm=37_324
2023	*Title:*	**Biventricular and hemodynamic assessment under multi-stage exercise using real-time CMR.**
	Authors:	P. Chandrasekaran, C. Chen, Y. Liu, C. Crabtree, **S.M. Arshad**, et al.
	Conference:	*International Society for Magnetic Resonance in Medicine* ***(ISMRM) 2023*** *Annual Meeting,* **Toronto, ON, Canada.** Published in *Proc. Intl. Soc. Mag. Reson. Med., Vol. 33.*
	Link:	https://doi.org/10.58530/2023/1078

INVENTIONS & PATENTS

2024	*Published Patent:*	**Systems and Methods for Cardiovascular Magnetic Resonance Imaging.**
	Publication#:	*WO/2024/238469*
	Link:	https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2024238469
2025	*Pending Patent:*	**Motion Robust Cardiovascular Imaging.**
	Application#:	63/663,874
	Link:	https://drive.google.com/file/d/1-YaVKiiuCUCqnJGDdj_4LqgocqfurmsG
2019	*Prototype:*	**iSight: Computer Vision & Ultrasonic Sensor based Smart Cane & Glasses for the Visually Impaired |** *Developed as senior-year capstone project*
	Recognition:	**IEEE IAS Humanitarian Project Award** at *54th IEEE Annual Meeting,* ***Baltimore, MD.***
	Link:	https://youtu.be/wlyYk-eeM3M?si=9IWfO-LSmK2pj7o1

PRESENTATIONS

Oral Presentations

2025 **"EMORe: Motion-robust free-breathing volumetric cardiovascular magnetic resonance image reconstruction using Expectation-Maximization (EM) algorithm."**
2025 Hayes Advanced Research Forum, **Columbus, OH**. | **2nd Place Award Winner**

2025 **"EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm."**
SCMR '25 Scientific Sessions: Motion Compensation Session, **Washington, DC**.

2024 **"Motion robust 3D cine imaging using Compressive Recovery with Outlier Rejection (CORe)."**
SCMR '24 Scientific Sessions: Dealing with Motion Session, **London, UK.**

2023 **"Motion artifact reduction in self-gated CMR 4D flow imaging under exercise stress."**
ISMRM'23: Advanced Flow & Angiography Power Pitch, **Toronto, Canada.** | **Among top 2.7% abstracts**

Poster Presentations

2024	**"EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm."** *Kraus Memorial Poster Competition '24,* **Columbus, OH. | 2nd Place Award Winner**
2024	**"EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm."** *19th Annual Research Day for the Davis Heart and Lung Research Institute (DHLRI),* **Columbus, OH.**
2023	"**Motion-robust free-running volumetric cardiovascular MRI."** *Kraus Memorial Poster Competition'23,* **Columbus, OH.**

HONORS & AWARDS

2025	2nd Place Award, 2025 Hayes Advanced Research Forum, Columbus, OH. | Link
2025	Best Image Award, Society for Cardiovascular Magnetic Resonance Imaging, Washington, DC. | Link
2024	2nd Place Award, Kraus Memorial Poster Competition, The Ohio State University. | Link
2024	Graduate Associate Leadership Award (GALA), The Ohio State University. | Link
2019	6 Gold Medals for Academic Excellence, University of Engineering & Technology, Lahore. | Link
2019	Performance Award, Electrical Engineering Class of 2019, University of Engineering & Technology, Lahore. | Link
2019	IEEE IAS Humanitarian Project Award, 54th IEEE Annual Meeting, Baltimore, MD. | Link
2019	1st Place, DICE Virtual Innovation National Competition, Pakistan. | Link
2019	Best Project in Computer Engineering Award, Department of Electrical Engineering, University of Engineering Technology, Lahore, Pakistan. | Link
2015 – 2019	Dean's Merit Scholarship Award for all semesters, granted to the top 10 undergraduate students each semester at the University of Engineering & Technology, Lahore.
2013 – 2019	Awarded National Talent Scholarship throughout high school and undergraduate studies; granted to the top 50 students at the state level based on academic performance.

LEADERSHIP & SERVICE

2022 – 2025 ***Delegate, ECE Graduate Program, Council of Graduate Students, The Ohio State University***

- Represented the department and voiced constituent concerns at monthly council meetings.
- Organized Student Engagement Event (Apr 2023) to boost social engagement; received special recognition from ECE graduate program coordinators.

2023 – 2025 ***Chair, Housing & Family Affairs Committee, The Ohio State University***

- Successfully advocated for creation of a dedicated housing resource for graduate students by engaging university leadership and participating in the recruitment and onboarding process.
- Organized a legal guidance workshop (Nov 2023) to help students navigate tenant rights.
- Initiated a pre-arrival housing orientation for incoming international students in collaboration with the Office of International Affairs.

2023 – 2024 ***General Secretary, Graduate Muslim Club (GMC), The Ohio State University***

- Initiated and led 'Share Table Meetings' for monthly interfaith and cultural exchanges.
- Organized Eid celebration (June 2023) to foster community for students, faculty, and families celebrating away from home.
- Hosted two educational sessions (Apr & Sept 2023) to help international students understand and navigate the U.S. financial system.

2024 – 2025 ***Mentor, Undergraduate Research Mentorship***

- Supervised an undergraduate student on research spanning one academic year

2022 – 2025	***Speaker, Graduate Admissions & International Student Advocacy*** ▪ Hosted annual webinars at UET Lahore, guiding students on U.S. graduate admissions. ▪ Invited by the International Student Affairs Committee at OSU to share my journey. (March 2025)
2023 – 2024	***Judge, Career Development Grant (CDG), Ray Travel Award, and HackOHI/O*** ▪ Reviewed graduate student travel grant applications and hackathon submissions at OSU.
2023	***Outreach Presenter, COSI Science Festival*** ▪ Represented the OSU ECE department and organized interactive electrical engineering demos to spark interest among youth.
2023	***Mentor, GUIDE Peer Mentoring Program, The Ohio State University*** ▪ Provided mentorship to incoming graduate students to support their transition to graduate life.
2022	***Volunteer & Outreach Lead, Indus Hospital Fundraiser, Columbus Convention Center*** ▪ Helped raise $125,000 for flood victims in Pakistan through a fundraiser in Oct 2022 at Columbus.

REFERENCES

Prof. Rizwan Ahmad, Ph.D.—*Advisor*
Professor, Electrical & Computer Engineering and Biomedical Engineering, The Ohio State University.
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Professor, Electrical & Computer Engineering, The Ohio State University.
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Website: https://ece.osu.edu/people/potter.36

Hassan Haji-Valizadeh, Ph.D.—*Internship Supervisor*
Manager, MR Feature Development, Canon Medical Research USA, Inc. (CMRU).
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