

# Syed Murtaza Arshad

4<sup>th</sup> Year Ph.D. Candidate, Electrical & Computer Engineering

+1-380-710-6288 | Columbus, OH, US

LinkedIn: [linkedin.com/in/SyedMurtazaArshad](https://linkedin.com/in/SyedMurtazaArshad) | Email: [SyedMurtazaArshad@gmail.com](mailto:SyedMurtazaArshad@gmail.com)

Personal Website: [SyedMurtazaArshad.github.io](https://SyedMurtazaArshad.github.io)

## EDUCATION

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

## WORK EXPERIENCE

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

**Programming Libraries:** PyTorch, NumPy, Optuna, OpenCV, TensorFlow, Scikit-learn

**Relevant Courses:** Machine Learning, Probability & Random Variables, Signal Processing, Linear Mathematics, Convex & Stochastic Optimization, Stochastic Processes & Estimation, Magnetic Resonance Imaging, Medical Imaging and Processing.

## PUBLICATIONS & RESEARCH WORK

### Journal Articles

2025 Title:	<b>EMORe: Motion-Robust 5D MRI Reconstruction via Expectation-Maximization-Guided Binning Correction and Outlier Rejection.</b>   <a href="#">GitHub Code Link</a>
Authors:	<u>S.M. Arshad</u> , L. C. Potter, Y. Liu, C. Crabtree, M.S. Tong, R. Ahmad
Journal:	Under revision, submitted to <i>IEEE Transactions on Medical Imaging (TMI)</i>
Link:	<a href="https://arxiv.org/abs/2507.23224">(Preprint)</a>

2024	<b>Title:</b>	<b>Motion-robust free-running volumetric cardiovascular MRI.</b>   <a href="#">GitHub Code Link</a>
	<b>Authors:</b>	<u>S.M. Arshad</u> , L. C. Potter, C. Chen, Y. Liu, et al.
	<b>Journal:</b>	<i>Magnetic Resonance in Medicine (MRM)</i> 92, no. 3 (2024): 1248-1262.
	<b>Link:</b>	<a href="https://doi.org/10.1002/mrm.30123">https://doi.org/10.1002/mrm.30123</a>
2025	<b>Title:</b>	<b>A multi-dynamic low-rank deep image prior (ML-DIP) for real-time 3D cardiovascular MRI.</b>
	<b>Authors:</b>	C. Chen, M. Vornehm, P. Chandrasekaran, M.A. Sultan, <u>S.M. Arshad</u> , et al.
	<b>Journal:</b>	<i>Journal of Cardiovascular Magnetic Resonance (JCMR)</i> 2025: 102015.
	<b>Link:</b>	<a href="https://doi.org/10.1016/j.jcmr.2025.102015">https://doi.org/10.1016/j.jcmr.2025.102015</a>
2025	<b>Title:</b>	<b>Multi-dynamic deep image prior for cardiac MRI.</b>   <a href="#">GitHub Code Link</a>
	<b>Authors:</b>	M. Vornehm, C. Chen, M.A. Sultan, <u>S.M. Arshad</u> , et al.
	<b>Journal:</b>	<i>Magnetic Resonance in Medicine (MRM)</i> (2025): 1-12.
	<b>Link:</b>	<a href="https://doi.org/10.1002/mrm.70000">https://doi.org/10.1002/mrm.70000</a>
2025	<b>Title:</b>	<b>Accelerated Real-time Cine and Flow Under In-magnet Staged Exercise.</b>
	<b>Authors:</b>	P. Chandrasekaran, C. Chen, Y. Liu, <u>S.M. Arshad</u> , et al.
	<b>Journal:</b>	<i>Journal of Cardiovascular Magnetic Resonance (JCMR)</i> 2025: 101894.
	<b>Link:</b>	<a href="https://doi.org/10.1016/j.jcmr.2025.101894">https://doi.org/10.1016/j.jcmr.2025.101894</a>
2025	<b>Title:</b>	<b>Achieving high heart rate with in-magnet exercise Cardiac MRI.</b>
	<b>Authors:</b>	C.D. Crabtree, J. Stoner, P. Chandrasekaran, Y. Liu, <u>S.M. Arshad</u> , et al.
	<b>Journal:</b>	Under revision, submitted to <i>Journal of Cardiovascular Magnetic Resonance (JCMR)</i>

## Peer-reviewed Abstracts

### First-authored

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

### Co-authored

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

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

## INVENTIONS & PATENTS

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

## PRESENTATIONS

### *Oral Presentations*

2026	<b>(Upcoming) “Motion-robust whole-heart 5D MRI using Expectation-Maximization-Guided Binning Correction and Outlier Rejection (EMORe).”</b> <i>SCMR '26 Scientific Sessions: Image Reconstruction (including machine learning), Rio de Janeiro, Brazil.</i>
2025	<b>“EMORe: Motion-robust free-breathing volumetric cardiovascular magnetic resonance image reconstruction using Expectation-Maximization (EM) algorithm.”</b> <i>2025 Hayes Advanced Research Forum, Columbus, OH.   2<sup>nd</sup> Place Award Winner</i>
2025	<b>“EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm.”</b> <i>SCMR '25 Scientific Sessions: Motion Compensation Session, Washington, DC.</i>

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- 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
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#### **Poster Presentations**

- 2024 "EMORe: Motion-robust XD-CMR reconstruction using Expectation-Maximization (EM) algorithm." *Kraus Memorial Poster Competition '24, Columbus, OH.* | 2<sup>nd</sup> 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.*
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#### **HONORS & AWARDS**

- 2025 Presidential Fellowship 2025-2026, The Ohio State University, Columbus, OH. | [Link](#)
- 2025 Travel Grant from SCMR to attend the 29th Annual Scientific Sessions, Rio de Janeiro, Brazil. | [Link](#)
- 2025 Ray Travel Award 2026, The Ohio State University, Columbus, OH | [Link](#)
- 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 – 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 – Awarded National Talent Scholarship throughout high school and undergraduate studies; granted to 2019 the top 50 students at the state level based on academic performance.
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#### **LEADERSHIP & SERVICE**

- 2022 – **Delegate, ECE Graduate Program, Council of Graduate Students, The Ohio State University**
- 2025 ▪ 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 – **Chair, Housing & Family Affairs Committee, The Ohio State University**
- 2025 ▪ 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.
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2023 –	<b>General Secretary, Graduate Muslim Club (GMC), The Ohio State University</b>
2024	<ul style="list-style-type: none"> <li>▪ Initiated and led 'Share Table Meetings' for monthly interfaith and cultural exchanges.</li> <li>▪ Organized Eid celebration (June 2023) to foster community for students, faculty, and families celebrating away from home.</li> <li>▪ Hosted two educational sessions (Apr &amp; Sept 2023) to help international students understand and navigate the U.S. financial system.</li> </ul>
2024 –	<b>Mentor, Undergraduate Research Mentorship</b>
2025	<ul style="list-style-type: none"> <li>▪ Supervised an undergraduate student on research spanning one academic year</li> </ul>
2022 –	<b>Speaker, Graduate Admissions &amp; International Student Advocacy</b>
2025	<ul style="list-style-type: none"> <li>▪ Hosted annual webinars at UET Lahore, guiding students on U.S. graduate admissions.</li> <li>▪ Invited by the International Student Affairs Committee at OSU to share my journey. (March 2025)</li> </ul>
2023 –	<b>Judge, Career Development Grant (CDG), Ray Travel Award, and HackOHI/O</b>
2024	<ul style="list-style-type: none"> <li>▪ Reviewed graduate student travel grant applications and hackathon submissions at OSU.</li> </ul>
2023	<b>Outreach Presenter, COSI Science Festival</b>
	<ul style="list-style-type: none"> <li>▪ Represented the OSU ECE department and organized interactive electrical engineering demos to spark interest among youth.</li> </ul>
2023	<b>Mentor, GUIDE Peer Mentoring Program, The Ohio State University</b>
	<ul style="list-style-type: none"> <li>▪ Provided mentorship to incoming graduate students to support their transition to graduate life.</li> </ul>
2022	<b>Volunteer &amp; Outreach Lead, Indus Hospital Fundraiser, Columbus Convention Center</b>
	<ul style="list-style-type: none"> <li>▪ Helped raise \$125,000 for flood victims in Pakistan through a fundraiser in Oct 2022 at Columbus.</li> </ul>

## REFERENCES

**Prof. Rizwan Ahmad, Ph.D.—Advisor**

Professor, Electrical & Computer Engineering and Biomedical Engineering, The Ohio State University.

Email: [ahmad.46@osu.edu](mailto:ahmad.46@osu.edu)

Website: <https://u.osu.edu/ahmad>

**Prof. Lee C. Potter, Ph.D.—Advisor**

Professor, Electrical & Computer Engineering, The Ohio State University.

Email: [potter.36@osu.edu](mailto:potter.36@osu.edu)

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).

Email: [hhaji@mru.medical.canon](mailto:hhaji@mru.medical.canon)