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RESEARCH AREA & VISION

Machine learning–driven metabolic MRI and quantitative image science for accessible, low-cost molecular imaging. I develop acquisition, reconstruction, and modeling methods (metabolic MRI, super-resolution, kinetic modeling) and translate them toward clinical studies.

APPOINTMENTS

- **Assistant Professor**, Medical Physics, Howard University — 2023- *present*
- **Postdoctoral Research Associate,** Memorial Sloan Kettering Cancer Center — *2018–2023*

EDUCATION

- **Ph.D.**, Physiology, Biophysics & Systems Biology — Weill Cornell Medicine, 2018
- **M.S.**, Medical Physics — Columbia University, 2011
- **B.A.**, Physics — Oberlin College, 2000

RESEARCH HIGHLIGHTS (SELECTED INDEPENDENT CONTRIBUTIONS)

- **First-in-human brain study of HP [1-13C]pyruvate in D_2O (MRM, 2024, first author):** Established safety/feasibility and a practical path for whole-brain metabolic imaging.
- **Whole-abdomen HP pyruvate using D_2O solvation (JMRI, 2024):** Contributed to methodology enabling expanded field-of-view in humans.
- **Single-image super-resolution for HP 13C images (arXiv, 2023, first author):** Introduced example-based SR to recover fine metabolic heterogeneity.
- **Dynamic volumetric HP 13C with multi-echo EPI (MRM, 2022, first author):** Developed an acquisition pipeline for rapid, volumetric metabolic imaging.
- **QSM biomarkers and materials translation (2018–2020):** Validated QSM for SPION hyperthermia and characterized lesion microstructure in MS.

SELECTED PEER-REVIEWED PUBLICATIONS (last ~5 years)

1. **Deh K.**, Zhang G., Park A.H., *et al. Magn Reson Med* (2024). First-in-human evaluation of [1-13C]pyruvate in D_2O for HP MRI of the brain: safety and feasibility.

2. Zhang G., **Deh K.**, Park H., *et al. J Magn Reson Imaging* (2024). Feasibility of HP [1-13C]pyruvate whole-abdomen MRI using D_2O solvation in humans.

3. Marin-Valencia I., **Deh K.** (co-author), *et al. Cell Metabolism* (2024). In vivo brain glucose metabolism reveals propionate anaplerosis in PDH deficiency.

4. **Deh K.**, Coffee E., Zhang G., *et al.* arXiv:2312.16630 (2023). Single-image example-based super-resolution of HP 13C images.

5. **Deh K.**, Granlund K.L., Eskandari R., *et al. Magn Reson Med* (2022). Dynamic volumetric HP 13C imaging with multi-echo EPI.

6. Lee G., Ruan T., Wong C., **Deh K.**, *et al. Bioengineering* (2023). Micro-Slab coil design for HP metabolic flux analysis in multiple samples.

7. Miloushev V.Z., **Deh K.**, Keshari K.R. *J Magn Reson* (2023). Phase-shift series correct lattice reduction of fractional k-space indices.

8. Miloushev V.Z., **Deh K.**, Keshari K.R. *J Magn Reson* (2022). Free super-resolution MRI by BRICKD slices.

9. **Deh K.**, Zaman M., Vedvyas Y., *et al. Sci Reports* (2020). Validation of QSM of SPIONs for hyperthermia in vivo.

10. **Deh K.**, Ponath G.D., Molvi Z., *et al. JMRI* (2018). Myelin digestion during MS lesion formation increases magnetic susceptibility.

GRANTS & FUNDING (selected)

- American Cancer Society Cancer Research Award
- Howard-Hopkins U54CA295337 Pilot Project Award (2024)
- Ruth L. Kirschstein **NIH F31** Predoctoral Fellowship, NIBIB (2014)

AWARDS & HONORS

- **Finalist**, Memorial Sloan Kettering Cancer Center Postdoc Slam 2023
- **Distinguished Reviewer**, Journal of Magnetic Resonance Imaging 2023

- **ISMRM-ESMRMB Magna Cum Laude** (2018): Myelin digestion/QSM mechanistic study
- Bradley-Alavi Student Fellowship, SNMMI (2011)

INVITED & SELECTED PRESENTATIONS (recent)

- World Molecular Imaging Congress (2021 oral; 2022 submissions) — HP 13C super-resolution and metabolic imaging.
- SIIM CMIMI (2021) — Machine Learning Algorithms & Toolkits: super-resolution for HP 13C (scientific abstract).
- ISMRM-ESMRMB (2018 oral; 2018/2014 posters) — QSM reproducibility and lesion microstructure.

TEACHING & MENTORING

- Mentored rotation, graduate, and summer students; supervised scanner operations/training (MSKCC).
- Medical and Health Physics courses (Howard University).

PROFESSIONAL SERVICE

- **AAPM**: Online Learning Services Subcommittee (RDCE)
- **ISMRM**: Education Committee Subcommittee on Global Accessibility

METHODS & TOOLS

- **Programming:** Python (TensorFlow, PyTorch, NumPy, Nibabel), MATLAB, Bash
- **Image Processing:** NIfTI, DICOM, ITK-SNAP, ImageJ, FSL, AFNI
- **Modeling & Simulation:** TOPAS-nBio, STIR (SPECT Reconstruction), kinetic modeling
- **Machine Learning:** GANs, GRUs, Residual Learning, Supervised/Unsupervised Learning
- **MRI Physics:** ASL, DCE-MRI, CEST, QSM, Hyperpolarized MRI
- **Radiation Physics:** Alpha-particle dosimetry, radiobiological modeling

OTHER WORK EXPERIENCE

- **Senior Software Engineer**, Motorola Inc., Boston, MA   2004-2009

- **Software Manager**, TXTechnology, Inc. Randolph, NJ   2002-2004
- **Systems Software Engineer**, Nokia, Inc. Boston, MA   2000-2002