BIOGRAPHICAL SKETCH

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NAME: VIPUL SHETH

eRA COMMONS USER NAME (credential, e.g., agency login): VIPULSHETH

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Case Western Reserve University, Cleveland, OH	BSE	05/2004	Biomedical Engineering
Case Western Reserve University, Cleveland, OH	PhD	01/2011	Biomedical Engineering
Case Western Reserve University, Cleveland, OH	MD	05/2012	Medicine
Akron General Medical Center, Akron, OH		06/2013	Transitional Year
University of California, San Diego, CA		06/2018	Radiology & Nuclear Radiology
Stanford University, Palo Alto, CA		06/2019	Body MRI

A. Personal Statement

I am an Assistant Professor of Radiology, and my research and clinical interests are in translation of new pulse sequences, development of PET and MRI based biomarkers, and therapeutic applications utilizing PET and MRI based image guidance in diagnosis and treatment of cancers including rectal, prostate, and pancreatic cancer, pelvic floor disorders, as well as MRI-guided cryoablation, focused ultrasound ablation, and biopsy procedures. I have a broad background in MRI research and I am board certified in Diagnostic and Nuclear Radiology. I have completed the National Imaging Informatic Course sponsored by the Society of Imaging Informatics. As part of my PhD dissertation I developed a method to measure pH in breast tumor models in mice using a MRI contrast mechanism known as Paramagnetic Chemical Exchange Saturation Transfer (PARACEST). Similar techniques can allow the measurement of biochemical biomarkers like pH, metabolites (glucose and lactate), and enzyme activity. During my radiology residency I worked on developing new applications of the ultrashort echo time MRI technique in the brain for evaluation of multiple sclerosis and other white matters disorders.

Ongoing and recently completed projects that I would like to highlight include:

SPO #313906
Sheth(PI)
Support from GE Healthcare (1/24/2025-1/23/2027)
Rapid Dual Contrast PET/MRI for Complete Staging and Assessment of Rectal Cancer

R37 CA260346-01A1
Rusu (PI), Role: Co-investigator
1/2022-12/2026
Rad-pathomic deep learning models to assist radiologists in differentiating aggressive from indolent prostate cancer on MRI

U01 DK127384-03
Park (PI), Subcontract from Penn State College of Medicine; Role: Co-investigator
8/2022-7/2024
Investigating imaging biomarkers for development of type-1-diabetes following acute pancreatitis

R01 CA28545601
Rujiang Li (PI), Role: Co-investigator
09/2023 – 08/2028
MRI and blood biomarkers of neoadjuvant therapy response and outcomes in rectal cancer

1. Neshatian L, Triadafilopoulos G, Wallace S, Jawahar A, **Sheth V,** Shen S, Gurland, B. Increased Grades of Rectal Intussusception: Role of Decline in Pelvic Floor Integrity and Association With Dyssynergic Defecation. Am J Gastroenterol 2024.
2. Capaldi DPI, Wang JY, Liu L, **Sheth V**, Kidd EA, Hristov DH. Parametric Response Mapping of Co-Registered IVIM MRI and PET to Identify Radioresistant Sub-Volumes in Locally Advanced Cervical Carcinoma Undergoing CCRT. International Journal of Radiation Oncology*Biology*Physics 2023, 117 (2, Supplement), e648.
3. Neshatian L, Lam JP, Gurland BH, Liang T, Becker L, **Sheth VR.** MRI biomarker of muscle composition is associated with severity of pelvic organ prolapse. Tech Coloproctol. 2022 09;26(9):725-733. PMID: 35727428.
4. Düx DM, Baal JD, Bitton R, Chen J, Brunsing R, **Sheth VR**, et al. MR-guided focused ultrasound therapy of extra-abdominal desmoid tumors: a multicenter retrospective study of 105 patients. Eur Radiol. Published online August 24, 2023. doi:10.1007/s00330-023-10073-9. PMID: 37615768.

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

08/2019 – Present Assistant Professor, Body MRI Division, Department of Radiology, Stanford University, Palo Alto, CA
06/2018 – 06/2019 Body MRI Fellow and Clinical Instructor, Department of Radiology, Stanford University, Palo Alto, CA
06/2013 – 06/2018 Radiology Resident, Department of Radiology, University of California, San Diego, CA
06/2003 – 08/2003 Research Intern, Biomedical Engineering Summer Internship Program, Laboratory of Cell Biology, NCI, NIH, Bethesda, MD
06/2002 – 08/2002 Research Intern, Undergraduate Summer Research Program, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH
02/2002 – 08/2002 Research Intern, Cancer Targeted Drug Delivery Laboratory, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH
06/2000 –08/2001 Research Intern, Biomedical Engineering Group, Lerner Research Institute, Cleveland Clinic, Cleveland, OH

Honors

2020 Academy Council for Early Career Investigators in Imaging (CECI2) class of 2020
2018 Robert R. Mattrey Clinician-Scientist Award, Radiology, UC San Diego
2014 ISMRM Trainee Stipend Award to present at 23rd ISMRM, Milan, Italy
2014 AUR Scholar Program Participant, AUR Annual Meeting, Baltimore, Maryland
2013 1st place poster for Akron General Medical Center, NEOMED Internal Med. Residency Research Day, Rootstown, Ohio
2009 Student Stipend Travel Award to present poster at WMIC, Montreal Canada
2009 ISMRM Education Stipend Award to present poster at 17th ISMRM, Honolulu, Hawaii
2000 Whitaker Case Summer Research Fellow, Dept. of Biomedical Engineering, CWRU
2000-2004 Dean's High Honors List

2000-2004 Ohio Academic Scholarship
2000-2004 Department Stores National Merit Scholarship

C. Contributions to Science

1. My clinical and research focus is in the translation of MRI and PET biomarkers to clinical practice for diagnosis, prognosis, and treatment planning. Our goal is to develop the tools and workflows for rapidly moving the wealth of information generated by imaging so that it can be interpreted and presented in radiology reports for use in patient care. This requires expertise in advanced MRI and PET methods, developing software tools to help radiologists manage this large volume of information utilizing machine learning and artificial intelligence, and learning to extract and present the most relevant information for each patient to enable clinicians to make treatment decisions.

1. Liu C, Boncompagni ACA, Perrone KH, Agarwal AA, Dong GH, Lope I, Sheth V, Morris AM. Predictive value of Magnetic Resonance Complete Response after Neoadjuvant Therapy for Rectal Cancer. *J of Surgical Research*. Feb 2025 (306) 474-478.
2. Capaldi DPI, Wang JY, Liu L, **Sheth V**, Kidd EA, Hristov DH. Parametric Response Mapping of Co-Registered IVIM MRI and PET to Identify Radioresistant Sub-Volumes in Locally Advanced Cervical Carcinoma Undergoing CCRT. *International Journal of Radiation Oncology*Biology*Physics* 2023, *117* (2, Supplement), e648.
3. Selby HM, Liu C, Sheth V, Napel S, Wagner T, Morris AM. Predicting treatment response for the safe non-operative management of patients with rectal cancer using an MRI-based deep-learning model. Annual Meeting of the American Society of Clinical Oncology (ASCO), Chicago, Illinois, USA, Jun 2-6, 2023.
4. Pollom E, Sheth V, Dawes A, Holden T. (2024). Nonoperative Management for Rectal Cancer. The Cancer Journal, 30 (4), 238-244. doi: 10.1097/PPO.0000000000000727.

2. As part of my postdoctoral work and one of my current research focuses is improving the value of pelvic floor imaging in the diagnosis and treatment of pelvic floor disorders. I have worked with both animal models of pelvic floor injury and investigating imaging biomarkers in patients with pelvic floor disorders. I am a member of the Pelvic Health Center at Stanford and the primary radiologist for our monthly interdisciplinary conference. I'm also a member the Pelvic Floor Disease Focus Panel of the Society of Abdominal Radiology and a contributor to the Pelvic Floor Disorders Consortium.

1. Neshatian L, Lam JP, Gurland BH, Liang T, Becker L, **Sheth VR.** MRI biomarker of muscle composition is associated with severity of pelvic organ prolapse. Tech Coloproctol. 2022 09;26(9):725-733. PMID: 35727428.
2. Neshatian L, Triadafilopoulos G, Wallace S, Jawahar A, **Sheth V,** Shen S, Gurland, B. Increased Grades of Rectal Intussusception: Role of Decline in Pelvic Floor Integrity and Association With Dyssynergic Defecation. *Am J Gastroenterol* **2024**.
3. Gurland BH, Khatri G, Ram R, et al. Consensus Definitions and Interpretation Templates for Magnetic Resonance Imaging of Defecatory Pelvic Floor Disorders: Proceedings of the Consensus Meeting of the Pelvic Floor Disorders Consortium of the American Society of Colon and Rectal Surgeons, the Society of Abdominal Radiology, the International Continence Society, the American Urogynecologic Society, the International Urogynecological Association, and the Society of Gynecologic Surgeons. *AJR Am J Roentgenol*. 2021;217(4):800-812. doi:10.2214/AJR.21.26488
4. Zhou W, Zikos TA, Halawi H, **Sheth VR,** Gurland B, Nguyen LA, Neshatian L. Anorectal manometry for the diagnosis of pelvic floor disorders in patients with hypermobility spectrum disorders and hypermobile Ehlers-Danlos syndrome. BMC Gastroenterol. 2022 Dec 23;22(1):538. doi: 10.1186/s12876-022-02572-8. PMID: 36564719

3. My doctoral dissertation, entitled, "A CEST MRI method to measure pH" explored tumor pH as an important biomarker in cancer and an approach to measure pH by Chemical Exchange Saturation Transfer (CEST) MRI. My work described the characterization of a CEST MRI contrast agent, Yb-DO3A-oAA. I showed that this was one of the few MRI contrast agents capable of pH measurement independent of concentration and T1sat relaxation times and was effective over a wider pH measurement range than alternative methods. I validated

these measurements with the use of an established NMR pH probe, IEPA. To simplify MRI acquisition of CEST spectra, I developed a new MRI method Arrayed CEST-FISP. The arrayed CEST-FISP pulse program simplified acquisition setup and subsequent analysis. I optimized the parameters of this method for use with CEST agents. I also developed a new method for fitting CEST spectra and demonstrated the use of median filtering as a tool to remove artifacts in CEST spectra. Finally, I translated Yb-DO3A-oAA from in vitro to in vivo use to measure pH in an MDA-MB-231 tumor model and mouse muscle. A ratiometric measurement was linearly correlated with pH throughout the physiological pH range. The pH was measured with a precision of 0.21 pH units and an accuracy of 0.09 pH units. This work was an important step in the advancement of molecular imaging CEST contrast agents for MRI.

1. **Sheth VR,** Liu G, Li Y, Pagel MD. Improved pH measurements with a single PARACEST MRI contrast agent. Contrast Media Mol Imaging. 2012 Jan-Feb;7(1):26-34. PMID: 22344877; PMCID: PMC4882612.
2. **Sheth VR,** Li Y, Chen LQ, Howison CM, Flask CA, Pagel MD. Measuring in vivo tumor pHe with CEST-FISP MRI. Magn Reson Med. 2012 Mar;67(3):760-8. PMID: 22028287; PMCID: PMC3572795.
3. **Sheth VR,** Li Y, Chen LQ, Howison CA, Pagel MD. Measuring in vivo tumor pHe with a PARACEST MRI contrast agent. Poster Presentation at the ISMRM, Montreal, Canada, May 10, 2011.

4. My postdoctoral work has focused on translating ultrashort echo time (UTE) MRI as a potential technique to image white matter disease in multiple sclerosis. In this work, I showed that UTE and inversion recovery UTE (IR-UTE) could detect myelin lipid and myelin basic protein using a whole body clinical scanner at 3T. Myelin in white matter of the brain was imaged with the IR-UTE sequence, where an adiabatic inversion pulse is used to invert and null the higher signal from the longer T2 components (e.g., T2 ~ 80 ms or longer) in water within white matter. I also showed that these techniques more sensitive for detection of multiple sclerosis lesions in multiple sclerosis cadaver brains as well as in vivo multiple sclerosis patients.

1. **Sheth V,** Shao H, Chen J, Vandenberg S, Corey-Bloom J, Bydder GM, Du J. Magnetic resonance imaging of myelin using ultrashort Echo time (UTE) pulse sequences: Phantom, specimen, volunteer and multiple sclerosis patient studies. Neuroimage. 2016 Aug 1; 136:37-44. PMCID: PMC4914437.
2. **Sheth VR,** Fan S, He Q, Ma Y, Annese J, Switzer R, Corey-Bloom J, Bydder GM, Du J. Inversion Recovery Ultrashort Echo Time Magnetic Resonance Imaging: A Method for Simultaneous Direct Detection of Myelin and High Signal Demonstration of Iron Deposition in the Brain - A Feasibility Study. Magn Reson Imaging. 2017 May; 38:87-94. PMCID: PMC5503675.
3. **Sheth VR,** He Q, Bydder GM, Corey-Bloom J, Du J. In Vivo Imaging of Myelin Using Ultrashort Echo Time (UTE) Sequences at 3T. Oral Presentation at RSNA 2014, Chicago, Illinois, Nov 30 – Dec 5, 2014.
4. **Sheth VR,** He Q, Saberi S, Vandenberg S, Bydder GM, Du J. Ultrashort Echo Time (UTE) Imaging in Multiple Sclerosis. Oral Presentation at ISMRM, Milan, Italy, May 15, 2014.

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/myncbi/vipul.sheth.1/bibliography/public/