Thomas G. DeSilvio | PhD Candidate

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[LinkedIn Profile](#)   [Google Scholar](#)   [Personal Website](#)

PROFESSIONAL SUMMARY

PhD candidate dedicated to building cutting-edge, high-impact artificial intelligence applications for imaging. With a highly versatile skillset in deep learning backed by 10+ peer-reviewed publications in computer vision and medical imaging, I am eager to learn, collaborate, and make tangible change in healthcare and other domains.

EDUCATION

Ph.D. Biomedical Engineering	Case Western Reserve University, Cleveland, OH	*EXP in 05/2025*
Post-Baccalaureate Mathematics	Lakeland Community College, Kirtland, OH	*05/2020*
B.S. Biology	Xavier University, Cincinnati, OH	*08/2018*
B.A. Computer Science	Xavier University, Cincinnati, OH	*08/2018*

GRANTS AND FELLOWSHIPS

- Fellow, CWRU T32 Interdisciplinary Biomedical Imaging Training Program Grant (2T32EB007509-16), 2022
- Fellow, VeloSano Trainee Dream Experiment Fellowship Award, 2022
- Recipient, Microsoft Research Sponsorship, 2021

PUBLICATIONS AND RESEARCH INTERESTS

Developing novel deep learning tools for treatment response characterization, including (1) state-of-the-art, extensible deep learning wavelet networks in PyTorch to identify rectal cancer patients presenting specific patterns on MRI associated with response to chemoradiation treatment and (2) deep learning models trained with region-specific context in Keras/Tensorflow to accurately segment rectal structures critical for response assessment on MRI.

- **DeSilvio T** and Kong M*, Bao L, Flannery B, Parker BN, Tang SM, O'Connor GM, Gupta A, Steinhagen E, Purysko A, Marderstain EL, Carroll A, Crittenden M, Gough M, Young KH, Viswanath SE. Human-in-the-loop informed deep learning rectal tumor segmentation on pre-treatment MRI. SPIE Medical Imaging 2024 Conference as oral presentation. * indicates co-first authors.

- **DeSilvio T**, Antunes JT, Bera K, Chirra P, Le H, Liska D, Stein SL, Marderstein E, Hall W, Paspulati R, Gollamudi J, Purysko AS, Viswanath SE. Region-specific deep learning models for accurate segmentation of rectal structures on post-chemoradiation T2w MRI: a multi-institutional, multi- reader study. *Front Med (Lausanne)*. Switzerland; 2023;**10**:1149056. doi:10.3389/fmed.2023.1149056. PMID: 37250635 PMCID: PMC10213753

♦ Sadri AR, **DeSilvio T**, Chirra P, Singh S, Viswanath SE. Residual Wavelon Convolutional Networks for Characterization of Disease Response on MRI. In: Wang L, Dou Q, Fletcher PT, Speidel S, Li S, editors. *Medical Image Computing and Computer Assisted Intervention – MICCAI 2022*. Cham: Springer Nature Switzerland; 2022. p. 366–375. (oral presentation)

♦ Sadri AR, **DeSilvio T**, Chirra P, Purysko A, Paspulati R, Friedman KA, Krishnamurthi SS, Liska D, Stein SL, Viswanath SE. Deep hybrid convolutional wavelet networks: application to predicting response to chemoradiation in rectal cancers via MRI. 2022. p. 120330H. Available from: https://doi.org/10.1117/12.2613035 doi:10.1117/12.2613035 (oral presentation) (best paper award)

♦ **DeSilvio T**, Antunes J, Chirra P, Bera K, Gollamudi J, Paspulati R, Delaney C, Viswanath S.E, "Region-specific fully convolutional networks for segmentation of the rectal wall on post-chemoradiation T2w MRI," Proc. SPIE 10951, Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling, 1095134 (8 March 2019); https://doi.org/10.1117/12.2513055 (poster)

♦ U.S. Patent US-20230267607-A1. *Hybrid Convolutional Wavelet Networks for Predicting Treatment Response via Radiological Images of Bowel Disease*. Issued August 24, 2023

Open-source machine learning tools for quality evaluation and reproducibility analysis of imaging data and deep learning approaches. Participated in the development of (1) an unsupervised machine learning method called CohortFinder to intelligently partition datasets based on image quality metrics, (2) deep learning algorithms for assessing MRI quality, and (3) generative deep learning models for normalizing multi-institutional MRI scans to overcome image inhomogeneity and improve cancer detection.

♦ Fan F, Martinez G, **DeSilvio T**, Shin J, Chen Y, Wang W, Ozeki T, Lafarge M, Koelzer V, Barisoni L, Madabhushi A, Viswanath S.E, & Janowczyk A. (2023). CohortFinder: an open-source tool for data-driven partitioning of biomedical image cohorts to yield robust machine learning models (under review).

♦ Sadri AR, **DeSilvio T**, Debnath T, Toth R, Bera K, Gupta A, Soman S, Nayate A, Hill V, Tiwari P, Viswanath SE. Unsupervised identification of MRI artifacts via integration of deep learning and image quality measures. *Radiological Society of North America 2022 Scientific Assembly and Annual Meeting*. 2023 Nov 27; (poster presentation)

♦ Sadri AR, **DeSilvio T**, Debnath T, Toth R, Bera K, Gupta A, Soman S, Nayate A, Hill V, Tiwari P, Viswanath SE. A light-weight deep learning web app for rapid identification of poor-quality structural MRI scans: A multi-institutional study. *Radiological Society of North America 2022 Scientific Assembly and Annual Meeting*. 2023 Nov 27; (poster presentation)

♦ **DeSilvio T**, Moroianu S, Bhattacharya I, Seetharaman A, Sonn G, Rusu M. Intensity normalization of prostate MRIs using conditional generative adversarial networks for cancer detection. 2021. p. 115970J. Available from: https://doi.org/10.1117/12.2582297 doi:10.1117/12.2582297 (oral presentation)

Evaluation of tumor diversity features and machine learning approaches for treatment response via imaging. Engineered (1) a novel radiomics approach that incorporates features from multiple planes of acquisition to predict treatment response, co-developed (2) a state-of-the-art pathomics framework for detecting rectal cancer on digitized pathology imaging, and (3) tumor diversity features, a class of radiomic features to quantify different mathematical aspects of tumors arising from treatment response.

♦ **DeSilvio T**, Bao L, Seth D, Chirra P, Singh S, Sridharan A, Labbad M, Bingmer K, Jodeh D, Marderstein EL, Paspulati R, Liska D, Friedman KA, Krishnamurthi S, Stein SL, Purysko AS, Viswanath SE. Integrating multi-plane and multi-region radiomic features to predict pathologic response to neoadjuvant chemoradiation in rectal cancers via pre-treatment MRI. 2023. p. 124660K. Available from: https://doi.org/10.1117/12.2655787 doi:10.1117/12.2655787 (oral presentation)

♦ Le H, **DeSilvio T**, Patel S, Vasilyeva D, Pathak T, Friedman K A, Stein S L, Viswanath SE, "Computerized Pathomic Descriptors of Residual Tumor on Digitized Pathology Specimens for Evaluation of Tumor Stage and Regression Grade after Neoadjuvant Chemoradiation in Rectal Cancers", ASCRS 2023 (poster)

♦ Singh S, **DeSilvio T**, Purysko A, Paspulati RM, Friedman K, Liska D, Stein S, Krishnamurthi SS, Viswanath SE. Computerized features of tumor diversity on pre-chemoradiation MRI are associated with pathologic complete response in rectal cancers: A multi-institutional study. *JCO*. 2022 Jun 1;**40**(16_suppl):3608–3608. doi:10.1200/JCO.2022.40.16_suppl.3608 (poster presentation)

♦ Singh S, **DeSilvio T**, Sadri AR, Labbad M, Bingmer K, Paspulati R, Friedman K, Liska D, Stein SL, Marderstein EL, Krishnamurthi S, Purysko A, Viswanath SE. Tumor diversity features across pre- and post-chemoradiation MRI are associated with degree of pathologic response to chemoradiation in rectal cancers: a multi-institution study. *Radiological Society of North America 2022 Scientific Assembly and Annual Meeting*. 2023 Nov 27; (poster presentation)

♦ U.S. Patent Disclosure. *Computerized Features of Tumor Diversity on MRI Are Associated with Pathologic Response in Rectal Cancers*. Filed March 4, 2022. Patent Pending.

PROFESSIONAL EXPERIENCE

Graduate Student Researcher
Case Western Reserve University | Cleveland, OH   *08/2020 – CURRENT*

♦ Engineered novel wavelet-based deep learning ResNet and DenseNet models to non-invasively classify response to treatment in rectal cancers via MRI, with end goal of preventing thousands of unnecessary surgeries per year.

♦ Developed state-of-the-art deep learning U-Net models to segment rectal structures on MRI for planning surgery

♦ Collaborated with Microsoft Al to enable scalable deployment of lab's deep learning cancer detection pipelines via distributed GPU computing in Azure

♦ Mentored and managed 20+ students in building supervised machine learning algorithms for medical image analysis

High Performance Computing Cluster Administrator
Case Western Reserve University | Cleveland, OH   *08/2020 – CURRENT*

♦ Maintained and optimized 3 on-premises, Linux-based NVIDIA GPU servers for intensive deep learning workflows, distributed computing, and data visualization

♦ Primary liaison for facilitating 80+ lab members utilization of CWRU's scalable high performance computing cluster for deep learning/machine learning pipelines and data visualization

♦ Diligently managed an extensive 130+ TB dataset of medical imaging data (radiology and pathology) on Linux-based, high-performance servers

Canary Cancer Center Research Intern

Stanford University | Palo Alto, CA   *06/2020 – 08/2020*

- Developed state-of-the-art generative deep learning models for normalizing intensity distributions on MRI, toward improving early detection of prostate cancer
- Published and presented results at SPIE Medical Imaging 2021 conference

I.T. Consultant

Business Technology Services, Inc | Twinsburg, OH   *06/2016 – 08/2020*

- Created 10+ custom Amazon Alexa Skills via Amazon Web Services (AWS) for construction data retrieval
- Designed and administered 2 Wordpress intranets used by 1000+ educational providers
- Worked closely construction and education clients to provide high-quality, on-site I.T. technical support

HONORS AND AWARDS

- Recipient, CWRU Biomedical Engineering Exceptional Mentorship Award, 2023
- Recipient, ITCR 2022 Trainee Day Travel Award, 2022
- Recipient, Best Computer-Aided Diagnosis Paper Award, SPIE Medical Imaging Conference, 2022
- Entrepreneurial Lead, I-Corps@NCATS, 2022
- Recipient, Best Technical Demonstration, SPIE Medical Imaging Conference, 2021

PROFESSIONAL MEMBERSHIPS

- Journal Reviewer: Frontiers in Radiology, European Radiology, American Cancer Society, Medical Engineering and Physics, Biomedical Signal Processing and Control, present
- Student Member, Beta Beta Beta Biology Honor Society, 2014-2018
- Student Member, University Scholars Honors Program, Xavier University, 2014-2018