

My work focuses on expanding the use of artificial intelligence to advance biomedical research, precision nephrology, and AI-enabled discovery. My research integrates whole-slide imaging, tissue segmentation, single-cell sequencing, and multi-omics data to improve precision medicine research.

I began my academic path in electrical engineering at San Diego State University (SDSU), where I earned top awards and published early work on biomedical sensors. At The Pennsylvania State University (Penn State), I studied piezoelectric materials for medical applications and received the Button-Waller Fellowship. My Ph.D. research in MRI at Northwestern University/UCLA/Cedars-Sinai Medical Center, supported by NIH funding, produced several publications and patents.

As a Postdoctoral Fellow at the University of Pennsylvania (UPenn), I accelerated whole-slide image processing and integrated multi-omics data to uncover disease mechanisms in nephrology. I also mentored young scientists and supported AI-driven biomedical research.

In my current role as Lead Researcher AI Consultant at the University of Oklahoma, I help researchers adopt AI methods, access state and national AI resources, and apply AI to new scientific questions. I also support AI training, mentor student AI consultants, and contribute to a statewide and national effort to expand AI expertise across research institutions.

Selected publications:

1. **Single Cell Profiling Characterization of Kidney Disease** – Utilized single-cell RNA sequencing to analyze the impact of Loss of Y chromosome (LOY) on kidney cell gene expression in aging males. Our findings indicate that LOY in proximal tubule cells correlates with altered calcium reabsorption, immune response, and metabolic pathways, potentially predisposing men to kidney disease.
 - a. **Agraz, J.L.**, Wilson, P.C. Impact of Y Chromosome Loss on Age-Related Gene Expression. American Society of Nephrology Conference (2024).
2. **Whole-Slide-Image Preconditioning Methods** - Histopathologic analysis of H&E WSI is crucial for disease diagnosis but faces challenges due to color inconsistencies affecting computational WSI analysis. Current normalization methods rely on insufficient reference WSIs, prompting our research into an optimal, population-based approach to enhance computational pathology's robustness and accuracy.

Original Articles:

- a. **Agraz J.L.**, Wilson P.C. Optimized Whole-Slide-Image H&E Stain Normalization: A Step Towards Big Data Integration in Digital Pathology. IEEE Open J Eng Med Biol. 2024 Sep. <https://doi.org/10.1109/OJEMB.2024.3455011>
- b. **Agraz J.L.**, Grenko CM, Chen AA, Viaene AN, Nasrallah MD, Pati S, Kurc T,

Saltz J, Feldman MD, Akbari H, Sharma P, Shinohara RT, Bakas S. Robust Image Population Based Stain Color Normalization: How Many Reference Slides Are Enough? IEEE Open J Eng Med Biol. 2023 Jan 5;3:218-226. doi: 10.1109/OJEMB.2023.3234443. <https://ieeexplore.ieee.org/document/10006883>

- c. Hao J, **Agraz J.L.** Predicting Overall Survival Of Glioblastoma Patients On Multi-Institutional Histopathology Stained Slides Using Deep Learning And Population-Based Normalization. Neuro Oncol. 2020 Nov 9;22. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7651051/pdf/noaa215.622.pdf>
3. **Imaging using PHIP methods:** Development of a para-Hydrogen induced polarization (PHIP) instrument for the hyperpolarization of Magnetic Resonance Imaging (MRI) carbon-based contrast agents using para-Hydrogen spin transfer.

Original Articles:

- a. **Agraz, J.L., Grunfeld A.** LabVIEW-based control software for para-hydrogen induced polarization instrumentation. Rev. Sci. Instrum. 1 April 2014; 85 (4): 044705. <https://doi.org/10.1063/1.4870797>
- b. **Agraz, J.L., Grunfeld A.** Improved PHIP polarization using a precision, low noise, voltage controlled current source. Journal of Magnetic Resonance. 2013. V235, P 77-84. <https://www.joseagraz.com/resume/publications/1-s2.0-S1090780713001973-main.pdf>
- c. **Agraz, J.L.** Grunfeld, A. PHIP Instrumentation Pinch Valve System for Sample Delivery, Process and Collection. Adv. Biom. Sci. Eng. Vol. 1 8-17 (2014). <https://www.joseagraz.com/resume/publications/ValvesAccepted.pdf>

A full list of my published work is available here:

<https://scholar.google.com/citations?user=Hmmi7XcAAAAJ&hl=en>