Ashwin Sakhare

Neuroengineer *working at the intersection of neuroscience, medicine, and engineering.*

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Education

University of Southern California — **May 2015 – April 2021**
PhD, Biomedical Engineering — *Los Angeles, CA*

University of Southern California — **Aug 2015 – May 2017**
M.S., Biomedical Engineering — *Los Angeles, CA*

North Carolina State University — **Aug 2005 – Dec 2009**
B.S., Biomedical Engineering — *Raleigh, NC*

Select Coursework

- Applied Statistical Data Analysis
- Machine Learning for Data Science (*regression, decision trees, random forest, SVM, clustering, neural networks, PCA)*
- Introduction to Clinical Medicine
- Pathophysiology of the Nervous System
- Advanced Studies of the Nervous System

Technical Skills

- **Programming Languages:** C#, Python
- **Statistical Software:** SPSS, SAS
- **Python Packages**: NumPy, Torch, Scikit-learn, Torch, Pandas, PyQt5, Pydicom
- **Game Engines**: Unity3D
- **Version Control:** Perforce, Git
- **CAD Software:** SolidWorks

Key Projects

Deep Learning – Predicting meningioma consistency — **Duration:** 7 months
- Trained a CNN for classification of meningioma images acquired using multiple MRI sequences.
- Developed a pre-processing pipeline that increased size of available training data.

NeuroFlow – A medical imaging segmentation tool — **Duration:** 5 months
- Developed a desktop GUI application in python for segmenting MRI scans and visualizing cerebral flow dynamics in the brain.
- Core functions: Load DICOM images, display metadata, segment and label ROI's, plot flow curves
- Trained a CNN to classify loaded MRI images based on anatomical level in the brain.

FitViz – ANT+ health and fitness monitoring client — **Duration:** 5 months
- Developed a desktop GUI application in python for segmenting MRI scans and visualizing cerebral flow dynamics in the brain.
- Core functions: Load DICOM images, display metadata, segment and label ROI's, plot flow curves
- Trained a CNN to classify loaded MRI images based on anatomical level in the brain.

NeuroRiderVR – A trilogy of virtual reality serious games for health — **Duration:** 3 years
- Lead Unity3D gameplay programmer and designer of a VR game designed to improve brain health.
- Designed game physics, interaction system, and backend SQL database.
- Designed and manufactured a custom, stationary virtual reality exercise bike.
- Managed a cross-functional team of 10 engineers, technical artists, and neuroscientists.
- Programmed real-time Serial and UDP data communication between game and external peripherals.

Research Experience

Doctoral Student — **May 2015 – Present**
Stevens Neuroimaging and Informatics Institute — *Los Angeles, CA*
- Designed and conducted a 2-year clinical trial assessing the impact of simultaneous cognitive stimulation and exercise in virtual reality on brain health in older adults at risk for Alzheimer's disease
- Utilized MRI techniques to elucidate the pathogenesis of Alzheimer's disease and developed and validated a novel, non-invasive MRI biomarker of brain health.

Work Experience

Systems Engineer **July 2011 – June 2015**
LipoScience *Raleigh, NC*

- Managed design changes to Vantera, an FDA-cleared clinical blood analyzer, reducing downtime and improving sample throughput.

Publications

Stradford J.; Sakhare AR., Ravichandran R., Schroeder T., Michener L., Pa J., *Conducting a VR Clinical Trial in the Era of COVID-19*. *(Submitted)*

Sakhare AR.; Barisano G., Pa J., *Assessing test-retest reliability of phase contrast MRI for measuring cerebrospinal and cerebral blood flow dynamics*. Magn Reson Med. 2019; 82:658–670.

Sakhare AR.; Yang V., Stradford J., Tsang I., Ravichandran R., Pa J., *Cycling and Spatial Navigation in an Enriched, Immersive 3D Virtual Park Environment: A Feasibility Study in Younger and Older Adults*. Front. Aging Neurosci. 2019; 218.

Extracurricular Activities

USC Street Dance Society **Aug. 2015 – July 2016**
SMART-VR Student Ambassador **Nov. 2020 – Present**

Select Presentations

Sakhare AR; Pa J. *Virtual Reality to Enhance Brain Health in Older Adults at Risk for Alzheimer's disease*. Seminar in Bioengineering, Los Angeles, CA, October 2019. (Talk)

Sakhare AR; Yang V., Stradford J., Tsang I., Ravichandran R., Pa J. *Cycling and spatial navigation in an enriched, immersive 3D virtual park environment: a study of adverse effects in healthy older adults*. Grodins Research Symposium, Los Angeles, CA, April 2019. (Poster)

Sakhare AR; Yang V., Delev D., Tsang I., Ravichandran R., Pa J. *Nuts and Bolts: Designing a fully integrated VR bike*. USC Virtual Technologies for Health Symposium, Los Angeles, CA, September 2018. (Poster)

Sakhare AR; Yang V., Delev D., Tsang I., Ravichandran R., Pa J. *Combined cognitive and physical activity in VR to promote brain health*. USC Virtual Technologies for Health Symposium, Los Angeles, CA, September 2018. (Poster)