



Kayhan Batmanghelich, PhD

Assistant Professor

Email: kayhan@pitt.edu

Tel: 412-624-5100

Research Topics:

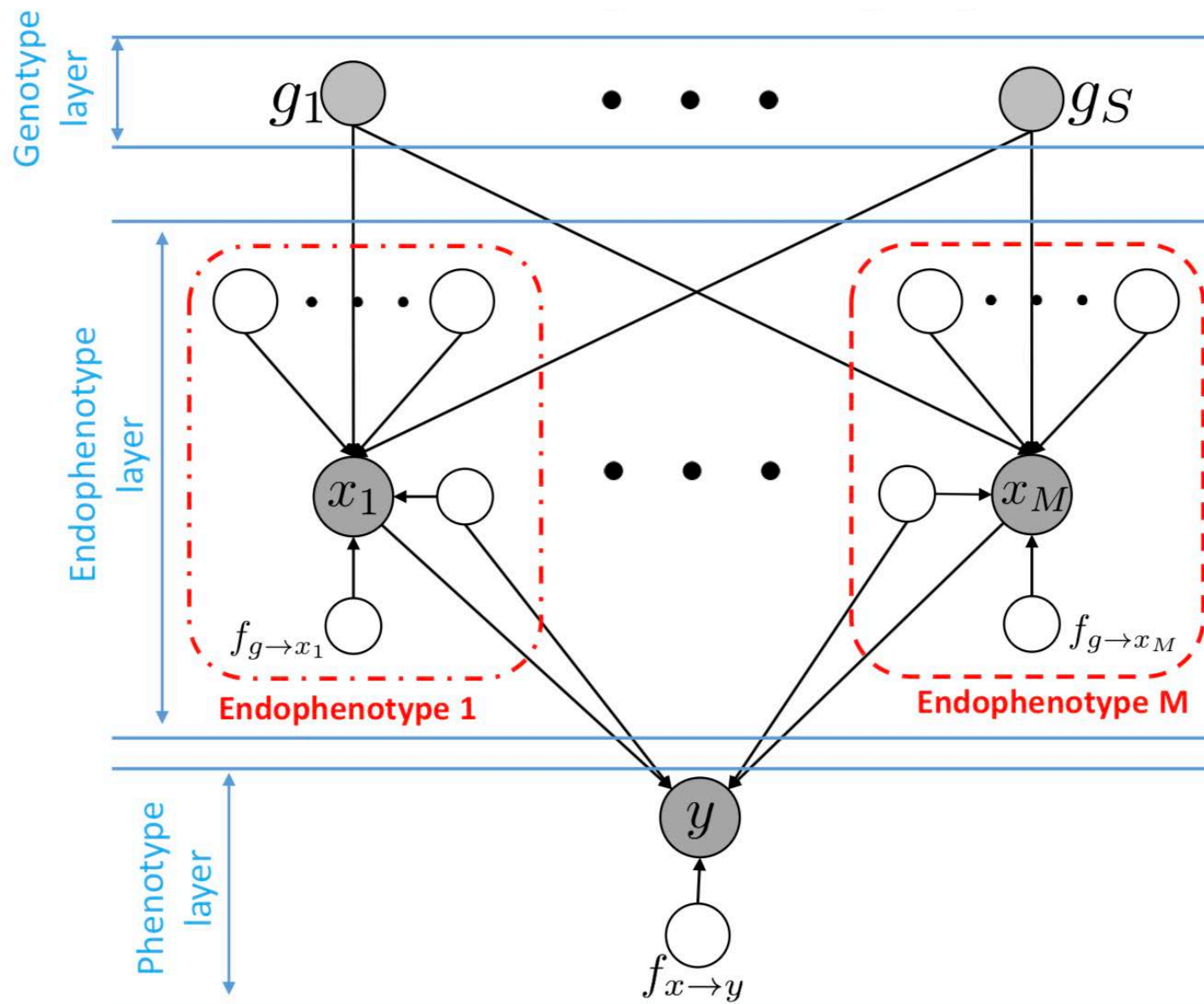
- Radiogenomics for the following application domains:
 - Alzheimer's Disease
 - Chronic Obstructive Pulmonary Disease
 - Glioblastoma
- Deep Learning for Multi-Modal Data Analysis
- Statistical Modeling for Healthcare Applications



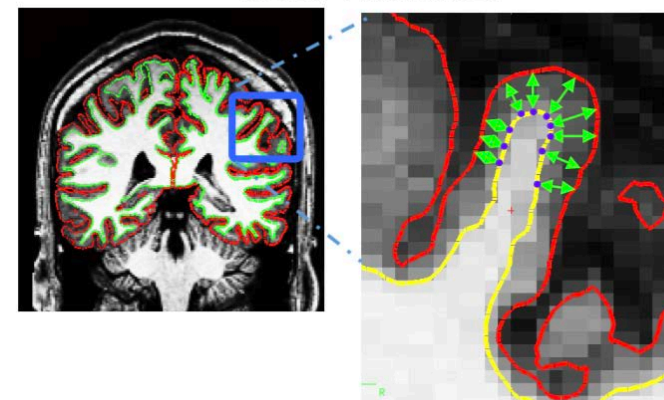
Current Projects

- **NIH R01 HL141813-01 (PI):** An Integrative Radiogenomic Approach to Design Genetically-Informed Image Biomarker for Characterizing COPD (\$2.8M)
- **SAP (PI):** Deep Multi-Domain Learning: A Framework to Incorporate Weak Labels to the Attention Models (\$390,577)
- **Pfizer (PI):** Developing Statistical Method to Jointly Model Genotype and High Dimensional Phenotype (\$100,000)
- **Competitive Medical Research Fund (PI):** Machine Learning Approach to Characterize COPD using Heritable Image Phenotype (\$40,000)

Imaging Genetics of the Alzheimer's Disease

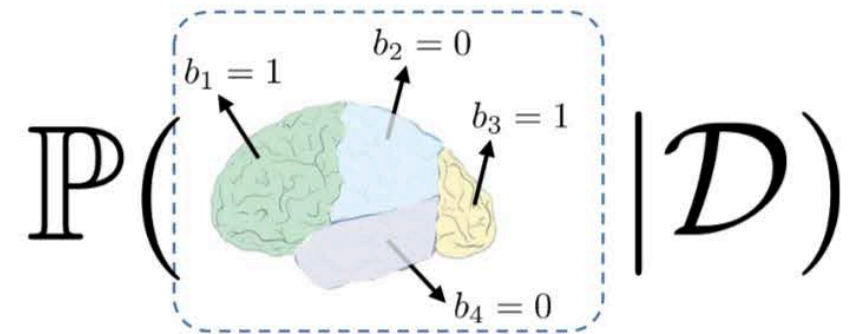
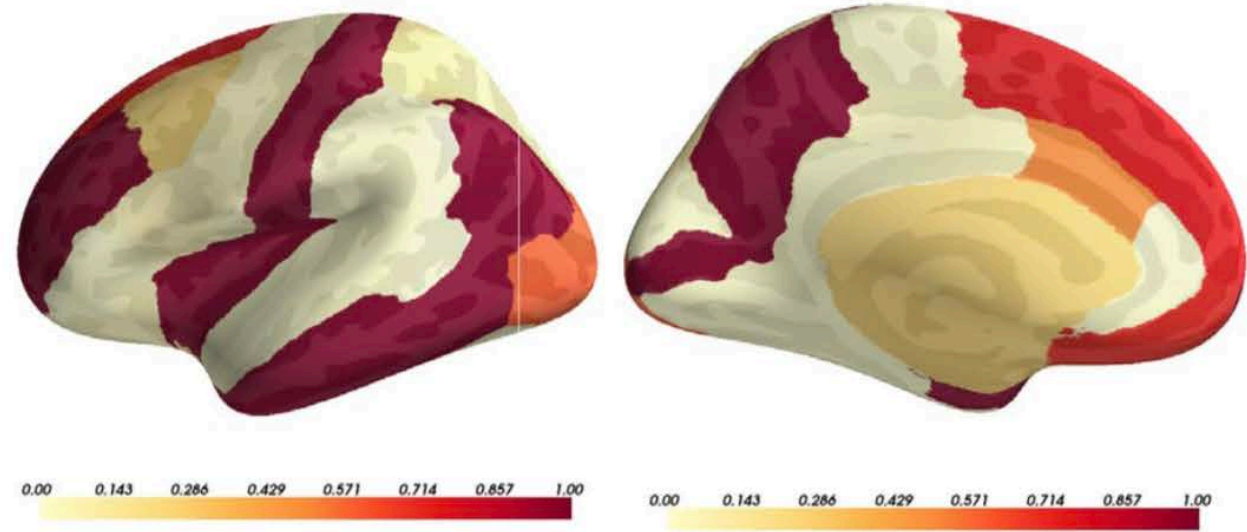


Example of endophenotype (Input):
Local Thickness



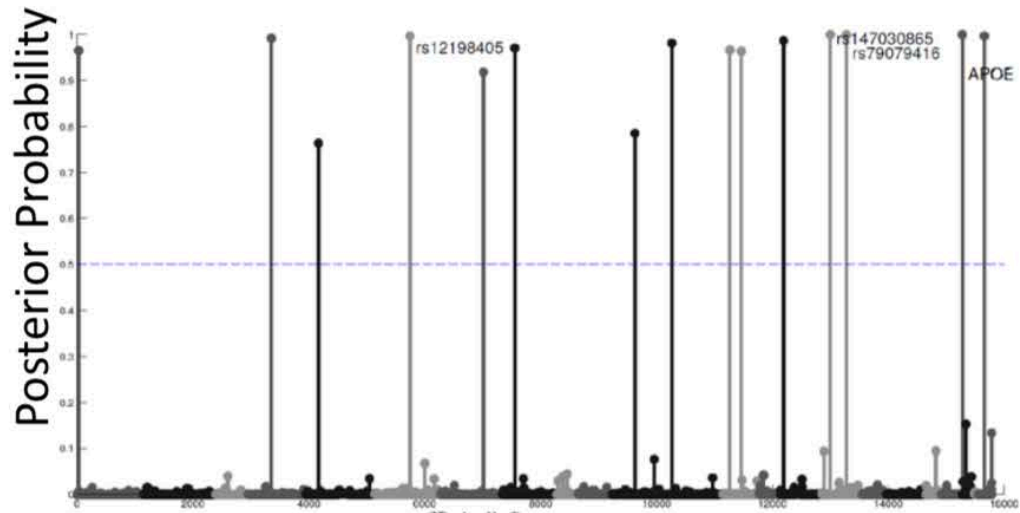
Radiomics Application for Brain Disease

Left Hemisphere



$$\mathbb{P}(\text{Brain Map} | \mathcal{D})$$

$$\mathbb{P}(\text{Genetic Loci} | \mathcal{D})$$



Genetic Loci colored by Chromosomes

Radiomics Application for Lung Disease (Chronic Obstructive Pulmonary Disease)

Chronic Obstructive Pulmonary Disease (COPD)

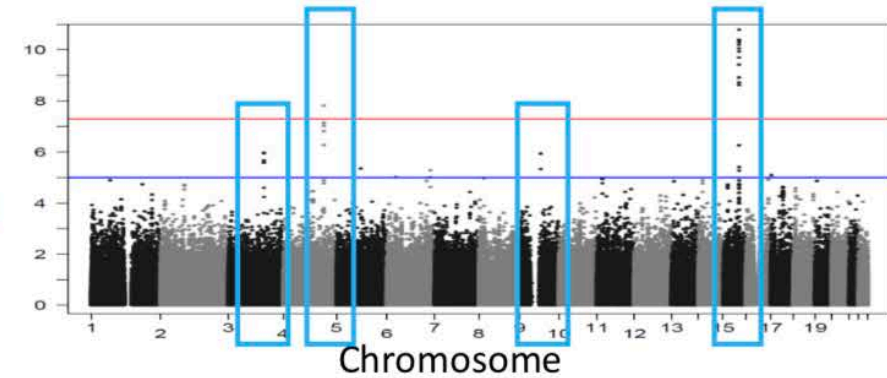
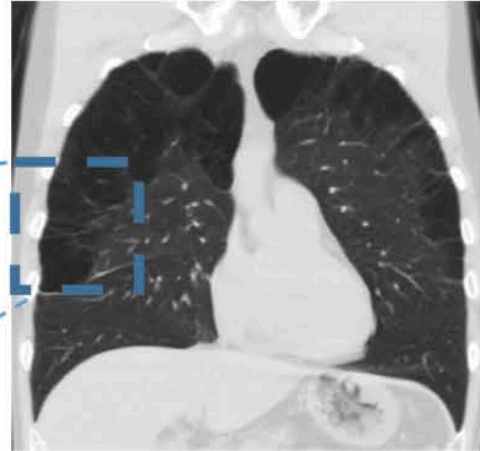
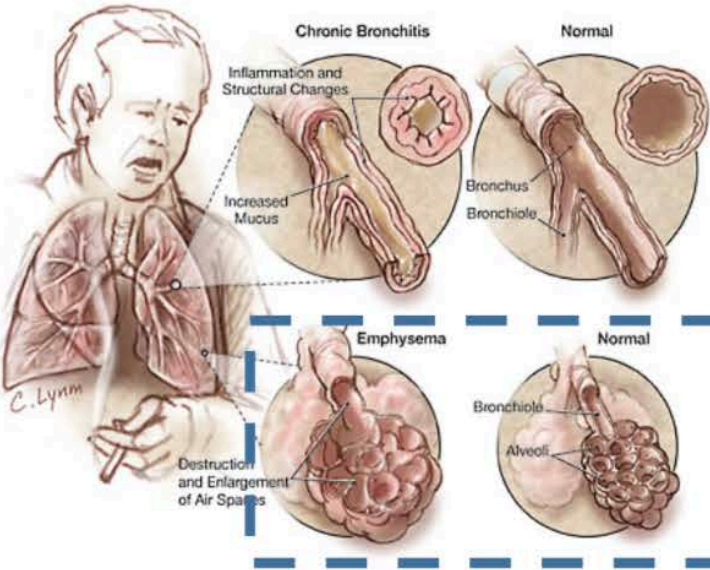
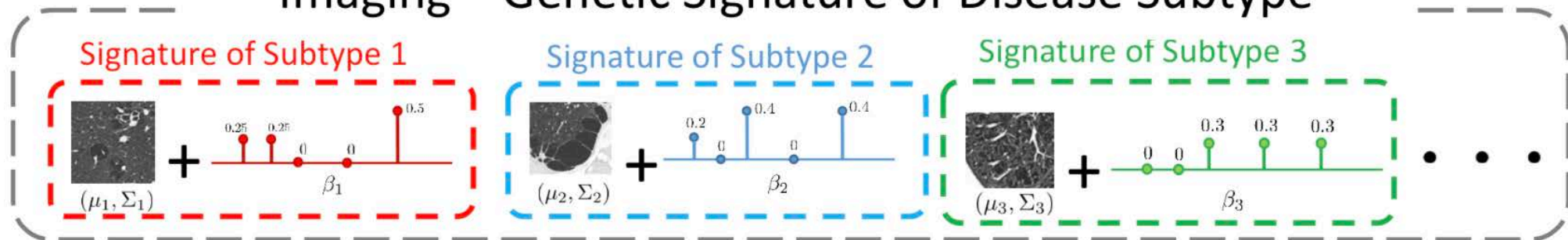
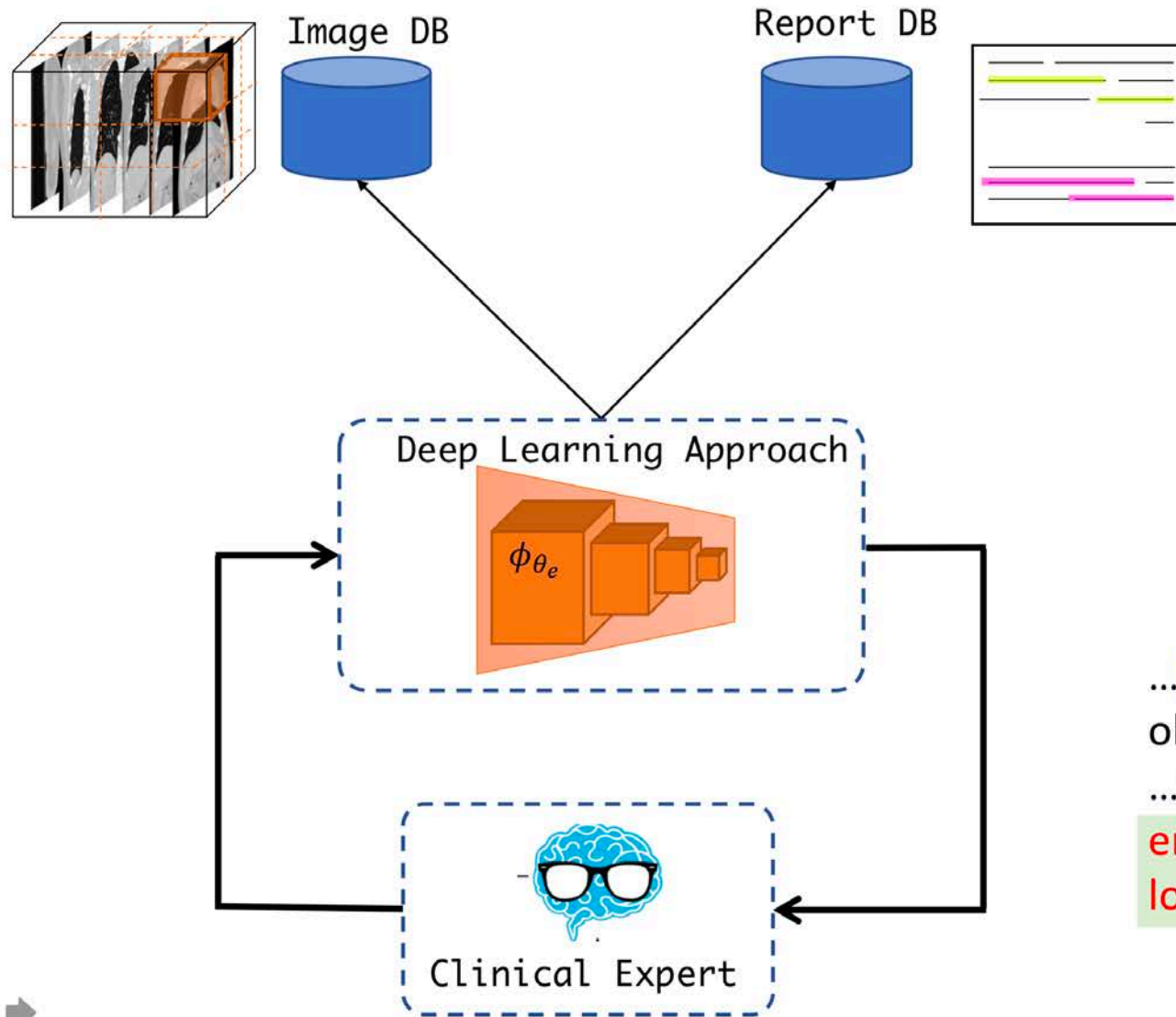


Image Reference: radiopedia.com

Imaging – Genetic Signature of Disease Subtype



Deep Learning for Joint Modeling of Radiology Images and Clinical Reports



... **pneumothorax** is
observable in the **right lung**
...there is a significant
emphysema in the **right**
lobe....

Acknowledgments

Funding:



National Institutes
of Health



Pfizer



External Collaborations:



Carnegie Mellon University



Harvard Medical School
(School of Public Health)



Brigham and Women's
Hospital



Massachusetts Institute
of Technology