

# KWAN HO RYAN CHAN

ryanckh@seas.upenn.edu ◊ (626) 400-3159 ◊ [ryanchankh.github.io](https://ryanchankh.github.io) ◊ Philadelphia, PA

## EDUCATION

### Doctor of Philosophy in Electrical and Systems Engineering

Expected: May '26

University of Pennsylvania

- Awards: National Science Foundation Graduate Research Fellow (NSF GRFP), UPenn Dean's Fellowship
- Advisors: Professor René Vidal, Professor Donald Geman
- Research Interests: Multi-modal Generative Models, Interpretable Machine Learning, Explainable AI

### Bachelor of Arts in Applied Mathematics

Class of '19

University of California, Berkeley

- Advisor: Professor Yi Ma
- Interests: Representation Learning, Self-supervised Learning, Sparse and Low-rank data structures

## RESEARCH HIGHLIGHTS

### Multi-modal Explanations for Trustworthy Predictions

Nov '23 - Current

IDEAS, University of Pennsylvania

Philadelphia, PA

- A framework for coarse-to-fine, open-ended question answering with multi-modal Foundation Models
- Performed evaluation of question-answering and trustworthy benchmarks on Foundational Models such as multi-modal generative models (StableDiffusion) and Vision-Language Models (GPT-4, LLaVA)

### Scalable Interpretable-by-Design Image Classification with Information Pursuit

Feb '22 - Nov '23

IDEAS, University of Pennsylvania

Philadelphia, PA

- An interpretable image classification method for large-scale visual datasets with variable-length and open-ended sets of concepts using Large Language Models (GPT-3, LLaMA) and Visual Language models (LLaVA, BLIP-2)
- Published as co-first author at ICLR'24, titled "Bootstrapping Variational Information Pursuit with Foundation Models for Interpretable Image Classification," the first work on Information Pursuit that involves Foundation Models
- Constructed a scalable classifier that leverages contrastive multi-modal embeddings for fast and accurate binary visual question answering, with 100x speed improvement over state-of-the-art Vision-Language models
- Conducted a human evaluation on the faithfulness of the concept answering model with over 10k image-concept pairs

### Information Pursuit for Interpretable Machine Learning

Aug '21 - Nov '22

Vision Lab, Johns Hopkins University

Baltimore, MD

- An interpretable-by-design machine learning framework, known as Information Pursuit, that learns tasks with user-defined queries and makes interpretable and explainable predictions in a coarse-to-fine manner
- Published at ICLR'23, "Variational Information Pursuit for Interpretable Predictions," the first scalable and performant work using Information Pursuit for a wide-range of medium-scale image classification and clinical prediction tasks
- Developed a variational approach that achieves 100x computational speed improvement versus generative approaches
- Achieved state-of-the-art results against reinforcement-learning methods on image classification and disease prediction

## TEACHING EXPERIENCE

### Teaching Assistant for ESE7000-004: Deep Generative Models

Aug '23 - Dec '23

University of Pennsylvania

Philadelphia, PA

- Designed lectures on the history of generative models, from classical Probabilistic Principal Component Analysis and Variational Autoencoders, up to modern Foundation Models such as Transformers and Diffusion Models
- Gave hands-on sessions to a class of 40 students on the implementation, details and practice of Vision Transformers

## SKILLS

**Programming Languages:** Python, Java, Matlab

**ML/AI Frameworks:** OpenAI API, PyTorch, HuggingFace, OpenAI, Sklearn, DGL

**Data Analysis:** Jupyter Notebooks, NumPy, SciPy, Pandas, Matplotlib, OpenCV

**Development Tools:** Git, AWS, GCP, Weight & Biases, Microsoft Office

**Fluent Languages:** English, Chinese (Mandarin and Cantonese)