



## education

### phd | machine learning

uc berkeley | '17-'22

advisor: bin yu

### ms | data science

uc berkeley | '17-'21

research: statistical biology

### bs | cs & math

university of virginia | '14-'17

double major

## skills

### machine learning

data cleaning • deep learning

pytorch • scikit-learn • jax

aws ec2 • s3 • sagemaker

keras • mllib • tensorflow

### experienced

python • java • matlab

### proficient

r • c/c++ • web basics

### human languages

english • spanish • hindi

## awards

berkeley grad slam semifinalist '19

outstanding teaching award '18

uva rader research award '17

uva undergrad symposium winner '17

raven honor society '16-'17

icpc regional qualification '14-'16

1st place microsoft code jam '16

3rd place google games uva '17

2nd place apt puzzle competition '17

### funding awards

pdsoros fellowship finalist '19

ircn workshop travel award '19

vidya shelat fund award '16

rodman scholarship '14-'17

## experience

### berkeley | interpretable ml research (bin yu lab %)

fall '17 - present

- developed interpretation methods for ml models (e.g. neural nets)
- created interpretable models in medicine, biology, and computer vision

### aws | research internship (pietro perona lab %)

summer '20

- testing for bias with causal matching using GANs
- interpreting semantic directions in generative models

### response4life | volunteer data scientist

spring '20

- helped develop, integrate, and deploy models to forecast covid-19 severity

### pacmed ai | interpretable ml internship

summer '19

- developed techniques to interpret machine-learning models for healthcare
- integrated interpretability techniques for predicting icu re-admission

### facebook | computer vision internship

summer '17

- investigated unsupervised deep learning for segmentation of satellite imagery
- implemented crfs for segmentation post-processing

### uva | ml research (yanjun qi lab %)

fall '16 – spring '17

- developed novel weighted- $\ell_1$ , multi-task gaussian graphical model
- analyzed large-scale functional brain connectivity with graphical models

### hhmi | ml research (srini turaga lab %)

summer '15, winter '15, summer '16

- extended cnns and watershed algorithms for neural image segmentation
- implemented distributed random forests for image segmentation

### uva | comp. neuroscience research (william levy lab %)

fall '14 - fall '16

- developed detailed biophysical models of neural computation
- analyzed energy efficiency, noise, and variability in stochastic neurons

### hhmi scientific computing | comp. neuroscience research

summer '14

- analyzed backpropagating action potentials via biophysical simulations

### research innovations inc. | web dev + android internship

summer '13 - spring '14

- developed web/mobile app for task coordination with qr codes

## coursework

### computation

machine learning  
computer vision  
structure learning  
algorithms  
artificial intelligence  
deep learning  
learning theory  
ai in graphics  
cs theory  
data structures  
software dev. I & II  
information retrieval  
computer architecture

### stat/math






statistical models  
probability  
statistics  
optimization  
linear algebra  
info theory  
real analysis  
linear models  
stochastic processes  
chaos theory I & II  
multivariate calculus  
discrete mathematics  
differential equations  
abstract algebra

### neuroscience





neural coding  
neural network models  
neurobiology  
visual neuroscience  
cognitive science

## papers




### interpretability

- interpretations are useful: penalizing explanations to align neural networks with prior knowledge: rieger, **cs**, murdoch, & yu, *icml '20* 
- transformation importance with applications to cosmology: **cs**\*, ha\*, lanusse, boehm, liu & yu, *iclr '20 workshop (spotlight talk)* 
- hierarchical interpretations for neural network predictions: **cs**\*, murdoch\*, & yu, *iclr '19* 
- interpretable machine learning: definitions, methods, and applications: murdoch\*, **cs**\*, kumbier, abbasi-asl, & yu, *pnas '19* 
- disentangled attribution curves for interpreting random forests and boosted trees: devlin, **cs**, & yu *arXiv '19* 



### interpretable data science projects

- curating a covid-19 data repository and forecasting county-level death counts in the united states: altieri, barter, ..., **cs**\*, ..., & yu\* *harvard data science review '20*  
- developing reliable clinical decision rules: a case study in identifying blunt abdominal trauma in children: kornblith, **cs**, et al. *seam abstract* 
- interpretable deep learning for accurate molecular partner prediction in clathrin-mediated endocytosis: **cs**\*, li\* et al. *in prep* 





### software packages

- imodels: a python package for interpretable modeling: **cs**\*, nasseri\*, & yu, '21  
- pcs-pipeline: a python package for facilitating stable data analysis 



### causal inference / ml theory

- matched sample selection in face datasets via GAN projections: **cs**, balakrishnan, & perona '21 *in submission* 
- revisiting complexity and the bias-variance tradeoff: dwivedi\*, **cs**\*, yu, & wainwright *arXiv '20* 

### statistical neuroscience


- large scale image segmentation with structured-loss-based deep learning for connectome reconstruction: funke et al. *tpami '18* 
- a weighted- $\ell_1$ , multi-task graphical model with applications to heterogeneous brain connectivity: **cs**, wang, & qi, *neurips '17 amlicd workshop* 
- a consensus layer V pyramidal neuron can sustain interpulse-interval coding: **cs** & levy *plos one '17* 
- linearized synaptic integration at no extra cost: morel, **cs**, & levy, *journal of computational neuroscience '18* 

### selected talks

- interpreting ml models: *uc berkeley bair seminar*, '20 
- uncovering brain connections underlying autism via graphical models: *tom tom founder's machine learning conference*, '17 

## teaching





### berkeley | student instructor

summer 2018  
machine learning: cs 189/289   
lectures to class of 80+ students

### fall 2019

artificial intelligence: cs 188 

## projects / activities

notes, blog, & slides  '14-'20  
hummingbird tracking  '18  
news balancer django app  '17  
java mini-games  '14-'16

## service

basis education volunteering '19-'20  
bair undergrad mentoring '18-'20  
cvpr reviewer '21  
aaai xai workshop reviewer '21  
neurips ml4h workshop reviewer '20  
computer literacy volunteering '15-'17