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# Julia Cluceru

A Ph.D. level bioengineer focused on deep learning applications in imaging. I have a strong theoretical and applied background in machine learning and statistical analysis. I am seeking internship opportunities for 2019-20.

## Education

**University of California, San Francisco** — *Ph.D. in Bioengineering/Pharmaceutical Sciences*
Fall 2015 - (exp.) Fall 2020 (San Francisco, CA)

**University of North Carolina, Chapel Hill** — *B.A., Mathematics; B.A. Chemistry*
Fall 2009 - Spring 2013 (Chapel Hill, NC) - Graduated with Distinction

## Projects + Research                                                     (prior projects/publications)

**Developing new tools to diagnose brain tumors using MRI** — *University of California, San Francisco*
Spring 2017 – Present (San Francisco, CA)
*Goal: Identify treatment damage that mimics the appearance of a brain tumor to help radiologists diagnose patients and plan treatment*

- Distinguished between real recurrence of a brain tumor and the damage induced by treatment using magnetic resonance images (MRI) and convolutional neural networks (CNNs) (progress here)
- Discovered a novel marker that can predict the outcome of tissue samples in recurrent tumor patients using repeated-measures statistics and logistic regression *(publication pending)* (progress here)
- Programmed two end-to-end python-based MRI processing pipelines for different regions of interest, including quality control visualization. Pipeline adoption by lab members saving ~2 hours of processing per patient group.

**Automating the retrieval of relevant images for doctors** — *University of California, San Francisco*
Fall 2018 – Present (San Francisco, CA)
*Goal: Create a web-based application for neurologists that automatically classifies, retrieves + aligns unlabeled images of interest to assess disease progression over time*

- Developed baseline models using support vector classifiers on features derived from image-associated metadata
- Designed two-step classification experiments to 1) classify brain images (0.97 AUC); and 2) classify MRI contrast of brains resulting in 96.4% accuracy (6 well-balanced classes) using CNNs + random forests (progress here)
- Developed a command line tool to create reproducible stratified training and testing splits of brain MRI exam cohorts for seamless integration into the pytorch workflow
- Deployed algorithms into the UCSF Neurology clinic to display the correct images of patients' brains with other clinical metrics over time, serving 15 clinicians with ~1000 projected patient visits per year (~10k MRI exams/year)

**Stratifying brain tumor patients into genetic subtypes** — *University of California, San Francisco*
Summer 2019 – Present (San Francisco, CA)
*Goal: Group patients into one of three major genetic brain tumor subtypes in order to evaluate their candidacy for different chemotherapies*

- Classified patients into genetic subtypes with 91% validation accuracy (even class distribution) using CNNs (progress here)
- Successfully repurposed my MRI processing pipeline developed above for all images in this analysis

**Evaluating microfinance loan candidacy** — *University of California, Berkeley*
Summer 2019 (Berkeley, CA) - (linked here)
*Goal: Predict whether an individual would be suitable for microfinance loans based on financial history*

- Used EDA to visualize correlations among the feature set comprised of 10 datasets describing human demographics and general financial information
- Transformed 400,000 disparate financial transactions into a score representing credit
- Predicted credit score with gradient boosting machines, providing insight into the most important features related to loan payer status

## Skills

- Pandas, Numpy, Scikit-learn, OpenCV, Pillow, Pytorch, R, bash scripting, git, jupyter; Some: Tensorflow, SQL

## Publications + Posters

### Papers

- Nesmith JE, Chappell JC, Cluceru JG, et al. Blood vessel anastomosis is spatially regulated by Flt1 during angiogenesis. *Development*. 2017:1445:889–96.
- Chappell JC, Cluceru JG, Nesmith JE, et al. Flt-1 (VEGFR-1) coordinates discrete stages of blood vessel formation. *Cardiovasc. Res.* 2016:1111:84–93.
- Walpole J, Chappell JC, Cluceru JG, et al. Agent-based model of angiogenesis simulates capillary sprout initiation in multicellular networks. *Integr Biol (Camb)*. 2015:79:987–97.

### Selected Talks

- Cluceru J, et al., Recurrent high-grade glioma and treatment effects have different MR signatures in the contrast-enhancing and nonenhancing lesions. *Society for Neuro-Oncology,* Phoenix, AZ. Nov 2019.

### Selected Posters

- Cluceru J, Crane J. Automated longitudinal alignment and visualization of clinical neurological MRI exams. *American Society for Functional Neuro-Radiology.* San Francisco, CA. Nov 2019.
- Cluceru J, Nelson SJ, Molinaro AM, Phillips JJ, Olson MP, Jakary A, Nair D, Cha S, Chang SM, Lupo, JM. MR imaging parameters are associated with the pathology of recurrent high-grade tumor in the context of treatment effect. *Society for Neuro-Oncology.* New Orleans, LA. Nov 2018.
- Cluceru J, Nelson SJ, Molinaro AM, Phillips JJ, Olson MP, Jakary A, Nair D, Cha S, Chang SM, Lupo, JM. Treatment effect and recurrent tumor have different MR signatures in the contrast-enhancing and nonenhancing regions. *International Society of Magnetic Resonance Imaging.* Paris, FR. June 2018.

## Awards + Scholarships

- Ruth L. Kirschstein T32 NIH Training Grant, $49,140 total award — 2018-2019
- Diversity Scholarship, $5,000 total award, USF Deep Learning Part I & II — 2018-2019
- 1st place, Best Student Speaker at the AAPS Insight Symposium — Stockton CA, 2019
- 1st place, Best Poster at the UCSF Radiology Symposium — Santa Rosa, CA, Mar 2019
- Invited Speaker, Society for Neuro-Oncology Conference — Phoenix, AZ, Nov 2019

## Selected Coursework

- **University of San Francisco**: Deep Learning Pt. I, II (Howard),  Introduction to Deep Learning (Interian)
- **Stanford**:  CS231n (Li), Statistical Learning (Tibshirani, Hastie), Introduction to Machine Learning (Ng), Introduction to Deep Learning (Ng), Hyperparameter tuning, Regularization and Optimization (Ng), Convolutional Neural Networks (Ng)
- **École Polytechnique Fédérale de Lausanne**: Digital Signal Processing (Prandoni)
- **UCSF:** Pharmacokinetics (Kroetz, Giacomini, Benet), Computational Pharmacogenomics (Bandyopadhyay)
- **UC Berkeley:** Selected lectures from CS61A (Harvey), Graduate Data Science Organization participant