# CAT P. LE

☎ (626)-360-8023 • ✉ cat.le@duke.edu • 🌐 catphuocle.com • in linkedin.com/in/catple/

## EDUCATION

**Duke University**                                                                   Durham, NC
Ph.D., Electrical and Computer Engineering                      Expected May 2023
Research: *Machine Learning, Computer Vision*
Thesis: *Task Affinity and Its Applications in Machine Learning*
Advisor: Dr. Vahid Tarokh

**California Institute of Technology**                                   Pasadena, CA
M.S., Electrical Engineering                                                       June 2017
GDP: 4.00
Advisor: Dr. Babak Hassibi

**Rutgers University – New Brunswick**                        New Brunswick, NJ
B.S., Electrical and Computer Engineering                                 May 2016
GDP: 4.00
Honors: *Summa Cum Laude, Matthew Leydt Society, John B. Smith Award,*
*Outstanding Engineering Scholar, E. M. Toomey Scholarship, Tau Beta Pi, Eta Kappa Nu*

## PROFESSIONAL EXPERIENCE

**Amazon – Alexa Natural Understanding**                          Arlington, VA
*Research Scientist*                                      June 2022 – September 2022
- Analyzing the open-domain dialogs via sentiment analysis, response relevance, response specificity, and text classification.
- Designing the feature extraction frameworks to utilize the relevant features from the open-domain dialogs for customer rating prediction.
- Developing a novel open-domain dialog evaluation system, based on BERT, LSTM, and causal inference analysis. The model is trained to predict the ratings from the customers and experts.
- Applying causal inference in the open-domain dialog evaluation system helps improve the flexibility and prediction performance of the model.

**Motorola Solutions**                                                              Dallas, TX
*Software Engineer*                                              June 2017 – August 2018
- Developing a Camera Shutter Synchronization System with LED Strobing for the license plate recognition cameras.
- Optimizing the Optical Character Recognition (OCR) algorithm of the license plate recognition cameras.
- Improving the energy consumption and the detection performance of the license plate and facial recognition cameras.
- Developing the firmware for the license plate and facial recognition cameras.

## RESEARCH EXPERIENCE

**Duke University**                                                                                                Durham, NC
*Graduate Research Assistant*                                                           August 2018 – Present
- Developing a novel task affinity based on Fisher Information matrices and maximum bipartite matching algorithm.
- The task affinity indicates the complexity of transfering the knowledge of a task to another. It is non-commutative and invariant to label permutation.
- Designing frameworks to apply task affinity in Neural Architecture Search, Transfer Learning, Few-Shot Learning, Continual Learning, Multi-Task Learning, Causal Inference, and Image Generative Models.

**California Institute of Technology**                                                     Pasadena, CA
*Graduate Research Assistant*                                                 September 2016 – June 2017
- Designing the framework to understand the American sign language using the NASA Jet Propulsion Laboratory (JPL) Sleeve, which receives the signals from 20 hand muscles and maps them into the alphabet.
- Developing the real-time musical note detector, using FPGA, and FFT.

**Rutgers University**                                                                        New Brunswick, NJ
*Undergraduate Research Assistant*                                              August 2015 – May 2016
- Developing the Radio Access Network under the REU Funding Program of the National Science Foundation (NSF).
- Designing a simulation with three OpenAirInterface base stations, using USRP B210, which is capable of allocating resources according to users' demands.
- Evaluating the data transmission rate using the Spectrum, Waterfall, and Constellation plots with varying bandwidths.

**WINLAB**                                                                                  North Brunswick, NJ
*Undergraduate Research Assistant*                                             May 2015 – August 2015
- Developing the framework for Wi-Fi, LTE, and LTE in the Unlicensed Spectrum.
- Design a simulation of the LTE's base station (eNB) and users (UEs) using USRP B210 with the OMF and OpenAirInterface repositories.
- Evaluating the data transmission rate using the Spectrum, Waterfall, and Constellation plots with varying bandwidths.

## TEACHING EXPERIENCE

**Duke University**                                                                                                Durham, NC
- ECE 590 - Introduction to Deep Learning
- ECE 681 - Pattern Classification and Recognition Technology

**California Institute of Technology**                                                     Pasadena, CA
- APh/EE 9 - Solid-State Electronics for Integrated Circuits

**Rutgers University**                                                                        New Brunswick, NJ
- 14:332:346 - Digital Signal Processing

## PUBLICATIONS

- C. P. Le, L. Dai, M. Johnston, Y. Liu, M. Walker, R. Ghanadan, "Improving Open-Domain Dialog Evaluation with a Causal Inference Model," in Diversity in Dialogue Systems, IWDSD, 2023. **Best Paper Award Runner-Up**.
- Aloui, A., Dong, J., Le, C. P., and Tarokh, V., "Causal Knowledge Transfer from Task Affinity," submitted to UAI, 2023.
- C. P. Le, J. Dong, M. Soltani, and V. Tarokh, "Task Affinity with Maximum Bipartite Matching in Few-Shot Learning," in International Conference on Learning Representations (ICLR), 2022.
- C. P. Le, M. Soltani, J. Dong, and V. Tarokh, "Fisher Task Distance and Its Applications in Neural Architecture Search and Transfer Learning," in IEEE Access 10, 2022.
- C. P. Le, M. Soltani, R. Ravier, and V. Tarokh, "Task-Aware Neural Architecture Search," in IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021.
- C. P. Le, M. Soltani, R. Ravier, and V. Tarokh, "Improved Automated Machine Learning from Transfer Learning," in CoRR, 2021.
- C. P. Le, Zhou, Y., Ding, J., and V. Tarokh, "Supervised Encoding for Discrete Representation Learning," in IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020.

## HONORS & AWARDS

- **Matthew Leydt Society** – Rutgers University                                    2016
  *Top 1% Highest-Achieving Graduates of the Class of 2016*
- **Outstanding Engineering Scholar** – Rutgers University                 2016
  *The Highest Cumulative GPA Graduate in the School of Engineering*
- **John B. Smith Award** – Rutgers University                                      2016
  *The Highest-Ranking Graduate in the Department of Electrical Engineering*
- **Nikola Tesla Scholar** – Columbia University                                    2016
- **E. M. Toomey Scholarship** – Rutgers University                             2015

## PROFESSIONAL AFFILIATIONS AND HONOR SOCIETIES

| | |
|---|---|
| IEEE – Signal Processing Society | 2020 – Present |
| The Institute of Electrical and Electronics Engineers (IEEE) | 2018 – Present |
| Sigma Alpha Pi | 2016 – Present |
| Eta Kappa Nu | 2015 – Present |
| Tau Beta Pi | 2015 – Present |

## SKILLS

- **Programming Language** – Python, C/C++, Matlab, Git, Numpy, Scipy, Scikit-learn, Pandas, Matplotlib, Seaborn, OpenCV, Tensorflow, Keras, Pytorch
- **ML Framework** – Transfer Learning, Continual Learning, Few-Shot Learning, Reinforcement Learning, Computer Vision, Neural Architecture Search, Natural Language Understanding

# REFERENCES

- Prof. Vahid Tarokh (vahid.tarokh@duke.edu)
  Professor, Duke University
- Prof. Babak Hassibi (hassibi@caltech.edu)
  Professor, California Institute of Technology
- Prof. Yicheng Lu (ylu@ece.rutgers.edu)
  Distinguished Professor, Rutgers University