

ANDREA BURNS

Computer Vision. Natural Language Processing. Machine Learning.

EDUCATION

Boston University – *Ph.D., Computer Science*

SEPTEMBER 2018 – PRESENT, BOSTON, MA

Advised by Prof. Kate Saenko, Prof. Bryan A. Plummer. Member of the Image and Video Computing group.

Tulane University – *B.S., Mathematics, Computer Science*

SEPTEMBER 2014 – MAY 2018, NEW ORLEANS, LA

GPA: 3.94/4.0. Minor in French. Summa Cum Laude graduate, member of Phi Beta Kappa honor society and participant of Women in Technology.

Université Paris Diderot – *Semester Abroad*

SEPTEMBER 2018 – DECEMBER 2018, PARIS, FRANCE

French immersion semester abroad.

PUBLICATIONS

- [1] **A. Burns**, D. Kim, D. Wijaya, K. Saenko, S. Sclaroff, B. A. Plummer. “Learning to Scale Multilingual Representations for Vision-Language Tasks.” In Proceedings of the IEEE European Conference on Computer Vision (ECCV), 2020. (Spotlight, top 5% of accepted papers)
- [2] **A. Burns**, R. Tan, K. Saenko, S. Sclaroff, B. A. Plummer. “Language Features Matter: Effective Language Representations for Vision-Language Tasks.” In Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2019.
- [3] **A. Burns**, W.U. Bajwa. "Multispectral imaging for improved liquid classification in security sensor systems", Proc. of the International Society of Optics and Photonics (SPIE) 10644, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIV, 1064418 (8 May 2018); doi: 10.1117/12.2304696

AWARDS

Grace Hopper Conference Award, Boston University

Invited participant for the Grad Cohort Workshop of the CRA-W

Dean's Fellowship Fall 2018, Boston University

Friezo Family Greater New York Area Scholarship 2015-18, Tulane University

The Academic Achievement Award Scholarship 2014-18, Tulane University

Dean's List 2014-18, Tulane University

The Elsa Freiman Angrist Scholarship 2015-18, Tulane University

RESEARCH EXPERIENCE

Tulane University – *Undergraduate Researcher*

SEPTEMBER 2017 – MAY 2018, NEW ORLEANS, LA

- **Probabilistic Chemotaxis Modeling for Sperm Motility.** Developed a probabilistic algorithm to determine sperm swimming behavior with chemotaxis and short-term swimming decisions in Python. Presented at the SCALA conference at Louisiana State University, February 2018.

DIMACS – *NSF REU Scholar*

MAY 2017 – JULY 2017, PISCATAWAY, NJ

- **Machine Learning from Multimodal Data.** Improved accuracy of image classification of liquids by 60% using a self-curated multispectral dataset in Python. “Multispectral imaging for improved liquid classification in security sensor systems” published and presented at the SPIE Defense & Security Conference, April 2018.

Tulane University – *NSF REU Scholar*

MAY 2016 – JULY 2016, NEW ORLEANS, LA

- **Mathematical and Computational Biofluids.** Discovered implicit limitations in phenomenological and neural-based models of simple vertebrate locomotion when affected by external sensory input, ultimately creating a combination of models using Matlab.

INDUSTRY EXPERIENCE

Ellevest – *Software Engineering Intern*

JUNE 2018 – AUGUST 2018, NEW YORK, NY

- **Drift Report Update and Extension.** Implemented key compliance report to ensure consistency between clients’ assigned portfolios and owned securities. Refactored SQL to query relevant account information and integrated Sidekiq job into Ruby on Rails application to store in database records. Implemented front-end interface for filtering, analyzing, and taking action on accounts with inconsistencies. Began work on creating intelligent models for action prediction.

TEACHING EXPERIENCE

Boston University – *Guest Lecturer*

AI & Systems Biology (ENGBE500) Presented an introduction to feed-forward and convolution neural networks.

Boston University – *Teaching Fellow*

Introduction to Computer Science (CS101) Taught and facilitated lab lectures and held office hours weekly.

Boston University – *Grader*

Machine Learning (CS542) Graded multiple assignments during the semester, reviewed content and oversaw Piazza discussions.

PROJECTS

Boston University – *Graduate Researcher*

JANUARY 2020 – PRESENT, Boston, MA

- **Image Captioning for Pictures Taken by Low-Vision and Blind Users.** Designing image captioning models that better leverage spatial relationships and well known patterns/logos to counter OCR failures. Third place winner of the VizWiz Grand Challenge at CVPR 2020.

APRIL 2019 – PRESENT, Boston, MA

- **Automating Web Tasks Across Environment and Ability.** Building mobile application task dataset, to be used with environment-agnostic reinforcement learning policy for the purpose of automating web navigation tasks across different environments. A feasibility classifier and action-oriented captioning model will be built to provide tools for low-vision or blind users.

Boston University – *Graduate Student*

MAY 2019 – APRIL 2019, Boston, MA, CS520 Final Project

- **Supervised Learning with Abstract Templates.** Implemented logistic regression and perceptron algorithms by creating abstract supervised learning templates in ATS. Informational video can be found here: www.youtube.com/watch?v=YRNSqJDEcws.

NOVEMBER 2018 – DECEMBER 2018, Boston, MA, CS585 Final Project

- **Visual Speech Recognition Survey.** Compared feature representation performing VSR of the AVLetters dataset with Hu moments, Zernike moments, HOG descriptors, and LBP-TOP features. Investigated frame-level and video-level classification using an SVM classifier in SciKitLearn.

Tulane University – *Undergraduate Student*

SEPTEMBER 2017 – MAY 2018, New Orleans, LA

- **Multimodal Sentiment Analysis for Voice Message Systems.** Created a multimodal machine learning model to learn the urgency of a voice message after categorizing it into four emotions: anger, fear, joy, and sadness. Used Python's SciKitLearn and SDK libraries to apply emotion classification and unsupervised intensity regression on audio and text data.

SELECTED COURSEWORK

Boston University

- Image and Video Computing (CS585) • Advanced Optimization Algorithms (CS591E1)
- Deep Learning (CS591S1) • Intro to Natural Language Processing (CS585)

Tulane University

· Intro to Machine Learning (CS3240) · Machine Learning (CS4720)

RESEARCH TALKS / OUTREACH

Hariri Institute for Computing — *AIR Research Talk*

Presented “Learning to Scale Multilingual Representations for Vision-Language Tasks” at the Artificial Intelligence Research initiative gathering 5/18/2020.

Girls Who Code — *AI Panelist*

Participated in an Artificial Intelligence Panel held by Girls Who Code at Boston University 2/20/2020 and informed women of the graduate school application process.

Hariri Institute for Computing — *AIR Research Talk*

Presented “Language Features Matter: Effective Language Representations for Vision-Language Tasks” at the Artificial Intelligence Research initiative gathering 7/1/2019.

AI4ALL — *Guest Speaker*

Presented introduction to vision and language topics during the AI4ALL program which encourages high school women to get involved with AI, hosted by Boston University 7/22/2019.

PROFESSIONAL ROLES

ECCV — *Reviewer*

Reviewed one paper for the 2020 European Conference on Computer Vision.

WACV — *Reviewer*

Reviewed two papers for the 2020 Winter Conference on Applications of Computer Vision.

Boston University — *IVC Seminar Coordinator*

Invited speakers and organized weekly meetings for the Image and Video Computing group for the Summer 2019 - Summer 2020.

SKILLS

Languages · Python · Ruby on Rails · Java · Matlab · HTML/CSS

Tools · PyTorch · SciKit-Learn · Git