ANDREA BURNS

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EDUCATION

Boston University
Ph.D., Computer Science **2018 – Present**
Advised by Prof. Kate Saenko and Prof. Bryan A. Plummer.
Member of the Image and Video Computing group.

Tulane University
B.S., Mathematics, Computer Science **2014 – 2018**
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 **2016**
French immersion semester abroad.

PUBLICATIONS

A. Burns, D. Kim, D. Wijaya, K. Saenko, B. A. Plummer. *"Learning to Scale Multilingual Representations for Vision-Language Tasks."*
In the European Conference on Computer Vision (ECCV), 2020. (Spotlight, top 5% of papers)

A. Burns, R. Tan, K. Saenko, S. Sclaroff, B. A. Plummer. "*Language Features Matter: Effective Language Representations for Vision-Language Tasks."*
In the Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2019.

A. Burns, W.U. Bajwa. "Multispectral imaging for improved liquid classification in security sensor systems."
In the Proceedings of the International Society of Optics and Photonics (SPIE) 10644, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIV, 2018.

AWARDS

Third Place Winner of the CVPR 2020 VizWiz Grand Challenge	**2020**
Grace Hopper Conference Award, Boston University	**2019**
Invited participant for the Grad Cohort Workshop of the CRA-W	**2019**
Dean's Fellowship, Boston University	**2018**
Friezo Family Greater New York Area Scholarship, Tulane University	**2015 – 2018**
The Elsa Freiman Angrist Scholarship, Tulane University	**2015 – 2018**
Dean's List, Tulane University	**2014 – 2018**
The Academic Achievement Award Scholarship, Tulane University	**2014 – 2018**

RESEARCH EXPERIENCE

Tulane University
Undergraduate Researcher – Probabilistic Chemotaxis Modeling for Sperm Motility **2017 – 2018**
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.

NSF REU Scholar – Mathematical and Computational Biofluids **2016**
Discovered implicit limitations in phenomenological and neural-based models of simple vertebrate locomotion when affected by external sensory input. A mixture of models was applied using Matlab.

DIMACS
NSF REU Scholar – Multispectral Liquid Classification **2017**
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

INDUSTRY EXPERIENCE

Google
Student Researcher – Robust Perception **Present**
Building unsupervised contrastive learning techniques for disentangled visual representations.

Google
Research Intern – Robust Perception **2020**
Building unsupervised contrastive learning techniques for disentangled visual representations.

Ellevest
Software Engineering Intern – Drift Report Update and Extension **2018**
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) **2020**
Presented an introduction to feed-forward and convolution neural networks.

Grader – Machine Learning (CS542) **2019**
Graded multiple assignments during the semester, reviewed content and oversaw Piazza discussions.

Teaching Fellow – Introduction to Computer Science (CS101) **2019**
Taught and facilitated lab lectures and held weekly office hours.

PROJECTS

Boston University
Graduate Researcher – Image Captioning for Pictures Taken by Low-Vision and Blind Users **2020 – Present**
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, awarded $10K Microsoft Azure Credit.

Graduate Researcher – Automating Web Tasks Across Environment and Ability **2019 – Present**
Building mobile application task dataset, to be used with an 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.

Graduate Student – CS520 Final Project **2019**
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.

Graduate Student – CS585 Final Project **2018**
Surveyed features representations for Visual Speech on the AVLetters dataset. This included Hu moments, Zernike moments, HOG descriptors, and LBP-TOP features. Investigated frame-level and video-level classification using an SVM classifier in SciKit-Learn.

Tulane University
Undergraduate Capstone – Multimodal Sentiment Analysis for Voice Message Systems **2017 – 2018**
Created a multimodal machine learning model to learn the urgency of a voice message after performing sentiment analysis. Used Python's SciKit-Learn and SDK libraries to apply emotion classification and unsupervised intensity regression on audio and text data.

RESEARCH TALKS / OUTREACH

Hariri Institute for Computing
AIR Research Talk **2020**

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

AIR Research Talk **2019**
Presented “Language Features Matter: Effective Language Representations for Vision-Language Tasks” at the Artificial Intelligence Research initiative.

Girls Who Code
AI Panelist **2020**
Participated in an Artificial Intelligence Panel held by Girls Who Code at Boston University to inform women of the graduate school application process.

AI4ALL
Guest Speaker **2019 – 2020**
Presented introduction to vision and language topics during the AI4ALL program which encourages high school women to get involved with Artificial Intelligence, hosted by Boston University.

SELECTED COURSEWORK

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

Tulane University
- Machine Learning (CS4720)
- Intro to Machine Learning (CS3240)

PROFESSIONAL ROLES

Reviewer **2020**
ECCV, WACV, Big Data

Boston University
IVC Seminar Coordinator **2019 – 2020**
Invited speakers and organized weekly meetings for the Image and Video Computing group.

SKILLS

Languages
Python, Ruby on Rails, Matlab

Tools
PyTorch, Tensorflow, SciKit-Learn, Git