Tyler Giallanza

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Education

B.S. in Computer Science **August 2017 - June 2020**
Southern Methodist University GPA: 4.0
- Minor in Chinese

Study Abroad, Computer Science **October 2019 - June 2020**
Oxford University

Professional Experience

Research Assistant **March 2019 – Present**
Princeton Neuroscience Institute
- Development of word embedding models for increased predictive power in human behavior
- FMRI scanning to investigate influence of attention on semantic representations
- Research position funded by NSF-REU and Leadership Alliance

Year-Round Research Assistant **Fall 2017 – Present**
Darwin Deason Institute for Cybersecurity, Southern Methodist University
- Lead researcher on project using deep learning for mobile device side-channel attack prevention (externally funded)
- Head researcher for project on generative adversarial network applications to network security (externally funded)
- Conducting research on deep learning for audio signal processing
- Designed and implemented graph search algorithms to optimize traversals of multi-valued decision diagrams in multiple-objective optimization problems

Academic Year Research Assistant **Spring 2017 – Fall 2019**
Intelligent Data Analysis Lab, Southern Methodist University
- Interdisciplinary research applying deep learning algorithms to flow field analysis and classification
- Leading research on creating human-interpretable machine learning classification algorithms
- Conducting research on machine learning model understanding through data visualization
- Contributed major feature to open-source R package ArulesViz with over 10,000 unique downloads per month

Academic Year Research Assistant **Fall 2018 – Spring 2019**
AT&T Center for Virtualization, Southern Methodist University
- Creating a data visualization platform to assist corporations comparing CSP offerings
- Deploying big-data search, filtering, and visualization via BigQuery and GCP
- Contributing to open-source platform PerfKitExplorer

Academic Year Research Assistant **Fall 2017 – Fall 2018**
Lyle School of Engineering, Southern Methodist University
- Research and development of novel network security protocols
- Lead author on submitted publication describing low-resource IoT security protocol

Software Development Intern **Summer 2015 & 2016**
Northrop Grumman, Aurora, CO
- Led team of students developing computer vision algorithm for object detection from aerial video footage

- Developed content-management website for employee on-boarding and training

Service and Instruction

CyberPatriot Team Mentor **August 2018 - Present**
CyberPatriot Cyber Defense Program, USA
- Volunteer team mentor for 6 high-school teams competing in largest youth cyber defense competition
- Provides tutoring and mentoring weekly via Skype
- Coached 3 teams to score within the top 10% of the competition (over 4,000 teams total)

Co-founder and Lead Instructor **Summer 2016 – Winter 2018**
Colorado MC2 Camp, Denver, CO
- Co-founded educational summer camp for middle-school students to learn STEM topics
- Lead instructor for multiple weeks per summer; over 75 students instructed sine founding
- Developed program website, coloradomc2.com

Computer Science Tutor **August 2016 – May 2017**
Cherry Creek High School, Greenwood Village, CO
- Worked with head computer science teacher to provide mentoring/tutoring to at-risk students from under-represented groups
- Instructed 3 students in Advanced Placement Computer Science
- Raised student grades by an average of 20%; all tutored students passed the AP test

Publications

Conference/Journal Articles

1. *Keyboard Snooping from Mobile Phone Arrays with Mixed Convolutional and Recurrent Neural Networks.*
   Tyler Giallanza, Travis Siems, E. Gabrielsen, I. Johnson, E. Larson, and M. Thornton.
   Proceedings of the ACM on Interactive, Mobile, Wearable, and Ubiquitous Technologies. Volume 3 Issue 2, June 2019 Article No. 45.
2. *Task Value Calculus: Multi-objective Trade off Analysis using Multiple-Valued Decision Diagrams.*
   Tyler Giallanza, Eric Gabrielsen, M. Taylor, E. Larson, and M. Thornton.
   2019 IEEE 49th International Symposium on Multiple-Valued Logic. Pages 126-131.

Open-Source Code Packages

1. *ArulesViz: Visualizing Association Rules and Frequent Itemsets.*
   Michael Hahsler, **Tyler Giallanza**, and S. Chelluboina.
   The Comprehensive R Archive Network (CRAN).
2. *ArulesCBA: Classification Based on Association Rules in R.*
   Ian Jonhson, **Tyler Giallanza**, and M. Hahsler.
   The Comprehensive R Archive Network (CRAN).
3. *ArulesCWAR: Classification Based on Weighted Association Rules.*
   Tyler Giallanza and Michael Hahsler.
   The Comprehensive R Archive Network (CRAN). Accepted and in press.

Presentations/Lectures

1. *Context Matters: Recovering Human Semantic Structure from Machine Learning Analysis of Large-Scale Text Corpora.*

Council on Undergraduate Research 2019; invited poster presentation.

2. *Context Matters: Recovering Human Semantic Structure from Machine Learning Analysis of Large-Scale Text Corpora.*
   Society for Neuroscience Annual Conference 2019; conference presentation.
3. *Context-Specific Embedding Spaces Recover Similarity.*
   Leadership Alliance National Symposium 2019; conference presentation.
4. *Context-Specific Embedding Spaces Recover Similarity.*
   Princeton Neuroscience Institute and Intel Labs; invited talk.
5. *Task Value Calculus: Multi-objective Trade off Analysis using Multiple-Valued Decision Diagrams.*
   Lyle School of Engineering Research Days 2019; poster presentation.
6. *Firebase as a Mobile and Web Backend.*
   HackSMU 2019; invited workshop presentation.
7. *Authentication with Time Delay.*
   CSE3339 (Information Security) 2019; invited guest lecture.
8. *Scheduling Algorithms for Course-Conflict Reduction at Large Schools.*
   Cherry Creek School District Board of Directors Meeting 2017; invited talk.

Submitted Publications

1. *Context Matters: Recovering Human Semantic Structure from Machine Learning Analysis of Large-Scale Text Corpora.*
   Marius Cătălin Iordan, **Tyler Giallanza**, C.T. Ellis, N. Beckage, and J.D. Cohen.
   Journal submission 2019. Pre-print in arXiv: https://arxiv.org/abs/1910.06954
2. *CWAR: Classification Based on Weighted Association Rules.*
   Tyler Giallanza and Michael Hahsler.
   Journal submission 2019.
3. *EAT: Estimated-Arrival-Time Authentication for Encryption-Free Authentication in Resource Constrained Devices.*
   Tyler Giallanza, Ian Johnson, D. Engels, and J. Dworak.
   Conference submission 2019.

Honors and Awards

Goldwater Scholar **2019**
Barry Goldwater Scholarship Foundation
- Funded national scholarship award honoring the top undergraduate researchers in STEM fields

NSF-REU Award Winner **2019**
National Science Foundation
- Fully funded summer research program at the Princeton Neuroscience Institute

Leadership Alliance SR-EIP **2019**
Leadership Alliance
- Summer research funding and career development (in cooperation with NSF-REU) for URM students

President's Scholar **2018**
Southern Methodist University
- 4 year full academic scholarship awarded to top 20 incoming students

National Merit Scholarship **2018**
National Merit Scholarship Corporation
- $8,000 academic scholarship granted to top students nationally based on test scores

AXA Achievement Scholar **2018**
AXA Corporation
- $10,000 academic scholarship award granted to top academic achiever and leader in each state

National AP Scholar **2018**
The College Board
- Award granted to top national AP scorers; awarded due to a perfect 5/5 score on 12 different AP tests

2nd Place Nationally in Cybersecurity **2017**
CyberPatriot Cyber Defense Program
- Award granted out of thousands of initial teams