Camelia D. Brumar

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Education

May 2020 - Present
Ph.D. Computer Science, GPA: 3.960, *Tufts University*, Advisor: Dr. Remco Chang.

Relevant Coursework: Statistical Pattern Recognition, Directed Study on Graph Neural Networks and Graph Embeddings, Introduction To Machine Learning, Data Visualization Seminar, Web Engineering.

Graduation date: May 2020
B.S. Mathematics, GPA: 3.684, *University of Maryland, College Park (UMD)*, Advisor: Dr. Amitabh Varshney.

Relevant Corsework: Data Visualization, Data Analytics and Statistical Learning, Computer Graphics, Object-Oriented Programming, Geometry for Computer Applications, Probability Theory I, Numerical Analysis of Differential Equations, Abstract Algebra, Affine and Euclidean Geometry, Projective Geometry.

Publications

2020
PIXAL: Visualizing Explainable Anomalies through Predicate Induction, *IEEE TVCG 2021*, In submission.

Brian Montabault, <u>Camelia D. Brumar</u>, Michael Behrisch, Remco Chang.

2020
A Log-Rectilinear Transformation for Foveated 360-degree Video Streaming, *IEEE VR - TVCG 2021*, Honorable Mention.

David Li, Ruofei Du, Adharsh Babu, <u>Camelia D. Brumar</u>, Amitabh Varshney.

2019
Application of Approximate Matrix Multiplication to Neural Networks and Distributed SLAM, *IEEE HPEC 2019*, Co-first author.

Brian Plancher, <u>Camelia D. Brumar</u>, Iulian Brumar, Lillian Pentecost, Saketh Rama, David Brooks.

Work Experience & Research

May 2020 - Present
Graduate Research Assistant, *Visual Analytics Lab*, Tufts University, Supervisor: Dr. Remco Chang.

- Researching how to visualize semi-structured data such as network graphs using Graph Neural Networks, and how to create a tool that allows users to prototype such models without any coding involved. This project will potentially have applications in biology, COVID'19 data visualization, software visualization, etc.
- Co-authoring a paper based on the creation of a visual analytic system for explainable anomaly detection. Designed the visualization which is able to display a multi-dimensional data set and detect where the anomalies most probably occurred by using a parallel coordinates visualization integrated with a violin plot for each dimension.
- Research assistant on NSF Collaborative Research: Converging Genomics, Phenomics, and Environments Using Interpretable Machine Learning Models [*read more*]. Managing two research assistants/interns through the research and design process of integrating our platform.
- Research assistant for The Walmart Foundation, designing an experiment on gamifying a shopping website.

June 2021 - August 2021
Data Science Intern, *Alife Health*, San Francisco, CA - Remote Internship.

- Working on explainability, interpretability and visualization of deep neural networks using methods such as integrated gradients, occlusion sensitivity, Grad-CAM, SmoothGrad, etc.

March 2020 - May 2020	**UI/UX Intern**, *Hyka Therapeutics*, Remote Internship. ○ Researched interface designs of the section of Hyka's health application that is dealing with the motivation and encouragement for people that experience any type of mental distress.
October 2019 - May 2020	**Undergraduate Research Assistant**, *Graphics and Visual Informatics Laboratory at UMD*, College Park, MD, Supervisor: Dr. Amitabh Varshney. ○ Worked on the paper "*A Log-Rectilinear Transformation for Foveated 360-degree Video Streaming*", which was submitted and accepted to IEEE VR 2020 conference. ○ Worked on developing a user interface for creating animations starting from an individual image (photograph or painting). Reproduced results observed in the paper "*SinGAN: Learning a Generative Model from a Single Natural Image*".
May 2019 - August 2019	**Software Engineering Intern**, *Bose Corporation*, Framingham, MA, Supervisor: Matthew Jannace. ○ Developed a demo Android App and a Python Dockerized microservice in the Bose cloud. Prototyped a new Dynamic App UI experience by fetching dynamic resources and configuration from the cloud to display them in a mobile app. ○ Worked with the automation team on a research project about how to port the code that automates the UI tests for Bose Music App from Python to Kotlin.
March 2019 - July 2019	**Undergraduate Research Assistant**, *Worcester Polytechnic Institute*, Worcester, MA, Supervisor: Dr. Zhongqiang Zhang. ○ Worked on Rational Krylov subspace approximation methods applied to partial differential equations. Implemented the Randomized SVD for Image Processing and worked on implementing the exponential integrator method for the heat equation in 1D and 2D, using the functional matrix approach to evaluate the exponential matrix.

Projects

Fall 2020	**PIXAL**, *Collaboration Research project at VALT*. Visualizing and detecting anomalies for Machine Learning, where I am contributing by designing and building a visualization tool in d3.js to observe the results from our anomaly detection algorithm.
Summer 2020	**Dota 2 Counters Project**, *Major League Hacking Hackathon*. Built a force directed graph visualization tool using d3.js. This project was a 3rd place winner at the Data Day Grind hackathon organized by Major League Hacking.
Spring 2020	**Animation from a single image using SinGAN**, *Collaboration Research Project at UMD*. Contributed to a system which allows users to intuitively create short animated videos from single images. By using generative adversarial networks (GANs), our system allows users to add three distinct types of animations to their photographs using a simple web-based interface.
Fall 2019	**Foveated 360-degree Video Streaming**, *Collaboration Research Project at UMD*. Contributed strategically with matrix decomposition methods such as the singular value decomposition (SVD) and other approaches to communicate data in a VR scenario, more specifically the pipeline of 360-degree Video Streaming.
Summer 2017 & 2018	**Know Yourself Android App**, *Personal Project*. Developed a stress-prediction wearable application based on Random Forests with the goal of predicting the well being of its user as correlated with the day of the week, hour of the day, number of hours slept and as related to the weather (temperature, pressure, humidity, etc.) and other variables.
Spring 2019	**The Cite Site**, *CS 480X Data Visualization*. Built a treemap visualization in d3.js that aims to provide an informative and exploratory way of presenting information about Wikipedia articles, links and citations.
Fall 2019	**Alexa NGO Donator**, *HackUPC Winter Hackathon*. Developed an app for the Amazon Alexa which automatically makes donations to an NGO via Paypal conditioned on human behavior.

Awards & Membership

Summer 2020 — **Major League Hacking Prize**, *Data Day Grind Hackathon*.
Awarded the Third Prize Overall (200+ participants, 50+ projects).

Fall 2019 - Spring 2020 — **Dean's List**, *University of Maryland, College Park*.

Fall 2018 - Spring 2019 — **Dean's List**, *Worcester Polytechnic Institute*.

Skills

Programming.
Python • JavaScript • scikit-learn • pandas • HTML • CSS

Familiar.
d3.js • Java • Android • Bash • Matlab • SLURM Job Scheduler

Mentoring and Team Management

June 2021 - Present — **Binh (Irene) Chang**, *Tufts 2022*, VALT Undergraduate Research Assistant.

October 2020 - Present — **Zeyu Chang**, *Tufts 2022*, VALT Graduate Research Assistant.

October 2020 - May 2021 — **Anna W. Yuen**, *Tufts 2021*, Former VALT Undergraduate Research Assistant, Data Science Intern at U.S DOT Volpe National Transportation Systems Center.

May 2020 - September 2020 — **Kate Hanson**, *Tufts 2021*, VALT Undergraduate Research Assistant.

Teaching

Spring 2021 — **COMP 152-02 Visual Analytics**, *Tufts University*.
Assisted a lab by teaching d3.js.

Service & Activities

September 2020 - Present — **Harvard Innovation Labs**, *Member of The Venture Program*.

August 2020 - Present — **Association for Computing Machinery**, *Student Member*.

August 2020 — **SIGGRAPH 2020 Conference**, *Student Volunteer*.

Languages
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Romanian (native), Spanish (native), Catalan (native), and English (fluent).