

# Katalina Biondi

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## Education

**University of Central Florida**, Orlando, FL  
*Doctoral Student in Computer Science*, Current

**University of Washington Tacoma**, Tacoma, WA  
*Bachelor of Science*, Computer Science and Systems  
Minor in Mathematics, June 2019

## Employment

**Harmonic Discovery Cheminformatics Intern**  
**Nov 2021**

Research intern focusing on molecular fragmentation and classification for drug design.

**Human Centered Artificial Intelligence Research Assistantship**  
**June 2020 - Current**

Research Assistant with focus on Ai-driven techniques for drug-discovery and material design.

**U.S. Air Force Research Lab Summer Faculty Fellowship**  
**June 2020 - August 2020**

Research fellow focusing on analysis on deep learning models.

**FASTVDO Research Intern**  
**November 2019**

Research intern with focus on video quality analysis and a variety of DoD funded projects.

## Projects

**Fragment-Based Generative Modeling for Drug-Design**  
**2022**

In this project, we investigate the results of multiple fragment-based generative models to create novel kinase inhibitors. Models explored included in-house developed models, LSTM Generators with smiles, off-the self platforms such as MoLeR and REINVENT.

**Accurate prediction of adenine pocket kinase inhibitor substructures by integrating machine learning and expert curation (Accepted talk and poster at ACS 2022)**  
**2021**

This project we investigate the use of chemical fingerprints and descriptors to classify kinase inhibitor fragments as one of seven labels based on the KinFragLib dataset, prioritizing AP fragments using expert curated descriptors and commonly used chemical fingerprints.

**An Exploration of Virtual Screening Techniques for Small Molecule Inhibitors for COVID-19 (Accepted presentation at MRS Spring Meeting 2021)**

Accepted presentation at MRS Spring Meeting **2020**

This project different packages such as DeepChem, DeepPurpose and other published deep learning architectures were explored in order to rank binding affinities of small molecules to COVID-19. The rankings of the models have been validated in the nanotechnology lab at UCF. Models are being further optimized. The goal of the project is to find a material that can capture and kill COVID-19. Models include: GCNN and DNN. Further research is exploring how to leverage PauliNet information and also research in Hypergraph representation for deep learning.

**VMAF And Variants: Towards A Unified VQA  
2020 - Current**

This project our team investigates variants of the popular VMAF video quality assessment algorithm for the full reference case, using both support vector regression and feed-forward neural networks. The same methods are extend it to the no reference case, using some different features but similar learning, to develop a partially unified framework for video quality analysis.

**Machine Learning: Camouflage Detection  
October 2019 - 2020**

Personal research project to explore different machine learning models to detect camouflage objects in images and videos including convolutions neural network architectures and different feature selection techniques including image segmentation. Project aims to create a model to predict with a high level of accuracy so that the model can then be used for adversarial machine learning to fool the model with better camouflage techniques. **Dataset used: CAMO Dataset, Language used: Python**

**Machine Learning: Logistic Regression for Gender Classification  
April 2019 - June 2019**

Machine learning project to build a system for automatic recognition of the age, gender, and personality of social media users. When given as input the likes of a user, the system returns as output the age, gender and personality trait scores of that user. The models explored during this project include Naive Bayes and Logistic Regression, Lasso Regression. **Language Used: Python**

**Undergraduate Research: "IoT Pollution Detection Project"  
September 2018 - Current**

Applying Internet of Things (IoT) concepts to research and how to develop a smart system that is capable of detecting pollution in real-time. Using hardware prototyping platforms such as Arduino and Raspberry Pi to investigate populated areas around the City of Tacoma. During the directed research my primary contribution included front end web development and the first authoring of a conference paper. Project prototype will be demonstrated in hopes to be implemented in research for the Azores Islands in Portugal. The projects next phase is to build an app around this IoT edge platform, so scientist in the field can record additional data. **Skills learned: IoT basics, IEEE conference paper, scholarly research, Microsoft Azure basics, app development Ionic Framework, Javascript and Angular**

**Project Rubik's Cube:  
September 2018 - June 2019**

I am project leader for a RSO collaboration project with four other clubs on campus, including IEEE, HuSCII Coding, Math club, and Women in Code. The project aims to build a robot that will be able to solve a Rubiks Cube and be presented and displayed on campus. The purpose of this project is to work on a relatively simple project, and demonstrate how large groups can complicate tasks. The projects aims is to develop how to work in large teams on engineering projects. **Skills learned: hardware basics, computer vision basics, communication**

**Summer Research Assistant: "Wildfire Prediction Analysis":  
June 2018 - September 2018**

Sensitivity analysis of fuel loading data inputs and empirical wildfire emissions models. During this research, I help develop quantitative tools that improve scientific assessment and prediction of the effects of wildfire on air quality and carbon emissions. I work with existing computer models and quantitative methods to understand uncertainty in the prediction of wildfire emissions. Primary tasks include data processing, writing and running R scripts, data analysis, visualization, scientific literature review, and writing. **Skills learned: R, Latex, FOFEM Model, Consume Model, Sobol basics**

**Multi-Department Relocation Committee:  
Jan 2019 - June 2019**

Listened to staff and student concerns about underrepresented and formed a committee of twelve members to sit on a committee to achieve an equitable multi-department move at the University of Washington Tacoma. This included appointment of members and the creation of a committee charter and bylaws that had to be approved by the Senate, Board of Directors, and the Chancellor. **Skills learned: Roberts Rule, charter design, communication.**

**Publications**

**Classifying Camouflage Images Using CNN and K-Means Clustering for Image Segmentation**

10th International Conference on Computer Science and Information Technology  
March 21st, 2020, Vienna, Austria

**Hybrid Environment IoT-Mapping of Over-Tourism and Air Pollution in The Azores Archipelago**

2020 IEEE Conference on Technologies for Sustainability  
April 24th-25th, 2020, Las Vegas, Nevada

**User-Generated Data Collected from a Wireless Sensor Network: Monitoring Air Pollution Levels in the Azores**

International Conference on Engineering and Computer Science  
September 8-9, 2019, Guimaraes, Portugal

**Air Pollution Detection System Using Edge Computing**

International Conference in Engineering Applications  
Jul7 8, 2019, Azores Island, Portugal

**Presentations**

**ACS Fall Meeting**

Presentation: Accurate prediction of adenine pocket kinase inhibitor substructures by integrating machine learning and expert curation  
August, 2022

**ACS Fall Meeting - Sci-Mix**

Poster Presentation: Accurate prediction of adenine pocket kinase inhibitor substructures by integrating machine learning and expert curation  
August, 2022

**MRS Spring Meeting**

Symposium SM09: Peptide and Protein Design for Responsive Materials  
Poster Presentation: Binding Affinity of Oligomers Towards SARS CoV 2 S-Protein Through Machine Learning and Experimental Validation  
April 23, 2021, Virtual

**PNW MAA Sectional Meeting: Project Rubik's**

Student Speaker  
April 13, 2019, Portland

**Global Engagement Conference : IoT Pollution Detection Project**

Panel Presentation  
May 29, 2019, Tacoma

**Mini Makers Fair: Project Rubik's**

Demo Presentation  
May 11, 2019, Tacoma

**Mini Makers Fair: IoT Pollution Detection and Tree Energy Harvesting**

Poster Presentation  
May 11, 2019, Tacoma

## Experience

**Student Government Association** University of Central Florida  
**Graduate Senator**

November 2019 - Current

Orlando

The Legislative Branch (or Student Body Senate) is composed of 72 student leaders who are elected by the student body each year. Our Student Body Senate provides students and organizations with the funds necessary for travel and conference registration, as well as for campus-wide events and projects. Also, through various committees, Senate has great impact on issues that directly regard the Student Body. Student Senators also work on college-specific and/or campus-wide initiatives that better the student experience for UCF Knights!

**Student Technology Funds  
Committee**

University of Washington

September 2018 - June 2019

Tacoma

The Student Technology Fee Committee (STFC) is appointed by the Associated Students of UW Tacoma (ASUWT). As a voting student member of the fee committee, I assist in recommending and reviewing the amount of funds and decide what technology resources the fees will fund through the Annual Allocation and the Special Allocation processes.

**ASUWT Senator of the School of  
Engineering and Technology**

University of Washington

June 2018 - June 2019

Tacoma

I represent the School of Engineering and Technology for the University of Washington Tacoma. I attend weekly Senate meetings and plan student activities and evaluate issues that happen within the institute through a student represented voice.

**Data Structures Facilitator**

University of Washington

September 2018 - June 2019

Tacoma

As a facilitator I am involved in teaching support for selected institute programs, currently Data Structures for Computer Science. Work includes facilitating bi-weekly study sessions in a classroom for several hours. As a facilitator I construct worksheets, and attend meetings with faculty supervisors, and help guide students to understanding historically challenging classes.

**Marketing Coordinator**

Real Carriage Door Company

September 2017 - September 2018

Gig Harbor

As a Marketing Coordinator I was in charge of product database and SKU management. I received training in search engine optimization and Google Analytics. Other duties included day-to-day outreach, database management and extensive work with Excel, Google Spreadsheets, and Access, Mail Chimp, and other e-commerce platforms. I oversaw a small team of two to ensure ads and product images were completed on time.

**Supplemental Instruction Leader**

Tacoma Community College

September 2012 - September 2014

Tacoma

Supplemental Instruction (SI) is a series of weekly review sessions open to students taking difficult courses who want to better their understanding of course materials and improve their grades. During this position I facilitated weekly study sessions, attended meetings and training's, and researched teaching and studying techniques.

**Assistant Lab Technician**

Tacoma Community College

September 2012 - September 2014

Tacoma

Provided assistance in supporting science teaching laboratories and auxiliary areas in

the Science and Engineering Building. This includes work in biology, earth science, chemistry or physics. Assist with laboratory cleanliness and organization, assist with preparation of laboratory supplies for science courses, assist with the auxiliary functions of the science stock rooms.

## Recognition and Titles

**Husky 100, UWT:** Each year, the Husky 100 recognizes 100 UW undergraduate and graduate students from Bothell, Seattle and Tacoma in all areas of study who are making the most of their time at the UW.

**Deans List, UWT:** The quarterly dean's list includes the names of matriculated undergraduate students who have attained a quarterly grade point average of 3.50 in the final grades for at least 12 graded credits.

**Math Club Vice President, UWT:** Officer of Math Club at the University of Washington Tacoma

**Xenta Tower First Place Winner, TCC:** Received first place in an engineering competition at Tacoma Community College to design a tower with a functioning elevator, using straws as the tower structure.

**Environmental Club Vice President, TCC:** Former Officer of Environmental Club at the Tacoma Community College

**Port Orchard City Royal Ambassador, Port Orchard City:** Royal Ambassador for Port Orchard City, duties included fund-raising for local clubs, attending parades, and attending other town events.

## Conferences

### MRS Spring Meeting 2021

**SET Conference - Women in Technology: Navigating the Corporate Jungle Gym 2018:** Keynote presentation by Infoblox SVP of Global Customer Care Services, Sonya Andreae, followed by an insightful panel discussion and networking session. The panelists shared their experiences on developing and navigating an evolving career path while focusing on the successes and challenges encountered.

**MAA PNW Section Meeting 2018:** Seattle University hosted the Pacific Northwest section meeting of the Mathematical Association of America. Main event included a talk about Knot Theory.

**IEEE Rising Stars, 2019:** The Rising Stars conference focuses on bringing together technical professionals who are experts in emerging technologies including autonomous vehicles, space and manufacturing, cloud computing, big data, artificial intelligence, security and IoT.

**Women in CyberSecurity Conference, 2019:** This conference is a premier event to recruit, retain and advance women in cybersecurity. It brings together students and professionals from academia, research, government and industry to share knowledge and experience, network, learn and mentor.

## Clubs and Memberships

American Chemical Society  
Math Club  
IEEE Club  
Chinese Language Culture Club  
IEEE Student Member  
MAA Member  
WiCys

**Interests**

Machine Learning, Biology, Nanotechnology, Human-Machine Teaming, Artificial Intelligence, IoT, Defense Applications

## References

Dr. Orlando Baiocchi 253-692-4727 baiocchi@uw.edu Relationship: Professor and Research Advisor

Dr. Ehyab Al-Masri 253-692-4721 ealmasri@uw.edu Relationship: Professor and Research Advisor

Dr. Alan Bartlett 253-692-5692 alanmb@uw.edu Relationship: Club Advisor and Mentor

Elizabeth Hansen 253-692-4685 hansen7@uw.edu Relationship: Leadership Supervisor