

# BRYON TJANAKA

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## RESEARCH INTERESTS

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Robotics, (Hierarchical) Reinforcement/Imitation Learning, Clustering, Human-Robot Collaboration, Algorithms

## EDUCATION

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**Ph.D. Computer Science** Aug. 2020 - Present  
University of Southern California (Los Angeles, California, USA)  
Advisor: Stefanos Nikolaidis

**B.S. Computer Science** (ICS Honors program, AI specialization) Sept. 2017 - Jun. 2020  
University of California, Irvine (Irvine, California, USA)  
**GPA:** 4.0/4.0 • **GRE:** 170/170 quant., 161/170 verbal, 5/6 writing

**High School** Aug. 2013 - May 2017  
Bellarmine College Preparatory (San Jose, California, USA)  
**GPA:** 4.3/4.0 • **SAT:** 2350/2400

## HONORS AND AWARDS

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USC Graduate School Fellowship for Incoming Students Feb. 2020  
Summa Cum Laude, UCI School of ICS Jun. 2020  
NSF GRFP Honorable Mention Mar. 2020  
UCI Dean's Honor List Sept. 2017 - Mar. 2020  
UCI Regents' Scholarship Sept. 2017 - Jun. 2020  
UCI UROP Fellowship for *Improving Molecular Simulations* Jan. 2020  
UCI UROP Fellowship for *Improving Molecular Simulations* Jan. 2019  
UCI UROP Honorary Fellowship for *Implications of Mall Security Robots* Jan. 2018  
7<sup>th</sup>/88 at ACM ICPC 2019 SoCal Regional Nov. 2019  
9<sup>th</sup>/98 at ACM ICPC 2018 SoCal Regional Nov. 2018  
16<sup>th</sup>/105 at ACM ICPC 2017 SoCal Regional Nov. 2017  
39<sup>th</sup>/4103 in world, 4<sup>th</sup>/202 in US at IEEEExtreme 13.0 Oct. 2019  
74<sup>th</sup>/4049 in world, 7<sup>th</sup>/188 in US at IEEEExtreme 12.0 Oct. 2018  
Best Entrepreneurial Hack at HackUCI V hackathon Feb. 2019  
John Hollowell Composition Program Award for Best Advocacy Project, UCI School of Humanities May 2018  
2017 VEX Robotics High School World Champion Apr. 2017  
Recognition for VEX Robotics Championship, Rep. Ro Khanna, CA-17 Aug. 2017

## RESEARCH AND PROFESSIONAL EXPERIENCE

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**Undergraduate Researcher** Oct. 2019 - Jun. 2020  
Intelligent Dynamics Lab, UC Irvine  
Advisor: Professor Roy Fox

**Undergraduate Researcher** Oct. 2018 - Jun. 2020  
Mobley Lab, UC Irvine  
PI: Professor David Mobley, Graduate Mentor: Jessica Maat

**Independent Undergraduate Researcher** Oct. 2017 - Jun. 2018  
Mentor: Professor Caesar Sereseres

**Software Engineering Intern, Google Ads** Jun. 2020 - Aug. 2020  
Google, Inc. (Mountain View, California, USA)

**Software Engineering Intern, Google Ads** Jun. 2019 - Sept. 2019  
Google, Inc. (Mountain View, California, USA)

**Engineering Practicum Intern, Google Assistant** Jun. 2018 - Sept. 2018  
Google, Inc. (Mountain View, California, USA)

## PRESENTATIONS

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### **Improving Molecular Simulations through Force Field Development and Computational Techniques**

2019 UCI Undergraduate Research Symposium

### **Implications of Mall Security Robots on Privacy of Shoppers**

2018 UCI Undergraduate Research Symposium

## ATTENDED CONFERENCES

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ICLR 2020 (virtual; received travel award)

April 2020

UCI Undergraduate Research Symposium

May 2018, May 2019

## SELECTED PROJECTS

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### **Actor-Critic by Committee (ACBC)**

Oct. 2019 - Jun. 2020

**Associated with:** Undergraduate Researcher at Intelligent Dynamics Lab

Hierarchical reinforcement learning algorithms typically use a high-level controller to compose sub-policies sequentially or combinationally. Inspired by work on ensembles, we developed an algorithm, ACBC, in which outputs from multiple sub-policies, or experts, are composed with a linear combination. As the experts can control their weights, ACBC performs both sequential and combinational composition without a high-level controller.

### **Improving Molecular Simulations through Force Field Development and Computational Techniques**

Oct. 2018 - Jun. 2020

**Associated with:** Undergraduate Researcher at Mobley Lab

smirnoff99Frosst is a molecular dynamics force field, a set of parameters which defines how atoms interact in a system. Like many force fields, smirnoff99Frosst lacks parameters for improper torsions, which determine the planarity of molecules. This project involved building a pipeline which analyzes the eMolecules database of 6 million molecules to create new parameters, thus increasing the accuracy of smirnoff99Frosst.

### **Utilize All Parameters**

May 2019 - Jun. 2019

**Associated with:** Undergraduate Researcher at Mobley Lab

To benchmark a molecular dynamics force field, one needs a set of molecules which exercises all of the force field's parameters. Here, a greedy solution to the weighted set cover problem was used to select such a set for the smirnoff99Frosst force field from the eMolecules database of 6 million molecules. This work is included in a pending publication.

### **Multithreaded Affinity Clustering**

Jun. 2019 - Sept. 2019

**Associated with:** Software Engineering Intern at Google

Affinity clustering is a clustering algorithm which approximates the high quality of hierarchical agglomerative clustering while running in linear time. In this project, a multithreaded version of affinity clustering was implemented, optimized, and evaluated. Ultimately, this algorithm has applications in Ads and Search quality. This work is included in two pending publications.

### **Safeline**

Feb. 2019

**Associated with:** Best Entrepreneurial Hack at HackUCI V hackathon

Falls are one of the leading causes of injury for the elderly. In this hackathon project, a Raspberry Pi, a camera, and OpenCV were used to detect falls and send alerts to an iPhone.

### **3P Agent Crawl Tool**

Jun. 2018 - Sept. 2018

**Associated with:** Engineering Practicum Intern at Google

Third-party (3P) agents are plugins which provide additional functionality to Google Assistant. This project involved building a tool which evaluates an agent by analyzing its responses to thousands of relevant queries.

### **Implications of Mall Security Robots on the Privacy of Shoppers**

Oct. 2017 - Jun. 2018

**Associated with:** Independent Undergraduate Researcher with Dr. Sereseres

This independent project explored several privacy concerns which arise as a result of the introduction of security robots into malls.

## SELECTED COURSES

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Neural Networks and Deep Learning	Spring 2020
Optimal Control and Reinforcement Learning	Winter 2020
Formal Languages and Automata	Spring 2019

## LEADERSHIP & SERVICE ACTIVITIES

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<b>Senator</b>	Aug. 2020 - Present
USC Graduate Student Government	
<b>Webmaster</b>	Aug. 2020 - Present
USC Viterbi Graduate Student Association	
<b>Internal Vice President, Competitor</b>	Sept. 2017 - Feb. 2020
ACM, UC Irvine Chapter	
<b>Speaker, Volunteer</b>	Jul. 2017, Aug. 2018, Jun. 2019
Google Girl-Powered VEX Robotics Workshop	