

# TRISTAN W. BRODEUR

## CONTACT INFORMATION

Phone: +1 (505) 977-6014

Email: [brodeurtristan@gmail.com](mailto:brodeurtristan@gmail.com)

Personal Site: [twbot.github.io](http://twbot.github.io)

## RELATED INFORMATION

Github: [github.com](https://github.com)

Algo-Art: [opensea.io](https://opensea.io)

LinkedIn: [linkedin.com](https://linkedin.com)

Google Scholar: [scholar.google.com](https://scholar.google.com)

Youtube: [youtube.com](https://youtube.com)

## SUMMARY

Senior Software Engineer with 8+ years of experience specializing in full-stack development, machine learning, and blockchain technologies. Proven track record of leading innovative projects and developing cutting-edge algorithms.

## EMPLOYMENT

### Idea Entity

*Sr. Software Engineer*

March 2023 - June 2024

*Washington D.C., USA ·*

- Created a budgeting tool that surveyed existing contracts, identifying instances for potential cost-saving opportunities, as well as navigated hierarchical contracts, providing insights on optimizing expenses through contract upgrades, resulting in an estimated 15% reduction in overall contract expenses.
- Designed and developed an "Automatic Database Creation Tool" that automates the process of generating tables, fields, and relationships from Entity Relationship Diagrams (ERDs), reducing initial development time by approximately 40%. The algorithm analyzed ERDs, extracting information and dynamically generating scripts for table creation, field definitions, and relationship constraints.
- Led the planning and execution of the company's transition to automated testing practices, promoting the adoption of tools such as Jest and Playwright. The existing solutions primarily relied on manual testing, utilizing test cases documented in Excel spreadsheets.

### Jasmine Energy

*Sr. Software Engineer & Co-Founder*

June 2022 - February 2023

*Washington D.C., USA ·*

- Co-founded Jasmine Energy, an organization focused on revolutionizing the energy industry through the creation of a decentralized Energy Attribute Certificate (EAC) market utilizing the Ethereum blockchain.
- Spearheaded the development of the initial dApp (decentralized application), completing the MVP in just 3 months. Presented the innovative solution to investors at the esteemed Y Combinator, receiving widespread acclaim and securing \$2.1 million in seed funding.
- Demonstrated leadership as the lead software engineer, overseeing the launch of the first tokenized Renewable Energy Credit (REC). Implemented solutions for price transparency and efficient credit tracking, addressing long-standing issues of price differentials and double counting that has plagued the existing energy credit market. This solution increased market efficiency by 25% and reduced instances of double counting by 32%.

### Transparent Sky Corp.

*Research & Development Engineer, Machine Learning Team Lead*

August 2020 - June 2022

*Albuquerque, NM, USA ·*

- Developed 3D reconstruction algorithms that are capable of producing high quality meshes of entire cities in a span of 3 minutes.
- Sole creator of an in-house library of algorithms for point-cloud processing tasks, mesh processing tasks, and 3D geometry processing.

- 3D temporal differencing, point-cloud segmentation, Kd-tree & octree creation, level-of-detail (LOD) operations, reconstruction, texture-mapping, & ray-tracing.
- Utilized Point Cloud Library (PCL) & Cloud Compare Core Library (CCCoreLib) as base utilities within the library.
- Created a web UI for viewing and interacting with 3D mesh/point-cloud data.
  - Developed using Chromium Embedded Framework (CEF), C++, & Javascript.
- Developed novel algorithms related to point-cloud segmentation & image stitching with dynamic homography estimation.
  - Our novel image stitching algorithm restricts the homography estimation problem to 4 DOF instead of the common 9 DOF, ensuring proper homography and faster processing [1].
  - Point-cloud segmentation algorithm segments point-clouds using topological/geometric information, grouping points on a per-layer basis [2].
- Experimented with reinforcement learning algorithms applied to navigation for UAV swarms using AirSim.
- Led the research team where we developed machine learning methods for: Image super-resolution (single-image & multi-image approaches), stereo depth estimation, object detection in aerial oblique imagery, and shadow removal.

### Terbine, Inc.

September 2017 - May 2020

*Front-End Developer*

*Las Vegas, NV, USA ·*

- Sole designer & developer of the initial in-house "data-searcher" web utility that allowed employees the ability to upload datasets and write the corresponding metadata configurations.
- Assisted in the design & development of a "data-wrangler" utility that allowed employees the ability to assess input metadata configurations and write corrections for metadata and/or send feedback to "data-searchers" for corrections.
- Both web utilities were built using Angular (Typescript-based web framework), RESTful API, NodeJS, PostgreSQL, & Java (for the back-end).

### **Hickory Ridge Group**

September 2019 - December 2019

*Research Analyst Intern*

*Las Vegas, NV, USA ·*

- Researched aspects of autonomous logistics (i.e. autonomous shipping ports, automated storage/retrieval, & autonomous freight trucks) for cost-benefit analysis, urban planning, and current technological limitations.

### Atlas Group LC

March 2016 - July 2017

*Full-Stack Developer*

*Las Vegas, NV, USA ·*

- Developed an in-house web dashboard that allowed property managers to track financial data, property listings, & customer acquisitions.
  - Django (Python-based web framework) was utilized to develop the utility.

### White Rabbit Group

August 2015 - February 2016

*Quality Assurance Engineer*

*Reno, NV, USA ·*

- Performed automated/manual testing of websites and apps.

## PUBLISHED WORKS

**T. Brodeur**, H. AliAkbarpour, and S. Suddarth, "Point Cloud Object Segmentation Using Multi Elevation-Layer 2D Bounding-Boxes," 2021 International Conference on Computer Vision Workshops (ICCV-W), 2021. [10.1109/ICCVW54120.2021.00438](https://doi.org/10.1109/ICCVW54120.2021.00438)

H. AliAkbarpour, **T. Brodeur**, and S. Suddarth, "Analytical Image Stitching in Non-Rigid Multi-Camera WAMI," IEEE Sensors Letters. (Preprint not yet available (Requires governmental approval))

**T. Brodeur**, P. Regis, D. Feil-Seifer and S. Sengupta, "Search and Rescue Operations with Mesh Networked Robots," 2018 9th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), 2018, pp. 6-12, doi: [10.1109/UEMCON.2018.8796743](https://doi.org/10.1109/UEMCON.2018.8796743).

**T. Brodeur**, A. Cater, J. C. Vaz and P. Oh, "Directory navigation with robotic assistance," 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), 2018, pp. 777-778, doi: [10.1109/CCWC.2018.8301771](https://doi.org/10.1109/CCWC.2018.8301771).

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## RESEARCH EXPERIENCE

[Hyman in vivo Electrophysiology Lab \(HIVE\)](#) September 2019 - November 2019  
*Undergraduate Computational Neuroscience Researcher* Las Vegas, NV, USA ·

- Implanted *Open Ephys* tetrodes into rat brains to allow recording of neurons during experiments.
- Assisted in processing of neural data using Matlab's signal processing toolbox.

[Robotics Research Laboratory \(NSF REU\)](#) May 2018 - August 2018  
*Undergraduate Robotics Researcher* Reno, NV, USA ·

- Developed a novel algorithm that allowed an array of UGV's & UAV's to coordinate and navigate based on a temporarily defined *master* robot node using a mesh-network topology, with a published paper as a result.
- Technologies used include Robot Operating System (ROS) and Gazebo.

**NSF International Research Experiences for Students - Korea** June 2017  
*Undergraduate Robotics Researcher* Seoul, Jeju, & Daejeon, Republic of Korea ·

- Attended the International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) in Jeju, Republic of Korea.
- Explored the research being conducted at KAIST's Hubo Lab and the various robotic platforms being used to conduct said research.
- Attended the RoboUniverse conference in Seoul, Republic of Korea where I was able to explore state-of-the-art commercial applications of robotics.

[UNLV Drones & Autonomous Systems Laboratory \(DASL\)](#) December 2016 - March 2018  
*Undergraduate Robotics Researcher* Las Vegas, NV, USA ·

- Developed a directory navigation robot using the Furo-S robot platform
  - Scanned a floor plan and built a map of navigable terrain of the scanned floor plan.
  - Developed a user interface that listed a selection of endpoints a user could click on and have the robot navigate to.
  - Developed a modified A\* path planning algorithm and path smoothing algorithm for the robot.
  - Published paper on developments.

- Applied a harmonic potential fields algorithm to a Festo Robotino robot to allow navigation of a cluttered environment.
  - Developed a stock app for Amazon Alexa that scrapes stock data from Yahoo Finance and provides stock data to the user dependent upon the voice request.
  - Used existing in-house kinematics libraries to move a humanoid robots arm with a given end-effector position input.
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## VOLUNTEER EXPERIENCE

### [National Interscholastic Cycling Association - Nevada \(NICA\)](#)

March 2019 - August 2020

*Assistant Coach*

*Las Vegas, NV, USA ·*

- Assisted in coaching of the Las Vegas Rattler's mountain bike team. I coached the beginner team, where the coach's job consisted in training students the fundamentals of mountain biking, such as mechanics and trail etiquette.
  - Our team obtained first placement in the Nevada Interscholastic Cycling League in our first season. Obtained second placement in our second season.
  - Developed the website for the Nevada Interscholastic Cycling League with input from the league director.
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## PROFESSIONAL MEMBERSHIPS

[FIRST Nevada Alumni](#)

[Institute of Electrical and Electronics Engineers \(IEEE\)](#)

[Rotary International](#)

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## TECHNICAL STRENGTHS

**Tech Languages**

C/C++, Python, Javascript/Typescript, Solidity, CUDA

**Protocols & Architectures**

AMQP, JSON, REST, GraphQL

**Databases**

MySQL, PostgreSQL, Redis

**Tools**

Tensorflow, Amazon Web Services (AWS), RabbitMQ, Docker, Gazebo, Hardhat, Microsoft VS, OpenCV, Robot Operating System (ROS)

**Frameworks**

ReactJS, Angular5, React Redux, Apollo Server/Client

**Languages**

English, French