Riley **Jackson** 

## Skills

Languages C++, Python, C, Matlab / Octave, Java, Bash, SQL, JavaScript, HTML/CSS **Tools** Linux, Git, MySQL, CMake, Google Test / Bench, Docker, AWS, GDB, Vim

## Education

#### **University of Waterloo**

- B. Math, Triple Major in Computer Science, Pure Math, Combinatorics & Optimization
- 90% Cumulative GPA (93% Faculty Average), Dean's Honour List, President's Scholarshop of Distinction.
- Select Graduate Courses: Advanced Algorithms, Integer Programming, Continuous Optimization, Algorithmic Game Theory.

# Work Experience \_\_\_\_

#### **Headlands**

**Quantitative Researcher** 

• Incoming for Fall 2023 Full Time.

## **Citadel Securities**

Quantitative Developer Intern - Low Latency Options • C++, Python • NDA

• Applied advanced statistical analysis to options market data to improve quoting strategies.

#### **Citadel Securities**

Software Engineer Intern - Low Latency Trading • C++, SystemVerilog (FPGA's) • NDA

Used modern C++ alongside specialized hardware to develop state-of-the-art low latency trading systems.

#### SideFX

3D Software Developer Intern - Character Team • C++, libigl, Ceres

- Architected and implemented a new rigging framework based on pose space deformation.
- Significantly improved upon the performance of Arthur Gregory's paper on Pose Weight Interpolation by utilizing adaptive meshes, physically approximating a non-convex heuristic, and re-formulating the problem as a sparse Quadratic Program.
- Implemented multi-input spherical linear interpolation (SLerping) for new skeleton transform blending workflow. *New York City, NY (Remote)*

#### Bloomberg

Software Engineer Intern - Limits and Trading Controls • C++

- Implemented and helped design a parallel evaluation pipeline for trade compliance checking.
- Decreased latency and significantly improved throughput of a system performing hundreds of millions of compliance evaluations daily.
- Produced multi-threaded, fully lock-free, and unit-tested code; profiled and optimized to obtain better performance.

#### **Jasper PIM**

Full Stack Developer Intern • PHP, VueJS, MySQL, AWS, ElasticSearch

- Completed 50+ front-end, back-end, and infra tickets.
- Parallelized and optimized backend batch processing resulting in an overall 1000x performance increase.
- Revived advanced search by fixing critical indexing bug, worked directly with clients to implement custom features.

# Select Projects \_

#### 3D Physics Engine 🖸 • C++, OpenGL, Eigen, gtest

- Architected and developed a constraint-based rigid body simulator with support for joints, springs, and (Coulomb) friction.
- Implemented a mathematical optimization library with support for linear, quadratic, and linear complementary problems.

#### Lazy Optimization Library • C++

- Non-linear optimizaiton library implementing lazy interior point methods with arbitrary "just-in-time" precision.
- Solver utilizes an automatic differentiation engine which leverages dual numbers and template meta programming.

#### Travelling Salesman Art 🖸 • C++, OPENCV, CAIRO

- Designed a rendering engine which takes any image and redraws it using a single line.
- Solves the travelling salesman problem on a graph obtained by stippling an image, then renders the result into art.

# **Other Projects:**

• Ray Tracer, Real-Time Operating System, Java → x86 Compiler, Vim Clone, Soccer Playing Robot.

Sep. 2018 - Apr. 2023

Waterloo, ON

Chicago, IL Aug. 2023 - Present

Chicago, IL May. 2022 - Aug. 2022

#### Chicago, IL

## Toronto, ON (Remote)

Jan. 2022 - Apr. 2022

Sept. 2021 - Dec. 2021

Jan. 2021 - Apr. 2021

Toronto, ON

May. 2019 - Aug. 2019