Dan Cline

Software Engineer

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Education

University of Massachusetts Amherst

B.S. in Computer Science
Anticipated Graduation: May 2021

September 2017 - Present

Graduate Courses

Cryptography
Advanced Cryptography
Operating Systems Implementation

Undergraduate Courses

Cryptography
Operating Systems
Algorithms
Functional Programming
Software Engineering
Abstract Algebra
Data Structures

Awards

- Binance DEXathon Winner ($50,000 award)
- MIT Bitcoin Hackathon: City of Zion Prize ($5,000)
- HackUMass V: Grand Prize
- YHack: JP Morgan Finance of the Future Prize

Talks

ClockWork: An Exchange Protocol for Proofs of Non Front-Running
Stanford Blockchain Conference
February 2020
(dci.mit.edu/clockwork)

Skills

• Go • Python • Rust • C • C++ • Java
• Scala • TypeScript • LaTeX • Git • C#
• Linux • .NET

Experience

VMware | Software Engineer Intern, VMware Tanzu Remote
June 2020 - August 2020

- Implemented internal support for the Cluster API Docker provider (CAPD) in Tanzu Kubernetes Grid (TKG) in Go.
- Used Bash Automated Testing Suite to verify deployment state after executing TKG commands using the docker provider.

UMass Cryptography Lab | Undergraduate Researcher Amherst, MA
January 2020 - Present

- Working with professor Adam O'Neill on a cryptanalysis of the Bitcoin Pseudorandom Number Generator.

MIT Digital Currency Initiative | Undergraduate Researcher Cambridge, MA
January 2019 - September 2019

- Designed algorithms to mitigate the front-running problem in cryptocurrency and securities exchanges, and increase overall public audit-ability of exchanges.
- Wrote an academic paper (in submission) which introduces new cryptographic protocols to decrease trust needed in cryptocurrency and securities exchanges.
- Worked with layer 2 technologies such as the Bitcoin Lightning Network and hash time lock contracts (HTLCs) to implement non-custodial exchange technology.
- Implemented research while building OpenCX, an open source cryptocurrency exchange framework.

Charles River Analytics | Software Engineer Intern Cambridge, MA
June 2018 - August 2018

- Created framework to score causal analysis algorithms for time series analysis in Python.
- Implemented various statistical analysis methods to detect causality in time series data with Granger, Pearson, and Convergent Cross Mapping tests.
- Demonstrated an increase in precision and recall for detecting causal effects in sets of arbitrary time series data.

Projects

OpenCX | Open-source project - Author (github.com/mit-dci/opencx)

- Author of OpenCX, an open-source toolkit for building asset exchanges.
- Implemented a batching system for revealing and decrypting exchange orders that are locked in cryptographic puzzles for a certain amount of time.
- Developed state of the art features for non-custodial trading, timelock puzzles, and public verifiability of exchange behavior.
- Designed and implemented a novel front-running resistant and non-custodial exchange protocol using tools from OpenCX.

Binance DEX | Open-source project - Co-author

- Modified the Bitcoin codebase to implement asset creation, limit GTC order creation, and delegate voting on the blockchain.
- Designed and implemented a Delegated Proof of Stake consensus algorithm that works with the UTXO Model.
- Won a **$50,000** award for DEX implementation. Design rationale that was submitted for the contest can be read at dancline.net/binance.