

Derek Sorensen

Curriculum Vitae

Education

- 2019–2023 **PhD in Computer Science**, *University of Cambridge*.
- 2016–2017 **MSc in Mathematics and Foundations of Computer Science**, *University of Oxford*.
- 2013–2016 **BSc in Mathematics**, *Brigham Young University*, Provo, UT, USA.

Interests

I am interested—mathematically, philosophically, scientifically—in the notions of *proposition* and *proof* in computer science. My doctoral research developed theoretical tools for rigorous specification of financial smart contracts, blockchain-based programs which routinely manage huge quantities of money. Some of these tools leveraged geometric properties of programs and propositions. Moving forward, I wish to expand these theoretical tools, consider formal proof in the context of verified computation, and make an explicit study of the geometry of propositions.

Publications

- 2023 Sorensen, D. *Tokenized Carbon Credits*. Ledger, 2023.
- 2023 Sorensen, D. *Structured Pools for Tokenized Carbon Credits*. ICBC CryptoEx 2023.
- 2019 Butt, K., Sorensen, D. *Streamlining Classical Consensus*. International Journal of Blockchains and Cryptocurrencies. Vol. 1, No. 4.
- 2019 Sorensen, D. *Establishing Standards for Consensus on Blockchains*. ICBC 2019.
- 2017 A. Francis, D. Smith, D. Sorensen and B. Webb, *Extensions and applications of equitable decompositions for graphs with symmetries*. Linear Algebra and its Applications **532** (2017), 432-462.

Experience

- Oct 2022 - **Software Engineer**, *Protocol Labs*, Remote.
- Mar 2023 - Contributor to Lurk, a Turing complete dialect of LISP for zero-knowledge proofs.
 - Contributed to specification of meta-Lurk, which allows for recursive reference to and computation over zero-knowledge proofs
- May 2021 - **Business Development: Sustainability**, *TriliTech*, London, UK.
- Aug 2022 - Advised sustainability-oriented businesses building on Tezos, including in tokenized carbon offsets, regenerative finance (ReFi), and sustainability-oriented art marketplaces
 - Member of the Technical Advisory Committee, the funding body for the Tezos Foundation

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- March 2021 - **Consultant: Decentralised Finance**, *Gro*, London, United Kingdom.
- May 2021 - Advised on decentralised deposit insurance on the Ethereum Blockchain
 - Built optimisation model for the system we built to optimise parameters for consumers
- Jan 2021 - **Consultant: Intellectual Property on Blockchains**, Cambridge, United Kingdom.
- March 2021 - Identified industries most likely to tokenise intellectual property rights
 - Delivered specific, technical details to tokenise intellectual property rights and how it might integrate with existing business models and regulation
- Oct 2019 - **Formal Verification Engineer**, *Clearmatics*, London, United Kingdom.
- Nov 2020 - Designed, formally specified, and formally verified enterprise blockchains
 - Advised the software development life cycle to formally verify Ethereum smart contracts
 - Lectured to the engineering team on formal methods
- Jul 2019 - **Consultant: Cryptocurrency Design**, *Digital Asset*, New York, NY.
- Sep 2019 - Designed and built a functional cryptocurrency that supports legal compliance and business-friendly privacy features
 - Specified privacy model, fee structure, minting structure, and incentive systems
- March 2018 - **Consultant: Blockchain Language Verification**, *RChain Coop*, Seattle, WA.
- Oct 2018 - Developed the formal semantics of the language Rholang in the K Framework
- Mar 2018 - **Research Mathematician**, *Pyrofex Corporation*, Provo, UT.
- Jun 2019 - Research in the fundamental algorithms supporting cryptocurrencies.
 - Developed cryptocurrency that can process transactions at the rate of Visa.
 - Built the formal semantics for Rholang in K-Framework for the RChain Coop.
- 2017-2019 **Adjunct Faculty (Mathematics)**, *Utah Valley University*, Orem, UT.
 - Wrote lecture notes, homework, quizzes, exams.
 - Marked and give feedback to all written work.

Scholarships and Awards

- 2016 Robert K Thomas Honors Scholarship
- 2015 AMS Math in Moscow Travel Grant
- 2015 Marc Burton Scholarship
- 2015 Best of session at the 2015 BYU Spring Research Conference
- 2014 & 2015 Award for Excellence in Undergraduate Research
- 2014 & 2015 Award for Academic Excellence in Mathematics

Teaching

- Mich. 2020 Economics, Law, and Ethics (University of Cambridge)
- Mich. 2020 Analysis & Topology (University of Cambridge)
- Summer 2020 Artificial Intelligence in Blockchain Security (Immerse Education)
- Summer 2020 Relating the Price of Bitcoin and its Related Cryptocurrencies to Their Respective Trading Volumes (Horizon Inspires)
- Summer 2020 Predicting NBA Playoff Results With Machine Learning (Horizon Inspires)
- Lent 2020 Groups, Rings, and Modules (University of Cambridge)
- Spring 2019 Stat 1040 - Introduction to Statistics (Utah Valley University)

- Spring 2018 Stat 1040 - Introduction to Statistics (Utah Valley University)
- Spring 2018 Stat 2040 - Introduction to Statistics (Utah Valley University)
- Spring 2018 Math 1050 - College Algebra (Utah Valley University)

Presentations

- 2023 Tokenized Carbon Credits, **IEE ICBC CryptoEx**, *Dubai, UAE*
- 2022 Applications of Blockchains to Decentralised Finance, Markets, Art, and Beyond, **University of Cambridge**, *Cambridge, England*
- 2021 Blockchain & DeFi: The Technology and its Applications, **Judge Business School, University of Cambridge**, *Cambridge, England*
- 2018 Rholang Semantics and the K-Framework, **RCon3**, *Berlin, Germany*
- 2018 Formal Verification Panel, **RCon3**, *Berlin, Germany*
- 2015 Presentation at the 2015 BYU Spring Research Conference
 - o Voted best of session
- 2014 Presentation at the 2014 BYU Spring Research Conference

Summer Schools

- 2021 Oxford Fintech Programme
- 2019 Interenational Conference and Summer School of Homotopy Type Theory
- 2017 CMI-LMS Research School Algebraic Topology of Manifolds

Computer skills

Coq, CameLIGO, DAML, K Framework

Spoken Languages

- Native English
- Fluent Spanish
- Intermediate Russian
- Basic French