

# Bitcoin & Blockchain Research Newsletter

Q1 2017

## This quarterly newsletter

1. Curates the most relevant research reports, papers and articles on the subject of cryptocurrency and blockchain technology, and
2. Provides updates from Fidelity's Blockchain Research partners.



## HIGHLIGHTED RESEARCH REPORTS

### OPEN MATTERS: WHY PERMISSIONLESS BLOCKCHAINS ARE ESSENTIAL TO THE FUTURE OF THE INTERNET by Coin Center

**Summary:** You may have heard that “blockchain technology” is the solution to any number of social, economic, organizational or cybersecurity problems. It is not. A blockchain is merely a data structure and “blockchain technology” is a vague and undefined buzzword. In this paper, the author explains the true technologies that undergird blockchain networks and the distinctions between open and closed blockchain networks, why they matter, and why only open blockchain networks can solve certain specific issues related to electronic cash, identity, and the Internet of Things.

### BITCOIN: RINGING THE BELL FOR A NEW ASSET CLASS by Ark Invest and Coinbase

**Summary:** Bitcoin exhibits characteristics of a unique asset class—meeting the bar of investability, and differing substantially from other assets in terms of its politico-economic profile, price independence, and risk-reward characteristics.

As Bitcoin's open-source software evolves, bitcoin will differentiate itself further from other asset classes. Recent innovations like segregated witness promise to catalyze bitcoin's more innovative use cases. Smart contracts and sidechains, for example, could enable entirely new financial services like liquid private markets and truly peer-to-peer loan issuance.

### BLOCKCHAIN-ENABLED CONVERGENCE: UNDERSTANDING THE WEB 3.0 ECONOMY by Outlier Ventures Research

**Summary:** Blockchain technologies, including distributed ledgers & smart contracts, are the mega-trends that allow all other macro-trends to scale securely, converge and combine. They represent the next phase of The Web, Web 3.0 or ‘The Trust Web / Internet of Ownership’, and will transform how technologies interact with one another and the World around them.

Combined they enable a new more decentralized and automated Web infrastructure that brings with it previously impossible economic models. At their core they represent a fundamental shift from centralized & human mediated systems to trustless decentralized & autonomous networks.



## OTHER RESEARCH FROM THE BLOCKCHAIN COMMUNITY

[Thinking Outside the Blocks: A Strategic Perspective on Blockchain and Digital Tokens](#) by The Boston Consulting Group

[Bitcoin – A primer for Policymakers](#) by Jerry Brito and Andrea Castillo

[Unlocking Economic Advantage with Blockchain – A Guide for Asset Managers](#) by J.P.Morgan and Oliver Wyman

[Money Is No Object: Understanding the Evolving Cryptocurrency Market](#) by PwC

### Harvard Business Review – “Business in the Era of Blockchain” Series

- o [The Truth About Blockchain](#) by Marco Iansiti and Karim R. Lakhani
- o [A Brief History of Blockchain](#) by Vinay Gupta
- o [How Blockchain Is Changing Finance](#) by Alex Tapscott and Don Tapscott
- o [How Blockchain Applications Will Move Beyond Finance](#) by Christian Catalini
- o [The Potential for Blockchain to Transform Electronic Health Records](#) by J. Halamka, A. Lippman, and A. Ekblaw
- o [The Promise of Blockchain Is a World Without Middlemen](#) by Vinay Gupta
- o [How Safe Are Blockchains? It Depends](#) by Alisson Berke
- o [The Blockchain Will Do to the Financial System What the Internet Did to Media](#) by J. Ito, N. Narula, and R. Ali
- o [We Don't Need Political Solutions for Global Trade – We Need Practical Ones](#) by Rob Knight
- o [Global Supply Chains Are About to Get Better, Thanks to Blockchain](#) by M. Casey and P. Wong
- o [Blockchain Will Transform Customer Loyalty Programs](#) by D. Kowalewski, J. McLaughlin, and A. Hill
- o [What Blockchain Means for the Sharing Economy](#) by Primavera De Filippi
- o [Blockchain Will Help Us Prove Our Identities in a Digital World](#) by Michael Mainelli
- o [Blockchain Could Help Artists Profit More from Their Creative Works](#) by Don Tapscott and Alex Tapscott
- o [How Utilities Are Using Blockchain to Modernize the Grid](#) by J. Basden and M. Cottrell
- o [What Initial Coin Offerings Are, and Why VC Firms Care](#) by Richard Kastelein

[Top 10 Mistakes in Enterprise Blockchain Projects](#), by Gartner

Academic journal [Ledger](#) dedicated to cryptocurrency research published their first volume.

### Research Articles

- o [Ring Confidential Transactions](#)
- o [BIX Certificates: Cryptographic Tokens for Anonymous Transactions Based on Certificates Public Ledger](#)
- o [Subchains: A Technique to Scale Bitcoin and Improve the User Experience](#)
- o [The Bitcoin Mining Game](#)
- o [A Probabilistic Analysis of the Nxt Forging Algorithm](#)
- o [Game Channels for Trustless Off-Chain Interactions in Decentralized Virtual Worlds](#)
- o [Gaming Self-Contained Provably Fair Smart Contract Casinos](#)
- o [Bitcoin Market Volatility Analysis Using Grand Canonical Minority Game](#)
- o [Autonocoin: A Proof-of-Belief Cryptocurrency](#)
- o [Governance in Blockchain Technologies & Social Contract Theories](#)

### Conference:

Blockchain Protocol Analysis and Security Engineering 2017 (Stanford, January 26 - 27)

The conference explored the use of formal methods, empirical analysis, and risk modeling to better understand security and systemic risk in blockchain protocols.

[Video recordings and slides from the conference are available here.](#)



## RESEARCH FROM OUR PARTNERS

### MASSACHUSETTS INSTITUTE OF TECHNOLOGY - DIGITAL CURRENCY INITIATIVE



The Digital Currency Initiative is a research group at MIT composed of students and professors from the Media Lab, Computer Science and Artificial Intelligence Lab and the Sloan School of Management that seeks to push the envelope on the development of blockchain technology with fundamental research, while shedding light on the associated benefits, risks, and ethical quandaries.

### DCI Projects

- o [MedRec: Medical Data Management on the Blockchain](#)
- o [Open Music Initiative](#)
- o [User-controlled Credit Identities](#)
- o [Digital Currency at Central Banks](#)
- o [Securitized Financing for Solar Microgrids](#)

### Featured Research Across MIT

- o [Bayesian Regression and Bitcoin](#)
- o [Digital Certificates Project](#)
- o [Blockchain Border Bank](#)
- o [SpaceMint: A Cryptocurrency Based on Proofs of Space](#)

### Papers

- o [A Case Study for Blockchain in Healthcare](#)
- o [Digitally Rebuilding the Real Estate Industry](#)
- o [The Application of Digital Identity in the United States](#)
- o [Blockchain Applications to Solar Panel Energy: Landscape Analysis](#)

### Events

- o [MIT Bitcoin Expo](#) (March 4-5, 2017) – Video recordings from [Day 1](#) and [Day 2](#).

### INSTITUTE FOR THE FUTURE – BLOCKCHAIN FUTURES LAB



ITF's Blockchain Futures Lab connects industry leaders with practical visionaries and domain experts to identify long-term opportunities and design considerations for blockchain technology. The Blockchain Futures Lab provides a community forum to discuss paths toward a more efficient, transparent, and equitable world using the full potential of distributed systems.

### Research

- o [Blockchain Map of the Decade 2017-2027](#): Over the coming decade, audacious blockchain experiments will reshape the way we think about everything from cash to computing, from identity to governance. Starting from today's cryptocurrencies, these experiments will build on the unique affordances of blockchain architectures to create radical zones of transformation. They will catalyze—and be catalyzed by—advances in artificial intelligence, virtual reality, and the Internet of Things. These chain reactions will coalesce to create a global infrastructure for trusted computing that will touch every sector, every market, every household. This map of the coming blockchain decade is an at-a-glance view of this rapidly unfolding infrastructure.
- o [Changing Hands: Blockchain Peer-to-Peer Economies](#)
- o [Distributed Reflections: Blockchain Identity](#)
- o [Binding Commitments: Blockchain Governance and Distributed Organizations](#)

### INITIATIVE FOR CRYPTOCURRENCIES AND CONTRACTS (IC3)



A University consortium consisting of Cornell University, Cornell Tech, UC Berkeley, University of Illinois and University of Maryland, that aims to move blockchain-based solutions from white board and proof-of-concept to implementation of practical and reliable financial systems.

[IC3 Newsletter Q1 2017](#): Quarterly newsletter to keep the blockchain community aware of IC3 innovations, events, news, publications, and other service to the community by IC3 staff and partners.

### Projects: (more details [here](#))

- o [Solidus: A Centralized Future for Cryptocurrencies?](#)
- o [Bitcoin-NG: A Next-generation Blockchain Protocol](#)
- o [Miniature World: A Test Bed for Simulating Real World Blockchains](#)
- o [Fruitchain: A new Approach for Incentivating Compatible Blockchains](#)
- o [Falcon Network: A High-Performance, Wide Area Interconnect for Blockchains](#)
- o [FLAC: A Calculus for Flow-Limited Authorization](#)
- o [Theoretical Foundations for Secure Decentralized Systems](#)
- o [Hawk: Privacy-Preserving Blockchain & Smart Contracts](#)
- o [Town Crier: Authenticated Data Feeds for Smart Contracts](#)
- o [Virtual Notary: A Free and Secure Electronic Attestation Service](#)
- o [EtherScrape: A Complementary Block Explorer for the Ethereum Blockchain](#)
- o [Gyges: Crime in Decentralized Smart Contracts](#)
- o [Honey BadgerBFT: The Honey Badger of BFT Protocols](#)
- o [Teechan: Payment Channels Using Trusted Execution Environments](#)

### UNIVERSITY COLLEGE LONDON – CENTRE FOR BLOCKCHAIN TECHNOLOGIES



The UCL CBT aims at becoming the leading European research hub focused on the impact of blockchain technologies on socio-economic system and the promotion of a safe and organic development and adoption of blockchain-based platforms.

### Working Papers:

- o [Smart Contract Templates: Foundations, Design Landscape and Research Directions](#)
- o [A Fistful of Bitcoins: Characterizing Payments Among Men with No Names](#)

### UNIVERSITY COLLEGE DUBLIN – CENTER FOR APPLIED DATA AND ANALYTICS (CEADAR)

The primary outputs of the CeADAR centre are industry prototypes and demonstrators along with state of the art reviews of data analytics technology, tools, best practice methodologies and processes.

### Research

- o [Blockchain: An Overview and Comparative Evaluation](#)