



## Report on Crypto Currencies Workshops NEMODE award

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April, 2016



## WORKSHOPS

### WORKSHOP 1

#### Background

In association with [Oxford Technology Media & Finance Network](#), Autumn Networking Event 2015

**Date:** Monday 5<sup>th</sup> October 2015 6.00pm to 9.00pm

**Venue:** The Maths Institute, Oxford University

**Theme:** Cryptocurrencies Evil Empire or Digital Saviour?

What is a cryptocurrency? How does it work? Why is it important and why is it something that both excites online privacy activists and terrifies governments?

The rapid growth of crypto-currencies and emergence of blockchain technologies creates a series of challenges as well as opportunities for business including reduced costs for businesses and consumers and immediacy of transaction as well as opportunities for new business models. However, there are also a number of significant challenges too, such as volatility and the absence of a central regulating authority. Although the three differ in subtle ways, the terms crypto-, virtual and digital-currency have come to be used interchangeably and the currency brand 'BitCoin' synonymously represents a domain of upwards of 100 such currencies. The mystery surrounding the origins of Bitcoin are a legend in themselves. The algorithm created by the shadowy figure known as Satoshi Nakamoto has created both a digital myth and a new distributed transactional ecosystem that threatens to be truly disruptive.

Will Bitcoin and its successors disintermediate the banks and liberate business from the tyrannies of transaction costs, online payment charges and inflation? Or is it the greatest step forward for criminals to launder money? Do cryptocurrencies offer a genuinely safe financial haven for consumers and businesses across the world? Are they a commodity (for investment) or a currency (an aid to transaction)? How can you trust a currency that is not guaranteed by a government or backed by a central bank?

Oxford Technology & Media are delighted in conjunction with NEMODE to welcome a distinguished panel including **Dr Vili Lehdonvirta** of The Oxford Internet Institute, **Robert Kay**, CEO of GovCoin Systems, **John Edge** Managing Partner of Redrose, **Danny Barugh** of LondonLink Bitcoin brokers and **Mark Lamb** CEO of CoinFloor, the UK's leading Bitcoin Exchange.

The panel will explore these and other questions relating to the implications of Bitcoin, cryptocurrencies and blockchain technologies for business, how they work and what opportunities they offer in the digital economy. We look forward to seeing you there!

#### Summary

The purpose of the workshop was to create a forum in which members of the Oxford Technology Media & Finance Network and the wider interested public could meet to learn about, explore the meaning, practical realities and implications of cryptocurrency, blockchain and distributed ledger technologies in a safe, expert environment. An additional purpose was to generate for the NEMODE community a better understanding of the level of existing knowledge in the business community as well as topics of interest and concern.

The workshop consisted of a panel presentation, chaired by Robert Kay, CEO of GovCoin Systems and with contributions from Dr Vili Lehdonvirta of The Oxford Internet Institute, Robert Kay, CEO of GovCoin Systems, John Edge Managing Partner of Redrose, Danny Barugh of LondonLink Bitcoin brokers and Mark Lamb CEO of CoinFloor, the UK's leading Bitcoin Exchange.

The workshop was principally given over to a discussion between the panel and, between the panel and the audience, relating to the mechanics of bitcoin and the distributed ledger, including: what is a distributed ledger; what does validation mean; what is mining; an exploration of use cases (from cryptocurrencies as an asset vs unit of exchange to the underlying distributed ledger technology as the underpinning for a set of disruptive economic and societal innovations such as the modernisation of identity systems); and, governance issues such as can the programmers change the rules or not, and who do you implicitly trust when you put your assets into this seemingly trustless network?

## **WORKSHOP 2**

### **Background**

In association with techUK and Loughborough University

**Date:** Thursday February 25th, 2016.

**Venue:** techUK, 10 Bride Street, London EC4A 4AD.

**Theme:** Blockchain and beyond: the emerging architectures and applications of distributed ledger in financial services.

The purpose of this workshop was to bring together key players and the community of interest to share information, experiences and questions relating to the emerging applications of blockchain technology in financial services. The focus of the workshop was on practical applications of the blockchain as seen from academic and practitioner perspectives.

The workshop consisted of three sessions: a view from practice; a view from research; and, an open discussion, as follows:

#### **From practice**

- Practical applications of permissioned blockchains in the finance industry: Peter Randall, COO SETL and Anthony Culligan, CEO SETL
- Respondent: Dr Pinar Emirdag, CEO, Complymatic
- Open discussion: Moderated by Alistair Milne, Professor of Financial Economics, Loughborough University School of Business and Economics

#### **From research**

- Practical Byzantine Fault Tolerance and Payment Networks: Distributed Transaction Clearing Beyond Blockchains: Julian Williams, Professor of Accounting and Finance, Durham University Business School
- Respondent: Philip Bond, Visiting Professor, Departments of Engineering Mathematics and Computer Science, Bristol University, and Visiting Professor Oxford Centre for Industrial and Applied Mathematics, Oxford University
- Open discussion: Moderated by Alistair Milne, Professor of Financial Economics, Loughborough University School of Business and Economics

#### **Open panel discussion**

- Leda Glyptis (Global Markets Director, Sapient )

- Alistair Milne (Loughborough University School of Business and Economics)
- Salome Parulava (Consultant, Consult Hyperion)
- Peter Randall (COO, SETL)
- Julian Williams (Durham University Business School)
- Moderated by Dr Richard Adams, NEMODE Senior Research Fellow, University of the West of England and Surrey University

## OUTPUTS

Outputs from this award include:

1. Two mixed-participant workshops as described above
2. Video reports of the two workshops. Available for view at:
  - a. Oxford: [Bitcoin 101: Bitcoin and Blockchain explained](#)
  - b. techUK: [Blockchain and beyond \(i\)](#) and [Blockchain and beyond \(ii\)](#)
3. Special issue of [Strategic Change: Briefings in Entrepreneurial Finance](#), The Future of Money and Further Applications of the Blockchain. First submissions deadline May 1<sup>st</sup> 2016, anticipated publication date, 2017. See Call for papers in Appendix 3. Contributions have been received from both practitioner and research communities.
4. Special session “Blockchain for Good: Distributed Ledger Technologies and the CSR Agenda” at [7th International Conference on Corporate Sustainability and Responsibility: CSR in an Age of Digitization](#). September 14-16, 2016. See Call for papers in Appendix 4.

## APPENDIX 1

### Attendees, workshop 1, Oxford

- Richard Adams; NEMODE
- Claire Barry; abtv Productions Limited
- Stefano Belbin; Grant Thornton UK LLP
- Martine Benoit; ON Communication
- Mark Bishop; Grant Thornton UK LLP
- Jonathan Brodie; Angel Sharp Media Ltd
- Phil Clare; Research Services, University of Oxford
- Antony David; Solid State Logic
- Karen David; Spriggs David
- Graeme Freeman; Freeman Clarke
- Phil Godsiff; Surrey University
- Sunny Gohel; Grant Thornton UK LLP
- MG Harris; Author
- David Harris; Heart of Business
- Tim Heath; Cyber Security Intelligence Ltd
- Maria Horn; Grant Thornton UK LLP
- Robert Kay; GovCoin Systems
- Henry Kinniburgh; Ixium LLP
- Andrew Knight; Ixonos Plc
- Duncan Lamb; Grant Thornton UK LLP
- Dr Vili Lehdonvirta; The Oxford Internet Institute
- Peter Lismer; Software Imaging
- Andrew Mackintosh; Sphere Fluidics
- Ian Macpherson; Oxford Science Park
- Hannah Madsen; Angel Sharp Media Ltd
- Henry Mendus; White and Black
- Greg Michalcheon; Outer Capital
- Céline Moguen; Arlington Legal
- Stuart Newstead; Ellare
- Glenn Parry; UWE
- Stuart Savage; LG Electronics
- Karl Schweppe; Freelance
- Michael Scott; 96Club
- Arvindra Sehmi; Oxford Economics Ltd
- Paul Wightman; Indigo Dingo Ltd
- Victoria Wright; Pennington-Manches

## APPENDIX 2

Registrants, workshop 2, London (n=63)

- David Barker, Founder & Technical Director; 4D Data Centres Ltd
- Jeremy Light, Managing Director; Accenture (UK) Ltd
- Alexander Morsakov; Accenture (UK) Ltd
- Jonathon Puttick, Policy Assistant; Association of British Insurers
- Michael Davison, Industry Principal, Financial Services; Atos
- Edward Sutton, Product Manager; Atos
- Andy Thompson, Senior Business Development Manager; Australian Trade Commission
- Christian Bartsch, Partner; Bird & Bird
- Matthew Field, Government Affairs Advisor; British Bankers Association
- Nick Fleming, Market Development Manager, Services; British Standards Institution
- Tim McGarr, Market Development Manager (ICT & Asset Management), Governance; British Standards Institution
- Chris Addenbrooke, CEO; Capita Asset Services
- Simon Bailey Director, Payments and Transaction Banking; CGI IT UK Ltd.
- Mike Fox, Principal Risk and Regulatory Consultant-Financial Services; CGI IT UK Ltd.
- Philip Skinner, Payments & Collections Manager; CGI IT UK Ltd.
- Mark Bailey, Partner; Charles Russell Speechlys LLP
- William Garner, Partner; Charles Russell Speechlys LLP
- Ozgur Gurleyen, Global Account Manager; Cisco Systems Ltd
- Craig Hogan, Vertical Solutions Architect; Cisco Systems Ltd
- Sian Jones; Coinsult
- Pinar Emirdag, CEO; Complymatic
- Salome Parulava; Consult Hyperion
- Himanshu Vyas, Customer Relationship Professional - Financial Services; CSC
- Lesley Charteris, Insurance Practice Snr Principal Consultant; Dell Corporation Ltd
- Anthony Myers, Future Technologies, Digital Economy Unit; Department for Culture, Media & Sport
- Michele Nati, Lead Technologist Personal Data and Trust; Digital Catapult
- Tom Harrison, Political Liaison Executive; Digital Jersey Limited
- Julian Williams, Professor of Accounting and Finance; Durham University Business School
- Luke Seaman, Senior Associate / Early Intervention /Strategy & Competition; Financial Conduct Authority
- Haydn Jones, Managing Director; Fujitsu
- Martin Glasspool, Trade & Finance; Government Office for Science
- Richard Hennah, Vice President; HCL Great Britain Ltd
- Pradeep Vancheeswaran, Regional Sales Head Financial Services UK & I; HCL Great Britain Ltd
- Danny Gozman; Henley Business School
- Martin Sadler, Director of Bristol Labs; Hewlett Packard Enterprise
- Alec Nacamuli, Global Payments Executive; IBM United Kingdom Limited
- Anthony O'Dowd, Solution Architect, Blockchain Technologies; IBM United Kingdom Limited
- Anandha Gopalan; Imperial College London
- Robert Learney; Imperial College London

- Jonathan Liebenau, Reader in Technology Management; London School of Economics and Political Science
- Alistair Milne, Professor of Financial Economics; Loughborough University
- Malcolm Cressey, Business Development Director; Mastek (UK) Limited
- Peter Allwood, Vice President of Strategy, Enterprise Security Solutions; Mastercard Europe Services Ltd
- Marcia Clay Group Head, Strategy and Market Development; Mastercard Europe Services Ltd
- Jenny Hotchin, Technology Lawyer; Pinsent Masons
- Leda Glyptis, Global Markets Director; Sapient Ltd
- Colin Bristow, Senior Technical Client Manager; SAS Software Limited
- Anthony Culligan, CEO; SETL
- Peter Randall, COO; SETL
- Andrew Coakley, Managing Partner; Sopra Steria Ltd
- Arghyatilak Chanda Director, Cards & Payments; Syntel Europe Limited
- Rodger Oates, Consulting Partner, BFSI; Tata Consultancy Services
- Rajesh Raghavan; Tata Consultancy Services
- Howard Smith; Taylor Vinters LLP
- Howard Yates, Managing Director; Tendo Technologies Ltd
- EJ Smith; University of Kent
- Philip Bond, Visiting Professor; University of Oxford
- Richard Adams; University of Surrey
- Phil Godsiff; University of Surrey
- Glenn Parry, Associate Professor in Strategy and Operations; University of the West of England
- Fabio Massacci; University of Trento
- Kyle Alves, Senior Lecturer; University of West of England
- Mark Shaw, Strategy Lead; VocaLink Limited

## APPENDIX 3

### **Call for Papers: Strategic Change: Briefings in Entrepreneurial Finance**

#### **The Future of Money and Further Applications of the Blockchain**

##### **PROPOSAL**

Satoshi Nakamoto (2008) proposed “a system for electronic transactions without relying on trust” that purported to resolve two fundamental challenges, double-spending and the Byzantine Generals problem, thus making digital currencies possible. This system, a *cryptographically enabled distributed ledger*, popularly referred to as the Bitcoin-developed “blockchain” is a disintermediating and decentralizing proposition. As the logical ramifications of implementation and adoption are worked through, the blockchain threatens to be an innovation *at least* as disruptive and transformative as the internet has been. The purpose of this special issue is to examine contexts and implications of such disruptive potential for incumbent and start-up organizations.

The technical innovation that the blockchain represents is around its distributed, decentralized data architecture: it enables a shift from central authority to community consensus, from controlling hand to community management. Blockchains are designed to be a tamper-proof record of transactions held and maintained in a distributed fashion by the community such that it is owned by no one and controlled by no one.

Decentralized models have the potential to reorganize all manner of human activity (Foroglou and Tsilidou, 2015), with potentially wide implications, including: commerce, government, freedom, jurisdiction, censorship and regulation. Just as the internet has provided real-time settlement of information, so the blockchain can provide real-time settlement of worth [or value-in-exchange]. Currently, this worth is predominantly in the form of money but in future it is envisaged that a diverse range of tangible and intangible asset types will be transacted. The music industry is currently promoting the use of blockchain technology and cryptocurrencies as new royalty-distribution mechanisms to manage and track intellectual property and online payments (Rethink Music, 2015). In another case, Provenance.org is using the blockchain to enable supply chain transparency and secure traceability for materials, ingredients and products providing product authentication as well as value-adding appended product stories.

The disruption may play out in human-to-human, human-to-machine and machine-to-machine transactions prompting the emergence of a difficult-to-envisage novel structuration and operation of society as established power relationships and hierarchies lose their utility (Swan, 2015). Further, these technological developments pose significant ethical questions in their design and use (Bergstra and de Leeuw, 2013) derived, for example, from developers’ and adherents’ underlying political and economic philosophies (Godsiff, 2015) or, as ‘machines become smarter’, unintended consequences of evolution or irresponsible use (Ahmed, 2015).

This is not an uncommon situation with IT and internet developments, and most research to date has focused on technical challenges such as cryptography. But, given the current interest and growth in cryptocurrencies and distributed ledger technologies, more work is needed in these areas. In order that we have the answers in place well ahead of time, immediate consideration must be given to legal and ethical issues and practices being “designed in” rather than retrofitted later (Edwards, 2013; Kwecka *et al.*, 2014). Better understanding of the economic, social, organizational,

environmental and governmental benefits and drawbacks of blockchain technologies is also required. The purpose of this special issue is to address these needs.

The Special Issue welcomes a wide range of contributions exploring the disruptive potential and implications of the blockchain. We invite papers from leading established scholars and from emerging scholars to explore this phenomenon and advance our knowledge with conceptual, theoretical or empirical work. We particularly welcome contributions that provide novel insights into the disruptive potential and implications of blockchain developments from collaborations between academic researchers and practitioners. This includes, but is not limited to, engineers, venture capitalists, developers, entrepreneurs, policy makers and regulators. We encourage submissions considering the following thematic areas:

**What transformation and where?** It is predicted that the financial services industry might generate up to \$20bn p.a. in efficiency savings from blockchain implementation (Oliver Wyman, 2015). Others suggest that blockchain technology signals the end of capitalism and the emergence of a new form of social, political and economic organization (Bauwens, 2005; Rifkin, 2014). How will the blockchain change the nature of organizations? Which industries and sectors will be disrupted and in what way?

**Blockchain for good.** Two billion of the poorest people in the world are disenfranchised from affordable financial services and have limited or no access to banking or credit facilities (Demirguc-Kunt *et al.*, 2015). Will a blockchain-powered economy emerge in the developing world? How can the blockchain be used to serve public interest in the face of (repressive) governmental or institutional power structures? What are the implications of the blockchain for the challenges of climate change and social injustice?

**Privacy, Identity, Trust and Ethics.** The promise of smarter machines connected to and enabling smarter tangible and intangible artefacts (from houses to contracts, from money to intellectual property) is to help address great contemporary societal issues. But, this potential to fundamentally change the way we live raises a series of questions relating to Privacy, Identity, Trust and Ethics. Contributors are encouraged to frame and explore these questions, such as: What does it mean to trust the (blockchain) algorithm as opposed to socially constructed institutions? When should be the correct time in cryptocurrency and blockchain development to introduce ethical concerns? What novel ethical principles may emerge from cryptocurrencies and the blockchain? Is it acceptable that cryptocurrencies should be able to subvert government-issued money?

**Community.** Cryptocurrencies such as Bitcoin are underwritten by the community and not a central bank operating in a tiered hierarchical structure. In what ways and with what consequences does the blockchain challenge and change existing social and political governance structures and models? How, and by whom, could/should blockchain transactions be regulated?

**Institutions.** Currently, inter- and intra-regional differences in approaches to regulation exist. What are the policy implications of an absence of central control over monetary systems? How should national and trans-national financial institutions integrate with, manage and utilise blockchain technologies? What are the implications for national governance?

## **SUBMISSION**

Please email your submission to Dr Richard Adams **before 1st May 2016: [r.adams@surrey.ac.uk](mailto:r.adams@surrey.ac.uk)**

## **PROPOSED TIMELINE**

- Call issued: October 2015;

- Papers Due May 2016;
- Shortlist and review for return by September 2016;
- Completed Revisions by December 2016;
- Review and completion of SI March 2017.

## EDITORS

Richard Adams: University of West of England and Surrey University. Richard holds Senior Research Fellow appointments at the University of West of England and University of Surrey. His research interests coalesce around organizational transformation particularly as a response to and consequence of innovation, digital technologies and sustainability. He has held academic posts at Cranfield University, Imperial College London, University of Exeter, and with the UK Cochrane Centre. Prior to this, Richard spent much of his time roaming the transitional economies of former Warsaw Pact countries working on economic regeneration projects.

Phil Godsiff: Surrey University. Phil is a Senior Research Fellow, working on the Innovation Gateway Project. His current research interests include the effect of the growth in the digital economy on industries, such as financial services, where he believes that existing business models are no longer appropriate, and that new forms of currency, such as crypto and personal currencies, will begin to emerge. He has spent 30 years working and consulting in Financial Services. He has an M.A. in economics from Cambridge University, and a PhD in Management from Exeter University. He is a Fellow of the Institute of Chartered Accountants.

Peter Ward: Warwick University. Peter is a doctoral student in the Service Systems and Supply Chain Research Groups at the University of Warwick. Using the lens of Service-Dominant Logic to understand consumption and the concept of the “last yard” to engage the supply chain, he is researching how health supply chains can make it easier for patients to take their medicines in resource-poor areas of sub-Saharan Africa. In his former career Peter held a range of European and African program management, executive and consultancy roles at IBM.

Glenn Parry: University of the West of England Glenn is Associate Professor of Strategy and Operations Management at the University of the West of England. He is interested in business models, value and organisational change. His research seeks to meet the twin hurdle of academic rigour and industrial relevance and his study areas have included aerospace, construction, IT, music, publishing and offender rehabilitation.

## REFERENCES

- Ahmed, K. 2015. *Google's Demis Hassabis – misuse of artificial intelligence 'could do harm'* [Online]. <http://www.bbc.co.uk/news/business-34266425>: BBC. [Accessed 17 September, 2015].
- Bauwens, M. (2005). The political economy of peer production. *CTheory*, **1**.
- Bergstra, J.A. & De Leeuw, K. (2013). Questions related to Bitcoin and other Informational Money. *arXiv preprint arXiv:1305.5956*.
- Demirguc-Kunt, A., Klapper, L., Singer, D. & Van Oudheusden, P. (2015). The global finindex database 2014: Measuring financial inclusion around the world. World Bank Development Research Group Finance and Private Sector Development Team April 2015.

- Edwards, L. (2013). Privacy, Law, Code and Social Networking Sites. *In: Brown, I. (ed.) Research Handbook On Governance Of The Internet*, University of Oxford, UK.
- Foroglou, G. & Tsilidou, A.-L. (2015). Further applications of the blockchain.
- Godsiff, P. (2015). Bitcoin: Bubble or Blockchain? *In: Jezic, G., Howlett, R.J. & Jain, L.C. (eds.) 9th KES International Conference, Agent and Multi-Agent Systems: Technologies and Applications*. KES-AMSTA 2015 Sorrento, Italy, June 2015: Springer International Publishing.
- Kwecka, Z., Buchanan, W., Schafer, B. & Rauhofer, J. (2014). "I am Spartacus": privacy enhancing technologies, collaborative obfuscation and privacy as a public good. *Artificial intelligence and law*, **22**, 113-139.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Consulted*, **1**, 28.
- Oliver Wyman (2015). The Fintech 2.0 Paper: rebooting financial services. [www.oliverwyman.com](http://www.oliverwyman.com). [Accessed 6 September, 2015].
- Rethink Music (2015). Fair music: transparency and payment flows in the music industry. Recommendations to increase transparency, reduce friction, and promote fairness in the music industry. [www.rethink-music.com](http://www.rethink-music.com): Rethink Music.
- Rifkin, J. (2014). *The Zero Marginal Cost Society. The internet of things, the collaborative commons and the eclipse of capitalism*, New York, NY, Palgrave MacMillan.
- Swan, M. (2015). *Blockchain: Blueprint for a New Economy*, O'Reilly Media, Inc

## Call for Papers

relating to the **special session** on

**“Blockchain for Good: Distributed Ledger Technologies and the CSR Agenda”**

at 7th International Conference on Corporate Sustainability and Responsibility

- CSR in an Age of Digitization -

September 14-16, 2016. Berlin, Germany

<http://www.csr-hu-berlin.org>

**Special session sponsored by**

**NEMODE**  
New Economic Models in the Digital Economy

Distributed ledger (blockchain) technology is a potentially disruptive innovation that will enable individuals, communities and organizations to redesign their economic and political interactions based on a process of decentralized, automated and trustless (free of the requirement for trusted intermediaries/third parties) record keeping. New technologies can introduce significant changes into social concepts and practices: advocates argue that Distributed Ledger Technologies have the potential to rapidly change even the tenets that underpin existing political systems and governance models, calling into question the traditional role of State and centralized institutions.

The purpose of this special session, sponsored by the [NEMODE Network+](#), is to explore the implications of Distributed Ledger (Blockchain) Technology for the CSR agenda. We invite submissions that contribute to this theme from a scientific, practical and/or political point of view. We encourage submissions from sociologists, psychologists, philosophers, political scientists, legal scholars, economists, management scholars, computer scientists and others who want to bring the logic and empirical techniques of their science to bear on issues of CSR. We especially welcome conceptual, theoretical and empirical research, in particular case studies, reflecting on such questions as:

- What are the innovative applications of Distributed Ledger Technology in the context of CSR, climate change, energy and water use and management?
- What are the implications of Distributed Ledger Technology for institutional design and modes of governance for CSR?
- What barriers and facilitators exist to the adoption and implementation of Distributed Ledger Technology solutions to CSR challenges?
- How does Distributed Ledger Technology in particular, and big data and the Internet of Things in general, enable scaling up to systems level solutions to CSR related challenges?
- What are the affordances that so-called Web of Trust tools bring to bear on CSR related challenges?

- How can Distributed Ledger Technology be used to address the United Nation's Sustainable Development Goals?
- What are the characteristics of CSR challenges that lend themselves to Distributed Ledger Technology solutions: what are the advantages of decentralized over centralized infrastructures?
- Does Distributed Ledger Technology offer a realistic possibility to solving the global commons challenge?
- Platform collaborativism: what the internet was designed for?

### **Further Information and Submission**

Please submit a one-page proposal for the paper (having a full paper is not a condition of either acceptance of a proposal or for presentation at the conference). Submissions to be sent to:

[submission@csr-hu-berlin.org](mailto:submission@csr-hu-berlin.org)

Deadline for submissions is May 31, 2016.

**Sponsorship by the NEMODE Network+ allows us to waive conference registration fees for accepted papers (restricted to one conference fee waiver per paper).**

For questions specifically relating to the 'Blockchain for Good' special session, please contact Dr Richard Adams at: [r.adams@surrey.ac.uk](mailto:r.adams@surrey.ac.uk)