

**MINUTES OF THE MARCH 22, 2023 MEETING OF THE
U.S. COMMODITY FUTURES TRADING COMMISSION'S
TECHNOLOGY ADVISORY COMMITTEE**

The Technology Advisory Committee (“TAC”) convened for a public meeting on Wednesday, March 22, 2023 at 12:00 p.m. at the U.S. Commodity Futures Trading Commission’s (“CFTC” or “Commission”) Headquarters Conference Center, located at Three Lafayette Centre, 1155 21st Street, N.W., Washington, D.C. The meeting consisted of three panels. Panel I explored issues in decentralized finance including a survey of the decentralized finance landscape; decentralization indicators and issues; the horizon for digital identity, privacy, and unhosted wallets; and exploits and continuing vulnerabilities in crypto markets. Panel II addressed cyber resilience in financial markets, including the cyber threat landscape. Panel III focused on responsible artificial intelligence (“AI”), including a blueprint for an AI bill of rights; responsible AI development, deployment, and use; and the emerging threat of AI-enabled cyber attacks.

TAC Members in Attendance

Carole House, Chair, TAC and Executive in Residence, Terranet Ventures Inc.,
Ari Redbord, Vice Chair, TAC and Head of Legal and Government Affairs, TRM Labs
Hillary Allen, Professor of Law, Associate Dean for Scholarship, American University,
Washington College of Law
Nikos Andrikogiannopoulos, Founder and Chief Executive Officer, Metrika
Dan Awrey, Professor of Law, Cornell Law School
Christian Catalini, Co-Founder and Chief Strategy Officer, Lightspark
Todd Conklin, Deputy Assistant Secretary of the Treasury for Office of Cybersecurity and
Critical Infrastructure Protection, U.S. Department of the Treasury
Jonah Crane, Partner, Klaros Group
Sunil Cutinho, Chief Information Officer, CME Group
Cantrell Dumas, Director, Derivatives Policy, Better Markets, Inc.
Timothy Gallagher, Managing Director, Cyber Risk and Investigations, Kroll
Michael Greenwald, Global Lead, Digital Assets and Financial Innovation, Amazon Web
Services
Dan Guido, Co-Founder and Chief Executive Officer, Trail of Bits
Emin Gun Sirer, Founder and Chief Executive Officer, Ava Labs
Jill Gunter, Chief Strategy Officer, Espresso Systems
Stanley Guzik, Chief Technology and Innovation Officer, S&P Global Commodity Insights
Jenifer Ilkiw, President, ICE Futures U.S.
Kavita Jain, Deputy Associate Director, Innovation Policy, Board of Governors of the Federal
Reserve System
Ben Milne, Founder and Chief Executive Officer, Brale
John Palmer, President, Cboe Digital, Cboe Global Markets, Inc.
Michael Panfil, Senior Director, Lead Counsel, Climate Risk and Clean Power, Environmental
Defense Fund
Francesca Rossi, IBM fellow and AI Ethics Global Leader, IBM
Joe Saluzzi, Co-Founder, Partner, and Co-Head of Equity Trading, Themis Trading, LLC
Michael Shaulov, Co-Founder and Chief Executive Officer, Fireblocks

Justin Slaughter, Policy Director, Paradigm
Todd Smith, Director of Centralized Data Science and Analytics, National Futures Association
Steve Suppan, Senior Policy Analyst, Institute for Agriculture and Trade Policy
Corey Then, Vice President of Global Policy, Circle
Nicol Turner Lee, Senior Fellow and Director, Governance Studies, Center for Technology
Innovation, The Brookings Institution
Adam Zarazinski, Chief Executive Officer, Inca Digital
Jeffrey Zhang, Assessment Professor of Law, University of Michigan Law School

CFTC Commissioners and Staff in Attendance

Christy Goldsmith Romero, Commissioner and TAC Sponsor
Kristin N. Johnson, Commissioner
Summer K. Mersinger, Commissioner
Caroline D. Pham, Commissioner
Anthony Biagioli, TAC Designated Federal Officer (“DFO”)
Joe Cisewski, Chief of Staff and Senior Counsel, Commissioner Christy Goldsmith Romero
Phil Raimondi, Senior Counsel and Policy Advisor, Commissioner Christy Goldsmith Romero

Invited Speakers in Attendance

Kevin Stine, Chief of the Applied Cybersecurity Division, NIST Information Technology
Laboratory, National Institute of Standards and Technology
Alan E. Mislove, Assistant Director for Data and Democracy, White House Office of Science
Technology and Policy

I. Opening Remarks

Mr. Biagioli called the meeting to order and welcomed all for attending. He then turned to Commissioner Goldsmith Romero, the TAC sponsor, for her welcome and opening remarks.

Commissioner Goldsmith Romero welcomed all. She stated that she was excited to hear the perspectives of the well-respected technology experts on the committee. She emphasized the need for a broad representation of stakeholder perspectives to build a safe financial system that harnesses the best of technology while protecting customers and financial stability. She introduced the TAC’s chair, Ms. House, and Vice Chair, Mr. Redbord, highlighting their work in digital assets. She also thanked her staff and other CFTC staff responsible for organizing the meeting.

Commissioner Goldsmith Romero highlighted the key topics of the panels. First, she discussed responsible AI for financial markets and what that means. Responsible AI involves using AI technologies to improve the efficiency, accuracy, and transparency of financial systems while also ensuring that these technologies are deployed in a way that aligns with the interests of all stakeholders. Second, she stated that the TAC would discuss decentralized finance (“DeFi”) and its implications for our financial system. Third, she stated that the TAC would discuss how to plan and prepare to have cyber resilience. She described cyber resilience as the ability to recover quickly from minor cyber incidents and errors. Finally, she stated that the TAC would

also discuss various cyber incident responses and the benefits and challenges of cloud technology.

Commissioner Johnson then gave her opening remarks. She thanked the organizers and acknowledged the critical role of the committee. She reflected on the history of the TAC, and highlighted how the committee’s focus shifted after 9/11. She emphasized the need for the TAC to explore certain topics further, including: digital ledger technology (“DLT”) in common business practices, cybersecurity risks and the role of NIST standards, and AI-enabled cyber risks and the ethical implications of introducing AI to society.

Commissioner Mersinger began by thanking the CFTC staff, the organizers of the TAC, and the presenters. She specifically acknowledged the hard work of Mr. Biagioli, the DFO for the TAC. She emphasized the importance of responsible innovation in the derivatives markets and the need to achieve a balance between market integrity, customer protection, and emerging technologies. She stated that learning from the public and industry leaders is the key to sound policymaking.

Commissioner Pham began by thanking all the organizers and members of the TAC. She focused her remarks on operational resilience in the financial system in light of ongoing shocks and disruptions. She stated that the CFTC has direct oversight over systemically-important banks and financial market utilities. She stated the CFTC and its partner the National Futures Association (“NFA”) both have rules to help manage the risks associated with operational resilience, but compliance failures should be examined and addressed, and the Commission should also examine if additional regulations may be necessary.

Mr. Biagioli thanked everyone for their opening remarks and turned to Ms. House and Mr. Redbord.

Ms. House thanked Chairman Behnam, the Commissioners, and CFTC staff for reconstituting the TAC membership. She emphasized the significance of technology in the U.S. economy and stated that it is a tool for both legitimate and illicit actors and that it had implications for a spectrum of policy issues before the Commission. She stated that she and Mr. Redbord were present to contribute their understanding of technology’s challenges and to help propose solutions to those challenges to drive responsible innovation. She stated that the meeting would focus on DeFi, cybersecurity, and the responsible use of artificial intelligence.

II. Panel I: Exploring Issues in Decentralized Finance

A. A Survey of the Decentralization of Finance (DeFi) Landscape and Indicators and Issues in Decentralization

Ms. House introduced Mr. Redbord, who would present a brief survey of the DeFi landscape. Mr. Redbord highlighted the potential for DeFi to revolutionize financial services by offering peer-to-peer financial services without the need for intermediaries. He discussed the qualities of public blockchains that contribute to the promise of DeFi, including transparency, traceability, and the permanence of blockchain records. He also emphasized that blockchains

offer improved privacy and that their programmability and smart contract execution abilities increase financial system access.

Ms. House then introduced Mr. Andrikogiannopoulos, who presented further on decentralization indicators and issues in the context of DeFi. He discussed the historical context of DeFi and emphasized that modern technology, cryptography, and consensus have solved the coordination problem among untrusted parties. He explained how decentralization brings transparency, security, and greater autonomy to users. However, he also acknowledged the challenges of decentralization including bootstrapping, technological maturity, governance issues, and the interconnection of decentralized networks with traditional finance. He concluded by saying that the benefits of decentralization outweigh the costs, and that new tools and practices are needed to enable broader adoption of DeFi.

Mr. Redbord concluded by emphasizing the growth and resilience DeFi has shown and noting the potential for regulatory advancements enabled by the transparency and visibility offered by blockchain technology. Mr. Redbord then opened the floor to question and comments from the TAC membership. Generally, the concerns and discussion raised in this session included: the risks associated with DeFi protocols; the distinction between technological decentralization and economic decentralization, which is not achieved as easily; the need to resolve hardware limitations and the need to explore new technologies such as graphene for more efficient processing; the use of DeFi for sanctions evasion; the potential for manipulation; and the vision for a truly decentralized future.

B. Digital Identity, Privacy, Unhosted Wallets: What's On the Horizon?

Ms. House began the discussion by highlighting NIST's leading role in establishing digital identity guidelines in the U.S. and how NIST is essential in finance, consumer services, and cryptocurrency. She discussed the need for privacy in certain transactions on public ledgers and new privacy-enhancing technologies. She also discussed how the concept of identity is complex, with different contexts requiring different types of identities. She explained the importance of identity-proofing and enrollment, authentication, and federation, and highlighted how exploitation of these aspects requires different solutions.

Ms. Gunter then discussed the DeFi identity landscape and various identity products, including compliance and know your customer ("KYC") solutions, civil resistance mechanisms, standards bodies, and reputation protocols. She discussed the trade-offs of various privacy solutions in the Web3 and DeFi space, including private payment protocols, configurable privacy solutions, and privacy-oriented DeFi applications. Finally, she discussed the self-custody landscape otherwise known as unhosted wallets. She stressed the importance of users being able to custody their own assets without relying on third-party custodians or exchanges.

Ms. House concluded by highlighting the importance of examining technology and policy to establish standards and clarity in the DeFi space. She emphasized the key features an identity system should possess, such as portability, verifiability, equity of access, privacy, and recoverability. Ms. House then opened the floor to questions and comments from the TAC membership. Generally, the concerns and discussion raised in this session included: concerns

about the reliance on centralized on-and off ramps in compliance strategies; the potential shift towards decentralized networks; the importance of privacy for mainstream users; the role of regulators in encouraging decentralization and competition; the technical challenges in implementing privacy preserving systems; addressing unchained identity in the blockchain space; lessons learned from using digital assets and digital identity in humanitarian payments; the potential for providing access to financial services to individuals who lack traditional identification; skepticism about the centralization and credibility of decentralized finance; and the importance of control and standardization in identity solutions, including definitions.

C. Exploits & Continuing Vulnerabilities in Crypto Markets

Ms. House then introduced Mr. Guido, who discussed the unique challenges faced by the blockchain industry. He emphasized the need for better security expertise and the lack of trustworthy information. He stated that traditional standards and practices are insufficient to keep up with the rapidly changing blockchain technology. The public nature of blockchain transactions and hacks creates a need for highly accurate safety measures. In fact, it requires risk elimination rather than mitigation as each hack directly impacts a blockchain firm's finances and operations. He believes more research, innovation, and precise algorithms are needed to secure blockchain systems effectively. He also presented twelve critical security controls that can help assess the safety of blockchain protocols.

Next, Mr. Shaulov discussed three real-world hacks that occurred in the past 18 months. In these examples, hackers were able to: convince an IT engineer to download a malicious PDF file, which allowed them to access private keys and withdraw \$650 million in cryptocurrency; target a decentralized application and insert code that tricked users into approving transactions for the hackers to steal \$120 million in assets; and exploit a logical bug in a protocol to trigger a liquidation that allowed the hackers to steal \$200 million. He emphasized the need to improve key management, transaction security, and smart contract security in the industry.

Following Mr. Shaulov's presentation, Ms. House moved to further consider the issues discussed with a motion to create a Digital Asset and Blockchain Technology Subcommittee. She asked for a motion, which was seconded, to establish the subcommittee. TAC members then briefly discussed their support for the committee and commented on the panel discussion. Generally, the concerns and discussions raised included: the fact that most of the hacks were cybersecurity-related and did not have to do with vulnerabilities on the blockchain; DeFi cannot be applied to different financial products with a one-size-fits-all approach; the need to examine front-running in the context of a DeFi environment; and an emphasis on investor protection and economic competitiveness.

Ms. House then called for vote on the motion and the motion to establish the subcommittee was unanimously adopted.

[Break]

III. Panel II: Ensuring Cyber Resilience in Financial Markets

A. The Cyber Threat Landscape for Financial Markets: Lessons earned from ION Markets, Cloud Use in Financial Services, and Beyond

Ms. House introduced the first speaker, Mr. Conklin, who highlighted the U.S. Treasury Department's efforts to support cyber resilience through the Treasury Cloud Study and Report, which highlighted gaps and recommended follow-on items to improve the financial sector's cloud adoption, including rebuilding the cyber incident communications and response playbook, coordinating with the private sector, and providing declassified cybersecurity information to the financial sector. He stated that the Treasury Department plans to establish a Cloud Services Steering Group to develop common definitions and terms, explore oversight of cloud service providers, improve contract prices, and establish NIST-centric frameworks for cloud adoption strategies.

B. Pillars of a Cyber Resilience Framework for Financial Markets

Ms. House then introduced Mr. Stine, who highlighted the strong relationship between NIST and the financial sector, and NIST's mission to promote innovation and competitiveness through standards and measurements science. He emphasized the importance of risk management and enterprise risk management. He also discussed the NIST Cybersecurity Framework, a standards-based tool developed to help organizations understand, communicate, manage, and reduce cybersecurity risks. NIST plans to update this framework.

Ms. House then opened the floor to questions and comments from the TAC membership. Generally, the concerns and discussion raised in this session included: improving incident response and early warning in non-cloud systems; measuring cybersecurity capabilities and providing more context around the impact of risks; the need for better risk management and modelling; and the importance of repeated testing to improve defenses against cyber attacks.

Ms. House moved to further consider the issues discussed with a motion to reestablish the Subcommittee on Cybersecurity. She asked for a motion, which was seconded, to reestablish the subcommittee. Ms. House then called for vote on the motion and the motion to reestablish the subcommittees was unanimously adopted.

IV. Panel III: Responsible Artificial Intelligence (AI)

A. Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People

Ms. House introduced Mr. Mislove, who discussed the Blueprint for an AI Bill of Rights. The blueprint aims to ensure the responsible development and deployment of AI systems that protect the rights of the American public and uphold democratic values. The Blueprint focuses on five core protections for AI systems: (1) protect from unsafe or ineffective systems; (2) prevent discrimination by algorithms; (3) protect against abusive data practices; (4) provide notice and an explanation of when automated systems are being used; and (5) preserve the ability

to opt-out of automated systems and access human assistance. The Blueprint includes a technical companion that provides example and concrete steps for integrating the protections into the design process of AI systems. Mr. Mislove discussed the applications of the Blueprint, the importance of ensuring safe and effective systems, and the need for these systems to work well with real-world data.

B. Responsible AI Development, Deployment, and Use

Ms. House introduced Ms. Rossi, who presented on AI ethics. She began by highlighting the history and development of AI. She stated that since AI is used in various online activities and high-stakes decision-making applications, ethics is crucial. Ethical considerations include: data privacy, fairness, inclusivity, explainability, transparency, accountability, social impact, human agency, and environmental impact. She suggested a multidisciplinary and collaborative approach to address ethics issues. She stated that issues that arise in AI development should be addressed quickly and described three phases of AI development: (1) the awareness phase; (2) the principles phase; and (3) the current practice phase. Finally, she highlighted IBM's approach in structuring its AI ethics activities around five pillars: explainability, fairness, robustness, transparency, and privacy.

C. The Emerging Threat of AI-Enabled Cyber Attacks

Ms. House introduced Mr. Gallagher, who discussed threats to the nation's financial infrastructure as a result of AI-enabled cyber attacks. He stated that partnerships between law enforcement, regulatory agencies, and private companies can mitigate these threats. He then discussed different types of threats, including malware and phishing attacks. He further expressed concerns about how AI cyber attacks are a threat to financial markets and the importance of public confidence. He also stated that AI can help further malign activity in certain instances, such as in pump-and-dump schemes, where AI can help recruit investors, create synthetic profiles, and generate fake news to manipulate stock prices.

Ms. House then opened the floor to questions and comments from the TAC membership. Generally, the concerns and discussion raised in this session included: how a private firm can protect itself and individuals if it is coerced by an organization to manipulate markets using their AI technology; the use of AI in risk management; and the challenges of evaluating generative AI systems that lack specific use cases or specifications and the need to anticipate and mitigate potential risks and unintended consequences.

Ms. House moved to further consider the issues discussed with a motion to establish a Subcommittee on Emerging and Evolving Technologies. She asked for a motion, which was seconded, to establish the subcommittee. Ms. House then called for vote on the motion and the motion to establish the subcommittees was unanimously adopted.

V. Closing Remarks

In closing, Ms. House thanked the presenters and Commissioners for the excellent discussion. Commissioner Goldsmith Romero also thanked all for their expertise.

Mr. Biagioli adjourned the meeting at 4:55 p.m.

Carole House

Carole House
Chair, TAC

20JUN2023

Date