

Centre for the Fourth Industrial Revolution Network

for Global Technology Governance

Quarterly Report

April - June 2019





World Economic Forum
Centre for the Fourth Industrial Revolution
1201 Ralston Avenue
San Francisco, CA 94129
Tel.: +1 415 704 8848
Email: c4ir@weforum.org
www.weforum.org/centre-for-the-fourth-industrial-revolution

© 2019 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system.

REF 180319 - 00063821

Updates from the Centre for the Fourth Industrial Revolution Network for Global Technology Governance

(April – June 2019)

Note: Hyperlinks to the Forum's digital platform TopLink are only available to Centre for the Fourth Industrial Revolution partners and members.

Centre for the Fourth Industrial Revolution inaugurates Global Councils to restore trust in technology

To help policy-makers and businesses strike the right balance between promoting technological innovation and proactively mitigating its risks to society, the Centre for the Fourth Industrial Revolution (C4IR) convened six Global Fourth Industrial Revolution Councils on 29 May in San Francisco. Covering emerging technologies such as artificial intelligence and machine learning, autonomous mobility, blockchain, drones, the internet of things and precision medicine, the Global Councils brought together more than 200 leaders from the public and private sectors, civil society and academia from around the world.

Council members committed to working together to develop policy guidance and address governance gaps or the absence of well-defined rules for emerging technologies. The Councils will enable the global exchange of policy and regulatory experiences; identify and address gaps in public policy or corporate governance through multistakeholder cooperation; share best practices to improve policy coordination within and among countries; and provide strategic guidance to the C4IR Network regarding the governance of its projects and pilots.

Click [here](#) for a summary of the outcomes of the 29 May Inaugural Meeting of the Global Fourth Industrial Revolution Councils and an overview of the ambitious agendas and wide range of initiatives to be undertaken by the six Councils over the coming year.

World Economic Forum announces new Global Technology Governance Summit

The World Economic Forum will hold its first Global Technology Governance Summit on 20-21 April 2020 in San Francisco. This event will be the world's premier high-level, multistakeholder meeting dedicated to shaping the governance of emerging technologies. It will bring together government ministers, chief executive officers, civil society leaders, start-ups and international organizations to collaborate on developing innovative and human-centred approaches to technology governance. The next in-person gathering of the six Global Fourth Industrial Revolution Councils will occur at the Global Technology Governance Summit. More information about the summit will be available in the coming weeks.

C4IR Expands Global Network with New Affiliate Centres

New C4IR Affiliate Centre in South Africa announced:

On 16 April, the Department of Science and Technology (DST) of South Africa announced its intent to establish an Affiliate Centre that will be hosted at the Council for Scientific and Industrial Research (CSIR), South Africa's premier scientific research and development organization. The announcement was made after a consultation breakfast with over 120 representatives from academia and business as well as members of the Presidential Commission on the Fourth Industrial Revolution chaired by President Ramaphosa. The Centre will be officially launched during the World Economic Forum on Africa regional meeting, which will take place in Cape Town from 4 to 6 September 2019. Projects at the Affiliate Centre will initially focus on the internet of things and blockchain.





UAE Affiliate Centre launched: On 28 April, the Middle East's first C4IR Affiliate Centre **was launched** in the UAE in collaboration with the Ministry of Cabinet Affairs and the Future. The launch was attended by Forum President, Børge Brende, and the UAE's Minister of State for Artificial Intelligence, Omar bin Sultan Al Olama, alongside several senior government officials from the UAE and CEOs from leading companies. C4IR UAE will be hosted by the Dubai Future Foundation, the government entity mandated to shape the future of strategic sectors in cooperation with the public and private sectors. C4IR UAE will further strengthen the Forum's strategic relationship with the UAE and will focus on precision medicine, blockchain, and artificial intelligence and machine learning.

Colombia Affiliate Centre launched: On 30 April, Latin America's first C4IR Affiliate Centre **was launched** in Colombia in the presence of President Ivan Duque and Mayor of Medellín Federico Gutiérrez. Ruta N, the city of Medellín's entrepreneurship and innovation hub, will host the Centre. The launch event was attended by over 60 journalists and more than 350 participants from the private sector, government, civil society and academia, generating tremendous interest from all stakeholders in partnering with C4IR Colombia. The Centre will focus on building policy frameworks and governance protocols related to artificial intelligence and machine learning, the internet of things and blockchain.



Project updates

Artificial Intelligence and Machine Learning (AI/ML)



- **Empowering AI Leadership:**

This project is co-designing a toolkit for corporate boards to responsibly govern their companies' design, deployment and procurement of AI technologies. Over 50 industry leaders and other stakeholders provided input into an initial draft of the toolkit in a workshop during the World Economic Forum Annual Meeting 2019 in Davos-Klosters. Numerous companies in the session committed to piloting the toolkit with their boards. Feedback was provided on an updated version of the toolkit during a workshop at the Industry Strategy Meeting in Geneva in May. Insights from these pilots and from case studies will be integrated into the final version of the toolkit, to be released at the Annual Meeting in Davos-Klosters in January 2020. More information for companies interested in piloting the toolkit is available [here](#).
- **Setting Responsible Limits on Facial Recognition Technology:**

This project focuses on creating actionable policies to address human rights concerns arising from the use of facial recognition technology. The Government of France will be the first to co-design and pilot these policies, and numerous other governments have expressed interest. A workshop is scheduled in Paris on 26 June 2019. The structured discussion will focus on the participants' perceptions, understanding and ideas regarding government use of facial recognition technology in their sectors, with the aim of ensuring it does not infringe on individual rights and fundamental freedoms; preventing and mitigating uses that are likely to lead to biased outcomes; and protecting consumers against invasive surveillance by private companies.
- **Unlocking Public-Sector AI:**

Although AI has the potential to vastly improve government operations, many public institutions are cautious about harnessing it due to concerns over bias, privacy, accountability, transparency and overall complexity. This project will change that by designing guidelines for the responsible procurement of AI technology by the public sector. It aims to help set global standards for AI procurement and to revolutionize how governments provide services to the public. The project community, which includes over 100 members from government, business, civil society and academia, has co-designed these guidelines over the past few months and is now creating a workbook that explains how the guidelines should be applied by procurement officers. The United Kingdom is the first government that has committed to piloting these guidelines, which it approved in April 2019. Various UK ministries will begin piloting them mid-year, until November 2019. Fifteen other governments have also expressed interest in piloting and adopting the guidelines, including Bahrain, Brazil and Singapore.
- **Generation AI – Standards for Protecting Children:**

This project, run in partnership with UNICEF, considers the human rights of children in an age of AI. So far, the project has held three workshops, bringing together over 150 diverse stakeholders to examine this issue, including companies working with AI-enabled devices, leading researchers in developmental science, children's rights advocates and government representatives. A follow-up meeting will take place at UNICEF headquarters in New York on 26 June and will incorporate the lessons learned from the previous workshops related to policy frameworks that will be advanced through UNICEF's country-level offices. Additionally, this project is working with numerous companies selling AI-enabled toys and educational tools to build, co-design and pilot self-imposed guidelines for the responsible development and deployment of AI technology.

- [View](#) the slide deck presented during the Artificial Intelligence and Machine Learning Portfolio update call on 12 March 2019.
- [Watch](#) a recording of the call.
- **Upcoming project community calls:**
 - Generation AI – Standards for Protecting Children: 11 July 2019
 - Teaching AI Ethics: 1 August 2019



Autonomous and Urban Mobility (AUM)



– **Global New Mobility Coalition:**

The [Global New Mobility Coalition](#) has brought together 24 diverse stakeholders over six workshops to create a prototype framework for shared, electric and automated mobility that governments can use to reduce environmental pollution and global warming. Coalition members have created a library of over 40 policy recommendations, identified four environmental assessment models and are currently identifying three potential pilot cities, in North America, Europe and Asia, to co-design and pilot policy solutions. As the coalition prepares for its official launch mid-2019, workshops are being held in Germany, Israel and China.

– **Alleviating Transportation Deserts with Autonomous Vehicles:**

Transit deserts (i.e. areas with insufficient transportation services) exist all over the world, hampering economic development and putting many citizens – usually the most vulnerable populations – at a disadvantage for employment, housing, healthcare and food. Led by C4IR Japan, this project is exploring ways in which innovations in mobility, such as autonomous vehicles (AVs) and mobility-as-a-service platforms (i.e. on-demand services that include various modes of transport), can address transit deserts. The project is examining why transportation deserts are developing in rural areas and smaller cities in Japan. The 17 partners involved in this project are developing a Sustainable Transportation Index and identifying potential cities for policy experiments.

– **Preparing Cities for Autonomous Vehicles:**

The commercialization of AV technologies will change how people move about in urban environments. Municipal governments are keen to understand its potential impact and viable options for addressing concerns about AVs. Using San Francisco's [Guiding Principles for Emerging Mobility Services and Technology](#) as a starting point, this

project is developing a framework to examine how the introduction of AVs could impact cities. To date, the project team has conducted interviews with government stakeholders, reached consensus on the framework's outline, and identified citizen advocacy groups, benchmark cities and businesses for input. Working with the San Francisco Municipal Transportation Agency, this project will hold a series of workshops mid-year to discuss action items.

– **Adjudicating Autonomous Vehicle Liability Gaps (scoping):**

In April 2019, this project published a [White Paper](#) examining legislative gaps pertaining to automated vehicles and contrasting the various types of solutions feasible under civil law, common law and international agreements. Some of the gaps identified include elaborating on AV-related activities outside of driving, defining the responsibilities of a non-human driver, clarifying the obligations of remote operation of an AV, and identifying system liability. The project is now working to forecast likely legal outcomes in differing jurisdictions arising from policy gaps surrounding AV risks with regard to the relief of victims.

– **Ensuring Safe AV Trucking on Highways (scoping):**

This project aims to specify a set of policy requirements for enabling the safe transportation of goods on highways via autonomous heavy-duty commercial trucks. Four key areas will be examined: right of way, data and insight reporting to regulatory authorities, infrastructure requirements and the sharing of information with other motorists. Two use cases will be examined: one looking at two different jurisdictions with no hard borders but differing regulatory regimes, and the other involving goods crossing an international border. The project has identified 10 potential community members and begun a landscape review.

- [View](#) the slide deck presented during the Autonomous and Urban Mobility Portfolio update call on 14 March 2019.
- [Watch](#) a recording of the call.
- Fill out the short [AUM Portfolio Survey](#) if interested in getting involved with an AUM project.
- **Next Autonomous and Urban Mobility Portfolio update call:** September 2019
- **Upcoming project community calls:**
 - AV Trucking on Highways: July 2019
 - Adjudicating AV Liability Gaps: July 2019



Blockchain and Distributed Ledger Technology



– **Central Banks in the Age of Blockchain:**

As critical engines of the global economy, central banks must be particularly cautious in experimenting with blockchain despite adoption in the broader financial services industry. This project has brought together over 40 central banks and international organizations on a confidential platform to exchange information and best practices related to distributed ledger technologies (DLT). Since January 2019, the Forum has hosted seven webinars on key technology topics as well as an in-person event organized in collaboration with the International Monetary Fund that brought together 15 central banks and international organizations to discuss the future of central bank digital currencies, blockchain-based bond issuance and potential blockchain deployment strategies that could be championed by central banks. The Forum published a [White Paper](#) that summarizes these discussions' key insights and findings. The community has started developing a policy framework for central bank digital currency (CBDC) issuance, which a number of banks have expressed interest in piloting. Framework development began with an in-person meeting in Amsterdam in June 2019 on the sidelines of the Money20/20 conference.

– **Redesigning Trust: Blockchain for Supply Chains:**

This project has brought together [over 100 organizations](#) to co-create a policy framework and user-friendly decision-making toolkit to promote the interoperable, responsible and inclusive deployment of blockchain for supply chains. The project will release a series of six White Papers that will inform the toolkit. Two were released in April: an [Introduction](#) and a paper on [digital identity](#). Additional information for the toolkit will be gathered during a workshop in June and during feedback sessions across Europe and at the Annual Meeting of the New Champions in China in July. An initial version will be released by September, with numerous stakeholders lined up to pilot it in the following months.

– **Unlocking Government Transparency:**

In partnership with the Inter-American Development Bank (IDB) and the Colombian Inspector General's office, the Forum is engaging a multistakeholder community to explore whether and how blockchain technology can be used to enhance transparency within various government processes, reducing corruption and enhancing accountability. The team has authored a policy framework for a blockchain-based procurement platform that adequately balances transparency and anonymity – a template that can be replicated in other settings – along with recommended legal reforms to enable such a platform. The platform will be used later this year for a pilot procurement process in Colombia, valued at over \$1 million. Lessons from that pilot will be used to update the framework for deployment by other governments.

– **Blockchain as a Team Sport: Governance Models for Blockchain Consortia (scoping):**

Given the distributed nature of blockchain technology, collaboration across industries and sectors is necessary for successful deployment. But a growing number of blockchain consortia are confronting multiple governance challenges unique to this decentralized technology. The goal of this project is to co-design and pilot governance frameworks for blockchain consortia and joint blockchain platforms that can apply to diverse industries consisting of multiple stakeholders with different incentives. By bringing together these diverse stakeholders to co-design governance frameworks, the project aims to reduce missteps and embed best practices into the formation of blockchain consortia. The project is undertaking an extensive landscape review and hosting global workshops across various interested industries.

– [View](#) the slide deck presented during the Blockchain Portfolio update call on 14 February 2019.

– [Watch](#) a recording of the call.

– **Next Blockchain Portfolio update call:**
15 August 2019

Data Policy



– **Thinking Outside the Box: Fit for Purpose Consent:**

This project is working with regulators and data-collecting organizations to find common ground on which mechanisms for consent are sufficient to meet new regulatory and legal requirements. Recent regulations in the United States and European Union have caused confusion and ambiguity about which types of models and mechanisms for consent are considered best practice or even minimally compliant. Enforcement actions are emerging that provide some guidance, but they are also raising concerns that the methods companies have long relied upon may not be adequate. Data can start to be processed and used once the user provides consent, so the costs of getting consent wrong are very high. There is a longer-term opportunity in leveraging human-centred design thinking to explore new consent mechanisms that address the unique characteristics of Fourth Industrial Revolution technologies. A scoping workshop will be held in partnership with the Stanford Law School Center for Internet and Society in October 2019 at the Centre for the Fourth Industrial Revolution in San Francisco.

– **Designing Interoperable Frameworks for Data Flows:**

The Data Policy team held a community session at the World Economic Forum on the Middle East and North Africa in Jordan in April to discuss how the MENA region could become a leader in the data economy of the Fourth Industrial Revolution. The panellists discussed the potential value that data transfer could unlock for the region and agreed that MENA countries must work together to pool their resources and data to compete in the Fourth Industrial Revolution. Developing a clear regional framework and a cooperation mechanism – whereby data can easily move across different jurisdictions – will have a significant impact on economic growth in the region.



One of the project's workstreams focuses on developing regional interoperable data flow models. While such models exist in the European Union and APEC economies, developing countries that are boosting their investment in technology can apply and customize approaches based on lessons learned in other parts of the world. The development of regionally compatible data flow principles in the Middle East, Latin America and Africa will help fuel the burgeoning technology sectors in these regions and make them competitive with other regions that have had a head start in technology development. Another workstream focuses on co-designing data policy frameworks for specific fields. It aims to identify and address challenges to creating data-sharing frameworks for clearly beneficial use cases, such as humanitarian uses of cross-border data and research on rare diseases.

- **Trustworthy Data for the Common Good:**
The Data Policy team released an [Insight Report](#), playbook and policy toolkit in May at the World Health Assembly and UN Office for the Coordination of Humanitarian Affairs. The report reviews a comprehensive set of use cases and illustrates how concerns about the potential misuse of private-sector data need to be balanced with the lost opportunities related to its non-use. Collaborative efforts to share and use data for the common good need to focus on six dimensions: security, accountability, transparency, auditability, equity and ethics.

The Contract for Data Collaboration, an open repository of legal clauses from data-sharing agreements, was previewed in Bogotá, Colombia, at the semi-annual meeting of the Thematic Research Network on Data and Statistics. An updated version will be available for early-stage piloting towards the end of 2019.

This project is also developing a White Paper for release later this year on the ability of federated approaches to access highly sensitive data on a global scale while limiting costs and complying with local regulatory requirements.

- **Ethical Development, Deployment and Use of Technology:**

This project seeks to produce a framework and tools that organizations can use to incorporate ethical design into product development and technology deployment. With a multistakeholder Steering Committee now in place, the project is focusing on input and participation from global stakeholders. On the heels of the launch of C4IR Colombia on 30 April 2019, the project convened a workshop with 20 Colombian entrepreneurs to elicit feedback on the kinds of ethical questions that arise in the development, deployment and use of new technologies. A follow-up session will be held in Cartagena, Colombia on 24 July 2019 with key ICT industry stakeholders in the region at the 14th International Telecomm Regulatory Meetings. A session on this project will also be held at the Annual Meeting of the New Champions on 3 July in Dalian, China.



– **Healthcare and Data Policy:**

Led by C4IR Japan, this project is working with the Government of Japan's Future Innovation Working Group – jointly organized by the Ministry of Economy, Trade and Industry and the Ministry of Health, Labour and Welfare – to explore ways in which a range of medical and lifestyle data might be better used to address dementia, which is a growing problem in Japan and other ageing societies around the world. Workshops on system architecture were conducted with Keio University's Graduate School of System Design and Management. The initiative is scoping potential amendments to Japan's Personal Information Protection Act, which is set for revision in 2020, that would update the law to suit the needs of an ageing society, taking into account the agency and well-being of people of all ages and with diverse needs.

– **Model Artificial Intelligence Governance Framework:**

The Data Policy team is supporting the Singaporean government in piloting their accountability-based Model Artificial Intelligence Governance Framework and co-designing an AI Accountability Assessment Guide with a set of guidelines for companies to evaluate their AI deployment practices. On 2 April 2019, a roundtable with Yeong Zee Kin, Deputy Commissioner, Singapore Personal Data Protection Commission, and a group of key stakeholders from various sectors explored mechanisms for piloting and further developing the framework. A summary of the meeting is available [here](#). Companies are invited to pilot the AI governance processes proposed by the framework and then be featured as case studies for the companion Assessment Guide. A workshop will be held at the Centre for the Fourth Industrial Revolution in San Francisco on 1 August 2019.



- [View](#) the slide deck presented during the Data Policy Portfolio update call on 11 June 2019.
- [Watch](#) a recording of the call.
- **Upcoming workshops:**
 - Model AI Governance Framework: 1 August 2019 at C4IR San Francisco
 - Fit for Purpose Consent Models: October 2019 (California, USA)

Digital Trade



– TradeTech:

This initiative is working with partners to co-design norms and policies around emerging technologies to drive international trade. It strives to increase efficiency and inclusivity in global trade and align with the UN Sustainable Development Goals. On 25 March, the team co-hosted an event called “Making Global Trade Inclusive” at the Netherlands Consulate General in San Francisco with remarks from Sigrid Kaag, Minister for Foreign Trade and Development Cooperation of the Netherlands.

The TradeTech initiative has developed the following workstreams:

– Global Trade Single Window with Blockchain:

In collaboration with the Inter-American Development Bank, this project aims to create a policy framework for implementing blockchain in the export and import trade ecosystem with an initial pilot in Argentina. Over 60 experts and government officials participated in launch webinars, including Marisa Bircher, Secretary of International Trade of Argentina. A second draft of the policy framework with feedback from partners was discussed on the quarterly project call on 17 May.

- ### – 3D Printing and Trade Logistics:
- In collaboration with key stakeholders from governments, economic development boards and the private sector, this project examines the impact of decentralized manufacturing on governments and industries, focusing on the future potential of national strategies for 3D printing. On 7 May at The Digital Factory conference in Boston, the team hosted an informal dinner to discuss issues pertinent to companies looking to expand 3D printing globally. The project community convened for a scoping workshop in San Francisco on 3 June 2019.

- [View](#) the slide deck presented during the Digital Trade Portfolio update call on 13 February 2019.
- [Watch](#) a recording of the call (PIN: 1234).
- [Follow](#) Digital Trade Portfolio and project updates on TopLink, the World Economic Forum’s digital collaboration platform.



Drones and Tomorrow's Airspace (DTA)



– **Drone Innovators Network:**

The Drones and Tomorrow's Airspace team, in partnership with the Japanese Ministry of Economy, Trade and Industry (METI), convened the second [Drone Innovators Network \(DIN\) Summit](#) on 12 March 2019 in Tokyo for a discussion on how to design drone policies and protocols to safely enable drone delivery, humanitarian applications and sky taxis. The event was attended by 11 governments from four continents alongside leaders from the private sector and international organizations, and resulted in assessing two new projects that will be driven in partnership with community members. Highlights from the [summit report](#) include speeches and presentations from the US Federal Aviation Administration, Japan Civil Aviation Bureau, METI and the UK Civil Aviation Authority, as well as from private organizations, such as Airbus, DJI, Rakuten AirMap and Volocopter. The next DIN Summit will be held in India in October 2019.

– **New Paradigms for Drone Regulation:**

The Forum's work on performance-based regulation is scaling through collaboration with the United Nations International Civil Aviation Organization (ICAO). The [Advanced Drone Operations Toolkit](#), released in January 2019 at the World Economic Forum Annual Meeting in Davos-Klosters, was officially recognized as reference material by the [ICAO Task Force on Unmanned Aircraft Systems for Humanitarian Aid and Development \(TF-UHAD\)](#). Harrison Wolf, Project Lead, Drones and Tomorrow's Airspace, was elected Rapporteur of the Operations Workgroup for the ICAO Task Force and will lead a team of representatives from various civil aviation authorities and international organizations to carry out the task force's mission.

– **Personal Aerial Mobility Challenge:**

As cities and suburban areas struggle with increasing congestion and the need to provide mobility services for a growing population, policy-makers and urban planners are considering how new aerial platforms can be part of the solution.

This project is bringing together public- and private-sector stakeholders to inform and develop policies on strategic investment and societal impact to create a safe, clean and inclusive urban transport system in the sky. The initial project community is being developed in coordination with existing Portfolio members and new C4IR member Skyrise. The kick-off workshop for this project will take place in November 2019 in Los Angeles and will focus on the policy challenges facing local and regional municipalities as they shape the autonomous aerial transport systems of the future.

– **Accelerating the Drone Delivery Revolution:**

Drone delivery has the potential to connect remote and underserved communities with important economic and social services. Some of the earliest successes with this technology have included delivering vaccines, blood and other medical supplies to communities that would otherwise not have timely access to these necessities. In May 2019, C4IR India brought together leaders from Indian state governments, major hospitals and international organizations to develop a commitment to sharing data and piloting medically oriented drone delivery applications. A White Paper on the opportunity for drones to improve health supply chains will be released in October 2019 at the World Economic Forum on India regional meeting, with a pilot scheduled to be announced around that time.

– [View](#) the slide deck presented during the Drones and Tomorrow's Airspace Portfolio update call on 8 May 2019.

– **Next Drones and Tomorrow's Airspace Portfolio update call:** Second week of September 2019

– **Upcoming workshops:**

- Drone Innovators Network Summit: October 2019 in New Delhi, India
- Personal Aerial Mobility Challenge: November 2019 in Los Angeles

Fourth Industrial Revolution for the Earth



- **Ocean Innovations for Sustainable Fishing:**
This project is releasing a new [White Paper](#) that illuminates pathways to solutions for addressing illegal fishing through technology and policy. The paper highlights the essential role of good data policy and best practices for implementing the Port State Measures Agreement, a milestone UN Food and Agriculture Organization agreement on illegal fishing that has over 50 signatories but unclear pathways to implementation. This work is being produced at a critical time to influence global dialogue and the adoption of data policies that will help meet UN Sustainable Development Goal 14.4 on ending illegal fishing.

- **Critical Minerals:**
A workshop at C4IR San Francisco on 14 May 2019 hosted in collaboration with the Friends of Ocean Action initiative brought together a diverse group of stakeholders to explore how to meet the growing demand for minerals (such as cobalt) that are essential to power the renewable energy transition and the Fourth Industrial Revolution. Discussions focused on deep sea mining and drew from a range of subjects, including ocean science, international policy, next generation batteries and the role of innovation and technology.



Internet of Things, Robotics and Smart Cities



– **Creating Market Incentives for Secure Industrial IoT:**

In 2018, the internet of things (IoT) team released the *Industrial Internet of Things: Safety and Security Protocol* to leverage insurance, which plays an integral part in the incentive structures of cybersecurity norm-setting and governance, to facilitate the improvement of industrial internet of things (IIoT) security design, implementation and maintenance practices. The IoT team, together with the World Economic Forum Centre for Cybersecurity, is convening key stakeholders from aviation, the insurance and asset management industries, international regulators and industrial associations to use the protocol to co-design and pilot a new approach to quantifying cyber-risk exposure in the aviation sector that can then be scaled across other fields. In working sessions over the next few months, this multistakeholder community will define the first assessment framework and agree on the tools and data needed for standardized risk measurement.

– **Accelerating the Impact of IoT Technologies:**

This project is bringing traditional industry competitors together with other key stakeholders from various sectors to devise and agree on a set of trusted implementation models to accelerate and scale the adoption of the most socially beneficial IoT solutions. In partnership with the Brazilian Ministry of Economy, the State of São Paulo and a broad multistakeholder community, the IoT team is defining a new policy prototype to support of small and medium-sized manufacturing companies by encouraging the responsible and sustainable adoption of IIoT technologies. Similar policy frameworks are also being co-designed to speed up and ease the adoption of smart water systems and IoT tools for the remote diagnosis of health conditions. Design workshops are scheduled for mid-2019.

– **Unlocking the Shared Value of IoT Data:**

In partnership with key stakeholders from China, Denmark, India and Japan, the IoT team is co-designing a new policy protocol to pave the way for increased sharing of IoT data between the private and public sectors. The team's work is focusing on developing common language and frameworks to define policy needs and on providing clarity on the roles and responsibilities of data providers, governments and data marketplaces in governing the responsible collection, transmission, processing and use of data. Next steps include the creation of standardized operating procedures and a template for master agreements for the cross-sector sharing of IoT data.

– **Forging a New Social Contract for Smart Cities:**

This project is collaborating with the Government of Japan during its presidency of the G20 summit to establish an international agreement and global alliance to strengthen the governance of data and digital technology in urban areas. This initiative was officially endorsed by business leaders at the Business 20 (B20) Tokyo Summit in March 2019, and by mayors from participating cities at the Urban 20 (U20) Mayors Summit in May. The IoT team also partnered with more than 100 stakeholders from government, the design community, technology companies and non-profits to develop a [first-of-its-kind set of open standards](#) to help inform and educate the public about smart city technologies deployed in public spaces.

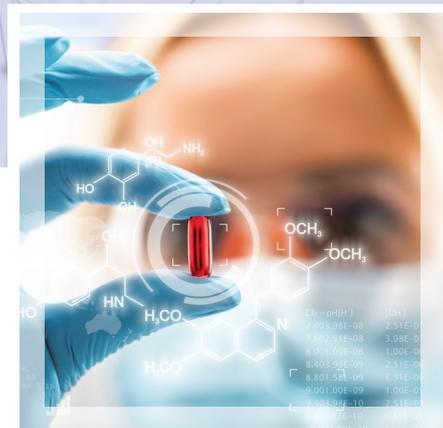
– **Enabling an Inclusive Roll-Out of 5G and Next-Generation Connectivity (scoping):**

In April 2019, the IoT team launched its 5G trailblazers workshop series, convening a community of two dozen start-ups, network operators, policy-makers and system integrators to outline the current state of the 5G ecosystem as well as the key opportunities and challenges ahead. Mid-2019, the project will work with partners to scope a policy pilot for removing barriers to a 5G roll-out and help ensure these opportunities can reach communities across the globe.

- [View](#) the slide deck presented during the Internet of Things, Robotics and Smart Cities Portfolio update call on 13 June 2019.
- [Watch](#) a recording of the call.
- **Next Internet of Things Portfolio update call:** 12 September 2019
- **Upcoming workshop:**
 - Smart Cities: 8 July 2019 (New Delhi, India)



Precision Medicine



– **Leapfrogging with Precision Medicine:**
This project is developing a set of case studies demonstrating how policy-makers in low- and middle-income countries can develop precision medicine approaches that will enable their healthcare capabilities to leapfrog those of developed countries despite resource and infrastructure limitations. The workstream on Precision Medicine Readiness Principles, which is producing a document with benchmarks for precision medicine, hosted a multistakeholder workshop on 21 May 2019 as a side event to the 72nd Session of the World Health Assembly to collect input for this document. The Government of Rwanda, which has committed to co-designing and piloting policies for diagnostic capacity building as part of this project, selected BRCA (a breast cancer susceptibility gene) mutation testing as the focus of its pilot.

– **Breaking Barriers to Health Data:**
Federated data systems, in which queries are sent between data repositories without transferring the data, are a mechanism for enabling cross-border access to sensitive health data. This project aims to create a scalable framework to enable the effective and responsible use of federated data systems to facilitate the sharing of health information across borders to support precision medicine. The project community convened on 4-5 April to co-design a draft governance framework for federated data systems that will be piloted with numerous health institutions. Project partners also met on 30 April in Cambridge, England, on the sidelines of a meeting of the Global Alliance for Genomics and Health, a global genomic data standards organization.

– **Precision Pathology and Next-Generation Diagnostics:**
Standards for pathology are ripe for change in China as medical diagnostics enter a new era marked by technological innovations, such as the adoption of new artificial intelligence-assisted processes and procedures. A workshop on “Digital Pathology with Artificial Intelligence Applications

and Pilot Studies” took place in Guangzhou, China, on 19 April 2019, after which a [workshop report](#) was produced.

- [View](#) the slide deck presented during the Breaking Barriers to Health Data Project update call on 11 June 2019
- **Next Precision Medicine Portfolio update call:** September 2019
- **Upcoming project community call:**
 - Precision Pathology and Next-Generation Diagnostics: August 2019



Recent delegations visiting the Centre for the Fourth Industrial Revolution in San Francisco

1. Colombia: On 8 May 2019, the Centre welcomed President Ivan Duque of Colombia, along with First Lady María Juliana Ruiz and the Minister of Trade, Industry and Tourism of Colombia José Manuel Restrepo. Following a tour of the Centre's facilities, President Duque addressed all staff and Fellows and heard from several Portfolio teams on ongoing projects and progress to date. The visit followed the successful launch of C4IR Colombia the previous week, on 30 April.



2. Rwanda: On 29 April 2019, the Centre hosted a visit by President Paul Kagame of Rwanda, accompanied by Paula Ingabire, Minister of Information Communication Technology and Innovation of Rwanda, and a delegation of senior government officials. Following a bilateral meeting with members of the C4IR leadership, President Kagame participated in a roundtable discussion featuring C-suite executives from several C4IR Network partner and member companies. In addition, staff from C4IR's Drones and Tomorrow's Airspace and Precision Medicine Portfolio teams updated the visitors on the progress of the Centre's collaboration with Rwanda in these domains.



3. UK Parliament: On 18 April 2019, C4IR hosted the United Kingdom's All-Party Parliamentary Group on the Fourth Industrial Revolution, a group of cross-party MPs for which Klaus Schwab, World Economic Forum Founder and Executive Chairman, serves as a founding patron. A number of issues were discussed during three hours of dialogue, including the C4IR's mission and methodology, key Fourth Industrial Revolution-related challenges facing UK policy-makers, and specific issues of interest within the IoT, AI, Fourth Industrial Revolution for the Earth, Autonomous and Urban Mobility, and Data Policy Portfolios.

4. Georgia: On 16 April 2019, C4IR welcomed Mikheil Batiashvili, Minister of Education, Science, Culture and Sport of Georgia, who shared updates on the activities of his government, in particular the country's ongoing efforts to reform its education system to better address the skills requirements of the Fourth Industrial Revolution. The Centre's Blockchain team presented its work with central banks. The visit also served to identify priority C4IR communities of particular interest to the Georgian officials for their participation.

5. Singapore: On 15 April 2019, C4IR hosted a visit by Vivian Balakrishnan, Minister for Foreign Affairs and Minister in Charge of the Smart Nations Initiative of Singapore. C4IR staff provided the Minister with an update on the overall progress of the Centre as well as Singapore's C4IR partnership, and heard from him about Singapore's efforts to position itself for success in the Fourth Industrial Revolution, including through significant reforms to its education system. This event was followed on 23 April by a visit from the leadership of the Prime Minister's Smart Nations office.



6. Bank of England: On 15 April 2019, C4IR hosted a visit by Mark Carney, Governor of the Bank of England. Governor Carney shared his thinking on certain long-term issues on the Bank's agenda, including the role of emerging markets in the global financial system, the impact of climate change on economies and financial systems, cybersecurity and the security of cloud networks, and the internal technology systems underpinning the Bank's operations. C4IR staff shared an update on the Centre's progress as well as specific details on the Central Banks Blockchain Community, of which the Bank of England is a member.

7. Office of the United Nations High Commissioner for Human Rights (OHCHR): On 15 April 2019, C4IR hosted a visit by Michelle Bachelet, UN High Commissioner for Human Rights, and President of Chile (2006 to 2010). Following a bilateral meeting with staff focused on operationalizing the C4IR-OHCHR partnership, C4IR hosted a fireside chat and reception for High Commissioner Bachelet. Strong attendance from government, industry and civil society stakeholders enabled an in-depth discussion focused on "Safeguarding Human Rights in the Age of Artificial Intelligence", including a panel featuring the High Commissioner alongside representatives from Google, Amnesty International and human rights organization Article 1.



8. Viet Nam: On 11 April 2019, C4IR hosted a visit by Nguyen Manh Hung, Minister of Information and Communications of Viet Nam. During his visit, progress was made on developing a plan for operationalizing Viet Nam’s partnership with the C4IR on digital trade, and information and insights on key policy developments in the region were also exchanged.



9. Interpol: On 4 April 2019, C4IR hosted a visit by Anita Hazenberg, Director, Interpol Innovation Centre. Hazenberg talked about how Fourth Industrial Revolution technologies are changing the nature of crime and the practice of policing, including crime prevention, monitoring, criminal investigations, and evidence gathering and analysis. C4IR shared its work on the AI, IoT, Autonomous and Urban Mobility, Fourth Industrial Revolution for the Earth, and Drones and Tomorrow’s Airspace Portfolios. The meeting was followed by a lunch-and-learn, which provided an opportunity for C4IR staff and Fellows to learn about Interpol’s mission and operations and the challenges and opportunities that the Fourth Industrial Revolution presents to the criminal justice system.



10. Costa Rica: On 14 March 2019, C4IR hosted a visit by President Carlos Alvarado Quesada of Costa Rica, along with Dyalá Jiménez Figueres, Minister of Foreign Trade, and Luis Adrian Salazar Solís, Minister of Science, Technology and Telecommunications. Discussions focused on Costa Rica’s ambitions with respect to Fourth Industrial Revolution-related technologies and featured in-depth examinations into C4IR’s AI, IoT, Autonomous and Urban Mobility, and Digital Trade Portfolios, with a specific focus on 3D Printing and Trade Logistics. Costa Rica announced its intention to join several C4IR Portfolio and Project Communities for ongoing engagement on these issues.

Analyses from C4IR experts

Recent C4IR publications

- [Filling Legislative Gaps in Automated Vehicles](#), published on 26 April 2019
- [Inclusive Deployment of Blockchain for Supply Chains Part 2 – Trustworthy verification of digital identities](#), published on 24 April 2019
- [Inclusive Deployment of Blockchain for Supply Chains: Part 1 – Introduction](#), published on 8 April 2019
- [Central Banks and Distributed Ledger Technology: How are Central Banks Exploring Blockchain Today?](#), published on 3 April 2019

Recent articles by C4IR experts

- [“Here’s how blockchain could stop corrupt officials from stealing school lunches”](#), by Ashley Lannquist, Project Lead, Blockchain and Distributed Ledger Technology, **World Economic Forum Agenda**, 17 May 2019
- [“I have a rare disease. This is my hope for the future of medicine”](#), by Lynsey Chediak, Project Specialist, Precision Medicine, **World Economic Forum Agenda**, 14 May 2019
- [“3 ways to use digital identity systems in global supply chains”](#), by Nadia Hewett, Project Lead, Blockchain and Distributed Ledger Technology, **World Economic Forum Agenda**, 14 May 2019
- [“The growing cyber-risk to our electricity grids - and what to do about it”](#), by Karime Kuri Tiscareno, Project Lead, Internet of Things, Robotics and Smart Cities, **World Economic Forum Agenda**, 30 April 2019
- [“Global Action Needed To Protect Electricity Grids From Growing Threats”](#) by Karime Kuri Tiscareno, **Forbes**, 29 April 2019
- [“3 ways blockchain can revolutionize global supply chains,”](#) by Nadia Hewett, **World Economic Forum Agenda**, 25 April 2019
- [“Opportunities and challenges of future urban air traffic”](#), by Junwei Yang, Project Lead, Drones and Tomorrow’s Airspace, C4IR China, **Sina**, 19 April 2019
- [“This new form of currency could transform the way we see money”](#), by Ashley Lannquist, **World Economic Forum Agenda**, 6 April 2019

- [“10 ways central banks are experimenting with blockchain”](#), by Ashley Lannquist, **World Economic Forum Agenda**, 3 April 2019
- [“Is It A Bird? Is It A Plane? Is It A Bomb? Security Concerns Hold Back Drones”](#), by Harrison Wolf, Project Lead, Drones and Tomorrow’s Airspace, **Forbes**, 26 March 2019

C4IR experts in the media

- Richard Samans, Managing Director and Head of Policy and Institutional Impact, quoted in [“World Economic Forum launches 6 Global Councils to help with new technology governance”](#) **Yahoo! Finance**, 30 May 2019
- Kay Firth-Butterfield, Head of Artificial Intelligence, quoted in [“World Economic Forum launches Global AI Council to address governance gaps”](#), **VentureBeat**, 30 May 2019
- Kay Firth-Butterfield, quoted in [“The World Economic Forum wants to develop global rules for AI”](#), **Technology Review**, 28 May 2019
- Jeff Merritt, Head of Internet of Things, Robotics and Smart Cities, quoted in [“Why 2020 Is Set to Be a Pivotal Year for IoT”](#), **IoT for All**, 21 May 2019
- Ashley Lannquist, Project Lead, Blockchain and Distributed Ledger Technology, quoted in [“How JPMorgan, Johnson & Johnson And Ford Use Blockchain To Tap \\$3.1 Trillion In Value”](#), **Forbes**, 13 May 2019
- Nadia Hewett, Project Lead, Blockchain and Distributed Ledger Technology, quoted in [“World Economic Forum to Work With Top Supply Chain Groups to Boost Blockchain Implementation”](#), **SDC Executive**, 13 May 2019
- Nadia Hewett, quoted in [“World Economic Forum to define blockchain for supply chain deployment”](#), **Enterprise Times**, 10 May 2019
- Murat Sönmez, Head of the Centre for the Fourth Industrial Revolution, quoted in [“Medellín le da variedad a la Cuarta Revolución”](#), **El Colombiano**, 7 May 2019
- Nadia Hewett, quoted in [“100 organizations to accelerate blockchain deployment with World Economic Forum”](#), **Modern Diplomacy**, 5 May 2019
- Nadia Hewett, quoted in [“World Economic Forum Officially Supports Blockchain Tech, 20](#)

- Governments Involved”, **Coinmarkets**, 3 May 2019
- Nadia Hewett, quoted in “[WEF Forms Global Mega-Team to Redesign Trust Regarding Blockchain for Supply Chains](#)”, **Bitcoin Exchange Guide**, 2 May 2019
- Nadia Hewett, quoted in “[World economic forum and partners to accelerate blockchain use](#)”, **Safety4Sea**, 2 May 2019
- Nadia Hewett, quoted in “[World Economic Forum Teams Up With 100 Logistics Firms, 20 Gov’ts in New DLT Project](#)”, **Cointelegraph**, 2 May 2019
- Nadia Hewett, quoted in “[WEF offers logistics industry-created blockchain ‘toolkit’](#)”, **JOC**, 1 May 2019
- Nadia Hewett, quoted in “[100 organizations join World Economic Forum blockchain supply chain initiative](#)”, **Ledger Insights**, 1 May 2019
- Børge Brende, President, World Economic Forum, quoted in “[UAE Inaugurates Center for Fourth Industrial Revolution](#)”, **Asharq Al-Awsat**, 30 April 2019
- Kay Firth-Butterfield, Head of Artificial Intelligence and Machine Learning, quoted in “[World Economic Forum’s AI head on how to protect human rights without stifling innovation](#)”, **Venture Beat**, 29 April 2019
- Børge Brende, quoted in “[WEF launches Dubai Centre for the Fourth Industrial Revolution](#)”, **The National**, 28 April 2019
- Eddan Katz, Project Lead, Artificial Intelligence and Machine Learning, quoted in “[Teen social media app uses facial recognition to check users’ ages](#)”, **The Telegraph**, 28 April 2019
- William Hoffman, quoted in “[Partnerships founded on trust: Introducing Contracts for Data Collaboration \(C4DC\)](#)”, **SDSN Trends**, 24 April 2019
- Zvika Krieger, Head of Technology Policy and Partnerships, quoted in “[The ‘virtual’ Ministry of Possibilities is a reality - but how will it work?](#)”, **The National**, 24 April 2019
- Jeff Merritt, quoted in “[Is Your Smart City Watching You? There’s an Icon for That](#)”, **Government Technology**, 19 April 2019
- Murat Sönmez, quoted in “[WEF, SA to launch Africa’s first Fourth Industrial Revolution centre](#)”, **CNBC Africa**, 16 April 2019
- Murat Sönmez, quoted in “[South Africa and World Economic Forum to establish 4IR Affiliate Centre](#)”, **Africa Tech**, 16 April 2019
- Lofred Madzou, Project Lead, Artificial Intelligence and Machine Learning, quoted in “[Interview Of The Week: Lofred Madzou](#)”, **The Innovator**, 14 April 2019
- Eddan Katz, quoted in “[Walmart to Use More Robot Technology for Store Tasks](#)”, **Marketplace**, 10 April 2019
- Timothy Reuter, Head of Drones and Tomorrow’s Airspace, quoted in “[Indian state turns to drones to modernise agriculture](#)”, **Future Farming**, 8 April 2019
- Ashley Lannquist, quoted in “[10 Ways Central Banks Are Researching Blockchain Technology Today](#)”, **Forbes**, 8 April 2019
- Nadia Hewett, quoted in “[Are Industries, Governments and UN Agencies Ready For 5th Machine Age Blockchain Adoption?](#)”, **Forbes**, 8 April 2019
- Ashley Lannquist, quoted in “[Davos Report: Over 40 central banks worldwide are experimenting with blockchain technology](#)”, **FXStreet**, 5 April 2019
- Michelle Avary, Head of Autonomous and Urban Mobility, quoted in “[The race to write global rules for self-driving cars](#)”, **Axios**, 5 April 2019
- Ashley Lannquist, quoted in “[New WEF Research Explores Central Bank Activities With Blockchain And DLT](#)”, **CoinJournal**, 5 April 2019
- Ashley Lannquist, quoted in “[CryptoCorner: SEC Issues Statement Outlining Digital Asset Framework, WEF Report Says 40 Central Banks Considering CBDCs](#)”, **Investor Ideas**, 4 April 2019
- Ashley Lannquist, quoted in “[Foro Económico Mundial: más de 40 bancos centrales experimentan con Blockchain](#)”, **Diario Bitcoin**, 4 April 2019
- Ashley Lannquist, quoted in “[WEF: More Than 40 Central Banks Experimenting With Cryptocurrency](#)”, **Coinspeaker**, 4 April 2019
- Ashley Lannquist, quoted in “[Central Bank Digital Currency, 40 considering; World Economic Forum paper](#)”, **Cryptopolitan**, 4 April 2019
- Ziyang Fan, Head of Digital Trade, quoted in “[Who are the blockchain winners and losers?](#)”, **United Nations Conference on Trade and Development**, 4 April 2019
- Ashley Lannquist, quoted in “[Over 40 Central Banks Are Considering Blockchain Applications: Davos Report](#)”, **CoinDesk**, 4 April 2019
- Ashley Lannquist, quoted in “[WEF Report: 40 Central Banks Are Considering Digital Currencies, Blockchain Tech](#)”, **Cointelegraph**, 3 April 2019
- Ashley Lannquist, quoted in “[WEF Report: Over 40 Central Banks Interested In Blockchain And Cryptocurrency Tech](#)”, **ETH News**, 3 April 2019
- Harrison Wolf, Project Lead, Drones and Tomorrow’s Airspace, quoted in “[Q&A: The Skies are Alive – with the Sound of Drones](#)”, **Viterbi Magazine**, 1 April 2019
- Harrison Wolf, quoted in “[WEF’s Harrison Wolf: ‘The benefits that drones present to society are infinite in their possibility’](#)”, **Karma Network**, 1 April 2019
- Sheila Warren, Head of Blockchain and Distributed Ledger Technology, quoted in “[Top 100 Women in Fintech 2019](#)”, **Lattice80**, 22 March 2019



Recent speeches by C4IR experts

- Timothy Reuter, Head of Drones and Tomorrow's Airspace, spoke at the OECD International Transport Forum Summit, the largest global gathering of transport ministers, on [Ensuring Access for Remote and Rural Communities](#) on 23 May 2019.
- Jeff Merritt, Head of Internet of Things, Robotics and Smart Cities, spoke at the [Urban 20 \(U20\) Summit](#) in Tokyo, Japan on 20 May 2019.
- Nadia Hewett, Project Lead, Blockchain and Distributed Ledger Technology, gave a keynote speech on the importance of blockchain governance during the European Blockchain Convention in Copenhagen on 20 May 2019.
- Ashley Lannquist, Project Lead, Blockchain and Distributed Ledger Technology, spoke on the "Hold-up! Can blockchain solve one of economics' thorniest problems?" panel at [Consensus 2019](#) in New York City on 13 May 2019.
- Ashley Lannquist spoke at the European Central Bank's "[An Innovative Single Market for the Euro](#)" event in Frankfurt, Germany on 6 May 2019.
- Karime Kuri Tiscareno, Project Lead, Internet of Things, Robotics and Smart Cities, gave a keynote speech on the social value of IoT and was a panellist on women in technology and on global IoT trends at the [IoT Innovatech Summit](#) in Santiago, Chile on 2-3 May 2019.
- Harrison Wolf, Project Lead, Drones and Tomorrow's Airspace, presented on [Collaboration and Harmonization: Addressing UAS Policy Issues on a Global Scale](#) at the [AUVSI Xponential](#) in Chicago, alongside the US Federal Aviation Administration, the International Civil Aviation Organization and PrecisionHawk.
- William Hoffman, Project Lead, Data Policy, spoke at the Bogotá Chamber of Commerce's "Innovation and the SDGs: Counting on the World" conference on 30 April 2019 in Bogotá, Colombia.
- Sheila Warren, Head of Blockchain and Distributed Ledger Technology, spoke about blockchain's legal atmosphere and projections at she256's [Recolor Conference](#) on 28 April 2019 while accompanied by her newborn daughter.
- Ashley Lannquist spoke at the UC Berkeley's Haas School of Business' "[Is Blockchain Technology the Innovation We've Been Waiting For?](#)" event on 27 April 2019.
- Kay Firth-Butterfield, Head of Artificial Intelligence and Machine Learning, spoke on a panel at the [Applied AI Conference 2019](#) on 18 April, where she discussed national AI strategies, state funding for AI and geopolitical implications.
- Ziyang Fan, Head of Digital Trade, was part of the "Blockchains in Trade Logistics" panel at the [UNCTAD E-Commerce Week](#) in Geneva on 4 April 2019.
- The Drones and Tomorrow's Airspace team presented to 10 World Bank Country Directors from Africa during their 3 April 2019 tour of Silicon Valley.
- Nadia Hewett spoke at the American Association of Port Authorities' Spring Conference in Washington DC on 20 March 2019. The event featured representatives from over 30 ports in Latin America and covered topics including an introduction to blockchain, blockchain governance gaps and C4IR's blockchain projects.
- Nadia Hewett sat on the [Blockchain for Impact](#) panel hosted by C4IR Partner World Food Programme, at South by Southwest on 14 March 2019.
- Timothy Reuter spoke at a special panel session at [Japan Drone](#), the largest drone conference in Japan, on 13 March 2019.
- Seiichiro Yamamoto, Project Lead, Data Policy, spoke at the Dementia Global Round Table, held by the Japan Agency for Medical Research and Development (AMED) on 4 March 2019.



New C4IR partners and members

The Centre for the Fourth Industrial Revolution Network is pleased to welcome its new partners and members who joined between April and June 2019.

New C4IR partners

- Ping An Technology (joined April 2019)
- Roland Berger (joined April 2019)
- Astana International Financial Centre (AIFC) (joined May 2019)
- NTT Corporation (joined May 2019)
- Saudi Aramco (joined May 2019)

For a full list of C4IR partners, click [here](#).

New C4IR members

- KONUX (joined April 2019)
- Noodle.ai (joined April 2019)
- Zipline (joined April 2019)
- Best Practice AI (joined May 2019)
- GreenCom Networks (joined May 2019)
- Intertrust (joined May 2019)
- MIZA (joined May 2019)
- Orbs Ltd (joined May 2019)
- Skyrise (joined May 2019)
- TT Consultants (XLPAT) (joined May 2019)

For a full list of C4IR members, click [here](#).



New members of the Centre for the Fourth Industrial Revolution team

New C4IR Employees

- Karen Bhagyan, Office Operations Manager, C4IR India
- Xuening Chen, Intern, C4IR China
- Zhenkun Chen, Intern, C4IR China
- Bofu Dai, Intern, C4IR China
- Arunima Sarkar, Project Lead, Artificial Intelligence and Machine Learning, C4IR India
- Geoff Wylde, Project Lead, IoT, Robotics and Smart Cities

New C4IR Fellows

- Erdi Ay, Blockchain and Distributed Ledger Technology Fellow, Koç Holding/Yapi Kredi Bank
- Grace Chung, Data Policy Fellow, Government of Singapore
- Canalp Gundogdu, Autonomous and Urban Mobility Fellow, Koç Holding/Ford Otosan
- Daichi Iwata, Internet of Things, Robotics and Smart Cities Fellow, NEC Corporation, C4IR Japan
- Francis Jee, Blockchain and Distributed Ledger Technology Fellow, Deloitte
- Sébastien Louradour, Artificial Intelligence and Machine Learning Fellow, Government of the French Republic
- Yasunori Mochizuki, Internet of Things, Robotics and Smart Cities Fellow, NEC Corporation, C4IR Japan
- Hitomi Sano, Fellow, Eisai Co Ltd, C4IR Japan
- Julian Torres Santeli, Artificial Intelligence and Machine Learning Fellow, Deloitte

More about the Centre for the Fourth Industrial Revolution Network

- Click [here](#) for the C4IR Network brochure, which provides an overview of its mission, methodology and portfolios.
- Click [here](#) for more detailed information about each of the nine portfolios and projects.
- For more information about how businesses can engage with the C4IR, email [Ruth Hickin](#) and [Patrick Hynes](#).
- For more information about how start-ups can engage with the C4IR, email [Susan Nesbitt](#).
- For more information about how governments and civil society organizations can engage with the C4IR, email [Mark Caine](#).
- For media inquiries, email [Amanda Russo](#).
- For general inquiries about the C4IR, email C4IR@weforum.org.





COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.
