

Snapshot: Federal Landscape - Artificial Intelligence

Artificial Intelligence (AI) systems of varying complexity and capability continue to permeate aspects of everyday life as their incorporation into commercial products accelerates. AI is poised to alter the workforce, national security, fields of study and services, and raise questions regarding the ethical and moral implications of the technology itself. Given the amount of discussion on AI at the federal level, Lewis-Burke compiled this snapshot addressing some of the most recent events, investments, and discussions taken by the Trump Administration and Congress. In addition, as context for these federal activities, this document also includes a brief landscape of select international announcements, external stakeholder groups, think tanks, and opinion pieces helping to shape the dialogue.

Trump Administration and Executive Agencies

While AI is a top priority of the White House and Chief Technology Officer nominee Michael Kratsios, federal Agencies such as the Department of Defense and the National Science Foundation have been investing in AI research for many years. Enhanced federal activity and interests in future directions can be seen both through policy documents issued by the White House and individual activity driven by relevant federal research agencies.

2019 Executive Order

On February 11, 2019, President Trump signed an [Executive Order](#) (EO) on “Maintaining American Leadership in Artificial Intelligence,” establishing the American AI Initiative. The EO focused on ensuring safety and public trust in AI and encouraged agencies to work together and fund research and development opportunities for the private sector, academia, non-profit organizations and state, local, tribal and territorial governments. The EO also focused on secure research and development of AI technologies to prevent international competitors, such as China and Russia, from obtaining and using technologies before they are deployed in the United States. Finally, the EO echoed the importance of working to further STEM education and develop the growing workforce for jobs in AI fields.

The National Artificial Intelligence Research and Development Strategic Plan: 2019 Update

On June 21, 2019, the Trump Administration released [The National AI R&D Strategic Plan: 2019 Update](#), a modified version of a similar plan originally released in 2016. The plan, which creates a framework for guiding federal AI R&D activities, offers eight individual strategies for how the Federal Government can help to advance them. These strategies are:

1. Make long-term investments in AI research;
2. Develop effective methods for human-AI collaboration;
3. Understand and address the ethical, legal, and societal implications of AI;
4. Ensure the safety and security of AI systems;
5. Develop shared public datasets and environments for AI training and testing;
6. Measure and evaluate AI technologies through standards and benchmarks;
7. Better understand the national AI R&D workforce needs; and
8. Expand public-private partnerships to accelerate advances in AI

This update reinforces the need to continue implementing the first seven strategies—which appeared in the initial 2016 plan—and includes recommendations on how to continue implementing them given actions undertaken by federal agencies in the last three years. New in the 2019 iteration is the eighth strategy, which was added in order to reflect the significant strides made by the commercial sector in AI and to encourage the exchange of ideas and practices between businesses, universities, and the Federal

Government. A greater emphasis will be placed on use-inspired research, commercialization of ideas, and workforce development.

National Science and Technology Council (NSTC) Select Committee on Artificial Intelligence

The [National Science and Technology Council Select Committee on Artificial Intelligence's](#) purpose is to “advise and assist the NSTC to improve the overall effectiveness and productivity of Federal research and development (R&D) efforts related to artificial intelligence (AI).” In President Trump’s Executive Order regarding AI, the committee was given the role of leading the American AI Initiative. Tasks involved in that role include providing educational grants, conducting foundational AI R&D, and providing recommendations to the NSTC Committee on STEM Education regarding AI-related educational and workforce development considerations, focusing on American citizens.

Department of Defense (DOD)

The Department of Defense’s overarching approach to AI is two-fold: to integrate AI to enhance mission-oriented warfighting capabilities and to leverage AI to achieve efficiency and cost savings in the Pentagon’s business functions. In February 2019, the Department of Defense released its [AI Strategy](#) laying out the military’s approach to realizing the benefits of the technology and leadership in AI ethics and safety. The Strategy discusses the threats of China and Russia’s significant investments in AI for military purposes. The centerpiece of the DOD’s AI Strategy is the establishment of the [Joint Artificial Intelligence Center \(JAIC\)](#), which is focused in the near term on identifying appropriate use cases for AI across the Department, rapidly piloting solutions, and scaling successes across DOD. To counter concerns that the technology will replace servicemembers, the DOD is focused on how human-machine teaming enabled by AI can improve military operations, reduce the risk of human casualties, and increase readiness through predictive analytics. The Office of the Under Secretary of Defense for Research and Engineering (USD(R&E)) is developing a draft modernization plan called the “Road to Dominance” to accelerate development and investment in Department-wide technology priorities that will include an updated AI R&D plan.

While each DOD laboratory’s AI research portfolio focuses on AI applications relevant to its respective branch, the Defense Advanced Research Projects Agency (DARPA) is spearheading the Department’s efforts on foundational, long-term advancements in the field of AI. DARPA announced \$2 billion in investments under its [“AI Next” campaign](#), which includes both new and existing programs pertaining to AI. DARPA ultimately seeks to develop “third-wave” AI, where AI systems are capable of contextual reasoning, moving beyond the capabilities of rules-based AI (first wave) or machine learning (second wave). Within the research portfolio, “explainability” is an essential area for development that will facilitate acceptance of AI with the user community. The Defense Innovation Unit (DIU) is tasked with surveying and procuring private industry’s AI capabilities for DOD applications in the mid-term.

Department of Energy (DOE)

Artificial intelligence and scientific machine learning (AI/ML) are top research and development priorities for DOE. DOE recently established an Office of Artificial Intelligence and Technology to help coordinate research and developments efforts across the fundamental and applied energy research offices and adopt AI/ML to improve DOE’s business and administrative practices. DOE is planning on investing heavily in applied math, with priority research areas defined in [Basic Research Needs for Scientific Machine Learning: Core Technologies for Artificial Intelligence](#), computer science, and computational partnerships. DOE is also interested in commercialization of AI/ML technologies developed at DOE national laboratories and will host an XLab on AI/ML at Argonne National Laboratory

on October 2-3, 2019 designed to bring together industry leaders from the energy, transportation, healthcare, and manufacturing sectors with researchers from DOE's national laboratories.

DOE has also invested in AI through its applied energy programs. DOE's Advanced Research Projects Agency-Energy (ARPA-E) issued a \$20 million funding opportunity announcement for the [Design Intelligence Fostering Formidable Energy Reduction and Enabling Numerous Totally Impactful Advanced Technology Enhancements](#) (DIFFERENTIATE) program, to accelerate the incorporation of machine learning and artificial intelligence into energy technology and product design processes. In another example, DOE issued a \$7 million [grid resiliency](#) funding opportunity through the Office of Electricity to develop AI/ML tools that improve analytics, modeling, asset management, and sub-second automatic control options to prevent grid outages, increase resilience, and lower costs.

National Institutes of Health (NIH)

While NIH's intramural research program has had an AI interest group for more than fifteen years, the broader agency focus on AI has only occurred in the last year and holistic efforts across the Institutes are not yet part of the approach. Across NIH, more than two dozen funding opportunity announcements have been released since the beginning of 2019 explicitly encouraging proposals with some element of consideration of artificial intelligence, machine learning, or deep learning.

Building on the outcomes of workshops held in 2018, NIH organized an AI Working Group at the end of last year and tasked it with identifying opportunities in AI that span NIH, helping NIH do a better job connecting the computer science community with the biomedical community, facilitating training that bridges these two more effectively, and identifying the major ethical challenges that arise when applying AI to healthcare and biomedical research. The group released a [draft report](#) that recommended NIH invest in creation of AI-ready curated data; cultivation of multidisciplinary researchers that cross biomedicine, computer science, and other fields; address ethical and social implications of AI to minimize bias; promote funding opportunities to encourage exploration of AI applications to biomedicine, health care delivery, and public health; and identify areas for deployment-ready AI applications. The final recommendations will be presented to the NIH Advisory Committee to the Director in December. NIH is not expected to unveil any agency-wide initiatives until after that time.

National Institute of Standards and Technology (NIST)

[NIST research in AI](#) is focused on measurement and enhancement of the security and trustworthiness of AI systems domestically and internationally. NIST's AI program aims to "advance application of AI to NIST metrology problems by bolstering AI expertise at NIST and enabling NIST scientists to draw routinely on machine learning and AI tools to gain deeper insight into their research; and fundamental research to measure and enhance the security and explainability of AI systems." To advance these goals, NIST created the [FARSAIT Visiting Fellow program](#), which encourages nationally recognized leaders in ML/AI to share their knowledge and experience to advance NIST goals in collaborative AI. The AI Visiting Fellows provide technical support in ML/AI methods, contribute through participation in workshops and meetings, and assist with development activities for NIST AI research projects. Additionally, NIST has been tasked by President Trump's EO to develop "a plan for federal engagement in the development of technical standards and related tools in support of reliable, robust, and trustworthy systems that use AI technologies." The draft plan is expected to be released for public comment in the coming weeks and the final plan is expected in early August.

National Science Foundation (NSF)

The National Science Foundation's (NSF) recent [activities](#) in artificial intelligence have focused on creating interdisciplinary programs and external partnerships to address a broad view of AI challenges. AI features prominently in two of NSF's *10 Big Ideas*: the [Future of Work at the Human-Technology Frontier](#) Big Idea focuses on impacts of AI development and implementation on society, workers, jobs, and education; the [Harnessing the Data Revolution](#) Big Idea seeks to "enable new modes of data-driven discovery" through creation of new algorithms and data science approaches, as well as creation of new data infrastructure.

NSF released a [Dear Colleague Letter](#) inviting proposals to core computer science programs that specifically address fairness, ethics, accountability, and transparency (FEAT) topics. Shortly thereafter, NSF announced a collaboration with the Partnership on AI to offer EAGER awards to explore "the social challenges arising from AI technology and enable scientific contributions to overcome them," including principles for safe and trustworthy AI, bias in AI, and human-AI interaction. Other partnership opportunities from NSF include a program on [Fairness in AI](#) with Amazon, and a program on [Real-Time Machine Learning](#) in collaboration with DARPA. Most recently, NSF convened stakeholders in government, industry and private foundations to discuss future large center-based AI investments. NSF activity suggests a much more robust and concentrated investment level may be on the horizon.

Congress

With the explosion of AI activity across government and industry, Congress has been struggling to respond to calls from government agencies, including DOD and NIH, and private corporations, such as Google and Microsoft, to create policies that fund AI R&D and establish standards for implementation of AI. Legislation that has been introduced thus far has either been modeled on recent quantum information science R&D or dealt mostly with the ethical/moral considerations and implications of artificial intelligence. Recently, the House of Representatives has been moving towards new policies regarding AI education and workforce development. In addition, congressional appropriators have expressed interest in increasing federal research, development, education, and training budgets in AI for fiscal year (FY) 2020.

Examples of AI Legislation in the 116th Congress

- *National Defense Authorization Act (NDAA)*: The House FY 2020 NDAA would double the investment in AI R&D already made by JAIC and require DOD to develop an AI Education Strategy.
- *Algorithmic Accountability Act of 2019*: The bill would direct the Federal Trade Commission to require entities that use, store, or share personal information to conduct automated decision system impact assessments and data protection impact assessments. Sponsored by Rep. Yvette Clarke ([HR 2231](#)) and Sen. Ron Wyden ([S 1108](#)).
- *AI in Government Act of 2019*: The bill would authorize an AI Center of Excellence within the General Services Administration and to authorize the Office of Management and Budget to issue a memorandum to federal agencies regarding artificial intelligence governance approaches, to be followed by preparation and submission of governance plans by the agencies. Sponsored by Rep. Jerry McNerney ([HR 2575](#)) and Sen. Brian Schatz ([S 1363](#)).
- *Artificial Intelligence Initiative Act*: The bill would establish a coordinated Federal initiative to accelerate research and development on artificial intelligence for the economic and national

security of the United States, and for other purposes. Sponsored by Sen. Martin Heinrich ([S 1558](#)).

- *GrAITR Act*: The bill would establish a coordinated Federal initiative to accelerate artificial intelligence research and development for the economic and national security of the United States. Sponsored by Rep. Daniel Lipinski ([HR 2202](#)).
- *AI Jobs Act of 2019*: The bill would promote a 21st-century artificial intelligence workforce. Sponsored by Rep. Darren Soto ([HR 927](#)).
- *Armed Forces Digital Advantage Act*: Seek to establish digital engineering as a core military competency. Sponsored by Senate AI Caucus Co-chairs Senators Rob Portman (R-OH) and Martin Heinrich (D-NM) ([S 1471](#)).
- *Deepfakes Legislation*: There are plans for the Senate AI Caucus to introduce legislation aimed specifically at countering the spread and malicious use of deepfakes.

House Congressional Artificial Intelligence Caucus

Then Congressman John K. Delaney launched the [Congressional Artificial Intelligence Caucus](#) in the 115th Congress to inform policymakers of the technological, economic and social impacts of advances in AI and to ensure that rapid innovation in AI and related fields benefits Americans as fully as possible. Current Co-Chairs of the Caucus, Rep. Pete Olsen (R-TX) and Rep. Jerry McNerney (D-CA), recently hosted a briefing with a panel of experts who emphasized the importance of AI education as a starting point and a high priority for Congress. The House AI Caucus, alongside Senators Maria Cantwell (D-WA), Todd Young (R-IN), and Ed Markey (D-MA) introduced the *Future of AI Act*, which would establish a National Commission on AI. The Commission was established in the FY 2019 NDAA, following a compromise with a similar piece of legislation introduced by Rep. Elise Stefanik (R-NY), then-Chair of the House Armed Services Subcommittee on Emerging Threats and Capabilities. The National Security Commission on AI is mandated to deliver a report with its findings and recommendations annually, with the first report to be submitted in August.

Senate Artificial Intelligence Caucus

The Senate Artificial Intelligence Caucus was launched on March 13, 2019. The group is comprised of a bipartisan group of Senators, which includes Senators Martin Heinrich (D-NM), Rob Portman (R-OH), Brian Schatz (D-HI), Cory Gardner (R-CO), Gary Peters (D-MI), and Joni Ernst (R-IA). Caucus members Schatz, Portman, and Heinrich have introduced the *Artificial Intelligence Initiative Act* (discussed above).

Other Congressional Activity and Interest

In May 2019, Senators Robert Menendez (D-NJ) and Mark Warner (D-VA) wrote to the State Department expressing concern about China, which is organizing the UNESCO conference on AI, and asking them to articulate “the U.S. vision for global standards, norms, and mechanisms for the use of artificial intelligence.”

International Perspective

The United States is not alone in investing in AI research, development, or implementation. Other countries have been making investments in AI, machine learning, data science, and computing in attempts to become the global leader in the field and gain an economic and/or military edge. While many of our global allies share the United States’ concern over AI’s moral and ethical implications, others are investing in AI with less regard for those considerations. Below are some select examples of global activity that is influencing U.S. policy.

China

China's [New Generation of Artificial Intelligence Development Plan](#) outlined their development in AI and their goals for the future, focused around becoming the world leader in AI by 2030. China has also heavily invested in AI technology, [creating](#) at least four \$50 million per year AI Centers and a \$1B per year National AI Research laboratory with thousands of AI researchers and engineers. China's two primary pathways for establishing leadership in AI include establishing strong partnerships with organizations, nations, and other entities to grow and recruit AI talent, and globally exporting its domestically developed AI technologies. China has already begun [educating and training](#) children on artificial intelligence so they will be prepared to work in the world of AI when they enter the workforce. The Ministry of Education has approved dozens of universities to begin offering undergraduate degrees in artificial intelligence with a goal of training 500 instructors and 5,000 students at major universities.

Russia

Russia is continuing to pursue its 2008 defense modernization agenda, with the aim of robotizing 30% of its military equipment by 2025. Russia's AI Agenda called for establishing an AI and Big Data consortium, funding for Analytical Algorithms and Programs; creation of state-backed AI training and education program; creation of an AI lab; and creation for a National Center for Artificial Intelligence. In 2019, Russian President Putin [called](#) for a new AI strategy by the end of June. Initial details of the plan included a \$160 million pledge in support for 14 centers of study based at universities and scientific organizations.

United Kingdom

In May 2018, the United Kingdom released their [AI Sector Deal](#) that was incorporated in their Modern Industrial Strategy. The Deal discussed the government and the industry point of view on the research, development, and implementation of AI. The UK's primary concern is building more opportunities in the field of STEM and building AI education by working with schools, universities, and industries to "ensure a highly-skilled workforce". The Deal also extensively reviews plans for government funding, investments from numerous industries, and the infrastructure of implementation, but primarily focuses on the first stage of the process: education. The Deal called for the creation of an [AI Council](#) within the UK's Artificial Intelligence Sector, and on May 16, 2019, the government announced the introduction of the council who will "help put in place the right skills, ethics, and data so the UK can make the most of AI technologies." The UK [has pledged](#) an investment of 1 billion Pounds in AI, including support for 1,000 PhDs and 8,000 specialized teachers as well as conversion of Turing Institutes into data-driven AI research centers.

European Union

The European Union has attempted to work proactively to address the prevalence and importance of AI. To ensure competitiveness and spur development, the European Commission outlined its "[European approach to AI](#)." On April 8, 2019, the European Commission released the [Ethics Guidelines for Trustworthy AI](#) created by its [High-Level Expert Group on Artificial Intelligence](#), comprised of Commission-appointed representatives from academia, civil society, and industry. The guidelines aim to promote "Trustworthy AI", defined by three components that should be met throughout an AI system's entire lifecycle: "It should be lawful, complying with all applicable laws and regulations; It should be ethical, ensuring adherence principles and values; It should be robust, both from a technical and social perspective since, even with good intentions, AI systems can cause unintentional harm."

International Institutions

The [G20 Ministerial Statement on Trade and Digital Economy](#) presented G20 members' thoughts on AI. The G20 members recommended creating an environment for human-centered AI; encouraging responsible use of AI so that the benefits can improve everyone's work environment and quality of life; following the G20 AI Principles, developed from the Organization for Economic Cooperation and Development (OECD) [Recommendation on AI](#) to foster public trust and confidence in AI technologies; and striving for international cooperation in areas of AI research and development.

OECD created their own [Principles of AI](#), a list of five complementary values-based principles for the responsible use of trustworthy AI. OECD also compiled a list of best practices for governments to encourage and enable AI, which included: "Facilitate public and private investment in research & development to spur innovation in trustworthy AI; ensure a policy environment that will open the way to deployment of trustworthy AI systems; empower people with the skills for AI and support workers for a fair transition; and co-operate across borders and sectors to progress on responsible stewardship of trustworthy AI."

"AI for Good" is the leading United Nations (UN) platform for dialogue on Artificial Intelligence. Recently, the UN has organized an annual "AI for Good Global Summit" to promote international dialogue about emerging AI technologies. Through these summits, the United Nations created the [United Nations Activities on Artificial Intelligence](#) which provides an up-to-date look at what the different sectors of the United Nations are currently developing in the world of AI.

External Stakeholder Groups

Outside of Congress and the Executive Branch, many interest and advocacy groups are pushing agendas in AI accountability, research investment, and development of standards, among other issues. The three external groups included below were selected based on their track record of engagement with federal agencies in the AI conversation, including both partnerships and strategic influence. While the list below is not intended to be comprehensive, it provides some context of how external stakeholders are influencing the federal conversation in AI.

Partnership on AI

Partnership on AI (PAI) was established to study and formulate best practices on AI technologies, to advance the public's understanding of AI, and to serve as an open platform for discussion and engagement about AI and its influences on people and society. PAI is guided by their [Thematic Pillars](#), which include Safety-Critical AI; Fair, Transparent, and Accountable AI; AI, Labor, and Economy; Collaborations Between People and AI Systems; Social and Societal Influences of AI; and AI and Social Good. On April 30, 2019, the organization released [three case studies](#) on AI's Real-World Impacts on Labor and the Economy.

Computing Community Consortium

In May 2019, the Computing Community Consortium released an [AI Research Roadmap](#). NSF requested this report and is working with the community on new thrusts based in part on its recommendations. The 117-page roadmap makes a number of recommendations, including the creation of open AI platforms and resources, creation of National AI Research Centers with large multi-disciplinary teams, development of AI Curricula at all levels, recruitment and retention programs for advanced AI degrees, training highly skilled AI engineers and technicians to build upon the open AI platforms, engaging underrepresented and underprivileged groups, and investing in core programs for AI research.

Association for the Advancement of Artificial Intelligence

In January 2019, the [Association for the Advancement of Artificial Intelligence](#) (AAAI) held its [33rd AAAI Conference on Artificial Intelligence](#), where they identified the “Societal Drivers for AI Research.” Following the conclusion of the conference, they called for a new era of “Audacious AI Research” that will engage the community through large-scale shared resources to tackle broad goals. Recommendations to achieve this new era included: “creating an Open National AI Platform that offers a shared ecosystem infrastructure for AI research, including hardware, data, software, services, and people; creating new funding programs; broadening AI education; and promoting AI policy and ethics.”

Think Tanks

Think tanks serve as a voice and source for recommendations in guiding the policy conversations surrounding AI, and reports they publish often serve to influence policy conversations. While nearly all major think tanks have released reports or held events touching on various AI topics, the below section focuses on major think tanks who have launched dedicated AI efforts and whose expert opinion carries weight with policymakers.

Center for a New American Security (CNAS)

The CNAS [Artificial Intelligence and Global Security Initiative](#) was created to “explore how the artificial intelligence revolution could lead to changes in global power, the character of conflict, and crisis stability.” The Initiative’s [research agenda](#) covers a range of issues related to the implications of the AI revolution for global security, including shifting power dynamics among actors in the international arena; changes in the character of conflict; crisis stability, including conflict initiation, escalation, and arms race; security dimensions of AI safety; prospects for international cooperation.

Center for Security and Emerging Technology (CSET)

On February 28, 2019, Georgetown University announced the creation of a new \$55 million center, [Center for Security and Emerging Technology \(CSET\)](#). CSET, which is housed at Georgetown University’s Walsh School of Foreign Service, plans to address national competitiveness, talent and knowledge flow, and relationships with other technologies.

Brookings Institution

The [Brookings Initiative on artificial intelligence and emerging technologies](#) seeks to establish a proper societal framework for the impending “digitalization of everything.” John R. Allen, President of The Brookings Institution, wrote a [blueprint for the future of AI](#), which discussed their role in the research community and how The Brookings Institution plans on being a leader in the AI research world. Brookings Institution’s research in this area includes trends in the information technology sector, countering the geographical impacts of automation, and education in the age of artificial intelligence.

Center for Strategic & International Studies (CSIS)

The CSIS has its Technology Policy Program and the International Security Program researching [intelligence, surveillance, and privacy](#), examining the relationship among technological innovation, civil liberties, and the intelligence systems. Research that they have conducted includes facial recognition, AI Cyber-Warfare, and China’s cybersecurity and ethics.

Carnegie Endowment for International Peace

Through the [Technology and International Affairs Program](#), Carnegie Endowment for International Peace aims to anticipate and mitigate the international security challenges emerging in the wake of Artificial Intelligence’s proliferation. This includes “short-term (zero to five years) challenges that may result from

the accidental or intentional misuse of AI in its current form as well as medium-term (five to twenty years) challenges that may result from AI's regressive impacts on global economic growth and security." Research regarding AI includes how to tackle deepfakes, how governments can effectively use AI, and military use of AI.

Information Technology & Innovation Foundation (ITIF)

The ITIF discussed in their [Tech Policy To-Do List](#) different ways that the government should incorporate artificial intelligence. Joshua New, a Senior Policy Analyst for ITIF published a report last December titled, "[Why the United States Needs a National Artificial Intelligence Strategy and What It Should Look Like.](#)" In the report, New discussed the importance for Congress to direct the Economic Development Administration to encourage state governments to foster AI industry development. He also recommends Congress fund the National Science Foundation to create a competitive AI fellowship program for at least 1,000 computer science students annually and to provide competitive awards for up to 1,000 AI researchers to remain in academia for a period of five years. The ITIF-affiliated Center for Data Innovation has issued [many reports](#) on AI policy, research and development, and implementation.

The Aspen Institute

The Aspen Institute conducted the Third Annual Aspen Institute Roundtable on AI called Artificial Intelligence and The Good Society: The Search for New Metrics, Governance, and Philosophical Perspective from February 11 to February 13, 2019. David Bollier created a report of the meeting, displaying the topics the roundtable discussed such as moonshot visions of AI, the perils of AI, philosophy of AI design and governance, and envisioning new metrics, governance and accountability for AI. The full report can be found [here](#).

Opinions on Artificial Intelligence

Leading technology and industry voices have often spoken up to share insights and opinions on the potential opportunities and challenges that AI poses to society. Among the many voices on this subject, Elon Musk, co-founder, CEO, and product architect of Tesla, Inc; co-founder of OpenAI, along with other CEO positions, was a vocal critic of Artificial Intelligence saying that it was a threat to the future of mankind. However, in November 2018 Musk had an [interview](#) with Axios co-founders where he introduced the idea of humans merging with AI to create a "symbiosis" that would lead to a "democratization of intelligence". Not all business heads have the same opinion as Musk; Jeff Bezos, CEO of Amazon, is in support of AI. He encourages more innovation in AI, in a [podcast](#) with The Aspen Institute in 2016, Bezos discussed Amazon's Alexa and the use of artificial intelligence to create that device and how AI can be used in the future for businesses. Later Bezos launched a conference called [re: MARS](#), dedicated to AI, optimism, and Amazon. At this conference, Robert Downey Jr. [announced](#) his new project, [The Footprint Coalition](#), a way of using AI in order to help our environment and address the problems of climate change. A year ago Downey and his wife, Susan Downey, announced that they are producing a [docu-series on YouTube](#) meant to explore AI and the impact it will have on people's lives. Others in support include Ginni Rometty, CEO of IBM. In a [CNBC interview](#) she discussed that she believes that the Fourth Industrial Revolution is underway and it is shaping up to be one of the most significant challenges and opportunities of our lifetime.