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Making Immigration Law Respond to the Needs of Building U.S. Leadership in Artificial Intelligence

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by Richard A. Boswell & Aditya Mohan

Is Building Artificial Intelligence Leadership a National Priority and How Does U.S. Immigration Law Support or Hinder This Objective?[1]

We begin this discussion with an affirmative response to the question posed above, and with the admonition that advancing United States leadership in Artificial Intelligence should be one of the nation's highest priorities. This position has been supported by a series of U.S. Presidents[2] and the National Security Commission on Artificial Intelligence (NSCAI).[3] Its importance to national security is highlighted by recent events. In December of 2020, it was announced that hackers working for a foreign government had breached software provider SolarWinds and then deployed malware into an update of their Orion software.[4] As a result the network systems using the SolarWinds' Orion software were compromised. The SolarWinds' Orion software was widely used by many federal agencies and the hack resulted in breaches, which included among others NASA, the Federal Aviation Administration, Departments of State, Homeland Security (DHS), Treasury and Commerce.[5] More recently, in March 2021, it was confirmed that the SolarWinds attack resulted in hackers getting access to email accounts of the Trump administration's head of the DHS and members of the department's cybersecurity staff who are responsible for managing threats from foreign countries.[6] A publicly accessible Federal Aviation Administration (FAA) case study for FAA's use of SolarWind published in 2018 mentioned that one of the challenges the FAA addressed using SolarWinds product was the "difficulty of determining whether a security incident occurred and what happened during the breach."[7] According to one source as many as 18,000 SolarWinds's customers were infected with malicious code.[8]

The attacks described above are commonly known as "supply chain attacks." By compromising one entity or manufacturer in the overall supply chain of a product's production, hackers can undermine target

[1] We use the term "Artificial Intelligence" as encompassing technologies that involve making computers perform tasks which replicate some of the functions engaged by humans.

[2] *See* The White House Launches the National Artificial Intelligence Initiative Office, https://trumpwhitehouse. archives.gov/briefings-statements/white-house-launches-national-artificial-intelligence-initiative-office/; Artificial Intelligence Initiative: Year One Annual Report, https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/02/American-AI-Initiative-One-Year-Annual-Report.pdf.

[3] Final report (March 2021) by The National Security Commission on Artificial Intelligence (NSCAI), an independent federal commission tasked with providing the president and Congress recommendations to "advance the development of artificial intelligence, machine learning, and associated technologies to comprehensively address the national security and defense needs of the United States," stated "*America is not prepared to defend or compete in the AI era. This is the tough reality we must face, and it is this reality that demands comprehensive, whole-of-nation action*" https://www.nscai.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf.

[4] *See* Emergency Directive 21-01, Mitigate SolarWinds Orion Code Compromise, Cybersecurity and Infrastructure Security Agency (Dec. 13, 2020), https://cyber.dhs.gov/ed/21-01/https://perma.cc/69TZ-DTVQ.

[5] Other agencies included the National Nuclear Security Administration, National Telecommunications and Information Administration (NTIA), National Institutes of Health, and the Justice Department. *See* Zack Whittacker, *SolarWinds hackers targeted NASA, Federal Aviation Administration networks*, TechCrunch, (Feb. 23, 2021), https://techcrunch.com/2021/02/23/solarwinds-hackers-targeted-nasa-federal-aviation-administration-networks/ https://perma.cc/YF2H-TZXR.

[6] A. Suderman, *SolarWinds hack got emails of top DHS officials*, Denver Post (Mar. 29, 2021), https://apnews.com/article/solarwinds-hack-email-top-dhs-officials-8bcd4a4eb3be1f8f98244766bae70395, https://perma.cc/A2Y7-ZTFJ.

[7] SolarWinds Government Case Study, Federal Aviation Administration Case Study, TechValidate (Oct. 28, 2018), https://www.techvalidate.com/product-research/solarwinds-government/case-studies/453-303-8D4, https://perma.cc/8TM2-8JY5.

[8] D.E. Sanger, N. Perlroth & E. Schmitt, *Scope of Russian Hacking Becomes Clear: Multiple U.S. Agencies Were Hit,* N.Y. Times (Dec. 14, 2020, https://perma.cc/VZ7J-LDM6 https://www.nytimes.com/2020/12/14/us/politics/russia-hack-nsa-homeland-security-pentagon.html, https://perma.cc/668C-RHRA (last visited Mar. 31, 2021).

security efficiently and at scale.[9] There is also some indication that the malicious attack on SolarWinds' Orion was developed by engineers in satellite offices located in the Czech Republic, Poland and Belarus.[10]

Artificial Intelligence and Cybersecurity

Artificial Intelligence (AI) plays an important role in cyber security, the tools used in cyber security and the enabling infrastructure. An example of AI can be found in the very agency responsible for protecting against these attacks, the Cybersecurity and Infrastructure Security Agency (CISA).[11] Within CISA is the EINSTEIN system which is designed to detect and block cyberattacks from compromising federal agencies.[12] The CISA EINSTEIN system was unable to detect the malicious code last year since the hackers inserted the malicious code into the Solar-Winds' Orion update itself and EINSTEIN considered the update as "trusted".[13] As a result of the SolarWinds incident, a number of lessons were learned. One was that it is important to have engineers working on important systems inside a country's border. Another is that the cybersecurity tools currently used by U.S. agencies to protect the critical national infrastructure lack the necessary sophistication to defend against the external cybersecurity threats.[14] It is only logical to assume that AI based malware and hacking technologies are bound to become much more sophisticated in the near future, and when funded by rogue nations, hostile to the U.S., the dangers will only be further magnified.

AI and COVID-19 Vaccine

Scientists from University of Southern California in February 2021 reported in Nature Research that they have come up with an AI system that can provide COVID-19 vaccine candidates within seconds.[15] As the virus mutates, it becomes important to create vaccine candidates before they can spread globally. The AI system was able to find 26 potential vaccines that would work against COVID-19. AI was one of the key technologies that helped Pfizer to successfully create its vaccine in less than a year instead of typical 10 years. Pfizer used AI during COVID-19 vaccine clinical trials to help find signals on the efficacy of the vaccine within the millions of data points in its 44,000 person study.[16] It is becoming more readily apparent that the ability to develop vaccines for COVID-19 variants going forward while at the same time having control over the AI systems used to accelerate the development of the vaccines is critical to national security.

AI and Semiconductors

The last 5 years have seen a shift that involves more software platforms being condensed into silicon as a system-on-chip (SoC).[17] AI focused software platforms have led this trend due to the need for better performance for on-edge operation, for example in an autonomous vehicle, a security camera or a smartphone. Today, instead of computing systems (whether on cloud based or on-premise servers) with embedded general purpose processor chips that run AI software, a SoC

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[9] L. H. Newman, *No One Knows How Deep Russia's Hacking Rampage Goes*, Wired (Dec. 14, 2020), https://www.wired.com/story/russia-solarwinds-supply-chain-hack-commerce-treasury/, https://perma.cc/6FTK-X22F.

[10] J. Fingas, *SolarWinds Hack May Have Been Much Wider Than First Thought: Early Warning Systems Appear to Have Failed*, EnGadget (Jan 2, 2021), https://www.engadget.com/russia-solarwinds-hack-broader-than-expected-211046098.html (last visited Mar. 31, 2021), https://perma.cc/R8CE-W57S.

[11] Cybersecurity and Infrastructure Security Agency (CISA) is part of the Department of Homeland Security, https://www.cisa.gov.

[12] CISA EINSTEIN, https://www.cisa.gov/einstein, https://perma.cc/R43P-LY9X.

[13] It was Justin Katz, a cybersecurity analyst who said "that makes it unlikely Einstein ever could have detected the malware implanted into SolarWinds Orion because it was delivered to agency networks through a trusted update." *See* J. Katz, In Search of a Smarter Einstein, Defense Systems (Feb. 3, 2021), https://defensesystems.com/articles/2021/02/03/smarter-einstein.aspx#:~:text=That%20makes%20it%20unlikely%20Einstein,too%20costly%2C%20cybersecurity%20analysts%20, https://perma.cc/B75N-EW4M.

[14] Included within this infrastructure are the power grids. C. Timberg & E. Nakashima, *The U.S. Government Spent Billions on a System for Detecting Hacks. The Russians Outsmarted It*, The Wash. Post (Dec. 15, 2020), https://www.washingtonpost.com/national-security/ruusian-hackers-outsmarted-us-defenses/2020/12/15/3deed840-3f11-11eb-9453-fc36ba051781_story.html, https://perma.cc/KDL9-JPEY.

[15] G. Polakovic, *Artificial Intelligence Aims to Outsmart the Mutating Coronavirus*, USC News (Feb. 5, 2021), https://news.usc.edu/181226/artificial-intelligence-ai-coronavirus-vaccines-mutations-usc-research/, https://perma.cc/9E8K-HCKT.

[16] C. Johnson et. al., *FDA Review Confirms Safety and Efficacy of Pfizer Coronavirus Vaccine*, The Wash. Post (Dec. 8, 2020), https://www.washingtonpost.com/graphics/2020/health/pfizer-vaccine-trial-results/, https://perma.cc/B4ZT-3AWN.

[17] Stephen B. Furber, ARM System-on-Chip Architecture (2000).

includes most of the hardware and the AI software components needed to build the AI system. These specialized SoCs are purpose-built to run an AI application. Examples of these systems can be found in Apple's A14 Bionic chip and Tesla's Full Self-Driving chip.[18] These substitute the general purpose processor chips from Intel and Nvidia respectively.

In addition to performance and on-edge operation, these AI SoCs are much more secure. On the other hand, it is extremely difficult and cost prohibitive to hack or reverse engineer a highly integrated system and even more a system packaged into a single chip, a SoC.[19] This makes these products good export candidates since the producers can be assured of greater protection of their intellectual property. It is equally hard to verify chip security, for example in an AI or 5G SoC, when imported into the U.S., where it might be used in critical infrastructure, such as the power grid, a telecom base station or a defense installation. An imported chip could be embedded with some type of "backdoor entry" which could in turn compromise the very grid that it was intended to manage. This makes it critical to have as much control over the semiconductor supply chain as possible, including at a minimum the AI SoC and assuring that the research and development is carried out within the U.S.. In addition, the current global chip crisis has shown that manufacturing should wherever possible, be domestically sourced. The recently introduced "CHIPS for America Act" addresses this issueby incentivizing investments and support for U.S. semiconductor manufacturing, research and development, and supply chain security.[20]

What is Artificial Intelligence?

Artificial Intelligence commonly referred to by its acronym "AI," can be described in general terms as a discipline that involves making computers do tasks that replicate some of the functions that humans can do, specifically tasks that need human level skills including the ability to acquire and apply knowledge. The AI demonstrated by machines today, either a software program or a robotic system, does not involve consciousness, common sense, intuition or emotions that are typical of human intelligence.

AI can be broken down broadly into rule-based learning and machine learning. Rule-based learning systems can be described as AI systems that rely on hard-coded knowledge. These systems include predefined rules (knowledge) crafted by engineers to build "expert systems" and are predictive in nature. AI systems that can acquire their own knowledge from data can be described as machine learning systems. Machine learning doesn't require pre-defined rules. Instead it uses statistics to compute these rules, in other words "learn" using training data. This makes the machine learning algorithms and the systems using these algorithms, probabilistic. One of the popular sets of machine learning algorithms is representational learning. Representational learning can be described as algorithms that allow a system to automatically discover the representations needed for "feature" detection or classification from raw data.[21] A feature is defined as a specific property, identification of, or distinguishing characteristic in a dataset.[22] For example, in a spam detection system that uses a representational learning algorithm, a feature may include the presence or absence of certain email headers, the email structure, the language, the frequency of specific terms,

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[18] *See* Press Release, Apple unveils all-new iPad Air with A14 Bionic, Apple's most advanced chip, (Sept. 15, 2020), https://perma.cc/P5NT-MYD4, https://www.apple.com/newsroom/2020/09/apple-unveils-all-new-ipad-air-with-a14-bionic-apples-most-advanced-chip/; Pegasus pulls about four times as much power. So per-watt Tesla comes out ahead by the stats, D. Coldewey, *Tesla Vaunts Creation of the Best Chip in the World*, TechCrunch, Apr. 22, 2019, https://techcrunch.com/2019/04/22/tesla-vaunts-creation-of-the-best-chip-in-the-world-for-self-driving/, https://perma.cc/EC2R-E7KQ.

[19] For example accessing an iPhone can be extremely difficult because of the way that the passcode is encrypted, creating a problem for whoever is trying to hack into the device which can permanently lock out anyone from the information contained on the device after a set number of failed passcode entries. *FBI Breaks into iPhone. We Have Some Questions*. Hacker News, Mar. 29, 2016, https://news.ycombinator.com/item?id=11378750, https://perma.cc/34ZP-AUM9. In another situation, then FBI Director, James Comey, Jr. testified before Congress that the law enforcement agency's effort to access the iPhone of one of the attackers in the San Bernadino mass shooting, required them to paying an "undisclosed group" more than $1.3 million to assist in hacking into the device. *See* Erich Lichtblau & Katie Benner, *F.B.I. Director Suggests Bill for iPhone Hacking Topped $1.3 Million, N.Y. Times,* Apr. 21, 2016, https://www.nytimes.com/2016/04/22/us/politics/fbi-director-suggests-bill-for-iphone-hacking-was-1-3-million.html, https://perma.cc/W7BB-MBP7.

[20] Debby Wu, Ian King & Tom Giles, *The Global Chip Crisis*, Bloomberg News (Mar. 8, 2021), https://www.bloomberg.com/news/storythreads/2021-03-09/the-race-for-chip-supremacy-could-reshape-the-world, https://perma.cc/T4ND-SWSZ, CHIPS for America Act, H.R. 7178, 116th Cong., 2d Sess. (2020).

[21] Ian Goodfellow, Yoshua Bengio & Aaron Courville, *Chapter 15, Representational Learning* in Deep Learning 526-27 (2016).

[22] Christopher M. Bishop, Pattern Recognition and Machine Learning 202 (2006).

and the grammatical correctness of the text.[23] Some of these features can be complex, abstract and hard to extract from raw data. The algorithm called deep learning solves this issue by introducing representations that are expressed in terms of other, simpler representations or features.[24] Simply put, deep learning algorithms can be described as algorithms that allow software to build complex concepts out of simpler concepts.

Deep learning algorithm design has been inspired by the human brain and collective learning ("training") and decision making ("inference") through collections of neurons, a unit of compute. Neuroscience forms the basis of how to form the structure for, and interconnect (a neural network) between the neurons to work together to solve a problem. A single deep learning algorithm can solve many different problems. Deep learning algorithms can be supervised or unsupervised.

Supervised learning can be described as representational learning algorithms that take in a training dataset containing features.[25] In addition, the training dataset also contains corresponding human annotated labels for such features. It is used to "supervise" or train the algorithm to generate results that are learned from, and outside the training dataset. In other words, the algorithm is able to generalize the training dataset to cover unseen inputs.[26]

A spam detection system, using a supervised learning algorithm, might include a feature that searches for certain words in the subject line in combination with the sender's email domain. For example, a message with the subject line "new message from social networks" received from an email address "**** <****@ilbbci.hardliners.ru>" irrespective of the content of the message would be labelled by a human as spam. This means that the training dataset would learn according to the algorithm to identify subject line such as "new message from social networks" with certain domains and label them as spam. Alternatively, a phishing scam detection system using a supervised learning algorithm can follow a similar approach.[27] In practice, supervised learning algorithms use the training dataset as a "supervisor" to create a model that is then deployed in the AI system to generate the results. In the above example, the result will be that the email received by the user would be categorized as spam. The amount and quality of the training data will determines the accuracy of the results.

Unsupervised learning can be described as representational learning algorithms that take in a dataset containing features without the need for human annotated labels.[28] The algorithm is able to learn properties of the dataset, which is then used to create a dynamic model and generate results. Unsupervised learning algorithms involve moving from static to dynamic models, and raw generalized data instead of labelled data. In unsupervised learning algorithms, human intervention to tag/annotate data is not needed, making these algorithms much more scalable and robust if designed and deployed properly.

In the example described above for an AI based spam detection system, messages with the subject line "new message from social networks" received from an email address "**** <****@ilbbci.hardliners.ru>", may also have the same message content as other emails with the same subject line and email address. The presence of commonality of subject line, email address and message content would be enough to identify these messages as spam by the unsupervised learning algorithm without need for training dataset to supervise. In unsupervised learning, there is no supervisor and the algorithm learns to make sense of the data without this guide.

Today, supervised learning algorithms are widely used in AI systems. The algorithms that fall within the category of deep learning algorithms, whether supervised or unsupervised, can be termed as advanced AI algorithms due to their complexity and the probabilistic nature of their approach to learning. These deep

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[23] Google uses representational learning for spam detection in Gmail for over one billion users. See Neil Kumaran, Product Manager, Gmail Security, *Spam does not bring us joy—ridding Gmail of 100 million more spam messages with TensorFlow* (Feb. 6, 2019), https://cloud.google.com/blog/products/g-suite/ridding-gmail-of-100-million-more-spam-messages-with-tensorflow, https://perma.cc/B3T7-7QUD.

[24] *See* Deep Learning *supra* note 21 at 140-55.

[25] *Id*. at 140.

[26] Tom M. Mitchell, The Need for Biases in Learning Generalizations (1980), Rutgers CS tech report CBM-TR 5-117, New Brunswick, New Jersey, U.S.A., http://www-cgi.cs.cmu.edu/~tom/pubs/NeedForBias_1980.pdf, https://perma.cc/GS46-6PLH.

[27] Adam Dawes, Product Manager, Google, *Landing Another Blow Against Email Phishing* (Google Online Security Blog). Archived from the original on June 6, 2012, https://security.googleblog.com/2012/01/landing-another-blow-against-email.html, https://perma.cc/E7UM-MRQN.

[28] Geoffrey Hinton & Terrence Sejnowski, Unsupervised Learning: Foundations of Neural Computation (1999), https://doi.org/10.7551/mitpress/7011.001.0001, https://perma.cc/P54N-6ZNH.

learning-based AI systems have gained popularity in the last few years. For example, they are used today for computer "vision" based analytics such as facial recognition, security, optical character recognition (OCR) for document processing and even in banking for mobile check depositing. Autonomous cars, intelligent weapons, weather forecasting, cybersecurity and credit card fraud analysis are some other computing systems that use deep learning.

Who is needed to build AI?

Building a computer system requires expertise in computer science, engineering and the domain where the computer system will be used.[29] These systems are built by teams of individuals. Usually the team which builds the computer system works with experts from the domain in a disjoint fashion. For example, to build the software guidance system for a Boeing 737 MAX, knowledge of aerospace is required to produce the design after which it can be handed over to the software engineering team. Software engineering teams generally will not need expert knowledge of aerospace as long as the software and the hardware components have well documented design specifications. A product or a project manager with some domain knowledge usually suffice to facilitate the software/hardware development.

The demand for highly trained workers such as software engineers in information technology (IT) organizations are continually increasing.[30] In addition, new roles for workers with specialized knowledge have emerged. As it pertains to AI, the breadth, depth of knowledge and training required to build an AI system is well beyond the expertise of a typical software developer. In short, having proficiency in programming[31] is less important than understanding the AI algorithm, dataset used, design and how it will operate when deployed in a certain domain. In addition the role of systems architect, AI and data scientists are key to the design of an effective AI system. Some of the obvious individuals who play key roles in developing AI include (and may not be limited to) functions known in the field as systems architects, software and hardware engineers, DevOps[32] engineers, quality assurance engineers and project/program/product managers.

When building a computer system involving AI, domain expertise and coordination between the engineering and domain experts are critical. The software engineering team itself needs to have experts who know how to build and deploy AI systems. In addition, some of these AI systems need large amounts of data in the correct format, and in good number of cases annotated by humans, to train these systems before meaningful results can be produced. Some of the important skilled workers needed to design, implement and maintain an AI computer system include the following:

- Domain experts - Example of which, include aerospace engineers, who will know how an aircraft operates including the avionics, control systems and other hardware systems. Healthcare professionals and mechanical engineers with focus on automotive are other examples.
- Data scientist - Workers with expertise in data science and modelling are needed in most AI based computer systems unless we are dealing with rule-based AI systems. Machine learning-based AI systems involve teaching machines to learn the rules from the data itself. Data scientists will have a background in data modelling, analytics, symbolic systems and other related disciplines.
- Data engineers - Workers that analyze, build, test and maintain data needed for an AI system.
- AI Scientist - These include workers with focus on AI algorithms and complex design in areas of software and hardware systems.

Since machine learning based AI systems involve computer systems to learn rules ("train") based on a large amount of data, besides the above staff, a set of workers are needed that may not have to be highly skilled. These workers will either: generate the data needed (for example driving a vehicle fitter with camera to survey and take images of roads in a city); or annotate the data ('feature extraction') to prepare it for supervising ('training') an AI system. The workers needed to generate and annotate the data will be skilled

[29] As used here "domain" refers to the industry vertical where a computer system may be deployed. In some cases, the computer system may be designed and tested specifically for a domain, for example aerospace or healthcare.

[30] Steve Lohr, *The Pandemic Has Accelerated Demands for a More Skilled Work Force*, N.Y. Times, April 7, 2021, https://perma.cc/5FNV-VZTT.

[31] Programming can be described as the ability to write code in using a certain computer programming language given a well-defined problem.

[32] Development Operations Engineers are those who have some experience in the system deployment itself as well as in its implementation. Among the engineers are those involved in software development (Dev) and IT operations (Ops) hence the designation"DevOps." Len Bass, Ingo Weber & Liming Zhu, DevOps: A Software Architect's Perspective 1-6 (2015).

workers but not necessarily with specialized knowledge. For example, this might include drivers and technicians that drive vehicles with mounted cameras around in a city to map the roads and take images. Neither driving a car nor identifying or annotating road signs and city blocks require specialized knowledge. Even simple rule-based AI systems need workers to help engineers understand the system's behavior. Usually computer systems that are not AI based, will not need skilled workers to generate and annotate data. Data quality as well as AI algorithm design are both equally important for machine learning based AI systems unlike rule-based AI systems where once the rules are defined, the system will generate predictable output.

Additional skilled workers are needed to maintain data quality, essential in the continued operation of an AI system.

Skilled workers - Data quality maintenance roles

Once the AI system is deployed after being trained on the datasets, the skilled workers are needed to maintain the quality of such data sets on an ongoing basis when additional data is available or the AI system is not behaving as expected. Some of these are covered in the section above but are included here for completeness.

To maintain the quality of data, skilled workers can be divided into a number of categories including those who might be used to generate additional data and then annotate that data such as data scientists, architects or workers with varying levels of sophistication in data science, linear algebra, statistics, data modelling; and those possessing domain specific knowledge such as in healthcare, automotive or aerospace experts.[33]

U.S. Immigration Law and the Admission of Skilled Workers

Current immigration law has its roots in a system which has evolved into one heavily dependent on migrants being able to establish that their skills are in need by a specific employer and then tying their status to the same employer.[34] It is worth exploring the background of the current immigration system insofar as it relates to the admission of skilled workers.[35]

Since at least the middle of the 1800's immigration to the United States has become increasingly restrictive. As will become apparent later in this discussion, when these enactments are viewed from a historical perspective they are an overlay of provisions which seem designed to address an issue peculiar to their place in time. These provisions then appear as an overlay of increasingly restrictive set of laws forming a patchwork quilt of rules which do not always reflect a cohesive framework.[36]

The immigration laws have long reflected a concern about restricting the immigration of foreigners seen as competing with domestic workers. Given the prominence of race as a part of this country's history it should not appear surprising that xenophobia or racial exclusion would also play a significant role. The now infamous "Chinese Exclusion" laws specifically identified Chinese laborers and excluded them based on the premise that their admission "disturbed the good order of certain localities."[37] Later legislation enacted in 1885 would restrict the immigration of contract laborers, making these contracts null and void as they were seen as depressing the U.S. labor market.[38] The

[33] This list is not meant to be exhaustive, but rather to illustrate the dynamic range of expertise and knowledge needed in developing AI systems.

[34] Under current law, while not all workers are required to have a sponsoring employer, most are. Applicants who are able to meet the "national interest waiver" requirements or who can establish "extraordinary ability" may avoid the sponsor requirement. *See* 8 U.S.C. §§ 1153(b)(2)(B)(i) and (b)(1)(A).

[35] We use the term skilled to the extent that it relates to those with either advanced degrees or with experience that would set them apart from other workers. This of course does not mean that other workers with less education, are not important to sustaining an economically vibrant economy. Indeed, one thing that we have learned from the COVID-19 pandemic is that critical/essential workers also come from the ranks of the so-called "lesser skilled" workforce.

[36] Judge Irving R. Kaufman of the Second Circuit in a famous opinion drew on the image of King Minos's labyrinth in ancient Crete in attempting to describe the complex immigration laws, comparing them with the tax laws in their acceleration of the aging process of judges. Lok v. INS, 548 F.2d 37, 38 (2d. Cir. 1977).

[37] The Chinese Exclusion Act of 1882, 22 Stat. 58, Chap. 126 (1882). The exclusion of Chinese would later be expanded to include all Asians. Enid Trucio-Gaynes, *The Legacy of Racially Restrictive Immigration Laws and Policies*, 76 Oregon L. Rev. 369, 392-400 (1997). Indeed, they were preceded by immigration restrictions precluding non-whites from being eligible to enjoy legal protections. *Id*. *See also* Neil Gotanda, *Other Non-Whites in American Legal History: A Review of Justice at War*, 85 Colum. L. Rev. 1186 (1985).

[38] *See* Act of Feb. 26, 1885, ch. 48-164, 23 Stat. 332. The 1885 was amended two years later to place responsibility for its enforcement with the Secretary of the Treasury. *See* Act of Feb. 23, 1887, ch. 49-220, 24 Stat. 414.

legislation specifically permitted the admission of contract workers where the skilled labor could not be otherwise located within the U.S.[39] Legislation enacted in 1917 further codified controls on the admission of contract laborers and specifically permitted a number of categories of skilled workers such as civil engineers, physicians, chemists and teachers but only to the extent that similarly skilled unemployed U.S. workers could not be found for the position.[40] The anti-immigrant sentiments which provided the impetus for the 1917 legislation would later result in the first quota restrictions on immigration that remain at the core of current U.S. immigration law. These quotas restricted overall immigration by nationality in an attempt to preserve the national origins represented in the U.S. according to the 1910 census.[41] The restrictions established in this legislation were ultimately extended and made permanent in 1924. These quota laws would later provide the framework for a quota regime that continues to this day albeit with numerical limits which are higher than what existed when originally enacted.

The original quotas did not include most immigrants from the Western Hemisphere or those within designated categories including "professional actors, artists, lecturers, singers, nurses, ministers of any religious denomination, professors for colleges or seminaries, aliens belonging to any recognized learned profession, or aliens employed as domestic servants" but would nonetheless count against the annual quota allotments.[42]

In 1952 Congress enacted the McCarran-Walter Act, which was a comprehensive re-codification of the immigration laws into one cohesive set of laws.[43] The 1952 Act, which was passed over the veto of President Truman remains the core of U.S. immigration law and like its predecessor statutes provided for admissions based on either family ties or job skills.[44] The legislation incorporated earlier restrictions on lesser skilled immigrants with fewer on those with more education. At the same time the law generally favored family unity over that of meeting the needs for foreign labor.[45] However this legislative scheme which favored family unity did not completely ignore the need for foreign workers since an immigrant who had sufficient family ties likely brought with them a host of skills thereby benefiting the national economy.[46] The changes incorporated into the 1952 legislation remained unaltered until their revision in the 1965 Act which eliminated the national origin quotas. The statute maintained clearly delineated quotas for immigrants based on family relationships with U.S. citizens and employment skills sought by a U.S. employer.[47] The 1952 Act also

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[39] The law specifically exempted those coming as professional actors, artists, lecturers, singers or domestic servants. Id. at § 5.

[40] Act of Feb. 5, 1917, Pub. L. No. 64-301, ch. 29, 39 Stat. 874, 877. The political climate leading up to the enactment of the legislation in 1917 was notable in that there had been a dramatic increase in immigration from prior periods just in the first ten years of the Twentieth Century.

[41] *See* Sec. 2(a), Quota Act of 1921, 42 Stat. 5. This quota needs to be understood as being part of a larger restrictive effort, for the U.S. had already banned immigration from Asia and African immigration was virtually non-existent.

[42] *Id*. at § 2(d). The legislation further extended preference for spouses fiancé(e)s, parents, siblings and underage children of U.S. citizens or those who had applied for citizenship or who had served honorably in the U.S. military during World War I. *Id*. at §2(d)(3).

[43] Pub. L. No. 82-414, ch. 477, 66 Stat. 163 (1952).

[44] President Truman's veto message which complained about the racially discriminatory quota also noted that the quota restrictions even as modified in the 1952 Act failed to meet the "growing needs of the Nation for manpower to maintain the strength and vigor of our economy." Harry S. Truman, *Veto of Bill To Revise the Laws Relating to Immigration, Naturalization, and Nationality* (June 25, 1952) available at https://www.presidency.ucsb.edu/documents/veto-bill-revise-the-laws-relating-immigration-naturalization-and-nationality (last visited Feb 20, 2021) https://perma.cc/WL4C-37UT.

[45] This prioritization of family unity over other factors has significant justification. After all, the family is the core social structure in most societies and keeping them together might contribute to greater integration and social stability. Indeed, under current law an immigrant who is immigrating based on her relationship with a U.S. citizen or permanent resident will be admitted without regard to having to meet the "skill" requirements found in other sections of the law.

[46] Since the enactment of the United States' earliest immigration laws, migrants have had to meet additional stringent "admissibility" requirements such as establishing that they are not likely to become public charge, something which can only be established by a showing of sufficient financial resources, or by possessing certain skills or education. 8 U.S.C. § 1182(a)(5)(A)(i). While under current immigration law, family migrants are exempt from the labor certification requirements they must still overcome other inadmissibility grounds including the "likelihood" of becoming a public charge. 8 U.S.C. §§ 1182(a)(4)(A) and (B). So a person immigrating as the spouse of a permanent resident or U.S. citizen could incidentally possess educational or other skills but these would not form a part of the decision to allow for their admission.

[47] Act of October 3, 1965, 79 Stat. 911. At the same time that the Act eliminated the national origin restrictions, it set a cap of 170,000 immigrants from the Eastern Hemisphere and limited the admission from any one country in excess of 20,000. According to this designation, the world was divided into two hemispheres – east and west with the east being anything outside of North and South America. Immigrants who were the minor children or spouses of U.S. citizens

incorporated provisions allowing for the temporary admission of workers either of "distinguished merit and ability" or in fields where "unemployed persons capable of performing such service" could not be found.[48]

While having the beneficial distinction of eliminating the national origins restrictions, the 1965 Act created additional strains on those wishing to immigrate by hardening an already restrictive quota system. The Act established a cap on Eastern Hemisphere migration and prohibited the admission of more than 20,000 people from any one country in a given year.[49] A later amendment enacted in 1970 removed the requirement that a foreign worker of distinguished merit and ability had to be coming to fill a job which was "temporary" in nature, only that the non-citizen be coming temporarily to perform work of an exceptional nature.[50] Amendments enacted 1976 would rein in the numbers of overall immigrants by adopting a global quota system, setting it at 290,000 and included other provisions which imposed sponsorship requirements on those immigrating as members of the persons or persons with exceptional abilities.[51]

With increased interest in immigration and a growing awareness of the immigrants themselves, perhaps caused in part by demographic and geopolitical realignments, Congress established the Select Commission on Immigration and Refugee Policy.[52] The Commission was charged with studying and making recommendations with an eye towards reforming the immigration system.[53] Inherent in this charge was how the U.S. was to navigate the political thicket of a growing concern about the numbers of immigrants coming to the U.S. and balancing that with the country's own national interests. The end result of the Commission's work resulted in a legalization or immigration amnesty which was enacted in 1986 with the creation of a regime of sanctions against employers for knowingly hiring unauthorized foreign workers. It would not be until the close of 1990 that Congress would enact the second part of the Commission's recommendations which was the revision of the way that the U.S. satisfied it's need for foreign workers.[54]

The 1990 Amendments were the first major changes to the legal migration scheme since the McCarran-Walter Act of 1952.[55] While retaining the basic architecture of the 1952 Act, it's provisions relevant to foreign workers included increases in the number of visas allocated to professionals and those with "higher" skills raising the number from 54,000 to 120,000.[56] While the 1990 Act had some noteworthy

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continued to immigrate outside of the quota, and those coming based on their employment skills were limited.

[48] 66 Stat. at 168.

[49] That "cap" would later be expanded to 290,000 and would include Western Hemisphere migrants.

[50] The statutory language was written as a person with a foreign residence "who is of distinguished merit and ability and who is coming temporarily . . . to perform services of an exceptional nature requiring such merit and ability." Act of April 7, 1970, Pub. 91-225, 84 Stat. 116 (amending 8 U.S.C. § 1101(a)(15)(H). The predecessor provision was written as "[a person] who is of distinguished merit and ability and who is coming temporarily to the United States *to perform temporary services* of an exceptional nature requiring such merit and ability. Act of June 27, 1952, 82-414, 66 Stat. at 168 (1952) (establishing 8 U.S.C. § 1101(a)(15(H)) (emphasis supplied).

[51] See Act of October 12, 1976, Pub. L. No. 94-484, 90 Stat. 2243 at 2300; Pub. L. No. 95-83, 91 Stat. 383 at 395.

[52] It is noteworthy that all of this was occurring at the same time that large numbers of refugees were coming from Southeast Asia as a result of the collapse of South Vietnam and the withdrawal of U.S. forces from that country.

[53] *See* Philip L. Martin, *Select Commission suggest Changes in Immigration Policy*, Monthly Lab. Rev. 31 (Feb. 1982); The Report of the U.S. Select Commission on Immigration and Refugee Policy: A Critical Analysis (Ed. Ricardo Anzaldua Montoya and Wayne A. Cornelius) Center for U.S.-Mexican Studies, University of California, San Diego, 1983.

[54] *See* Immigration Act of 1990, Pub. L. No. 101-649, 104 Stat. 4978 (Nov. 29, 1990).

[55] The Immigration Act of 1990 should be viewed together with corrective legislation termed the Miscellaneous and Technical Immigration and Naturalization Amendments of 1991, Pub. L. No. 102-232, 105 Stat. 1733 (Dec. 12, 1991).

[56] *See* Warren R. Leiden, *The New Preference Categories of the Immigration Act of 1990*, 15 In Defense of the Alien 36, 41 (1992). Included in the Act were provisions which for the first time placed limits on family based immigrants and greater emphasis on removing non-citizens facing criminal grounds for removal. Under prior law employment immigrants were divided into two categories called "third" and "sixth" preferences. The third was for higher skilled workers and the sixth for lesser skilled. The 1990 Act created three new employment preferences, each allowing for 40,000 visas. Also included were 10,000 visas for investors who could show that their investments would create additional jobs. All told the quota was revised to limit immigration to 675,000 per year with 465,000 for family unification, 140,000 and 55,000 for so-called "diversity" immigrants. The diversity designation is somewhat deceptive since it was not designed to re-adjust previous racially exclusionary provisions but were allocated for foreign nationals from countries who had not been represented in the migration ranks in recent years. One of the more significant changes created by the 1990 Act was its revision of those who could

and positive features, it did not significantly alter the immigration quota system.[57] Visas continued to be allocated based on family unification and sponsorship by U.S. employers seeking out non-citizens with certain skills. The 1990 Act provided some enhancements that facilitated the admission of higher skilled nonimmigrant workers on a longer term but technically temporary basis.[58] This was done quite artfully by expanding the definition of what would be treated as "temporary" and permitting these visa holders to retain their nonimmigrant status while simultaneously poised ready willing and in pursuit of permanent visas.[59]

There have been few significant statutory changes directed at the recruitment of foreign skilled workers since the enactment of the 1990 legislation and their later technical amendments. What this means is that the major changes fall into the category of regulatory or policy interpretations of the existing statutes. By definition such changes are narrower and unlikely to be able to resolve structural problems. Many of these regulatory changes occurred during the period of the Obama and Trump Administrations from the period between 2009 and 2020. While the most widely known of the Obama policy interpretive initiatives involved those designed to provide temporary relief for children of undocumented immigrants,[60] another focused on challenges for recruitment of skilled workers. One of these involved permitting work authorization to certain spouses of H-1B workers.[61] Others included revision of interpretations of the definition of "specialized knowledge" which impacted the admission of foreign nationals coming under the intra company transfer visas.[62] Another example was in the

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qualify for the H-1B to include persons in "specialty occupations." A specialty occupation is defined as including those with highly specialized knowledge and the attainment of a bachelor's or higher degree or its equivalent in the specific specialty.

[57] It is worth noting that the original quotas were set in the first quarter of the last century when the population was approximately 117,859,000. U.S. Dept. of Commerce, Bureau of the Census, Fourteenth Census of the U.S. Taken in the Year 1920: Population 1920, Vol. 2 at 13. The most recent population estimates place the total number of persons residing in the U.S. at approximately 332,000,000. U.S. Dept. of Commerce, Bureau of the Census, U.S. Population and World Population Clock, https://www.census.gov/popclock/, https://perma.cc/6B6L-47DG. As will be discussed later, the immigration quotas have not kept pace with the nation's growth whether one views this in terms of the numbers of people or the size of the economy.

[58] Most notable of these were those related to H-1B nonimmigrants permitting them admission on a technically "temporary" basis while at the same time allowing them to transition to permanent residency if they could secure a sponsoring employer. H-1B's were subject to an annual quota of 65,000 subject to clearance by the Department of Labor. At the same time the legislation placed a quota of 25,000 on H-2B unskilled non-agricultural temporary workers. Other provisions were those creating nonimmigrant visas for "O" and "P" non-immigrants. The "O" visa is intended for persons of extraordinary ability and achievement in the sciences, arts, education, business or athletics. The "P" visa is for those who are coming to perform as athletes or entertainers or members of a group.

[59] This was artfully recognized as "dual intent," something which most nonimmigrants are precluded from having lest they risk the viability of their nonimmigrant status. Daniel Walfish, *Student Visas and the Illogic of the Intent requirement*, 17 Geo. Imm. L. J. 473, 497-501 (2003). Under dual intent certain nonimmigrant visa holders may simultaneously be nonimmigrants while they are pursuing permanent residency. For most nonimmigrants, the demonstration of intent to become a permanent resident places their nonimmigrant status in jeopardy. Indeed, the immigration laws presume that all foreign nationals are immigrants unless they can prove otherwise, and if so, they must show that they qualify for the immediate issuance of an immigrant visa. One consequence of the quota restrictions and the restrictions on nonimmigrant visas is that would-be immigrants are challenged with maintaining their status while waiting for the availability of permanent resident slots. Later interpretations would allow certain H-1Bs meeting very specific criteria to be able to remain for longer periods. *See, e.g.,* 8 C.F.R. § 214.2(h)(13)(v) (six-year time limit not applicable to beneficiaries who are in the U.S. for less than six months or are seasonal or intermittent employees); Memo, Aytes, Assoc. Dir. Domestic Operations, USCIS, Dec. 5, 2006 (beneficiary who departs the U.S. for one year may begin a new six-year period also avoiding the numerical cap); 8 C.F.R. §214.2 (h)(13)(i)(A) (grace period between positions).

[60] The program came to be known as Deferred Action for Childhood Arrivals (DACA). The DACA program was later expanded under the Obama Administration to include their parents (DAPA). Litigation challenging both was eventually brought and the DAPA program never went into effect. Within nine months following his inauguration Donald Trump issued directives to the DHS Secretary to rescind the program, an effort which was met with a legal challenge resulting in an injunction. In 2020 the Supreme Court held that the DACA rescission had been carried out improperly thereby requiring the agency to begin the process anew. Department of Homeland Security v. Regents of Univ. of Calif., 140 S. Ct. 1891, 207 L. Ed. 2d 353 (2020). Soon after President Biden's inauguration in 2021, DACA was reinstated and legislation has since been introduced that would extend permanent status on many of its original beneficiaries.

[61] 79 Fed. Reg. 10,283 (Feb. 25, 2015).

[62] The intracompany transferee visa is designated as "L-1." *See* 8 U.S.C. § 1101(a)(15)(L). This classification is designated for those in a managerial or specialized knowledge capacity. The Department of Homeland Security (DHS) issued a series of guidance or interpretive statements in March and May of 2015 with their position finalized in August, 2015, USCIS, Policy Memorandum PM-602-0111, L-1B, Adjudications Policy (Aug. 17, 2015) (updating the Adjudicator's Field

permission extended to foreign students following their completion of studies to engage in post-graduate employment.[63] The most far reaching of these were memorialized in a report issued by the Obama Administration in 2015 in which sweeping regulatory changes were recommended.[64] The recommendations included among other things expanded use of the intra company transfer visa for transferring higher skilled workers to the U.S., extending the post-graduate work authorization for certain students in science and engineering, allowing H-1B workers to transfer position, and the most far-reaching which provided principals in start companies with special status while they wait for permanent resident petitions to become available.[65] These modifications were made without statutory changes under the agency's rulemaking authority and as a result were subject to change by the newly installed Secretary under the Trump Administration.[66] Most of the major regulatory and policy guidance was rescinded or significantly changed over the course of the four years of the Trump Administration and more recently were reinstated by President Biden.[67] However what remains is a complicated set of hurdles that applicants must meet.[68]

Under the U.S. legal system Congress through its enactment of a statute can commit to administrative agencies the power to promulgate rules equally binding in their effort to adjudicate benefits. These rules, which are promulgated in the Code of Federal Regulations are permissible as long as the authority to interpret has been delegated and they are reasonable and rational. This means that significant changes cannot be created by interpretive rulemaking and can only be enacted through the legislative process. This treatment of federal agencies has long been recognized in the U.S. legal system and is consistent with a sensible and orderly system where agencies apply the laws written by Congress on a daily basis. In the immigration context the DHS is entrusted with interpreting and applying provisions of the INA related to the determination of who qualifies as a skilled worker whether seeking admission as a nonimmigrant or immigrant. Therefore the agency is unable to address problems that are grounded in the statute itself, such as quota restrictions or limiting statutory language.

Manual (AFM) by replacing Chapter 32.6(e) with the version included in the PM).

[63] 8 C.F.R. § 214.2(10).

[64] *See* Modernizing and Streamlining Our Legal Immigration System for the 21st Century (July 2015), https://obamawhitehouse.archives.gov/sites/default/files/docs/final_-visa_modernization_report1.pdf (last visited 4/29/21); https://perma.cc/A7RR-PYTW. Much of this was described in proposed rulemaking which was published in the Federal Register in December 2015. *See Retention of EB-1, EB-2, and EB-3 Immigrant Workers and Program Improvements Affecting High-Skilled Nonimmigrant Workers,* 80 Fed. Reg. 81,899 (Dec. 31, 2015).

[65] *See* Retention of EB-1, EB-2, and EB-3 Immigrant Workers and Program Improvements Affecting High-Skilled Nonimmigrant Workers, 80 Fed. Reg. 81,899, (Dec. 31, 2015). The "special" treatment accorded to the principles involved in start-up enterprises was called "International Entrepreneur Parole." 81 Fed. Reg. 60,130 (Aug. 31, 2016); 82 Fed. Reg. 5,238 (Jan. 17, 2017) (announcing the final rule effective July 17, 2017). In immigration law "parole" is a special discretionary status where the person is permitted to enter the country but is not under either a temporary (nonimmigrant) or permanent (immigrant) visa. Parole granted to these individuals would have been for a period of two years with a possible "re-parole" for an additional three years.

[66] Federal agencies have the authority, within limits, to promulgate binding rules or guidance regarding how certain provisions of the immigration statute are to be applied. These rules when properly promulgated and if consistent with the underlying statutory authority are binding on future administrations until they have been properly modified or rescinded. A policy guidance does not carry the force and effect of law, may not necessarily bind an agency and can be modified by a superseding guidance. *See* Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals and the Like: Should Federal Agencies Use Them to Bind the Public*, 41 Duke L. J. 1311, 1319-23 (1992); *Molycorp, Inc. v. EPA*, 197 F.3d 543, 547 (D.C. Cir. 1999). Moreover, an agency can also set national policy through adjudications. *See* SEC v. Chenery Corp., 332 U.S. 194, 201-03 (1947). An Entrepreneurial Parole Program created by the Obama Administration in January 2017 was put on hold and ultimately revoked by the Trump Administration. *See* 82 Fed. Reg 5,238, 5,242 (Jan. 17, 2017). The Trump Administration's proposed rule was stayed by a federal court in December 2017. *See* National Venture Capital Ass'n v. Duke, 291 F.Supp.3d 5, 21 (D. D.C. 2020). On May 11, 2021 Secretary Mayorkas issued a notice in the Federal Register withdrawing the Trump Administration's revocation of the Entrepreneurial Parole Program. *See* 86 Fed. Reg. 25,809 (2021). This effectively means that the program is reinstated.

[67] While the individual actions are too numerous to list and are not the focus of this article, some examples of Trump Administration policies revoked by President Biden can be found in a series of Executive Orders. *Buy American and Hire American*, Exec. Order No. 13,788, 82 Fed. Reg. 18,837 (Apr. 21, 2017) *revoked by Ensuring the Future Is Made in All of America by All of America's Workers,* Exec. Order 14,005, 86 Fed. Reg. 7,475 (Jan. 28, 2021); *Enhancing Vetting Capabilities and Processes for Detecting Attempted Entry Into the United States by Terrorists or Other Public-Safety Threats, Presidential Proclamation* 9645, 82 Fed. Reg. 45,161 (Sept. 27, 2017) revoked by *Proclamation on Ending Discriminatory Bans on Entry to The United States,* 86 Fed. Reg. 7005 (Jan. 25, 2021).

[68] Stephen Yale-Loehr, *Attracting the Best and the Brightest: A Critique of the Current U.S. Immigration System*, 38 Fordham Urb. L.J. 183 (2010).

One overarching problem is that the U.S. immigration system remains caught in an early 20th Century approach to dealing with migration demands. The quotas which were enacted in the early part of the 20th Century with the modest modifications made in 1952 and later in 1990 coupled with the requirement that each requires legislation created yet additional challenges. Unless Congress eliminates the fixed immigrant quotas and rigid nonimmigrant visa categories the U.S. will remain unable to adequately respond to the workplace requirements of a rapidly changing world. Other problems in the system can be found in the agency's inability or unwillingness to deal with the fact that many of the firms in the emerging world of high tech are comprised of small Start-Up enterprises where the principals and key employees are compensated by the future financial success from their personal investment of intellectual property and know-how. Often these companies will not look like more traditional businesses and are closely held with the relationship between the employer and immigrant employee being much closer. It is unreasonable to expect that adjudicators within DHS will have sufficient knowledge about the fields of expertise which are needed to build these companies, or be able to to make speedy decisions about which are legitimate and deserving of approval and which are not.

Another and perhaps more pressing problem is that the fields of domestic workers in short supply are constantly changing. In our view this makes it difficult to predict which fields are needed at any given time. Addressing the problems we describe requires a rapid response – something which could only seem possible when the country faced an imminent threat or something approaching a catastrophic event such as what the country experienced on 9/11. Yet the threats confronted by the U.S. following the unfolding of the global pandemic of COVID-19 has not resulted in anything beyond executive actions.[69] While welcome, these executive actions are not able to deal with the problems of a cumbersome process and an immigration statute in serious need of reform.[70] This inability to develop reforms responsive to these deep problems only provide additional arguments in favor of more radical structural change.

American employers have long had great difficulties meeting their need for qualified workers. The only solutions must come from a combination of changing how our educational system prepares people for taking on the ever-changing positions needed in the workplace and finding foreign workers who meet those qualifications. Setting fixed numerical limits on the number of foreign workers who can be admitted to fill these positions, whether on a temporary or permanent basis, cannot meet the needs of any modern dynamic economy. Yet this has been how the immigration system has been structured for more than half a century.

What is Urgently Needed

We submit that some of the problems raised in this essay could be addressed on two levels. One set of solutions fall into the category of "short term" and these would be partially addressed by the Biden Administration's reversion back to the Obama initiatives of 2015. In our view these are but short term solutions and fail to grapple with the fundamental problem of the artificial quota restrictions placed on the admission of this category of foreign workers.[71] Related to this is the overly complex and cumbersome adjudicatory environment.[72] Immigration rules should be able to quickly bend with the needs of this increasingly complex world.[73] When Congress created the H-1B

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[69] Following the onset of the COVID-19 pandemic the Trump Administration issued a number executive orders, most of which were revoked by the new Biden Administration soon after taking office. *See supra* note 67.

[70] At the moment it appears that there is a possibility that some changes may come about within the budget reconciliation process. However the "reforms" which have been proposed thus far do not address the problems presented in this essay, as their primary focus is to provide for legalization of large swathes of the current undocumented population. *See* Arturo Castellanos-Canales Danilo Zak, *Summary: Immigration Provisions in the Budget Resolution*, Nat'l Immigration Forum, Aug. 17, 20211, https://perma.cc/NM2H-WQRD; Laurence Benenson, *Explainer: Budget Reconciliation and Immigration Reform*, Nat'l Immigration Forum, Jul. 26, 2021, https://perma.cc/NHB5-YZ96. The deficiency of any legalization program is that it addresses the immigration problems of the past and not of the future.

[71] We acknowledge that the same problem besets the family unification part of our immigration system, but this is not the focus of this paper.

[72] We would posit that this adjudicatory environment is but a by-product of the restrictive quotas which have been statutorily imposed.

[73] Indeed in President Biden's State of Union Message he indicated as much, at least with respect to the importance and the speed of the changing world. He said in reference to his American Jobs Plan

> . . . We will *see* more technological change — and some of you know more about this than I do — we'll see more technological change in the next 10 years than we saw in the last 50. That's how rapidly artificial intelligence and so much more is changing.
>
> And we're falling behind the competition with the rest of the world.

program it only dealt with an immediate problem facing a particular industry. As a result we now have an even more complicated system, subject to gaming and which only works to the benefit of those most able to find a highly skilled immigration lawyer. The H-1B program has restrictions on the number of persons who can qualify annually, and even if they do, those from certain countries may be precluded from obtaining durable status because of immigration quota restrictions.[74] Finally, beneficiaries remain beholden to their sponsoring employers and thereby vulnerable to potential abuse.[75]

We believe that Congress should establish a durable long-term solution built on reimagining how we address immigration needs in areas of critical national importance. As we have seen in the national response to the COVID-19 pandemic, a modern society needs to have flexibility to address emerging and complex problems. To do so requires taking advantage of the sophisticated talent found within academia and private industry. Our recommendation would call on the talents found within academia and industry (in the sciences, engineering and other areas) to set the categories of fields, the educational and skills backgrounds of national importance with a goal of allowing the visa beneficiaries admission on durable status outside of quota restrictions.[76] These visa beneficiaries would remain subject to all of the normal inadmissibility grounds and background checks applied to all immigrants.

One model which could be used would be to borrow from the expert panels used to evaluate drug efficacy and permit used by the Food and Drug Administration, or panels used by the National Science Foundation in making grant awards. These agencies rely on non-governmental experts to assist government officials in making important decisions. Here the decision to be made would be on the category of fields of national importance and the range of skills which would be needed in each of the fields. Those admitted under this system would be given priority admission outside of the normal immigration quotas. The experts from different fields could be convened on a regular basis to identify critical needs such as AI, cyber-security, public health, climate etc. Once the categories and skills areas were determined based on the recommendations, companies, organizations or individuals possessing expertise in these areas could then apply for admission. Those admitted under this system would be given renewable visas and after a period of time, perhaps three years, could have their status adjusted to that of a lawful permanent resident – thereafter they would be treated like any permanent resident.[77] To assure against abuse of the system, applicants would be subject to the criminal and national security grounds of admission found in current immigration law.[78] If Congress is hesitant to create such a program on a permanent basis it could do it as a "pilot program."[79] While current law provides for a "national interest waiver" for certain immigrants when the person's admission under certain employment based immigrants who are members of the professions

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Remarks by President Biden in Address to a Joint Session of Congress, April 28, 2021.

[74] As a general rule nonimmigrant visas do not have quota restrictions. The restrictions placed on H-1B were the result of a compromise which highlight the problems discussed in this paper. Initially H-1B's were restricted to 65,000 per year. *See* Immigration Act of 1990, Pub. L. No. 101-649, § 205(a). That number was modified to 115,000 and lowered again, rising as high as 195,000 in 2001 and then returning to 65,000. An Act Making Omnibus Consolidated and Emergency Appropriations for the Fiscal Year Ending September 30, 1999, § 411, Division C, Title IV of Pub. L. 105-277, 112 Stat. 2681. H-1B's are often obtained as part of a longer term residence strategy. The path to residency is challenging, both in the requirements for the initial visa and with regard to immigrant quota issues, thereby resulting in an even more complex set of rules necessitating the hiring of a lawyer. The immigration quota system also places a cap on immigrants coming from any single country at approximately at approximately 25,000. *See* 8 U.S.C. § 1152(a)(2).

[75] Some of these problems have been alleviated through "visa portability" when a employment-based adjustment applicant remains pending for more than 180 days they may switch to a new employer in a similar occupational classification. *See* 8 U.S.C. § 1154(j).

[76] The authors are of the view that the immigration quotas are antiquated and work against what would be a sound immigration policy based on family unity and national interest.

[77] Permanent residents who meet additional good moral character, durational, physical presence and other eligibility requirements may petition for naturalization as a U.S. citizen.

[78] *See* 8 U.S.C. §§ 1182(a)(2) and (3). One of the requirements which we do not believe should be applied are the requirements placed in the immigration laws in 1996 which places a heavy burden on persons who failed to maintain lawful status (irrespective of the reason for the violation). A person who qualifies as a priority admission applicant has by definition established a compelling national interest for receiving status and to subject them to additional requirements would be counter to the purpose of the program itself.

[79] A similar scheme was used when Congress established the Visa Waiver Program allowing for the admission of non-citizens from certain countries to be admitted as visitors for pleasure or business without the need of obtaining a separate consular issued visa. *See* Immigration Reform and Control Act of 1986, § 313, Public Law 99–603, 100 Stat. 3359 (1986).

holding advanced degrees in addition to individuals of exceptional ability, this only allows the foreigner to "self-petition" and it does not apply to outstanding professors and researchers.[80] More importantly the process is both cumbersome and doesn't avoid quota restrictions.

This proposal bears some similarity to a program which exists in the United Kingdom, called the Tech Nation or "Global Talent" visa for recognized and emerging leaders in the digital technology space[81] such as fintech, AI and cybersecurity, yet goes much further.[82] The Tech Nation visa was used in the United Kingdom to spur the development, particularly in London allowing its beneficiaries admission for 5 years for recognized high tech professionals. The Global Talent Visa permits the entry for 5 years allowing individuals to convert to a permanent resident type of status. Part of this approval process relies on expertise found outside of the government office responsible for adjudicating visa requests. It does this by relying on such esteemed bodies such as the Royal Society of Science and Medicine, the Royal Academy of Engineering and others.[83] Once an application is approved, its beneficiary has the flexibility to change employers, or be founders of new companies. What is notable about the UK model is that it has a well-developed strategy for recruiting workers and building various parts of their tech economy and system and are much more aggressive than the U.S. which focuses more narrowly on entrepreneurship. In our view, recruiting a broad range of skilled workers and building entrepreneurship should be the focus of any change in the system. Equally as important is vesting more authority in professional bodies with deeper and more sophisticated knowledge of the skills needed to support this important part of our economy.[84]

We have highlighted some of the compelling reasons why the admission of highly skilled individuals, particularly in the AI field should be admitted to the U.S. We believe that there is no compelling reason to limit the admission of these talented individuals to the U.S., subjecting them to either quota restrictions, or tying their status to a specific employer. The central questions which drive this proposal are whether the U.S. needs highly trained individuals in certain fields, whether those fields are likely to change over time, and whether the current law provides sufficient flexibility to assure their rapid admission.

This proposal introduces the idea of a special unrestricted category of immigrants whose admission to the U.S. would benefit the national interest. It introduces the concept of establishing the characteristics of potential workers as established not by the agency, but a group of experts who would make these determinations on a periodic basis. The overall objective here would be to create a more transparent, less complicated system that would provide for the expeditious admission of these immigrants. Finally, none of this needs to sacrifice our national security, for the traditional agencies involved in background checks and applying the grounds of inadmissibility found in the current statute would continue to play their role.

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[80] *See* 8 U.S.C. § 1153(b)(2)(B); 8 C.F.R. 204.5(k)(1). *See* Matter of Dhanasar, 26 I. & N. Dec. 884 (AAO 2016).

[81] Tech Nation Visa Guide - The Global Talent Visa Guide for Digital Tech https://technation.io/visa-tech-nation-visa-guide/#typical-applicants.

[82] *See* The Tech Nation Visa, https://technation.io/visa/, https://perma.cc/8M7Y-TXGL; Tech Nation Visa Guide - The Global Talent Visa Guide for Digital Tech https://technation.io/visa-tech-nation-visa-guide/#typical-applicants; *see also* Katherine A. Stolerman, *Rain or Shine for London, Reexamining the Fintech Capital of Europe After Brexit*, 38 B.U. Int'l L.J. 157, 165 (2020).

[83] Applicants in the UK must obtain an endorsement from one of six endorsing bodies. The applicant also must have technical or business within a prescribed range. For more information, see Government of the U.K, Global Talent Guidance, Aug. 21, 2020 https://www.gov.uk/ government/collections/global-talent-guidance (last visited July 24, 2021). The immigration rules can be found at https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-global-talent (last visited July 24, 2021).

[84] There have been many forward-looking proposals such as one proposed by Congressmember Zoe Lofgren in July, 2021, called the "Let Immigrants Kickstart Employment Act" or "LIKE Act." *See e.g.* https://lofgren.house.gov/sites/lofgren.house.gov/files/7.26.21%20-%20LIKE%20Act%20-Full%20Text.pdf, https://perma.cc/875G-BTBN.