President’s Address 2019

[Slide 1: Title slide] Good morning! I hope that everyone is enjoying the 156th Annual Meeting of the National Academy of Sciences. It has been another busy, active year for the NAS. As in the past two years, I have enjoyed traveling the nation, meeting with many of you at regional meetings to discuss issues of importance to science and society. I am always impressed by the thoughtfulness of your engagement with this organization and your selflessness in giving your time and energy to the National Academy.

With the caveat that I cannot possibly do justice to the many highlights of the past year, let me provide a brief, curated list of some of the varied accomplishments since we last met.

Reports
Let’s start with some influential reports that were issued from the National Academies.

Sexual Harassment Report and the Action Collaborative

[Slide 2: Sexual Harassment] In June last year the Academies released its highly anticipated report on sexual harassment in academia. Like all Academies’ reports, this one was evidence based, documenting the frequency and impacts of both the well-known forms of sexual coercion such as unwanted sexual attention and quid pro quo, as well as the perhaps less noticed – but certainly no less insidious – forms of gender harassment that make women feel out of place and that they don’t belong.

The cumulative effect of sexual harassment is significant damage to research integrity and a costly loss of talent. The biggest predictor of sexual harassment is an organization’s perceived tolerance for it. The report recommends that institutions treat sexual harassment just as seriously as they address research misconduct. The NAS, as an institution, cannot expect other organizations to follow our advice if we ignore it. For that reason, both scientific misconduct and sexual harassment are treated equally in the new NAS Code of Conduct. Our enforcement of the code will be watched by the research community as an indicator of our tolerance for misconduct within the Academy.

[Slide 3: Action Collaborative] Too often, recommendations from the Academies fail to reach their full impact because of lack of follow-through. Taking a page from the NAM playbook, we set up an “action collaborative” for higher education following the release of the sexual harassment report. An action collaborative is a coalition of the willing. The role of the Academies is to provide a forum for institutions eager to put the recommendations from the report into action. The action collaborative allows its members to set goals, share best practices, and measure progress towards their goals. Funding for the collaborative is provided by assessing modest dues on the members, and leadership comes from within.
The action collaborative launched with twenty-eight inaugural members, shown in bold, and has now grown to more than forty members. It is an excellent and diverse core group to develop effective approaches for stopping harassment across academia.

Medications for Opioid Use Disorder Save Lives

Another issue that has been making headlines for some time is the opioid epidemic. Just a few weeks ago, we released a report that looks at the effectiveness of three medications approved by the FDA to treat opioid addiction. This is one of our many activities across the Academies related to combatting the opioid epidemic. Our report found that these medications are effective and save lives by alleviating withdrawal symptoms, reducing opioid cravings, or decreasing the response to future drug use. However, more than 80 percent of roughly 2 million people struggling with opioid addiction are not being treated with them, due to stigma, restrictions on treatment settings, and other factors. Given the timeliness and importance of this topic, the report garnered a lot of press coverage, including editorials in both the New York Times and USA Today. I expect that its impact will continue.

Reducing Child Poverty

Another pressing national dilemma is the almost 10 million children who are living in families with annual incomes below the poverty line. This has serious implications for the healthy development of these children, but the nation also pays a high price – an estimated $800 billion to $1.1 trillion annually in lost adult productivity, increased costs from crime, and higher health expenditures. We released a congressionally mandated report in February that identifies evidence-based programs and policies to reduce the number of children living in poverty by half within 10 years. The report has been met with great interest on the Hill, and was the focus of several bipartisan congressional briefings. It also generated national and regional news coverage, including a mention by Pulitzer Prize winning New York Times columnist Nicholas Kristof. I hope you’ll have a chance to check out the data explorer we developed for this study – you see the URL here – which allows you to drill down on national- and state-level impacts of the report’s proposed policy packages.

Securing the Vote

Next, the 2016 presidential election and the 2018 midterms ushered in warnings of the vulnerabilities and weaknesses in our voting system. Last September we released Securing the Vote: Protecting American Democracy, which recommended ways to strengthen security of the voting process and guard against foreign cyberattacks. The report – which urged federal, state, and local governments to use paper ballots for elections and to audit the results – has helped shape public discussion around this issue, and in some cases, action. For instance, the Georgia General Assembly recently voted to switch to a touchscreen marked paper ballot system with a new auditable paper trail. And the Wisconsin Elections
Commission voted unanimously to require audits in five percent of precincts throughout the state after every general election.

**Negative Emissions Technologies and Reliable Sequestration**

(Slide 8: Negative Emissions) Some might worry that with the current administration’s focus turned away from climate, the Academies are ignoring this important issue. Not so. In October we issued a report that examined the potential benefits and drawbacks of “negative emissions technologies,” which remove carbon dioxide from the air and sequester it. The study committee concluded that these technologies will need to play a significant role in mitigating climate change and called for the launch of a substantial research initiative to advance them. A bipartisan group of senators cited the report when they introduced a bill in February to support innovation in negative emissions technologies.

I would also like to call your attention to a report that we plan to release in May. The working title of the report is Reproducibility and Replicability in Science, and the chair of the authoring committee is Harvey Fineberg, former president of the Institute of Medicine. We hope it will bring greater clarity to how we define and understand reproducibility and replicability, and their role in the scientific process.

**Champion of Justice Award**

The last report I want to highlight is not new – in fact, it is celebrating its 10th anniversary this year. But it is a fantastic example of the lasting and profound impact our reports can have. I’m proud to share that Judge Harry T. Edwards and Constantine Gatsonis, co-chairs of the committee that authored our landmark 2009 report *Strengthening Forensic Science in the United States: A Path Forward*, have been awarded the Innocence Network’s 2018 Champion of Justice Award. You may recall that this report concluded that with the exception of DNA, the reliability of forensic evidence such as bite marks, blood spatter, or hair strands has not been scientifically verified or quantified. As a result, many wrongful convictions have been overturned or are undergoing appeal. (Slide 9: Champions of Justice Award) Judge Edwards, who serves on the U.S. Court of Appeals for the District of Columbia, accepted the award on behalf of the Committee and the Academies at an event attended by nearly 1,000 people – including over 200 exonerees.

**Promoting the Talent Pool**

The NAS has actively been reaching out to the next generation of younger, more diverse scientists to ensure a strong, enduring talent pool through several worthy programs.

*30th Anniversary of the Frontiers of Science*

For example, I had the good fortune back in the late 1980s through the mid-90s to participate in the Frontiers of Science program, including its international expansion to Germany and
China. I experienced first-hand how this innovative program conceived by Frank Press develops future leaders in science by building their skills for working across disciplines and networking nationally and internationally. Eventually our good friends at the Kavli Foundation agreed to help sponsor these meetings, and it is now known as the Kavli Frontiers of Science program.

To date, there have been over 5,900 Kavli Fellows who have attended the meetings, including more than 3,400 in the US alone. 265 Kavli Fellows have been elected to the Academy since 1989, including 15 alumni just last year, and they now comprise over 11% of the NAS membership. What’s more, we have now partnered with ten different nations in international Frontiers meetings. On our website, you’ll find more than 1,300 videos spanning 61 symposia.

This last February was the 30th anniversary of the Frontiers program. Bruce Alberts, Steve Chu, and I participated in a panel discussion at this year’s meeting along with two young alumni of the program, Juan Gilbert from the University of Miami and Joy Ward from the University of Kansas. The panel was an opportunity for the alums to encourage this year’s attendees with stories of how participation in the program altered the course of our careers. A few of the young Frontiers attendees from this year snapped this photo [Slide 10: Frontiers of Science] and sent it to me. I loved the fact that they were suitably inspired to be dreaming about both the past and the future of our Academy.

New Voices

[Slide 11: New Voices] And to solicit new ideas and fresh perspectives from the next generation of leaders in science, engineering, and medicine, the Academies recently launched the New Voices Program, with the support of the Gordon and Betty Moore Foundation. They are already hard at work creating a networking tool to help the NRC identify more diverse and highly qualified experts to serve on Academies panels and other convening activities. They also are building connections to young Academies worldwide.

International Partnerships

On the international front, we have built upon some longstanding global partnerships with Academies across the world, as well as forged new relationships. These partnerships allow us to address issues that transcend borders and can only be addressed on a global scale.

Human Genome Editing

[Slide 12: Human Genome Editing] Anyone not in a coma heard about all of the excitement last November at the Second International Summit on Human Genome Editing in Hong Kong – cohosted by NAS and NAM along with the Academy of Sciences of Hong Kong and the Royal Society of the U.K. The summit was already receiving widespread attention when a researcher from Shenzhen, China revealed that twins were born whose healthy embryonic genomes had been edited. The researcher was quickly condemned by the summit organizers and by much of the international scientific community for violating longstanding norms and ethical principles.
This news heightened the urgency for an internationally agreed upon path forward on human genome editing research and applications. Toward that end, the NAS and the NAM have partnered with the Royal Society to form an international commission on the clinical use of heritable human genome editing. We are also being joined by dozens of scientific academies around the world in this effort. I’ll be serving on the commission’s oversight board, along with NAM President Victor Dzau and John Skehel of the Royal Society. The commission will be co-chaired by prominent researchers from the U.S and the U.K, and we will be announcing the full slate and statement of task very soon. We intend this work to be an important step forward in building international accord on standards that should apply to decisions about germline editing. But we also recognize that we need to reach beyond the scientific and medical communities to achieve societal consensus on these decisions, especially given the global implications of heritable genome editing.

Israeli Agreement

I’d also like to just briefly mention a new agreement that the NAS signed with the Israel Academy of Sciences and Humanities that will provide opportunities for joint cooperative programs between US and Israeli scientists. Nili Cohen, President of the Israel Academy, and I signed the joint agreement at a lovely ceremony in Jerusalem that was hosted by the President of Israel. Len Blavatnik’s family foundation has provided the funding for this program. The first event will be a joint conference on computer science and AI in Israel in September.

Strengthening the Academy

We are gaining momentum on our efforts to transform how the Academies deliver on its mission to advise the nation and to increase the impact of that advice. Changes are necessary to ensure that the Academies remain the preeminent, go-to source for authoritative, evidence-based, and trusted advice.

Transformation Progress

Let me begin by updating you on what we are calling the Transformation. Last year at this time I introduced to you the recommendations of the outside review of the National Research Council, the operating arm of the Academies. Conducted by the National Academy of Public Administration (NAPA), the review made a number of suggestions for how to streamline our operations, use our volunteers, staff, and IT more effectively, serve our report sponsors better, and basically deliver the high-quality advice that is the hallmark of the National Academies in a more timely fashion to better meet the needs of sponsors.

We have just now completed an engagement with Boston Consulting Group (BCG) that has been very productive. The BCG professionals imposed an order and discipline to the many tasks needed to transform the NRC into a more nimble organization, which will help ensure orderly tracking of progress and coordination across the institution. But more importantly, BCG is teaching us how to be a continually transforming organization – one
that encourages innovation and experimentation, and empowers its staff to embrace new and better ways to deliver on our mission.

Let me highlight for you just a few of the changes we are already implementing as a result of this transformation. First, we have created a sponsor feedback tool to track our sponsors’ satisfaction with our work. Previously, there was no formal engagement with the sponsor to determine what went well and what didn’t with a particular report or workshop. Next, we are working on a more standardized impact assessment for our products. Currently we gauge impact largely by relying on anecdotes, which are hardly quantitative, or report downloads, which may not be universally representative. And third, we are streamlining all of the processes and procedures required to execute a consensus study or workshop from conception to review signoff. We are striving to shorten the timeline, reduce costs, and remove unnecessary bureaucracy.

New Communications Director

As part of the transformation, I have been on a quest to elevate the impact of the communications activities at the NAS and across the National Academies. In tandem with the independent review that launched our Transformation effort, I also asked for an outside review of our communications structure and activities. Not surprisingly, we learned that the Academies punch below their weight class. Given the important work we do to provide guidance on so many of the nation’s most pressing challenges, it is essential that we reach our audiences – policy makers, influencers, and the public – in effective and timely ways.

Based on this review, we are taking a number of steps to improve our performance. The first is that we have hired a new Chief Communications Officer, David May, who arrived in January. I hope you will all get to know David. He is already busy making important changes to make our communications more strategic, professional, and coordinated, and to amplify our voice with our constituencies.

Communications Activities

[Slide 15: Vaccination Campaign] As an example of a more strategic and coordinate communication activity, you may have seen our recent response to the measles outbreak, triggered by dropping rates of vaccination in certain communities, which also may be fueled in part by misinformation. All three Academy presidents signed onto a joint statement about the efficacy and relative safety of vaccines. David May’s office coordinated the multi-media outreach campaign, which included social media, the web, and e-mail. The campaign was amplified by more than 1,400 new shares on social, and more than 84,000 subscribers read our e-mail message.

When people’s health and safety are threatened by events such as this measles outbreak, Dan Mote, Victor Dzau, and I believe that it is our duty to speak out and inject science and evidence into the national discourse. Another recent example was our public statement on the policy of
separating young migrant children from their families at the border, and the lifelong damage this could inflict on these children, according to the findings of a body of National Academies' reports. The presidents recognize that such statements need to be carefully crafted to stick to the science of the situation, and should be used judiciously.

Misinformation is a growing threat to society’s ability to make informed decisions, and we feel we have a responsibility to look for new ways to make the evidence base more well-known. To that end, we recently launched Based on Science, a new, targeted program funded by Google to counteract misinformation on the web. We select topics for the program based on frequent Internet searches and the likelihood that search results turn up sources or information that are purposely misleading or not based on credible science. The NAS project pairs experts in the topic areas with science writers to counteract this misinformation in a clear, easily accessible manner. In addition to the safety of vaccines, other hot topics include miracles cures for cancer, misattributed causes of cancer, inaccurate information about community water fluoridation, and unproven and potentially unsafe weight loss techniques. We are exploring expanding this to additional topics.

Strategic Planning

Part of strengthening our own Academy is better planning. I convened, with the encouragement of your elected Council, a small committee of NAS members to begin drafting a strategic plan for the National Academy. There were a number of motivations for deciding that such an action was long overdue. The first is that without a strategic plan, the NAS has difficulty directing its current program portfolio towards a higher purpose, prioritizing among options, coordinating diverse activities, or rationally arguing for something other than the status quo. Second, we noted confusion among our partners and stakeholders as to what constitutes our basic mission and goals, which is all understandable given that there is no document that captures our purpose and aspirations. On a more practical level, both the National Academy of Engineering and the National Academy of Medicine have strategic plans. Without a comparable document for the NAS, we were at a disadvantage for joint planning.

[Slide 16: Strategic Plan] Our small team, selected for their independent thinking and familiarity with the NAS, met for a day and a half over a weekend on the Pima-Maricopa Indian Reservation outside of Phoenix, Arizona. In that short time, we performed a SWOT analysis of the Academy’s strengths, weaknesses, opportunities, and threats, drafted a mission and a vision statement, and identified goals, objectives, actions, and metrics. I have submitted the draft plan for the Council’s approval, and I look forward to sharing it with the broader membership soon to receive your suggestions and feedback. Stay tuned!

Testimony to Congress

[Slide 17: Congressional Testimony] On Capitol Hill, our engagement with members of Congress remains as strong as ever. Almost every day we are briefing Members or their staff on a new report or emerging issue. I myself testified this spring before the House Committee on Science,
Space, and Technology on the topic of “American Leadership in Science and Technology.” I was joined by Pat Gallagher, Chancellor of University of Pittsburgh (and former director of NIST) and Dr. Mehmood Khan MD, Vice Chairman and Chief Scientific Officer at PepsiCo, also the Chairman of the Council on Competitiveness. The hearing was for the most part quite positive about the benefits of government funded research. To be sure there are concerns about priorities, but both sides of the aisle support healthy research budgets. In my oral testimony, I emphasized how important it is for America’s research enterprise to continue to attract the best and brightest students and researchers from the entire world. I noted that in fact, our ability to do this is perhaps the best measure we have of leadership in science and technology. My full written remarks are available on our website.

Nobel Reception

As you may recall, last year for the first time the NAS co-hosted an event at the U.S. Capitol along with Senators Lamar Alexander (R-TN) and Chris Coons (D-DE) for the U.S. Nobel laureates. The event was such a success, that we repeated it again this year, but upped the ante by inviting not just the US Nobel laureates, but also the 2018 Kavli Prize winners. The evening began with a lovely reception in the Mansfield Room at the Capitol where Senators Smith and Coons both spoke, as well as Kelvin Droegemeier, the new director of OSTP. This was just one of several NAS events that Dr. Droegemeier has attended since he was confirmed. His remarks have always been warmly received, and we are developing an excellent rapport with him and his office. After the celebration at the Capitol, we transitioned back here for a panel discussion with all of the laureates moderated by Mariette DiChristina, Director of Editorial & Publishing for Nature Publishing and Editor-in-Chief of Scientific American. It was a very inspiring evening, and a powerful reminder of the rich rewards that result from investing in basic science and maintaining a strong U.S. research enterprise.

Nobel Alert for 2020

Speaking of Nobel laureates, I want to alert you all that immediately following the annual meeting next year, in 2020, the National Academy of Sciences will be hosting the first ever Nobel Prize Summit on the topic: “Ensuring Humanity’s Future on Earth,” framed around the U.N. sustainability goals. This event is being co-organized with the Nobel Foundation, the Potsdam Institute for Climate Impact Research, and the Stockholm Resilience Centre. The full format for this summit is still taking shape, but is likely to involve open sessions and closed sessions to engage the widest possible range of stakeholders while still delivering concrete results.

Open House

And finally, for something really fun. Here at the NAS we had been gently experimenting with what it would be like to open our doors to the public, and have hosted small, informal open houses in conjunction with the March for Science. This year, we decided to go all out, and host
a major Family Science Day [Slide 21: Family Science Day] using the framework we have successfully deployed at the biennial Science and Engineering Festival at the Convention Center here in Washington, D.C. We called our open house “DecisionTown,” and we featured fun, hands-on activities based on our work at the Academies. Gene Robinson at the Carl R. Woese Institute for Genomic Biology, University of Illinois offered to partner with us, integrating their “World of Genomics” public engagement activity that they have used at science museums into our model. Our one big concern was: will people show up? Both science museums and the Science and Engineering Festival at the Convention Center have ready-made, guaranteed audiences. We didn’t know if people would show up at an imposing-looking edifice on the mall in D.C. on a Saturday, especially since the Cherry Blossom Festival and other celebrations were occurring at the same time.

We need not have worried. Although we didn’t formally count the crowds, the number of guests to the Academy easily numbered many thousands. Visitors streamed through the doors when we opened and continued at a steady pace until we closed down that afternoon – in fact, we even had to turn people away. All of the activity stations and the programming in this auditorium were packed all day. The public response was warm, complimentary, and enthusiastic. I took on the role of the Mayor of DecisionTown, and Gene Robinson was my Chief Scientist. In this photo [Slide 22: Family Science Day-2] we are discussing with some hearing impaired guests whether they think all cities should have Chief Scientists. Their response was that all cities would be better managed if the citizens had a chief scientist to help them use evidence in decision-making.

I also met young Joshua, who can’t be any older than 5. Seeing his NASA ball cap, I asked him if he knows the names of the planets. Listen to his response. (Play video on slide) While the open house sure seemed like a great activity for the families of the D.C. Metro region, I believe it was also a great day for all of the National Academies and University of Illinois volunteers who made the event possible. Who can’t have a positive outlook for the future after meeting someone like Joshua?