THE VALUE OF INVENTION

Shared prosperity and the need for INCLUSIVE GLOBALIZATION

What satellite images reveal about China’s DISAPPEARED UYGHURS

PUERTO RICO’S reconstruction and recovery

RAND RESEARCHERS MEASURE THE ECONOMIC AND SOCIAL IMPACTS OF INVENTION PAGE 12
Researchers conducted a survey of Black Americans in November-December 2020 to better understand the drivers of vaccine hesitancy. Based on the results, researchers engaged with community stakeholders to identify an initial set of public health messaging and communication strategies likely to be successful in addressing COVID-19 vaccine hesitancy and increasing vaccination in Black communities.

MORE AT www.rand.org/t/RRA1110-1

More than 46 million Americans live with a mental illness, yet only half of them receive treatment. Even fewer receive high-quality care that would give them the best treatment possible. This tool is designed to help connect mental health systems, policy leaders, and decisionmakers with resources and evidence-based solutions that could help transform the complex mental health landscape in the U.S.

MORE AT www.rand.org/t/TLA889-1

Talking and reading to young children can support brain development from a very early age—even before they are able to talk or read themselves. This video features interviews with families and educators in the Middle East who have experienced the positive effects of engaging children in conversations and educational activities at home and in early childhood programs.

MORE AT www.rand.org/t/v210224karam

Educators have been under tremendous pressure during the COVID-19 crisis. While there has been a good deal of attention on issues related to technology access and student engagement during the pandemic, there has been less attention paid to helping educators teach a high-quality, standards-aligned curriculum during these times.

MORE AT www.rand.org/b210303

In February 2021, terrorism expert Brian Michael Jenkins presented testimony before the House Committee on Homeland Security, discussing, among other things, a national commission to review the events of January 6; the political consequences of normalizing threats and violence; and whether new domestic terrorism laws are needed.

MORE AT www.rand.org/t/CTA1175-1
Human Rights Abuses Against Ethnic Uyghurs in China
What we are learning from satellite images

Supporting the Development of Inventions
A deep dive into the economic impact of Lemelson-MIT Prize winners’ inventions

Research Briefly
Equitable learning opportunities for students with disabilities, and more

Commentary
Krishna B. Kumar on the need for inclusive globalization

Giving
RAND has launched several philanthropically supported research centers and institutes to help solve new and enduring challenges

News
Kington elected to RAND Board of Trustees; Kilmer named inaugural McCauley Chair in Drug Policy Innovation

Invention diversities. MIT Prize winners’ impact of Lemelson-MIT Prize and the economic development of MIT’s global reach.

Abstracts
Providing Quality Education and Equitable Learning Opportunities for Students with Disabilities

Students with disabilities need more support than they’re getting in American schools. That’s not a message from concerned parents or teachers, but from the principals of those very schools.

RAND researchers asked nearly 1,700 secondary school principals whether they had the training, guidance, and staff to meet the needs of students with disabilities. Only a quarter said they had “completely sufficient” support. Nearly 80 percent said their school could do a better job of helping students with disabilities.

The numbers were even more concerning in schools with high percentages of students of color. Principals in those schools were around 10 percentage points more likely than principals in majority-white schools to say they need more district support, materials, and staff expertise.

Those same principals were also more likely to have higher percentages of students identified as disabled in their schools. Studies have shown that students of color are disproportionately labeled as disabled, for reasons that could range from testing biases to educational inequities to different behavior expectations. As a result, principals in schools with the greatest need for materials and support also tended to serve the highest percentage of students who could benefit from them.

RAND’s findings point to an opportunity for federal and state education agencies to provide more support for schools, to help them better serve students with disabilities. That kind of support could be especially important for schools serving the highest percentage of students of color.

The study, based on research funded by the Bill & Melinda Gates Foundation, drew from RAND’s American Educator Panels. Researchers created the panels, with nationally representative samples of teachers and school leaders, to provide on-the-ground insights into questions of education policy and practice.

MORE AT www.rand.org/t/RR2575z13
Opioid Litigation and Public Health

Opioid suppliers, like tobacco companies and the makers of lead paint before them, face a courtroom reckoning for the devastating consequences of the products they sold. Their liability could run into the tens of billions of dollars.

The courts are often considered an imperfect last resort when policy and regulation have failed. Opioid litigation shows the courts can help achieve three important objectives for public health, even before the gavel falls: compensation, deterrence, and accountability.

Thousands of local, state, and tribal governments have filed suit, seeking at least some restitution for the damage opioids did to their communities. Their lawsuits have brought to light evidence of corporate malfeasance and a massive failure of regulation. The litigation has influenced several companies to shift from mass marketing opioids to developing new products that cannot be abused so easily.

Most of the companies have not admitted responsibility for the opioid crisis. But the courtroom headlines alone have helped hold them accountable in public opinion. The litigation also has prompted increased government scrutiny and regulation, which can deter harmful company practices going forward.

A global settlement of the opioid lawsuits should build on the lessons learned in courtroom battles over tobacco, lead paint, and asbestos. It could require companies to invest in new, less-addictive therapies, and to earmark money for addiction treatment and overdose-reversing drugs. It also should require a clear admission of fault from the opioid companies if they broke the law, and transparent reporting of court records and settlement terms.

No settlement or judgment can address the full scope of the loss caused by the opioid epidemic. But, if wielded effectively, the litigation can supply the funds and corporate reforms needed to help abate it.

Detecting Malign and False Information

Russian internet trolls worked the far-right and -left margins of American politics in the runup to recent elections. Their words, researchers found, gave them away.

The researchers, with RAND and RAND Europe, trained sophisticated computer algorithms to recognize the linguistic tics of known Russian troll accounts. Then they fed nearly 2 million new tweets into the computers. They were able to pick out the trolls, and the online communities they were targeting, nearly 75 percent of the time.

The trolls tried to incite left-wing audiences with “outrage stories” of police brutality or social injustice, and appeals to immediate action with words like “right now” or “this moment.” They leaned on liberals’ concerns about fascism and racism.

On the right, the trolls pushed a narrative of perceived threats, with references to terrorism or destruction, and warnings about “the way we live.” They depicted a United States under attack from outsiders, especially illegal immigrants and Islamic terrorists.

In short, the trolls imitated the most divisive and confrontational elements of the far-left and far-right wings of American politics. RAND’s project, sponsored by the UK Ministry of Defence and based on tweets from the 2016 election, shows that it’s possible to detect them in real time by using computers to search for word patterns. The researchers were able to use the same methods to detect trolls—likely Russian—interfering with the online discourse over the 2020 U.S. election.

Their approach could be used in the future to spotlight attempts at misinformation or manipulation as they come across the screen. It also could alert online communities to be careful and move slowly when there are trolls in their midst.
Hurricane Maria hit Puerto Rico with such force in September 2017 that one meteorologist compared it to a 50-mile-wide tornado. It peeled roofs from houses, turned roads into rivers, and left millions of people without electricity or safe drinking water. It was one of the strongest and deadliest hurricanes to ever hit the United States.

In its aftermath, the Federal Emergency Management Agency asked RAND to assess the damage and recommend a path toward recovery. Working with local and federal officials, researchers identified tens of billions of dollars in projects to rebuild the island physically and economically. Their recommendations covered more than a dozen sectors, from water to housing to schools to health care.

But funding has been slow to arrive in hard-hit communities across Puerto Rico. Marielena Lara, a senior physician policy researcher at RAND, and policy analyst Gabriela Castro partnered with local foundations and experts to support communities as they continue the work of recovery.

“We saw a window of opportunity,” Lara said, “to empower citizens and nongovernmental organizations [NGOs] who are the active participants in Puerto Rico’s reconstruction and recovery.”
Q What was your experience on the morning Hurricane Maria made landfall?

A When you grow up in Puerto Rico, you think of hurricanes the way people elsewhere might think of snow days. The kids are out of school, everyone gets ready, but it’s not necessarily that serious. Maria was different.

It was 3:15 a.m. in California, where I live, when Maria made landfall in Puerto Rico. I couldn’t sleep. My friends were posting about how a monster had descended on the island, with videos of horrific winds unearthing trees, rattling roofs. And then—nothing. Everyone on the island had lost power.

I was born and raised in Puerto Rico, so this was a disaster that struck a deep personal chord. That’s why I was so heartened when RAND was asked to provide support for the preparation of Puerto Rico’s recovery plan, and grateful to be part of it.

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What was RAND’s role?

The Homeland Security Operational Analysis Center worked with the government of Puerto Rico, mayors, community leaders, experts, and citizens to support the development of the recovery plan. In a nutshell, it was about conducting a broad assessment of damage and needs across the island. It was a Herculean task, in an extremely compressed time frame. Cynthia Cook, a senior management scientist at RAND, led a team of more than 100 RAND researchers who worked around the clock on it for six months.

None of it would have happened without our longtime partners at the University of Puerto Rico. They had worked with me and RAND for more than 15 years and played a paramount role in collecting and analyzing data and securing the collaboration of other local partners.

What has your work in Puerto Rico continued and evolved since then?

Very little recovery was occurring, even years after the hurricane, in part because of delays in federal funding. We wanted to bring the results of our policy analysis to the community, to local foundations and other NGOs, to strengthen their ability to prepare for and respond to natural disasters. COVID-19 prevented us from holding the face-to-face workshops we had planned. Instead, we convened virtual conversatorios, roundtable conversations, on Zoom with local NGOs. Our agenda was just to talk about the findings from our recovery work and give the NGOs an opportunity to react or expand on them.

What did you hear from them?

They echoed one of the major themes of the recovery plan, which was that it is necessary to involve community and local partners in developing and implementing any plan. Almost all of them talked about how funding was the most important barrier to recovery. Without funding, nothing would come from even the best plan. They saw problems with the bureaucratic process to apply for funds, the financial risk of a reimbursement-only payment plan, and the difficulties with centralized funding.

Finally, they offered potential solutions, some of which they were already implementing. They suggested intermediary organizations that could channel funds and help NGOs write proposals, or umbrella groups that could bring together many NGOs to apply for funding together.

What are the next steps?

We would like to hold a second series of conversatorios, to talk more about lessons learned with local community organizations and NGOs. That could point toward strategies that would help government entities and the private sector, thus informing disaster policy at both the local and federal levels.

We would also like to continue to engage with communities and other partners in Puerto Rico. We’re hoping to support the government of Puerto Rico and other clients to formulate strategies to strengthen the implementation of the recovery plan going forward.

Disasters are a lot about equity. Systemic inequities tend to magnify the negative impacts of disasters on disadvantaged populations, and prolong the process of recovery for vulnerable communities and individuals. We want to continue to be part of developing policy approaches that help address the root causes of inequity in disasters, not just in Puerto Rico, but around the world.
Commentary

The disaffection of a wide swath of the American population has been linked to the political polarization of the country, as well as its divisive tendencies, such as the increase in white supremacist violence and the storming of the U.S. Capitol on January 6.

While globalization—the free movement of goods, services, technology, and capital across national boundaries—is not the only reason for this disaffection, it is an apt lens through which to view the revolt against elitism, expertise, and changing demographics. As much as acts of violence should be condemned, it may be dangerous to equate all disaffection with divisiveness. It may help to understand the job losses, “deaths of despair,” humiliation, and marginalization that many in the white working-class have experienced. These genuine grievances, if left unaddressed, are likely to continue fueling demagoguery, bigotry, and isolationism.
The analytical case for international trade that underlies globalization is well understood and dates back to David Ricardo’s principle of comparative advantage. It argues for countries to specialize in goods in which they are relatively more productive and export them while importing other goods. In this fashion, trade can make all countries better off in the aggregate. In principle, appropriate transfers from those who gain from trade to those who lose out can make everyone better off. But implementing this has proved extraordinarily difficult.

It is difficult to disentangle the effects of trade from other related factors, most notably technological change. While losses are concentrated—such as a decrease in certain types of jobs—gains in the form of cheaper and an increased variety of imported goods are diffused. Policymakers may resort to the politically contentious mechanism of progressive taxes, which tax the rich at a higher rate irrespective of whether gains were from trade, to redistribute income. And Trade Adjustment Assistance (TAA), the country’s answer to help those displaced by trade, has been inadequate and ineffective.

The net result is that the implicit compact of shared prosperity underlying globalization has been broken. Even though there is evidence that trade might have created jobs, a stubbornly persistent class of those who have lost out or feel left behind has arisen over the last few decades of globalization. Between 1990 and 2010, at the height of globalization, the share of income accruing to the lowest quintile fell from a paltry 3.8 percent to 3.3 percent. Indeed the share of all quintiles went down except for the highest quintile, which saw its share increase from 46.6 percent to 50.3 percent. American comparative advantage is in skill-intensive products and the skilled have benefited disproportionately from globalization. Between 1979 and 2012, for U.S. men, the gap in earnings between the median college-educated and median high school-educated workers doubled from $17,411 to $34,969, in constant 2012 dollars, with globalization cited as one of the causes.

The Trump administration understood well the malaise of the disaffected segments of the population and besides curbing immigration, it levied tariffs, especially on China. When China retaliated with its own tariffs on U.S. agricultural products, the administration provided subsidies to affected farmers. Ultimately, a tariff is a blunt instrument, and the administration did not even achieve its goal of significantly reducing the trade deficit. And withdrawing from global trade agreements such as the Trans-Pacific Partnership (TPP) only created a trade leadership vacuum, which China was eager to fill. China scored a geopolitical win by signing on to the Regional Comprehensive Economic Partnership, in which it is expected to be a key beneficiary.

The Biden administration has moved quickly to reengage with global organizations. What else could it do to address the uneven gains from globalization? The forces of globalization are inexorable and beneficial overall, and attempts to abandon it altogether may prove futile, notwithstanding the temporary hiccups to the global trading system caused by COVID-19. Looking inward for solutions, instead of continuing a trade war, and making globalization inclusive by focusing on workers rather than jobs unlikely to return may be a more realistic option. Accepting the grievances of those who have lost out on account of globalization could be a good start, and integrating them into the global system, however hard, could be a potential path to pursue.

For instance, as we ponder strategies to address the future of work that artificial intelligence and other technologies will bring (which could well be hastened by the pandemic), a strategy for retraining the workers sidelined by globalization for the jobs of the future and ensuring their lifelong learning could be beneficial. It might not be possible to train all workers, and therefore bolstering the social safety net to aid those who still fall through the cracks might be required.

The TAA program that provides aid to displaced workers may need to be strengthened and potentially integrated with other parts of the safety net to offer comprehensive adjustment assistance. America could also consider joining global trade agreements, especially the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, a latter version of the TPP, so that it has a seat at the table to argue its case for fair trade. While there are no simple solutions to the divisiveness that plagues the country, lumping the legitimate concerns of the many with the fissiparous tendencies of some may be neither a humane response nor a sound strategy for a politically, socially, and economically stable future.
A Calamity in China

Satellite Images Offer Glimpses into Human Rights Abuses Against the Uyghur People
One million Uyghurs and other ethnic minorities, maybe more, have vanished into a sprawling network of camps and prisons in China’s far west. Chinese officials at first denied the camps even existed. Then they claimed they were for training workers, or for re-educating potential radicals. Then they said it didn’t matter—everyone had graduated and was free to go.

Satellite data reviewed by RAND tell a different story. They show bright-lit compounds in the desert dark, wall after wall of barbed wire, and a sudden rush to build what appear to be fortified preschools.

“This gives us clear evidence of what’s happening on the ground in western China,” said Katherine Pf frommer, a quantitative analyst at RAND who helped review the images. “In such a denied area, it’s hard to know how conditions are changing and evolving. Satellite images gave us a way to get that information.”

The United States has described what is happening to the mostly Muslim Uyghurs as a genocide. Starting in 2016, China launched a campaign of repression, banning Muslim names, forbidding long beards. It transformed the vast Uyghur homeland of Xinjiang into one of the most sophisticated surveillance states in the world, bristling with police checkpoints and facial-recognition cameras. Then people began to disappear.
China’s approach may have shifted in 2019 and 2020 from the short-term detention and re-education of Uyghur people to long-term incarceration.

Students coming home on break found empty houses. Officials told them their parents had been “infected” by the virus of Islamic radicalism and needed to be quarantined and cured, according to documents obtained by The New York Times. Occasional stories began to emerge from the camps: high-pressure indoctrination classes; forced labor; physical and sexual abuse; a grinding out of Uyghur language, culture, and identity.

The growth of detention facilities

Researchers at RAND had used satellite observations to get inside the Islamic State, to see how it governed and how cities fared when it took over. Now they turned their attention to Xinjiang. Working with the National Geospatial-Intelligence Agency (NGA), they began looking at detention camps that Chinese officials insisted were empty.

“It’s breathtaking how much satellite imagery is publicly available,” said Edmund Burke, the former senior China officer at the NGA, now a senior international defense researcher at RAND. “You see stories about one particular camp, or hear one harrowing account from someone who got out of Xinjiang. We realized we could advance those stories and help provide a broader account of what is happening there.”

Australian researchers had already mapped 380 suspected detention facilities scattered across Xinjiang, based on media reports, government documents, and their own review of satellite data. RAND’s team started there and then focused in on how the nighttime lighting at those locations changed over time, an indication of activity there. They saw the same pattern, again and again, starting in earnest in 2016: the glaring lights of construction work, followed by the steady glow of a new prison or detention center.

In fact, lighting kept increasing at nearly half of the facilities through at least mid-2020, an indication that they were not just active, but growing. At most other facilities, lighting levels stayed steady, or declined some, but never dimmed to where they had been before. That suggested to the researchers that those facilities were still operating, but possibly at reduced capacity.

The facilities that slowed down seemed to be mostly lower-security...
re-education sites. Those that grew looked more like prisons, with high walls spiked with barbed wire. That may indicate that China’s approach shifted in 2019 and 2020, from the short-term detention and re-education of Uyghur people to long-term incarceration.

Only 51 of the facilities showed the kind of significant lighting decline that could indicate a closure. But when researchers looked at satellite photos of those sites, they found evidence that most were still active. There were cars in the parking lots, people standing outside, walkways plowed of snow. Despite Chinese assurances that the camps had closed, the researchers concluded that only 11 of them—3 percent of the total they examined—showed any real signs of closure by mid-2020.

“The data is so granular that you can see, down to a city block, how bright the lights are, and how that changes, every month,” said Sean Mann, a policy analyst at RAND who specializes in data science. “Even in urban areas, we could identify these lighting signatures that showed us where they were establishing camps, where they were expanding them, and when they really decommissioned them.”

A sustained campaign

Journalists had reported seeing boarding schools in Xinjiang that appeared to house children whose parents had been taken away. The researchers began scrolling through satellite images to find these facilities. They identified nearly 100 in three towns alone—“postage stamp” buildings, often two or three stories tall, many with high walls and a single controlled point of entry. Some had decorative towers, some had colorful circles on the ground, but they all had a telltale play structure outside. Most of the schools appeared within a matter of months, just as the detention camps were lighting up.

The researchers also saw evidence of destroyed Uyghur cemeteries. China had acknowledged that it demolished some grave sites to make way for roads, parks, and high-rise buildings. The researchers did indeed find factories, farms, buildings, and green space on some of the old cemeteries. But nearly a third seemed to have been razed for no apparent reason.

RAND published its findings in a series of reports in the NGA’s public online journal, Tearline. Taken together, they provide new and visual evidence of the furious pace with which China carried out its detention campaign against the Uyghurs and other ethnic minority groups in Xinjiang. The satellite data “allowed us to capture and really understand the extent to which the broader detention network just kind of turned on overnight,” said Eric Robinson, a research programmer and analyst at RAND.

The researchers hope to continue piecing together a bird’s-eye view of what’s happening in Xinjiang. In particular, they want to take a closer look at allegations of forced labor in local factories, some of which supply major global brands. Their lighting data showed that camps administered by the state-owned Xinjiang Production and Construction Corps grew especially quickly.

Their work is a continuation of some of RAND’s earliest research. During the Cold War, RAND helped pioneer satellite technology as the United States raced to see behind the Iron Curtain. The first report it ever published, in fact, proposed a “preliminary design of an experimental world-circling spaceship,” a decade before the launch of Sputnik. Such an “observation aircraft,” the researchers wrote in 1946, would provide an unobstructed view across the “whole surface of the world.”

THE RESEARCHERS CONCLUDED THAT ONLY

3% of the total camps
WERE INACTIVE BY MID-2020

Select RAND Publications in the National Geospatial-Intelligence Agency’s Tearline Project Series
A FOCUS ON THE RESEARCH OF
Benjamin M. Miller, David Metz, Jon Schmid, Paige M. Rudin, and Marjory S. Blumenthal

The Power of Invention—
Jerome Lemelson was a restless dreamer and tinkerer who filled his notebooks with ideas that became the gadgetry of modern life. Barcode scanners. A video filing system. The mechanism that made the Sony Walkman work. A new and improved propeller beanie.

Lemelson died in 1997 with more than 600 patents to his name. He left behind a foundation dedicated to supporting young inventors, and a $500,000 annual prize for a mid-career inventor who had changed the world. “Every new American inventor,” he once said, “is a potential new American business.”

Researchers at RAND showed how true that can be. They measured the impact that each winner of Lemelson’s prize has had—the markets they moved, the jobs they created, the dollars they put in the bank. They found that getting more people from more backgrounds excited about inventing could be a very smart investment.

“We wanted to highlight the importance of invention, the importance of engaging students,” said Benjamin Miller, an economist at RAND who led the study. “One of the points we make is that if you want to maximize the benefits to society, you need everybody to have a chance to be the best inventor they can be. There’s a whole pool of people we’re missing out on because they’re not being engaged.”

and the Value of Diversity and Inclusion

By Doug Irving, Staff Writer
Sangeeta Bhatia wanted to create an artificial micro-liver using live human cells. To do that, she needed those liver cells to behave like liver cells even outside of the body—to organize themselves into stripes on the etched glass plates she had prepared for them. But the view through her microscope was always the same: nothing. “I found 100 ways for it not to work,” she says now.

Her eureka moment came in the back stacks of a university library, as she pored over old medical texts. Brain cells had attached to proteins in a chemical solution that should have killed their activity; maybe a similar approach would work to line up her liver cells. She rushed back to her lab, mixed a new solution, and looked through the microscope.

Stripes.

“You see footage now of people celebrating the Perseverance rover landing on Mars? That’s how it feels,” she said. “All the hard work and late nights and just feeling like, ‘Oh my god, I did it.’ It’s like winning a race, getting that shot of adrenaline, times a hundred.”

Her micro-liver revolutionized drug trials and helped earn Bhatia the 2014 Lemelson-MIT Prize—the Academy Award for inventors. The Lemelson Foundation and MIT awarded the prize to just 26 inventors between 1995 and 2019, recognizing work that benefited society and improved lives and communities. Their portfolios include the balloon catheter, the computer mouse, the spam-filtering reCAPTCHA test, and the entire field of recombinant DNA technology.

Prize administrators asked RAND to calculate the social and economic value those 26 inventors helped create through their inventions. “We thought it would help us make the case for investing in young people and their opportunities for learning,” said Stephanie Couch, executive director of the Lemelson-MIT program. “The world needs more creative and inventive problem solvers.”

Researchers dug through corporate filings, patent applications, and scientific journals. They found that the 26 prize winners had gone on to start more than 140 companies to develop and market their inventions. Those companies that reported their financial data had more than $54 billion in total revenue in 2019. They employed around 40,000 people.

The 26 inventors also held more than 3,800 total patents. But their creative impact went far beyond that. The researchers found more than 40,000 subsequent patents that built on their ideas and cited them as precedent.
“This is a high-achieving group of inventors, and their impacts were tremendous,” said David Metz, a senior quantitative analyst who co-led RAND’s recent project. “Some of the cases we looked at led to entirely new fields, revolutionized science, produced new treatments and therapies, and put thousands of people to work.”

Those findings also provide some idea of what America may have lost by not encouraging more women, minorities, and people from lower-income families to become inventors. Previous studies have estimated that America would have four times as many inventors if those “lost Einsteins” had the same support and exposure to role models as higher-income white men. That represents billions of dollars in missed opportunities.

Some great stories have been too-often overlooked along the way. Everyone learns that Thomas Edison invented the lightbulb. But it was Lewis Latimer, a self-taught Black inventor, the son of formerly enslaved parents, who figured out how to make light filaments that didn’t burn out after a few days.

Sangeeta Bhatia—now recognized as one of the most innovative young scientists in the world—said she still feels like an imposter sometimes, like she doesn’t belong. She was 19 years old before she met a woman with a Ph.D. in science. In college, she watched other women drop out of engineering classes, one by one. Those who stayed, like her, had a parent, a teacher, or a coach encouraging them, telling them they did belong there.

“I would always overprepare, do extra work, sleep less,” she said. “And then I would collect people who I respected and enjoyed as mentors: my father, my adviser. I don’t think I would be a bioengineer without them. There were no female role models that I could see that had the life and career that I wanted at the time.”

The Lemelson-MIT program awarded its final $500,000 prize in 2019 to an inventor who created a new kind of solar panel that makes drinking water from sunlight and air. The program has pivoted since then to focus on inspiring future inventors and providing the role models that Bhatia never had. RAND’s study “gives us data that we can share with the world that demonstrates the power of invention,” said Carol Dahl, who directs the Lemelson Foundation.

It also demonstrates the try-and-try-again spirit behind many of the inventor success stories. The researchers found more than a dozen companies launched by Lemelson prize winners that failed for one reason or another. One awardee, for example, invented an environmentally friendly way to dry-clean clothes—but couldn’t get enough financing in the immediate aftermath of the Sept. 11 attacks. “Not everything they touched worked,” RAND’s Miller said. “But that’s OK. They went back out and started over.”

Policymakers could help by funding programs, and enacting regulatory policies, that support the development of inventions and inventors, RAND’s study concluded. That’s a finding that would have appealed to one of the most prolific inventors in American history. When he wasn’t writing new ideas down in his notebooks, Jerome Lemelson was often defending his patents in court and urging Congress to do more to help young inventors.

Invention “drives our economy, it drives our modern world, our tomorrow,” Bhatia said. “Everything that’s happened, that’s new, had to be born in someone’s mind. Society and humanity move forward by a willingness to do things that we couldn’t do before.”

She holds 68 patents. She and her trainees have launched ten companies. But she still considers one of her most important contributions to be an organization she started as a graduate student. The organization, Keys to Empowering Youth, gives middle-school girls a hands-on introduction to science and engineering. The idea is to “get them excited about how cool it is,” Bhatia said—and to make sure they don’t have to wait until they’re 19 to meet a woman with a Ph.D. ■

Understanding and clearly communicating the value of invention can help policymakers appreciate the benefits of supporting the development of inventions and of addressing inequities that limit the development of female and minority inventors.

Measuring the Value of Invention: The Impact of Lemelson-MIT Prize Winners’ Inventions is available for free download at www.rand.org/t/RRA838-1

$54,000,000,000

REPORTED REVENUE IN 2019
Communities and societies worldwide are facing a new set of complex problems—and they are facing them on multiple fronts. With funding from donors and grantmakers, RAND launched several research centers and institutes to help solve both new and enduring challenges. By applying objective research and analysis in novel and far-reaching ways, we aim to help individuals, families, and communities throughout the world be safer and more secure, healthier and more prosperous.
COMPLEMENTARY AND INTEGRATIVE HEALTH

The RAND Center for Collaborative Research in Complementary and Integrative Health was established through a gift from the National Board of Chiropractic Examiners. A first-of-its-kind effort, the center is intended to bolster research expertise and participation at colleges that train practitioners in complementary and integrative health.

Although research in chiropractic, naturopathic, acupuncture, and other complementary health fields is at an all-time high, in terms of both funding and the number of studies being funded, little of this research is occurring at complementary and integrative health colleges. Many of these colleges have seen their research programs retrench or fail to launch in recent years as researchers and research dollars for this form of health care have migrated to large research universities.

“The center presents an opportunity to close the gap between complementary and integrative health practitioner training and research,” said Patricia Herman, a senior behavioral scientist at RAND who coleads the center with senior health policy researcher Ian Coulter. “Our effort will support these colleges so that they can keep their researchers and get back into the research game.”

SUPPORTING VETERANS AND MILITARY FAMILIES

A gift from the Epstein Family Foundation is launching the RAND Epstein Family Veterans Policy Research Institute. The institute will be dedicated to generating creative strategies and interventions to address issues facing veterans and military families, including housing, health, and mental health care needs.

The new institute will help build on RAND’s history of research on veterans’ issues. RAND research has helped bring posttraumatic stress disorder and other “invisible wounds of war” out of the shadows. It has helped get military caregivers the support they need. And it has shown how the American health care system too often fails veterans, especially those in suicidal distress.

The institute’s core research agenda will include analysis to better understand how military service and post-service experiences affect the needs of veterans in the short and long term. Researchers, led by senior policy researcher Carrie Farmer and senior behavioral scientist Rajeev Ramchand, will evaluate interventions and policy changes that can minimize adverse outcomes, support those at risk, and increase access to high-quality services. The institute will prioritize conducting research that recognizes the diversity of the veteran population and that leads to equitable and inclusive solutions for improving outcomes for veterans and their families.
ANALYSIS OF U.S. GRAND STRATEGY

The RAND Center for Analysis of U.S. Grand Strategy draws on research and expertise from across RAND to advance the debate on American foreign policy.

“The United States is in the midst of a debate about its future grand strategy,” said K. Jack Riley, vice president and director of the RAND National Security Research Division. “But a number of analytical gaps make it difficult for the country to fully engage with the choices it faces and the relative merits of various options.”

Led by senior political scientist Miranda Priebe and initially funded by a grant from the Charles Koch Institute, the center is designed to address these gaps so that policymakers may consider fully developed options for future U.S. grand strategy—the country’s road map for how it uses all instruments of national power to achieve security and promote its vital interests.

America’s current grand strategy—referred to by different groups as liberal internationalism, liberal hegemony, or primacy—is relatively well understood. Yet its central assumptions have not been fully articulated or tested. The center will test the assumptions and arguments of current and proposed grand strategies and consider how they might cope with technological change, shifts in the balance of power, and other global trends.

For more information about giving, visit campaign.rand.org.
HOUSING, HOMELESSNESS, AND SUSTAINING A MIDDLE CLASS

As communities throughout the country grappled with the effects of a global pandemic and economic downturn, a gift from the Lowy family enabled RAND to launch two new research centers: one aimed at tackling housing and homelessness in Los Angeles and the other focused on building new pathways to revive and sustain an American middle class.

The core research agenda of the RAND Center on Housing and Homelessness in Los Angeles will include analysis to better understand the needs of people experiencing homelessness in Los Angeles and the challenges of addressing affordable housing solutions in one of the most expensive housing markets in the nation. Led by RAND researchers Sarah Hunter and Jason Ward, RAND will work to align incentives among stakeholders, including people experiencing homelessness, community members, service providers, housing developers, and policymakers. Researchers will explore broad questions concerning the supply and demand for housing and services, including examining the disproportionate impacts on communities of color and the varied needs of subpopulations such as veterans, as well as zoning and regulation reform options that can speed up housing development. Researchers will also investigate ways to address the effects of COVID-19 on the housing and homelessness landscape.

The RAND Lowy Family Middle-Class Pathways Center will focus on ways to create and support middle-class employment in the face of rapidly changing labor market conditions. Led by RAND researchers Jeffrey Wenger and Melanie Zaber, RAND experts will examine the forces of technology and automation, outsourcing and trade, and COVID-19’s effects on the middle-class workforce. Researchers will explore impediments to starting and growing a business and also explore options to remove those barriers that limit business success. Researchers will also reimagine and rework current education and skill development systems, with the goals of advancing equity and preparing workers for career pathways that offer more Americans resilience and upward mobility. Through pilot tests, and in collaboration with educators, businesses, and support organizations, RAND will identify what works, and for whom, to create an integrated system of supports that can help workers reach and maintain in the middle class. ■
Raynard S. Kington, head of school at Phillips Academy, also known as Andover, was elected to the RAND Corporation Board of Trustees in February 2021. Kington became the 16th head of school at Andover in July 2020 after serving for 10 years as the president of Grinnell College. Prior to Grinnell, Kington served in the public sector as the deputy director and acting director at the National Institutes of Health, and as a division director at the Centers for Disease Control and Prevention. Earlier in his career, he also was a senior scientist at RAND and an assistant professor of medicine at UCLA.

“It is an honor to welcome Raynard back to the RAND family as the newest member of the Board of Trustees,” said Michael D. Rich, president and CEO of RAND. “He exemplifies RAND’s mission to address the world’s most challenging problems through rigorous research and analysis, and his career-long commitment to advancing diversity in the scientific workforce will further boost our efforts to serve the public good.”

As a researcher, Kington has focused on the social determinants of health and diversity in the biomedical sciences. He holds a B.S. and M.D. from the University of Michigan, an M.B.A. from the University of Pennsylvania, and a Ph.D. with a concentration in health policy and economics from the Wharton School. He completed board certification in internal medicine, public health and preventative medicine, and geriatric medicine.

Beau Kilmer was named the inaugural McCauley Chair in Drug Policy Innovation at RAND. A seven-figure gift to the Tomorrow Demands Today fundraising campaign from engineer and inventor Jack McCauley established the endowed chair to support drug policy innovation; the gift will also support the RAND Drug Policy Research Center and RAND Social and Economic Well-Being.

“For three decades, the RAND Drug Policy Research Center has helped decisionmakers address issues involving alcohol and other drugs, bringing an objective and data-driven perspective to an often emotional and fractious policy arena,” said Kilmer. “With drug overdose deaths continuing to rise, we cannot limit our responses to existing approaches. Now is the time for new solutions, and Jack’s gift will empower RAND to contemplate and rigorously evaluate innovative ways to reduce these deaths and other drug-related harms.”
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