

Science and Technology in U.S. Presidential Campaigns

A Report to NEDO, March 2012

by

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1. SCIENCE AND TECHNOLOGY ISSUES IN U.S. PRESIDENTIAL CAMPAIGNS

What roles do science and technology policy issues play in U.S. presidential campaigns? Do presidential candidates often debate about these issues, or do they usually say little about science and technology? And are debates during the current 2012 campaign similar to or different from debates during past American presidential campaigns?

This paper was written in March 2012, months before the election in November. However, both President Obama and the Republican presidential candidates have discussed public issues for many months now, so we can reach some tentative conclusions. This paper makes three arguments about both past campaigns and events in 2012.

First, the *operation* of federal science and technology activities –how research and development (R&D) funds are awarded, the role of universities and federal laboratories in performing R&D, the relationships between universities and industry, etc. – is rarely controversial at any time in the United States, including during presidential campaigns. The U.S. continues to have a strong bipartisan consensus on how to conduct R&D. When debates over science and technology do occur in presidential campaigns, they usually occur because the candidates differ over the *purposes* for which S&T is used. That is, in past campaigns they argued about defense, energy, health, and other national priorities and occasionally argued over whether new R&D programs are needed in these areas or whether new scientific findings should lead to new government policies.

Second, over the past decades several standard patterns have emerged during U.S. presidential campaigns:

- *Republican-Democratic differences.* As is well known, Republicans generally favor limited government, except in defense and some areas of energy (such as aid for nuclear power). They do generally support basic research in universities and government laboratories. Democrats also support basic research, but in addition they often

want other government programs (including R&D programs) to help with economic growth, environmental protection, and other areas.

- *General policy statements.* Since 1960, many Democratic and Republican presidential candidates have issued general statements about their policy positions on science and technology or else mentioned science and technology issues in speeches. Interest groups often ask for, and publicize, these general statements.¹ But usually these position papers and speeches repeat standard Republican and Democratic positions, and most voters do not pay much attention to them.
- *Occasional high-visibility issues.* Occasionally, however, a science or technology issue will become a major theme in a candidate's campaign, and candidates will argue in about the issue in debates and speeches. Candidates will seek to win support for specific groups of voters. This can happen in several ways: a candidate proposes a new initiative for, say, defense S&T or in space or energy policy; a candidate criticizes an opponent's proposals; or an incumbent president running for re-election defends proposals made during the first term.

Third, as of March 2012 the 2012 presidential campaign has had some familiar developments and some unfamiliar ones. Examples of typical campaign statements include President Obama's traditional Democratic positions, including his recent proposals on manufacturing technology. They also include several S&T-related proposals from Republican candidates, including Mr. Gingrich's proposal to build a major base on the Moon – a proposal he made in Florida, which has many NASA employees and contractor workers. But as this paper will discuss, 2012 is also unusual, particularly because several Republican presidential candidates have explicitly rejects scientific findings and scientific advice about issues such as evolution, vaccines, and global warming. The United States has seen “anti-science” views before in its history, but this year these attitudes are particularly strong and visible.

¹ American Association for the Advancement of Science, “Science and Technology in the 2012 Presidential Election, <http://elections.aaas.org/2012/>. Accessed on March 18, 2012.

To illustrate these various points, the remainder of this paper contains four main sections. Section 2 briefly examines general S&T policy statements by presidential candidates. Sections 3, 4, and 5 discuss three specific areas: environment and energy, defense, and “anti-science.” These sections provide both a brief history of key S&T-related policy debates in these areas and a discussion of how the 2012 campaigns are similar or different than past examples. Section 6 provides a brief conclusion.

2. CAMPAIGN STATEMENTS ON SCIENCE AND TECHNOLOGY

2.1 General Policy Statements

During both the “primary season” – when Republican and Democratic voters select their parties’ candidates – and during the “general election campaigns” that follow, candidates seek to appeal to specific interest groups and general voters. Along with occasionally making highly visible proposals, they also often give speeches and issue general policy statements on policy issues.

General voters may pay little attention to these policy statements, but candidates feel that they need to show that they are knowledgeable about policy issues. In the case of science and technology, sometimes candidates issue position statements on S&T policy itself, in order to show people that they value S&T and want to use it to help solve the nation’s problems. At other times, science and technology themes are put into statements on issues such as the economy, defense, and so forth. And sometimes candidates say little about science and technology; they are not necessarily hostile to federal support for research but do not place a high priority on science, technology, and innovation. So these various policy statements reflect how important candidates think science and technology are to the nation and how high a priority they place on government investments in science and technology.

These position papers are designed to attract support voters of the candidate’s political party as well as moderate independents. So, usually these position papers and speeches restate familiar Republican and Democratic themes, which is why they often do not receive much attention from general voters. But, as mentioned above, the statements help build support among interest groups and try to convince reporters and other observers that the candidates are knowledgeable and thoughtful about policy.

2.2 Candidate Policy Positions in 2012

In 2012, for example, the leading Republican candidates and President Obama have Web sites that summarize their positions on important policy issues.

As of March 2012, Governor Romney's Web site lists his basic policy positions in three main areas: jobs and economic growth, foreign policy, and "smaller, smarter, simpler government." Except when talking about energy policy, his position statements say little about science, technology, and innovation, even when talking about the economy. For example, his 160-page document, "Believe in America: Mitt Romney's Plan for Jobs and Economic Growth," argues that reducing government regulations is the most important step for promoting long-term economic growth. As discussed in the next section, he does support additional basic research in the energy field.²

Senator Santorum has a long list of position statements on his Web site, particularly on issues social conservatives care about (such as abortion and gun control). None of his issue statements mentions science or technology, which reflects his view that eliminating economic regulations and restoring conservative social policies will restore America's economy and its position in the world. On competitiveness, for example, he talks about cutting the corporate income tax in half, restricting lawsuits against allegedly faulty products, and repealing the Dodd-Frank law to regulate financial institutions. With regard to energy, he talks about allowing more oil and gas drilling and pipelines but not about investing in new energy technologies.³

Of the three major Republican candidates in March 2012, former Congressman Newt Gingrich is the most interested in science and technology. His

² Mitt Romney, "Believe in America: Mitt Romney's Plan for Jobs and Economic Growth," <http://www.mittromney.com/sites/default/files/shared/BelieveInAmerica-PlanForJobsAndEconomicGrowth-Full.pdf>. Accessed March 18, 2012.

³ "Rick Santorum's Frist 100 Days Economic Freedom Agenda," <http://www.ricksantorum.com/rick-santorums-first-100-days-economic-freedom-agenda>. Accessed March 18, 2012.

proposals for jobs and the economy do not mention innovation and new industries, but his energy plans says this: "Finance cleaner energy research and projects with new oil and gas revenues."⁴ That is, he wants to lease more federal land to oil and gas companies and use the royalties that those companies pay to the government to pay for additional energy R&D.

President Obama's Web site emphasizes the importance of science and technology both for the economy and for energy and the environment. In March 2012, his Web site emphasized his positions on several issues: jobs and the economy, education, energy and the environment, equal rights, health care, national security, and taxes. The jobs section illustrates the important role that he thinks science, technology, and innovation can play:

INVESTING IN AMERICAN MANUFACTURING AND INNOVATION

- President Obama wants to grow high-technology U.S. manufacturing capacity and supply clean energy projects with American-made parts and equipment. That's why he's provided tax incentives to and made investments in clean energy technologies such as wind turbines and advanced car batteries.
- President Obama launched the Advanced Manufacturing Partnership, a national effort to invest in technologies that will create high-quality manufacturing jobs and enhance America's global competitiveness.
- President Obama signed the America Invents Act, historic patent reform legislation that will help American entrepreneurs bring inventions to market sooner, helping to create new businesses and new jobs.⁵

President Obama is saying that he believes that science, technology, and innovation can help the country increase jobs and improve energy. Republican candidates are not saying anything against R&D investment by the government, but they emphasize eliminating government regulations as the best way to help the economy grow. These statements reflect not only the candidates' personal beliefs but also what they say in an attempt to win the support of specific groups of voters.

⁴ "Newt Gingrich's Proposed American Solutions #3: An American Energy Plan," <http://newtingrich360.com/american-energy-plan>. Accessed on March 18, 2012.

⁵ "The President's Record on Jobs and the Economy," <http://www.barackobama.com/record/economy>. Accessed on March 18, 2012.

Beyond these general policy statements, individual science and technology-related policy issues occasionally become much more visible politically and become part of the debates and media discussions held during a presidential election year. Candidates try to capture attention and voter support by making dramatic statements, and often the candidates will debate each other over these issues and proposals. For example, during the Florida Republican primary election in January Newt Gingrich made a dramatic and controversial proposal to build a Moon colony, and he promised to build during the eight years of a Gingrich presidency.⁶ At other times, candidates have tried to gain attention and support by criticizing the policies of their opponents.

In the next section, we examine several examples of these visible proposals and criticisms in the field of the environment and energy policy.

⁶ Kenneth Change, "For a Moon Colony, Technology Is the Easy Part," *The New York Times*, January 27, 2012, <https://www.nytimes.com/2012/01/28/science/space/for-a-moon-colony-technology-is-the-easy-part.html?ref=moon>. Accessed March 18, 2012.

3. THE ENVIRONMENT AND ENERGY AS PRESIDENTIAL CAMPAIGN ISSUES

Since the 1970s, environmental and energy policy issues have often become highly visible and controversial topics during U.S. presidential campaigns. Both areas have been controversial – the environment being perhaps the more so. In both energy and environmental policy, science and technology have typically been cast as the tools by which other policy goals can be achieved. This said, there has rarely if ever –with the exception of nuclear energy, which predates this discussion – been a major and sustained public commitment to the development of technologies that would “solve” these problems. On the contrary, the debate in both areas has often devolved into questions of the limits of the government role, and how to balance it appropriately with the private sector.

In the following discussion, five presidential elections are briefly surveyed. These campaigns were chosen to explore instances in which environmental and energy policy loomed large as political issues. One important point is that candidates will sometimes make major environmental or energy proposals, in an attempt to attract the support of voters, or they will criticize the proposals of other candidates. A second point is that when an incumbent president runs for re-election, policy proposals that the president have made during the first term may become major campaign issues.

3.1 Richard Nixon (1972)

Richard Nixon was first elected President in 1968, and ran for re-election in 1972. During those four years the “Environmental Movement” gained most of its momentum, and issues of pollution control moved to the forefront of the national debate. While environmentalism became a hugely controversial topic, often dividing the young and old, and pitting industry against activists, the political

parties had not established fixed positions on such issues – a fluidity which President Nixon exploited to his benefit.

Early in the 1972 campaign, the Democratic frontrunner appeared to be Senator Edmund Muskie from Maine. Muskie was nicknamed “Mr. Environment,” for his championing of environmental causes in general, but particularly for his legislative proposals to control automotive pollution in a Clean Air Act. When President realized how popular the Muskie proposals were, he began campaigning to take Muskie’s pollution-control targets and strengthen them in half. He thus undercut his opponents and established his subsequent term as one that was committed to environmental legislation.

Senator Muskie ultimately was not the Democratic nominee in 1972; Senator George McGovern was the candidate. But President Nixon kept his promise about the Clean Air Act. What is perhaps most remarkable in the Nixon position from the point of view of science and technology policy is that many of the air pollution standards proposed under the Clean Air Act were known to be technologically infeasible within the regulatory timeframe originally contemplated. After the President’s re-election, the Nixon Administration nevertheless went ahead with the implementation of such standards, trusting both that the technology would be produced and/or that some accommodation would be made. And thus the idea of a “technological fix” to environmental problems (as opposed to behavioral or economic solutions) took precedence in policy.

3.2 Jimmy Carter and Ronald Reagan (1980)

Jimmy Carter was elected in 1976, and in 1980 he ran for re-election. His opponent that year was the Republican former governor of California, Ronald Reagan.

The biggest political issues in 1980 were the bad economy and defense,⁷ but the candidates also took different positions on energy and environmental policy. Oil prices were very high in the late 1970s, and President Carter made energy his highest priority. He was one of few U.S. presidents with an engineering background and an understanding of energy issues. One pillar of his Administration was strict regulation of industry, to promote the environment, health and safety. Another was commitment to energy policy. He championed the development of alternative energies, such as solar – in the Solar Energy Research Institute (SERI) – and synthetic fuels – in the Synfuels Corporation. Perhaps even more vigorously, Carter championed energy conservation measures with a zeal that some saw as a call to austerity.

It may be that President Carter gave mixed messages on technology policy questions. While his regulatory and conservation measures certainly imparted a sense of constraint – both to industry and consumers – his technology programs put great faith in the power of government funding to create new technological solutions in the energy field. Ultimately, he was left vulnerable to attack on both these counts.

Governor Reagan was not anti-technology. In fact, he had great faith in the ability of technology to solve some problems, especially in defense. However, he argued in the 1980 campaign that the Carter Administration had intruded too much into the private market, and that the government's regulations and push for alternative energy hurt the economy rather than helped it. Once elected, he began to dismantle Mr. Carter's energy regulations and energy R&D programs. While President Reagan was able to largely dismantle energy programs such as SERI and Synfuels, he could never hope to destroy the apparatus of environmental regulation, nor the increasing approval that the general public showed for it.

⁷ The next section of this paper will discuss defense debates during the 1980 election.

3.3 Bill Clinton and George H.W. Bush (1992)

The economy and health care were the two major issues of the 1992 election. But Al Gore, who ran as Bill Clinton's vice presidential candidate, was deeply concerned about global warming and other environmental issues, and his positions appealed to environmentalists and many Democrats. The first President Bush was not against environmental policies, but his administration contained many senior members who did not want to expand government regulation. Some of them, including the President himself, had worked in or with the U.S. oil industry.

The election of Bill Clinton and Al Gore led to new interest in environmental protection and alternative energy, and both the new President and Vice President wanted to use public-private R&D partnerships to develop new and innovative energy and environmental technologies. In fact, the political partnership between President Clinton and Vice President Gore may present a unique example of leadership-sharing at the highest levels, and a unique demonstration of Presidential importance accorded to science, technology and the environment. As Senator, Vice President Gore had become well known for his long-term visionary focus on environmental issues of global concern, and his commitment to science and technology as a source of solutions to environmental problems.

This commitment did not waver during the eight years of the Clinton-Gore Administration. Indeed, it offered a significant source of popularity. The Gore environmental activism did, however, run into political roadblocks in Congress. This was the case for one of its singular proposals: the Environmental Technology Initiative (ETI). What Gore proposed was a large, but by no means massive, governmental commitment to R&D on environmental technologies that would have generic applicability throughout industry. The vision was to move toward large-scale systems change, and away from the short-term environmental palliatives that were then so often seen. This program never materialized, largely because of the

Republican take-over of the Congress at mid-term. Nevertheless, it seems fair to say that Vice President Gore had success in shifting the focus in environmental regulation, and particularly in harmonizing it with the process of technological innovation in industry. Gore's subsequent career as a Silicon Valley venture capitalist only underscored this orientation.

3.5 Barack Obama and John McCain (2008)

Barack Obama's campaign for the Presidency was as notable for its use of technology – the Internet and social media – as for its support of science and technology. And its support for science and technology were high. Then-Senator Obama emerged as a particularly strong advocate for the scientific system and for the “integrity” of science in public policy. Above all, the issue of integrity – which was taken to mean honest scientific advice without regard to politics – came to the fore in environmental policy. Obama alleged that scientific integrity had been compromised by the Bush Administration in a series of decisions in the Environmental Protection Agency about global climate change. Obama promised to “restore” the integrity of science, and indeed, made this issue the centerpiece of his first public speech as President – given at the National Academy of Sciences.

In terms of programmatic initiatives, the beginning of President Obama's Administration showed strong support for alternative energy, both through public R&D funding and economic incentives. This orientation seems unlikely to persist to the same degree, given Republican resistance in the Congress, a new emphasis on economic policy, and a particularly intense controversy surrounding the funding of Solyndra, a solar energy company.

The positions of the Obama candidacy – as well as those of Hillary Clinton and John McCain -- on science and technology and energy and the environment are

presented in the chart on the following page, which derives from a 2008 report by TPI to NEDO.

Comparison of Candidates' Views on Science and Technology Policy

	<i>Clinton 1996</i>	<i>Obama 2008</i>	<i>McCain 2008</i>
Science Investment	\$50 billion energy fund; increase basic research 50% in NSF, DOE, DOD in 10 years; more physical science, eng.; 8% set-aside for high-risk; innovation prizes; broadband support	Double basic research; increase physical science, engineering	Supports continued space exploration; vehemently opposes "earmarks" (special projects for individual members of Congress)
Competitiveness and Innovation	Science budget increases; permanent & more generous R&D tax credit; women & minorities in science; COMPETES Act	Improve STEM education; energy R&D; info tech; permanent R&D tax credit; improve H-1B visa; reform patents	Risk capital; entrepreneurship; light regulation; market access; skilled workers (H-1B); export energy technologies
STEM Education & Workforce	Part of competitiveness agenda; proposed in COMPETES Act; increase NSF teacher fellowships	Top national priority; public school STEM teacher fellowships	Supports increased immigration, including expanded H1-B visa program
Health	Stem cell and health R&D top priority; increase NIH by 50% in 5 years, 100% in 10	Rescind Bush stem cell policy; establish institute on comparative treatment	Supports stem cell research
Energy	\$50 billion strategic energy fund; fuel efficiency regulation; building standards	Double energy R&D; increase fuel efficiency standards; biofuel support	Supports nuclear and biofuels; not ethanol
Climate Change	Cap & trade	First Senate bill with mandatory cuts in CO ₂ emissions; market approaches	Cap & trade; international agreements
National & Homeland Security	Financial, infrastructure support for unstable countries; low-enriched fuel; international alliances	Pandemic prevention top priority; track spent nuclear material	Defense acquisition reform; fund defense only in regular appropriations process
"Science Advisor"	Thomas Kalil, Special Assistant to Chancellor, UC Berkeley	Alec Ross, Senior VP, One Economy Corporation	

3.6 Republican Energy and Environmental Positions in the 2012 Campaign

As of March 2012, the three major Republican candidates all have similar positions on energy and the environment – positions that reflect traditional Republican viewpoints and are similar to the positions taken by Republican candidates in earlier years.

The current Republican candidates believe that concerns about global warming are wrong or unproven (with the partial exception of Newt Gingrich, a point we will discuss later in this paper), and therefore that fossil fuel use is good and that the federal government should make it easier to explore for domestic oil and natural gas. They argue that federal government regulations are hurting domestic oil, gas, and coal production. Governor Romney and former Congressman Gingrich support research to develop new energy technologies but oppose taxes and loan guarantees to help bring new products to the market. For example, here is the Romney position on energy R&D:

There is a place for government investment when time horizons are too long, risks too high, and rewards too uncertain to attract private capital. However, much of our existing energy R&D budget has been devoted to loan guarantees, cash grants, and tax incentives for projects that might have gone forward anyway. As president, Mitt Romney will redirect clean energy spending towards basic research.... Investments should be channeled through programs, such as “ARPA-E,” that seek to replicate DARPA’s success....⁸

Senator Santorum’s list of energy policy recommendations does not emphasize energy R&D, and the final point on his list is not clear on whether he believes R&D on alternative energy is good or bad. Here is that energy policy list:

- Remove bans on drilling—both onshore and offshore. This would immediately increase supply, create jobs, and bring revenues to the federal and state governments.

⁸ Mitt Romney, “Believe in America: Mitt Romney’s Plan for Jobs and Economic Growth,” page 96, <http://www.mittromney.com/sites/default/files/shared/BelieveInAmerica-PlanForJobsAndEconomicGrowth-Full.pdf>. Accessed March 18, 2012.

- Continue promoting private sector drilling techniques for natural gas. More than half of U.S. households use natural gas for heat, and a quarter of the nation's electricity is made from it.
- Eliminate all energy subsidies and tax credits. This will prevent the federal government from picking winners and losers in our effort to unleash all of America's domestic energy sources.
- Immediately approve the construction of the proposed Keystone XL oil pipeline. Construction of this pipeline would deliver an additional 700,000 to 830,000 barrels of oil per day to the U.S. and would create 20,000 jobs.
- Repeal bureaucratic regulations such as EPA's greenhouse gas regulations, Utility MACT, Boiler MACT, Cement MACT, the reclassification of coal ash, and any regulation of farm dust.
- Restructure the priorities of the Department of Energy (DOE). The DOE spends an exorbitant amount of money on technologies to reduce carbon dioxide emissions and alternative-energy vehicles. All of these energy sources and technologies are currently available, but they are not yet commercially viable because of burdensome regulations or because they are still prohibitively expensive. It is not the government's role to force these technologies into the market place.⁹

3.7 President Obama's Campaign Positions

As is well known, President Obama is a strong supporter of clean energy technologies and measures to help create a large clean energy industry in the United States. He has supported both energy R&D and policies such as tax incentives and loan guarantees to help companies in these industries grow. And he continues to appeal to environmentalists who want to reduce global warming and protect public lands.¹⁰

These positions are similar to those of earlier Democratic candidates, including Bill Clinton and Al Gore and, in many respects, Jimmy Carter.

⁹ Rick Santorum, "Unleashing America's Domestic Energy," <http://www.ricksantorum.com/unleashing-america%E2%80%99s-domestic-energy>. Accessed March 18, 2012.

¹⁰ President Obama's 2012 energy policy positions are available at: <http://www.barackobama.com/record/environment?source=primary-nav>. Accessed March 18, 2012.

4. DEFENSE

During the Cold War (1947-1991) and even after, national defense has almost always been one of the most important issues debated during presidential election campaigns. Democratic and Republican candidates have competed to convince voters that they knew best how to protect the country. And because new technology is often important in national security, defense technology issues sometimes have become part of major debates between presidential candidates. This was particularly true in the 1960 presidential election campaign.

4.1. Jack Kennedy and Richard Nixon (1960)

In October 1957, the Soviet Union shocked the United States by launching the *Sputnik* satellite into orbit around the earth. Americans were shocked for two reasons. First, the Soviet Union had launched an artificial satellite first, upsetting Americans' assumption that they enjoyed technological superiority in space technology. Second, if the Soviet Union had rockets that could put satellites into orbit, then they also probably had rockets that could send nuclear warheads into American cities.

In the late 1950s, President Dwight Eisenhower knew from secret intelligence sources that the Soviet Union did not have a large fleet of nuclear-armed intercontinental ballistic missiles (ICBMs). But the nation as a whole was deeply worried that the United States might fall behind the Soviet Union in this important field and be vulnerable to a Soviet missile attack.

In the 1950s, Senator Jack Kennedy was young and energetic and wanted to run for the presidency. But his likely Republican opponent, Vice President Richard Nixon, had more experience and a well-established reputation as a critic of the Soviet Union and a strong defender of U.S. security. So even before the 1960

campaign, Kennedy began speaking more about defense policy, to show that he was knowledgeable and thoughtful.

On August 14, 1958, Kennedy gave a major speech on the floor of the United States Senate claiming that the U.S. was behind the Soviet Union in the deployment of nuclear-tipped ICBMs. Here he was following others who claimed that there was a “missile gap” that left the United States vulnerable to a possible Soviet attack. At the time, Kennedy did not have access to U.S. intelligence, which, as President Eisenhower knew, showed the Soviets behind in deploying the new ICBMs.¹¹

He repeated the charges into the 1960 campaign, until President Eisenhower provided him with a secret briefing on the subject. Senator Kennedy then stopped saying that there was a gap, but some of his supporters repeated the claim. There was no “gap,” but Vice President Nixon could not discuss this publicly without unveiling secret intelligence information. The 1960 presidential race was very close, so the “missile gap” issue may have helped Senator Kennedy win the 1960 election.

4.2. Jimmy Carter and Ronald Reagan (1980)

In 1980 the economy and national defense were the two big campaign issues. (Energy was also a major issue, but mostly in terms of the cost of gasoline and the role that high oil prices played in that year’s economic problems.)

Defense was an issue for two reasons. First, President Carter appeared militarily weak because of a series of developments in 1979 and 1980: the November 1979 seizure of U.S. embassy employees in Iran, the December 1979 decision by Soviet leader Brezhnev to send Soviet troops into Afghanistan, and the humiliating failure of the April 1980 military mission to rescue the hostages in Iran.

¹¹ Preble, Christopher A. (December 2003). "Who Ever Believed in the 'Missile Gap'?: John F. Kennedy and the Politics of National Security". *Presidential Studies Quarterly*: 25 pages (801–826).

Second, American conservatives, operating through the Committee on the Present Danger and other advocacy groups, claimed repeatedly that the United States military was weak and needed much more government money. President Carter of course was a graduate of the U.S. Naval Academy and very knowledgeable about the military. But he worked to stop government spending on projects he considered obsolete or unnecessary, including the B-1 bomber. The conservatives, who supported Governor Ronald Reagan, said President Carter and his Administration were not doing enough to protect U.S. security. Their estimates of the size of Soviet forces later proved to be wrong. And President Carter was highly sophisticated about military technology, as shown in his argument that the U.S. should build the radar-evading B-2 stealth bomber instead of the older B-1.

But despite his expertise, President Carter lost the 2000 election to Ronald Reagan. And Mr. Reagan began one of the largest and most costly increases in defense spending in U.S. history.

4.3. Ronald Reagan and Walter Mondale (1984)

During his first term, President Reagan persuaded Congress to increase defense spending, including additional nuclear missiles. And his Administration's talk about improving civil defense and preparing for nuclear war frightened many Americans. In 1982 and 1983, liberal groups organized a "nuclear freeze" movement – public demonstrations calling for a halt to the deployment of additional nuclear weapons.

On March 23, 1983, President Reagan called for a Strategic Defense Initiative (SDI, informally known as "Star Wars"), a proposed system of ground-based and space-based systems to protect the United States from attack by ICBMs. While Mr. Reagan intended it as a way to avoid nuclear war and hoped that the proposal would reduce support for the nuclear freeze movement, opponents criticized the program as technically flawed and also politically destabilizing, because it might cause the Soviets to believe that the nuclear balance was threatened.

The Democratic candidate in 1984 was former Vice President Walter Mondale. As in earlier election years, the economy and national security were the two major issues. While the United States had suffered a deep recession at the beginning of Mr. Reagan's first term, the economy was better in 1984. And while Mr. Mondale endorsed the proposal for a "nuclear freeze," most Americans supported Mr. Reagan. President Reagan overwhelmingly won re-election.

We now know that President Reagan's views on nuclear weapons were complex. While he wanted the United States to maintain military superiority over the Soviet Union, he privately hated nuclear weapons. In his second term, he began to negotiate arms reductions with the then-new Soviet leader, Mikhail Gorbachev.

4.4. Defense and Defense Technology Issues in Recent Election Years

In November 1989, the Berlin Wall fell, and in December 1991 the Soviet Union dissolved. With the end of the Cold War, defense and defense technology remained important but were less important in presidential campaigns. In 1992, for example, Bill Clinton beat President George H.W. Bush, even though President Bush had much more defense experience and in fact had just won a successful war to drive Saddam Hussein from Kuwait. But in 1992, the voters were primarily concerned about economic matters, and Mr. Clinton won.

The terrorist attacks of September 11, 2001, of course increased concerns about security. But George W. Bush's wars in Iraq and Afghanistan ultimately proved unpopular, and in 2008 Barack Obama, a new Senator with no military or foreign policy experience, beat his Republican opponent, John McCain, an experienced Senator who also was a Navy hero during the Vietnam War.

In 2012, voters have not shown much interest in defense issues and defense science and technology issues. Citizens seem to care more about the deep economic downturn and America's continuing "culture wars" (fights over abortion, gun rights,

etc.). Republican candidates have tried to claim that President Obama is “weak” on defense and have sometimes criticized both his reluctance to attack Iran and his proposed cuts in defense spending. But as of March 2012 these criticisms have not damaged the President’s position with most voters. Many Americans are reluctant to enter another war, both parties (and not just Democrats) have called for reductions in government spending, and Mr. Obama’s successful mission to kill Osama bin Laden protects him from claims that he is not “strong.”

Interestingly, while defense issues are not major topics of debate during the 2012 campaign, President Obama has taken several dramatic steps in defense policy and defense S&T policy. The U.S. has ratified a new nuclear arms control treaty with Russia. The U.S. is moving towards a new focus on Asian security and in the process has begun a major defense R&D effort to deal with new security threats, including the potential use of “asymmetric” weapons such as inexpensive missiles launched by opponents. And cybersecurity has become a major priority. All of these are important developments, but they not particularly controversial within the United States and have not led to major debates between Mr. Obama and the Republican candidates.

5. SUPPORT FOR SCIENTIFIC REASONING VERSUS “ANTI-SCIENCE”

“Fundamentalist” Christians and some other Americans have long disagreed with some of the findings of modern science, particularly regarding theories of evolution and the earth’s geological history. The attitudes continue. But the “anti-science” attitudes voiced today by some Republican candidates and voters include more than a rejection of evolutionary theory; they also reflect two other factors: systematic efforts by some conservative business leaders and advocacy groups to cast doubt on climate change science and other scientific findings, and an even deeper distrust some conservatives feel towards the federal government and towards American elite experts, including scientists.

5.1 Religious Objections to the Theories of Evolution and Geology

Christian churches and believers have long objected to some scientific findings. In the early 17th century, the Roman Catholic Church punished Galileo for saying that the sun and planets do not revolve around the Earth.

But in the United States, the main objections began in the late 19th century, as fundamentalist Protestants who believed that the story of creation in the Bible is literally true began to object to the new theories of evolution and scientific geology. By the early 20th century, schools had become the main battleground in this fight. Religious groups tried to force schools not to teach the theory of evolution or, if that failed, to have evolution classified as “only a theory” and to require that schools also teach “creationism” (now sometimes called “intelligent design”), meaning the Biblical story that God created the world in seven days and created humans separately from animals.

In 1925, a famous court case in Tennessee brought national attention to these efforts. Tennessee had passed a law banning the teaching of evolution in schools, and a teacher, John T. Scopes, was arrested and put on trial for telling his

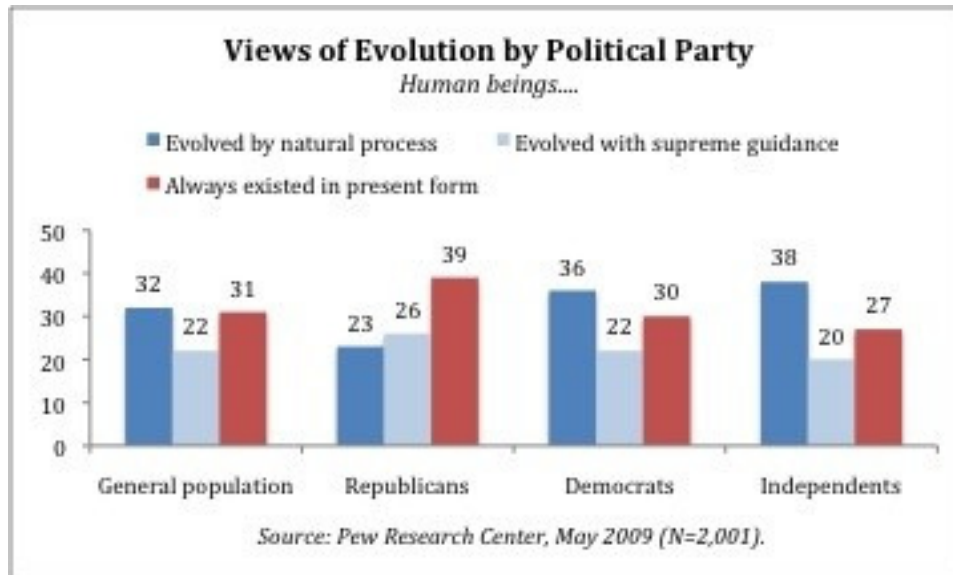
students about evolution. He was convicted, but the verdict was overturned. More importantly, the Tennessee law received much criticism from around the country. Only a few other states adopted anti-evolution laws, and in 1968 the U.S. Supreme Court ruled in the case of *Epperson v. Arkansas* that state bans on teaching evolution violate the U.S. Constitution's First Amendment because their primary purpose is to impose a religious point of view.

In the decades since the Scopes trial, fundamentalist groups and their supporters in state legislatures and school boards have periodically tried to change school textbooks or classroom discussions to include "intelligent design."¹² When this has happened, the courts have struck down these policies. But today the anti-evolution viewpoint is widespread among many conservative Christians and conservative Republican leaders. During the early phase of the 2012 Republican presidential contest, Governor Rick Perry of Texas criticized the theory of evolution, although he also left open the possibility of evolution with guidance from a supreme being.¹³

¹² For example, the Tennessee state legislature continues even in 2012 to consider such proposals. This is a report from a Tennessee newspaper: "The [Tennessee] Senate approved a bill Monday evening [March 19, 2012] that deals with teaching evolution and other scientific theories.... The Senate voted 24-8 for HB368, which sponsor [Republican] Sen. Bo Watson...says will provide guidelines for teachers answering students' questions about evolution, global warming and other scientific subjects. Critics call it a 'monkey bill' that promotes creationism in classrooms." Tom Humphrey, "Anti-evolution class discussions get Senate's OK," *knoxnews.com*, March 19, 2012, <http://www.knoxnews.com/news/2012/mar/19/anti-evolution-class-discussions-get-senates-ok/>. Accessed March 20, 2012.

¹³ Robert P. Jones, "Understanding Rick Perry's Texas Two-Step on Evolution," *The Washington Post*, August 25, 2011.

The following chart from the Pew Research Center (an independent, highly-regarded organization) shows the results of a 2009 opinion poll of Americans.¹⁴



The people who told the Pew Center that human beings “have always existed in their present form” believe in the Bible’s story that God created humans at the beginning of time. The opinion survey shows that Americans have complex beliefs. For example, 30 percent of Democrats believe in divine creation, while a quarter of Republicans believe in natural evolution (without a god).

5.2 Criticisms of Climate Science

Many Republican voters and leaders also argue that climate change science is wrong or unproven. It is likely, though, that this attitude stems less from religious concerns than from a concerted public relations campaign by some business leaders and conservative groups to cast doubt on the science and any policy proposals to regulate greenhouse gases.

¹⁴ This chart comes from the *Washington Post* article mentioned above. The data come from the Pew Research Center for the People and the Press, “Scientific Achievements Less Prominent Than a Decade Ago: Public Praises Science; Scientists Fault Public, Media,” July 9, 2009, <http://www.people-press.org/files/legacy-pdf/528.pdf>. Accessed March 18, 2012.

There is no doubt that many Republicans in America are skeptical about climate change. The following table comes from the Pew Center report mentioned earlier. Pew asked 2,001 Americans whether they thought (1) global warming is occurring and is due to human activity, (2) is occurring but is due to natural changes, or (3) there is no solid evidence that the earth is warming. Among people who describe themselves as conservative Republicans, only 21 percent gave the first answer, 45 percent gave the second, and 28 percent said that there is no solid evidence that the earth is warming.¹⁵

	Warming human activity %	Warming natural changes %	Not getting warmer %	N
Total public	49	36	11	2001
18-29	60	33	5	264
30-49	47	37	10	629
50-64	50	34	14	617
65+	39	39	13	464
College grad+	58	28	11	703
Some college	49	36	11	502
HS or less	45	40	10	784
Republican	30	43	24	504
Conserv Rep	21	45	28	343
Mod/Lib Rep	41	36	17	151
Democrat	64	29	4	747
Cons/Mod Dem	59	34	4	473
Liberal Dem	74	21	4	250
Independent	49	38	9	579

Figures read across.

Some journalists argue, however, that this skepticism among conservatives is no accident. They point to deliberate and well-funded public relations campaigns by conservative groups to cast doubt on scientific findings and to accuse environmentalists and Democrats of trying to impose unnecessary regulations and

¹⁵ Pew Research Center, page 39.

costs on Americans. According to the journalists, these groups also provide arguments that Republican administrations use to justify repealing regulations.¹⁶

Among major Republican candidates in 2012, Rick Santorum has been the most vocal in dismissing scientific findings about global change. He calls global warming “a hoax.”¹⁷

Mitt Romney has shifted from saying he believes that humans are contributing to climate change is real to being skeptical about that change, despite the evidence. *National Journal* says that in October 2011 he told campaign donors at Pittsburgh’s Consol Energy Center: ““My view is that we don’t know what’s causing climate change on this planet. And the idea of spending trillions and trillions of dollars to try to reduce CO₂ emissions is not the right course for us.”¹⁸

Newt Gingrich also has shifted his position. In 2008, Mr. Gingrich appeared in a television advertisement with then-Speaker of the House Nancy Pelosi, a Democrat. “We do agree that our country must take action to address climate change,” he said then. But in late 2011 he said it is unclear whether man-made global warming is real. “I believe we don’t know,” he said in a television interview.¹⁹

5.3 Conservative Distrust of Elite Experts

¹⁶ Two such books are Chris Mooney, *The Republican War on Science*, and Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*.

¹⁷ Emily Schultheis, “Santorum: I never believed global warming ‘hoax,” Politico. Com, February 7, 2012, <http://www.politico.com/blogs/burns-haberman/2012/02/santorum-i-never-believed-global-warming-113739.html>. Accessed March 18, 2012.

¹⁸ Coral Davenport, “Mitt Romney’s Shifting Views on Global Warming, *National Journal*, October 28, 2011, <http://www.nationaljournal.com/2012-presidential-campaign/mitt-romney-s-shifting-views-on-global-warming-20111028>. Accessed March 18, 2012.

¹⁹ Luke Johnson, “Newt Gingrich Doubts Global Warming: ‘I Believe We Don’t Know,” *The Huffington Post*, December 1, 2011, http://www.huffingtonpost.com/2011/12/01/newt-gingrich-global-warming_n_1123361.html. Accessed March 18, 2012.

For some Republican voters and candidates, the skepticism about scientific evidence on climate change and scientific evidence generally goes deeper than the conservative dislike of climate science. Some voters also appear to have a deep distrust of U.S. elite experts, including scientists. Distrust of Washington, DC, is high in some parts of the country, and that distrust may have grown after the financial crisis of 2008-2009, when many Americans felt that the country's financial, economic, and government elites had failed to protect ordinary citizens.

In this environment, some voters see scientists as liberals looking for any justification to place new regulations on ordinary citizens. Senator Santorum seems to think this way about global change science. Another 2012 Republican presidential candidate, Congresswoman Michele Bachmann, also showed a deep distrust of government and scientific elites, when she claimed in September 2011 that the human papillomavirus (HPV) vaccine is dangerous and can cause mental retardation. She criticized another Republican candidate, Governor Rick Perry of Texas, for requiring girls in his state to get the vaccine. Congresswoman Bachmann did not trust scientific claims about the safety of the vaccine and also said that the Texas rule was a "violation of a liberty interest."²⁰ In short, she saw this as another attempt by government to impose something dangerous on ordinary citizens; she did not care whether or not doctors had tested the vaccine and found it safe.

²⁰ Carrie Gann, "Michele Bachmann's HPV Vaccine Safety and 'Retardation' Comments Misleading, Doctors Say," ABC News, September 14, 2011, <http://abcnews.go.com/Health/Wellness/michele-bachmanns-hpv-vaccine-safety-retardation-comments-misleading/story?id=14516625#.T2fcyYGwcto>. Accessed March 18, 2012.

6. CONCLUSIONS

In many ways, the 2012 presidential candidates reflect traditional Republican and Democratic positions on science and technology and the large subjects – defense, health, energy, etc. – that draw upon new science and technology. Republicans still generally oppose new government programs beyond support for basic research and defense S&T, and Democrats still support a larger role for government in supporting the development and deployment of new technologies that can contribute to economic growth and a better environment.

And as in previous presidential campaigns, the operation of science and technology programs rarely becomes the subject of major debates. In part, this reflects an enduring bipartisan consensus in America in favor of basic research and defense R&D. Instead, Americans typically fight more about the overall role of government in areas such as energy and defense and sometimes about the size and nature of specific R&D programs that help advance these large national missions.

What is different this year is the stronger “anti-science” attitude of some of the Republican candidates, particular Rick Santorum and earlier candidates Rick Perry and Michele Bachmann. A combination of traditional religious views, conservative efforts to criticize climate science, and the deep distrust that some conservatives feel for all American elites, including scientists, has led this year to an unusual opposition to scientific reasoning and scientific findings.

However, it is also true that most Americans do not share these conservative views. Many Americans believe in the theory of evolution, the role humans play in climate change, and the general credibility of science, and many of these Americans support President Obama. It is likely that conservatives and pro-science Americans will continue to argue over these issues – in 2012 and in the years after.