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How Scientists Engage the Public

Most scientists believe it is important to participate in public debates; almost half use social media and nearly a quarter use blogs to discuss their work and learn

A PEW RESEARCH CENTER STUDY CONDUCTED IN COLLABORATION WITH THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)

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About This Report

This report is based on a survey of American scientists who are connected to the American Association for the Advancement of Science (AAAS). It explores the ways in which scientists interact with citizens and journalists and their reasons for doing so.

This is the second of several reports analyzing the data from two surveys: this canvassing of AAAS scientists and a companion survey of U.S. adults. The first report was released last month and it focused on a comparison of the general public and AAAS scientists as a whole. Follow-up reports planned for later this year will analyze views of the general public in more detail, especially by political, religious and demographic groups. The connection between people's science knowledge and their views will also be explored.

The fieldwork for both surveys was conducted by Princeton Survey Research Associates International. Contact with AAAS members invited to participate in the survey was managed by AAAS staff with the help of Princeton Survey Research Associates International; AAAS also covered part of the costs associated with mailing members. All other costs of conducting the pair of surveys were covered by the Pew Research Center. Pew Research bears all responsibility for the content, design and analysis of both the AAAS member survey and the survey of the general public.

This report is a collaborative effort based on the input and analysis of the following individuals. Find related reports online at pewresearch.org <www.pewresearch.org/science2015>

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Acknowledgements

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We are also grateful to the team at Princeton Survey Research International who led the data collection efforts for the survey.

About Pew Research Center

Pew Research Center is a nonpartisan fact tank that informs the public about the issues, attitudes and trends shaping America and the world. It does not take policy positions. It conducts public opinion polling, demographic research, media content analysis and other empirical social science research. The center studies U.S. politics and policy views; media and journalism; internet, science, and technology; religion and public life; Hispanic trends; global attitudes; and U.S. social and demographic trends. All of the center's reports are available at www.pewresearch.org. Pew Research Center is a subsidiary of The Pew Charitable Trusts.

Summary of Findings

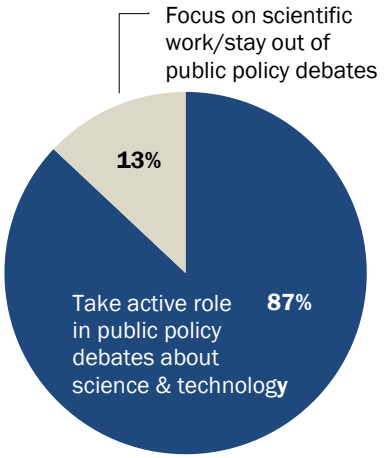
American scientists believe they face a challenging environment and the vast majority of them support the idea that participation in policy debates and engagement with citizens and journalists is necessary to further their work and careers.

A survey of 3,748 American-based scientists connected with the American Association for the Advancement of Science (AAAS) finds that 87% agree with the statement "Scientists should take an active role in public policy debates about issues related to science and technology." Just 13% of these scientists back the opposite statement: "Scientists should focus on establishing sound scientific facts and stay out of public policy debates."

This widely held view among scientists about active engagement combines with scientists' perspectives on the relationship between science and society today in several ways:

Most Scientists Support Active Engagement in Public Policy Debates

% of AAAS scientists who say scientists should ...



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q15. The less than one percent giving no answer are not shown.

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- **Most scientists see an interested public**: 71% of AAAS scientists believe the public has either some or a lot of interest in their specialty area.
- **Many scientists see debates over scientific research findings in the media**: 53% of AAAS scientists say there is a lot or some debate in the news about their field.
- **A sizable share of scientists believe careers can be advanced by media coverage of their work and social media use:** 43% of AAAS scientists say it is important or very important for scientists in their specialty to get coverage of their work in news media, up from 37% who said that in a 2009 survey. Some 22% described it as either "very important" (4%) or "important" (18%) for career advancement in their discipline to promote their findings on social media such as Facebook or Twitter. Still, a majority of AAAS scientists say it is not too or not at all important for career advancement to have their research covered in the news (56%), and 77% say it is not too or not at all important for career advancement to promote their findings on social media.
- **At the same time, most scientists believe that science news coverage can pose problems for science:** 79% of scientists believe it is a major problem for science that news reports don't distinguish between well-founded and not well-founded scientific findings.

Further, 52% of scientists say that simplification of scientific findings is a major problem for science in general.

These findings come at a time when science topics are increasingly part of the public debate. Pew Research findings from this survey reported last month showed an overall drop among AAAS scientists in how they rate the state of science in general and their particular scientific field. Scientists also express concerns about the precarious state of research funding, some of the influences on how funding is allocated, and difficulties they feel hinder the capacity of science disciplines to attract the best talent to the field.

How scientists are engaging: Half talk to reporters and 47% use social media.

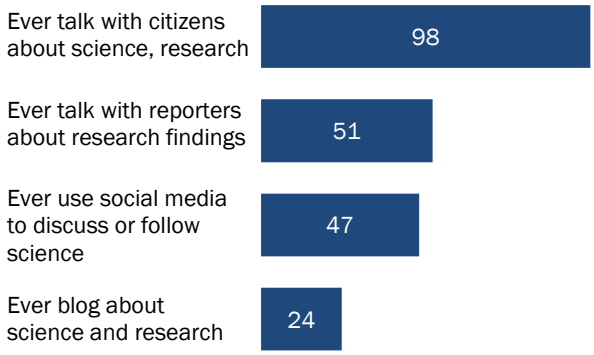
Nearly all the AAAS scientists (98%) say they have some level of interaction with citizens at least from time to time, and 51% have at least some contact with reporters about research findings.

In addition, nearly half of AAAS scientists – 47% – use social media to talk about science or read about scientific developments at least some of the time. Some 24% of these AAAS scientists blog about science and research.

The scientists who are most likely to be involved in public activities show distinct patterns by age, by the level of public debate and public interest they perceive in their specialty, and by discipline. Virtually all scientists engage with citizens. Mid-career and older scientists are especially likely to speak to reporters. Younger scientists are more likely to use social media. And blogging is something that equally spans the generations under age 65.

Nearly All Scientists Talk with the Public; A Sizable Share Use Social Media, Blogs

% of AAAS scientists who ever do each of the following



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q50a-f. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Responses of never and no answer are not shown.

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There is also evidence in the survey that the most engaged often use multiple methods and platforms to connect with the public. In other words, those who want to engage tend to do so in multiple ways.

Some 41% of AAAS scientists report that they "often" or "occasionally" do at least two of these four activities: 1) talk with non-experts about science topics, 2) talk with the media, 3) use social media or 4) blog. Nearly half, 48%, do one of these four activities either often or occasionally, and 11% do none of these on an "often" or "occasional" basis. Those who are more engaged by this metric are slightly younger; 46% of those ages 18 to 49 and 44% of those ages 50 to 64 are more engaged, compared with 33% among those ages 65 and older. A somewhat larger share of women (44%) than men (39%) report doing at least two of these activities on a more frequent basis.

41% *of AAAS scientists often or occasionally engage with the public in at least two ways*

AAAS scientists survey Sept. 11–Oct. 13, 2014. Based on Q50a-f. More engaged refers to those who say they "often" or "occasionally" do at least two of the four activities measured.

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Scientists include digital communication tools as they try to stay up-to-date in their work

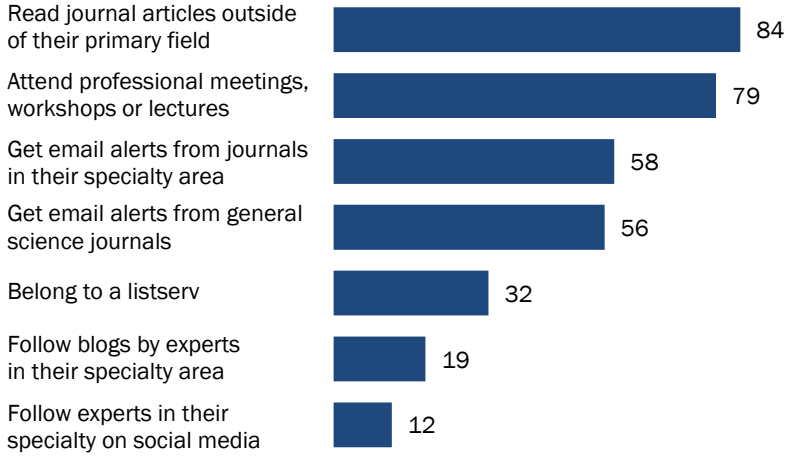
Traditional information and peer networking activities are the most common ways scientists stay up-to-date. However, digital methods are now a common part of the learning toolkit for many scientists.

Fully 84% of AAAS scientists read journal articles outside of their primary fields or scientific discipline. In addition, 79% say they attend professional meetings, workshops and lectures.

At the same time, digital communications are also a common part of the learning activities of scientists as they connect with peers: 58% get email alerts from journals in their specialty; 56% get emails from general science journals; 32% belong to email listservs; 19% follow blogs by experts their fields; and 12% follow tweets or other postings in social media by experts in their field.

Both Traditional and Digital Tools Help Scientists Stay Up-to-Date

% of AAAS scientists who do or use the following to stay up-to- date in their specialty area



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q49a-g. Those not selecting each item or giving no answer are not shown.

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About this survey

The survey of scientists was conducted online with a random sample of 3,748 U.S.-based members of the American Association for the Advancement of Science (AAAS) from Sept. 11 to Oct. 13, 2014. AAAS is the world's largest general scientific society, and includes members from all scientific fields. Founded in 1848, AAAS publishes *Science*, one of the most widely circulated peer-reviewed scientific journals in the world. Membership in AAAS is open to all. The survey was conducted under the direction of Princeton Survey Research Associates International. Further details on the methodology are in Appendix A at the end of this report.

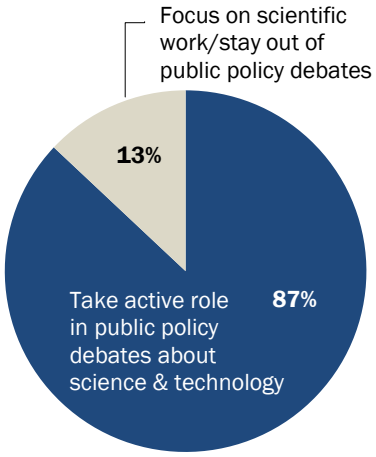
Scientists' Views: Most Approve of Active Role in Public Debates About Science and Technology

American scientists see themselves as facing a challenging environment and are trying to respond to it. As we detailed in our recent report, scientists, while still largely positive about the state of the field, are less upbeat than they were five years ago. Moreover, most scientists believe that policy regulations related to land use and clean water and air are not often guided by the best scientific findings. Notable numbers also say they do not think the best scientific information is often used in crafting policies around food safety and new drug and medical treatments.

Additionally, scientists are worried about the prospects for future funding of science research and about attracting talent to their fields. Fully 83% of AAAS scientists report that obtaining federal research funding is harder today than it was five years ago. The share saying this is a good or very good time to begin a career in their specialty is down 8 points, from 67% in 2009 to 59% today. And 58% say it is harder to attract the best young people to a science career than it was five years ago.

Most Scientists Support Active Role in Public Policy Debates

% of AAAS scientists who say scientists should ...



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q15. The less than one percent giving no answer are not shown.

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In this context, the Pew Research survey of AAAS scientists also finds that most favor active engagement in public debates. Fully 87% of AAAS scientists agree with the statement "Scientists should take an active role in public policy debates about issues related to science and technology." Just 13% of these scientists back the statement "Scientists should focus on establishing sound scientific facts and stay out of public policy debates."

Support for active engagement in policy debates is widespread among all age groups with 90% of those under age 50 saying this, and slightly fewer among older groups saying the same (86% of those 50 to 64 and 84% of those ages 65 and older). Strong majorities of AAAS scientists from all disciplines say that scientists should take an active role in policy debates ranging from 92% among those in the social sciences and 88% among biomedical scientists to 81% each among earth scientists and engineers.

Scientists see public debates and interest in their work

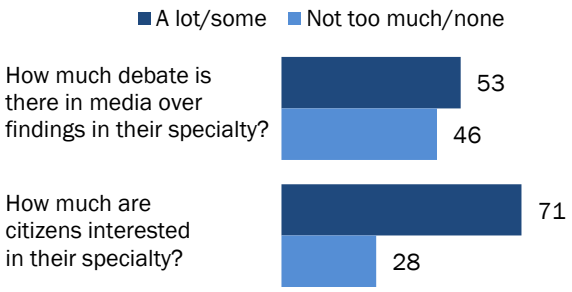
Other Pew Research surveys of American adults have shown a sizable share expresses an interest in science, and 37% of adults in one recent survey say they enjoy keeping up with news about science "a lot."

AAAS scientists show that they are aware there is noteworthy cultural clamor around their work. Some 53% of AAAS scientists say there is "a lot" (17%) or "some" (36%) debate in the media over research findings in their specialty area. Another 46% say there is not much (32%) or no debate in the media at all (14%).

More broadly, most scientists also believe that non-expert citizens are interested in their specialty area. Some 71% of AAAS scientists say there is a lot (27%) or some (44%) interest among non-expert citizens in their field. Twenty-eight percent of AAAS scientists say there is not too much citizen interest (23%) or no interest at all (5%) in their scientific specialty.

Most Scientists Perceive Both Interest in and Debate over Their Work

% of AAAS scientists on debate in the media and citizens' interest in their specialty



AAAS scientist survey Sept. 11-Oct. 13, 2014. Q47-48. Those giving no answer are not shown.

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Those working in earth and environmental sciences and working in the social sciences are more likely than those in other disciplines to see both public interest and debate in the news about their primary specialty areas. By comparison, chemists, engineers, math and computer scientists, and physicists and astronomers are less likely to say there is a lot or some media debate and interest among non-expert citizens in their fields.

Perceptions of Public Interest and Media Debate Vary by Discipline

% of AAAS scientists in each discipline who say there is a lot/some or not too much/no debate in the media about their specialty and % of AAAS scientists in each discipline who say there is a lot/some or not too much/no interest in their specialty among citizens

	Amount of media debate		***Amount of public interest***	
	A lot/ some	**Not too much/ none**	**A lot/ some**	**Not too much/ none**
Primary discipline				
Biomedical	59	40	77	23
Chemistry	32	65	49	50
Earth sciences	67	33	80	20
Engineering	35	65	57	43
Physics and astronomy	40	59	68	31
Math and computer sciences	33	67	57	43
Social, history, policy	70	29	83	16

AAAS scientist survey Sept. 11-Oct. 13, 2014. Q47-48. Those giving no answer are not shown. Those with some other primary discipline not shown.

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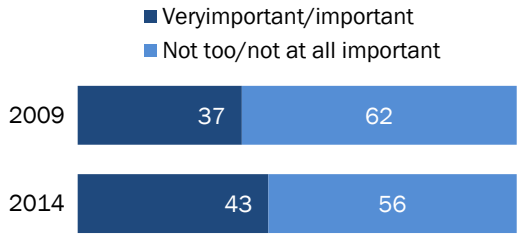
More scientists now say news coverage of developments in their field is important for advancement, and about a fifth believe social media promotion is important, too.

Some 43% of AAAS scientists believe that the chances for professionals to move ahead in their disciplines are tied to getting their research covered by the news media. In Pew Research's 2009 survey of AAAS scientists, 37% said they thought it was important or very important for scientists in their specialty to get coverage of their work in news media. Still, a majority of AAAS scientists (56%) consider news coverage of their research not too or not at all important, as was the case in 2009.

Furthermore, about a fifth of AAAS scientists (22%) believe that generating attention in social media such as Facebook and Twitter is either very important (4%) or important (18%) for people to advance in their disciplines. Fully 77% say that promoting their research on social media is not too or not at all important for career advancement in their specialty.

Uptick in Scientists Saying News Coverage Is Important for Career

% of AAAS scientists who say news coverage for their research is … for career advancement



AAAS scientists survey Sept. 11–Oct. 13, 2014. Q37. Those giving no answer are not shown. AAAS scientists survey May 1-June 14, 2009.

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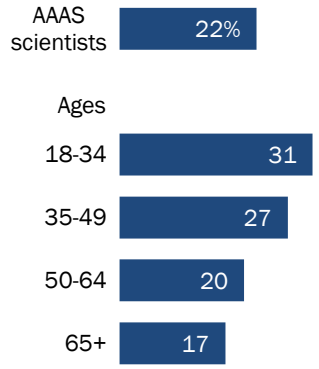
AAAS scientists' views about the importance of news coverage for career advancement are about the same by age. There are some differences in views about this topic by discipline. A majority of those working in social sciences, policy fields or the history of science consider news coverage of their specialty important for career advancement (55%), as do 48% of earth scientists. By comparison, chemists (35%) and physicists and astronomers (38%) are less likely to consider news coverage important for career advancement. Those working on applied research questions are more likely than those who work primarily on basic research questions to see important career benefits from news coverage (48% compared with 39%, respectively).

Younger scientists, more so than older ones, say that promoting their findings on social media sites such as Twitter, LinkedIn or Facebook is important for career advancement. Fully 31% of AAAS scientists under age 35 say social media is important for career advancement. By comparison, just 17% of those ages 65 and older say this.

More Younger Scientists See Career Benefits in Social Media Platforms

*% of AAAS scientists who say social media promotion of their finding is either **very important or important** for career advancement*



AAAS scientists survey Sept. 11–Oct. 13, 2014. Q38. Those giving no answer are not shown.

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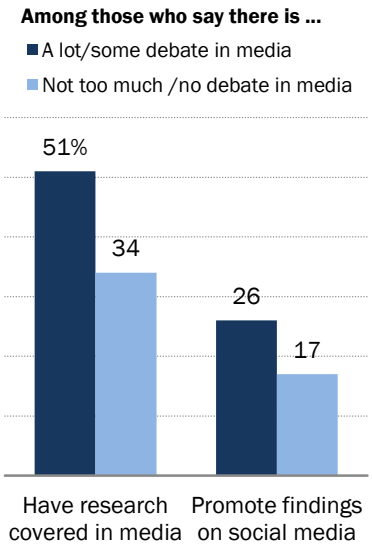
Those who believe there is more debate in the media over research in their field are more likely than others to say that media coverage and social media attention are important to career advancement. For example, 51% of those who see a lot or some debate in the media about their field say it is important for scientists in their area to get their research covered by the media. By comparison, 34% of those who say there is not much or no debate about their field in the news say having their research in the news is important for career advancement. The same pattern occurs in views about the role of social media for career advancement. Those who say there is a lot or some debate in the media are more likely than other AAAS scientists to say that promoting their findings on social media sites is important for career advancement (26% compared with 17%).

Scientists in Fields with More Debate Are Especially Likely to Say Media and Social Media Are Important for Career

*% of AAAS scientists who say it is **very important** or **important** for career advancement to have their work covered in the media or to promote their findings on social media*



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q37 & Q38. Those giving no answer are not shown.

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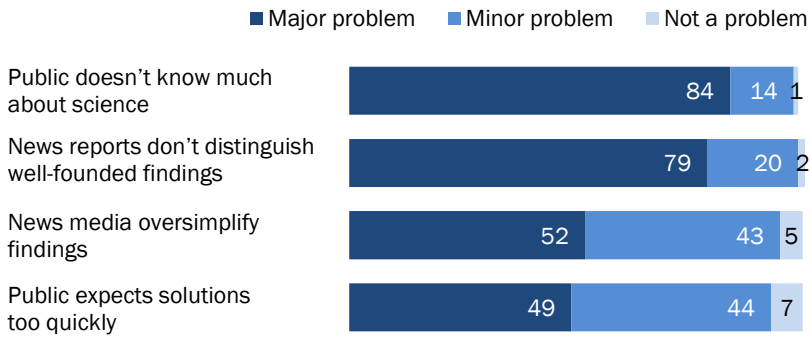
Many scientists see media coverage as a source of potential problems for science

This sense that there are personal stakes in engaging journalists links with other findings from the AAAS scientist survey about how reporters do their jobs and how the public itself comprehends scientific information: 79% of AAAS scientists believe it is a major problem for science that news reports don't distinguish between well-founded and not well-founded scientific findings. Further, 52% say that oversimplification of scientific findings is a major problem for science in general.

Most Scientists See Lack of Public Knowledge and Media Reports as Problems for Science

% of AAAS scientists saying each is a ... for science in general



AAAS scientists survey Sept. 11–Oct. 13, 2014. Q5a-d Those giving no answer are not shown.

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How Scientists Engage

Scientists have broad involvement with non-expert citizens and some of the connections are forged through social media and blogs. Nearly all AAAS scientists (98%) have some level of interaction with the general public at least from time to time, and 51% have some contact with reporters about research findings.

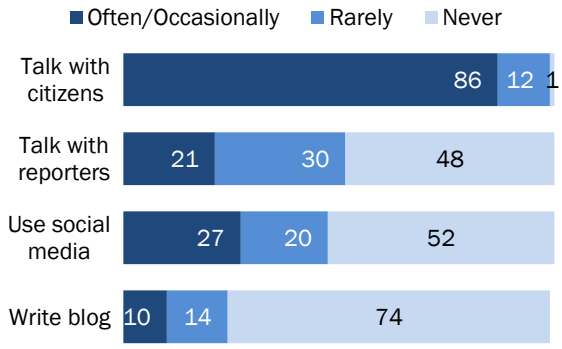
In addition, nearly half of AAAS scientists – 47% – use social media to talk about science or read about scientific developments at least some of the time. Some 24% of AAAS scientists blog about science and research.

Looking in more detail at how often AAAS scientists engage in these behaviors produces the following portrait:

- 86% of AAAS scientists often (37%) or occasionally (49%) talk with citizens about science or research findings. Another 12% do so, but only "rarely."
- 27% of scientists use social media such as Facebook or Twitter to talk about or follow science either often or occasionally. Another fifth of AAAS scientists (20%) do so, but only "rarely."
- 21% of scientists talk with reporters about new research findings often (3%) or occasionally (18%). Another 30% do so, but only "rarely."
- One-in-ten AAAS scientists write for a blog about science often or occasionally. Another 14% do so, but only "rarely."

Scientists Connect Directly with Citizens and Use New Media Tools, Too

% of AAAS scientists who do the following activities in connection with science or research findings



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q50a-f. Social media based on combined responses to Q50d,e. Blog use based on combined responses to Q50a,f. Those giving no answer are not shown.

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Despite widespread agreement about the worthiness of engagement in public policy debates, the frequency with which AAAS scientists engage with the public appears to be about the same as in 2009, when Pew Research last conducted a similar survey. The frequency with which scientists report talking with the general public and with the reporters is roughly the same in 2014 as it was in 2009. And the frequency of blogging is also about the same as in 2009, based on the

measure where a trend is available. (AAAS scientists were not asked about social media usage in 2009.)

The audiences scientists hope to engage via digital media

The Pew Research survey asked the AAAS scientists who have at least rarely used social media to talk about science for whom their messages were intended: 16% of this group say their social media activities are aimed primarily at science experts; 37% say their messages are aimed primarily at non-expert citizens; and 44% say their messages are intended for both groups equally.

Scientists Seek Both Specialized and General Audiences on Social Media

% of AAAS scientists who use social media to discuss science

When you talk about science on social media is your message...	
Intended primarily for science experts	16
Intended primarily for non-expert citizens	37
Intended for both groups equally	44
No answer	4

AAAS scientists survey Sept. 11- Oct. 13, 2014. Q51. Based on social media users in Q50d. N=1,472.

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Which scientists are more and less engaged

The scientists who are most likely to be involved in public activities show distinct patterns by age, by the level of public debate and public interest they perceive in their specialty, and by discipline. There is also evidence in the survey that the most engaged often use multiple methods and platforms to connect with the public. In other words, those who engage tend to do so in multiple ways.

While most AAAS scientists at least occasionally interact with non-expert citizens, those who talk with reporters tend to be in the mid-career and older age groups, while social media is used especially by younger scientists.

Most Scientists Engage with Public, Younger Scientists Are More Active on Social Media

% of AAAS scientists who do each activity

	Talk with citizens often/ occasionally	Talk with reporters often/ occasionally	Ever use social media	Ever use blogs
AAAS scientists	86	21	47	24
Ages 18-34	87	8	70	28
35-49	83	20	63	28
50-64	88	28	44	25
65 and older	86	22	30	20

AAAS scientists survey Sept. 11–Oct. 13, 2014. Q50a-f. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Other responses and those giving no answer are not shown.

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Just 8% of AAAS scientists under age 35 talk with reporters about research findings often or occasionally. This could be the case because younger scientists might not have become quite as established in their fields as their older colleagues – and thus be perceived as sources for news stories. This compares with 28% among those ages 50 to 64. About a fifth of those ages 65 and older (22%) and ages 35 to 49 (20%) talk with reporters at least occasionally.

At the same time, younger scientists are more likely than older ones to use social media to discuss and learn about science: 70% of the scientists under age 35 use social media, compared with 44% of those ages 50-64 and 30% of those 65 and older.

Interestingly, blogging spans the generations under age 65 about equally. Some 28% each of younger scientists (ages 18 to 34) and those ages 35 to 49 use blogging to engage about science in one way or another, as do 25% of those ages 50 to 64. A fifth of AAAS scientists ages 65 and older use blogs.

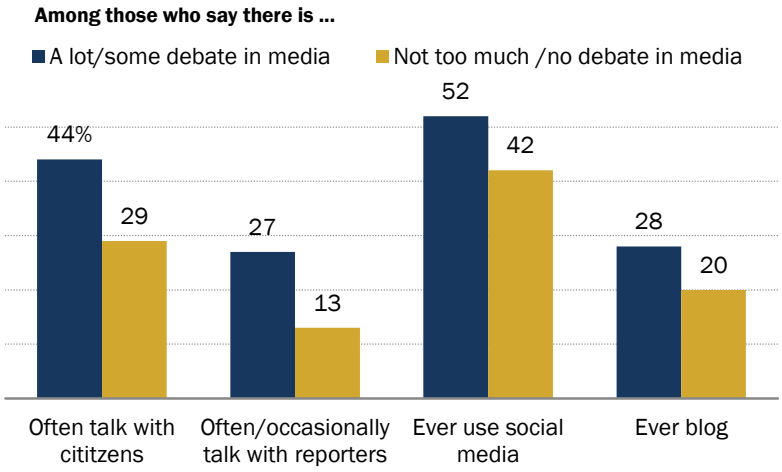
The scientists who are more engaged more also work in subjects where they feel there is public interest and debate

As a general rule, AAAS scientists who believe there is more debate in the media about their fields and who think there is relatively high public interest in their scientific discipline have more frequent interactions with the public and media.

For example, AAAS scientists who feel there is notable debate in the media concerning issues in their discipline are more likely than other scientists to discuss science with members of the general public: 44% of those who think there is a lot or some debate in the media about their field often talk with citizens about research findings, compared with 29% among those who see little debate in the media about their field.

Scientists in Public-facing Fields Are More Likely to Engage with Public

% of AAAS scientists in each group who do the following in connection with science research



AAAS scientists survey Sept. 11- Oct. 13, 2014. Q50a-f. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Other responses and those giving no answer are not shown.

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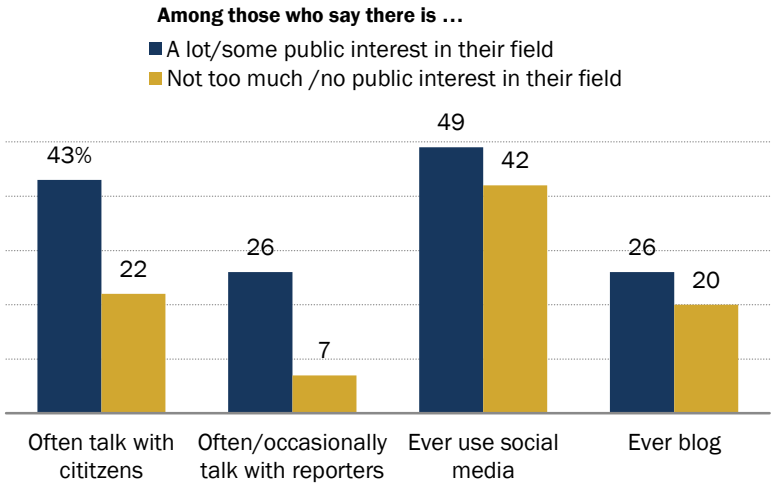
Similarly, those who see more debate in the news about their specialty are more likely than other AAAS scientists to talk with reporters about new research findings at least occasionally (27% compared with 13%), to use social media (52% compared with 42%) and to write for a blog (28% compared with 20%).

The same patterns occur when comparing AAAS scientists who see a lot or some public interest in their science specialty with those who say that non-expert citizens generally have not too much or no interest in their specialty area.

AAAS scientists who believe non-expert citizens have a lot or some interest in their specialty area are more likely than other scientists to talk with citizens; 43% do so "often" compared with 22% among those who see little interest among the public about their specialty. Similarly, AAAS scientists who perceive more public interest are more likely than others to talk with reporters about new research on an often or occasional basis, to use social media to talk about or follow science and to blog about science.

Scientists Who See More Interest Among Citizenry Are Also More Likely to Engage with Public

% of AAAS scientists in each group who do the following in connection with science research



AAAS scientists survey Sept. 11- Oct. 13, 2014. Q50a-f. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Other responses and those giving no answer are not shown.

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Social scientists and earth scientists are the most likely to engage the public through various channels

There are also disciplinary differences when it comes to the scientists who are most likely to engage the public in these various ways. Social scientists connected with AAAS and others working in the history of science or on science policy issues are particularly likely to engage the public. So, too, are earth scientists more likely than those in other areas to be involved in interactions with the public, the media, and through blogs: 53% of earth scientists often talk with citizens, 31% talk to reporters often or occasionally, and 31% blog about science in general or about their research and specialty area. The share using social media like Facebook or Twitter to talk about science or to follow tweets about research in their specialty ranges from four-in-ten among physicists and astronomers to 53% among AAAS members in the social sciences, policy or history fields.

Social Scientists and Earth Scientists Are the Most Publicly Engaged

% of AAAS scientists in each discipline who do each activity

	Often talk with citizens	Often/ occasionally talk with reporters	Ever use social media	Ever blogs
Primary discipline				
Biomedical	35	19	48	21
Chemistry	24	11	45	21
Earth science	53	31	50	31
Engineer	34	15	43	24
Physics and astronomy	40	26	40	24
Math and computer science	32	11	45	30
Social, history, policy	50	35	53	38

AAAS scientists survey Sept. 11–Oct. 13, 2014. Q50a-f. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Those giving other responses or no answer are not shown. Those with some other primary discipline not shown.

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Scientists who engage tend to do so in multiple ways

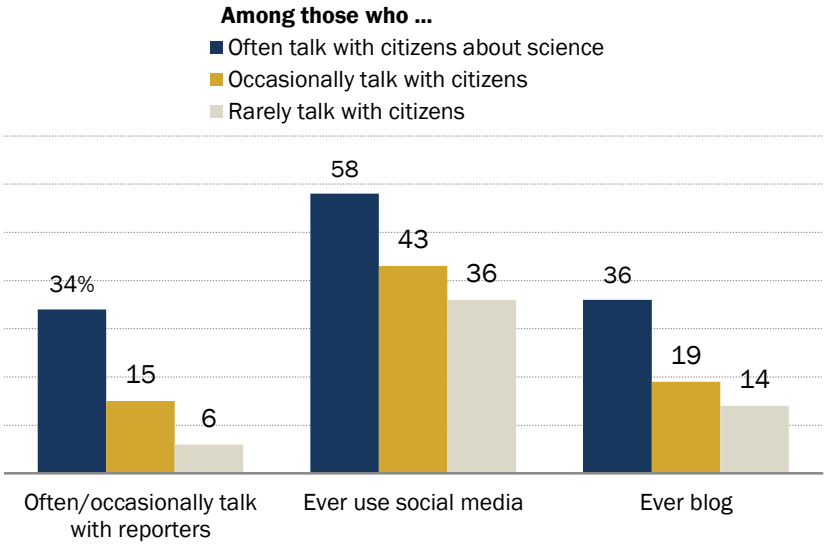
Those who are involved in public activities tend to use various means to do so. Some 41% of AAAS scientists report that they "often" or "occasionally" do at least two of these four activities: 1) talk with non-experts about science topics, 2) talk with the media, 3) use social media or 4) blog. Nearly half, 48%, do only one of these four activities either often or occasionally, and 11% do none of these often or occasionally basis.

Those who are more engaged by this metric are slightly younger: 46% of those ages 18 to 49 and 44% of those ages 50 to 64 are more engaged, compared with 33% among those ages 65 and older. A somewhat larger share of women (44%) than men (39%) report doing at least two of these activities occasionally or often.

While talking with non-expert citizens is common among all AAAS scientists, those who often do so are also more likely than other AAAS scientists to talk with reporters at least occasionally, to use social media to talk about science, and to blog.

Scientists Who Talk with the Public Often Are Also More Likely to Engage in Other Ways

% of AAAS scientists who do each of the following in connection with science research



AAAS scientists survey Sept. 11- Oct. 13, 2014. Q50a-f. Those who never talk with the citizens about research are not shown. Ever use social media based on combined responses to Q50d,e. Ever blog based on combined responses to Q50a,f. Other responses and those giving no answer are not shown.

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The advice scientists offer about how to create more support for scientific research

In an open-ended question, AAAS scientists were asked to share their thoughts on the best ways to encourage public support for scientific research. Fully 65% provided their ideas on this topic. The advice covered a number of themes, but many emphasized the importance of communicating with the public and becoming more involved with the local community, especially in schools.

Among those responding, some 21% of AAAS scientists advised others to use scientific advancements, especially in the medical field, to explain science's impact in people's everyday lives. Another 21% mentioned communication in general terms, while 6% expressed the importance of treating lay audiences as smart. Also, 5% said explaining research with less jargon would increase the society's support for scientific research.

Some 8% of scientists urged their colleagues to present research findings transparently, while others said focusing on quality research would lead to more public support (2%).

Many discussed the importance of scientists becoming involved with children and education. One-in-five mentioned volunteering at local schools or promoting science education. Another 3% said mentoring children was an effective way to develop more support for scientific research.

Political engagement was mentioned by a number of those responding; 16% said becoming more involved in politics would be an effective strategy to gain support, while 3% thought less politics in science would increase public backing.

Scientists Cite a Host of Strategies to Encourage Societal Support for Science Research

% of AAAS scientists who mention each of the following as a way to encourage societal support for scientific research today

Communicate (general)	21%
Explain the impact of scientific research to our daily lives	21
Volunteer/teach at schools /focus on improving education, including STEM	20
Reach out to politicians/get involved in politics or policy/vote	16
Reach out to media (all forms)/educate media on science news	14
Do not oversell research findings/make sure work is ethical/transparent	8
Treat lay audience as smart/don't talk down/listen to concerns	6
Communicate research more clearly, use less technical terms	5
Get involved with non-science community-based organizations	4
Talk with children about science (outside of school)/be a mentor	3
Explain the necessity of scientific research to future innovation	3
Keep politics out of science	3
Support or promote scientific TV shows	2
Talk to friends/family/neighbors about science	2
Support scientific organizations	2
Work hard/focus on high quality work	2
Speak out against scientific misconceptions	1
Reach out to U.S. and international business community	1
Other ideas and comments	14

Source: AAAS scientists survey Sept. 11–Oct. 13, 2014. QC. Based on those who gave a response, N=2,481. Open ended responses. Responses do not add to 100% because multiple responses are coded for each respondent.

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Getting scientific research covered in the news and educating journalists who write about science was mentioned by 14%; another 2% mentioned supporting science-themed TV shows, like NOVA or Cosmos.

Other responses emphasized the importance of building support closer to home - 4% mentioned getting involved in community organizations, while 2% said talking to friends, family and neighbors was a good way to get people excited about science.

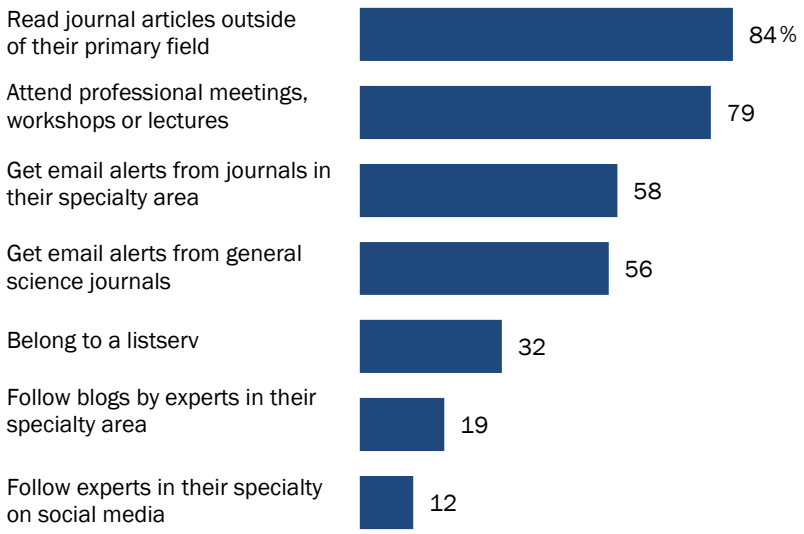
The ways scientists stay up-to-date

The Pew Research survey of AAAS scientists sought insight into how scientists keep abreast of developments in science. It is still the case that traditional information and peer networking activities are the most common ways scientists stay up-to-date. However, digital methods are now a common part of the learning toolkit for scientists.

In keeping with the trend toward interdisciplinary work, 84% of AAAS scientists read journal articles outside of their primary fields or scientific discipline. In addition, 79% say they attend professional meetings, workshops and lectures.

How Scientists Keep Up with Their Specialty Area

% of AAAS scientists who use each of these methods to stay up-to-date in their specialty area



AAAS scientists survey Sept. 11-Oct. 13, 2014. Q49a-g. Those not selecting each item or giving no answer are not shown.

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Still, digital communications are also a common part of the learning activities of scientists as they connect with peers: 58% get email alerts from journals in their specialty; 56% get emails from general science journals; 32% belong to email listservs; 19% follow blogs by experts their fields; and 12% follow tweets or other postings in social media by experts in their field.

Another 10% of these scientists cited additional ways they stay up-to-date.

There is some variance across different scientific disciplines in the level of participation among AAAS scientists in these activities. Biomedical and social scientists are especially likely to cite email alerts from specialty journals as one way they stay abreast of new developments. Also, biomedical scientists are more likely than AAAS scientists in other disciplines to use general-science email alerts. Math and computer scientists, along with social scientists, are especially likely to mention blogs by experts in the field as a tool for staying up-to-date. And social scientists, followed by earth scientists, math and computer scientists and biomedical scientists are more likely to say they use listservs as a tool for learning and connection.

Scientists in Biomedical, Social Sciences Are Especially Plugged In Digitally

% of AAAS scientists in each discipline who pursue these activities in order to stay up-to-date in their specialty area

	Bio-medical	Chemistry	Earth scientists	Engineer	Physics, astronomy	Math, computer sciences	Social, history, policy
Get email alerts from journals in your field	66	50	50	46	45	47	57
Get email alerts from general science journals	61	47	53	52	50	51	54
Belong to listservs	33	18	38	20	24	37	50
Follow blogs by experts in your field	17	12	23	14	16	38	32
Follow experts in your specialty on social media	12	9	12	7	9	17	15

AAAS scientists survey Sept. 11-Oct. 13, 2014. Q49a-g. Those not selecting each item or giving no answer are not shown. Those with some other primary discipline not shown.

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Appendix A: About the AAAS Scientists Survey

The survey of scientists was conducted online with a random sample of 3,748 U.S.-based members of the American Association for the Advancement of Science (AAAS) from Sept. 11 to Oct. 13, 2014. AAAS is the world's largest general scientific society, and includes members from all scientific fields. Founded in 1848, AAAS publishes *Science*, one of the most widely circulated peer-reviewed scientific journals in the world. Membership in AAAS is open to all. The survey was conducted under the direction of Princeton Survey Research Associates International.

Sampling

A simple random sample of AAAS members was selected for participation by the staff of AAAS. Eligibility was limited to U.S. members but otherwise used a broad definition of the scientific community. AAAS members of any discipline or background were eligible to participate except for those whose membership type indicated that they were primary or secondary educators. AAAS staff and institutional members were also excluded from eligibility.

The sample was designed to replicate that used in the 2009 survey of AAAS members, and thus to maximize comparability of samples between the two time points. While it's possible that the composition of AAAS members could have changed in substantive ways over time, comparisons of population characteristics in the AAAS membership database for 2009 and 2014 as well as sample characteristics from survey respondents suggest that AAAS member characteristics have stayed about the same on a variety of demographic and professional characteristics.

Weighting

Survey-based estimates of the population of AAAS members could be biased if some members are more or less likely than others to participate in the survey. To help ensure sample representativeness, the data were weighted to match population characteristics of AAAS membership for three characteristics: membership category, fellowship status and email availability. Membership categories of the organization adjust for a somewhat lower response rate among student members and a somewhat higher response rate among other membership types including emeritus and professional memberships. AAAS fellows also had somewhat higher response rates compared with non-fellow members and thus weighting adjusts for that differential response rate. As expected, those with no email availability responded at somewhat lower rates, perhaps due to the greater difficulties this group faces participating in an online survey. Weighting also included an adjustment for contact via email or mail-only. Post data collection statistical adjustments require procedures that reflect departures from simple random sampling. The total design effect for this survey is 1.10.

The margins of error table shows the unweighted sample sizes and the error attributable to sampling that would be expected at the 95% level of confidence for different subgroups. The survey's margin of sampling error is the largest 95% confidence interval for any estimated proportion. For example, the margin of error for the entire sample is ±1.7 percentage points. This means that in 95 out of every 100 samples drawn using the same methodology, estimated proportions based on the entire sample will be no more than 1.7 percentage points away from their true values in the population, in this case, U.S.-based scientists in the AAAS. Sampling errors and statistical tests of significance used in this report take into account the effect of weighting. In addition to sampling error, one should bear in mind that question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of opinion polls.

Margins of Error

AAAS scientists in the U.S.

	Sample size	Margin of error in percentage points
All AAAS scientists surveyed	3,748	+/- 1.7
Men	2,756	+/-2.0
Women	986	+/-3.3
Age		
18-49	1,053	+/-3.2
18-34	508	+/-4.6
35-49	545	+/-4.4
50-64	1,159	+/-3.0
65 and older	1,469	+/-2.7
Primary discipline		
Biomedical sciences	1,802	+/-2.4
Chemistry	429	+/-5.0
Earth sciences	270	+/-6.3
Engineering	243	+/-6.6
Math and computer sciences	182	+/-7.6
Physics and astronomy	328	+/-5.7
Social sciences, history and policy	333	+/-5.6
Other	158	+/-8.2

Estimates from this sample of AAAS scientists can be made to the full population of U.S.-based scientists in the AAAS within the survey's margin of sampling error. The margins of error are reported at the 95% confidence level.

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Survey Administration

A total of 19,984 members were mailed a letter requesting participation in the survey. The bulk of selected members (n=18,682) had both an email address and a physical address in the membership database while some had only a physical address available (n=1,302). Multiple contacts via postal mail and email, if available, were made to encourage participation in the online survey.

The invitation letter described the nature and purpose of the survey and included the URL and other access information to the online survey, it used a letterhead showing both AAAS and the Pew Research Center logos, and it was signed by the head of each organization. An initial email was also sent to those with email addresses containing information similar to that on the advance letter in addition to a hyperlink to the survey login. A postcard reminder was sent to all who had not yet responded to the survey about two weeks after the initial mailing. A follow-up email or letter (if no email address) was sent to those who had not yet responded roughly three weeks after the initial mailing. The online survey was closed as of Oct. 13, 2014.

A total of 3,748 members completed the survey for an overall response rate of 18.8%.

Respondent Contact

Dates of contact

For all selected in survey sample	
Invitation letter	Sept. 3
Postcard reminders to all who had not completed	Sept. 22
For members with email addresses	
Email with hyperlink to login	Sept. 11
Reminder email to those who had not completed survey	Sept. 23
For members with mail addresses only	
Reminder letter to those who had not completed survey	Sept. 29

AAAS scientists survey Sept. 11 to Oct. 13, 2014.

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Appendix B: Topline AAAS Scientists Survey

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2014 SURVEY OF AAAS SCIENTISTS
TOPLINE
SEPTEMBER 11 - OCTOBER 13, 2014
N=3,748

NOTE: ALL NUMBERS ARE PERCENTAGES. ANY PERCENTAGES GREATER THAN ZERO BUT LESS THAN 0.5% ARE REPLACED BY AN ASTERISK (*). COLUMNS/ROWS MAY NOT TOTAL 100% DUE TO ROUNDING.

ALL TREND COMPARISONS TO PEW RESEARCH SURVEY OF AAAS SCIENTISTS CONDUCTED MAY 1 TO JUNE 14, 2009, N=2,533

ALL OTHER QUESTIONS PREVIOUSLY RELEASED IN APPENDIX D OR HELD FOR FUTURE RELEASE

QUESTIONS 1 through 4 PREVIOUSLY RELEASED
[RANDOMIZE ITEMS Q5A TO Q5D]
ASK ALL:
Q5 How much of a problem, if at all, do you think each of the following are for science in general?

	Major problem	Minor problem	Not a problem	No answer
a. The public expects solutions to problems too quickly	49	44	7	*
Trend 2009	49	45	6	*
b. The news media oversimplify scientific findings	52	43	5	*
Trend 2009	48	45	6	*
c. News reports don't distinguish between well-founded and not well-founded scientific findings	79	20	2	*
Trend 2009	76	22	2	*
d. The public does not know very much about science	84	14	1	*
Trend 2009	85	14	1	*

QUESTIONS 6 THROUGH 14 PREVIOUSLY RELEASED

[RANDOMIZE RESPONSE OPTIONS]
ASK ALL:
Q15 Which of these statements comes closer to your own view, even if neither is exactly right?

2014	
87	Scientists should take an active role in public policy debates about issues related to science and technology
13	Scientists should focus on establishing sound scientific facts and stay out of public policy debates
*	No answer

QUESTIONS 16 THROUGH 34 PREVIOUSLY RELEASED OR HELD FOR FUTURE RELEASE

ASK ALL:

Q37 How important for career advancement is it for scientists in your specialty area to get their research covered by the news media?

2014		2009
11	Very important	8
33	Important	29
43	Not too important	48
12	Not at all important	14
1	No answer	1

ASK ALL:

Q38 How important for career advancement is it for scientists in your specialty area to promote their findings on social media sites such as Twitter, LinkedIn or Facebook?

2014	
4	Very important
18	Important
46	Not too important
30	Not at all important
1	No answer

QUESTIONS 39 THROUGH 46 PREVIOUSLY RELEASED

[RANDOMIZE QUESTIONS Q47 AND Q48]

ASK ALL:

Q47 How much debate is there in the media over research findings in your primary scientific specialty area?

2014	
17	A lot
36	Some
32	Not too much
14	None at all
1	No answer

ASK ALL:

Q48 How much would you say non-expert citizens are interested in your primary scientific specialty area?

2014	
27	A lot
44	Some
23	Not too much
5	None at all
*	No answer

[RANDOMIZE ITEMS A TO G WITH ITEM H 'OTHER-SPECIFY' ALWAYS LAST]
ASK ALL:
Q49 Which of these do you do or use to stay up-to-date in your specialty area?
[Check all that apply.]

	Selected	NET Not selected/ No answer
a. Get email alerts from journals in your specialty area	58	42
b. Get email alerts from general science journals	56	44
c. Read journal articles outside of your primary field or scientific discipline	84	16
d. Follow tweets or other social media by experts in your specialty area	12	88
e. Follow blogs by experts in your specialty area	19	81
f. Attend professional meetings, workshops or lectures	79	21
g. Belong to listservs	32	68
h. Other (please specify) OPEN END	10	90

[RANDOMIZE QUESTIONS Q50A TO Q50F]
ASK ALL:
Q50a How often, if ever, do you ... write for a blog about science?

2014		2009
2	Often	2
6	Occasionally	5
12	Rarely	11
80	Never	82
1	No answer	1

ASK ALL:
Q50b How often, if ever, do you ... talk with reporters about new research findings?

2014		2009
3	Often	3
18	Occasionally	20
30	Rarely	31
48	Never	45
1	No answer	*

ASK ALL:
Q50c How often, if ever, do you ... talk with non-scientists about science or research findings?

2014		2009
37	Often	39
49	Occasionally	48
12	Rarely	11
1	Never	2
*	No answer	*

ASK ALL:
Q50d How often, if ever, do you ... use social media to talk about science (such as Twitter, Facebook, LinkedIn)*?*

2014	
7	Often
16	Occasionally
18	Rarely
57	Never
1	No answer

ASK ALL:
Q50e How often, if ever, do you ... follow tweets about research in your specialty area?

2014	
5	Often
8	Occasionally
13	Rarely
74	Never
1	No answer

ASK ALL:
Q50f How often, if ever, do you ... write a blog post that describes your research and specialty areas?

2014	
2	Often
6	Occasionally
12	Rarely
79	Never
1	No answer

COMBINED Q50a (How often, if ever, do you ... write for a blog about science?) and Q50f (How often, if ever, do you ... write a blog post that describes your research and specialty areas?)

2014	
24	Ever blog about science/research
74	Never blog about science/research
1	No answer

COMBINED Q50d (How often, if ever, do you ... use social media to talk about science (such as Twitter, Facebook, LinkedIn)? And Q50e *(*How often, if ever, do you ... follow tweets about research in your specialty area?)

2014	
47	Ever use social media to talk/follow science
52	Never use social media to talk/follow science
1	No answer

ASK IF USE SOCIAL MEDIA TO TALK ABOUT SCIENCE (Q50D=1,2,3)

Q51 When you talk about science on social media (such as Twitter, Facebook, LinkedIn), is your message intended...

BASED ON TOTAL

2014	
42	Ever use social media to talk about science Q50d
7	Primarily for science experts
15	Primarily for non-expert citizens
18	Both groups equally
1	No answer
57	Never use social media to talk about science Q50d
1	No answer Q50d

BASED THOSE WHO EVER USE SOCIAL MEDIA TO TALK ABOUT SCIENCE N=1,472

2014	
16	Primarily for science experts
37	Primarily for non-expert citizens
44	Both groups equally
4	No answer

NO QUESTIONS 52 THROUGH 54

QUESTIONS 55 THROUGH OTHER BACKGROUND Q'S PREVIOUSLY RELEASED OR HELD FOR FUTURE RELEASE

ASK ALL:

QC. What advice would you give to scientists and others who want to encourage societal support for scientific research today? Please mention any efforts you think would be especially effective.
[Please type your response in the box.]

2014	
65	Gave response
35	No answer

OPEN END, MULTIPLE RESPONSES ALLOWED
BASED ON THOSE ANSWERING N=2,481

2014	
21	Communicate (general)
21	Explain the impact of scientific research to our daily lives
20	Volunteer/teach in schools/focus on improving education, including STEM
16	Reach out to politicians/get involved in politics or policy/vote
14	Reach out to the media (all forms)/educate media on science news
8	Do not oversell research findings/make sure work is ethical/transparent
6	Treat lay audience as smart/don't talk down/listen to concerns
5	Communicate research more clearly, use less technical terms
4	Get involved with non-science community-based organizations
3	Talk with kids about science (outside of school)/be a mentor
3	Focus on necessity of scientific research to future innovation
3	Explain the necessity of scientific research to future innovation
2	Support or promote scientific TV shows
2	Talk with friends/family/neighbors about science
2	Support scientific organizations
2	Work hard/focus on high quality work
1	Speak out against scientific misconceptions
1	Reach out to U.S. and international business community
14	Other ideas and comments