AI SCIENTISTS’ PERSPECTIVES ON AI

April 2023

A REPORT OF THE SCIENCE, MEDIA, AND THE PUBLIC RESEARCH GROUP
DEPARTMENT OF LIFE SCIENCES COMMUNICATION
UNIVERSITY OF WISCONSIN-MADISON
http://scimep.wisc.edu

SUGGESTED CITATION

INTRODUCTION

Advances in artificial intelligence (AI) technology span across disciplines – impacting an increasing range of industries and aspects of daily life. As AI applications quickly develop in fields from healthcare to crime prevention to law and journalism, profound and diverse lifestyle and policy implications are being realized. Questions at the intersection of values and interest conflicts across different social groups and between developers and users. These questions and concerns associated with how AI applications impact society do not have clear-cut solutions. This report offers an examination of how scientific experts who work on AI think about and respond to the societal impacts of AI applications. We examine expert scientists’ views on potential risks and benefits of AI, potential regulations of AI technology, and personal practices when conducting AI research or developing AI applications.

The following data are from a survey of scientific experts who have published academic journal articles on AI (N=2,199). The survey was conducted from March to April 2022. More details about the survey methodology are available in the “About the survey” section at the end of the report.

FINDINGS SUMMARY

Regarding specific applications of AI, AI scientific experts perceive similar levels of potential risks and benefits of AI.

- AI scientific experts express more positive attitudes about AI technology related to improving the economy and health than other applications. The majority of them think that AI will improve individuals’ health (78.3% likely/ very likely/ certain) and strengthen the U.S. economy (72.6% likely/ very likely/ certain), but also to help fight terrorism threats (60.8% likely/ very likely/ certain) and increase national security (53.9% likely/ very likely/ certain).

- When it comes to potential risks of AI, respondents perceive high likelihood of AI giving some people too much power (70.0% likely/ very likely/ certain); AI displacing workers by automating their jobs (65.7% likely/ very likely/ certain); AI threatening persona liberties (53.5% likely/ very likely/ certain); AI worsening societal inequalities (47.3% likely/ very likely/ certain).

- However, respondents are divided in perceiving the likelihood of AI reducing human bias in human decision-making (38.2% not at all likely/ very unlikely/ unlikely, 28.0% somewhat likely, 33.8% likely/ very likely/ certain) and AI changing what it means to be human (48.5% not at all likely/ very unlikely/ unlikely, 17.4% somewhat likely, 34.0% likely/ very likely/ certain).

Despite differences in perspectives that AI will reduce bias in decision-making, many AI scientists expressed concern about AI worsening discrimination against minorities, especially based on race, income, and existing health risks.

- AI scientific experts express greater concern about AI worsening discrimination against people based on income or social class (48.5% very concerned/
Scientists' Perspectives on AI 

concerned), ethnicity or race (46.0% very concerned/ concerned), and health risks (41.9% very concerned/ concerned), as compared to discrimination based on age (34.1% very concerned/ concerned), gender (33.6% very concerned/ concerned), sexual orientation (30.3% very concerned/ concerned), and religion (27.2% very concerned/ concerned).

Most AI scientific experts are aware of unintended consequences of AI applications and perceive that existing regulations for AI applications are insufficient. However, they also recognize that there are trade-offs between regulating AI and scientific and innovation progress.

- Over ninety percent (90.3%) of respondents agree or strongly agree that there will be unintended consequences of AI applications. At the same time, over three-quarters of them are not confident that “As a society, we are prepared for the potential effects of AI applications” (75.9% strongly disagree/disagree).
- Respondents perceive existing regulations for AI applications as less sufficient than those for AI research. Only 6.1 percent of them agree or strongly agree that existing regulations for AI applications are sufficient, whereas 20.0 percent of them agree or strongly agree that existing regulations for AI research are sufficient.
- However, while two thirds of respondents disagree that advancing AI quickly is more important than protecting society from the unknown risks of AI (64.6% strongly disagree/disagree). Close to half expressed concern that regulating AI may significantly slow down important scientific and innovation progress (44.4% strongly agree/agree).

AI scientific experts' views on whether AI applications should be regulated by the U.S. federal government vary widely across various AI applications.

- The applications with the strongest support (strongly agree or agree) for regulation by the federal government include lethal autonomous weapons (93.0%), surveillance technology (86.1%), and autonomous vehicles (83.8%).
- High majorities of AI scientists also strongly agree or agree that the U.S. federal government should regulate data-driven policing (76.0%), deepfakes (73.5%), social scoring (66.0%), personalized medicine (65.5%), and brain organoid technology (58.7%).
- Differences in perspectives of federal regulations are most evident for applications such as chatbots (41.4% strongly agree/agree, 32.2% neither agree nor disagree, 26.5% strongly disagree/disagree) and smart personal assistants (33.7% strongly agree/agree, 32.4% neither agree nor disagree, 33.8% strongly disagree/disagree).

If there are new regulations for AI research and use in the U.S., there is consensus among AI scientific experts that university and industry scientists, regulation agencies, and citizens should be involved in the regulatory process. However, views diverge over the inclusion of governmental branches and big tech companies.

- Most respondents agree that the following actors should have a say in the development of AI regulation, including university scientists (90.8%), regulatory
agencies that oversee AI applications (78.8%), citizens through public engagement mechanisms (76.4%), industry scientists (74.8%), and AI-related non-profit organizations (71.9%).

- Large majorities also agree that end users (67.7%), digital rights groups (67.5%), congress (61.1%), and intergovernmental bodies or agreements (57.2%) should have a say.
- However, there is less consensus on whether the branches of government and big tech companies should have a say. Just over half of respondents think that the U.S. court system (51.6%) should have a say in the development of AI regulation, and less than have think that law enforcement agencies (49.3%), large technological companies (46.6%), and the White House (43.1%) should have a say.

One important factor that influences how AI scientists’ form their attitudes towards science and regulations of science are their value predispositions about the relationship they see between scientists (like themselves) and the broader public.

- There is a strong belief by AI scientists in the authority of science, with 86.8% agreement (agree and strongly agree) that science is the best way that society has of producing reliable knowledge and 71.2% agreement that science is the best way to understand the world.
- Despite these perspectives on the authority of science, AI scientists show mixed perspectives about the degree of deference to scientific authority among AI scientific experts. About half of respondents (50.7%) do not think (strongly disagree or disagree) that “scientists know best what is good for the public” and only 11.7% strongly agree or agree with the statement. However, over half of them (57.3%) strongly agree or agree that “scientists should do what they think is best, even if they have to persuade people that it is right.” Furthermore, they have mixed views regarding the statement that “scientists should be able to conduct their research without consulting the public” (32.5% strongly agree/agree, 26.1% neither disagree nor agree, 41.4% strongly disagree/disagree).
- AI scientists show high agreement with communicating about AI, with 82.6% agreeing (strongly agree or agree) that it is appropriate for scientists to become actively involved in political debates about issues like AI. About two thirds respondents (63.4%) agree or strongly agree that “scientists should pay attention to the wishes of the public, even if they think citizens are mistaken or do not understand their work.” However, they consider that scientists’ views are more important than the public opinion, with over half of them (55.7%) expressing disagreement (strongly disagree or disagree) towards the statement that “public opinion is more important than the scientists’ opinions when making decisions about the ethical implications of scientific research.”

How AI scientists view expectations around scientific conduct are more nuanced.

- About two thirds of respondents (66.0%) agree or strongly agree that a discovery is in itself neither good nor bad, it is only the way the discovery is used that matters. However, respondents are divided in their perspectives on the statement that “scientists are responsible for the way their discoveries are used by other
Scientists’ Perspectives on AI

people” (29.1% strongly agree/ agree, 26.1% neither disagree nor agree, 44.8% strongly disagree/ disagree).

- AI scientists agree that ethical standards are important for scientific practice. Specifically, a large majority of respondents (86.5%) agree or strongly agree that the authorities should formally require scientists to respect ethical standards. Likewise, there is high agreement (83.4% strongly agree/ agree) on the statement that “scientists should be free to carry out the research they wish, provided they respect ethical standards.”

- With regards to the classification science into “hard” and “soft” science categories, AI scientists hold mixed perspectives as to whether such classification is useful (25.8% strongly agree/ agree, 35.7% neither disagree nor agree, 38.5% strongly disagree/ disagree).

AI research and development is interdisciplinary in nature with a broad range of AI applications that impact nearly every aspect of society and our daily lives. Thus, the many journal articles, policy documents, and reports related to AI encompass this range of topics – from the technical aspects, commercialization, and market transfer of AI to ethics, responsible development, and societal implications of AI. We examine this diversity by further exploring what AI scientific experts read and cite in their research and who they collaborate with.

- Although fields like computer science and social science are different in their methodology and publication placements, AI scientists overall hold relatively positive attitudes toward both fields. For instance, a majority of respondents (72.9%) agree or strongly agree that “computer science research can greatly extend social theories by investigating social data that are co-shaped by algorithms and human behavior.” Additionally, when it comes to perspectives of social science research, 45.7 percent of respondents agree or strongly agree that “social science research is rigorous as research in other fields of science,” compared to only 25.4 percent that disagree or strongly disagree.

- We asked how often AI scientists read AI-related journal articles, policy documents, and reports that discuss ethics and responsible development of AI or societal implications of AI over the last three years. Not surprisingly, AI scientists most often read about technical aspects of AI, with 76.8 percent reporting reading often or very often about them. Respondents read about societal implications of AI, ethical implications of emerging technologies or commercialization and market transfer of AI much less often. Only about a third of respondents read about these areas often or very often (societal implications: 38.9%, social ethics: 34.1%, commercialization: 31.7%).

- Citing research is a more formal way of knowledge production in academia. When asked how often AI scientists cite work related to these different AI topics, over three-quarters (76.4%) said they cited research and reports focused on technical aspects of AI often, or very often. However, respondents cite research and reports about societal implications of AI, ethical implications of emerging technologies or commercialization and market transfer of AI much less often (societal implications: 22.7%, social ethics: 18.6%, commercialization: 15%, reporting often or very often). In fact, many respondents expressed that they
never cite research or reports about these aspects (societal implications: 21%, social ethics: 25.5%, commercialization: 29%).

- As machine learning and other AI-related techniques are widely used in researching a diverse range of topics, it is common that scholars collaborate with researchers from different fields. Over four-in-ten respondents at least collaborate and/or coauthor with researchers from the field of life sciences (50.5%), physical sciences (42.3%), or social sciences (41.5%). Comparatively, 85.7 percent of respondents have collaborated and/or coauthored with computer scientists.

Because AI development increasingly involves various stakeholders and has implications of diverse publics, we also examined what engagement activities AI experts participate in. Specifically, whether they participated in the following activities: interviews with journalists, interacting with government bodies or officials, collaborating with industry or professional stakeholders, presenting research to the public, and including members of the public directly in the research process.

- Over 89.7 percent of the respondents have participated in at least one of these forms of engagement. The most common activities respondents participated in include presenting research to the public (74.8% yes) and collaborating with industry or professional stakeholders (64.0% yes). Engagement with government bodies (37.9% yes) and journalists (31.2% yes) and including members of the public directly in the research process (16.0% yes), were less common.

- Different communication strategies are necessary for engaging with a broad range of audiences. During these interactions AI experts may choose to mention research about various aspects of AI. We find that during interviews with journalists, respondents reported that they mention a variety of these sources: 57.4 percent often or very often mention sources that discuss technical aspects of AI, 49.4 percent often or very often mention sources that discuss societal implications of AI, and 40.9 percent often or very often mention ethics and responsible development of AI.

- When AI experts include the public directly in the research process, they discuss societal implications and ethics of AI more than technical aspects. Specifically, about half of respondents often or very often mention societal implications of AI (52.8%) and ethics and responsible development of AI (46.6%). Comparatively, about four-in-ten of respondents often or very often mention technical aspects of AI (41.3%).
FIGURES

How likely do you think it is that AI will…
How concerned are you about AI worsening discrimination against people based on...
How much do you agree or disagree with the following statements about AI-related regulations?

- There will be unintended consequences of AI applications.
- Regulating AI may significantly slow down important scientific and innovation progress.
- Existing regulations for AI research are sufficient.
- Advancing AI quickly is more important than protecting society from the unknown risks of AI.
- As a society, we are prepared for the potential effects of AI applications.
- Existing regulations for AI applications are sufficient.

Percentage of respondents:

- **Strongly agree**
- **Agree**
- **Neither agree nor disagree**
- **Disagree**
- **Strongly disagree**
How much do you agree or disagree that the U.S. federal government should regulate the following AI applications? The U.S. federal government should regulate…
If there are new regulations for AI research and use, which of the following groups should have a say in the development of these regulations in the United States?
Now thinking about the relationship between scientists (people like you) and the public, how much do you agree or disagree with the following statements?
Please indicate the extent to which you disagree or agree with each of the following statements about science, scientists, and their scientific conduct.

1. The authorities should formally require scientists to respect ethical standards
2. Scientists should be free to carry out the research they wish, provided they respect ethical standards
3. A discovery is in itself neither good nor bad, it is only the way the discovery is used that matters
4. Scientists are responsible for the way their discoveries are used by other people
5. It is useful to classify science into hard and soft sciences

Percentage of respondents:

- Strongly agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly disagree
Below are some statements people have made about computer sciences and social sciences. How much do you agree or disagree with the following statements?
Please think about the AI-related journal articles, policy documents, and reports that you have read over the last three years. With that in mind, how often would you say you read about the following topics?
Please think about the AI-related journal articles, policy documents, and reports that you have written over the last three years. With that in mind, how often would you say you cite sources that discuss the following topics?
Please think about the AI-related journal articles, policy documents, and reports that you have written over the last three years. With that in mind, how often would you say you collaborate and/or coauthor with researchers in the following areas?
In the past three years, have you done any of the following to communicate about AI?
Thinking about your interviews with journalists, how often would you say you mention sources that discuss the following topics?
Thinking about your interactions with government bodies or officials, how often would you say you mention sources that discuss the following topics?
Thinking about your collaboration with industry or professional stakeholders, how often would you say you mention sources that discuss the following topics?
Thinking about when you present research to the public, how often would you say you mention sources that discuss the following topics?
Thinking about when you include members of the public directly in the research process, how often would you say you mention sources that discuss the following topics?
ABOUT THE SURVEY

This survey received Institutional Review Board approval for all parts of the data collection and analyses. Participants gave informed consent after receiving explanations of the study and possible consequences. Excluding 6,178 bounced emails, a total of 29,655 AI scientific experts with nonidentical emails were contacted to participate in a 15-minute web survey on Qualtrics. No incentives were provided. The survey was conducted from March to April 2022 with one initial email invitation and three subsequent reminders to non-respondents. The sample consisted of 2,352 respondents who had completed at least eighty percent of the survey, with a response rate of 8%.

To ensure the quality of the sample and examine non-response biases, we compared the demographic and professional characteristics of respondents across all four waves of email contact. The wave refers to the time when respondents submitted their survey relative to the round of email invitations or reminders. Using Tukey’s test for post-hoc analysis and the chi-square test, I did not find any significant individual differences in age, gender, and title across the four waves of email contact. There were some differences in professional characteristics. The average academic age of wave 2 is younger than that of wave 1. Compared to wave 1, wave 4 has more scientists from engineering but fewer from social, behavioral, and economic sciences. The components of scientists from the other fields remain similarly across the four waves of email contact. Besides, during the four weeks of the survey implementation, news coverage of AI, such as the use of AI in the Russia-Ukraine war, could have driven higher attention to the societal impacts of AI and indirectly influenced our response rate. However, no statistically significant differences were found in terms of attention to political and science news among respondents across the four waves of email contact. Therefore, we conclude that this sample has reached AI scientists from a wide range of fields, without overt self-selection biases.

The respondents in the sample represent a range of positions, including university faculty (62.8%), industry scientists and engineers (16.5%), government scientists (7.1%), graduate students (8.2%), and others (5.4%). Respondents focus on diverse subfields of AI, such as machine learning (80.7%), computer vision (25.5%), natural language processing (24.4%), knowledge representation (16.2%), ethics and societal impacts of AI (16.0%), robotics (10.5%), automated reasoning (9.3%), and other AI-related subfields (3.4%). 5.1% of the respondents identified that their work is not related to AI. The respondents also come from various academic fields, including computer and information science (48.4%), engineering (27.7%), medical sciences (19.1%), social, behavioral, and economic sciences (15.2%), mathematical and physical sciences (14.2%), biological sciences (14.2%), geoscience (4.0%), agriculture and food sciences (3.2%), arts and humanities (3.2%), environmental resources and education (2.8%), and education and human resources (2.3%). Because this dissertation focuses on AI scientific experts, those who are from the fields of arts and humanities or those who do not identify their work as related to AI are not included for analysis. The number of eligible participants for analysis is 2,199.

Regarding demographics, the mean age is 45.3 years ($SD = 13.1$) and the mean academic age is 14.8 years ($SD = 12.8$). The gender distribution is as follows: 79.0 percent males, 18.1% females, and 0.8% non-binary. The sample has a majority of
white (59.9%) and Asian (30.0%) respondents, followed by Hispanic or Latino (5.1%), Black or African American (2.0%), American Indian or Alaskan Native (0.5%), Native Hawaiian or the Pacific Islander (0.3%), and others (4.5%).
CONTACT

Luye Bao
Assistant Professor
Peking University HSBC Business School
luyebao@phbs.pku.edu.cn

Dominique Brossard
Professor and Chair
Department of Life Sciences Communication
University of Wisconsin-Madison
dbrossard@wisc.edu

This material is based upon work supported by the Wisconsin Alumni Research Foundation and the Morgridge Institute for Research. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of these organizations.