Reshaping the Transatlantic Science Diplomacy Space: Strategic Visions for a New Governance Model between Science and Society

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ABSTRACT

Progressive change and American leadership in global affairs are challenged by populism. The European Union has been shaken by the euro crisis, waves of migrants, and the aftershocks of the Great Recession. As the political and economic landscape has been shifting, maintaining global leadership for the transatlantic partners requires creative, new ways of thinking. Science and technology are essential engines of economic growth and they are strategic assets not only to EU and US foreign policies, but also to transatlantic relations. Intensive cooperation in this policy area and a more active engagement in science diplomacy are vital to transatlantic interests.

While the European Commission launched initiatives, such as the "Research, Innovation, and Science Policy Experts" high level group, and Europe seems to have made a continued commitment to responding to the challenges of globalization and social sustainability, it is harder to pinpoint such commitment in the US under the Trump administration. Building on two different science communication models, the scientific literacy model and the interactive science model, this research compares and contrasts how the EU and the US could strengthen their distinct science-society connection so that populist, ignorance-based politics could be countered.

This research aims to contribute to theorizing science communication as well as finding empirical evidence, using web scraping and content analysis, to look at governance structures and reimagine informal institutions that facilitate citizen engagement in enlightened debates in a virtual public sphere. The hypothesis is that greater public engagement ultimately leads to a push for legislation to invest more in scientific and technological innovations. Lastly, the paper/project considers the role of communication networks to boost domestic and transatlantic science diplomacy.

INTRODUCTION

"Scientists should challenge online falsehoods and inaccuracies — and harness the collective power of the Internet to fight back"

Phil Williamson 2016

21st century-level complexity in IR stimulates new modes of interactions among new and old actors and transforms social, economic, and political structures. Growing complexity that characterizes global foreign policy problems requires transnational cooperation. However, the global agora has been experiencing an erosion of collaborative patterns due to, a significant extent, the rise of divisive populist politics. As a consequence, efforts to maintain cooperative patterns worldwide and to defend the integrity of the democratic process domestically has proven to be rather challenging. The upsurge in *populism*[1] began to undermine democracies, transnational cooperation and, ultimately, contributes to a decline in the quality of our lives. "[P]opulist governments have deepened corruption, eroded individual rights, and inflicted serious damage on democratic institutions" (Mounk & Kyle, 2018, p. 1). We are witnessing the appeal of strongmen...severe setback for democracy worldwide; thirteen years of consecutive decline, *democracy in retreat worldwide* (Freedom House, 2019). Scholars are continuously trying to solve this puzzle and tease out the *key factors* that are causing *this negative trend*.

"Post-truth" politics

Although there have been signs earlier in this new century that scientific research might be entering a period when the political environment is not congenial to truth-seeking and the overall endeavors of scientific research, it was not yet entirely evident until recently that, operating in the age of post-truth or post-factual politics,[2] conducting such activities would face as many difficulties as it currently does. As philosopher, Kathleen Higgins (2016) affirms, "The Oxford Dictionaries named 'post-truth' as their 2016 Word of the Year. It must sound outlandish to scientists. Science's quest for knowledge about reality presupposes the importance of truth, both as an end in itself and as a means of

[1] Populism "means different things to different groups, but all versions share a suspicion of and hostility toward elites, mainstream politics, and established institutions. Populism sees itself as speaking for the forgotten "ordinary" person and often imagines itself as the voice of genuine patriotism" (Zakaria, 2016).

[2] a political culture in which debate is framed largely by appeals to emotion disconnected from the details of policy, and by the repeated assertion of talking points to which factual rebuttals are ignored. Post-truth differs from traditional contesting and falsifying of truth by rendering it of "secondary" importance (Wikipedia).

resolving problems. How could truth become passé?" (*Nature*, "Post-Truths: A Guide for the Perplexed"). As The Economist writes,

> [a] key problem is that the term, post-truth politics, "picks out the heart of what is new: that truth is not falsified, or contested, but of secondary importance …Trump is the leading exponent of "post-truth" politics—a reliance on assertions that "feel true" but have no basis in fact ("Post-truth politics: Art of the lie," September 10, 2016).

This paper is part of a larger project that aims to give a more comprehensive answer to questions presented in this paper, such as **who are, and who could be, the most influential actors** in shaping science communication strategies, what can they do, and what role cultural differences in the communication process play in shaping science and technology policy in today's 'risk society?'[3]

The Perils of Ignorance in a Democratic Society

"The art of political horse-trading…lets people of different beliefs live together in a peaceful, thriving society. In a liberal democracy, nobody gets exactly what he wants, but everyone broadly has the freedom to lead the life he chooses. However, without decent information, civility and conciliation, societies resolve their differences by resorting to coercion"

Crick, 1962; The Economist 2017, p.

Thomas Jefferson has warned about *the perils of ignorance* in a democratic society. Progressive change and transatlantic leadership in global affairs are challenged by a populist political culture facilitated by a breakdown of a consensus that the pursuit of knowledge is good and that scientific experts are trustworthy, and their evidence-based opinion matters more than value-laden opinions of non-experts. A prospective problem with science and the scientific way of thinking is that is has to be learned. Furthermore,

> scientific explanation stands in contrast to the wisdom of divinity and experience and common sense. Common sense once told us that the sun moves across the sky and that being out in the cold produced colds. But a scientific mind recognized that these intuitions were only hypotheses. They had to be tested…The scientific orientation has proved immensely powerful. It has allowed us to nearly double our lifespan during the past century, to increase our global abundance, and to deepen our understanding of the nature of the universe. Yet scientific knowledge is not necessarily trusted (Gawande, 2016, p. 1).

"Science matters, but science and the ideas of scholars and scientific researchers *also need to be made to matter"* (Legrand & Stone, 2018, p. 2, emphasis added). In their paper, "Science diplomacy and transnational governance impact," Legrand and Stone maintain that politics and international studies can be impactful (2018).

[3] Beck, Ulrich *Risk Society: Towards a New Modernity*. London, UK: Sage Publications Ltd., 1992.

As social media dominated international communication is becoming an ideological battleground, sweeping dis/misinformation, propaganda, manipulation, and dark money that moves these out of politics requires innovative, digitally driven changes within the public sphere.[4] To restore the integrity of the democratic process in the era of "post-truth" politics, it is essential to seek novel ways to uphold the importance of truth-seeking, science, and educate for global understanding and competence.

Emerging technologies have important implications for the political process and the quality of democracies. What are the stakes locally and internationally? Information technology, artificial intelligence or robotics spur (and are spurred by) innovation, represent progressive development in their respective fields and improve the human condition, but they represent both opportunities as well as potential threats within sociopolitical systems. Uncertainty and ambiguity accompany such, often times radical fast-paced, developments and their impact on various actors, institutions, their interconnections, and on the knowledge production process. As these developments have the potential to prompt social, political, and economic paradigm shifts, the only way to cope with the resulting shifts is to assess challenges/risks and opportunities and adapt. **The strategies of adaptation demand a rethinking of responses and find new ways to strike back**.

A critical side of the **science, technology and society connection** is *ethics*. With new discoveries and new technologies, we are seeing the emergence of ethical issues more intensely over time. Just as we have seen corporate ethics being on the agenda during the 1980s and 1990s in an institutionalized form, today we are seeing computer science ethics being taught for the first time at Harvard University. As the ethical implications of different subject matters can no longer be ignored and societal groups begin to push to put those on the agenda, policy-makers and politicians will no longer be able to ignore those. A Harvard Initiative that not only emphasizes learning about the societal implications of emerging technologies, but also teaches skills of **ethical reasoning and communications***,* might soon be seen as a model for others in academia. Their goal is to train technical experts in such a way so that they think not only about what they could achieve in their respective fields, but also about what they *should* do/create. "Expert in artificial intelligence and a pioneer in natural language processing," Professor of Natural Sciences at the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) Barbara Grosz designed an interdisciplinary course, called

[4] "Public spheres are sites of communicative interaction that feature citizens turning their attention to collective problems and democratically legitimate solutions" (Pfister, 2018).

"Intelligent Systems: Design and Ethical Challenges," in 2015 in an effort to try to **influence the mindset of future computer scientists** (Grosz as cited in Karoff, 2019).

During the past decade, Benkler et al. have collected data and studied "the impact of newly emerging digital communication on society, politics, and democracy" (Benkler, 2018, p. vii). In their book, *Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics*, these authors argue that

> technological processes beyond the control of any person or country— the convergence of social media, algorithmic news curation, bots, artificial intelligence, and big data analysis—were creating echo chambers that reinforced our biases, were removing indicia of trustworthiness, and were generally overwhelming our capacity to make sense of the world, and with it our capacity to govern ourselves as reasonable democracies (Benkler, 2018, p.4).

As Benkler et al. contend however that "Technology is not destiny. Technology interacts with institutions and ideology to shape how we make meaning, how we organize our affairs across economic, political, and personal domains, and how we make our culture and identity" (2018, p. 381). While short-term tech-based solutions might not bring ultimate solutions to disruptive communication problems, a multitude of diverse initiatives and a systematic development and institutionalization of such structures is a very good start. A "focus on the…longterm dynamic between institutions, culture, and technology, not only the disruptive technological moment; and on the interaction between the different media and technologies that make up a society's media ecosystem, not on a single medium, like the internet, much less a single platform like Facebook or Twitter. The present epistemic crisis in the United States

> is a phenomenon rooted in the radicalization of the right wing of American politics and a thirty-year process of media markets rewarding right-wing propagandists. We suspect that a similarly broad and long-term lens will be required to properly understand the rise of far-right parties and their information ecosystems elsewhere. At least in the United States, we find here that a failure to do so results in severe misdiagnosis of the challenges we face. (Benkler et al, 2018, p. 42).

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Reforming socio-technical systems require investment in developing creative solutions to emerging problems. International communications scholars and other scientists, working together with policy-makers and the public, need to make it a priority to develop multi-pronged approaches to counter network propaganda and find avenues to shaping the architecture of the media ecosystem in a way that becomes "less susceptible to disseminating these kinds of manipulations and lies" (Benkler et al. 2018, p.24). **This paper argues that both formal and informal institutional building blocks of science diplomacy can make or break the success of transatlantic partnership**. "The term 'science diplomacy' is relatively new. It's been used for less than a decade. However, diplomacy and science have intertwined throughout the ages" (https://-www.aaas.org/-programs/center-science-diplomacy/introduction).

THEORETICAL BACKGROUND

"Facts do not cease to exist because they are ignored."

Aldous Huxley

Discussing the history of science mass communication, Einsiedel and Thorne (1999) examine the construction of science publics. They show how the two seemingly different understandings, the scientific literacy model and the interactive science model could possibly be merged (Layton, Jenkins, Macgill & Davey, 1993). As they explain, the *first model* suggests, "knowledge of particular basic scientific ideas and concepts is required for people to function well in a variety of cultural contexts. Scientific knowledge in this framework is generally portrayed as fixed and certain" (Miller 1987, Hirsch, 1988 as cited in Einsedel and Thorne). The essence of this model is that "to be scientifically literate is a societal good" (Layton et al., 1993). As this paper insists, audiences need to be scientifically literate; however, audiences are non-homogenous and

> attentiveness changes with time, place, and issue, and science is a subject whose contours change for different publics at different times….in some situations, the need for public education is acute, making it imperative to provide information to the public (Einsiedel and Thorne, 1999, p. 51).

The *second model* "takes as a given that uncertainties [are] embedded in the scientific enterprise and the idea that science cannot be separated from its social and institutional connections." In this model, the public is conceptualized as adding value (or at least some

of the public doing so) to the scientific process through their profession-related expertise and understanding (adaptation, interpretation they need to do their jobs). In cases when the public is directly involved on an ongoing basis, such as “farmers dealing with radiation…in a nuclear power plant…scientific knowledge intersects with other stocks of public knowledge, that knowledge seeking depends on motivation, social networks,” etc. (Einsiedel and Thorne, 1999, p. 52).

These two models, however, are nonexclusive and should rather be seen on a continuum, where the second model could be useful in cases characterized by constant uncertainty (such is the case of high complexity environments). This can lead to a better understanding of the public: what they know and their approaches to scientific uncertainty. “We also need a fuller understanding of the contextual uses of scientific knowledge by the public and how the public negotiates through the thickets of uncertainty and the information environment” (Einsiedel and Thorne, 1999, p. 52).

This paper argues that progressive change and transatlantic leadership in global affairs is challenged by a populist political culture facilitated by a breakdown of a consensus that the pursuit of knowledge is good and that scientific experts are trustworthy, and their evidence-based opinion matters more than value-laden opinions of non-experts. While ***this represents a threat to science diplomacy in transatlantic relations,*** this paper also argues that threat-levels *might not be symmetrical* in regard to the formal institutional structures that drive transatlantic science diplomacy. This research raises important questions. *How can transatlantic science diplomacy spur global leadership and bridge gaps between academia, policy, and society? Are there innovative configurations of policy actions that try to counter and challenge divisive tactics and online falsehoods? Who and what contributes to leading the science, technology and society connection? Who are the agents of change?*

When scholars’ and policy practitioners’ understanding of change and adaptation in world politics is divorced from the average citizen’s understanding of the world, then the quality of democracy suffers. A likely cause is that politicians, policy-makers, and scientists collectively **fail to communicate scientific facts and risks associated with critical domestic and foreign policy issues in a way that is more accessible to the public**. These are the likely cases when value/opinion-based decisions trump evidence-based solutions.

Scientific linkages and structures are important and

> [i]n such open, non-linear and networked systems, academic knowledge should be seen as a dynamic part of a wider process of knowledge production in which stakeholders bring in their own expertise, knowledge and insight. Societal impact is thus the outcome of the creative encounter of these stakeholders and their contributions to a common goal” (LERU position paper, 2017, p.3).

METHODOLOGY

Step one in the research process is Google search organizations in the US and in the EU using key words such as “science diplomacy.” Step two is to consider potential differences in their approach to exchange views on scientific phenomenon, content analysis is performed on a corpus of Twitter data, web scraped from the public accounts of three governmental and three non-governmental institutions engaged in science diplomacy in the US and in the EU. A maximum of 10,000 tweets from each account is sampled, and text comparisons on these comparative social media text corpora are deployed. The goal of this investigation is that we find unique patterns of communication and alternative access points to diverse political audiences to develop various communicative means to influence the conversation about science in the realm of contemporary social media.

SCIENCE AND POLITICS

“Science is not an alternative fact. It is something we have to use if we want to push our future forward.”
-William E. Moerner, 2014 Nobel Laureate in Chemistry and professor at Stanford University

At the onset of the 21st century, scientists seem to have been alarmed as the Bush administration “was widely seen as unfriendly toward the scientific community…[and] the perceived politicization of science awaken[ed] long-standing problems in Science and Technology Studies (STS) concerning the relationship between politics and science” (Gauchat, 2012, p. 168). This is mainly because “the potential politicization of scientific inquiry, that is rendering scientific, evidence-based, approaches secondary to particularistic political interests and goals may hurt the outcome of policies (AAAS report, January, 2010 as cited in Paar-Jakli, 2015).

As the Trump administration began to take shape, scientists have found it to be particularly challenging to uphold the importance of truth-seeking and defend the scientific method in an era of “post-truth” politics. It feels like a miserable time for science as the recurring theme of the March for Science in March 2017 attests: “I can’t believe I have to march for science!” “A key problem is that the term, post-truth politics, “picks out the heart of what is new: that truth is not falsified, or contested, but of secondary importance …Trump is the leading exponent of “post-truth” politics—a reliance on assertions that “feel true” but have no basis in fact” (The Economist, 2016 as cited in Paar-Jakli, 2017). ***This state of affairs creates grave danger to scientists as it renders the very essence of science secondary at best and irrelevant at worst.*** The urgency to

respond is conveyed in the recent statement of the Union of Concerned Scientists that pressures

> the Trump administration and Congress to set a high bar for integrity, transparency, and independence in using science to inform federal policies. We will hold the Trump administration to the same standards as previous administrations and—as necessary—will aggressively push back against political or special interest interference in science (January17, 2017).

Perhaps most striking is the *absence of lawmakers and politicians with a scientific background and perspective* in the United States and elsewhere. As "science and technology play an increasing role in finding policy solutions to increasingly complex foreign policy problems," scientists urgently need a seat at the table. (Paar-Jakli, 2014, p. 6; Naughton, 2017). Furthermore, "complex human behavior and sociopolitical complexities are better explained by the interdisciplinary approach" (Paar-Jakli, 2014, p. 9).

> When science and politics intersect, a natural part of the scientific method – that scientific facts are not determined forever — presents a challenge for the perceptions of scientific truthfulness. Even when a large consensus of scientists agrees about a particular position…the iterative process of science leaves uncertainty that some politicians can use to support their efforts to gather more votes (Fellet, 2017).

As the literature points out, following WW II and up until the 1970s, there were no significant partisan differences in attitudes towards science in the United States; "political parties and ideologies were largely neutral and even deferential toward the scientific community…[but] the emergence of the new right (NR)—a group skeptical of organized science and the intellectual establishment in colleges and universities" began to change this consensus (Hofstadter 1970 & Mooney 2005 as cited in Gauchat 2012, p. 170). Key elements of creating this animosity, as identified by STS research, are: 1/ "an inherent tension between conservatism as a political philosophy that emphasizes traditionalism and the 'dynamism of scientific inquiry—its constant onslaught on old orthodoxies, its rapid generation of new technological possibilities'" (Mooney, 2005. p.5 as cited in Gauchat 2012, p. 170); and 2/ "the growth of regulatory science, which has been a central theme in STS for the past few decades"[5] (Gauchat, 2012, p. 171).

Gauchat argues that *"science has always been politicized*. What remains unclear is how political orientations shape public trust in science and how these dynamics might influence the way science is organized" (Gauchat, 2012, p. 168). The paranoid "of heated exaggeration, suspiciousness, and conspiratorial fantasy" that fuels irrational fears and anti-science sentiments… "had been around a long time before the Radical Right discovered it…its targets have ranged from "the international bankers" to Masons,

[5] "regulatory science refers to the institutionalization of science's legitimization role through the formation of a science advisory community" (Jasanoff 1990 as cited in Gauchat, 2012p. 171).

Jesuits, and munitions makers." However, it is the "use of paranoid modes of expression by more or less normal people that makes the phenomenon significant." (Hofstadter, 1964, p.1). What is unique, and potentially dangerous and destructive, about the Trump administrations' populist 'modus operandi' (bourgeoning in other democracies in the world as well) is that it exacerbates the perilous impacts of the paranoid style to a potential point of no return to normalcy.

Where Does Post-Truth Politics Come from and Where could it Lead?

"There is a cult of ignorance in the United States, and there has always been. The strain of anti-intellectualism has been a constant thread winding its way through our political and cultural life, nurtured by the false notion that democracy means that 'my ignorance is just as good as your knowledge."

Isaac Asimov

Where does this seemingly new trend, the "anti-enlightenment movement," come from? We have known about the importance of cognitive bias, but there is another important factor: new research shows that "it hasn't been such a big problem in the past, because **scientific conclusions were usually agreed on by political and cultural leaders and were promoted as being in the public's best interests.** "Science is universal, neutral, rational, transparent, non-ideological," It is a great way for countries to interact (https://www.aaas.org/programs/center-science-diplomacy/introduction). "Now, scientific facts are being wielded like weapons in a struggle for cultural supremacy...and the result is a 'polluted science communication environment'" (Macdonald, 2017, p.). "There has been a long tradition of anti-intellectualism in America, unlike most other Western countries. Richard Hofstadter, who won a Pulitzer Prize in 1964 for his book, *Anti-Intellectualism in American Life*, describes how the vast underlying foundations of anti-elite, anti-reason and anti-science have been infused into America's political and social fabric" (Williams, 2014, p.).

> Susan Jacoby, author of *The Age of American Unreason,* says in an article in the *Washington Post,* 'Dumbness, to paraphrase the late senator Daniel Patrick Moynihan, has been steadily defined downward for several decades, by a combination of heretofore irresistible forces. These include the triumph of video culture over print culture; a disjunction between Americans' rising level of formal education and their shaky grasp of basic geography, science and history; and the fusion of anti-rationalism with anti-intellectualism'(Jacoby as cited in Williams, 2014).

The Death of Expertise?

"Not everything is a matter of opinion…some things are right and others are wrong" argues Tom Nichols in his new 2017 book, *The Death of Expertise: The Campaign against Established Knowledge and Why it Matters*, as he offers a comprehensive explanation on

the “cult of ignorance” in the US (p. xii). Nichols investigates pieces of the puzzle, such as citizens, higher education, the Internet, journalism, and experts[6], and examines how those may contribute to the problem. Expertise is in trouble, he contends, due to a worship of ignorance and a lack of “principled, informed arguments [that] are a sign of intellectual health and vitality in a democracy.” This “new rejection of expertise,” is not only evident for the academia, but also affects fields, such as the medical or the legal professions. Additionally, “the ubiquity of the Internet” made it more of a visible issue (Nichols, 2017, p. x, xii). A key factor is the **disappearing trust toward intellectuals** and politicians alike. Undermined trust in society is not only detrimental to amassing what Putnam called social capital and civicness, but it also **damages efficient and effective public policy-making**, the value of accumulated authoritative/established scientific knowledge and, ultimately, destabilizes democracy as it gives rise to populism. As Berelson, Lazersfeld, and McPhee maintain, "[t]he democratic citizen is expected to be well- informed about political affairs. He is supposed to know what the issues are, what their history is, what the relevant facts are, what alternatives are proposed, what the party stands for, what the likely consequences are" (1954, p. 308).

Nichols explains how an unarguably positive trend, that more people have access to more information/knowledge (although these two are not the same, as this paper subsequently illuminates), has facilitated the emergence of a “nation of explainers” (2017, p. 2, 13). While exchanging arguments and pursuing healthy debates are vital to the democratic process, the “denigrat[ion of] intellectual achievement,” rejection of expert advice and “fundamental rules of evidence, along with “refus[ing] to learn how to make a logical argument” put the accumulation of knowledge and scientific achievement, hence human development and civilization, in grave danger (Nichols, 2017, p.3). Nichols warns about a fundamental rule that “[e]xperts have a responsibility to educate. Voters have a responsibility to learn” (2017, p.11). Of course, “resistance to intellectual authority” is not entirely new, **but in the age of complexity the consequences of a distrustful citizenry of “experts, professionals, and intellectuals” carries much greater risks than it did before** (Nichols, 2017, p.16, 14). As Hofstadter made it clear, competence matters now even more as “the complexity of modern life has steadily whittled away the functions the ordinary citizen can intelligently and competently perform for himself” (as cited in Nichols, 2017, p.18). The recent trend of unprecedented distrust and “attacks on established knowledge” are peculiarly ‘hip’ and “have reached frightening proportions” (Nichols, 2017, p.25).

[6] Nichols defines experts as “people who know considerably more on a subject than the rest of us, and are those to whom we turn when we need advice, education, or solutions in a particular area of human knowledge (2017, p.28). “True expertise,” he adds, “the kind of knowledge on which others rely, is an intangible but recognizable combination of education, talent, experience, and peer affirmation” (2017, p. 30).

Nichols elaborates on the significant impact of confirmation bias in society and discusses "the Dunning-Kruger Effect," which "in sum, means that the dumber you are, the more confident you are that you're not actually dumb…[your] 'incompetence robs [you] of the ability to realize it'" (Kruger and Dunning, 1999, pp. 1121-1122). These people are lacking a skill, called 'metacognition,' "the ability to know when you're not good at something by stepping back, looking at what you're doing, and then realizing that you're doing it wrong" (Nichols, 2017, p. 45). Nichols (2017) points out that a crucial part of the problem is that the fundamentals of the 'scientific method' are not know by the general public, hence they do not have an appreciation for the process. Rather, fears of the implication brought about by global complexity give rise to a greater tendency of trying to find easy answers using pernicious conspiracy theories to complex issues. Additionally, the confirmation bias dilemma is exacerbated when "it stems 'from issues closely tied to our conception of self'" (Konnikova as cited in Nichols, 2017. p. 67). In fact, this is why populism and identity politics are extremely dangerous. As Dunning notes, "some of our most stubborn misbeliefs arise…from the very values and philosophies that define *who we are* as individuals…narratives about the self, ideas about the social order – that essentially cannot be violated" (as cited in Nichols, 2017, p.67).

Nichols looks at higher education, as the next piece of the puzzle, and points out the "increasing commodification of education" as a core problem (2017, p. 72). **Developing critical thinking, learning, and achieving personal maturation used to be the ultimate goals of higher education**. **University education *should not* be conflated with training. The "customer-service university" is not congenial to intellectual discipline and maturation**. Instead, "[d]riven by compete for teenagers and their loan dollars, educational institutions promise an experience rather than an education." He likens it to "having a hospital entice heart patients to choose it for a coronary bypass because it has great food" (Nichols, 2017. p.80-81). Moreover, as Nichols argues, "college is supposed to be an uncomfortable experience," in that not learning to fail or learn to confront one's own set of ideas and being proven wrong are important parts of a higher learning process (Nichols, 2017. p.78). But, as Nichols points out, "[w]hen college is business, you can't flunk the customer" (2017, p. 94). Additionally, it *must not* be the responsibility of the university to do remedial work due to failures in the K-12 education system and self-reliance is an important trait that ought to be learned throughout college. Acceptance rates are way too high on average. This dilution of universities carries enormous societal risks and leaves almost no room for much-needed trade schools and apprenticeships that, for example, the German educational system offers. More importantly, "admission to college is the beginning, not the end, of education and that respecting a person's *opinion* does not mean granting equal respect to that person's *knowledge"* (Nichols, 2017, p. 83, emphasis in original). Reversal of roles in the classroom is damaging students' intellectual development; "to be a student requires

certain modicum of humility." The "degree-granting arms race," which characterizes contemporary US higher education, where "degrees…do not actually signal a corresponding level of knowledge…borders on academic malpractice… [where one can obtain] the illusion of an education" (Nichols, 2017, p. 87-91). There are many more problematic areas with today's image and practices of higher education in the United States that have contributed to the "death of expertise." Some of these are: grade inflation, creating "safe spaces" and "speech codes" that may lessen the effects of critical thinking development, or the ratings of professional men and women "as though they're reviewing a movie or commenting on a pair of shoes…there's something wrong with a system that asks a student how much they liked their education. College isn't a restaurant" to do Yelp reviews (Nichols, 2017, p. 96-97). As Nichols warns, learning should be the beginning of an education, not an endpoint (2017, p.7).

The next piece in this puzzle is the information age and the use of the Internet, which "allows people to mimic intellectual accomplishment by indulging in an illusion of expertise provided by a limitless supply of facts" (Nichols, 2017, p. 106). Access to information and knowledge are key to social, political, and economic development and "in our *increasingly complex and interconnected world network-based solutions* of knowledge creation, dissemination, and the diffusion of best practices can enhance our capacity to define and address policy problems more efficiently" (Paar-Jakli, 2014, p.1). This is why "the 'free movement of knowledge'…has recently been coined as the fifth freedom in the EU…[and] is regarded as a priority to respond to the challenges of globalization and transform the EU into 'a truly modern and competitive economy.'" (Paar-Jakli, 2014, p. 172). However, the abundance of "facts" online is not indicative of their truthfulness, neither are "facts" necessarily equivalent to knowledge; "[t]he Internet is a vessel, not a referee" (Nichols, 2017, p.109). The speed of communication and instantaneous affirmation empowers people to spread a so-called 'counterknowledge,' or whatever outlandish ideas anyone might come up with, which are resistant to facts and scientific evidence (Nichols, 2017, p.113). This then becomes a **source of extremism** exacerbated by the fact that there are currently no mechanisms or rules on the Internet that would make these falsehoods and potentially damaging information disappear. This all culminated in the taking office of a surreal US Twitter President who spreads falsehoods. A serious implication to political knowledge and action is the "search engine manipulation effect," which creates the illusion of accurate knowledge of facts making people believe that they have become experts in any area of inquiry they read about based on search engine rankings, regardless of the source, accuracy or authority of information and news. Thereby search engine users trust those more than experts of particular field despite the fact that the knowledge/expertise of the latter was gained through the **scientific method** (Nichols, 2017). Lastly, as we know people now live in 'echo chambers' that create ideological segregation and hostility towards 'others' and if experts try "to break through this shell of political insularity and self-assured ignorance do

so at their own peril (Nichols, 2017, p.132). Speed and anonymity are certainly exacerbating this problem.

Collins (2014) points out a critical fact, in his book *Are We All Scientific Experts Now?,* ordinary people used to consider science "infallible," scientists trustworthy men and women of knowledge pursuing the truth and contributing to the common good. Recently, we have been seeing a rather unfortunate erosion of this trend and the emergence of a more skeptical stance on science's pre-eminence.

> If we start to believe we are all scientific experts, society will change: it will be those with the power to enforce their ideas or those with the most media appeal who will make our truths, according to whatever set of interests they are pursuing. The zeitgast has to change if we want to preserve society as we know it, because we have to start raising the value of plain ordinary science in our minds (Collins, 2014, pp. 131).

Public debates about scientific issues with widespread implications on the public, such as climate change, are more ubiquitous, to a great extent, due to the abundance or information available on the Internet; but the problem is that

> [t]he experience of John and Jane Doe and their children is right up there with the Nobel Prize-winning research because the Nobel Prize-winning research has been done by people like you and me…But, science and scientific expertise "he argues, should serve as an example to ordinary citizens of how to think and act, and not the other way round (ed. review).

Yet another important component contributing to the "death of expertise" is journalism or the current state of the media rather. We live in a world in which people get their news from a variety of rather diluted news sources. Long gone are the days when fact checking, investigative journalism, and integrity of the messenger were a must for the profession and valued. As Nichols argues, "[e]xperts face a vexing challenge: there's more news available, and yet people seem less informed, a trend that goes back at least a quarter century" (2017, p. 137).

Trump-era Populism and Real-time Consequences

Fareed Zakaria calls "President Trump's election a 'class rebellion' against elite educated professionals in the U.S…I think there's a whole part of America that's sick and tired of being told what to do by this overeducated professional elite that Hillary Clinton in many ways perfectly represented, and that's why they're sticking with him" (The Hill, July 31, 2017). Whereas Max Boot writes,

> After nearly five months in office, Trump has given no indication that he possesses the mental capacity to be president…The surest indication of how not smart Trump is that he thinks his inability or lack of interest in acquiring knowledge doesn't matter. He said last year that he reaches the right decisions 'with very little knowledge other than the knowledge I [already] had, plus the words 'common sense,' because I have a lot of common sense and I have a lot of business ability' (*Foreign Policy*, June 16, 2017).

While it is beyond the scope of this research paper to uncover the complexities of the roots of the Trump phenomenon and Trump-era political subculture, this research aims to underscore **scientists' responsibility and potential to unleash new, innovative programmatic ways of supporting the "social mission of science** – to provide the best information possible as the basis for public policy" **by finding ways to include the public into discovering the virtues of the scientific process** so that findings cannot be "ignored by those in power or treated as mere matters of faith" (Higgins, 2016). It is time to publicly acknowledge that a **scientifically literate society** is the **only kind of society** that can hope to survive in the age of complexity and global interconnectedness.

This study argues that the US's position in the international system along with the post-WW II. **cooperative pattern in transatlantic relations is not only threatened** by geopolitical uncertainties, asymmetrical warfare, the clash of ideals, and other phenomena, but the greatest threat is the ***widespread science illiteracy*** and parallel **initiatives to delegitimize science**, scientific inquiry and the unique power and potential of truth-seeking that humanity has pursued for its progress since the Enlightenment era.

SCIENCE COMMUNICATION AND SCIENCE DIPLOMACY

"I do not share your view that the scientist should observe silence in political matters, i.e., human affairs in the broader sense "

- Albert Einstein, Letter to Max von Laue, 26 May, 1933

Issues and Actors

"So what are we, as scientists, to do?"- asks climate scientist Phil Williamson. He notes that a key problem is that, in accordance with Brandolini's law, it takes a lot more energy to refute bullshit than to produce it. Yet, it is of vital importance to do so. "Challenging falsehoods and misrepresentation may not seem to have any immediate effect, but someone, somewhere, will hear or read our response." As Nichols points out, "[k]nowing things is not the same as understanding them. Comprehension is not the same thing as analysis…Doing something well is not the same thing as becoming a trusted source of advice or learning about the subject" (2017, p. 37).

The key question is **how** could it be done when the "rising tide of populism threatens the future of evidence-based governance [and] Social media and websites,

lacking quality control, are replacing newspapers as the main information sources for the public and many politicians, even at the highest level"? (Williamson, 2016). **Who are the most influential** in shaping science communication strategies? Key players include "news organizations, reporters, information professionals, scientists, and audiences" (Weigold, 2001, pp. 164-193). Searching for strategies, the Franklin Delano Roosevelt Foundation's conference "Combating Fake News: An Agenda for Research and Action," held February 17-18, 2017 at Harvard University Shorenstein Center on Media, Politics and Public Policy at Northeastern University have produced some important questions. Perhaps the most important for the purposes of this study is:

> **What role is there for public institutions** (e.g., local, state and federal government) **and private actors** (e.g., social media companies, scholars, NGOs, activists) to combat fake[7] news and its harmful effects? …What regulatory interventions, if any, are appropriate by government actors...For companies such as Facebook, what steps are possible and desirable with respect to controlling fake news and misinformation...What kinds of interventions are possible by third parties-- fact checkers, extensions, apps? d/ What role for the academy? (pp. 2-21).

While addressing *all* of these actors/actions is beyond the scope of one research paper, this research project aims to shed light on how scientists and policymakers in the United States can learn innovative ideas and both try to emulate European practices and cooperate more closely with the EU in the future in science diplomacy. This paper makes the argument that a **determining factor in the US** has been the presence of certain anti-intellectualist tendencies in political culture that are almost non-existent in other developed parts of the world. The "cult of ignorance [that Asimov referenced in his 1980s interview] is the most serious national security issue facing the U.S. today" (Traphagan, John 2014, "Asia's Cult of Intelligence," *The Diplomat*). This study builds on this idea.

Science Communication

The proliferation of ideas necessitates effective ways of communication and, hence, the exploration and, subsequent, institutionalization of channels of communication. During the Enlightenment, coffee houses, newspapers, salons, reading societies, served as institutional means of idea dissemination, where ideas were exchanged, challenged, and critically judged in open-minded debates. "These elements formed what historians have called an emerging 'public sphere,'" a most likely necessary element of the success of the Enlightenment (Brown, n.d.)

We need to *develop similar structures and modes of communication* that is congenial to today's Internet society. One of such initiatives is the so-called "Emily's list for scientists," 314 Action, founded by STEM community and science supporting activists.

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[7] [7] BuzzFeed's Craig Silverman had published an article that launched the term "fake news" (Benkler, 2018, p.3).

This organization, among other things, wants to help scientists run for public office, thus "advocating for evidence-based policy solutions," "make science more accessible to the public," and **"educate and advocate for and defend the integrity of science and its use" (**http://www.314action.-org/home/). As Naughton proclaims, "our aim is not to make science another highly partisan issue, but rather to let facts and empirically observed data trump emotional debate" (Naughton, 2017, p.). Yet, some caution should be exercised in regard to the "non-emotional" nature of communicating facts; as Lakoff warns, as it is not easy to separate the political mind from moral stances, and rationality has more than just one type of interpretation (2009).

At the recent 67th Lindau Nobel Laurate meeting participants showed some optimism as they highlighted that scientists are able to capitalize on the fact that, as public opinion polls indicate, *trust in scientists is still high*; for example, over "75% of Americans trust scientists to act in the public interest, while less than 50% have a similar trust in elected officials" (Pew Research Center. 2016 report as cited in Fellet, 2017). However, the question arises, "when politics makes it seem like the public is losing confidence in science, how do scientists help rebuild that trust?" An interesting **"citizen science" project** was suggested at the meeting that would bring in engaged citizens to learn about the scientific process through participating/contributing to interdisciplinary science projects (Fellet, 2017, p.). Some key characteristics of this "amateur science," "crowdsourced science," "volunteer monitoring," or "public participation in scientific research" are that: 1/ anyone is free to participate, 2/ there are participation standards to ensure data reliability, and 3/ widespread access and data-sharing is guaranteed (https://theoryandpractice.-citizenscienceassociation.org/artic-les/10.5334/cs tp.51/)

While trust in scientists is relatively high (in comparison to other groups such as politicians) disturbing trends can be observed. Developing *various means of science communication is of utmost importance*; as Gauchat, who used

> U.S. survey data from 1974 to 2010 [and had] found some deeply alarming trends. Despite increasing education levels, the public's trust in the scientific community has been decreasing. This ***is particularly true among conservatives, even educated conservatives***. In 1974, conservatives with college degrees had the highest level of trust in science and the scientific community. Today, they have the lowest (Gauchat 2012 as cited in Gawande 2016, emphasis added).

"A growing political polarization of science, even though the source of this polarization remains empirically underdetermined" (Gauchat, 2012, p. 184). Understandably, framing has an immensely significant sway on the subject. There are at least two major (and competing) approaches to explaining "political polarization in attitudes about science…*the intrinsic thesis*…[versus] the *contextual thesis."* While the former puts the emphasis on psychological differences and claims that "conservatives are consistently more likely to reject such information and/or to be distrustful of the scientific

community" (Mooney 2005, 2012; see also discussion by Kahan 2013 as cited in Nisbet et al. 2015, p. 37); the latter sees the differences not as a partisan issue based on psychological differences, but rather as a "consequence of which science policy issues are most salient in political and public discourse, often driven by institutional actors and political entrepreneurs" (Hiltgartner and Bosk 1988; M. Nisbet and Huge 2006). The contextual thesis asserts that liberals are as likely as conservatives to engage in motivated reasoning and biased processing when they are exposed to ideologically "dissonant" scientific evidence (Braman et al. 2012; Kahan 2013 as cited in Nisbet et al. 2015, p. 37)."[8] This second view is commensurate with the findings of McCright et al. who find that "conservatives are not distrustful of all scientists, but instead react negatively to those scientists who are engaged in what they call reflexive science[9]…Their results were consistent with the contextual thesis: liberals were more trusting and conservatives less trusting of impact scientists,[10] whereas liberals were less trusting and conservatives more trusting of production scientists"[11] (2013, 410 as cited in Nisbet et al. 2015, p. 40).

Science Diplomacy

Depending on which school of thought one is more inclined to find convincing, different solutions could be found useful in addressing the problem. "Kahan asserts that both liberals and conservatives engage in the 'the reliable employment of more effortful, conscious information processing' that magnifies 'the polarizing effects of identity-protective cognition'" (2013, 410 as cited in Nisbet et al. 2015, p. 40). It is noteworthy, however, as Jost et al. maintain, that "The core ideology of conservatism stresses resistance to change and justification of inequality and is motivated by needs that vary situationally and dispositionally to manage uncertainty and threat." As Nisbet et al. (2-25, p. 36) explain, "the scientific community remains one of the most trusted institutions in the United States (National Science Board 2014), yet over the past 30 years public confidence in science has become increasingly politically polarized as liberal and conservative attitudes toward science have diverged" (Gauchat 2012; Mooney 2005, 2012). Scientists who engage in communicating to the public need to cautiously consider these somewhat perplexing simultaneous trends. In light of these, several questions can be raised. Do people listen to challenging views at all? If yes, then who do they listen to

[8] Dissonant evidence is information that challenges one's ideological worldview or set of cultural values (Kahan and Braman 2006; Kahan et al. 2012; M. Nisbet 2005; M. Nisbet and Markowitz 2014).
[9] science that assesses the environmental and health impacts of modern society (Nisbet et al. 2015, p. 40).
[10] scientists such as climate scientists, epidemiologists, etc. (Nisbet et al. 2015, p. 40).
[11] food scientists, industrial chemists, etc. (Nisbet et al. 2015, p. 40).

and what media form is most congenial to make people listen? How can we incorporate science communication into the educational agenda? On the state-level,

> diplomacy is the field of policy and decision-making where science can be transformative …Aided by modern digital communication technologies, research and cross-border collaboration can proceed apace through multinational research networks …This is truly research without borders (Fedoroff 2009; Lord and Turekian 2007 as cited in Legrand & Stone, p.)

Science diplomacy has many forms that can be considered more or less successful internationally. However, developing domestic communicative means to the public should be addressed simultaneously. **Science communication, science diplomacy and science and technology policy are at the heart of 21st century foreign relations.** "Foreign policy decisions are increasingly driven by issues such as energy security and environmental problems; all of which require expert-knowledge and the cooperation of a diverse set of scientific disciplines. As the American Association for the Advancement of Science's (AAAS) science diplomacy center states, science and scientific cooperation promotes international understanding and prosperity,

> [m]any of our most pressing foreign policy challenges – energy, climate change, disease, desperate poverty and underdevelopment, and WMD proliferation – demand both technological and policy solutions. In these and other areas, U.S. national security depends on our willingness to share the costs and benefits of scientific progress with other nations (AAAS. 2010 as cited in Paar-Jakli, 2014, pp.2-3).

"As no nation-state has the expertise or the resources to face these unique 21st century challenges alone, foreign policy decision-makers need to focus on building a coherent strategy for science diplomacy" (Paar-Jakli, 2014, pp.2-3). An essential part of networked governance is science diplomacy. But what is science diplomacy? There are many definitions to approximate what the term stands for, one of these is Nina Federoff, Science and Technology Adviser to US Secretary of State's suggestion that "**science diplomacy is the use of scientific interactions among nations to address the common problems facing humanity and to build constructive, knowledge based international partnerships**" (AAAS report, January, 2010). Three central dimensions of "science diplomacy" can be recognized as it relates to science, technology and innovation policy: "informing foreign policy objectives with scientific advice (**science in diplomacy**); facilitating international science cooperation (**diplomacy for science**); [and] using science cooperation to improve international relations between countries (**science for diplomacy**)"(http://royalsociety.org/policy/publications/2010/new-frontiers-science-diplomacy/). As a general rule, these dimensions do overlap significantly.

> The largest and most powerful companies are technology-driven, and their influence is ubiquitous, but every citizen who travels can be a cultural ambassador and a transmitter of knowledge, and most people can form relationships and collaborations across borders without needing any government endorsement. Even more characteristic of the twenty-first century, individuals and

> companies are even doing things that previously only governments could do (Wang, https://www.aaas.org/programs/center-science-diplomacy/introduction).

All this has a transformational effect on diplomacy. Overall, this paper argues that **science communication is critical** not only to long-term human development, but it is also vital for countering security threats within and across societies.

The United States

> According to the first report of the National Science Foundation in 1952, "[t]he history of the Science Foundation legislation begins on November 17, 1944 when President Roosevelt wrote a letter to Dr. Vannevar Bush, Director of the wartime Office of Scientific Research and Development, asking him to prepare for him a report on a postwar science program" This is when "the *application of science*, formerly an endeavor supported by private initiatives, *gained recognition and support at the federal level*" (NSF, 1952 as cited in Paar-Jakli, 2014, pp.).

While, the "Smithsonian Foundation was established in 1846 by Congressional legislation; to quote Smithson, for the "increase and diffusion of knowledge among men," it took another century and the need to boost national resources and a World War to put the recognition of the impact of scientific research on the agenda of legislators in the United States (NSF, 1952 as cited in Paar-Jakli, 2014, p). During and after World War II. recognizing and investing in scientific research was on top of the US's national agenda, but the effects of science on society, and the communication of science and technology policy on behalf of politicians and policymakers, especially Congress, has been far from ideal and definitely much more controversial than in other developed nations such as the four "Innovation Leaders" of the European Union: Sweden, Finland, Germany, and Denmark. A "sizable opinion gap exists between the general public and scientists on a range of science and technology topics" (Pew Research Center, 2015). The **systematic promotion and commitment to science and adherence to Enlightenment values** seem to have been lost over the course of several decades.

One of the most prominent organizations in the US is the **American Association for the Advancement of Science's (AAAS)** science diplomacy center, which is an avid promoter of science and it facilitates many projects. A critical direction they also promote in science diplomacy is citizen science. Citizen science is "when ordinary citizens can contribute to major scientific projects," being a part of an environmental survey, help neuroscientists efforts map neurological connections by playing a video game. "Science diplomacy is gaining traction today," most importantly, due to the activities of non-state actors, science being more global than ever, and also because "mobility and connectivity accelerate solutions yet also lead to new challenges" (Soler & Wang, https://www.aaas.org/programs/center-science-diplomacy/introduction). However, as this research highlights, there is a lot that could be done by state and non-state actors as the US could learn from its European counterparts in fostering tangible as well as intangible institutions to combat the dangers of these security threats.

The European Union

The Research, innovation and science expert group (RISE), established in 2014, is a high-level group of policy experts who advise the Commissioner for Research, Science and Innovation, Carlos Moedas. RISE provides policy advice on the role of research and innovation impacting long-term growth and development and the future of the European Union (https://www.leru.org/files/Productive-Interactions-Societal-Impact-of-Academic-Research-in-the-Knowledge-Society-Full-paper.pdf). “In October 2016, Carlos Moedas, the European Commissioner for Research and Innovation, stated that research impact should be one of three “core values” for Europe’s research funding programmes, next to excellence and openness, and that his hope was to develop a “more sophisticated approach” to impact.” (https://www.leru.org).

Countries within the EU create public policy within the EU framework, which has several programs that strengthen/promote the science-society connection, such as “Europe for Citizens, Horizon 2020, ERASMUS+, EUROPE FOR CITIZENS, CREATIVE EUROPE, Education, Audiovisual and Culture Executive Agency (EACEA) programs (European Commission, 2002). EU Institutions create policies to ensure that their citizens live up to the expectations of a knowledge-based society; their goal is to guarantee that, fitting a democratic governance model, “citizens are able to make an informed choice from the options made available to them by responsible scientific and technological progress.” The EC has been following progress in this area and when the Eurobarometer indicated that “while scientists still enjoy the trust of Europeans, only half of the Europeans consulted said that they were interested in science and many of them consider themselves to be poorly informed.” As a response, an EU-level Science and Society Action Plan to pool efforts had been launched. “The document set out a new strategy to make science more accessible to European citizens, and 38 actions to achieve this objective.” Parts of this plan are: a new partnership *to promote public awareness, “scientific education and culture”* (EC Science and Society Action Plan, 2002).

As the European Commission’s 2015 Report “Science Education for Responsible Citizenship” argues, science education is crucial to 1) inspire the use of “evidence-based reasoning for decision making;” 2) boost citizens’ “confidence, knowledge and skills to participate actively in an increasingly complex scientific and technological world; 3) “develop the competencies for problem-solving and innovation, as well as analytical and critical thinking that are necessary to empower citizens to lead personally fulfilling, socially responsible and professionally-engaged lives;” 4) inspire children to be able to do the same; 5) encourage innovation and investment; 6) “empower responsible participation in public science conversations, debates and decision-making as active engagement of European citizens in the big challenges facing humanity today.” Overall,

> science learning helps us to interpret and understand our world, to manage risk and put uncertainty into perspective, to guide technological development and innovation and to forecast and

> plan for the future. It improves job prospects, cultural awareness and our ability to act as well-informed citizens in solidarity with citizens around the world (European Commission, 2015).

The European Commission's Horizon 2020 program started a *Science with and for Society program*, the objective of which is to "build effective cooperation between science and society, to recruit new talent for science and to pair scientific excellence with social awareness and responsibility" (EC, 2015). The European Science Events Association (EUSCEA) is a European network of popular science events and has more than 100-member organizations from 36 countries (www.eusea.info). The European Commission's Community Research and Development Information Service (CORDIS) is pursuing an ongoing project till the end of March 2017, titled "Equipping the Next Generation for Active Engagement in Science." Their main objective is to reform how science is taught, by "raising youth awareness to Responsible Research and Innovation through Inquiry Based Science Education" (EC, 2013).

The EC has also been developing a plethora of tools to embed RRI responsible research and innovation in citizen science (EC) and has been working on how to integrate RRI in secondary education and in higher education institutions as well. Their prominent role in transforming society cannot be overstated, they work as *change agents*, and "can help transform the R&I system such that societal responsiveness, sustainability and ethical acceptability become R&I's new normal." Some of these measure that can be instituted are: 1/ "a normative framework that includes RRI principles;" 2/ "a plan to foster dialogue, reflection, participation and public engagement in your institution;" 3/ "A plan to support structural change regarding gender equality in decision-making bodies, university staff and labour conditions;" 4/ "An ethical code of conduct for research and teaching and an active promotion of awareness and use of this code through internal meetings and education;" 5/ "Policies to promote transparency and openness across the scientific process (e.g., TOP guidelines) and measures to promote open access to research findings;" 6/ "Courses that use RRI principles or that teach students what these principles are and how to make use of them;" 7/ "Additionally, you could make use of indicators to gauge the impact of implementing RRI through such measures" (EC).

In regard to giving advice on "actionable guidelines for professional scientists engaging in citizen science at universities" and elsewhere Serrano et al. have worked out a white paper on which future citizen engagement and collective knowledge gathering could be built (2014, White Paper on Citizen Science for Europe, SOCIENTIZE). "Citizen Science refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources." They might provide experimental data or accommodations or otherwise add value to the scientific process/culture, thus under "this open, networked and trans-disciplinary scenario, science-society-policy interactions are

improved leading to a more democratic research based on evidence-informed decision making" (Serrano, 2013).

As an example, due to an increased need to have dialogues internationally that involves "different stakeholders and the public during the research process," the Swedish Research Council has launched a Science Communication Forum in 2016. As they contend, "concepts, such as Responsible Research and Innovation, Citizen science, Open science, Stakeholder involvement, etc. are increasingly heard in the public debate" (http://www.formas.se/en/Calendar/The-Science-Communi-cation-Forum-2016/). In fact, they have been holding International Science Festivals in Gothenburg since 1997.[12] This one of a kind popular science event in Europe aims to promote the relevance of science and research, as well as encourage higher education within such areas through various activities; it holds "workshops, lectures, private shows, music, theatre, debates, exhibitions and seminars to meetings of researchers. The content spans all disciplines, from social science and the humanities to natural science and technology"
(http://vetenskapsfestivalen.se/in-english/).

CONCLUSION

"The greatest enemy of knowledge is not ignorance, it is the illusion of knowledge."

Daniel J. Boorstin

The United States is in **desperate need to cultivate a culture of respecting education and science.** It seems vexing that, on the one hand, many of the Nobel Prize winners have lived in the US when they received their prize (although they were mostly immigrants) and research and development funding resources have been relatively abundant ever since the independent federal agency, the National Science Foundation (NSF)[13], has been created in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense," but on the other hand there is this pervasive anti-intellectualist political culture that severely hinders progress. At what point should the US be worried is no longer a question, because with the Trump Presidency we have reached a *potential point of no return*.

[12] The International Science Festival in Gothenburg is one of the founder members of EUSEA
[13] With an annual budget of $7.5 billion (FY 2016),

While science education has been considered an important component of achieving prosperity and global competitiveness, our deteriorating civic life could also benefit from it. (Terzian, 2013, Science Education and Citizenship: Fairs, Clubs, and Talent Searches for American Youth, 1918–1958). There needs to be **a more harmonious relationship between society and science** than we currently have; science sitcoms such as "Bing Bang Theory" might be making science look a bit cooler, but what the US needs is a much more programmatic, conscious effort, similar to that of European countries to have a lasting impact on education, civic participation, and should be tied more closely to job-creation and re-training programs in the knowledge economy. Additionally, the transatlantic partners need to renew and reinvigorate their cooperative patterns, especially on the state-level, where it has mostly been deteriorating recently.

There is another aspect of the main topic; that while "selling" the crucial role of science in the life of the public should be a non-partisan effort; we can already see that recently the right has been better at selling the public its agenda and framing popular discourse. Academics should not fear communicating with larger audiences in a more simplistic way. As Alvarez (2009) explains,

> Whereas the left's battles often involve conditioning popular discourse to unfamiliar material ("normativity," "the patriarchy," "genderqueer," "alienation"), the right has been exceptionally good at "framing" popular discourse out of familiar material ("right to work," "political correctness," "class warfare") and shifting people's sentiments in such a way that they'll even support things that are fundamentally bad for them.

As Friedman and Dunwoody (1999) articulate, "Building on best practice from previous projects, we intend to influence 12,000 science teachers across Europe, and extend this to pre-service teachers and their trainers." This is a direction the United States also needs to consider if it wants to remain relevant and a partner of the European Union in the 21st century competing knowledge society environment.

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