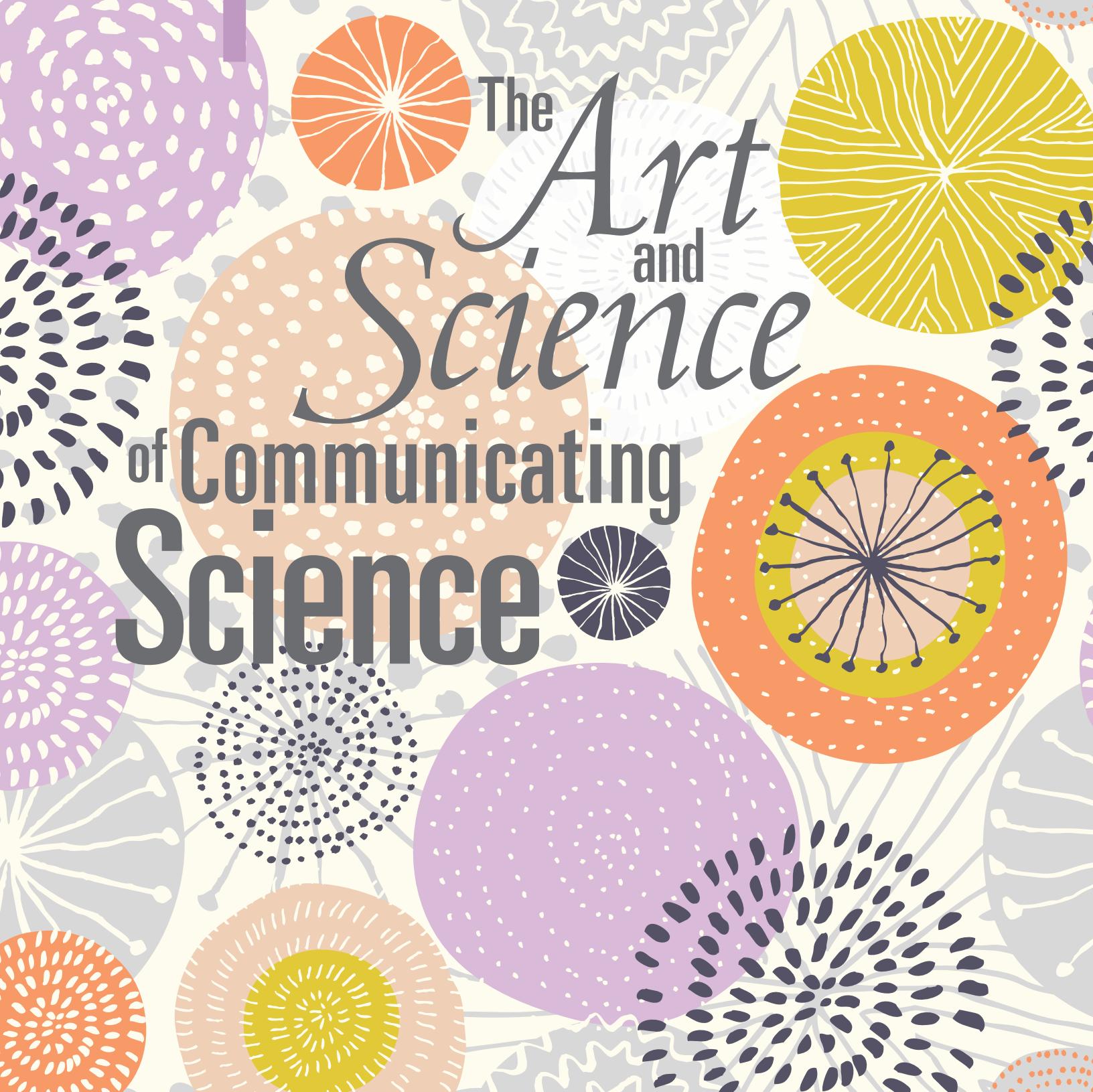


spectra

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The Art and Science of Communicating Science



ABOUT spectra

Spectra, the magazine of the National Communication Association (NCA), features articles on topics that are relevant to Communication scholars, teachers, and practitioners. Spectra is one means through which NCA works toward accomplishing its mission of advancing Communication as the discipline that studies all forms, modes, media, and consequences of communication through humanistic, social scientific, and aesthetic inquiry.

NCA serves its members by enabling and supporting their professional interests. Dedicated to fostering and promoting free and ethical communication, NCA promotes the widespread appreciation of the importance of communication in public and private life, the application of competent communication to improve the quality of human life and relationships, and the use of knowledge about communication to solve human problems. NCA supports inclusiveness and diversity among our faculties, within our membership, in the workplace, and in the classroom; NCA supports and promotes policies that fairly encourage this diversity and inclusion.

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Director of External Affairs and Publications

Wendy Fernando

wfernando@natcom.org

Contributors

LaKesha Anderson

Jenna Sauber

Design

Krystyn MacGregor

Advertising and Permissions

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Cover Art

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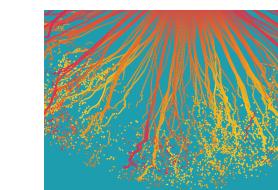
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The NCA 104th Annual Convention will feature more than 70 sessions on various Science Communication topics. To view the program, visit www.natcom.org/convention.

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The Everyday Significance of Communicating Science

By Ronald L. Jackson II, Ph.D.

I remember distinctly the first time I heard of the rhetoric of physics or the communibiology paradigm. I was taken aback. I wondered whether we had taken the parameters of our discipline too far by extending into what felt like relatively foreign areas of inquiry. Then I remembered the way a professor in my doctoral program had defined communication. He said that communication is the universe of interactive forms, processes, and structures that govern how we relate to the world. Although there is arguably room to elaborate upon this definition, it has proven to be sufficiently broad to guide my understanding of the scope of the field. Using this imperfect definition, I began to imagine how communication and science might be tethered. Another way to say this is to ask whether everyday interactions are impacted by science. If you are not a scholar who studies the intersections of communication and science, then perhaps your interests are piqued by this question.

Our lives are naturally entwined with science. In the interest of trying to separate areas of study into

distinct fields, academics have reimagined science as something that is independent from communication. Yet, when we think of public health crises, for example, we have discovered it is necessary to bring these areas back together to better inform the public and to enhance the everyday application of scientific discovery.

The articles in this issue of *Spectra* approach science communication from the perspective that our field has something valuable to add to the way in which science is understood by our world. Besides the obvious fact that none of us would know much about science without someone having communicated the rudiments of what we are experiencing, it is also the case that science communication can greatly enrich the information we use to understand not only political decisions, but also public responses and opinions regarding science. Consider, for example, the current U.S. national discussions around global warming and climate science, robotics, genetic cloning, space exploration, water resources, disaster recovery, energy innovation, public health and diseases, cybersecurity, and STEM education.



The scope and value of science communication has grown significantly, and within the discipline, there is great interest in demonstrating how communication scholars might best collaborate to contribute to the work of scientists who intend to improve the quality of human life.

Each of these issues holds the possibility of significantly influencing present and future generations, and the field of communication can help ensure that the public is productively engaged in developing successful outcomes.

Years ago, Teodoro Leon Gross wrote an article about the tethering of rhetoric, journalism, and science, arguing that they inhabit the same space, as science requires widespread interest to promote its findings and subsequent agenda. Yet the science community may have misgivings about the value added by communication, journalism, and other humanities disciplines. I think the scope and value of science communication has grown significantly, and within the discipline, there is great interest in demonstrating how communication scholars might best collaborate to contribute to the work of scientists who intend to improve the quality of human life.

In 2013, during the 20th anniversary of the Association for the Rhetoric of Science and Technology, Leah Ceccarelli asked her colleagues to consider the question, "To whom do we speak?" This is a poignant query in that it forces us to attend to the audiences we

serve when communicating about science. If, in fact, connecting science innovators, politicians, citizens, activists, and funding agencies enhances our collective quality of life, then the work of communicating science may be the key to facilitating progress.

Many of us have stories of family members whose health is declining, and who might have had a fighting chance of reversing their condition if they only knew how to access the information necessary to impact that reversal. Others of us have been impacted by the way in which climate change has shifted physical landscapes and led to tragedy. And, there are those of us who grapple with the implications of cybersecurity on our finances, safety, and families. The value that communication brings to science innovation is critical and productive. If we can facilitate transdisciplinary understanding of the role communication plays in the science community, we will have gone a long way toward improving the quality of human life across the globe. We are all indebted to those who are doing this meaningful work. ■

Spotlight

DATA ABOUT THE DISCIPLINE

The Status of Faculty Salaries

The American Association of University Professors (AAUP) recently released its annual report on the economic status of the profession. The report includes data from AAUP's 2017–18 Faculty Compensation Survey, which reports on average faculty and administrator salaries and benefits. A total of 1,018 institutions representing 378,865 full-time faculty participated in the survey.

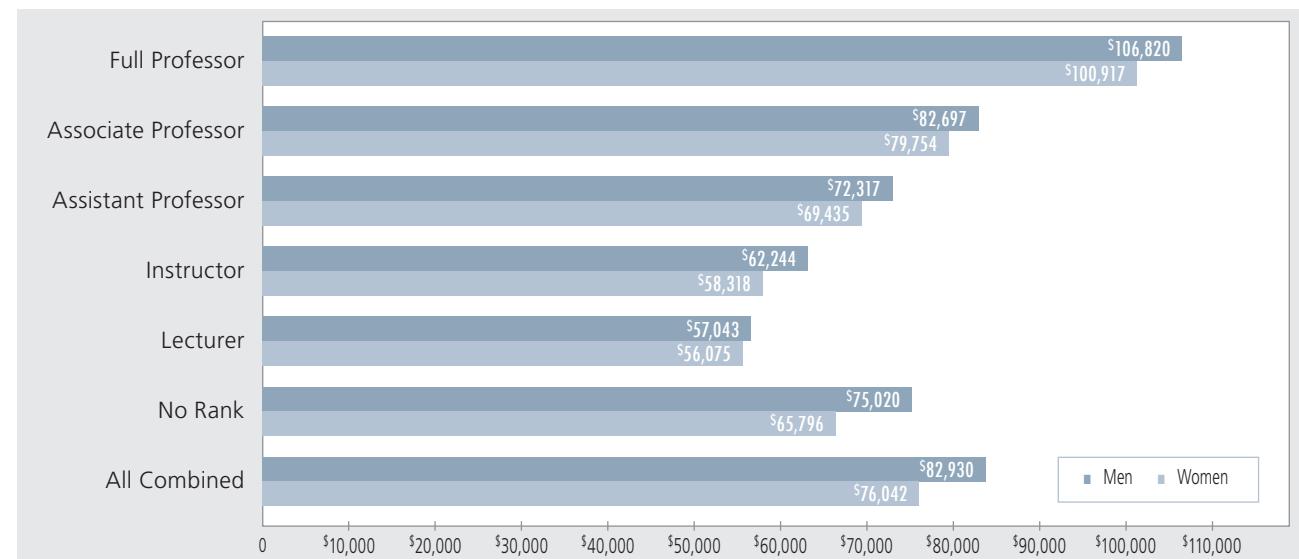
The report indicates that average salaries for full-time continuing faculty increased 3 percent over the previous year. However, when adjusted for inflation, the average increase is only 1.1 percent. The report suggests that the conditions responsible for producing years of salary changes near or below the inflation rate seem unlikely to change soon.

Average Salary and Salary Change Among Faculty by Academic Rank, 2017–2018

| POSITION | AVERAGE FACULTY SALARY | NOMINAL SALARY INCREASE FOR CONTINUING FACULTY | INFLATION-ADJUSTED SALARY INCREASE FOR CONTINUING FACULTY |
|---------------------|------------------------|--|---|
| Full Professor | \$104,820 | 2.5 | 0.6 |
| Associate Professor | \$81,274 | 3.2 | 1.3 |
| Assistant Professor | \$70,791 | 3.3 | 1.4 |
| Lecturer | \$56,712 | 3.4 | 1.5 |
| Instructor | \$59,400 | 3.3 | 1.4 |

The report also finds salary to be linked to gender. A total of 93 percent of reporting institutions pay men more than women at the same rank in at least one rank. There appears to be no change in gender salary inequity as faculty advance through the ranks, indicating that it is unlikely gender pay equity will be achieved in the near future.

Average Salary for Men and Women Faculty Across Rank and Institutional Affiliation and Category, 2017–2018



Note: These salaries represent the combined average salaries of men and women in numerous institutional categories (doctoral, master's, baccalaureate, and associate with ranks) as well as multiple institutional affiliations (public, private-independent, and religiously affiliated).

The full AAUP report, *The Annual Report on the Economic Status of the Profession, 2017–18*, can be found here: https://www.aaup.org/sites/default/files/ARES_2017-18.pdf.



PUBLIC PRESENCE

NCA Hosts Public Program on (Mis)communicating Science

On Thursday, April 19, 2017, nearly 100 people attended "(Mis)communicating Science," an NCA public program held on the campus of the Johns Hopkins University Advanced Academic Programs in Washington, DC. The program addressed the role media play in spreading misinformation, how scientists can do a better job of communicating their work, and how the public can become more informed by verifying scientific data. The program was co-sponsored by the Johns Hopkins University's Masters in Communication Program.

Panelists included Katherine Rowan (Department of Communication, George Mason University), Laura Lindenfeld (Director, Alan Alda Center for Communicating Science), Nsikan Akpan (Digital Science Producer, PBS NewsHour), Kasha Patel (Stand-up Comic and Science Writer, NASA), Aaron Huertas (Science Communicator and Political Consultant), and Sheril Kirshenbaum (Executive Director, Science Debate).

The panelists shared stories of misinformation and bad reporting in science stories, and offered prevention tips that might help members of the press avoid having to correct misinformation after the fact. Panelists encouraged audience members to search for sources to back up science headlines and factoids rather than relying on news bots, to broaden their news and media diet, and to turn to science experts for science information.

The entire program can be viewed online at: <https://youtu.be/PZtbNOCKds>.



Katherine Rowan



Laura Lindenfeld



Nsikan Akpan



Kasha Patel



Aaron Huertas



Sheril Kirshenbaum

IN OUR JOURNALS

Elisabeth J. Ploran, Mary Anne Trasciatti, and E. Christa Farmer, "Efficacy and Authority of the Message Sender During Emergency Evacuations: A Mixed Methods Study," *Journal of Applied Communication Research* 46 (2018): 291-322.

This study examines the reasons why coastal residents do not always evacuate prior to major storm events, as well as the influence that source and message content have on evacuation behaviors. The authors used a mixed-methods approach, interviewing individuals about their actual behavior during Superstorm Sandy and administering surveys about evacuation messages during a hypothetical storm situation. Interviewees recalled relying on informal sources, such as family and friends, when determining whether to evacuate. However, survey data indicate that residents are more likely to evacuate when given messages from traditional authority figures, such as the media and government officials. The authors discuss their study's implications for emergency message formation.

Rachel A. Smith, Alan Sillars, Ryan P. Chesnut, and Xun Zhu, "Investigating Married Adults' Communal Coping with Genetic Health Risk and Perceived Discrimination," *Communication Monographs* 85 (2018): 181-202.

This article reports on an investigation into couples' conflicts and support gaps while they coped with perceived genetic discrimination, as well as the degree to which communal coping reduced support gaps and stress. The authors analyzed the communication behaviors

of 133 married couples in which at least one partner had a genetic risk for serious illness. Stronger perceived genetic discrimination was linked with more conflicts about treatment, privacy boundaries, and finances. More conflicts were associated with more stress.

While communal coping did not moderate these impacts, it did affect support gaps in that both spouses felt better supported when they treated the genetic condition as a shared problem that they managed together. This study suggests that married couples need guidance on having constructive, supportive conversations when faced with a genetically-based condition.

David H. Kahl, Jr., "Critical Communication Pedagogy as a Response to the Petroleum Industry's Neoliberal Communicative Practices," *Communication Teacher* 32 (2018): 148-153.

In this article, Kahl explains a single-class activity meant to assist students in recognizing neoliberalism and its effects on their lives by focusing on an industry that is structured by neoliberal ideology. The activity requires students to examine the possible environmental effects of fracking and evaluate how the petroleum industry communicates in a way that obscures the effects of fracking using a rhetorical technique called corporate ventriloquism. Then, through the lens of critical communication pedagogy, students develop responses to the ways in which the petroleum industry exercises power and obfuscates facts.

THE REVIEW OF COMMUNICATION

SPECIAL ISSUE: Critical Discourse Studies and/in Communication: Theories, Methodologies, and Pedagogies at the Intersections

The articles in this special issue individually illustrate the affinities between Critical Discourse Studies (CDS) and communication studies; all of the contributions speak to the value of interdisciplinary theory building.

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<https://www.natcom.org/nca-journals>



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Arizona State University, USA



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AN INTRODUCTION



The Art and Science of Communicating Science

As the public continues to be inundated with information from a variety of media channels—some of it inaccurate or misleading—communication and rhetoric has a more and more important role to play in facilitating public understanding of science. As NCA President Ronald L. Jackson II states in his introduction to this issue of *Spectra*, to “better inform the public and to enhance the everyday application of scientific discovery,” it will be necessary for science and communication to join forces. The authors in this issue tackle this very notion—that the art *and* science of science communication must be used to educate the public and facilitate progress.

To begin, Laura Lindenfeld, Director of the Alan Alda Center for Communicating Science, explains how the Center trains scientists to better communicate. The Center uses a variety of improvisation techniques and acting exercises designed to evoke empathy. Reflecting on the results of one of her own moments of practice, Lindenfeld writes, “This is the art of science communication—the moment when we are willing to listen with the willingness to be changed, the moment of thoughtful risk taking, of emotional vulnerability that can open up possibilities for creativity and change.”

Edward Maibach’s essay encourages communication scholars to study real-world problems, such as the opioid epidemic, fake news, terrorism, and climate change. He details key moments throughout his career that have allowed him to pursue meaningful science communication work, including a project called Climate Matters. The project studied how TV weathercasters and

meteorologists could more effectively inform their viewers about climate change, and then armed these publicly facing professionals with tested materials they could use in their climate-change messaging. Maibach argues that by “[focusing] their energies on studying and/or attempting to solve real-world problems,” communication scholars can increase the influence of their work.

How can a rhetoric of science be harnessed for the public good? Lisa Keränen shares two examples from the public health arena to celebrate “the power of science to help solve society’s most pressing challenges,” and to illustrate how politics and science have become ever-more intertwined, leading to “disparate understandings of, attitudes toward, and responses to science in our society.” She poses several questions about how metaphors, narratives, memes, styles, and substance affect our understanding of science, and argues that “democracy needs both scientific and technical expertise and informed public discussions about scientific and technical matters”—and that communication scholars can take a leading role in facilitating such discussions.

Finally, LaKesha Anderson offers examples from the communication discipline that demonstrate how communication scholars are tackling the hard work of understanding and explaining science across issues that affect our daily lives—from the environment and food safety, to deception detection and cybersecurity. She notes that “communication can ... be an effective means of breaking down complex or dull material into engaging pieces of information that can literally save lives.”

We hope you enjoy this issue of *Spectra*.

Wide Open, Messy Opportunities: ON THE Art OF Science Communication

By Laura A. Lindenfeld, Ph.D.



You and I are standing facing each other. We have to decide which one of us is person A and which is person B. We've been told that our job is to make sure that I follow your every movement as if I were looking in a mirror. We've been asked not to speak. You move quickly, and I can't quite keep up. We both roll our eyes ever so slightly, so as not to get caught by the workshop instructor, and we chuckle knowingly—why are we being asked to do this awkward task? What does this have to do with science communication? I thought we were here to learn how to create a clear and terse message about our research. We are surrounded by seven other pairs just like us, laughing as inconspicuously as possible in that slightly uncomfortable way that betrays our collective discomfort with having to look each other

so deeply in the eyes and work so tightly in a pair. For many of us standing here, science communication is about well-designed studies that can provide us with research-based information about how to talk and write to different audiences. We're really not used to this. It feels awkward.

The instructor, Valeri Lantz-Gefroh, pauses us and asks one pair to proceed as the rest of us watch. We are to guess who is leading and who is following. It's immediately clear who is person A and who is person B. A sigh of relief floods the room as we recognize that none of us is getting this quite right. "I've picked you only because you happen to be standing here," Val says to the pair. "You are not doing anything better or worse than any other group in this room. Now I want you to try it again, and I want you to think about what will *really* make

this a perfect mirror." She asks us to provide input to our colleagues, who are nervously standing in front of us. "Well, they could slow down," one person says. Another offers that they could make the movements simpler, more repetitive. They try again.

This time, a strikingly different energy emerges. The room is silent as this pair moves together, in sync. Although no one is speaking, we can all feel that they are listening to each other. Listening and following together. It feels like a genuine connection. We've all felt it before, and we feel it here now. This is the art of science communication—the moment when we are willing to listen with the willingness to be changed, the moment of thoughtful risk taking, of emotional vulnerability that can open up possibilities for creativity and change.



At this intersection of art and science—bridging this willingness to be vulnerable with the knowledge we have about how different people see or don't see science—we have an opportunity to help society create a deeper, richer, and more culturally embedded sense of the value of science.

As we proceed through the next two days, our group comes to learn that effective communication is fundamentally rooted in empathy—our ability to put ourselves in other people's shoes and imagine what it feels like to be them, interacting with us. Empathy requires us to embrace uncertainty, or as Alan Alda has called it, to "surf uncertainty," for we cannot know exactly how someone else feels or will respond. It is when we lean into this vulnerability and uncertainty that we embrace the art of communication. This is not about learning simple tips; it's about the paired emotional and cognitive work of connecting and relating with each other.

That was how my first experience with the Alan Alda Center for Communicating Science at Stony Brook University transpired in June of 2013. Fast forward to an especially brisk March morning in 2016. I have just left my faculty position at the University of Maine. Excited, curious, and admittedly nervous, I make my way down I-95, blasting the Dixie Chicks song *Wide Open Spaces*, imagining what the blank slate ahead of me will offer for opportunities as Director of the Alda Center. Moving after 16 years represents a major shift for my family and me, and although there are some surprises, mostly I confront a series of changes that I expected. I studied science communication, focusing on science teams and how they could collaborate more effectively to produce research that is more accessible and useful. I felt like I had garnered some powerful experience outside the walls of my university. Moving from a position that was heavily focused on research toward one that is rooted in practice, however, has brought with it unexpected, enriching surprises and lessons about communication as an art. Here I am, surfing uncertainty in a big way in real life.

When we study something, we get to know it really, really well. We become masters of it—or at least that's

what we are supposed to achieve. Over time, we gain confidence in our abilities and strive to generate new ideas and insights about how the world works. I have always felt honored and privileged to be part of the academic community of people who aim to produce knowledge that gives us new insights into how things work, or how they could work. As much as I had learned previously, working at the helm of the Alda Center now for two years has pushed me to experience communication as an art that is rooted in our willingness to be vulnerable, to practice being truly present, and to listen deeply. At this intersection of art and science—bridging this willingness to be vulnerable with the knowledge we have about how different people see or don't see science—we have an opportunity to help society create a deeper, richer, and more culturally embedded sense of the value of science. I can hardly think of a time in our history when the ability to embrace science and evidence-based decision-making has mattered more. Every day, I ask myself how this work at the intersection of art and science can help us overcome the critical barriers in our country that have contributed to divisiveness and a lack of empathy, even denigration, toward those with whom we disagree.

Science communication is headed for success when we pay more attention to what the other person is *understanding*, rather than focusing on what we want to say. Alan Alda talks of the "curse of knowledge," the idea that we get ideas stuck in our own heads and forget what it feels like not to know them. When we fail to make the leap from what we know to what others may not, we wind up communicating as if we're talking to ourselves. Bridging this gap requires art as well as science, which is why actor and writer Alda, known widely for his role in the hit TV series *M*A*S*H*, has redefined himself over the past two decades as an advocate for science communication.



Alda, known widely for his role in the hit TV series *M*A*S*H*, has redefined himself over the past two decades as an advocate for science communication.

advocate for science communication. It is also why the Alda Center blends art and science in our approach to helping scientists and medical professionals communicate with empathy and clarity.

Science affects every aspect of our daily lives. It affords us a structured, systematic way of thinking that can reduce doubt and enhance our ability to make better decisions about society and our planet. Science also invites creativity

Improv draws on the principle of “yes, and,” which asks us to keep a scene moving forward even in the face of adversity, by greeting it with an attitude that builds on rather than rejects other viewpoints.

and creates a sense of wonder. Yet, as Carl Sagan wrote on the social importance of understanding science in a 1990 issue of *Skeptical Inquirer*, “We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.”

Even worse than this are the growing distrust and denial of science that have created fundamental threats to its future: decreases in funding, disregard of science in public decision making, and rejection of evidence in people’s choices about their personal lives. Increasing political, social, and cultural tensions have landed us in a situation where we have to figure out how to work together across differing and often incommensurate value systems.

In response to these concerns, science communication has reached a level of importance in the United States that we might even describe as a new *zeitgeist*. As concern about ongoing federal funding and public support for science grows, we are witnessing an increase in training programs, special issues on communication in diverse science journals, conference programming, fellowship programs, and calls for funding from public and private sources. Science communication experts also are grappling with how we can address these concerns. One of the things we have recognized is that the “deficit model” of science communication simply does not work. This model assumes that people simply lack information, and that by filling them up with more science, we can make them care about science.

The science of science communication can help, but it can bring us only so far without the art of communication. For 11 years, Alda hosted *Scientific American Frontiers*, a PBS series in which he interviewed hundreds of scientists about their breakthroughs in science, medicine, and engineering. Alda soon realized that the conversational approach that emerged naturally during these interviews led to a surprisingly spontaneous and vivid presentation of the scientists’ technical work.

He wondered if scientists could be taught to communicate more dynamically if they learned to pay close attention to their audience, connecting to them in a personal way.

Alda put this concept to action. “*Begin challenging your own assumptions. Your assumptions are your windows on the world. Scrub them off every once in a while, or the light won’t come in,*” Alda advises us. Using improvisational techniques he learned over 50 years of acting on stage and screen—such as the mirror exercise I described in the beginning of this piece—he and our team have devised and refined what has come to be called the Alda Method®. Since 2009, the Center has supported more than 12,000 scientists and medical professionals in Alda Method® workshops. Drawing on the passion, creativity, and vulnerability of the theatre arts and the knowledge developed by the science of science communication, we work closely with scientists to help them learn how to listen and connect across differences.

When we enter into these wide open spaces of connection, challenges emerge. How can art, in this case improv, help us navigate the messy, complex challenges we have ahead of us in creating connections across disparate value systems? Can connection help us forge new pathways to talk across tremendous differences in opinion, lifestyle choices, value systems, and cultures?

Improv draws on the principle of “yes, and,” which asks us to keep a scene moving forward even in the face of adversity, by greeting it with an attitude that builds on rather than rejects other viewpoints. This is not to say we shouldn’t disagree. It is to say that deep listening and attention to others’ values can help us develop new perspectives so that genuine learning and change can occur. “Yes, and” means getting out of our own heads and paying attention to the relationships rather than trying to score points. Improv’s other key principle, “make your partner look good,” may be one of the most

Combined with strategic knowledge about how people perceive and process information, improv, with its dedication to being present in the scenes of our lives, may provide possibilities as an artform when other forms of engagement fail.

challenging “rules”; it requires us to support someone with whom we might have deep disagreement as a scene partner in the theatre of life. Humiliation and arrogance undermine this tenet. If we are to be successful at talking across differences, humility and listening must be at the table. Combined with strategic knowledge about how people perceive and process information, improv, with its dedication to being present in the scenes of

our lives, may provide possibilities as an artform when other forms of engagement fail. Genuine connection requires humility and a commitment to listening. Even more, it forces us to embrace the messiness of feelings and affect. As Alda sagely advises us, in the spaces where the art and science of science communication meet, we must support ourselves and others to “*be brave enough to live life creatively.*” ■



LAURA A. LINDENFELD is Director of the Alan Alda Center for Communicating Science and Professor at Stony Brook University. Together with a team of researchers and practitioners, she helps scientists learn to communicate their work with clarity and passion. Lindenfeld’s work draws inspiration from the idea that we can make better, more informed decisions about how we shape our collective future. Her work has appeared in numerous journals, and with Fabio Parasecoli, she co-authored *Feasting Our Eyes. Food Films and Cultural Identity in the United States*.



Supporting Public Understanding of Scientific Research

Much of the work of communicating scientific research falls on scientists, their affiliated institutions, and news outlets. But there are also several organizations that play a supporting role in facilitating public understanding of scientific research. The Kavli Foundation, based in Los Angeles, is one such organization.

The Kavli Foundation was established in 2000 by California business leader and philanthropist Fred Kavli, with a mission of “advancing science for the benefit of humanity, promoting public understanding of scientific research, and supporting scientists and their work.” The Foundation implements its mission through a variety of programs, research institutes, professorships, and prizes, with a specific focus in four fields: astrophysics, nanoscience, neuroscience, and theoretical physics.

While many of the Foundation’s initiatives are focused on connecting scientists with one another to

discuss some of the biggest questions in their field, it also hosts, funds, and develops symposia, journalism workshops, roundtable discussions, and online resources to support scientific communication and connection with the public. Here are just a few examples:

- *FENS-Kavli Network of Excellence:* Fifteen neuroscientists are chosen biannually to participate in special meetings that provide opportunities for scientific collaboration, encourage mentorship opportunities between generations of scientists, and award prizes to veteran and up-and-coming scientists. Additionally, a key element of the Network of Excellence is to communicate with the general public and policy makers about brain research findings, via activities such as “pub talks,” which “showcase the most interesting areas of neuroscience in an entertaining and engaging way.”
- *AAAS Kavli Science Journalism Awards:* Established in 1945, this prestigious award program was endowed by The Kavli Foundation in 2009 to support its mission of honoring outstanding reporting for coverage of the sciences, engineering, and mathematics. Winning journalists in print, television, radio, online, and children’s news around the world are recognized for “scientific accuracy, initiative, originality, clarity of interpretation, and value in fostering a better understanding of science by the public.”
- *Journalism Workshops and Symposia:* The Foundation underwrites workshops, symposia, and other initiatives conducted by the renowned Knight Science Journalism Program at MIT. These initiatives have ranged from symposia that bring together leading journalists to discuss issues fundamental to the field, to workshops aimed at increasing science news coverage. The Kavli Foundation also partners with the World Federation of Science Journalists on a series of symposia and workshops aimed at leading journalists around the world.
- *Alda-Kavli Initiatives:* The Foundation is underwriting a number of initiatives conducted by the Alan Alda Center for Communicating Science, one of the nation’s premier institutions helping scientists more effectively communicate with the public. These initiatives range from the creation of the Alda-Kavli Leadership Workshops—workshops targeted at senior scientists and scientific leadership—to funding efforts to bridge academic research on science communication with communication training.
- *Public Engagement: Workshops and Symposia:* The Kavli Foundation aims to strengthen the field of public engagement and science communication, with a focus on catalyzing field-building work by leveraging other resources and partnerships. The Foundation has convened thought leaders in a “Support Systems for Scientists’ Engagement and Communication” initiative to advance the field of public engagement by understanding, connecting, and focusing on the people and organizations who support scientists in their public engagement interests and efforts. This effort strives to develop partnerships with key players in the engagement space, to work toward a shared vision of increasing public understanding of science and strengthening the connection between science and society.
- *Online Resources:* Kavli’s website features roundtable discussions and interviews with educators, scientists, journalists, and other individuals who are working to promote public understanding and improve communication between scientists and society. It is also underwriting online communications outreach at other institutions, such as the Kavli Conversations on Science Communication, conducted by the Science, Health and Environmental Reporting Program at New York University.
- *BrainFacts.org:* This website was created by the Society for Neuroscience (SfN) in 2012, and is a joint initiative with SfN, Kavli, and the Gatsby Charitable Foundation. Its purpose is to “communicate with the public, educators, and policymakers about revolutionary advances in understanding the brain and mind.” According to former SfN President Susan Amara, “Communicating with the public has only become more important in a world with many exciting discoveries to share. It’s also become more challenging, given the vast array of information that competes for public attention. As a result, the Society has sought to identify ways it can expand access to authoritative—and interesting—information that engages and excites the public about brain research.”

Learn more about the Kavli Foundation at kavlifoundation.org.

Communicating with the public has only become more important in a world with many exciting discoveries to share.

Using the Art and Science of Communication to Address *Real-World Problems*

By Edward Maibach, Ph.D.



Once, long ago, my wife and I had the good fortune to have lunch with Alan Marlatt at a chilly outdoor café on the University of Washington campus. Alan—now deceased—was a distinguished clinical psychologist whose research on addiction and relapse prevention helped lay the foundations of contemporary approaches to addiction treatment, and whose contributions to humanity were enormous. During lunch, when he learned that Albert Bandura had been a member of my dissertation committee, Alan told us the most wonderful story.

It happened in the late 1960s, during the final days of his doctoral program. Alan was doing a clinical rotation at the state mental hospital in Napa, California. Bandura was one of Alan's academic heroes, and Alan desperately wanted to meet him. One day, Alan gathered his courage and called Bandura, asking if he might be granted a brief meeting. Bandura—being an exceedingly friendly fellow—immediately agreed, inviting Alan to visit him at Stanford.

When they met, Bandura asked an obvious question: "When you complete your internship, what are your plans for research?" Alan told us that he went on at some length about his research plans, which involved studying some facet of a certain psychological theory—the details of which I no longer recall. Bandura listened intently. At the conclusion of Alan's explanation, Bandura politely but firmly responded: "Why don't you study a *real* problem? Smoking cessation...now that's a *real* problem." That was solid career advice, and Alan ran with it.

Any young (or not so young) communication scholar or practitioner would be lucky to receive the advice to study a real-world problem. Our training provides us with powerful insights and useful skills that can be used to study and help solve important problems in the world. Major problems in need of solutions currently include the opioid addiction epidemic, the looming collapse of the world's large fisheries, fake news, poverty and food insecurity, the rise of multi-drug antibiotic resistance, terrorism, air

pollution, the HIV pandemic, the obesity and diabetes epidemics, the reemergence of fascism, and, of course, climate change.

Bandura's advice to study a *real* problem has consistently served me well as a scholar, as a communication practitioner, and as a person. By studying and engaging with real problems in the world, every year has been more exciting—and more personally meaningful—than the last.

Here is an example: Shortly after Connie Roser-Renouf and I established the George Mason University Center for Climate Change Communication a decade ago, we conducted our first *Climate Change in the American Mind* (CCAM) public opinion poll in partnership with our now long-time collaborator at Yale, Anthony Leiserowitz. (Note: We recently completed our 20th CCAM survey.) The survey revealed a surprising finding: a large majority of American adults trust TV weathercasters as a source of information about global warming.

Several days after publishing that finding as Figure 39 (yes, 39) in our polling report, my office telephone rang. In a mellifluous voice, the caller introduced himself as Joe Witte. (Joe was a broadcast meteorologist I had seen many times on *Good Morning America*, the *Today Show*, and most recently on a Washington, DC, television station. I recognized his voice instantly, and I was more than a little excited to be hearing from him.) Joe asked if he could pay me a visit to share an idea; I readily agreed, and we set a date.

The idea that Joe shared with me—which came to him in response to Figure 39—was that he and other TV weathercasters around the country could potentially play an important role in debunking a prevalent misperception Americans have about global warming. Most Americans accept that global warming is happening, but they see it as a distant problem—in space (not here), in time (not yet), and in species (not us). Weathercasters are trusted sources of information about global warming (Figure 39 proved that), they have excellent access to the public

TV segments were branded “Climate Matters”—a brand identity that proved to be easy to use by Jim (WLTX Chief Meteorologist Jim Gandy, right), and popular with his audience.



(unlike climate scientists), and they have excellent science communication skills (again, unlike most climate scientists). Joe suggested that I write a National Science Foundation (NSF) grant proposal to produce localized climate reporting materials so that he and his colleagues could—in real time—report on local climate change impacts, thereby helping Americans understand that global climate change is happening here, now, to them.

Climate scientist Heidi Cullen (who at the time was the chief scientist at Climate Central, a non-profit climate research and communication organization), two of my Mason communication colleagues—Kathy Rowan and Xiaoquan Zhao—and I responded to Joe’s suggestion by writing an NSF grant proposal to explore his premise. With the funding, we conducted three studies. Using snowball sampling, we first interviewed every “innovator” (aka “positive deviant”) TV weathercaster we could find—people who were actively attempting to educate the public about climate change. We eventually found and interviewed 16, although few of them were currently educating their viewers about climate change on air. We then conducted the first systematic survey of TV meteorologists—approximately 1,400 members of the American Meteorology Society and the National Weather Association. Finally, in partnership with a TV weathercaster in Columbia, SC—WLTX Chief Meteorologist Jim Gandy—and his news director, we put the idea to test by working with Jim to create and air during the weather segment 13 local climate change impact stories over a 12-month, pilot-test period beginning in the summer of 2010. The TV segments were branded “Climate Matters”—a brand identity that proved to be easy to use by Jim, and popular with his audience. To evaluate the impact of the pilot test, we conducted pre- and post-test surveys of WLTX viewers and viewers of competing stations.

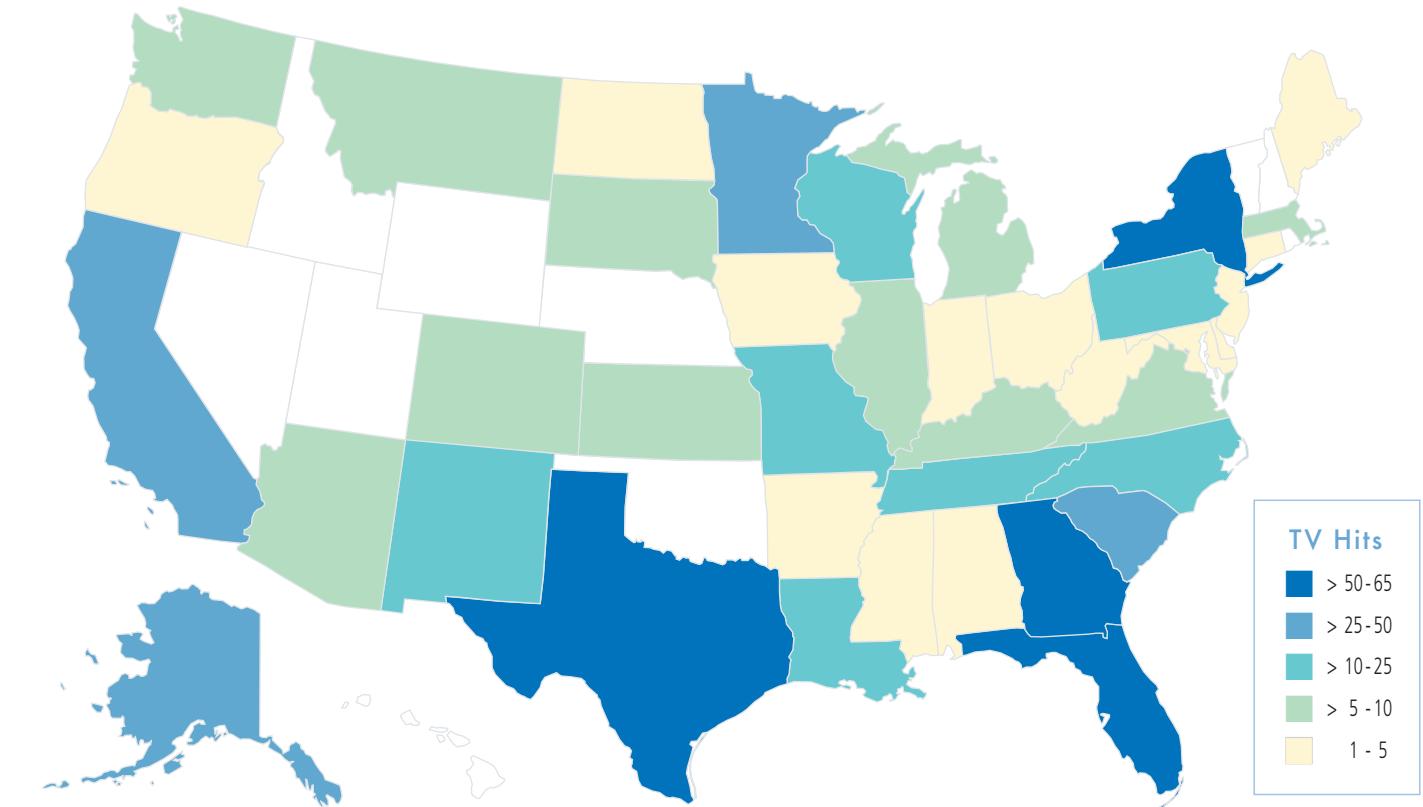
From the “innovators,” we learned that public response to their efforts was largely positive—suggesting

that concerns about potentially alienating viewers by reporting on climate change may be overblown. From the survey, we were surprised to learn that about half of America’s weathercasters were not (at that time) convinced that human-caused climate change was happening. But we also were pleased to learn that nearly all of the weathercasters who were convinced of human-caused climate change were potentially interested in educating their viewers about it. From the evaluation of the pilot test, we learned that when TV meteorologists make the effort to educate their viewers about local impacts of climate change, their viewers learn; specifically, they came to understand climate change as more of a “here-and-now” problem than they had previously appreciated.

Together, those three studies strongly suggested that Joe Witte’s idea—that TV weathercasters can help Americans develop a more accurate and science-based understanding of climate change—has considerable potential. Since then, using a combination of additional NSF grants and grants from philanthropic foundations, we have worked continuously to cultivate that potential. To that end, we have added new partners to the Climate Matters project—specifically organizations trusted by TV meteorologists including NASA, NOAA, and the American Meteorological Society—to help us scale up the project. And, importantly, we—i.e., Climate Central—hired an Emmy award-winning broadcast meteorologist, Bernadette Woods Placky, to lead the project scale up.

Scaling up the project meant supporting new weathercasters, in additional media markets, with localized climate reporting materials that helped them explain the local impacts of climate change. It also meant producing these materials on a frequent and sustained basis, so that weathercasters knew they could count on the continuous availability of updated materials. In addition, it meant offering an ongoing series of workshops and webinars to help TV weathercasters

On-Air Use of Climate Matters Materials by State, 2017



become both more knowledgeable about climate change and its local impacts, and more competent and confident as local climate reporters.

We first added 10 additional weathercasters to the project—each from a different U.S. media market—and then 20 more from Virginia. By 2013, we announced that any weathercaster who wanted localized Climate Matters reporting materials, in any U.S. media market, could have them—for free. The rate of program growth has more or less followed a classic “adoption curve” (as described in Diffusion of Innovation Theory). By 2014, more than 100 weathercasters were participating, and by 2016, more than 300 had signed on. In June 2018, the 520th weathercaster enrolled in the project.

By December 2017, we were producing localized Climate Matters materials for every media market in the country—in English and Spanish—on a weekly basis, approximately 50 weeks per year. Between 2012 and 2017, on-air reporting about climate change by TV weathercasters increased by over 1,600 percent. Perhaps most importantly, public understanding of climate change had also improved (although public understanding remains starkly divided along political lines).

Over the past four years, our CCAM surveys have shown significant increases in the proportion of American who:

- think global warming is happening—(up from 64 to 70 percent)
- are very/extremely sure global warming is happening—(up from 40 to 49 percent)
- think global warming is mostly human-caused—(up from 52 to 58 percent)
- think global warming is affecting the weather in the United States (some/a lot)—(up from 47 to 54 percent)
- think global warming is harming Americans now—(up from 32 to 39 percent)
- think they have personally experienced global warming—(up from 34 to 41 percent)
- are “somewhat” or “very” worried—(up from 55 to 62 percent).

Climate Matters can’t yet claim any credit for these increases, but my colleague Teresa Myers is currently using CCAM data to build an evaluation model that will test

The Climate Matters project appears to have helped to foster a new social norm among weathercasters such that they accept and embrace local climate change as relevant to their profession.

for a dose-response relationship between rate of Climate Matters reporting and rate of increase in the indicators listed above in each of America's 212 media markets. In the meanwhile, we have conducted additional small-scale experiments that show that exposure to TV weathercasters using Climate Matters materials on air improves public understanding of climate change as a local problem.

Another important indicator of project success is that, by 2017, nearly all TV weathercasters in America had become convinced that human-caused climate change is happening. By helping broadcast meteorologists—starting with “innovators,” and then “early adopters,” and now

members of the “early majority”—learn more about the issue and embrace a new reporting practice, the Climate Matters project appears to have helped to foster a new social norm among weathercasters such that they accept and embrace local climate change as relevant to their profession.

I'm proud of this project, and I share it with *Spectra* readers to make this point: Any communication scholar or practitioner can have a similar impact by choosing to focus their energies on studying and/or attempting to solve real-world problems. As Albert Bandura urged Alan Marlatt to study a real problem, I urge all NCA members to do the same. You won't regret it. ■



EDWARD MAIBACH is a Distinguished University Professor at George Mason University, and Director of Mason's Center for Climate Change Communication. His research—funded by NSF, NASA, and private foundations—focuses on public engagement in climate change. Maibach was a member of the federal committee that conducted the 3rd National Climate Assessment, and he co-chaired the committee's Engagement & Communication Working Group. He was recently made a Fellow of the American Association for the Advancement of Science. Previously, Maibach served as Associate Director of the National Cancer Institute, Worldwide Director of Social Marketing at Porter Novelli, and Board Chairman for Kidsave International.

Science, Rhetoric, *and the* Public Good

By Lisa Keränen, Ph.D.

Current and former government officials met last May in a darkened conference room in Washington, DC, to face a daunting challenge. Seated around a large table, they watched videos and listened to briefings detailing the spread of a never-before-seen airborne virus. Contagious and sometimes lethal, the virus had rapidly overwhelmed healthcare systems, ignited political tensions among nations, and incapacitated heads of state.

Fortunately, the disease was imaginary, part of the Johns Hopkins Center for Health Security's “Clade X” bio-preparedness simulation. Although the virus was hypothetical, planners assured participants and the public that it was based on meticulous research and plausible scenarios. From diagrams of the structure of the Clade X virus, to charts detailing predicted mortality rates and statistical modeling of disease spread, the exercise marshalled scientific rhetoric to heighten awareness of health security, bolster the perceived credibility of the simulation, and, ideally, strengthen responses to future outbreaks.





At the same time the organizers of Clade X were drawing on virology and epidemiology to raise awareness of potential pandemic threats, scientists around the United States faced mounting challenges to their work. The *Washington Post* reported last December that the U.S. Centers for Disease Control and Prevention (CDC) had banned seven words, including *fetus*, *evidence-based*, and *transgender*. CDC spokespersons quickly denied the embargo, but they conceded that some staff members may have been cautioned to avoid the terms in budget requests in recognition of the current political climate. Meanwhile, the Environmental Protection Agency (EPA), under then-EPA Administrator Scott Pruitt's control, had replaced the term *climate change* with *extreme weather* in public communications and removed references to *greenhouse gases*, *fossil fuels*, and *global warming* from its websites. In June 2018, the Department of the

Interior (DOI) announced that U.S. Geological Survey scientists would be required to submit the titles of their papers to the DOI before they could present their work at major conferences, and that they would now be required to seek DOI permission before speaking to reporters. Debates about the censorship of science understandably followed, even while the National Park Service claimed victory in publishing an uncensored report that linked climate change to rising sea levels.

These two vignettes—the first implicitly celebrating the power of science to help solve society's most pressing challenges, and the second positioning scientific consensus as politically inexpedient and therefore suppressible—reveal disparate understandings of, attitudes toward, and responses to science in our society. But more than merely celebrating, denigrating, or denying scientific knowledge, our democracy depends on the ability to comprehend, analyze, and evaluate the nuanced dynamics of scientific,

From responding to viruses such as Zika, influenza, or Ebola, to addressing rising sea levels, our deepest existential challenges—both the problems themselves and their solutions—are profoundly dependent on how we communicate about science and technology.

technical, and medical discourses, materials, and practices. From responding to viruses such as Zika, influenza, or Ebola, to addressing rising sea levels, our deepest existential challenges—both the problems themselves and their solutions—are profoundly dependent on how we communicate about science and technology.

The “science of science communication” has become a popular catchphrase in academic circles. Yet the *art* of science communication, or the rhetoric of science, technology, and medicine, offers another approach to understanding scientific and science-related discourses, whether they come from the laboratory or the public sphere. Drawing from rhetorical and cultural studies, the rhetoric of science investigates how scientific, science-based, and science- and technology-related texts, contexts, symbols, objects, and materials structure both meaning and action.

Scholars who study the rhetoric of science, along with those who study the rhetoric of technology, and the rhetoric of health and medicine, identify recurrent patterns of discourse, isolate standard features of scientific and popular science genres, chart alternative rhetorical strategies, and map how power relations influence scientific inquiry, practice, and meaning. They also expose the mechanisms structuring gendered, raced, and classed imaginaries of science and track what Jeanne Fahnestock once called “the rhetorical life” of a scientific fact as it crosses from one domain to another. As a field of study, the rhetoric of science promotes a more discerning understanding of and public conversations about the marvelous and magnificently messy set of practices we call science.

Rhetoricians who study science, technology, and medicine ask and answer a variety of questions that are salient to the creation and dissemination of information about those fields. What are the structural, stylistic, and

substantive features of various scientific genres? How do particular metaphors, narratives, or memes shape public understanding of science? And what happens when humans are reduced to their genes, or to their brains, or are configured as “health consumers”? How do journal articles use rhetoric to dehumanize biomedical research participants in ethically flawed health research? Where do gendered and racialized genomics discourses originate? What rhetorical strategies do opponents of science use to manufacture scientific controversies for political gain? And how are risk rhetorics being used to promote particular policies and practices, or to organize communities around biological characteristics? These are just a few of the questions scholars in the rhetoric of science, technology, and medicine address. But communication scholars can play a broader role in promoting the understanding, production, and critique of scientific and technical discourses.

SCIENCE AND ITS RHETORICS REQUIRE CITIZEN ENGAGEMENT

Rhetorical studies of science have repeatedly shown that science alone cannot solve policy debates about science. For example, the global consensus about climate change within the scientific community does not automatically point to a single set of solutions. Rather, human beings—scientists and non-scientists alike—must deliberate to determine mutually acceptable plans for addressing the effects of a warming planet. The capacity for identifying, assessing, and re-imagining scientific discourse has economic, material, political, historical, cultural, and ethical consequences. This is why democracy needs both scientific and technical expertise and informed public discussions about scientific and technical matters.



Communication scholars have important roles to play in promoting inclusive and informed public dialogue about science and technology in our classrooms, communities, and personal lives, as well as in the public sphere.

Communication scholars have important roles to play in promoting inclusive and informed public dialogue about science and technology in our classrooms, communities, and personal lives, as well as in the public sphere. We can add units on science journalism in media studies and health communication classes, craft public-facing documents that help readers understand and critically analyze scientific discourses, show students how to interpret the visual imagery and social imaginaries of science, promote critical perspectives on risk-related communication, include science museum displays in our classrooms or scholarship, partner with scientists for the public good, and organize public forums that bring together diverse stakeholders for dialogue about matters of science and technology that impact their lives.

SCIENCE AND ITS RHETORICS REQUIRE TRUST AND TRANSPARENCY

Although societies are stronger when they engage publicly with matters of science and technology, history is full of examples of science being politicized or suppressed when it challenged orthodoxy. Yet trust and transparency lie at the foundation of science, which is why recent efforts to suppress, for starters, climate and reproductive science, threaten not just the institution of science itself but also our larger society. As former *New England Journal of Medicine* Editor Arnold S. Relman once observed, “It seems paradoxical that scientific research, in many ways one of the most questioning and skeptical of human activities, should be dependent on personal trust. But the fact is that without trust the research enterprise could not function.”

In a time when facts seem to command less currency than they have in the past, and when distrust of those who think differently abounds, communication scholars are well-positioned to counter efforts to obscure scientific consensus and to promote open dialogue about and exchange of scientific findings among varied publics. Although we live in an era of skepticism, when corporate, financial, and ideological interests taint our scientific and public life, and despite deep and often legitimate skepticism about science and technology news and health information, communication scholars can facilitate calls for open, transparent science communication in our classrooms and communities.

SCIENCE AND ITS RHETORICS DEMAND INFORMED ANALYSIS AND INTERVENTION

As one of the most powerful discourses and institutional practices of the past century, “science” can mean many things. It can refer to a set of evolving knowledge-making practices, an institution, or even a method of inquiry. But whichever of these we are talking about, science changes. It can be misused. And, science is certainly subject to human frailty, bias, and error. Yet it is also responsible for some of humanity’s greatest achievements, from the design of the Pyramids of Giza, to the exploration of outer space, to the cataloguing of the organisms of the microbiome.

Just as the scientific enterprise requires trust and transparency, it also requires a healthy dose of skepticism and rigorous inspection. Because our classrooms are potent sites for stimulating critical thinking and discourse, communication scholars should be teaching students how scientists structure arguments, how scientific

Democracy requires competence in understanding, creating, and assessing the rhetorics of science, technology, and medicine.

and technical knowledge circulates, and how rhetors can ethically use (or sometimes misuse) scientific and technical information. We can further identify rhetorical stasis points in scientific discourse where arguments remain at an impasse, and we can invent and recommend alternative discourses, policies, and practices.

Democracy requires competence in understanding, creating, and assessing the rhetorics of science, technology,

and medicine. Communication scholars can take leading roles in promoting public deliberations about the rhetorics of science and technology and in developing knowledge about and understanding of how scientific and technical information is created, contested, and circulated. In a time of epidemics, real and imagined, when temperatures are rising, and when science as an institution faces significant pressures, the stakes are high. ■



LISA KERÄNEN is an Associate Professor and Chair of the Department of Communication at the University of Colorado Denver–International College Beijing and a University President’s Teaching Scholar. Her research and teaching primarily concern the rhetorics of health and medicine. She is the author of *Scientific Characters: Rhetoric, Politics, and Trust in Breast Cancer Research* and co-editor of *Imagining China: Rhetorics of Nationalism in an Age of Globalization*. Her essays have appeared in venues such as *Argumentation & Advocacy*, *Chinese Journal of Communication*, *Health Humanities Reader*, *Rhetoric & Public Affairs*, and *Quarterly Journal of Speech*. She is a past President of the Association for the Rhetoric of Science, Technology, and Medicine (ARSTM).

SCHOLARLY RESOURCES

Association for the Rhetoric of Science, Technology, and Medicine, an NCA-affiliated scholarly organization
<http://www.arstmonline.org>

Oral Histories of Scholarship in the Rhetoric of Science and Technology <http://www.youtube.com/user/ARSTonline>

Rhetoric of Health and Medicine Bibliography <http://medicalrhetoric.com/bibliography/articles-and-book-chapters/>
SciCheck, *The Annenberg Public Policy Center*’s site for fact checking science <http://www.factcheck.org/scicheck/>

Also see <http://www.factcheck.org/issue/health-watch/> for healthcare debate fact checking.

PROMOTING UNDERSTANDING OF SCIENCE:

Examples from the Field

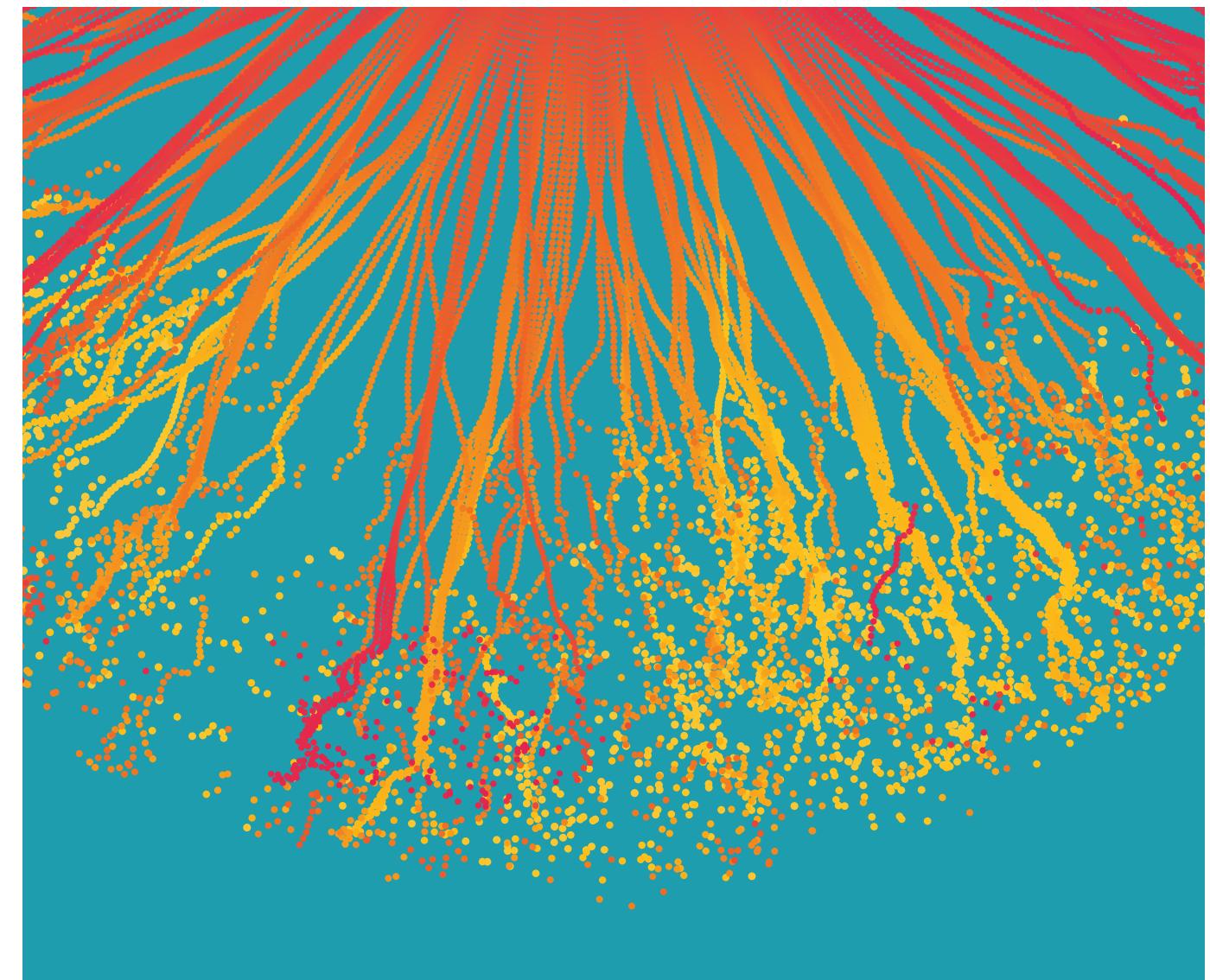
By LaKesha N. Anderson, Ph.D.

Science is everywhere. Whether it's deciding what type of transportation to take to work, choosing where to purchase groceries, or detecting fact from fiction, the decisions we make are greatly informed by science. For many, though, the science of science communication is almost entirely linked to discussions of global warming and climate change. This is because these issues receive widespread attention in both public and policy discourse. While climate change is an important and well-researched area of communication, communication scholars are studying science communication in myriad ways. A great deal of research being done by communication scholars on science communication recognizes the ubiquity of science in everyday life—from environmental communication, to deception detection and cybersecurity, to food safety.

ENVIRONMENTAL COMMUNICATION

Climate change communication is important to understanding the ways in which we engage with the natural environment. Many scholars are working on issues related to communicating global climate issues, and a few universities have dedicated climate change communication programs, including George Mason University and Yale University. These programs seek to identify the ways in which people around the world respond to climate change, and to develop communication strategies that will engage key audiences in climate change solutions. These programs work to effect positive individual behavioral change, and to effectively engage policy makers in problem-solving.

Several individual scholars are researching environmental issues that are not tied to climate change.



While their research varies in methodology, their work provides insight into issues related to science, environmental justice, public advocacy, and culture. For example, Danielle Endres of the University of Utah examines the rhetorical dynamics of nuclear controversies, highlighting the experiences of marginalized others in these controversies. Her research tells the stories of people involved in nuclear issues, painting a picture of the relationships that exist between people and their ecosystems. Endres' exploration of the exclusion of Native Americans from participatory decision-making processes that impact them and their lands communicates the importance of culture and place in environmental issues. Endres has advocated the value of collecting oral histories as a means of better understanding the communication surrounding environmental controversies. Additionally,

her work on the rhetoric of scientists and engineers working with low-carbon energy technologies provides insight into the complex intersections of science, policy, and publics.

Another scholar, Phaedra Pezzullo at the University of Colorado Boulder, focuses her research on environmental communication, as well as public advocacy and environmental and social justice. Her book, *Toxic Tourism: Rhetorics of Travel, Pollution, and Environmental Justice*, explores how environmental justice advocates use toxic tours to highlight environmental problems in various tourism communities, and the effects of those environmental problems on the people residing in these communities. Her work sheds light on the exploitation of cultures and environments for tourism purposes and offers a new understanding



of democratic participation in environmental decision-making processes. Along with former Sierra Club President Robert Cox, Pezzullo wrote *Environmental Communication and the Public Sphere*, which explores recent events that have impacted environmental communication, including developments in politics, media, advocacy, and science. Pezzullo's research is important to better understanding how both culture and science communication affect decisions and choices that influence our environment.

DECEPTION DETECTION AND CYBERSECURITY

Information security is an ever-advancing field of study that looks at the processes designed to protect communications from unauthorized or improper access, use, modification, disruption, or destruction. While often situated as a telecommunication issue, information security is also being studied through a social science lens. Arun Vishwanath of the University at Buffalo studies cybersecurity, with a focus on the "people problem." Specifically, he studies the reasons behind why people fall prey to cybersecurity attacks such as traditional email phishing and newer spearphishing attacks. As Vishwanath explains, these attacks persuade users to click hyperlinks contained in email, text, or social media messages. Understanding user psychology and communication tactics helps explain why these scams still work today: tailored messages make it hard to detect deception. His work highlights both the need for a better understanding and awareness of ways to protect against deceptive schemes that have long-lasting and widespread effects on individuals and

communities, as well as the need for additional research on the psychology of both attackers and victims.

University of California, Santa Barbara Professor Norah Dunbar also studies deception communication. Her National Science Foundation-funded research studies deception through a game called VERITAS, or Veracity Education and Reactance Instruction through Technology and Applied Skills. The game was designed as a training tool for law enforcement officers. It trains players to detect deception by teaching them to identify heuristics often used in credibility assessments. This game was not Dunbar's first educational game creation. Before developing VERITAS, she created MACBETH, a game focused on identifying biases, for the intelligence community. While traditional training models have failed to improve deception detection accuracy, Dunbar's work in video game creation shows promise. Early results of Dunbar's study indicate that people are more motivated and willing to learn via a game than a lecture, that people can learn lessons relatively quickly, and that the game is helpful in teaching people to detect truths. These games serve as a way to learn new skills in a low-risk environment before putting that knowledge to work in a high-stakes situation. Many studies on deception detection have relied on polygraph tests and fMRI to detect lies, but Dunbar's work provides a uniquely social scientific way of examining and teaching detection techniques.

FOOD SAFETY

Research about food spans a wide range of topics such as food safety, healthy eating behaviors, and food marketing. This research can help us make better decisions about

By helping scientists and science organizations identify their audiences, create effective messages, and choose relevant channels, communication scholars can help reduce the ambiguity and uncertainty of science information.

where to purchase food, what types of food to eat, how to read labels, and how to better understand the science of food. Rachel Bailey at Washington State University researches the human biological need to eat, and how food marketing alters that biological response. She has written about how the portrayal of food in advertisements interacts with individual differences such as diet, hunger, and motivation, and how these interactions affect attitudes toward food and individual consumption behaviors. Bailey's research helps us better understand the messaging strategies that are most effective in promoting healthy eating behaviors, while also breaking down the complexities of the relationship between biology and consumption.

The safety of food is an important issue in the United States, as the country faces more concerns about food contamination and bioterrorism. Several communication scholars are tackling this topic, including Timothy Sellnow at the University of Central Florida and Matthew Seeger at Wayne State University. They have researched the potential effects of the continued industrialization of food systems. They suggest that as these systems become more complex, there is a reduced ability to guarantee a safe food supply, and that the very systems that were designed to ensure food safety may actually spread contamination. What results is an altered public perception of America's food supply. Both Sellnow and Seeger have published with Wayne State University's Julie Novak on issues of food-borne contamination. Seeger and Novak's research explores the food warning/recall system as the primary method of reducing public exposure to food-borne risks. Their work draws on risk and crisis communication to better understand the ways in which food-borne risk is

communicated to publics. Similarly, Sellnow and Novak's research looks at the ways employees in food companies communicate as they do their work. They found that workplaces that promote participatory communication practices create organizational mindfulness about food safety, helping to reduce instances of food contamination.

Food science research is a growing area of study. The public has greater concerns about food safety and the safety of food than ever before. People are thinking more about where their food comes from, there is a great public awareness of food allergies, and the government is in continued debate over the agriculture and food policy legislation that impacts trade, conservation, food safety, and protections for farmers. Understanding how best to communicate about these issues helps the public make better choices regarding food and food policy.

SCIENCE COMMUNICATION IS INTERDISCIPLINARY

The good work of communication scholars demonstrates the interdisciplinary nature of science and science communication research. This article provides only a few examples of the ways communication scholars are studying science; there are myriad ways in which communication contributes to the understanding of science.

Scientists are expected to help solve problems, yet they are not trained as communicators. This is where the communication discipline is uniquely situated to help science. By helping scientists and science organizations identify their audiences, create effective messages, and choose relevant channels, communication scholars can help reduce the ambiguity and uncertainty of science information. Communication scholars can also help us

Communication can be a barrier to understanding, but it can also be an effective means of breaking down complex or dull material into engaging pieces of information that can literally save lives.

better understand the relationships between humans and science, such as the links among people, place, and science; a person's ability to make medical decisions; or a person's motivation for engaging in deception or one's ability to determine truth. And, whether communicating about a food crisis or helping translate policy to lay audiences, effective communication can also help people better understand the policies that impact food safety.

Communication can be a barrier to understanding, but it can also be an effective means of breaking down

complex or dull material into engaging pieces of information that can literally save lives. Effective science communication helps build support for science; promotes the understanding of science, thereby helping people make more informed decisions; and makes science more accessible to broader, more diverse audiences.

I suspect communication scholars will keep up the good work of offering science something that no other field can: understanding. ■



LAKESHA N. ANDERSON is Director of Academic and Professional Affairs at the National Communication Association (NCA) and part-time faculty member in Johns Hopkins University's Communication MA Program. Prior to joining NCA, she was an Assistant Professor of Communication at Indiana State University, teaching courses in advanced research methods and health communication. She also spent several years as an instructor at George Mason University and has served as a grant writer and program director for multiple nonprofits in Virginia. Anderson's research on health, risk, and crisis communication has appeared in several journals and books, and she has received awards for her research, teaching, and university service.

The advertisement features the NCA logo at the top left. To its right, the text "A RESOURCE FROM NCA" is displayed, with "FROM NCA" in orange. Below this, a large image of the "Pathways" booklet is shown. The booklet has a black cover with white text. At the top, it says "WHY STUDY COMMUNICATION?" followed by a question mark. Below that is the title "Pathways" in a large, stylized font, with "TO YOUR FUTURE" in smaller text underneath. At the bottom of the booklet cover, there is a graphic of many overlapping circles. Overlaid on this graphic are three horizontal bars with text: "BE VALUED", "GET HIRED", and "MAKE A DIFFERENCE". The NCA logo is also present at the bottom of the booklet cover. At the very bottom of the advertisement, the website "WWW.NATCOM.ORG/BOOKSTORE" is written in white text on a black background.

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Communication at Play

NCA 104th Annual Convention
November 8-11, 2018
Salt Lake City, Utah
www.natcom.org/convention

PLAN TO ATTEND, AND EXPERIENCE THESE CONVENTION HIGHLIGHTS



OPENING SESSION, featuring **Edward Schiappa**, Professor and Head of Comparative Media Studies and Writing, MIT; **David Zarefsky**, Professor Emeritus of Communication Studies, Northwestern University; **Rachel Hastings**, Professor of Communication, Southwestern College; **Paula McKenzie**, Associate Professor of Speech Communication and Theatre Arts, Bethune-Cookman University; and **Thom Gencarelli**, Professor and Chair of Communication, Manhattan College. Moderated by First Vice President Star Muir, Associate Professor of Communication, George Mason University.

Sponsored by Routledge, Taylor & Francis

In these turbulent times, are there touchstones of experience that can help us make sense of our current troubles and assist us in moving forward in positive ways? The NCA Opening Session will take a look back to look forward. A conversation among historical figures in our discipline, including Protagoras, Abraham Lincoln, Sojourner Truth, Elizabeth Cady Stanton, and Marshall McLuhan, will address the issues of Other, demagoguery, social media, and historical lessons about what truly makes a nation great.



CARROLL C. ARNOLD LECTURE, presented by **Joshua Gunn**, Associate Professor, University of Texas at Austin

Sponsored by Pearson

Joshua Gunn will attempt to temper the nostalgic connotations of play by highlighting its dark side and, in particular, the ways in which ingenuity is eclipsed by cultural scripts that pervert play into a rigged game. Gunn argues that understanding how play gets perverted in our time can help us move toward more creative and humane alternatives to all-too-familiar forms of foul play.

NCA PRESIDENTIAL ADDRESS, presented by **Ronald L. Jackson II**, NCA President and Professor of Communication, University of Cincinnati

The presence of commemorative plaques and historical markers facilitate at least three functions of our public memory: (1) reminding us of important moments, people, and events, (2) establishing our heroes, and (3) erecting our legacies. Every academic field metaphorically leaves traces of its history and sense of public memory through its institutional priorities and intellectual production. In his address, NCA President Ronald L. Jackson II will take us on a journey through NCA's past, challenging us to think about new possibilities and where we must go from here.



ENVIRONMENTAL JUSTICE IN THE AMERICAN SOUTHWEST

Sponsored by the Waterhouse Family Institute for the Study of Communication and Society

This special evening session will build on NCA's commitment to civic engagement and relevance by highlighting scholars and practitioners who are engaged in environmental justice issues affecting the southwestern United States.

COMMUNICATION AT PLAY SPOTLIGHT SERIES

The Communication at Play Spotlight Series shines a light on the nature of play and its role within communication and foregrounds sessions that exhibit playfulness in shaping the experience of scholars. Sessions include explorations of research methodology, the use of games to teach and train, the role race plays in contemporary discourse, the academy as a site of play, the role of prison debate, argumentation and self-expression, and a session that will connect historical suffrage-related texts to contemporary rhetors and issues.



PLAY SPACE

In the spirit of the convention theme, the 104th Annual Convention will host a Play Space for attendees to engage with and explore the nature of Communication at Play. The space will host improv games, daily morning yoga, Legos, tabletop games, performances, and more.



DAY OF SERVICE

Sponsored by Kendall Hunt

All convention participants are invited to a Day of Service on Wednesday, November 7, where we'll give back to the local community by compiling school supplies for elementary school-aged children in Salt Lake City. Please join us!



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