

Keynote Address to the World Conference of Science Journalists, June 11, 2015

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Thank you for that overly generous introduction, and special thanks to the programming committee and the host committee and all of the other conference organizers for all of their hard work, which has really paid off during this very busy week in Seoul. We've all felt *warmly* welcomed here in Korea, and not only because the toilet seats in the hotel rooms are temperature controlled! Seriously, I think all of us who are visitors have been so astonished by the intelligence and friendliness of South Korea's people, their science savvy, and the astonishing speed of Korea's economic ascent. We're all watching with great interest as this country makes its next transition, from a manufacturing economy to a creative economy. And as for the conference, it has truly been an eye-opening week. I love that the emphasis here has been on sharing and learning practical storytelling tools as well as the usual deep immersions into so many crucial issues that are at the confluence of science and society, which is the place where great science journalism is born.

But now that the conference is almost over, I think it may be useful to step back briefly from the day-to-day work of our craft and look at the big picture for science journalism,

something that is sometimes difficult to do, as busy as we are. How did we get to where we are today? Where do we want to go tomorrow? How can we get there? As Rich said, I am an environmental journalist and most of the time when I give speeches I'm talking about disease clusters or chemical pollution or global climate change or the Anthropocene. But today is different, because most of you are journalists – journalists from all over the world. This conference is unique in that way, and as I was thinking about what I could say that would be most relevant to this group I decided not to talk about environmental issues, but instead talk a bit about the long-simmering crisis afflicting science journalism, and suggest some ideas about how we can respond effectively to our problems. I do this with the full knowledge that many people in this room are at least as qualified as I am to talk about these issues. A significant part of my job as a professor and the director of one of the world's largest science journalism training programs is to keep a close eye on trends in our field, but I'm certainly not the daily journalist I was for 20-plus years. I still write magazine pieces but my newspapering days are over, and I concentrate these days on books (as Rich said) and teaching.

And here's another very important caveat: My talk will inevitably focus on the situation in the English-speaking world, and specifically the U.S., which is the world I know best, which means I will be contributing to what is already a strong systemic bias toward U.S. journalism in the global conversation over our field's future. I apologize for that. I hope what I say will nonetheless be relevant to those of you from Korea and other parts of Asia and from Africa and elsewhere because I'm reasonably confident that the trauma we in the Western media are experiencing will sooner or later become your problems, too, if they aren't already. Whether it

will be sooner or later will depend on cultural factors and rates of development and of digital penetration into the communications infrastructure.

If you'll indulge me, let me begin with a quick historical reminder, and I apologize if bringing it up is unpleasant or even offensive to anyone in this room, but I want to try to make the point that this incident and its aftermath show why our work as journalists is vital and endangered, but far from doomed.

Exactly 26 years and six days ago, about 1,000 kilometers west of here, in Beijing, much of the world was captivated by the image of a single man in a wide avenue standing in front of a long convoy of Chinese tanks, refusing to let them pass. The day before, a few blocks away in Tiananmen Square, the *People's* Liberation Army had violently ousted a large group of people -- peacefully protesting people, many of them students. Hundreds were killed.

As you may remember, this solitary man – Tank Man, as he came to be called, since no one knows for sure who he was, or what happened to him – Tank Man held a shopping bag in each hand, suggesting that this was not a long-planned protest, but a spontaneous act of great bravery and passion. Eventually he jumped onto the lead tank and shouted something into several of its portholes, presumably asking the driver to turn around and go back to his base. Instead, after the protestor climbed down, the lead tank driver started moving the convoy forward again, prompting the protestor to again jump back in front of the first tank, reinstating the standoff. This time, however, two unidentified men emerged from the crowd and dragged Tank

Man away, to an unknown fate even today. We do know the Chinese tank convoy proceeded toward Tiananmen, and the crackdown against dissent rolled on – and rolls on even today, in other more subtle forms, 26 years and six days later.

We know about Tank Man because there were journalists – news photographers and television camera people – situated on the balcony of the Beijing Hotel, about a half-mile from the scene, and they were able to capture the scene through their long camera lenses and eventually to transmit it around the world.

Tank Man's lonely protest became an iconic image of the modern era – a sort of Rorschach inkblot test into which people see what they wish to see. And I bring it up today because with the benefit of 26 years of hindsight, I think many of us in the West, and specifically in the Western media, misunderstood what the incident foretold about the future of free expression and the future of journalism, very much including science journalism.

For many years, I think, there was a kind of smug triumphalism in international news coverage by U.S. media and, to a lesser extent, European media – an assumption (sometimes explicit, always implied) that of course everyone else in the world wanted to be like us; that all peoples longed for *our* version of democracy and for the cacophony of conflicting voices that goes with it, amplified by a vigorous, thriving news industry. Tank Man may have been hustled away to an unknown fate, but the principles for which he stood – or at least the principles we ascribed to him, since he never spoke publicly – would surely triumph, we were certain. At the

time, Russia was transitioning to what many of us assumed would be free elections and a vigorously free press, so surely the repressive Chinese government's days were numbered, too, and also North Korea's, and any leader or government that did not yet embrace Western-style democracy and the robust press coverage that is essential to maintaining it. The emergence of the Internet as a radically different way to exchange information only made us some of us giddier and more confident. We thought we knew what Tank Man wanted, and we in the ultra-powerful Western media would make sure his cause would triumph, and soon.

Now, 26 years later, we know we were quite wrong to have been so smug. Capitalism may be triumphant but we have discovered that there is nothing inevitable about transitions to democratic, open government, and nothing inevitable about the continued prosperity of aggressive, independent journalism, either. For those of us in media, the last quarter-century has sometimes felt like one long rude awakening. In the United States and in some cases Europe – and soon in other parts of the world, I fear and expect – the rise of the web has crippled the revenue models that traditionally sustained newspapers, magazines and broadcast news. American media companies that have not adapted successfully are either dying or abandoning journalism. Those that *have* adapted to digital models are in some cases – far too many cases, let's be frank about it – doing so in ways that make good journalism increasingly difficult to practice. And perhaps most disturbingly of all, many of us in the media have come to realize that the general public doesn't care very much about our problems. They're happy to read our stories if they're free, but they're often not willing to pay a fair price for those stories. That has created a crisis for us because we desperately need subscription revenue, now that so

much advertising has disappeared from news media, apparently gone forever. In the United States, newspaper ad revenue is less than half of what it was ten years ago, and online ads – once our great hope – are still, more than two decades into the digital revolution, responsible for less than 20 percent of overall ad revenue at legacy newspaper companies. Magazines aren't doing much better. By now, this painful transformation has gone on long enough that we've lost the ability to be shocked that newspaper employment in the U.S. has fallen by almost *two-thirds* from its peak in 1989, also 26 years ago. Hundreds of those refugees are science specialists, now either freelancing or gone to the ever-burgeoning p.r. sector of the science communication world.

Now, I recognize that the meltdown in newspapers and magazines and broadcast journalism is not nearly as severe outside of the U.S., especially here in Asia, and that is indeed very wonderful news, but we have to ask ourselves, how long can that last? Surely the same shifts in consumer habits, driven by technology and demographic changes, are coming to you, too – and you will want to prepare for that transformation, and to learn from the U.S. media's very rough experience.

What's just as alarming as this economic crisis in the Western press is the closely related realization that many people in the U.S. and around the world do not necessarily strongly embrace the core values of independent journalism: they don't necessarily believe that an unfettered and thriving press is a crucial check on powerful institutions that otherwise would have virtually free reign to abuse their power. Throughout the world, governments and

corporations are restricting reporter access, censoring media reports, intimidating reporters, editors and publishers, and increasingly creating their own alternatives to a free press via an ever-increasing torrent of propaganda and marketing that usually can easily outshout and overwhelm what remains of independent media.

These curbs on press freedom are not only happening in countries like China and Turkey and Russia and Hungary and Venezuela, they're also happening in my country. Government agencies in the United States now routinely ignore inconvenient queries from reporters, and take years to respond – if they *ever* respond – to requests for documents that by law should have been promptly released. Prominent American politicians now routinely go for weeks – months – without answering a single question from an independent journalist. Our Supreme Court and Congress, meanwhile, and it terrifies me to say this, appear to be steadily moving toward an impenetrable system of campaign finance in which politicians can essentially be bought via secret and unlimited contributions. At a time when the American press is already *economically weak*, we journalists are *also* losing the *access* we need in order to hold powerful people and institutions accountable for their actions.

And again, most voters don't seem particularly agitated about this, or even if they do care they are deeply cynical about the prospect of fixing these problems. They care much, much more about *other* issues, especially economic ones. Governments from Beijing to Budapest, and everywhere in between, have come to realize that if their economies keep growing, people will overlook the gradual erosion of democracy. So now, in much of the world, we have more

wealth but also more inequality. More markets but less unfettered debate. Governments and corporations are more influential and efficient than ever before, but also less transparent and accountable to the public. And yes, thanks the explosive growth of digital technology, we can access more information than ever before, yet we also have less journalism, or at least less *deep* journalism conducted in the public interest.

Things really have changed over these last 26 years. And what we have learned, as journalists, is that we can't take *anything* for granted anymore, that we're going to have to *create* and even *fight* for the future of our profession, and for its crucial role in sustaining democracy, because there is nothing preordained about journalism's survival – or democracy's survival, for that matter.

As *science* journalists, we are not at all set apart from this fight – we're right in the middle of it! Verification -- fact-checking – is what separates journalism from propaganda, and the scientific method is a tremendous form of verification – the very best we have, despite its flaws. The best science journalists, and some of them are right here in this room, are relentless in their insistence that the weight of the evidence, not the preferences of the powerful, should drive our storytelling. They know that the purpose of science journalism is not to cheerlead for scientists, but to explain scientific developments in full context, including their social implications. We don't just quote people's assertions, we *check* them and figure out where the most persuasive evidence lies. That's especially important now, at a time when the public seems to gyrate between fearing scientists and worshipping them. We science journalists know

there is a profound beauty to the scientific *process* when it is practiced well, but that *scientists* are only human. We know from the ongoing scandals of fraud and irreproducibility and negligent peer review, that scientists are subject to the same errors of hubris and misjudgment and greed that afflict the rest of us, including journalists. If we science journalists don't expose those defects in science and make a fuss about them, then who will? So yes, we science journalists really do have a crucial role to play in demonstrating that independent, unbiased, evidence-based journalism *matters*, and that journalism's future as a profession is going to materially affect the world's future.

So this, then is the high-stakes, very challenging background in which we labor, struggling to do important work amid many obstacles. It all sounds pretty grim, doesn't it? And yet I think there are reasons for cautious optimism, and certainly reasons not to lose hope. I called this talk 'Convergence, Divergence and Dreaming in Digital' so let's quickly talk about these three big ideas, because I believe they will play crucial roles in determining whether science journalism will survive and maybe even thrive in the coming decades.

Journalism professors like me have been talking about media convergence for a very long time, and now it's in full bloom in the United States and a growing list of other countries. The idea is that the old distinctions between newspaper journalism and television journalism and radio journalism are melting away, and are being replaced by a hybrid model, housed on the Internet, that combines all of those kinds of journalism plus many more. If you go to CNN.com, for example, presumably a television site, you will see video, yes, but also text

stories, data visualizations, audio podcasts, photo slide shows, interactive features, and more. If you go to nytimes.com, presumably a newspaper site, you'll see the same mixture, maybe in different proportions, but very similar ingredients. Same thing with npr.org or bbc.com. And increasingly, I believe, the same media convergence will be occurring all over the world. I see no reason to think it won't, sooner or later.

What this means for my science journalism masters degree students at New York University, for example, is that by the time they get their degrees they will have learned to shoot and edit video, create audio podcasts, build data visualizations, draw animations, do some basic coding, and even practice the high art of tweeting. And in addition, of course, they will do a *lot* of writing – and rewriting, and re-rewriting! – of rigorously edited text stories that range from fast blog posts, to 5,000-word magazine stories and even book proposals – and everything in between. These grad students will also have practiced interrogating databases to extract great stories from them, and developing other investigative skills, too. We even have them do *poetry* exercises to develop their literary impulses. In short, we require that they learn to tell stories in as many ways as possible because that is what the digital journalism marketplace now demands. We're also now teaching them business and entrepreneurial skills – skills they will need in order to identify opportunities in the digital space and to exploit those opportunities, either by building new journalistic sites or products or even by developing new tools for digital storytelling. So we're asking a *lot* of these students. Ours is a very demanding curriculum – and also an extremely expensive one. We're very worried that high-level journalism is increasingly becoming the exclusive province of the privileged. So our approach at

NYU is not a panacea, but it does work for our students – even now, with all the problems in our industry, they get good jobs, and are telling great science stories all over the world.

And that is really the point, that in the era of converged media, those journalists who are able to master the new storytelling tools of digital media – and then employ those tools in concert with the traditional reporting and narrative skills that have always been at the heart of good journalism training – those dextrous multimedia journalists now have an opportunity to do absolutely amazing work. Media convergence is allowing them to pick the very best possible combination of tools to tell every particular story in the most compelling possible way. So in some ways, despite all of our problems with access and censorship and broken business models, this is a golden time for science storytellers, as long as we don't think too hard about getting them fair compensation. It's a time when they can tell stories that are more vivid, more comprehensive, more contextual, more transparent than ever before.

Unfortunately, this very positive trend toward media convergence is happening at the same time as another trend that I think is quite damaging. Even as we are converging on an ever-expanding set of wondrous digital storytelling tools, we are *di-verging* on the *content* of the stories we tell as journalists. In a digital universe of essentially unlimited searchable, accessible content, our audiences are fracturing – they're splitting or, and this is the term I prefer: atomizing. The magic of web 'search' and the tremendous growth of social media networks are making it easier than ever for individuals to build their own information bubbles

that incorporate only those ideas, topics and opinions that mesh smoothly with their own ideologies and interests.

As news outlets become less ambitious about reaching truly broad audiences, revenues shrink, leaving news managers with a unpleasant choice: they can cut costs, or they can tailor their products to the most affluent slivers of audience – the relative few who are willing to pay very large subscription fees for exclusive, insider information. Whether they're lobbyists or lawyers or investors, these insiders will pay big if they think they can profit from information that the rest of us don't have. This is a real growth area for specialized journalism, including science content, but one that surely only worsens social inequities.

The other choice news managers can make, of course, is to cut costs, which largely explains the rise of online content mills demanding five posts a day for appallingly low pay, with no time for anything but aggregating previously published work instead of doing independent reporting, and for writing misleading clickbait headlines and overhyped, out-of-context stories. Thankfully, there are an increasing number of stellar exceptions to this grim world of story quotas – more about them soon – but we need many more of them.

There are a couple of other very big problems with the fracturing of our audiences. One is that it has had a very corrosive effect, I think, on our shared culture, on the exchange of ideas and of evidence across the boundaries that divide social groups. These cross-cultural conversations that have been so important in knitting pluralistic societies together, and

audience atomization is stifling them. The old media system of general-interest newspapers and magazines and broadcast news programs essentially forced readers and viewers to learn even about topics and viewpoints in which they had no particular interest, and maybe even were offended by. But not any more, at least not in the United States. Now, if you're a liberal or a conservative, an animal-right activist or a vivisectionist, a luddite or a technologist – no matter what you believe it's shockingly easy to go for days or weeks or maybe years without having to face ideas and even facts that are distasteful to you, that challenge your long-held assumptions.

No wonder then that so-called “swing voters”, unpredictable voters who don't reliably support the same party over and over, are disappearing in the United States and, to a lesser extent, Europe. Most American politicians don't even bother chasing these undecided voters anymore, focusing instead on energizing their core supporters with aggressively partisan and often misleading messages. They do so because the strategy *works*; it works because an increasing number of people are spending virtually their entire lives swimming in a sea of confirmation bias, certain that they were right all along because, hey, all of their favorite websites and all of their like-minded friends on Facebook and Twitter *told* them they were right all along. This cannot be good for democracy.

And the third very disturbing problem with audience atomization is that it creates many more opportunities for mischief by governments, corporations, advocacy groups and others who are much more interested in gaining votes, customers and contributors than in actually informing people. These special interests know that the journalism industry is economically

weak, and that information bubbles are easier to create in the digital era than ever before, so they are capitalizing on the trend toward niche audiences. ISIS certainly understands this, and so does America's CIA. So does the so-called Publicity Department of the Communist Party of China. So does Exxon-Mobil, and Greenpeace. We may consider the agendas of some of these groups honorable and their ambitions noble, but the point is that each of them, in their own ways, is hard at work constructing their own self-interested version of reality, and then marketing that vision to advance their own agendas. The Apostle John said, 'And ye shall know the truth, and the truth shall set you free,' but I don't think John was counting on a time when everyone could so easily construct and promote their *own* truths, their *own* realities.

Now I'm not about to claim that this kind of propaganda hasn't been thriving for centuries, of course it has, and I'm not naive enough to assert that independent journalists have a unique claim in aspiring to the closest possible depiction of reality – of course we don't. We journalists are flawed, and sometimes corrupt, and always biased by our past experiences. But at least our first loyalties – when things go right, at least – our first loyalties are to our audiences, not to some hidden (or sometimes explicit) self-interested agenda. If we journalists go away – and there's no guarantee that someday we won't – there will be nothing left but a world of spin. That's not a world I want to live in, and I don't think you do either.

So again, this all sounds pretty bleak, I know. And I do apologize for that, but we journalists are in the business of depicting reality, and we need to see the world as it is, not as we wish it to be. But that is not *all* we should be doing. Because one strong lesson of the last

quarter-century is that we need not be passive in the face of change. Instead, we're going to need to be *proactive* and to continuously experiment and innovate in the digital space, and we're also going to need to work aggressively to grab the public's attention and *show* it why a free press and the independent verification of information *matters*. We don't have the luxury of being low-key in advocating for our craft. This is where the "dreaming" part of my "converging, diverging and dreaming" title comes into play, so I'd like to spend these last couple of minutes talking about some promising, important responses to our problems – responses that, who knows?, we may ultimately look back on and see as solutions to our dilemma.

There are at least three somewhat hopeful responses, I think. These are not ideal, by the way, they are not necessarily going to give us the journalism many of us grew accustomed to during the glory years of the '70s and '80s, but they are already giving us good digital journalism, including good digital *science* journalism, and we need to embrace and nurture that wherever we find it.

The first trend is that some web start-ups that have made a lot of money doing cut-rate, clickbait journalism, are now raising their game as they mature as media organizations. A good example is a site that I'm sure many of you know called BuzzFeed. Just eight years old, it chalked up cool \$100 million in revenue last year. It achieved this stunning feat largely through tens of thousands of pretty silly but smashingly popular posts – especially their so-called 'listicles' on topics such as, "12 Reasons Why Sam-the-Cat-With-Eyebrows Should be Your New Favorite Cat." (Those of you who have your laptops out now have my permission to Google 'Sam the Cat

with Eyebrows'.) Posts like that are what get BuzzFeed almost 200 million unique visits per month. And now that BuzzFeed is generating so much cash flow, its managers are doing something very encouraging: they are investing in deep journalism. BuzzFeed now has, for example, a newly hired, powerhouse science staff that is already producing impressive work. BuzzFeed isn't abandoning the clickbait – no way, it's their meal ticket – but it *is* adding richly reported, serious content. Something similar may be happening at Vice Media, which rose to prominence and huge revenues based on its macho, over-the-top videos but is now in the early stages of building out its capacity to do deeper work, including on science topics. Vox Media and 538 are similarly ramping up their science coverage capacities, while legacy brands like the New York Times, Guardian and the Washington Post are gradually getting more sure-footed in their transformations to digital-first models, typically by producing content that is increasingly differentiated from their traditional offerings on paper. What these thriving sites all have in common is that they haven't given up on trying to reach broad, general-interest audiences, *and* they are relentlessly innovative in their storytelling in order to *find* and engage those large audiences.

A second mostly encouraging trend is the rise of philanthropy-funded online news organizations. These are typically non-profit, and usually funded by foundations or individuals who recognize that independent journalism really is endangered, and that its demise really would have terrible consequences for democracy. The best of these new sites in the United States, such as ProPublica and the Texas Tribune, have constructed elaborate firewalls to make sure that the journalists are firmly in charge, and that funders do not influence the news

agenda. We need many, many more of these, and while I would much rather see the money come from private philanthropists than from governments, we may see more public funding, too, which is another reason why we will need to keep fighting so hard for firewall policies that protect the independence and integrity of the journalism on those sites. It's going to take a lot of effort from us as journalists to successfully incubate these young non-profit sites, and to keep them from succumbing to the onslaught of special-interest spin, but it's worth the effort.

And finally, whether we like it or not – and I have made my peace with it – we are surely going to see much more journalistic content produced directly by non-journalists, especially by experts who can communicate with authority. Scientists are very much at the leading edge of this trend, as the rapid growth of science blogs shows. There are certainly problems associated with this development, but it is part of the democratization of storytelling, spurred by the web, and to me its positive aspects far outweigh the negatives. What's crucial, no matter who's doing the storytelling – whether a professional journalist or someone else – is that those stories need to be infused with core journalist-ic values like verification and clarity and transparency and fairness and context. Professional journalists will, I think, be spending a growing percentage of their time mentoring these non-journalist subject-matter experts and editing their work via so-called 'Pro-Am' collaborations.

At NYU, we're already very much in the business of evangelizing on behalf of those core journalistic values. Over the last six years, we've trained more than 400 PhD students and post-docs across the science disciplines, and medical students, too – we've trained them all in the

fundamentals of effective, ethical science storytelling, and we've done this via the Science Communication Workshops we have organized at the university. We are also funding journalism directly, and are starting to experiment with collaborations between students, faculty and media companies.

We have to try everything to find a sustainable future for science journalism, so we are. Bold, relentless experimentation, carried out with integrity and transparency, is going to have to be the lodestar for our journey. In the end, what matters is not which or even whether newspapers or magazines or television broadcasts survive, but whether the *values* of journalism survive. They are what we must fight to preserve, at all costs. If we've learned anything from the shocks we have endured over the past 26 years, I hope we've learned that. Thank you.