

## **Topic: Low-Intensity Electrochemical Redox Reactions for Contaminant Remediation in Clay & Silt Matrices**

**Speaker: Dr. Song Jin, Advanced Environmental Technologies and Adjunct Professor at the University of Wyoming**

**Time: Tuesday, May 12, noon-1pm**

**Location: Webinar**

*CEMS has received one (1) General CLE for this presentation*

Most in situ treatment technologies for chlorinated solvents require good physical permeability of the contaminated matrix and the availability of mass tends to adsorb on the solid matrix. Tight formations such as clay and silts present a significant challenge. The slow back diffusion of contaminants from less permeable soils into groundwater exacerbates the situation, resulting in extended treatment time and high cost.

The concept of low-intensity electrochemical redox reactions found its new applications in treating contaminants in a number field projects. The process achieves multiple electrochemical reactions in the contaminated matrix, including 1) direct and fast reductive de-chlorination of chlorinated solvents through the beta elimination pathway that does not generate intermediates of chlorinated ethenes; 2) alteration of solid-water interface for an enhanced desorption of contaminants from solids into water phase; 3) lowering redox potential rapidly in the matrix, which favors biological reductive de-chlorination and extends longevity of other electron donating compounds; and 4) synergy with other remedial technologies such as ISCO, ISCR, and injections of electron donors and carbon material. This presentation will focus on the field case studies (brownfield projects) of using the low-intensity electrochemical redox reactions for in situ treatment of PCE and TCE in the subsurface dominated by clay and silts. Field data suggest that this new method could serve as a useful tool to help achieve cost-effective compliance goals, especially in an otherwise challenging tight formation.

Dr. Song Jin is the founder of Advanced Environmental Technologies (Fort Collins, CO) and Adjunct Professor at the University of Wyoming. Song has 20+ years of experience in technological innovation and implementation. He is one of the pioneers and a leading practitioner in the niche of bioelectrochemical redox techniques for in situ remediation of contaminants. Song received his Ph.D. in 1997 from the University of Wyoming. He has published 80+ papers in peer-reviewed journals, 100+ papers in technical conferences, and four book chapters. He also holds 30 US and international patents. Prior to AET, Song served as a Principal Scientist at MWH and Western Research Institute.

**LOCATION: WEBINAR:** Webinar links will be posted via email. If you misplace the webinar link, please email [admin@coems.org](mailto:admin@coems.org), and we will email it to you.

## Golf Tournament Update

CEMS Membership,

I hope this message finds you well and that you and your loved ones are staying safe and healthy. Through these difficult times, we wanted to reach out and thank you for your current and past participation at Colorado Environmental Management Society (CEMS) events. We also wanted to let you know that an alternate (later) date became available for this year's **CEMS Scholarship & Charity Golf Tournament** at Rolling Hills Golf Club.

**Out of an abundance of caution, and in hopes that this type of event will be allowed to take place, we have rescheduled the golf outing for Monday June 29, 2020.**

We are in the process of soliciting sponsors and golfers, so please sign-up to reserve your spot! Additional details are provided in the attached flyer and on our website. If you have any questions, please do not hesitate to reach out to myself or Ty anytime:

**Mike Jahn**

**Tylene Lichtenberg**

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**<https://coems.org/golf/>**

### A Message from CEMS Board of Directors

CEMS members, this is a time in our lives, we never thought we would experience. We may have heard about the Spanish Flu in a distant history class, yet it may not have even registered as a real threat to modern society. Well, here it is, we are living it, and it is more than something out of either a Stephen King or Robin Cook novel. We look around at the news across our country and see everyone reaching out to help in whatever capacity they can. We have people on the front lines – health care workers; first responders; factory workers; postal workers; teachers; everyday workers in the grocery stores, hardware stores, restaurants for takeout and delivery, etc. Everyone trying to make this pandemic as painless as possible. We owe a lot of gratitude to those on the front lines and let us not forget that. So, when you order take out, get curbside delivery, etc. please thank those who are helping and tip generously so that when we get through this, and we will, those people will still have a job.

That is our segue to another important subject – jobs and the loss thereof. There are those who are fortunate to be able to work from home, there are those who can still go to job sites, yet there are those who have lost their jobs because of this pandemic. CEMS is proud to have a job board on our website to advertise employers looking for people and people looking for jobs. So please, reach out to [admin@coems.org](mailto:admin@coems.org) to advertise your position or to send in your resume. We are here for you and this is not a trite phrase - **We are all in this together**. Take care of yourselves and your loved ones, be kind, be safe, and be well.

*CEMS Board of Directors*



**COLORADO ENVIRONMENTAL MANAGEMENT SOCIETY**

ENGINEERING, SCIENTIFIC, & LEGAL PROFESSIONALS

**PRESENTS THE 2020 SCHOLARSHIP & CHARITY GOLF OUTING**

**THE CLUB AT ROLLING HILLS**

**RESCHEDULED: Monday June 29, 2020**

**9 AM Shotgun Start**

**4-Person Scramble  
Hole-in-one prizes**

**Cheer & Gear  
Raffle 6 Prize holes**

**Access to Private Golf  
Course and Clubhouse**

**GOLD \$1,500**

Four (4) golfers  
Corporate logo on sponsor banner  
and on sign at tee box of one hole  
Option of attending hole

**SILVER \$1,000**

Two (2) golfers  
Corporate logo on sponsor banner

**BRONZE \$750**

One (1) golfer  
Corporate logo on sponsor banner

**SPONSORSHIP OPPORTUNITIES**

**Hole-in-one \$200**

Corporate logo on sponsor banner  
CEMS will purchase HIO insurance

**Hole \$150**

Corporate logo on sign at tee box

**Practice \$150**

Corporate logo at range or practice green

**Prize Holes \$175**

Corporate logo at prize hole location  
**ONLY 6 AVAILABLE**

**Course Signs \$500**

Corporate logo on sponsor banner  
and sponsor signs on course

**Cart Signs \$500**

Corporate logo displayed on golf carts

**Breakfast \$250**

Corporate logo displayed on sponsor banner

**Lunch \$250**

Corporate logo displayed on sponsor  
banner

**Beverage**

*See contacts for pricing*  
3 alcohol options  
Multiple non-alcohol options  
Corporate logo on sponsor  
banner

**Promotional  
& Raffle Items**

Donate "freebies" and/or golf  
supplies, e.g, golf balls, tees,  
divot removers, with your  
company logo items, etc. (120  
items for the "golfer's bag")

**You can also donate Colorado cheer  
for the raffle! Support Colorado  
distilleries, restaurants, & CEMS at  
the same time!**

**To Register Visit Our Website: <https://coems.org/golf/>**

*Or complete the section below*

**PLAYER REGISTRATION**

**I WILL BE GOLFING:**

GOLFERS\*\* : \_\_\_\_ @ \$150/player = \$ \_\_\_\_

**I JUST WANT TO SOCIALIZE:**

BREAKFAST, LUNCH, & RAFFLE SOCIALIZERS: \_\_\_\_ @ \$40/person = \$ \_\_\_\_

Golfer Name(s): \_\_\_\_\_

Team me with: \_\_\_\_\_

Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ e-mail: \_\_\_\_\_

Company: \_\_\_\_\_

**Payments due June 22, 2020**

Mail Checks To: Juliana Reid, Tournament Treasurer  
c/o CEMS Golf Tournament  
PO Box 2426, Evergreen, CO 80437-2426

7:30 – 9 AM – Registration/Breakfast/Practice

9 AM – Shotgun start

~2:00 – Après golf (lunch, awards, prizes)

\*Mulligans, Raffle Tickets, & Cheer Tickets available  
day of for \$5.00 each! (credit cards accepted)

**CEMS GOLF COMMITTEE CONTACTS**

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**Mike Jahn**  
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## *From the Board...Covid-19: Communicating with the Public in a Skeptical Era by Andy Horn, PG, Westwater Hydrology LLC*

As a boy I remember going to the cemetery with my mother, always the historian, who would point out a group of headstones from 1918 and 1919, and say, “they died from the Spanish Flu after World War I.” We would see another cluster of headstones from 1888 – “those are from the Yellow Fever epidemic.” Perusing a faded photo album, I might hear about this relative who, scratched in some minor accident had “died of blood poisoning,” or the infant kin who had died of whooping cough. Cholera, Polio, Measles, Typhoid Fever, and Diphtheria were words that brought mortal fear once upon a time. Death could arrive with the next ship or wagon and move among the populace, taking young and old, rich and poor, native and immigrant.

As the biologist Lewis Thomas put it in 1974:

*“Until a few decades ago, [infectious diseases] were a genuine household threat, and although most of us survived them, we were always aware of the nearness of death. We moved, with our families, in and out of death. We had lobar pneumonia, meningococcal meningitis, streptococcal infections, diphtheria, endocarditis, enteric fevers, various septicemias, syphilis, and, always, everywhere, tuberculosis. Most of these have now left most of us, thanks to antibiotics, plumbing, civilization, and money, but we remember.”*

The last statement, “but we remember” is no longer true. Only our eldest remember the days before wonder drugs and high-tech hospitals, antiseptics and routine sterilization. All but our most severe injuries are now seen as only a painful, but temporary, inconvenience, with recovery time filled with get-well cards and colorful scribbling on casts.

As the Coronavirus pandemic unfolds, we are watching what could be the greatest public health crisis of our time. In many of our world-class medical institutions are overwhelmed and basic supplies are scarce. There are accounts of patients healthy one day and stricken from our ranks within a week. With the virus spreading among our communities, we shelter in place, partaking in a centuries-old practice of quarantining ourselves from others who can transmit the illness or preventing ourselves from unknowingly spreading contagion. Safe in our homes we are bored but may feel uncharacteristically powerless as the virus silently and invisibly spreads through our communities. We may find ourselves praying for a modern-day Passover.

Today as environmental professionals we are mainly concerned with the anthropogenic causes of disease and death; the toxic byproducts of our industrial age.

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### **2020 CEMS Officers:**

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## **Presentation Opportunities for Upcoming CEMS Meetings**

The CEMS Program Committee is currently searching for "interesting, topical and informative" presentations for our meetings in 2020 and beyond. This is a great opportunity to network with your peers, share information and technology, and become more involved with the environmental community. CEMS is interested in an assortment and variety of topics relevant to environmental and natural resources professionals. Each monthly presentation is roughly 50 minutes, followed by a question and answer period.

**If you or someone you know is interested in presenting at our monthly meetings, or our annual conference, please feel free to contact our Programs Committee Chairperson, Andy Horn at [Andy@WestwaterHydro.com](mailto:Andy@WestwaterHydro.com).**

Comments or suggestions from previous meetings, including the Annual Fall Conference, are also welcome. Let us know if we can publish them in the newsletter or website.

## **CEMS 2020 Scholarship Recipients**

Each year, the Society provides scholarships for Colorado collegiate candidates with studies focused in the environmental science, engineering, or law arenas. In 2020, CEMS is pleased to announce we were able to award three scholarships of \$2,000 each to deserving students!

The annual scholarship coordination, including development and distribution of the scholarship application, is led by the Scholarship Committee. The applications are reviewed by the Scholarship Committee and recommendations on scholarship awards are presented to the Board for approval. A notice of the scholarship award is made to the recipients and presented in the monthly newsletter for notice to the members.

CEMS received many applications for scholarships this year. We are pleased to offer scholarships to each of the following students:

- Evan Lim, Colorado School of Mines, B.S. Computer Science – [Evan Lim Essay](#)
- Andrew Safulko, Colorado School of Mines, PhD in Civil and Environmental Engineering – [Andrew Safulko essay](#)
- Cody Phillips, University of Colorado Law School – [Cody Phillips essay](#)

Follow the link aside each scholarship winner to view their application essays. Winners will be present at upcoming CEMS luncheons to receive their checks.

## **Looking for a New Position**

CEMS posts many job opportunities on our website.

<http://www.coems.org/jobs>

If you or your company would like to post to our website, please just send over the job description, with contact information to [admin@coems.org](mailto:admin@coems.org).

We also will post resumes for our members to help you find new opportunities.

**Are you a lawyer, looking for CLE's? Is someone at your office in need of CLE's? CEMS offers a very inexpensive way to earn those needed CLE's. Just RSVP to [admin@coems.org](mailto:admin@coems.org), bring your box lunch, and attend for free.**

## MEMBERSHIP – RENEWALS AND NEW MEMBERS

A big thank you to all those members who renewed, and welcome to our newest members.

### Renew – Individual

Joe Jenkins, Environmental Compliance Systems, LLC  
 David Kempisty, Evoqua Water Technologies LLC  
 Dave Lipson, HRS Water Consultants, Inc.  
 Beth McDonald, Ninyo & Moore  
 Tim Murphy, Pacific Western Technologies, Ltd.  
 Paul Pigeon, Golder Associates, Inc.  
 Tom White, Iron Woman Construction and Environmental Services, Inc.  
 Lisa Woodward, Colorado School of Mines

### Renew – Corporate

#### **Faegre Drinker Biddle & Reath LLP**

Colin Harris	Travis Jordan	Lynn M. Kornfeld	Ann Prouty	Candee Smith
James Spaanstra	Todd Walker			

## CEMS Meeting Sponsorships

Sponsors for a CEMS lunch meeting are provided a table where brochures or other materials can be displayed. The cost to sponsor a CEMS meeting is \$30 for members and \$85 for non-members. The non-member rate includes a one-year CEMS individual membership. Please send your request to sponsor a lunch meeting to [admin@coems.org](mailto:admin@coems.org).

## Products and Services



COLORADO ENVIRONMENTAL  
MANAGEMENT SOCIETY

ENGINEERING, SCIENTIFIC, & LEGAL PROFESSIONALS

Advertise Your Business Here!

Please contact [admin@coems.org](mailto:admin@coems.org)  
for pricing details.

For information on listing products and services in the CEMS newsletter, please contact CEMS at (303)674-9752 or [admin@coems.org](mailto:admin@coems.org).

## **RECRUIT AND PROFIT!!**

Recruit a **NEW** member for CEMS and get a **box lunch** credit voucher! For each person you persuade to join CEMS, you will be issued a **box lunch** voucher that you can apply to the CEMS fee of your choice, whether it be a luncheon, workshop or your own membership renewal. Note that you cannot take credit for a member's renewal. However, there is **NO LIMIT** to the number of vouchers you can accumulate. Just have the new member put your name on the referral portion of the Membership Application Form. And keep those new members coming!

## **CEMS REGULATORY UPDATE FEDERAL AND STATE ACTIONS IMPACTING COLORADO**

**By April D. Hendricks  
Burns, Figa & Will, P.C.  
April 2020**

On April 10, 2020, the Environmental Protection Agency (EPA), through its Office of Land and Emergency Management (OLEM) and Office of Enforcement and Compliance Assurance (OECA) issued interim [guidance](#) concerning impacts to operations at cleanup sites due to the COVID-19 pandemic. This guidance is intended to clarify the terms by which field activities can continue under the Superfund program, the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA) cleanup provisions, the Oil Pollution Act, and the Underground Storage Tank program, among others. Under this guidance, the EPA determine whether onsite activities and field work should continue at a particular site on a case-by-case basis, in light of specific challenges posed by the pandemic. Each determination for delaying or extending onsite cleanup activities will be based upon a variety of factors, including the stage of cleanup (planning and investigation; active remediation; or post-construction maintenance or monitoring) and applicable legal enforcement requirements for the site in question. To the extent that work can be performed remotely, including report preparation, modeling, and documentation, the EPA's guidance encourages those efforts to continue despite any delays or interruptions to related onsite activities. Activities likely to be delayed under this guidance include onsite monitoring and sampling and active remediation of stable conditions; however, the EPA will likely require the continuation of any work that is necessary to prevent imminent threats to human health and the environment; to provide alternative water supplies to replace contaminated sources; to abate ongoing exposures of heavy metals or asbestos; to prevent releases of contaminants to water bodies; and to prevent a catastrophic event.

On March 26, 2020, the EPA announced a temporary [policy](#) regarding the enforcement of environmental obligations during the COVID-19 pandemic. Under this policy, the EPA is authorized to exercise discretion in pursuing enforcement actions for civil violations that may result from the consequences of the pandemic. Though the EPA expects regulated entities to comply with all of their various obligations, the EPA's policy permits the agency to consider the impacts of the pandemic, on a case-by-case basis, in determining an appropriate response for civil violations that may occur. The policy indicates that, for the duration of the pandemic, the EPA is less likely to seek penalties for noncompliance with routine monitoring and reporting obligations, where such noncompliance is associated with impacts of the pandemic, including worker shortages, travel and social distancing restrictions, and limited facility or laboratory operations. The EPA's enforcement discretion under this policy is conditioned on the regulated entity's efforts to comply with their obligations; where compliance is not reasonably practicable under the circumstances, the facilities must take action to minimize the duration and impact of their noncompliance; identify the nature and dates of noncompliance; and explain how the COVID-19 pandemic contributed to the noncompliance. Where such noncompliance may result in acute risks and imminent threats to human health and the environment, or the failure of air emission controls or waste or wastewater treatment systems, the temporary policy requires facilities to contact the EPA, or the applicable state or tribe, and work directly with regulators to mitigate or eliminate such threats that may arise. The temporary policy also makes clear that operators of public water systems are to continue normal operations, along with required monitoring and sampling, to ensure the continuity of drinking water supplies. The enforcement discretion described in the EPA's temporary policy does not apply to criminal violations or to imported materials, including pesticide products. This policy also does not apply to activities conducted under Superfund or RCRA, which are addressed by the policy discussed above.

On March 10, 2020, the EPA [published](#) a request for public comment on its proposed regulatory determinations for certain contaminants listed on the fourth Contaminant Candidate List (CCL) under the Safe Drinking Water Act (SWDA). The CCL is a list of contaminants that are not currently regulated under the SWDA but that are known or anticipated to be found in public water systems. Every five years, the SWDA requires the EPA to evaluate the regulation of at least five contaminants from the CCL, based upon whether 1) the contaminant may have an adverse effect on human health; 2) the contaminant is known to (or is substantially likely to) occur in public water systems with a frequency and at levels posing public health concerns; and 3) regulation of the contaminant presents a meaningful opportunity for reducing health risks for those served by public water systems. Based upon these considerations, the EPA proposes to regulate two contaminants, perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), but does not presently seek to regulate six other contaminants, 1,1-dichloroethane, acetochlor, methyl bromide, metolachlor, nitrobenzene, and RDX. Both PFOS and PFOA are manmade chemicals used in various consumer products that are resistant to heat, oils, grease, and water, which contribute to their persistence in drinking water supplies. The EPA requests comments on its regulatory determinations as well as potential monitoring requirements and regulatory approaches for PFOS and PFOA. Comments must be received on or before May 11, 2020.

## From the Board *(continued from page 4)*

In this time, we should remember that our profession is rooted in public health and sanitation, that our predecessors once tracked cholera outbreaks to contaminated wells, fighting pestilence daily. Our civil engineering forbearers designed and built water and wastewater conveyance and treatment systems that erased typhus and dysentery from our national consciousness.

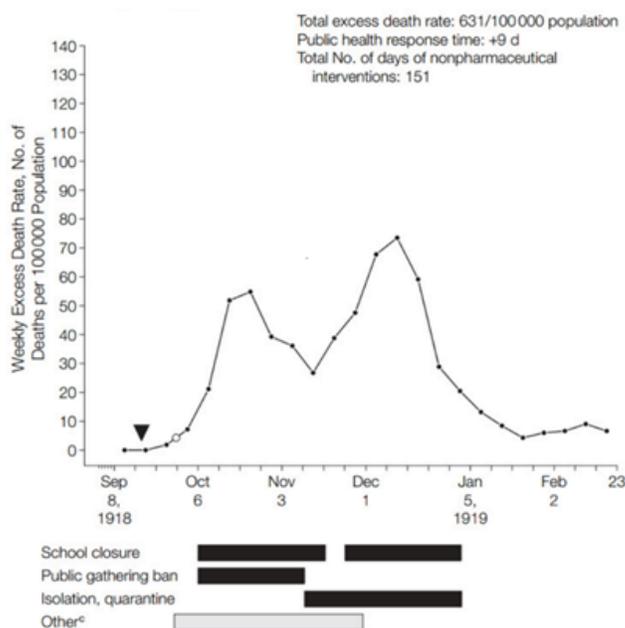
As our careers are rooted in public health and sanitation we may be called to speak to the lay public – families, friends, neighbors, social media communities, or passing acquaintances – and we can bring a knowledgeable understanding of how the Coronavirus spreads. We understand mortality rates, many of us know a smattering of microbiology, understand the action of soap or solvents on a microbe’s lipid membrane, and have firsthand knowledge of exponential functions and growth curves. We can play an important role to help our communities understand how the pandemic is spreading and how to control it. Collectively we can save lives.

As I write, it appears that in Colorado and the United States, the drastic measures we’ve taken are working to “flatten the curve” of the pandemic’s spread. Fortunately, the number of infections and fatalities are much lower than projections from a month ago. As the exponential growth in fatalities and infections slow there will be pressure to relax our quarantine and get back to our lives. Doubters of the Coronavirus’ severity are already arguing that what all we’ve done was for little gain, the virus was only a glorified flu outbreak, and that the severe losses to the economy are “unjustified by only a few thousand deaths.” If you take the pandemic seriously, I ask that you keep up the messaging to the public to continue the social distancing and keep “the curve” from spiking again.

A cautionary tale comes from Denver’s actions during the 1918-1919 Spanish Flu pandemic and shows the danger of stringent disease control measures followed by complacency when the outbreak subsided. After the pandemic arrived, in early October, the city-imposed measures we’re familiar with now: bans on worship and entertainment gatherings, mask wearing in public, social distancing requirements, and restrictions on business operating hours. By mid-October the number of new cases declined and Denver’s mayor made optimistic and premature proclamations that restrictions would be lifted within another week. It wasn’t until early November, however, that infections and fatalities had finally declined enough that health officials announced the worst had passed and relaxed the most onerous restrictions just in time for Armistice Day celebrations.

After two weeks it became apparent the reopening was premature as infections increased and the quarantine was reinstated. The second period of quarantine was met with public confusion, outrage by the business community, and non-compliance by a stubborn populace. The influenza rebounded, killing many more in a second outbreak accompanied by a prolonged quarantine (Influenza Encyclopedia, undated). The “double-peak” graph of Denver’s weekly influenza fatalities clearly show the danger of relaxing precautions too soon:

Excess Death in Denver during the 1918 Flu Pandemic



(Markel et al. 2007)

We currently risk repeating Denver’s 1918 mistake and must communicate to our friends and families the need to be vigilant and continue precautions even if stay-at-home orders are lifted. As scientists and engineers, we are good at sharing complex scientific information among ourselves.

*(continued on page 9)*

## **From the Board** *(continued from page 8)*

Unfortunately, “our tribe” seldom communicates to the lay public the necessity to take actions that, as today, will safeguard health and save lives. Many of us who have thrived on being the smartest kid in the class need to change how we communicate to get points across. Following are some tips for communicating with the public that us nerdy types should follow:

- 1) Understand that the listener simply doesn’t know or understand the subject, may have been misinformed, or is denying painful realities out of fear or hopelessness. We need to listen, be compassionate and gentle in our telling, and build on common understanding that can help us nuance the message so it will be better received. The best way I’ve heard this stated is the maxim that “in a year they won’t remember how brilliant and convincing your argument was, but they’ll remember how you made them feel.”
- 2) Know thine audience and avoid using jargon. Within our technical circles our jargon serves a purpose of streamlining our complex communication. Outside our circles, jargon quickly builds a wall between the technical expert and a lay person and may make the listener unreceptive to clear and very important information. For example, if I say the death rate is following a “positive trend” the lay person may not realize this is not a “positive” thing at all; a good alternative is to say “upward trend.”
- 3) State the conclusion first, tell the listener how it’s relevant to their life, and provide supporting details last. This is the opposite of our standard method of providing the background, stating the supporting details (often skipping the relevance of the findings to the audience), and then providing the conclusion at the end of our story.
- 4) Use metaphors and analogies relevant to the audience. The best viral spreading metaphor I can think of is already in common use – when we say a video on the internet has “gone viral” the lay person understands each viewer has passed the video on to several others, and it quickly got millions of views.
- 5) Don’t overwhelm your audience with facts, figures, and the minutiae of supporting data. We’re not in a courtroom trying to persuade a jury beyond a reasonable doubt, but are just having a conversation. If they want to know more, and we’re accessible, they’ll ask.

We live in a “post-truth” era in which wild conspiracy theories and false, fraudulent, or sensationalized stories “go viral” across the internet faster than knowledgeable professionals can refute them. Pseudoscience, stated authoritatively and with convincing technical-sounding language, finds fertile ground among even educated lay people. Superstition can become so strongly held that no amount of facts and figures can dissuade people from their misguided beliefs. And of course, we are under constant attack by disinformation campaigns spread by foreign agents to undermine trust in our nation’s institutions and weaken our country. Among these daunting challenges our knowledge and technical expertise, if properly used and communicated, can help save lives.

### **References:**

Shepherd, Marshall, 2016. 9 Tips for Communicating Science to People Who are not Scientists. Forbes Magazine, November 22, 2016.

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