

Global Partners in Science Communication

Sample 3-day syllabus

Day 1

7 pm	INTRODUCTION Welcome! It all starts here. You will hand in your pre-course assignment as we welcome you, provide a brief overview of how the course will unfold and go over a few key ideas that will help set the tone for the next few days.
7:30 pm	ART OPENING RECEPTION The exhibition of visuals and artworks is created by the images you have brought. Each guest exhibitor (that's you) will interpret the strength and messages of the visual communication for the assembled audience, and tell something about yourself in the process. Reception to follow.

Day 2

9:00 – 9:45 am	CREATIVE CONTEXT Before we dive in, we will start the day discussing the goals of the program. Science communications is an emerging culture, with a history of challenges concerning accuracy, visuals, sound, and the thirst for more creativity, larger audiences, means of engagement, and impact. This session sets the stage for the next few days by opening up the prospect of tackling these communications challenges with the user in mind. This takes creativity, courage and passion.
9:45 – 10:00 am	BODY OVER MIND In order to loosen up for the days ahead, we have to set you free! We'll begin some with warm up exercises that will prevent that brilliant mind of yours from being trapped in a body that is working against you.
10:00 am - noon	GETTING STARTED: ELEVATOR PITCH Mark Twain (or someone else clever) famously said, "I didn't have time to write you a short letter, so I wrote a long one instead." In this session, we will begin by having participants prepare a one-minute (that is, short!) "elevator pitch" and editing/practicing them in groups of three. The pitch should be about what you do – why should anyone come to see it/fund it/care about it? What is it about and why does it matter? We will record each person on video.
Noon – 1:00 pm	LUNCH
1:00 – 3:00 pm	PERSONALIZING THE IMPERSONAL Science communication often focuses on getting the science right, and that's essential, but a great story also includes people, especially you. This session asks you to ask yourself, why does your research matter to you? Why should it matter to anyone else? In this session we're asking you to write 75 words that would be an intro to a longer story, preferably about creative science and engineering. But somewhere in these 75 words you have to appear. This is a wonderful way to understand in a hands-on way the difference between talking to colleagues in your science circles and talking to pretty much anyone else. It can also set you up for writing your next blog or op-ed piece!

3:30 – 4:30 pm	GROUP PROJECT WORKOUT Fire up those laptops for an idea jam. You are going to be introduced to the different presentation platforms that are awaiting your creative science-loving selves. Together we are going to work up an inspired list of possibilities – without getting attached to any one place or concept just yet! Once we have a bowl full of brilliant and hilarious ideas, we'll put it on the back burner for stewing overnight.
4:30 – 5:15 pm	REACHING PEOPLE WHERE THEY LIVE You will be exhausted by this point in the afternoon, ready to watch YouTube. So that's just what we'll do. We'll take you through a pixel buffet of some inspiring pieces of science communications on screens, including Instagram, websites and television. We end the day on this note to share the many ways the people are presenting science in a range of visual media – all of course informed by great ideas and storytelling.
5:15 – 7:00 pm	BREAK AND DINNER
7:00 pm	IMPROV NIGHT This evening is not for the faint of heart – and not optional! Wear comfortable clothes and be prepared to have some fun. Leave your inner critic at home 😊

Day 3

9:00 - 10:00 am	STORY STRUCTURE 101 Everything you ever wanted to know about what makes a good science story, by someone who was the boss of this for 15 years at <i>Scientific American</i> . John Rennie will be joining us from his home in New York, where he has been a leading figure in the science publishing industry for decades. There is not a science subject in the world that John cannot wrangle into a presentable state, and he has the scars to prove it.
10:00 – 10:30 am	GROUP PROJECTS ASSIGNED Remember that idea stew? Now we dive in. You will be put into groups to come up with an original science communications project for one of the platforms we discussed. Your project could be a stage show, an interactive workshop, a roving character or a public awareness campaign. Over the coming two days, you will research, develop, produce, polish and rehearse the public presentation of your group project. Anything goes. It is time to get creative – and brave!
10:30 am – noon	CREATIVE FRONTLOADING All elements of your project are influenced by your ability to connect with your audience. You will be guided this morning through this first most important step in creative development – thinking about the audience, and why they might care. This is a session of pure strategy, emotion and cocktail napkin sketches. The more clear your goal, the easier it will be to make good decisions in the execution of the creative process.
Noon – 1 pm	LUNCH
1:00 – 4:00 pm	STORYBOARDING YOUR PROJECT Now that you know what you are trying to achieve, you will frame up and focus your group project and get feedback on your idea. The cutting room floor is more important than you think. The goal is to help you spend the rest of this day structuring in great detail a presentation that is ready for an audience!

4:00 – 5:00 pm	SCIENCE COMMUNICATIONS KEYNOTE A change is as good as a rest. Take a break with a Q&A with an accomplished science presenter. Come with questions!
5:00 – 7:00 pm	DINNER All creatives know that there is much inspiration to be found in stories at the dining table. We'll meet inspirational presenters and programmers to share their experiences and provide some tips.
7:00 – 9:00 pm	GROUP WORK TIME While you roll up your sleeves and flesh out how you are going to entertain audiences, one by one you can slip away to have a chat with faculty members about your individual aspirations. Think of these as conversations starters. A sign up sheet will be circulating.

Day 4

9:00 – 10:00 am	VISUAL DESIGN Visuals are often under-considered in science presentations. We will spend this hour coming to grips with effective visual design of communicating science. You don't have to be a graphic designer to know how images, video clips, charts, graphs and humour can engage the audience and support your message.
10:00 – 11:00 am	SCIENTISTS ON STAGE Many scientists are often asked to present publicly at science events without a stitch of training in stagecraft. We are not going to turn you into a thespian, but we will share some festival stage know-how, led by someone you'll see on all kinds of stages at the Jasper Dark Sky festival.
11:00 am – 12:00 pm	PROJECT TIME (WITH FACULTY FEEDBACK) As always, faculty are here to answer questions, help you make decisions, and most likely give you contradictory advice.
12:00 – 1:00 pm	PICNIC LUNCH Let's head outside for a picnic lunch and informal chats with your fellow science communicators and faculty members. We'll grab bag lunches and head to the hills. If it happens to be raining, we'll have an indoor picnic, and maybe one of the talented faculty members will inspire the group with some storytelling of their own.
1:00 – 4:00 pm	PRESENTATION PRACTICE AND PREP TIME Participants will scavenge, shop, build, and print as they put the final touches on their presentations (in a mad dash fashion)! Meanwhile, we'll continue the one-on-ones to discuss your personal science communications challenges and aspirations.

4:00 – 6:00 pm	SHOW TIME Let's entertain each other!, Consider this your best dress rehearsal. Based on the feedback, you will tune the script and visuals, and will soon be ready for the real world!
6:00 – 7:00 pm	WRAP UP AND CELEBRATION

Faculty Bios

Trevor Day

Dr. Trevor Day is professor of physiology at Mount Royal University in Calgary, and an alumnus of the University of Calgary, Cumming School of Medicine (Ph.D. 2008). He is an integrative cardiorespiratory human physiologist, studying responses to acute and chronic blood gas challenges. He is a leader in organizing high altitude research expeditions. His federally-funded research program engages undergraduate students in all aspects of the research endeavor, integrating his teaching, mentoring and research activities. He has an active interest in science communication, particularly how scientists can better engage the public in the importance and relevance of the scientific endeavor. Trevor is also a musician, and has been combining his love of the stage with his love of science through developing live science-music productions with Jay Ingram and his band. Trevor was presented with the 2019 Hotchkiss Brain Institute and 2020 Cumming School of Medicine Alumnus of Distinction awards at the University of Calgary. He was recently appointed to the Royal Society of Canada as a Member of the College of New Scholars, Artists and Scientists (2020-2027).

Jay Ingram

Jay Ingram was co-host of “Daily Planet,” the hour-long prime-time science program on Discovery Channel, for 16 years. He has worked in almost every mass medium. He hosted CBC’s “Quirks and Quarks” for 12 years, was contributing editor to Owl magazine for five years, and wrote a weekly science column in The Toronto Star for 12 years. He is host of two podcasts, is regularly involved in giving talks, often with a band. He has written 20 books, and received numerous accolades and awards for his outstanding contributions to the popularization of science. He has received six honorary degrees, the Queen Elizabeth II Diamond Jubilee Medal and was appointed to the Order of Canada in 2009.

Mary Anne Moser has built a career where art, culture and science intersect. She has worked as a journalist, an award-winning designer and was the founding editor of the Banff Centre Press. She started the Banff Science Communications Program in 2005, Canada’s Iron Science Teacher competition in 2007 and is the editor of two books on science in society: *Immersed in Technology* (MIT Press 1995) and *Science, She Loves Me* (Banff Centre Press 2011). She was president and co-founder of Beakerhead, and led a dramatic transformation of Telus Spark Science Centre in four years as CEO. She holds a BSc in zoology, a Master’s degree in communications, and an interdisciplinary PhD. For her work in professionalizing the discipline of science communications, she has received an ASTech Award, an Arch Award from the University of Calgary, an honorary doctorate from Mount Royal University, and the Queen Elizabeth II Platinum Jubilee Medal.

John Rennie

John Rennie is a science writer, editor and lecturer based in New York City. For 15 years he served as editor in chief of *Scientific American*, during which time the magazine was honored with two National Magazine Awards. He then served as editorial director of McGraw-Hill Education's online general science reference, and wrote “The Gleaming Retort” for the PLoS Blogs science blogging network. He was the creator and host of the 2013 television series *Hacking The Planet* on The Weather Channel. His other television and radio appearances include the History Channel special *Clash of the Cavemen*, Discovery’s *Apocalypse How*, PBS’s *Newshour*, *ABC World News*, *The CBS Early Show*, NPR’s *Science Friday*, Minnesota Public Radio’s *Marketplace* and many other shows. Since 2009, he has also been an adjunct instructor in the graduate Science, Health and Environmental Reporting Program at the Arthur L. Carter Journalism Institute of New York University. He is currently the biology editor at *Quanta*.

Niki Wilson

Niki Wilson is a multimedia science journalist with a past life as a biologist. She grew up dodging bears in Jasper National Park, Canada, and has studied everything from mammoths to mountain pine beetles. She now writes about nature and the environment for publications like *BBC Earth*, *PBS Nature*, and *Canadian Geographic*. She was associate producer for the Audible top five podcast *Wild Sounds of Canada*, and co-host of the Apple top ten science podcast *Anthropomania*. For her work in science journalism, she was recently honoured with the Wildlife Outreach Award from the Alberta Chapter of The Wildlife Society. Niki is thrilled this year to celebrate 10 orbits around the sun as a science advisor and main stage host for the Jasper Dark Sky Festival. She lives with her husband, a wildlife vet/ biologist with Parks Canada, and their teenage son. They once dissected an elk liver as a family, which taught them about both parasitic worm behaviour, and gag reflexes.

Participant Bios

Maria Bautista Chavarriaga is an environmental virologist, microbiologist, and educator who consistently seeks to bridge the divide between research and outreach. In her role as a Research Associate at the University of Calgary, she leads collaborative efforts in the Geomicrobiology Group, aiming to bridge science with real-world impact such as wastewater-based surveillance. Alongside her research, Maria has taken on teaching roles where she designs engaging curricula and employs active learning strategies, aiming to ignite students' passion for science. Maria's dedication to science communication becomes most apparent in her outreach initiatives. As a co-founder of "Cena y Ciencias" during her time at the University of Illinois in Urbana-Champaign, she championed equitable STEM access for Spanish-speaking minorities, driving hands-on science activities that kindle the curiosity of young minds and foster a sense of community. On a local level, Maria's participation in events like Soapbox Science and Science Takeover at the Calgary Public Library has allowed her to genuinely connect with diverse audiences, further solidifying her passion for bridging the gap between science and society.

Joe Harrison. Bio to come

I am **Belinda Heyne**, a forever 25-year-old female (she/her) adventurer, who explores “where everything the light touches...” (I hope you have seen the Lion King). In other words, I am a photochemist. My area of expertise is singlet oxygen. You might be curious about what singlet oxygen is. Singlet oxygen is a more reactive form of the regular oxygen we breathe, almost like oxygen has had 3 red bulls, boosting its energy and activity levels! It's this unique energetic state that gives it its properties. Contrary to oxygen, which is inert, singlet oxygen is very reactive and toxic to microbes without causing resistance. Photochemistry is closely aligned with nature, and I believe it holds the key to a more holistic approach in tackling some of the most significant threats facing our society today, such as climate change or antimicrobial resistance. When I'm not in the laboratory collaborating with my talented students, I take on the role of Interim Head in the Chemistry Department, where I strive to provide guidance and leadership to my colleagues. I am a fervent advocate of work/life balance and in my free time you will find me at the dog training facility, creating content for my dog Instagram account, or hanging on a cliff in the mountain. The reason I have registered for this workshop is because I believe to the vital importance of communicating science in our present era. With so much information readily available online, scientists must ensure that the public can access accurate and trustworthy scientific knowledge. Engaging and connecting with people in an accessible way helps restore faith in scientific understanding and informs our collective decisions. This kind of communication is not just an

enhancement to my work as a photochemist or a department head; it is essential to making real change in our society.

Brandon Karchewski is an Associate Professor (Teaching) at the University of Calgary in the newly rebranded Department of Earth, Energy, and Environment. He earned a B.Eng.Mgmt. (2011) and a Ph.D. (2015) both in Civil Engineering at McMaster University. His research focusses on numerical modelling of differential equations describing phenomena such as granular materials like sand and gravel, elastic wave propagation, electrical conductivity in the ground, and copper uptake in yeast. He is also involved in pedagogy research related to team-based learning, use of drones to create virtual field experiences (featured on the cover of *Journal of Geoscience Education* in 2019), and the use of metaphor in communicating science concepts between experts and novices. He has been teaching engineering and science since his second year of undergraduate in 2008 and is passionate about implementing the undergraduate experience of tomorrow for burgeoning geoscientists.

Justin MacCallum holds a B.Sc. in Biochemistry and a Ph.D. in Biophysical Chemistry, both from the University of Calgary. He currently serves as an Associate Professor in the Department of Chemistry, where his research employs a unique blend of structural biology, drug discovery, and both wet-lab and computational modelling. In recognition of his innovative work, Justin was appointed as a Tier 2 Canada Research Chair in Biomolecular Structure and Design. He further holds the position of Associate Dean for Graduate and Postdoctoral Scholars in the Faculty of Science. A deep-seated interest in scientific communication has marked Justin's career. For the better part of a decade, he has taught a course at both undergraduate and graduate levels, guiding scholars on effective communication strategies within the scientific community. He is interested in learning how to communicate science to the public better, how to be a better advocate for science, and how to teach these skills to others.

Farhad Maleki is an Assistant Professor in Computer Science at the University of Calgary. He is also an adjunct faculty member at the Department of Diagnostic Radiology at McGill University and at the Department of Radiology at the University of Florida. His main research focus is on developing machine learning and deep learning approaches for real-world applications, especially in the absence of large-scale datasets. Farhad completed his Ph.D. in Computer Science from the University of Saskatchewan. During his Ph.D., he worked on developing methodologies for the analysis of genomics and proteomics data. Currently, Farhad is leading a lab focused on machine learning and deep learning research.

Vivian Mozol is an Associate Professor (Teaching) at the University of Calgary. She currently teaches freshmen chemistry. Through her teaching she wishes to strengthen her students' academic independence and promote their scientific literacy. Her research interests focus on improving the development of students critical thinking skills through hands on experiential activities and puzzles. Some of these activities are rooted in her outreach efforts with the community at large. Vivian has earned a PhD in Inorganic Chemistry from the University of Calgary, an MSc in Inorganic Chemistry from the University of Alberta and a BSc in Co-operative Education in Chemistry from the University of Victoria.

Annie Quinney is a Senior Instructor in the Department of Earth, Energy, and Environment at the University of Calgary. She attributes her love of paleontology to growing up in the badlands of Drumheller. As a young teen, Annie secured a job in the cafeteria at the Royal Tyrrell Museum, where she dutifully flipped Brontoburgers and cleaned up after hot, cranky tourists. Eventually, she transitioned into other departments at the museum, including Security (no, sir, you cannot ride the Triceratops), Gallery Interpreter (the bathrooms are located in the Cretaceous Garden), and, finally, Education (today, we are going to look at the super, secret mystery fossil!). Her training and experiences at the museum set her up for a lifelong love of

learning and teaching science. After completing a B.Sc. and M.Sc. in geoscience at the University of Calgary, Annie pursued a Ph.D. at Monash University in Australia, where she studied amber palaeontology. Upon her return to Canada, she completed a Postdoctoral Fellowship at the Arctic Institute of North America. She has been happily teaching at the U of C since 2016.

Cristian Rios is an Associate Professor at the Department of Mathematics and Statistics, University of Calgary. Originally from Santa Fe, Argentina, where he study electro-mechanics in high school earning a degree of technician, followed by a Licenciatura in mathematics at the Universidad Nacional del Litoral. He obtained a PhD in mathematics from the University of Minnesota, and before settling in Calgary, he held temporary positions at McMaster University in Ontario and at Trinity college in Connecticut. His research concentrates on Analysis of Partial Differential Equations. He is currently associate head research for his department.

Sean Rogers has always been fascinated by nature. In grade five he tracked Haley's comet with a friend's telescope and won second prize in the district science fair. In grade 11 he skipped physics to partake in the opening of fishing season. He completed his BSc and MSc at the University of New Brunswick specializing in the emerging field of DNA fingerprinting, tracking strains of trout with genetic tools. After completing his PhD at Université Laval in evolutionary biology, Sean held a postdoctoral fellowship at the University of British Columbia that merged ecology with genomics to reveal how and why organisms are well suited to their environment. In 2009, Sean joined the Department of Biological Sciences at the University of Calgary where he now specializes in the development and application of genomic tools to predict outcomes for species under rapid environmental change. His research has been profiled on CBC's Quirks and Quarks three times. In 2016, Sean was recruited to lead the team at the Bamfield Marine Sciences Centre where he has secured over \$15m in research funding to lead scientific collaborations and ecological restoration of coastal ecosystems with First Nations, while training the next generation of scientists with the advanced tools and education they will need to help Canadians lead climate adaptation.

Nadine Sander-Green is the Senior External Communications Specialist for the Faculty of Science. She is a professional writer and communicator with over a decade of experience working for government, non-profits and media. Nadine believes storytelling is one of the most powerful ways to incite behavioural change and her talent lies in producing compelling stories that reach the audience's heart. Nadine is also an award-winning literary writer. Her debut novel, *Rabbit Rabbit Rabbit*, will be published by House of Anansi in April 2024.

Jeroen Stil is associate professor (radio astronomy) in the department of Physics and Astronomy. He explores the Milky Way and other galaxies with giant radio telescopes to understand gas flows in galaxies from micro-turbulence to galactic winds. Jeroen received holds an MSc and PhD in astrophysics from Leiden University in the Netherlands. He was a postdoctoral fellow at Queen's University, Kingston, ON, and Research Associate at the UofC before he joined the faculty in 2008. He leads an international research group and is a core member of the science working group on cosmic magnetism for the Square Kilometre Array Observatory (SKAO) that Canada joined this year. Jeroen has given many public presentations and serves as a contact for inquiries about space. Other outreach activities include a pop-up observatory on campus for a partial solar eclipse, winning the 2012 global image contest of the National Radio Astronomy Observatory, a press release about the discovery of a magnetic spiral arm in the Milky Way, and a 2023 on-line interview for UofC development about SKAO.

Owen Stockden holds an MA in English and an MBA in Marketing & Sales Leadership. Drawn to science from an early age, he was captivated by illustrations of deep space, distant planets, and far-future

civilizations. He is a passionate advocate for suicide prevention and mental health, serving as the Communications Chair for the Canadian Association for Suicide Prevention (CASP). His research interests – connected to his background in mental health communications – involve the intersection of collective trauma and organizational decision-making. A self-described high-functioning animal hoarder, he lives with three cats, two dogs, and one very accommodating partner. His hobbies include reading, writing, game design, and hiking in the mountains – especially with a dog or two in tow!

Originally hailing from Vancouver Island, BC, **Matt Taylor** is currently an Assistant Professor of Astronomy at the University of Calgary, and is currently searching for massive black holes using the incredible James Webb Space Telescope. Prior to this he earned his PhD in Astrophysics from Universidad Católica de Chile in Santiago, Chile before holding postdoctoral positions in Hilo, Hawai'i and Victoria, BC. In another life before astronomy, Matt spent several years working as a professional cook and still loves cooking at home - preferably with internationally inspired ingredients. Matt loves getting outdoors for hiking, camping, and the like to enjoy the deafening silence that only Nature can provide, but when the weather is not so good, Matt loves to embrace his inner geek over a rousing tabletop game. From classics like Cribbage to complex, modern games with many moving parts, time-permitting, Matt is almost always happy to sit down and roll the dice!

Leanne Wu (she/hers) is an Assistant Professor (Teaching) in the Department of Computer Science, with a research background in data privacy. In recent years, she has been involved in working young people and adults to explore the possibilities of technology, through her teaching and programs such as Technovation. In her free time, she has far too many unfinished needlework projects, video games she hasn't started, and an ever-growing stack of books she's been meaning to tackle.