

Science communication – opportunities and challenges

A toolkit for scientists





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Introduction

In an era where scientific communication has become increasingly vital, scientists are presented with numerous opportunities to share their research and engage with the public. This visibility, however, also brings significant challenges, particularly the risk of harassment. This toolkit aims to equip scientists with the knowledge and strategies needed to navigate these challenges effectively.

The toolkit has been developed by the Royal Meteorological Society and the Met Office to support you in navigating these challenges (see Annex H for more details on the authors of the toolkit). It provides practical advice on how to handle any issues that arise. With these resources, you can continue to share your research confidently and engage with a broader audience, helping you to develop your career, whilst fostering a more informed and scientifically literate society.

All researchers and experts should anticipate that their work will be examined closely by the public, policymakers, and campaigners. This scrutiny is a normal part of the research process and can lead to valuable feedback and discussion. However, those working on high-profile topics, like climate change, often face additional challenges. They may become targets of people with extreme views who disagree with their findings. Misinformation and disinformation campaigns can also undermine their work and credibility. In some cases, even the media may criticise them through ‘opinion’ pieces.

The harassment of scientists is nothing new. If you are being harassed, take heart that you are in great company; Galileo and Darwin are just two examples of ground-breaking scientists who were shunned for their research and communication efforts, but their science has prevailed. Annex A provides more historical context and examples of harassment of scientists over the years.

Researchers and experts face a significant risk of becoming preoccupied with responding to individuals with extreme views. This distraction can lead them to miss important opportunities to communicate with reputable media outlets, the general public, and policymakers. As a result, the chance to inform and engage with people who have not yet formed an opinion on the issues may be lost.

Instead of engaging in constructive debates about research, some researchers experience harassment. This can take many forms, including abusive emails, social media trolling, threats to personal safety,

malicious complaints to institutions or regulatory bodies, bombardment with Freedom of Information (FOI) requests, or libellous online posts about them or their colleagues. Such harassment not only delays research and threatens reputations but also hinders effective engagement with the media, the public, and other key stakeholders. Persistent harassment can lead to significant stress, anxiety, and other mental health issues. It can affect a scientist’s productivity and willingness to engage with the public. In Annex E, we provide advice and actions you can take to manage your wellbeing.

This toolkit aims to provide:

Practical Strategies:

Techniques for managing and mitigating harassment, including online safety measures, legal options, and support networks.

Communication Tips:

Best practices for effective and safe public communication, managing social media presence, and engaging with hostile audiences.

Mental Health Resources:

Information on coping mechanisms, counselling services, and peer support groups.

By understanding and preparing for these opportunities and challenges, scientists can better navigate the complexities of public engagement in weather and climate science, ensuring their voices continue to be heard through the media and via social media and the internet. As we tackle the issue of online and offline harassment, remember you are not alone and we share a number of case studies, in Annex G, from scientists who have experienced the benefits and/or the challenges of being an active science communicator.

Sharing Our Science

Engaging with the media or sharing our science through social media channels or online (i.e. blogs, YouTube, podcasts etc.) provides an important route to get our messages across and foster a deeper understanding of scientific concepts among the general public and decision makers. Through social media, digital content and media interviews, we can demystify complex topics, inspire future generations, and contribute to informed decision-making in society.

Increased visibility of our science can lead to greater collaboration opportunities with other researchers, institutions, and organisations. Engaging with the public and policymakers allows us as scientists to provide the best science based evidence. These collaborations can enhance the scope and impact of our scientific research.

Each time we share our work with people who aren't experts in our field, we have the opportunity to refine our own communication skills and deepen our understanding of our subject. Explaining complex concepts in accessible terms can help us to think about our work in new ways, often leading to new insights and ideas.

It is important to recognise that the general public often holds scientists and researchers in high regard, considering them among the most trustworthy professionals. As a result, our efforts to communicate our findings will usually be welcomed with interest and appreciation.

However, once we start sharing our science we may occasionally experience a very small number of people who strongly object to our work, and they can be very vocal. If this happens to you it can be helpful to put this into perspective by asking yourself some questions:



How many people are there who have extreme views about my work? Are they representative of the wider public? Remember that people who like the story don't usually react.



Do they represent policymakers, funders, or other important stakeholders?



Do they have significant influence over any of the above? How many people out there support what I am doing?



Remind yourself that it's not about you –

People often respond with predetermined ideas about science, our field or our topic, not about what we actually said. It can sometimes be an anxiety inducing experience, but on the whole, we can trust journalists to get our work out there and for social media channels and online platforms to help in raising our profile and sharing our science.

Science Communication

In this section we will look at some of the most powerful communication channels, namely media interviews, and social media and online platforms.



Media Interviews

Engaging with the media is a powerful way for scientists to communicate their research and contribute to public understanding of science. However, media interviews can also be daunting, especially when discussing technical topics.

Sometimes our message can get lost in translation or a quote can be taken out of context. Interviews with a newspaper (whether in print or online) journalist can be particularly challenging as the journalist who interviews you will have little control over the headline. The article they file will go through sub-editors who will make some changes to ensure it follows the publication's style and is easily understood by their readers. They will also add a headline that is designed to catch the eye and draw the reader to the article.

Annex B provides some more practical tips and strategies to help scientists navigate media interactions effectively.



Social Media and Internet Platforms

Social media and the internet are key elements of modern communications for both individuals and organisations. They open up a wealth of opportunities to connect with people on a local, regional and global scale whether it be as a way of keeping up to date with friends and family, or as a means of sharing knowledge, views and interests with a wider audience.

Social media and the internet provide unique ways to share science with a wide audience, raising awareness of scientific evidence and boosting the profile of scientists and their organisations and institutions. They also offer an opportunity to build networks and contacts of benefit for scientific collaboration and career development, especially during the early part of our scientific career. Whatever the style we choose - whether using prose, snappy soundbites, images or video – these platforms offer a way for us to communicate our research and grow our own community.

Annex C provides some tips on social media and internet platforms, getting started and important considerations such as privacy controls.

Whilst there can be many positive benefits of using social media and the internet, there are also challenges and potential negative impacts. Online harassment is one of those challenges, and one which the science community is often presented with. This can negatively impact individuals in the short- and long-term.

Challenges of Weather and Climate Communication

Whilst there are many positives of engaging with the media, using social media and online platforms, the potential challenges faced by scientists can have a range of impacts. As well as comments which directly criticise the science you are sharing, some scientists also experience harassment. Harassment can take various forms, including:

Online Abuse:

Negative comments, trolling, cyberbullying, and doxing on social media platforms and comment sections.

Email and Phone:

Abusive emails, threatening phone calls, and other direct communications.

In-Person:

Physical threats, and confrontations at public events or workplaces.

The glossary in Annex I provides some specific examples of different types of harassment and how you may wish to tackle them.

Those with extreme views about research often take to social media or the internet to air their concerns. Here are some things to remember should you find your communication activity being criticised or attacked:

- It can be hard to ignore, but in most cases, **no response may be the best response**. Accounts posting negative comments often have relatively small audiences, and they rely on you replying to get their remarks noticed by a wider audience. Don't give them that platform.
- There may be occasions, however, where you do decide to respond and wish to 'set the record straight'. A single, concise, factual response is likely to be more effective than a drawn-out argument and either reference the post in your own copy or share a screenshot rather than engaging directly with the critical comment or post.
- It can also take significant time and energy to respond; this is often what the attacker is hoping for. Trolling is a form of attack specifically designed to waste your time, slow you down, and use up your resources.
- The internet offers an opportunity to connect directly with the public, so you should ensure accurate

information about your work is available online. This can then be used as a point of reference that you can direct readers towards as a way of fact checking.

- Be upfront and honest about any uncertainties in your work and explain the limitations of your research. Make sure you have declared anything perceived as a conflict of interest, such as your funding sources or commercial ties.

The vast majority of people are not reading scientific journals, but they are using the internet and social media to gather information. It is important that scientists engage in these spaces because if there is a lack of credible expertise, others will happily fill the void with falsehoods and misinformation.

Dis-, Mis- and Mal-Information

In today's digital age, the spread of false information presents a significant challenge to scientific communication and public understanding. Disinformation, misinformation, and malinformation (DMMI) each play a role in distorting facts and undermining trust in science.

- **Disinformation** refers to false information deliberately created and spread to deceive or mislead.
- **Misinformation** involves the unintentional sharing of false or inaccurate information without malicious intent.
- **Malinformation** consists of true information shared with the intent to harm or mislead, often taken out of context.

Recognising and addressing these types of information is crucial for scientists. By understanding their nature and impact, scientists can develop strategies to counteract their spread, uphold the integrity of scientific communication, and foster a well-informed public.

It is vital for scientists to actively participate in science engagement to help fill the gaps that will often get filled by DMMI. Doing so not only helps to correct falsehoods but also promotes a more informed and scientifically literate society. By establishing ourselves as reliable sources of information, we can build a foundation of trust that makes it more difficult for disinformation and misinformation to take hold in the future.

Annex F provides some more detailed information about DMMI and strategies to help scientists navigate this growing problem.

Getting Support

Engaging with the public as a scientist is both rewarding and challenging. While sharing our research can inspire and educate, it also exposes us to potential stressors, including public scrutiny and harassment. Don't suffer on your own. Many people have had similar experiences and could give you advice, colleagues could support you and organisations can help.



Speak to:

Your peers could work with you to tackle the problems, you may find they have had similar experiences.

Your institution or organisation can support you whether it's your line manager, head of department, press office or comms teams who should be made aware, especially in serious cases or with FOI requests, and will be able to support you. If you have been misquoted in the media, your institution or organisation's press team can help if you need to request a correction or issue a clarification through your own organisational channels.

Your publisher, if your research and you are receiving criticisms related to the process of publication, your publisher can advise you and assess whether further investigation is necessary.

Your professional body, such as the Royal Meteorological Society, who aim to support their members in raising complaints with media outlets, and in some cases, can also raise awareness of harassment more generally through the media.

Support organisations, such as [The Cyber Helpline](#), [Cybersmile](#), and the [National Bullying Helpline](#).

Reporting to the police may be appropriate in extreme cases of online harassment particularly where this could be deemed a hate crime. See Annex C for more information.

For more information about how to get support and who to reach out to, see Annex D.

Other direct actions we can take to deal with harassment or online abuse include:

- Report any harassment or abuse to the social media platform provider, who often have reporting features.
- Keep a record of harassing emails or posts as these can be used later as evidence if an attack escalates.
- If attacks are taking place on social media, 'blocking' accounts will prevent them from engaging with you and 'muting' them will prevent you from seeing their messages (though they will still be published, it can help protect your mental well-being).

- Know when to step back - accept that you will not change the other person's mind.

Managing our mental health is essential to sustain our well-being and effectiveness in science communication. By prioritising self-care, seeking support, and utilising coping strategies, we can navigate the demands of public engagement with resilience and confidence. Further guidance on maintaining mental health can be found in Annex E.



In Summary

Engaging with the public as a scientist offers significant opportunities to enhance understanding, inspire change, and inform policy. However, it also brings challenges, including the risk of harassment. This toolkit aims to provide strategies for managing these challenges, from preparation and response to seeking support and maintaining mental health.

By proactively addressing harassment, countering false information, and prioritising well-being, scientists can continue to contribute positively to public discourse and advance scientific literacy. Remember, our work is vital, and with the right tools and support, we can navigate the complexities of science communication confidently and effectively.

Annex A: Historical Context

The harassment of scientists is not a new issue. For centuries, scientists who challenge beliefs and provide evidence that goes against popular thinking have faced harassment.

One of the earliest and most famous examples is Galileo Galilei, an Italian astronomer and physicist from the 1600s. Galileo's advocacy of heliocentrism—the view that the Earth orbits the sun—directly contradicted the geocentric model endorsed by the Catholic Church. Even though Galileo had strong observational evidence from his telescopic discoveries, he faced intense opposition. In 1633, the Roman Inquisition put Galileo on trial, forced him to withdraw his views, and made him live under house arrest for the rest of his life. Galileo's difficult experience shows how advancing a view contrary to people's beliefs, even when supported by evidence, can lead to severe backlash.

Moving forwards to the 1800s, Charles Darwin also faced major opposition after publishing his book *On the Origin of Species* in 1859. Darwin's theory that species evolve over time through a process of natural selection fundamentally challenged the accepted views at that time about how life was created and developed. Even though Darwin used thorough scientific methods and had extensive evidence, his ideas were strongly resisted by certain organisations and scientists. Critics labelled Darwin's work as offensive, leading to fierce personal and professional attacks against him. The harassment Darwin experienced shows the broader societal resistance to new scientific ideas that disrupt conventional beliefs.

More recently, scientists who have argued that human activities are causing climate change have also faced considerable harassment. Throughout the 90's and early 2000's, the debate around climate change became increasingly politicised, with climate scientists often being targeted by coordinated harassment campaigns. Researchers like Dr. Michael Mann, known for his "hockey stick" graph showing rising global temperatures, have received death threats, legal challenges, and public smear campaigns aimed at discrediting their work and intimidating them into silence. This modern-day harassment reflects the ongoing tension between scientific research and societal acceptance.

Then, in 2009, the Climatic Research Unit (CRU) at the University of East Anglia was hacked, leading to the "Climategate" scandal where thousands of CRU emails and documents were stolen and selectively published on climate sceptic blogs to disrupt the COP15 UN climate conference. Professor Phil Jones found himself at the epicentre of the ordeal and reported later of being bombarded with threatening and abusive mail and even death threats.

These examples show that the harassment of scientists is not a new issue, but rather a recurring challenge faced by those who push the boundaries of knowledge. Understanding this context is important for climate communicators today, as it provides a sense of connection with pioneering scientists from the past and gives a framework for anticipating and dealing with opposition they might face.

Annex B: Media Interviews Best Practice

Preparing for the interview

1. **Know your audience:** Understand the demographics and interests of the audience you will be addressing. Tailor your message to make it relevant and engaging for them.
2. **Key messages:** Identify 2-3 key points you want to convey. These should be clear, concise, and easy to remember. Reiterate these messages throughout the interview if possible.
3. **Anticipate questions:** Think about potential questions you might be asked, including challenging or controversial ones. Prepare thoughtful, measured responses.
4. **Practice:** Rehearse your key messages and responses to anticipated questions. Consider conducting mock interviews with colleagues or media trainers. But don't over-rehearse or script your interview responses.

During the interview

1. **Stay calm and composed:** Maintain a calm and professional demeanour, even if faced with difficult questions or a hostile interviewer.
2. **Be clear and concise:** Use simple language and avoid jargon. Keep your answers brief and to the point, focusing on your key messages.
3. **Bridge cack:** If a question veers off-topic, gently steer the conversation back to your key messages using bridging phrases like, "That's an interesting point, although what's important to understand is...".
4. **Be honest:** If you don't know the answer to a question, it's okay to say so. Offer to find the information and follow up later.
5. **Non-verbal communication:** Pay attention to your body language. Maintain good posture, make eye contact, and avoid distracting gestures.

Handling difficult questions

1. **Stay professional:** Respond to challenging or provocative questions with professionalism. Avoid getting defensive or confrontational.
2. **Acknowledge and redirect:** Acknowledge the question and then redirect to your key messages. For example, "I understand there are concerns about that, however what our research shows is..."
3. **Defuse tension:** If the interviewer becomes aggressive, remain calm. Take a deep breath before responding and keep your tone measured.

Post-interview

1. **Review and reflect:** After the interview, take time to review your performance. Reflect on what went well and what could be improved for future interactions.
2. **Follow up:** If you promised additional information or resources during the interview, follow up promptly.
3. **Build relationships:** Establishing a good rapport with journalists can lead to more positive and collaborative interactions in the future.

Additional resources

- **Media training:** Consider undergoing formal media training to enhance your skills. Many institutions and organisations offer specialised programs for scientists.
- **Online guides:** Resources like the [Science Media Centre](#) offer practical tips and support for scientists engaging with the media.

Annex C: Social Media and Internet Best Practice and Privacy Controls

Getting started

Channel selection

There is a wide range of social media and internet platforms to choose from and you may be familiar with some of them, such as YouTube, X (formally known as Twitter), Facebook, Instagram, Threads, TikTok and LinkedIn, or blogs and podcasts. If you are not, however, or have only used social media to stay connected with friends and family, the choice can seem overwhelming when it comes to thinking about their use in a professional capacity.

You may wish to start developing your presence on one channel or to start sharing your professional expertise on a range of platforms – both options are valid. Think about what you are aiming to achieve, including who you are trying to communicate with, and align your plans with the channels most likely to help you do this. Each channel has its own best practice approaches around content types, posting and building followers, so it is worth improving your understanding of their differences.

Developing content

Key to developing your personal brand on social media is to be authentic, whether you are engaging with the content of others or sharing your own. Liking, sharing and commenting on content shared by others who share your values, opinions and areas of expertise can help you to build your profile and achieve your goals. At the same time, you are showing your support and encouragement of other scientists and experts.

Depending on the platform, you may be sharing information in text form, as images or videos (or a combination), but there are some key things to consider, whatever the medium.

- What is the purpose of your post, video, podcast etc?
- Is it useful or interesting for your followers or the audience you are trying to reach? Remember your followers are likely following you for a reason. Successful channels often have a focus or theme so followers or viewers know what they are going to get by following you.

- Is your message clear or is it likely to be misinterpreted?
- You may be seen to be representing your employer or institution with your post; think about how your message comes across before you post it. If you are a civil servant, be mindful of the [Civil Service Code](#) and [Social Media Guidance](#). Including 'Views my own' or similar in your bio does not mean that what you share on that platform will not be attributed to your role at an organisation.
- Always be confident that whatever you are putting on your feed or in online content, either organically or by sharing other's posts, is something you would say to someone face to face.
- Would you be happy for your message to be quoted in the press?

And don't forget to double check your spelling and grammar!

Engagement

Engagement includes 'liking', 'sharing', clicking on a link or commenting. Complex algorithms are used by social media and internet platforms to prioritise the content that people see in their social media feeds, and the type of content and users you engage with will influence what else you may see on social media and internet platforms. When a post, image, video, podcast etc has high levels of engagement, this can also result in the post being seen by more people and may even go viral (approx. 10,000 views in less than 24 hours).

Certain engagements are seen as more 'valuable' to the algorithms - while these are constantly changing, shares and comments are generally high value engagements, especially as these surface your content to other users who may not follow you.

The following table provides details about some of the more popular social media platforms:

Platform	Main audience	Typical usage	Content
Facebook	Teenagers to older adults, with a significant portion being millennials and Generation X	Staying connected with loved ones, networking, and engaging with various communities and interest groups	Photos, videos, and status updates
X (formerly known as Twitter)	Teenagers to professionals, journalists, celebrities, and politicians	Real-time information sharing, news updates, and engaging in public conversations on various topics, networking, marketing, and following trends and events globally	Messages limited to 280 characters, photos, videos
Instagram	Younger demographics, teenagers, millennials, and young adults	Share personal moments, showcase creativity, and explore interests through visual content. It is also a popular tool for influencers, brands, and businesses to engage with audiences through reels, stories, live streams, and advertising	Images and videos
TikTok	Primarily Gen Z and younger millennials, although its user base has expanded to include older demographics	Creating, watching, and sharing a variety of content, including dance challenges, lip-syncing, comedy skits, tutorials, and informative videos	Videos typically ranging from 15 seconds to 3 minutes in length
LinkedIn	Working professionals, job seekers, and organisations across various sectors and industries	Users create profiles that showcase their work experience, skills, and educational background. They can also create and join LinkedIn groups to share business trends and ideas	Posts, images, videos, documents, polls, articles
YouTube	All age groups, with a strong presence among Gen Z and millennials	Entertainment, education, and following trends, as well as to discover music, tutorials, and vlogs. Also serves as a platform for influencers, businesses, and media outlets	Videos
Snapchat	Predominantly Gen Z and millennials	Casual communication with friends, sharing real-time experiences, and exploring augmented reality (AR) features through lenses and filters. Snapchat Discover offers curated content from publishers, influencers, and brands	Photos, videos, and messages
Reddit	Diverse, with a strong representation of millennials, Gen Z, and tech-savvy individuals	Exploring interests, from niche hobbies to current events. Seeking advice, sharing knowledge. Connecting with like-minded individuals	News aggregation and discussion, images, video
Threads	Young adults, creators, and influencers, though many professionals and brands also use it for more conversational and less image-heavy engagement	Short text updates, sharing links, images, or videos, and engaging in threaded conversations. It tends to focus on real-time discussions, trending topics, and light, casual dialogue rather than in-depth articles or visual content like Instagram	Personal thoughts, industry commentary, event reactions, and general life updates
WhatsApp	All age groups, with strong adoption among both individuals and businesses for personal and professional communication	Stay in touch with friends, family, and colleagues through its easy-to-use interface and group chat. Its business version provides tools for customer support and marketing, making it a versatile platform for communication across various contexts	Text messages, voice notes, images, videos

Privacy controls

Each social media platform has a range of privacy settings to help you manage your account. For example, you may have accounts on multiple platforms but on some you wish to simply connect with friends and family. On others you may wish to allow a wider range of followers with a view to gaining a broader following with which to share your professional expertise.

The [National Cyber Security Centre](#) provides advice and links to the relevant information on the different platforms.

Reporting serious online harassment

In extreme cases, it may be appropriate to report online harassment to the police as a crime may have been committed. The law around this is complex, but some

harassment may constitute a hate crime if it relates to race, religion or sexual orientation (in England and Wales). [Ask the Police](#) has some useful information on [cyberbullying](#), [sending threatening / abusive / offensive messages](#) and [posting false information](#).

[Report It](#) has more information on reporting a hate crime.

Annex D: Handling Media Misrepresentation and Harassment

Navigating the challenges of harassment and maintaining mental well-being is crucial for scientists, particularly those actively communicating their science. Seeking support is not a sign of weakness but a vital step in ensuring your safety, mental health, and professional longevity. This section highlights the importance of accessing support systems and provides guidance on the types of support available to help you manage harassment and maintain your well-being. From institutional resources to legal assistance and mental health services, a robust support network can empower you to continue your valuable scientific communication with confidence and resilience.

What to do if you are misrepresented by the media?

Even with the most conscientious journalist on your side, science can sometimes get lost in translation. Whether you took part in an interview, were asked to provide a quote, or a quote was lifted from another source, a media outlet may not represent your science or views exactly as they were intended. This section will discuss how to deal with such circumstances, whether you have the backing of a large organisation/institution or not.

As a starting point, you should notify the reporter, especially if you have a pre-existing relationship, and ask for a correction to be made. If this is unsuccessful, then you can escalate to an editor or producer. Check with your press office (if you have one) as they may want to manage any communication with journalists. If you have a personal relationship with the media outlet, it may be decided that communication is best coming from you, but make sure to copy your comms colleagues into any communication.

If you have not had prior communication with the outlet – for example they have taken a social media post out of context or incorrectly interpreted results from a journal article - and you have a press office, it may carry more weight for them to initiate contact.

It is advisable to make the first approach privately (e.g. via email or a direct message) as the journalist may be less willing to cooperate if they feel they have been embarrassed publicly. In general, approach the situation as if an honest mistake has been made; keep a polite, but factual, tone. Indeed, the vast majority of journalists will be keen to ensure their stories are accurate.

It is worth noting that, especially at national outlets, the journalist will have little control over the headline. The article they file will go through sub-editors who will make

some changes to ensure it follows the publication's style and is easily understood by their readers. They will also add a headline that is designed to catch the eye and draw the reader to the article.

What to do if you are harassed by the media?

Harassment from journalists is not common. If you are working within an organisation and you find yourself being hassled by a journalist or media outlet, tell your communications team and let them speak with the journalist.

If you are working individually and you receive a volume of questions from an individual journalist that could be considered vexatious, the first step would be to alert them to the fact. Consider stating that you're struggling to reply to the volume of questions they are putting to you and that you need to focus your time on your primary research or area of work. If you need to escalate, follow the same steps as outlined below.

If you work independently and you find yourself in the centre of a major news story which you feel is beyond your capability to control, consider seeking support from a professional media relations specialist.

How to escalate?

There may be a point at which you decide you need to escalate an inaccuracy or misrepresentation in the media. This could be because you are not getting a response from the journalist who produced the piece in question, or perhaps because you are not getting satisfactory action from the media outlet.

If you are working within an organisation this is something that your communications team will be able to look after for you. If they weren't present for the interview or are not aware of the situation they will want to know as much as possible about what has happened so they can formulate a way forward. Make sure to give them the context of the situation, any recordings of the interview and provide clarity on the facts of what you were trying to say in your interview or statement.

If you are working without the support of a communications team, the initial way to escalate will be to speak with an editor or producer at the outlet. This could be a sector editor, such as the Environment Editor, or the online or news editor. You can often find contact details for editors on the websites of news outlets. Alternatively, you can contact the news desk and mark it for the editor.

If your experience is still unsatisfactory you can bring in the Independent Press Standards Organisation (IPSO) which is the independent regulator of media in the UK. Before submitting a complaint it is worth raising that you are considering an [IPSO](#) complaint to the outlet in question, highlighting which part of the [Editors' Code of Practice](#) you feel they are breaching.

If changes are still not made, you can submit a complaint online. IPSO's first course of action is to email the publication with your complaint (with you copied in) to see if they will amend before they formally investigate. Be aware that this is a slow process and you will not have a quick resolution. This should be considered a last resort and not carried out lightly.

Dealing with offline harassment

It is the most innocuous question around, perhaps from a fellow traveller on a train or a friend of a friend at a party – “what do you do?”. Revealing that you are a weather or climate scientist can result in being on the receiving end of someone's opinions on the topic. Often these situations arise when you are ‘trapped’ – on a train, at a party, during a haircut – and it is difficult for you to extricate yourself from the situation, especially compared to online harassment when you can turn off apps and notifications and leave the conversation behind.

‘In the line of duty’

You may also encounter offline harassment when attending an event in your professional role, such as outreach activities at careers fairs or science festivals. In addition to being identified as a weather or climate scientist, you are also probably well highlighted as being from your organisation. As a result, while you may be mentally ready to deal with comments on chemtrails or climate change, you may be less prepared to encounter someone's opinion on the organisation you work for. When you are identifiable not only for your field but also your employer, you can feel even more exposed, knowing that your response will reflect on you but also on your organisation. The additional complication in this situation is that there may be others looking on, and the existence of the bystanders (who may or may not be supporting you) adds a pressure to provide a professional response in the face of the harassment.

Your response

Do not feel compelled to continue a long conversation if you feel harassed or unable to answer any questions posed. Even when in a professional capacity, it is legitimate to explain that something is not your area of expertise or that you need to move on to talk to others.

In-person harassment also means that your harasser knows where you are, what you look like, and vice versa. Depending on yours and their gender and build, it can be a physically intimidating scenario, adding to your stress and making you feel uneasy. If you feel unsafe, you should deal with this as you might in any situation regardless of the context – take a step back, if necessary, tell the person that they are making you uncomfortable and remove yourself if possible.

Particularly if you have felt harassed when in a professional situation, do make your employer aware of the situation so that they can support you and also consider whether you/your organisation should attend the event in future.

Keep it positive

When criticised, it is natural to want to defend your work and respond directly to any accusations. Sometimes this is appropriate but, in general communications with the public and media, make sure that you are not starting on the defensive. Doing so may give the impression that you have a case to answer and inadvertently give credibility to extreme views. Consider the scientific facts that you want your audience to understand and present these positively. The wider audience may be aware of criticisms of your work, but are likely open to hearing the facts directly from the source (you!) before they make up their minds.

Harassment on social media

If another social media user is persistently negative about your posts or comments, harassing you or even being abusive, you can block them on the relevant platform(s). This will stop them being able to interact with you on that platform. The person will know that they have been blocked and may comment negatively about this, but it can also send an important message about appropriate ways to behave on social media and safeguard your own mental wellbeing.

If a user is persistently abusive, you can also report them to the social media platform which may take the decision to remove them from the channel.

Annex E: Managing Mental Health Aspects of Harassment

If you feel that the negativity or criticism you are seeing or directly experiencing is impacting your mental wellbeing, there are steps you could take to help tackle this.

Setting boundaries

1. If there are one or two persistent 'trolls' who you feel are being abusive, you may wish to block them or even report them to the platform.
2. Only respond if you feel that it will be a positive experience for you. Resist getting drawn into protracted 'arguments'.
3. Only check social media at set times of the day and be strict with yourself about not continuing outside of these time slots.

Taking a break

1. Take a break from social media. This could be for a matter of days or longer.
2. Consider again the channels on which you share science. You may decide to keep some channels purely for connecting to friends and family.

Being part of a community

1. Support other scientists – this could be by responding where you see negative behaviours if you feel able to do so, or sending the scientist a private direct message of support.
2. Talk to your colleagues about the challenges you are facing – they may be having or have had similar experiences.
3. Raise the issues you are experiencing with your line manager so that they are aware and can support you.
4. Take advice on the use of social media from your organisation's communications team.

As well as the practical steps above, there are other ways you can protect and improve your mental wellbeing. The NHS suggests the [five steps to mental wellbeing](#):

1. Connect with other people.
2. Be physically active.
3. Learn new skills.
4. Give to others.
5. Pay attention to the present moment.

Annex F: Addressing Disinformation, Misinformation and Malinformation (DMMI)

Regardless of the research-based evidence behind much science communications, scientists often face negativity around the information they share. This can arise from a lack of knowledge or take the form of mis-, mal- or disinformation. Some of that can come from an ideological standpoint, for example when someone feels science threatens their way of life or believes that scientists are politically driven.

It is not always possible to tell whether contradictory information is mis-, mal- or disinformation, but it is more important to understand the impact this can have on those seeing the information and how best to tackle it.

A protracted argument with someone of a differing opinion is unlikely to have a positive outcome and can sometimes ‘fuel the fire’ both in terms of others joining the ‘debate’ and the impact this can have on social media algorithms. Greater levels of engagement can result in more people seeing your original post or comment, but they will also see the contradictory information.

Careful consideration should be given to whether a response is needed at all (e.g. when the negative or inaccurate comment has not been seen by many people), but if so how best to go about this. A single, concise, factual response may be more appropriate than an ongoing ‘conversation’ – by sharing clear scientific evidence, this can be allowed to speak for itself. This can also safeguard against some of the potential personal mental health impacts, which are covered later in this toolkit.

Common criticisms and examples of how to respond

If choosing to counter misleading information, it can be helpful to have stock responses with facts and figures available to roll out as appropriate to counter common criticisms. Examples include:

01

Example initial message:

Climate models show global average temperature will increase by 3°C by 2100.

Common critical response:

Models are always wrong – they can’t be sure that the temperature will increase by that much.

Reply:

Model outputs are an estimate for how the world will behave based on our knowledge of the Earth’s climate systems. There is uncertainty, but in this case, we found that in 95% of simulations a temperature increase of *at least* 3°C was observed under a ‘business as usual’ emissions scenario. This consistency gives us confidence in our conclusions.

02

Example initial message:

UK Climate Projections indicate that the UK can expect warmer, wetter winters and hotter, drier summers as the climate continues to change.

Common critical response:

This summer has been cold! Climate change isn’t happening; it’s all alarmism!

Reply:

The UK climate is variable so we can expect natural variations year-to-year, but long-term temperature records indicate that, on average, UK temperatures are already getting warmer. Future climate projections show that this trend is expected to continue.

03

Example initial message:

2023 was the warmest year on record.

Common critical response:

It has been hotter in the past! Climate change is a hoax!

Reply:

The world’s climate has changed throughout history and has been warmer than today, but humans are driving the rapid global change we are seeing. Global climate has remained relatively stable over the last 11,000 years, supporting human civilisation’s development, until the last 150 years when humans began releasing large quantities of carbon dioxide into the atmosphere.

Deepfakes

Deepfakes are fabricated images, audio or videos that seem real by using a type of artificial intelligence called deep learning. These manipulated media can mimic speech, facial movements, and other elements to make it look like someone said or did something they actually didn't.

If a deepfake image or video of you starts spreading online, report it — along with the accounts posting or sharing it — on any platforms where you see it. Do a reverse image search using parts of the photo to find other places it may have spread and keep reporting instances you find.

To protect your privacy, take time to see what personal information about you exists online and try to remove or restrict its visibility. You may also want to publicly address the deepfake to discredit it, while getting help from a support network to assist with research and reporting efforts.

Annex G: Case Studies

Case study – Dr Chloe Brimicombe

Dr Chloe Brimicombe is a climate scientist and extreme heat researcher. Her current role is a Post-Doc at the University of Graz, Austria.

Dealing with challenges in the media

Whilst a PhD student at the University of Reading in 2022, Chloe was interviewed by Sky News during the July heatwave. The Daily Mail picked up on this interview and made ageist and misogynistic comments with regards to Chloe's appearance.

Chloe explained: *"I was very motivated to communicate the risk of the heatwave and spoke to many media organisations. It's quite hard as an early career researcher to reach media organisations, so it was a big effort on my part and that of my University. The response from the Daily Mail did make me question whether it was worth the effort, but I decided to reply in a tweet and point out what I was trying to do. I was encouraged by the response I got, including that of the Royal Meteorological Society as my professional body."*

Positive science communication

"I love to communicate science but sometimes it doesn't go exactly how you think. That's not your fault most of the time, but I have learnt how to better interact with the news media and I'm more intentional about what I post on social media," said Chloe.

"I have taken advice from experienced scientists and science communicators and learn from their example of how to use social media effectively."

Case study – Dr Ella Gilbert

Dr Ella Gilbert is a climate scientist and communicator. Her current role is a Regional Climate Modeller at the British Antarctic Survey.

Dealing with challenges on social media

Ella makes YouTube videos and has had to deal with a great deal of harassment in the comments especially as the videos have become more popular.

"In the past this has really affected my mental health, and the relentless doom-laden comments about climate change definitely warp my perceptions and attitudes," explains Ella. *"I deal with this by putting very strict controls*

on comments, blocking specific words, and shadow-banning commenters who infringe my community guidelines. I also try to make a point of disconnecting from social media regularly, which helps me regain perspective and replenish my emotional reserves."

Ella also does a lot of news media engagements which generally present fewer opportunities for harassment. When this does occur, however, it has been very aggressive and misogynistic, and often questions Ella's qualifications and expertise. She has also had climate deniers sending formal complaints to her employer following high-profile interviews, and regularly receives letters and emails (both nonsensical and harassing) to her work address. *"Thankfully I've always had support from senior management in these situations,"* said Ella.

Positive science communication

Ella said: *"I still experience harassment online, but I currently feel that the benefits of being able to communicate with a huge international audience outweigh the negatives. It's also worth it for the lovely, supportive messages I get alongside the harassing ones, and for the kind comments I receive from people when I meet them in person."*

Case study – Dr Doug McNeall

Dr Doug McNeall is a climate scientist and statistician. His current role is a Senior Scientist at the Met Office and Lecturer in Global Systems at the University of Exeter.

Dealing with challenges on social media

Doug was an early adopter of Twitter (now X) and found that it removed barriers to communication with his peers, the interested public and those that might use the results of climate science for policy or in their work. He has found the costs to be high, however.

Doug explained: *"For a number of years, I actively engaged with those who were sceptical of climate science on social media. I no longer do so. I found that direct online communication became so effectively polarised as to be practically impossible. Another reason I don't engage directly with climate sceptics anymore is the psychological cost. I receive a lot of abuse in social media comments, and it's hard to deal with, even if you know it's unjustified. This abuse has intensified with the advent of algorithmic content feeds across social media."*

Positive science communication

Despite these challenges, Doug has also experienced positivity on social media. *“The upside of social media algorithms is that it can help you find your audience or your community. A follow-up to a post which received a lot of negative responses received thousands of messages of support, thanks and sympathy,”* he said.

For those engaging in social media to talk about their science, Doug offers a few words of advice.

“First, don’t feed the trolls. People have different opinions, and this is fine, but a few exchanges can soon identify those people who are only interested in trolling and abuse. You should block or mute them without guilt.

“Secondly, look after yourself. Take breaks from social media often and easily. Understand that it doesn’t represent the real world, but that people with extreme views self-select in.

“And, finally, find your people. Try and build a community. Getting support from others inside or outside of your institution is crucial. And offering support to others is rewarding and necessary — particularly if you are in a privileged position.”

Annex H: Toolkit Authors



About the Royal Meteorological Society

As the UK's professional and learned society for weather and climate, the Royal Meteorological Society (RMets) is an independent, authoritative voice and aims to support its members by providing advice, along with trusted partners, from those who regularly interact with the media and have experience working with researchers and experts who have faced targeting in the past. By sharing their stories and tips, we aim to amplify your voice and help the public and policymakers understand your perspective.

Find out more about RMets here:
<https://www.rmets.org/>



About the Met Office

The Met Office is the UK's national meteorological service and a world-leading weather and climate science research organisation. We hope that this toolkit will provide support for scientists both within the Met Office and beyond, including those who are already active on social media and those considering ways to raise their professional profile and share their science.

Find out more about the Met Office here:
<https://www.metoffice.gov.uk>

The Met Office has a suite of webpages which aim to [tackle common climate misinformation topics](#).

Annex I: Glossary

Having a common language for identifying and describing different kinds of online abuse can be a helpful step in combating it.

Astroturfing

Astroturfing is a deceptive practice where an individual, interest group, political party, or organisation creates numerous fake accounts to spread or amplify content, including abusive material. This content is made to appear as if it originates spontaneously from grassroots sources or ordinary people, when in reality it is carefully orchestrated.

Astroturfing can be effective because the perpetrators put significant effort into making their fake accounts seem authentic and legitimate. However, it's crucial to remain vigilant and watch for signs that an account might be fraudulent or inauthentic. Consider seeking support from an online community you trust to help report, block, mute, or document instances of abuse stemming from suspected astroturfing campaigns.

Concern trolling

Some people pretend to be supporters of someone's work, but they're actually trying to insult or criticise that person in a harmful way. They disguise their negative comments as advice or constructive criticism.

Engaging with these "concern trolls" who just want to provoke you and drain your energy is usually not productive. Blocking them could make the harassment worse. Instead, muting abusive content by user, keyword, etc., so you don't have to see it, might be a better approach. However, if the content goes beyond just being annoying and becomes outright abusive, you should report it.

Cross platform harassment

Harassers deliberately plan and coordinate their abusive behaviour across various social media platforms and communication apps. They take advantage of the fact that most platforms only moderate content posted on their own sites, rather than taking a broader approach across multiple platforms.

These coordinated harassment campaigns that span many platforms are a major challenge without any easy solution. Strengthening your online security to prevent hacking and your personal information from being

maliciously shared becomes extremely important. To deal with the overwhelming scale and breadth of these attacks, building a supportive online community to jointly document, report, block, and mute the abusive behaviour can provide some relief by sharing the burden.

Cyberbullying

Cyberbullying is a broad term that refers to many different types of harassing behaviours. Essentially, it involves intentionally and repeatedly causing harm to someone through the use of computers, smartphones, and other electronic devices and technology. The bullying is done deliberately and often happens repeatedly.

Cyber-mob attacks, AKA dogpiling

A "dogpile" is a mob-like harassment tactic where a large group of abusers collectively unleash a torrent of threats, insults, slurs, and other abusive behaviour towards one individual.

This could include group attacks aimed at publicly shaming, embarrassing, and penalising someone, often triggered by that person expressing views on controversial political topics or ideas that the outraged mob opposes and/or has misinterpreted or taken out of context to further an agenda.

Dealing with coordinated cyber-mob attacks can feel endless and draining, like constantly confronting a persistent onslaught. If reporting the abuse doesn't seem effective, consider asking someone you trust to temporarily monitor and report the harassment for you while you take a break. Other potential approaches include: launching a counter-speech campaign to reframe the narrative or reclaim a hashtag associated with your online identity; posting a statement on social media to make your online community aware of the negative activity; and/or temporarily deactivating or setting your social media accounts to private until the most intense phase of harassment subsides.

Cyberstalking

Cyberstalking is an extended pattern of abusive online behaviour with the intent to harm, harass, intimidate, or stalk a specific individual. The purpose is to cause harm, harassment, or intimidation to the targeted person.

Cyberstalking is a crime in England and Wales. If you feel comfortable involving the police or talking to a lawyer,

taking legal action against a cyberstalker may be an option. Other potential strategies include blocking the stalker on social media, documenting each harassing incident related to the cyberstalking, securing your online accounts to prevent identity theft if that seems likely, and relying on your support network of family and friends for assistance.

Deepfake

Deepfakes are fabricated images, audio, or videos that seem real by using a type of artificial intelligence called deep learning. This type of manipulated media can mimic speech, facial movements, and other elements to make it look like someone said or did something they actually didn't.

If a deepfake image or video of you starts spreading online, report it - along with the accounts posting or sharing it - on any platforms where you see it. Do a reverse image search using parts of the photo to find other places it may have spread and keep reporting instances you find. To protect your privacy, take time to see what personal information about you exists online and try to remove or restrict its visibility. You may also want to publicly address the deepfake to discredit it, while getting help from a support network to assist with research and reporting efforts.

Denial of Access/Service

Denial of Access means using the capabilities of a technology or platform to harm someone by blocking their access to important digital tools or services.

For example, abusers may work together to falsely report a target's account as abusive or breaking the rules, in an attempt to get it suspended or terminated. Or, abusers might overwhelm an individual's or institution's phone lines or email accounts with an extreme volume of unwanted messages, with the intent of limiting or blocking the target's ability to effectively use that platform.

Promptly report the harassment to the social media platform, phone service provider, internet company, or email service where it's happening. If needed, set up a new and/or temporary email address or username to let your colleagues, family, and friends know that you have been subjected to a message bombing attack and can no longer access your usual accounts.

Dog whistling

Dog whistling involves using words or symbols that have an additional abusive or harmful hidden meaning. Sometimes abusers use it as a secret signal to mobilise a group of online abusers to attack a specific target.

For dog whistling tactics to work for abusers, only they are supposed to know the double meaning behind the terms or symbols used. One potential way to counter it is through counter-speech efforts. This could involve reclaiming and redefining the symbol or word, or mobilising a supportive online community to expose the hidden dog whistle meaning and take away its malicious power.

Doxing

Doxing is the malicious act of publicly sharing someone's private and identifying information online, such as their home address, email, phone number, social security number, or personal photos. The intent is to harass, threaten, extort money, stalk, or enable identity theft against the targeted individual.

If your personal and sensitive information has been maliciously exposed online, promptly report the incident to the platform where the doxing occurred. Evaluate the potential threat to your safety posed by this privacy breach. If you have reason to believe the exposed information could be accessed by individuals intending to cause you harm, it is advisable to involve your local law enforcement authorities.

Hacking

Hacking refers to unlawfully accessing and infiltrating a device or network without authorisation. It is frequently done with malicious intent, aiming to attack, harm, or implicate another person. Hackers may steal data, violate privacy, or infect devices with malware. When hacking is used to conduct illegal activities or intimidate a target, it is considered a cybercrime.

Following good cybersecurity practices is important for protecting yourself against hacking attacks, including using:

- a password manager.
- strong, unique passwords.
- multi-factor authentication where possible.
- security question and answers where possible.
- vigilance to spot spam and phishing.

Hashtag poisoning

Hashtag poisoning is the malicious creation or co-opting of an existing hashtag, subsequently exploited as a catalyst for coordinated online harassment campaigns targeting individuals.

Counter techniques could include leaning on a supportive online community to reclaim a misappropriated hashtag or establish a new one that promotes positivity and solidarity.

Hate speech

Online hate speech targets and insults specific aspects of a person's identity, such as their race, ethnicity, gender, religion, sexual orientation, or disability. Instead of having an intelligent discussion about the topic, hate speech involves personal attacks that appeal to people's biases and prejudices. Rather than engaging with the subject matter, hate speech tries to avoid the real discussion by insulting the person's character or personal attributes. This type of language demeans individuals based on core parts of their identity and who they are as a person. While disagreeing on issues is okay, directing hateful speech at someone because of their race, gender, religion, etc. is unacceptable and can deeply hurt people.

Depending on how threatening the attacks are, you could block or mute the person, respond back with the truth, or sometimes even confront them directly. If you don't feel safe responding or blocking them, talk to your friends and family who support you and do things that make you feel better. If the person threatened violence or made sexual threats against you, and you're worried for your safety, you should think about telling the police.

Heckling

Heckling involves interrupting a public speaker with derisive or aggressive comments or abuse.

1. **Maintaining composure:** The first step in handling a heckler with dignity is managing your own emotional state. This involves controlling your thoughts and having a genuine belief that differing perspectives can be valid. Role-playing these situations with colleagues can be incredibly helpful in training yourself to override natural defensive or aggressive reactions and respond calmly.
2. **Allowing expression:** When someone interrupts initially, let them have their say for a bit. It may feel uncomfortably long, and you may notice audience members becoming restless, but this is often the most effective preventative measure to discourage

further heckling. If you shut them down immediately, they are more likely to continue interrupting, like a relentless jack-in-the-box, throughout your session.

3. **Reflective listening:** Before responding, reflect back to the heckler what they said, expressing in your own words your understanding of their point. This may seem transparent, but the heckler will likely feel heard. If your understanding is inaccurate, they will correct you, allowing you to reattempt reflecting their intended message accurately.
4. **Responding:** If appropriate, respond by addressing the entire audience, not just the heckler, while maintaining eye contact with them. However, unless you want to continue the dialogue, avoid ending your response while looking at the heckler, as this may invite further agreement or disagreement from them. Instead, look at someone else in the room as you conclude your response, then smoothly transition back to your prepared presentation.

Impersonation

Impersonation refers to creating a fake social media account that uses the target's name and/or photos to post offensive or inflammatory content. The goal is to defame, discredit, or provoke further abuse against the target. A harasser may also impersonate someone the target knows in order to cause harm.

You should immediately report the impersonation to the platform where it is happening. You may want to post a statement on your real social media accounts to alert your online communities about the imposter account. (On X (formerly Twitter), you can "pin" this statement tweet to the top of your profile temporarily so it's visible.) In some cases, it may be appropriate to inform your employer or loved ones about the abuse, especially if they are being implicated or referenced by the impersonator.

Online sexual harassment, including gender-based harassment

Online sexual harassment encompasses a wide range of inappropriate and abusive sexual behaviours on digital platforms. Those who identify as women and/or LGBTQIA+ individuals are disproportionately targeted by these acts.

1. **Deadnaming:** Maliciously revealing a target's former name against their wishes, typically used to "out" LGBTQIA+ individuals who may have changed their birth name to avoid discrimination and threats to their safety.

2. **Lollipoping:** Infantilising language and behaviour toward women, such as using condescending terms like “darling” or “sweetie,” or dismissively stating, “you’ll understand when you’re older.” Named after the candy given to children to placate them.
3. **Unsolicited pornography:** Sending sexually explicit or violent images and videos to a target without their consent.
4. **Unwanted sexualisation:** Sending unwelcome sexual requests, comments and content of a sexual nature to a target against their wishes.

A crucial first step is reporting the harassment to the platform where it occurred and documenting the abusive incidents. Online sexual harassment can be extremely traumatising for the target and may require legal action.

If you are a victim of online sexual harassment, remember you are not alone. Reaching out to others for support can greatly benefit your mental wellbeing.

Phishing

Phishing is a deception that starts with a communication — an email, text message, or WhatsApp message — crafted to look like it came from a trustworthy source. The goal is to trick you into taking an action, typically clicking a link or opening an attachment. This action may automatically install malware onto your device or lead you to disclose private information like login credentials. The attacker can then exploit this to gain unauthorised access to your online accounts, impersonate you, or sell your personal data to others.

Be cautious when receiving unexpected or unsolicited emails. Don’t open any attachments or links from unknown senders without first verifying they are legitimate. If you get an email with an attachment or link from a friend that you didn’t expect, promptly reach out to them to confirm the message is authentic before proceeding.

Threats

A threat is an expressed intention to cause harm, damage, or hostile action against someone or something. This includes threats of death, physical violence, and for women, threats of sexual assault are also common. Threats can take the form of menacing statements aimed at instilling fear about potential pain, injury, or destructive acts toward the targeted victim.

The anonymity of the internet can make it challenging to know how to respond to a threat appropriately. It is wise to treat all threats seriously, reflect on whether you feel unsafe, and rely on your instincts. If you do feel threatened, consider going somewhere safe, reporting the incident to the police, and informing trusted individuals as well as your employer if applicable. Documenting the threats is also vital, as you’ll need evidence to involve law enforcement and potentially pursue legal protection.

Virtual meeting hijacking

The intentional disruption of a virtual meeting by intruders sharing disruptive text, video, or audio content is also known as “raiding” or “bombing.” These raids sometimes happen for targeted reasons, such as interfering with an organisation’s operations or carrying out identity-based attacks against marginalised groups. The malicious actors hijack and take over the virtual space, causing chaos and undermining the intended communication and activities.

It’s important to frequently install the latest updates for any video conferencing apps you use. Developers continuously release new versions with enhanced security features to address emerging threats and vulnerabilities. Keeping your apps up-to-date helps protect against these kinds of disruptive raids.