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A good conference poster can get you noticed and spur discussions that can expand your network.

CONFERENCE PRESENTATIONS

Lead the poster parade

An eye-catching presentation can attract potential collaborators — and even a cash prize.

BY CHRIS WOOLSTON

Stroll through a decent-sized scientific conference and you'll probably face a bewildering number of posters — many more than you could ever hope to read in one day. So you have to pick and choose. Perhaps one reminds you of the worst PowerPoint presentation you ever endured; another is crammed with thousands of words in microscopic font. But you encounter one featuring a bold illustration, splashes of colour, readable text and clean lines. You pause for a closer look, chat with the presenter and discover common research interests. You've made a connection, and at least one poster has accomplished what its creator meant it to do.

The scientific poster remains a crucial currency for communication and connection, says biophysicist Anthony Salvagno, director of education for #SciFund Challenge, a non-profit organization in Santa Barbara, California, that specializes in science-communication training. Through SciFund, he co-teaches a five-week online course on poster design along with biologist Zen Faulkes of the University of Texas Rio Grande Valley in Edinburg.

Researchers now have access to an array of high-end graphics software — and the 'how to make a poster' conversation has been going on for years (see *Nature* **483,** 113–115; 2012). But that hasn't stemmed the flow of visual clunkers. As Salvagno explains, researchers often slap posters together at the last minute instead of thinking about the best ways to deliver their message and engage their audience.

But those who have the vision — and computer skills — to avoid distracting design blunders will draw the right kind of attention to themselves, their findings and their ideas. They might even win an award (see 'Tips for making your poster stand out'), although the main goals are to publicize their science and scientific identity while forging new associations. "A good poster will help you make better connections," Salvagno says. "Just one conversation can turn into a huge success."

Trishna Dutta, a wildlife researcher at Columbia University in New York City who studies tigers in India, says that lessons from the poster course helped to spark productive conversations at the 2015 International Congress for Conservation Biology (ICCB) in Montpellier, France. She had signed up for the course specifically ▶

to make an impression at the conference. She also wanted to make up for past failures. "My first posters were bad," she says. "I didn't have the aesthetic sense of what goes with what." Worse, comments from attendees suggested that her key points were often lost, especially for those outside her speciality. "That was a case where I needed to know my audience," she says. "People there studied everything from bacteria to elephants. I'm not sure they got my message."

Her ICCB poster was far clearer. A subheading spelled out the take-away message of tiger migration, the text was orderly and easy to read, maps added colour as well as context, and a photo of a wild tiger near the centre captured the eye. "I still don't make excellent posters, but I'm getting the hang of it," she says.

Anxiety about these visual presentations is widespread. When Vasco Elbrecht uploaded a set of scientific-poster tutorials on YouTube (go.nature.com/2akrsly), he realized that he had underestimated the demand for such help. "I would have been happy if just a few of my friends watched them," says the PhD student at the University of Duisburg-Essen in Germany. So far, his poster tutorials have racked up more than 31,900 views.

In his most-viewed video, Elbrecht shows examples of good and bad posters from his own repertoire. His first — about the genetics of *Microbotryum* fungus — was bogged down with huge swathes of text, a common pitfall. "I tried to fit everything I could on it," he says. "But at a conference, nobody is going to stand there and read it for ten minutes." In a later, more successful poster about the genetic diversity of the stonefly *Dinocras cephalotes*, he limited the text to a few hundred words — roughly the same count as an abstract (see 'A winning view'). That's generally enough to deliver a key message and entice passers-by without overwhelming them, he says. The design also helped him to win a €1,500 (US$1,660) research prize for his poster and abstract from the Institute for the Advancement of Water Quality and Water Resources Management in Essen, Germany, in 2014.

LESS IS MORE

Salvagno and Faulke's poster class stresses the same point: when it comes to text, less is more. Poster-makers often already know that too much text can be off-putting, but many are still unable to resist the temptation to include practically everything they know about their subject. "When I ask people what they dislike about posters, too much text is the number-one complaint," Salvagno says. "People hate seeing it on other people's posters, but they do it on their own."

Of course, there's more to it than getting the right word count. Text and graphics have to flow together in a way that's as visually appealing as it is informative. That takes a designer's eye — or a willingness to copy from people who know what they are doing. Elbrecht encourages researchers to borrow elements from posters that they like. "All design is redesign," he says. "There's no need to be original."

Effective posters take many shapes, but they tend to have some basic elements in common, says Sam Hertig, a freelance scientific illustrator in Berne, Switzerland. Hertig, who has just completed a postdoc in computational biology, gave a talk on creating a visually striking scientific poster at Stanford University in California earlier this year and uploaded the presentation to YouTube (go.nature.com/2aetlrc). As he explains, a "stunning" poster generally starts with a gripping centrepiece image, whether of a molecule, organism or galaxy. One of his own recent posters featured a multicoloured image of HIV. "Be daring," he says in the presentation. "There may be hundreds or thousands of posters at a conference. You want something that will stand out."

Hertig says that the text of a poster should have its own visual appeal. In most cases, the text will be neatly arranged in 2 to 4 columns on a poster that's about 91 cm by 122 cm. The font, which should be consistent throughout, must be clear and easy to read (not something like Comic Sans), and should be at least 24 points.

The poster should be printed to the maximum size allowed by the conference, and the title should be large and legible from a distance. The subheadings — which should also be clear and visible — should say something more dynamic than 'Results'. If, for instance, research uncovered a 5% decline in the reproductive success of heat-stressed frogs, the heading for the results section should hint at that finding.

Hertig says that the placement of white

EYES ON THE PRIZE

Tips for making your poster stand out

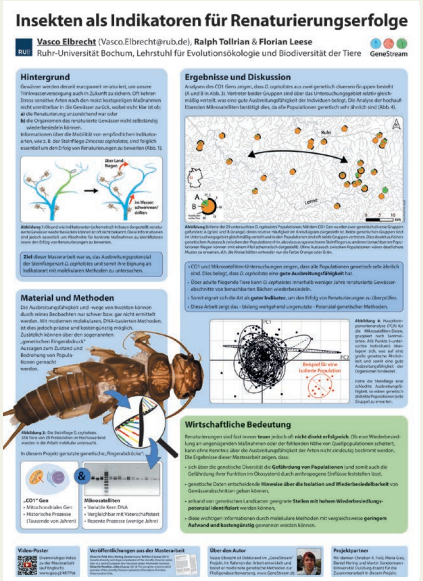
Good posters are supposed to communicate results and foster connections — but a first-place ribbon wouldn't hurt, either. A poster prize is more than a badge of honour: it's an accomplishment that would look great on a CV. Here are some tips for getting the prize.

- Scientific modelling. Winning posters often go beyond flat text and graphics. Where appropriate, consider building a 3D model of your study subject. "It doesn't add any scientific value, but it gets people's attention," says Vasco Elbrecht, a PhD student at the University of Duisburg-Essen in Germany who won a cash prize for his poster in 2014.

- Tech it up. Technology has opened up new possibilities: some conferences allow attendees to bolster their posters with videos on a tablet or similar device. "If you really want to go for a poster prize, have a QR smartphone barcode for a video on your topic," Elbrecht says.

- Do a test run. Before you ever set foot in a conference, you should be confident that your poster has all the clarity, appeal and impact that you intended. "The important thing is to get honest feedback," Elbrecht says. "Show it to people in another department if necessary."

- Know your audience. Hedwig van der Meer, a PhD student at the Amsterdam University of Applied Sciences in the Netherlands, was an underdog at the 2016 American Academy of Orofacial Pain poster session in Florida. "I was a physical therapist from the Netherlands going up against all of these American doctors," she says. "I didn't think I could win, especially after seeing the other posters." Her presentation was heavy with text but short on colour. Yet it worked because the presentation and the topic — the connection between temporomandibular disorders and headaches — hit the sweet spot. "The audience was a match," she says. "I had a clear message, and I'm passionate about what I do." C.W.



A WINNING VIEW
Vasco Elbrecht's award-winning poster about the genetic diversity of the stonefly *Dinocras cephalotes* has an eye-catching centrepiece image and limits text to a few hundred words — enough to deliver a key message and entice passers-by.

space is an important but often overlooked aspect of poster design. Visually attractive posters tend to have substantial borders and significant gaps between text blocks. The white space should flow together in a cohesive way that draws in the eye while giving it a chance to rest. In a room full of posters screaming for attention, he says, some well-placed emptiness can offer tranquility.

THE RIGHT TOOL FOR THE JOB

Yet these design aesthetics won't amount to much without the right software. Many researchers resort to PowerPoint, usually because they already have PowerPoint figures at hand. It can work: Hedwig van der Meer, a physiotherapy PhD student at the Amsterdam University of Applied Sciences in the Netherlands, used PowerPoint to make her first-place poster at the 2016 conference of the American Academy of Orofacial Pain in Orlando, Florida. But Salvagno advises against the program: it isn't designed for printing, the colours may be off and the alignment tools are cumbersome. If PowerPoint is the only option, he recommends disabling the 'snap to grid' function for maximum control of the layout.

Hertig recommends vector-based graphics programs such as Inkscape or Adobe Illustrator. Unlike PowerPoint and other programs that create illustrations with pixels, both of these use equations to determine each point; images and text can thus be scaled up without loss of clarity. These programs can also smoothly align text and captions. Choose one vector-based program and stick with it for every poster and presentation, Hertig adds. "It's important to invest the time early in your PhD. You won't have to learn it again. It will just be natural."

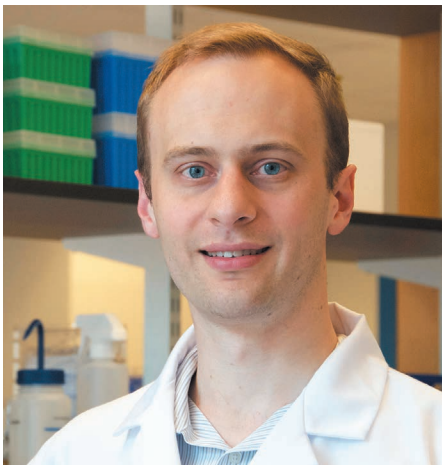
A quality poster is just one part of a successful presentation. At most conferences, the presenter will have at least a couple of hours to stand by their posters and interact with attendees. This is where some of the most important work at a conference takes place, which is why researchers should spend as much time polishing their pitches as they spend creating their poster, Salvagno says. He recommends preparing several different versions of one's talking points: a 20-second elevator pitch for the mildly curious and a longer version for anyone who wants a deeper dive.

For her part, van der Meer thinks that her presentation of her prizewinning poster was as important as the actual product. "You have to involve the audience by being open and enthusiastic," she says. "The combination of a clear poster and passionate presentation works best, because people will understand your work and get excited." ■

Chris Woolston *is a freelance writer in Billings, Montana.*

TURNING POINT
Kevin Esvelt

Evolutionary engineer Kevin Esvelt, at the Massachusetts Institute of Technology in Cambridge, works with gene drives, engineered bits of DNA that can cause a mutation to become heritable all the time. He calls for researchers to create and use safe lab procedures while working with this powerful but potentially risky technology.



ERIKA DEBENEDICTIS/MIT MEDIA LAB

What is a gene drive?
In nature, a gene drive occurs when a DNA sequence spreads through a population by breaking the conventional rules of inheritance. For example, if an organism has a single copy of a fluorescent marker gene and its mate has none, normally only half their offspring will fluoresce. When a gene-drive system is in play, almost all of them will glow.

How can scientists use this capability?
Gene drives allow us to drive altered traits through wild populations over generations. For instance, we could alter the DNA of wild mosquitoes to stop them from carrying disease. We could restore damaged ecosystems and save endangered wildlife by genetically removing invasive species.

How did your insights help to propel this field?
Even ten years ago, heritable genome editing was a possibility, but no one had found a molecular tool that would enable it to be done efficiently. In 2013, laboratories began using CRISPR to precisely edit the genomes of many species. I realized then that this tool could be used to build stable gene drives in many complex organisms. It could also be used to build reverse drives, which are like molecular erasers for overwriting previous edits.

Why did you explain how gene drives would work before you published results showing that they could work in any organism?
Most advances don't give individual scientists the power to affect entire ecosystems. By detailing what was possible, how it could be achieved and what safeguards were needed to prevent any accidental release of altered organisms from the lab, we hoped to set an example of how future work in gene drives should proceed.

Why was this important?
A single escaped organism that found a mate could eventually alter most of the local population and, very possibly, every population of that species worldwide. The ecological risk might be low, but the damage to public trust in biotechnology could imperil the future of the field.

Did you want researchers to agree on some guidelines first?
My immediate priority was to prevent the accidental release of any gene-drive organisms into the wild. I wrote to the few researchers working on gene drives to explain my concerns about ethics and safety.

What happened?
Last year, we released results showing that gene drives work in yeast. Then another group — who were working with fruit flies — independently created a functional gene-drive system. They were careful to keep the flies contained, but unlike our paper, their manuscript, which was meant to be published as a how-to for other labs, made no mention of safeguards or the risk to wild populations. To their credit, they agreed to include those details.

Did your efforts help to usher in regulation?
The fruit-fly case triggered responses from many scientists. For months, we struggled to agree on which safeguards should be used in the lab. We eventually published our recommendations in July 2015, and this year the US National Academy of Sciences released a report setting out how to conduct gene-drive research responsibly.

Should gene-drive information be classified?
Classifying such information would hinder beneficial applications and threaten biosecurity. We must know which species to monitor. Open science is the best defence and the best way to earn public support. ■

INTERVIEW BY VIJEE VENKATRAMAN

This interview has been edited for length and clarity.