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A winning poster uses bold graphics, plenty of white space and limited text to draw viewers.

PRESENTATIONS

Billboard science

Posters are a chance to show off work and to network with colleagues, but only if the design is easy on the eye.

BY KENDALL POWELL

It was the scientific version of a Las Vegas-style casino. The poster session at the American Society for Cell Biology (ASCB) meeting in Denver, Colorado, in December 2011 included numerous aisles lined with posters, and young presenters showing off the fruits of endless hours in the laboratory. A few metres away, dozens of representatives from science agencies, institutes and scientific-instrument companies staffed a sea of exhibitor booths. They were shamelessly vying for

scientists' attention with the free sweets, pens, noise-makers and other bits of sparkly plastic that end up at the bottom of a canvas conference bag. It is difficult enough for an attendee to locate a particular poster; it is harder still for presenters to get noticed.

Rashieda Hatcher, a doctoral student at Baylor College of Medicine in Houston, Texas, and third-place winner in the graduate-student category of the ASCB Minority Affairs Committee poster contest, made the most of her prime, end-aisle location. Her display, which chronicled her study of the protein securin in

breast cancer, had many of the hallmarks of a winning poster: tastefully colourful, with an enlarged photo of her most important result (an abnormal branching of the mammary gland in mice that don't produce securin) at the centre. It had cartoons instead of text to explain the methods and conclusions. Hatcher had included business cards beside her poster so that viewers could contact her later. She had embraced the idea that a poster is a good place to sell her science.

Her efforts brought immediate results, with a visit from a leading researcher in her field. After talking to Hatcher about her work and future experiments, Zena Werb, a developmental biologist at the University of California, San Francisco, invited Hatcher to a talk by Werb's postdoctoral fellow. The next morning, they discussed the prospect of working together after Hatcher finishes her PhD.

Senior scientists see poster sessions as an opportunity for junior researchers to show off their science, to get fresh perspectives on research questions and to network. Presenters who follow a few basic rules in poster layout, and who talk viewers through their work, will draw a crowd. Judges say that a killer poster will have clean lines, white space, intriguing images and a clear visual flow that supports a well-told research story. The worst posters have panel after panel of tiny print, which can turn a poster session into a lonely four hours for the presenter.

"A poster should look catchy from 10 metres away," says Colin Purrington, formerly an evolutionary biologist at Swarthmore College in Pennsylvania, and now a photographer who maintains a blog on poster design (see tinyurl.com/6wb62m9). "A clean layout speaks to an uncluttered mind, and that's who you want to talk to at meetings," he says.

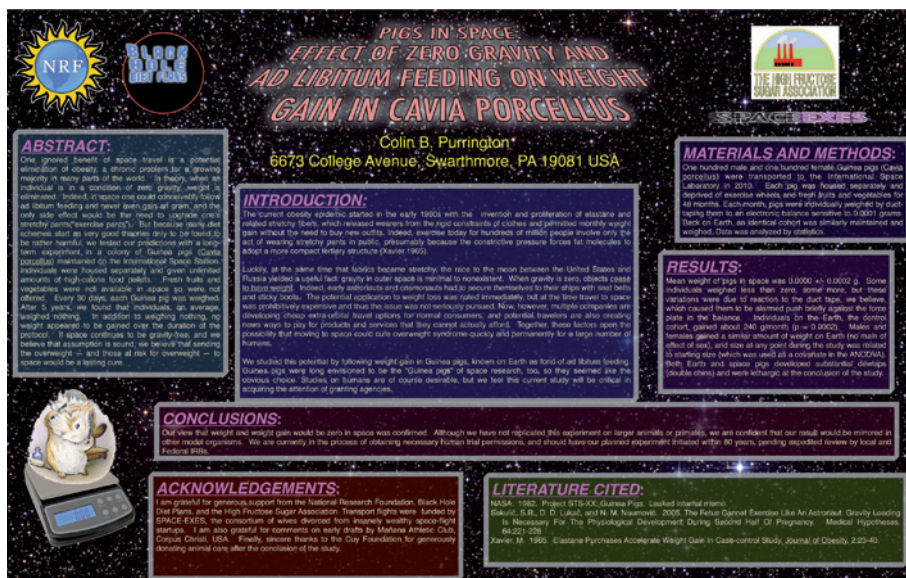
VISUAL AIDS

A poster should function as a visual aid — to help the presenter to talk through the research in an informal and engaging way. It should not be an abridged version of the researcher's current manuscript, stresses Zen Faulkes, a neuroethologist at University of Texas-Pan American in Edinburg. "People in a poster session usually have just come from an intense session and they need a mental break," says Jamie Simon, senior illustrator at the Salk Institute for Biological Sciences in La Jolla, California. Simon, who helps Salk researchers to design and print their posters, encourages scientists to stick to the standards of graphic design ▶

► (see 'Creating an eye-catching poster'). The design should follow the photography law of thirds. Most posters are three columns across, with three sections per column. "Put the hot stuff in the middle of the second column," says Simon — as Hatcher did. It is more visually appealing to use lots of white space to separate sections, and avoid distracting, whole-background images or swirls. Although most academic departments do not have a graphics guru like Simon, researchers can learn from poster sites such as Purrington's and Faulkes' (see tinyurl.com/7uv92fu).

Giving a little thought to how the layout is organized goes a long way, says cell biologist Peter Lenart at the European Molecular Biology Laboratory in Heidelberg, Germany. Although most scientists use Microsoft PowerPoint software to design posters, Lenart prefers Adobe Illustrator because it offers greater flexibility and more graphic-design tools. He uses boxes to delineate each results section, each of which has its own headline, and places figure legends in boxes with arrows to direct readers to the appropriate image. Lenart places any additional information for that results panel in a box marked with an encircled 'i'. Clear direction gives even the most casual of browsers a chance to understand the overall point of the research.

Award-winning presenters weave a research tale that flows from the layout. Martin Bergert, a doctoral student at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, Germany, had two related stories he wanted to convey at the annual meeting of the European Molecular Biology Organization (EMBO) last September in Vienna. He placed the figures and text for each story in a box with a catchy title: "On the edge — blebs vs.



Colin Purrington's example of a 'bad' poster is crammed with text and has a distracting background.

lamellipodia" to highlight work on two types of cellular protrusion, and "On the move — how to migrate by blebbing" to describe results on cell migration.

Natasha Gutierrez, a doctoral student in cell biology at Rutgers University in Newark, New Jersey, and the second-place winner in the graduate-student category of the ASCB's poster competition, put all her potential figures onto a board, then removed those that didn't fit her research story. Gutierrez displayed her most impressive experiment in a three-panelled figure showing two microscopic views of her cells and a graph of quantitative results. She placed this figure in the middle, providing a focus for her oral presentation.

A well-organized poster alone is not enough to entice passers-by. Bergert's poster, which earned him a prize at the 2011 EMBO poster competition, had a 'hook' image to reel people in. He repeated a simple, unobtrusive image of a blebbing cell, the main focus of his poster, several times beneath the title. The images were visible from across the room and lured in scientists already interested in blebs and other people intrigued by the blobby cells.

Hook images also provide a visual entry into the poster's research topic. Purrington says that every poster should include a hook on the left-hand side to attract visitors who are unfamiliar with the work and will view it from a fresh perspective. The image could be a photograph of the research organism, a map or a portrait of a mathematician, for example. It is worth taking the time to come up with a creative hook, says Purrington, who notes that the largest crowd at a Swarthmore College poster session was at a chemist's poster that featured a photo of a man suffering from arsenic poisoning.

Presenters should make sure their figures are easy to interpret from a metre or so away. Axes and labels that have been taken from a previous talk or publication should be adjusted so that they are easily visible. Arrows and artificial colours can also be used to highlight a point. "Don't be afraid to write on top of a cell, 'This is the typical phenotype'. Make it as visually clear as possible," says Lenart.

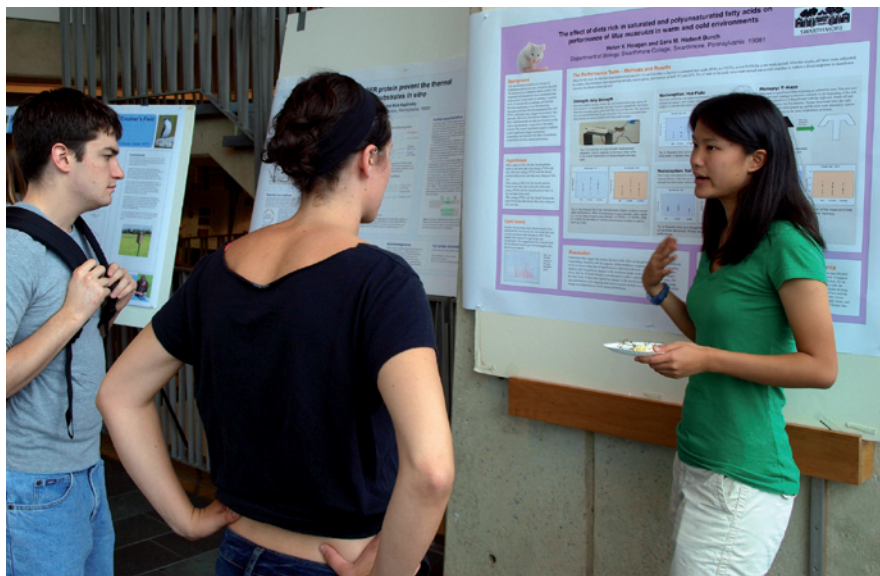
For simplicity, only the most important data points should be included in a poster, says Renato Aguilera, a judge for the ASCB contest and a molecular-cell biologist at the University of Texas at El Paso. "Have just two lines on your graph: the control and the most important result," he says, adding that posters should not force viewers to wade through hundreds of data points.

Finally, a few props can help to engage viewers. Bergert showed cell-migration movies on

CREATING AN EYE-CATCHING POSTER

Simple guidelines for poster presentation

- Choose landscape (horizontal) over portrait (vertical) orientations.
- Follow the recommended dimensions and instructions. Make sure you allow for white space and large fonts and images.
- Use photographs, cartoons or illustrations to explain concepts. Limit the word count to 1,000 words.
- Take great care in writing the abstract: conference attendees will identify posters to visit from the abstract book.
- Make the title the punchline of the research — and make it intriguing. Consider placing an engaging image close by.
- Titles and headings should be in a sans-serif font, such as Helvetica. Other text should be in a serif font such as Times New Roman, with a minimum size of 22 points.
- Consider short bullet points for methods and conclusions.
- Use black text on a white background. Red text can be used to draw attention, but avoid blue and yellow, which are hard to read.
- Place figures in an obvious order, and consider using numbering. Figures should have a large headline with the main finding.
- Enlarge the best piece of data and place it squarely in the middle at eye level.
- Have someone else proofread the text.
- Check the poster on a large computer screen at 100%, then step back half a metre from the screen.
- If possible, project the poster onto a wall before printing it to check formatting at actual size.
- Take a fine-line marker pen and white tape with you to the conference to fix any mistakes that you might have missed.
- Don't pin viewers down with an exhaustive tour of the poster. **K.P.**



Poster presenters should prepare different versions of their talk for passers-by and specialists.

an iPad at his poster session. Presenters can also direct viewers to large audio or video files, or to websites with additional data, using Quick Response barcodes that can be scanned by smartphones.

Purrington recommends that posters include laminated white space where the presenter can use a dry-erase marker to go through the research model. Get creative, he says, and have a section called ‘What I need help with,’ or overlap a panel with white tape so that extra information, such as a control experiment or an equation’s derivation, can be revealed. Images that don’t merit inclusion in the main poster can be attached on a ring.

Props can also serve as ice-breakers and attract viewers. “No one’s ever taken me up on this suggestion, but why not have a pitcher of beer and cups at your poster?” says Simon.

CONVERSATIONAL SCIENCE

Poster presenters should engage in conversations to help solve conundrums in data, get advice on improving the work or form possible future collaborations. At the ASCB poster session, Gutierrez seemed poised and in control. Her adviser at Rutgers and poster judge Alex Rodriguez, a cell biologist, who sat nearby, says that adopting an appropriate outlook in a poster session can be tricky for junior researchers. “Presenters have to be confident, but not defensive, and that’s a difficult line to ride, especially for young scientists,” he says. When a viewer challenged Gutierrez on her choice of cells, she pushed back in a friendly manner. “I hear what you are saying,” she responded, “but I still think this is a good model of wound healing.”

Perhaps most important, say judges and experienced presenters, is that presenters keep conversations with viewers friendly and two-way. It is a good idea to prepare

different versions of an oral presentation for casual passers-by, interested observers and interested specialists, says Faulkes. Presenters should practise their story, but not over-rehearse it. “You shouldn’t give it the same way twice,” he says.

Part of the preparation should be to anticipate tough questions. As a postdoctoral fellow, Lenart was caught off-guard when he presented research that used a proprietary compound provided by a pharmaceutical company. When people asked how the compound worked, he had to answer sheepishly that he could not say. Lenart advises presenters to prepare answers — or at least good excuses — for as many questions as they can think of. Presenters should do practice runs and discuss plans with a supervisor to decide what material is too sensitive to be shared.

Joseph Ramahi, the first-place winner of the ASCB poster competition and a doctoral student in cell biology at the University of California, Davis, thinks that his enthusiasm for presenting posters probably had an impact on the judges. “The questions I’ve been asked from giving posters have helped my project to grow,” he says. “Smile, and thank visitors for coming by, because they are helping you to get better, and that’s a really important part of science.”

Purrington believes that poster sessions are often under-rated as a place for scientists to air their ‘half-baked ideas’. The best part, he says, is picking other people’s brains about where a line of research should go next. “If you can get people excited enough about your question to want to be your colleague, or to give you a completely different take — that’s the fun of the poster session,” he says. “It can change your career.” ■

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UNITED STATES

Protect research ideas

A proposed US bill requiring all funded federal-grant applications to be posted on a government website would help competitors, including non-US scientists and businesses, to poach innovative research ideas, warns a group of US universities and scientific and professional societies. A letter sent on 15 February from the Coalition for National Science Funding (CNSF) in Washington DC to the US House of Representatives recommends that the bill require only abstracts to be posted. Samuel Rankin, associate executive director of the American Mathematical Society, a CNSF member, says that publicly open proposals would allow anyone to use researchers’ ideas in potential commercial applications, possibly even before the researcher can file a patent. “You’re giving away a lifetime of work,” says Rankin.

ENVIRONMENT

New observatory sites

The US National Ecological Observatory Network (NEON) will hire 15–20 ecologists who will collect ecological and climatic data, including soil, plant and animal samples, at three new observatory sites. NEON — a continent-wide network that will gather data over 30 years on the ecological impacts of climate change, invasive species and land-use changes — anticipates US\$60 million this year from the US National Science Foundation to build the observatories. The sites in Florida, Massachusetts and Colorado are expected to be completed by late 2013. NEON was established by the US National Science Board in 1999 to form a long-term network of ecological monitoring sites.

UNIVERSITIES

Top student city

Paris has been named ‘Best Student City 2012’ by QS Intelligence Unit, a company that compiles annual world university rankings. Paris earned the honour in part because of research institutions École Normale Supérieure Paris and École Polytechnique. London was second owing to the research institutions University College London and the London School of Hygiene and Tropical Medicine. Boston, Massachusetts, was third thanks to Harvard University and Massachusetts Institute of Technology, both in Massachusetts.