the effect wore off after a large number of citations. "Reputation aggregates," Petersen says. "Every citation spreads your name a little bit more. If you strike it big, you can strike it very big."

Some young researchers try to exploit the big-name effect by collaborating with eminent names in their field, even if it means taking a spot far down on the list of authors. But there are downsides for people who pursue the coat-tail effect. Santo Fortunato, one of Petersen's co-authors and a statistician and social scientist at Aalto University in Finland, notes that famous scientists do not necessarily have much time to offer extensive assistance with a paper or anything else. "You should be careful in choosing your co-authors, but realize that a name itself is not enough for a paper to be really successful," he says. "Quality work is still the best statement you can make."

Early-career researchers might think — with some reason — that they can get the best head start on creation of a positive reputation and on their career by earning their PhD at a big-name university. A 2014 study published in *Science Advances*[3] found that one-quarter of institutions accounted for 71–86% of all tenure-track hires in the fields of computer science, history and business. The authors conclude that institutional prestige has an "enormous role" in faculty hiring across disciplines.

Bourne says that this kind of "reputation by proxy" — the assumption that high-quality universities and high-quality labs tend to produce high-quality researchers — is pervasive in science. "Reputation rubs off," he says. But young scientists should not despair if they do not have a pedigree. As a recipient of a PhD from Flinders University in Adelaide, Australia, he is proof that one does not need to attend an illustrious institution to go far in science. After a while, he says, accomplishments start to matter more than the education section of a CV. "I always amuse myself because nobody's ever heard of the university I went to," he says.

Bik, who is originally from Boston, Massachusetts, earned her PhD at the University of Southampton, UK.

She completed a postdoc in a big-name lab — Jonathan Eisen's evolutionary-biology lab at the University of California, Davis — but for the most part she has had to build her reputation the way that most scientists do it: one paper, one conference and one tweet at a time. ■

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2. Petersen, A. M. *et al. Proc. Natl Acad. Sci. USA* **111,** 15316–15321 (2014).
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VANATCHANAN/SHUTTERSTOCK

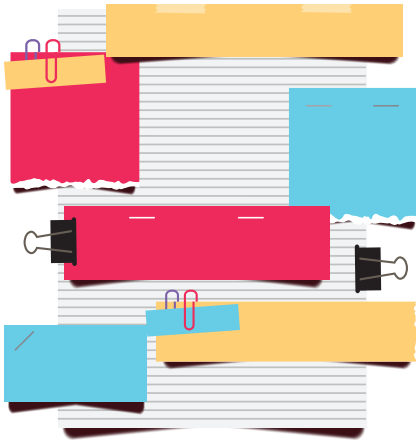
COLUMN

Visual maps bring research to life

Find the story in the science, says **Åsmund Eikenes**.

Research projects do not always follow a linear narrative — but papers, grant proposals and conference talks need to do just that. Early-career scientists can use narrative techniques to create what I call a 'storymap': a visual model of their research that helps them to organize their thoughts and to tell a clear, compelling story about their work.

Creating a storymap helps the researcher to evaluate the strengths and weaknesses of the project critically. I use this technique to visualize my ongoing projects and to improve my understanding of the content and direction of my research. There are several ways to make a storymap, whether on a blackboard, whiteboard or on the web using tools such as Prezi (www.prezi.com). The process is similar to that used by a detective, who pins notes and pictures to a wall as she or he maps out a case.



A researcher can instead use drawings, schematics and preliminary figure panels to map out a project. The process of sorting microscope images, graphs and diagrams into the storymap provides an instant overview of the project's status.

A WEB OF IDEAS

Although an experimental strategy might work well for one aspect of a research project, other parts might need a different approach. The initial research question can also change over time. The storymap helps to clarify these diverging paths early on, and allows the researcher to consider alternative strategies. If a scientist maintains the storymap on a shareable online platform such as Google+, he or she can also communicate the results of ongoing investigations in collaborative projects, and everyone involved can interact with the storymap content in real time. Graduate students, postdoctoral researchers and principal investigators can discuss the overview online and keep up with the progression of the research visually.

Historically, researchers have planned their work using long lists in lab notebooks or on PowerPoint slides. Storymapping, however, provides a clear visual reference for exploring potential new directions. Based on that insight, researchers can decide what supporting experimentation they need to pursue.

The visual model also lets the researcher see missing pieces of the project that need attention. This is instrumental for thoroughly understanding the data, and for narrating the project in a clear and effective way.

Storymapping can also help to guide the manuscript writing process. A well-written paper engages readers with a logical flow of intriguing questions and well-supported answers throughout the text. The storymap highlights the questions and answers that anchor the project, and so serves as a guide for describing the results.

I let the visual overview help me to articulate the sentences that serve to transition between results — the glue of the story. This approach helps me to produce the framework of the manuscript; these paragraphs will guide the narration of the experimental work. I start with the sentences that will link each section of the story, creating a structured backbone that I can use to build the first draft. After this, I find it much easier to fill in the gaps, akin to colouring inside the lines in a drawing book.

This structure places the data into context and shapes the manuscript into a smooth progression of results that trigger insightful questions, which the paper offers specific experimental ways to address.

Over the past four years, I have employed these storymapping techniques both alone and with colleagues, and find that they have significantly contributed to my development as a scientist. Using storytelling as a tool while working on a project facilitates critical thinking, and so enhances the scientific work. ■

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