how you would like a constructive review to be written if you were the author of the paper," he says. Snarkiness or scorn should not be present. "Derisiveness, aggressiveness or rivalry have absolutely no place in a review," Curry adds.

The document should start with a short, cohesive summary of the paper, says Pulverer, followed by comment on experimental design and the validity of controls. A key point of any review of biological work, he says, is whether the data and their interpretation support the reported findings. "We'd like reviewers to outline precisely what extra tests they think are needed and why," he says. Reviewers should also make clear whether more experiments are essential or merely desirable.

The specific technical and editorial advice that reviewers are expected to provide depends largely on the subject area and the scope of a journal. Validating a twist in string theory or cosmology calls for a different approach than reviewing the results of an astronomical observation, geological fieldwork or clinical trials. If asked to assess theoretical work, a reviewer should focus on equations and their interpretation.

Most studies will require reviewers to examine observational and experimental data contained in supplementary material (or external repositories) and their representation in graphs and figures.

Reviewers should check guidelines for authors and reviewers carefully to be sure that they

"Think how you would like a constructive review to be written if you were the author."

properly understand a journal's scope, how novel and 'big' any science must be to get published there, and whether referee reports and the authors' responses will be published online.

If the latter is the case, as it is for the EMBO journals, scientists should look at other reviews and authors' responses. This is a good way for novice reviewers to get a sense of the appropriate length and structure expected, and of the journal's overall review process, says Hames. If such information is ambiguous or unavailable, they should ask the journal for specifics.

Assessing the work of others nurtures critical thinking in ways that few other ventures can match. But at the end of the day, says Alaa Ibrahim, an astrophysicist with the American University in Cairo, it is good for authors to have others dissect their submitted work. "The worst thing," he says, "is that your science gets published just to be proven faulty or wrong soon after." ∎

Quirin Schiermeier *is a* Nature *correspondent in Munich, Germany.*

TURNING POINT
Intelligence programmer

Computer scientist Damien Anderson overcame a lengthy illness to pursue an award-winning PhD project in artificial-intelligence (AI) research at the University of Strathclyde in Glasgow, UK. After regaining his health, he had to wrestle with a crisis of confidence.

What led you to study AI?
I've been interested in computers since my dad bought a video-game console, when I was five. I grew up in a deprived area of Scotland called North Lanarkshire, so it was a big deal at the time. Later, I had serious health issues — undiagnosed pneumonia led to chronic-fatigue syndrome — which left me bed-bound from age 14 to 20. I replaced conventional education with the computer, teaching myself subjects that I was interested in. It was a negative time, but positive things came out of it. It gave me time to learn the things I wanted to learn.

How did you move forward once you were well?
When I had my strength back, I worked at a call centre fixing computers for four years. I decided that if I could do that, I was now physically able to stick to a degree. My confidence had been zapped by being ill for so long. I wanted a piece of paper that said I was capable of doing more than answering phones.

Can you describe your journey into university?
The hardest decision I ever made was to go back into education. I didn't have high-school qualifications, and so I had to prove myself. I did a national qualification in the form of an introductory course to digital media, and then completed a two-year diploma at the City of Glasgow College — a gateway to university if you don't have enough qualifications. I focused on software-programming languages. After that, I was allowed to enter the University of Strathclyde as a second-year student.

Were you intent on doing video-game design?
Early on, yes. But when I got to the university's department of computer and information science, I was really impressed by the people and their projects, which included AI. I decided to do a software-engineering degree. But to be honest, my initial goal was just to get a degree. I approached it as if I just had to survive my time in university. It was a game of attrition, and I would beat it through pure persistence.

What pushed you to do more?
My undergraduate programme offered an optional placement year in industry. When I looked at the list of places that students had

gone before, CERN, Europe's particle-physics lab near Geneva, stood out. I was determined to do well — not just get through it. I studied harder to get the grades necessary.

How was your time at CERN?
It was a dream. I expected to be surrounded by Einsteins and Feinmans, but these are normal, determined people like me, which was eye-opening. We were using real-time decision-making processes, called scrum, to develop machine-protection software for the Large Hadron Collider. After seven months there, I was named scrum master — essentially, team facilitator. It made me feel extremely valued. I came back after 14 months and finished a final-year project that won 2 awards, which helped me to secure funding from the Carnegie Trust for the Universities of Scotland to conduct a PhD.

What are you working on now?
The big hurdle in my field now is building AI systems that are able to solve a variety of problems, including ones they've never seen before. The Google DeepMind team — which just announced that its AI, called AlphaGo, won against the world's top Go player — is also funding a competition to build AIs able to solve more than one problem. I'm working on that. One of the best platforms to carry out that project is in video games, because there are so many types — from puzzles to role-playing to strategy.

How have you handled the attention that your work has received?
The publicity has at times got me way out of my comfort zone, but it's a great confidence boost. I've decided to say yes to every opportunity. ∎

INTERVIEW BY VIRGINIA GEWIN
This interview has been edited for length and clarity.