

A STAR Is Born

All science builds on other science. And behind every scientific discovery there is a detailed and often complex method: a “how to” that both informs the interpretations and robustness of the scientific claims and provides the foothold for other scientists to build upon those findings. Recent calls to arms by society, the research community, and funding agencies to improve rigor and reproducibility in science clearly point to the need to take a new approach to communicating not just the “what” but the “how” of science. We at Cell Press have been listening, and are now leading the effort of “Empowering Methods.”

Every paper published in a Cell Press journal has two intended audiences. One is the interdisciplinary reader who comes to the pages of our journals to find new ideas and inspiration from researchers working in other fields, who benefits from the hybrid vigor of cross-pollination of idea pools. The second, equally important reader is the one working on the same or very similar biological question, smack dab in the middle of the same field, who will often be looking to replicate specific experiments and build on them. For both of these audiences, clarity and completeness in the details of how the experiment was done are paramount, especially given the increase in technology-driven fields, in which accurate methodological information is critical for understanding the advances. However, the methods section, particularly in the broad spectrum journals, has traditionally been relegated to small type at the back of the article, filled with “as described in” references, requiring readers to hunt back through previous publications to find experimental details. Indeed, it is the section that is often written last, after figures and text have been drafted, with students and postdocs ruffling through old lab notebooks trying to reconstruct what they actually did, with little guidance on how to structure their information or even what is important to report. As a result, the methods section is often considered as the most difficult to comprehend and the least interesting and least valuable aspect of writing a paper, when it in fact contains crucial information for readers to evaluate the strength of the conclusions and to build on the work.

Considering the needs of all of our readers and authors, together with the heightened focus in society on the importance of reproducibility and robustness in science, Cell Press is upping our commitment to empowering the methods section of our papers. This is an enduring and multiphase focus for us. The first step of our “Empowering Methods” campaign rolls out in this issue of *Cell*. It may not be obvious at first glance, but click through the articles on our website and explore <http://www.cell.com/star-methods>, and you’ll quickly discover that our Methods section has undergone a prominent transformation. Inspired by the changes to the way research is done, by the needs of the community, and by the new ways science is being communicated, we have introduced exciting new features to bring the methods section the prominence it deserves.

With this new format, we shed our old name “Experimental Procedures” and adopt the new name of “STAR Methods:

Structured, Transparent, Accessible Reporting.” The name not only describes the aims of our redesign, but it also emphasizes our larger goal of highlighting the importance of the methods section in our papers.

The structure of STAR Methods promotes transparent reporting of experimental design and methodological details, making the information on how things are done and the resources used clear and easily accessible. One of the prominent elements of STAR Methods is the “Key Resources Table.” The Table, as we like to call it, is a focal point of the section, offering an easy overview of the key reagents and resources used in the study, while providing critical details in a format that is friendly both for author and readers. For authors, the Table is easy to fill out and is an intuitive tool that could be used to organize and report information on the spot, as assays are done (for instance, entering antibody details while a western blot is running). As a reader scanning through the Table, you are able to quickly identify a specific resource, be it an antibody, animal model, or software that is used to produce the results in the paper, complementing the narrative text of the Method Details section of the STAR Methods. Moreover, the Table has the potential to serve as a hub connecting the items listed in the table to resources available on the web when accessed via the online version of the manuscript. For instance, we are strongly encouraging our authors to participate in reproducibility initiatives such as the Resource Identification Initiative (<https://www.force11.org/group/resource-identification-initiative>) by using RRIDs, which promote a consistent citation of reagents in a format that is machine-readable. Integration with such initiatives and promoting authentication and validation of critical reagents is very much on our mind, and introducing STAR Methods is one way Cell Press strives to help empower methods reporting.

Scroll beyond the Table, and you will find other structural features supporting our commitment to transparency and accessibility. Traditionally, methods sections are often abbreviated for space and presented with little or no consistent organization across papers. From our conversations with scientists, it was clear that we needed to balance the desire to have accessible at-a-glance information with providing all the details necessary to both assess and build on the paper. With that in mind, in addition to providing ample space for authors to report their methodological details by not including STAR Methods in the total word count for the overall article length limits, we provide a simple framework to help both authors and readers navigate this section. Like a well-structured filing system, the simple organizational aid of grouping key details under standardized headings in the Table and text of STAR Methods makes the information easy to find. This structural framework also serves to remind authors to provide particular information that should be reported because of its universal importance. For instance, the dedicated and prominent new section identifying whom specifically to contact for reagents helps ensure accountability and compliance with expectations for resource and information

sharing. We also have new clearly delineated sections for authors to provide a detailed account of quantification and statistical analysis of the data, experimental model, and subject details. The presence of these sections helps authors to report and readers to easily appreciate how the studies follow guidelines from the NIH Rigor and Reproducibility initiative (<https://www.nih.gov/research-training/rigor-reproducibility>) and align with the ARRIVE guidelines on animal experimentation (<https://www.nc3rs.org.uk/arrive-guidelines>) and the Center for Open Science's Guidelines for Transparency and Openness Promotion (TOP; <https://cos.io/top/>). By strongly encouraging transparency and by providing an organized framework in which to present this information, STAR Methods gives clarity and guidance to authors, is easy for readers or authors to access, and will help scientists achieve their goals.

Cell and Cell Press have been at the forefront of publishing innovations since our inception (indeed the launch of *Cell* was innovative in its own right), and we are emboldened by the opportunity to be pioneers, and to extend what we do best—publishing the highest quality of science—to the methods section. Importantly, the impact of our mission will soon reach beyond *Cell*, with STAR Methods adopted by other Cell Press journals, starting with *Cell Systems* in the fall. And we have already begun work on innovations for the next phase

of “Empowering Methods,” so watch this space for more in 2017!

Taking this first step in our “Empowering Methods” campaign has been a labor of love for all of us at Cell Press. We began work on the project almost two years ago with a team that included editors and production managers from multiple journals. The driving force came from the Scientific Editors Ann Goldstein and Mirna Kvalo from *Neuron* and *Cell*, respectively, and the *Cell* production editors Andy Smith and Julie Fiorilla, under the guidance of the *Neuron* Editor Katja Brose. The *Cell Systems* Editor Craig Mak and the *Cell Host and Microbe* Editor Lakshmi Goyal provided much needed advice from the Cell Press wide perspective. We also cannot forget the contributions to the initial phases of the project by three Cell Press members who have since moved to different positions in and outside of Cell Press: former Scientific Editors, Liz Gaskell and Rebecca Alvania, and former Managing Editor, Gabriel Harp. Importantly, we've had the privilege to work with and get feedback from the scientific community all along the way and we've received enthusiastic responses from the authors who contributed to this inaugural issue, and who bravely sailed with us into the process. We thank them all! We hope that you'll embrace the new format both as readers and authors and find it helpful for building on our papers for the next big discovery.

Emilie Marcus and the whole *Cell* team

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