

# QUAD system offers fair shares to all authors

Showing who did what could solve the problem of authorship abuse and disputes.

*Sir*— Authorship is the currency of modern science, the measure of one's contribution to the literature. Yet while the contents of an article are held to strict scientific standards, the recognition of authorship is far less so.

With no accepted system to guide the process by which authors are recognized for their individual contributions, and with the numbers of authors per article steadily increasing, the incidence of authorship disputes and abuse is rising, as Eugen Tarnow noted in *Correspondence* ("When extra authors get in on the act" *Nature* **398**, 657; 1999).

Certain medical journals now require authorship declarations, although these are always qualitative. We suggest a quantitative method for evaluating authorship based on four categories of contribution: conception and design, data collection, data analysis and conclusions, and manuscript preparation. Each author would claim their percentage share of the total credit in each of the four categories. The least that one could contribute to a paper would be 10% within a single category, placing a theoretical limit of 40 on the total number of authors.

Authors would usually be listed in descending order of total contribution

across all four categories. When equal sums are reported, the listing could be made alphabetically, and for large collaborations, either groups or individuals may declare their contributions. Journals would be free to choose their own categories, but these would ideally be uniform across all papers.

The percentage share could be indicated as in the following example, reflecting a typical distribution in a student-mentor relationship in which the student, S, is responsible for 20% of conception and design, 90% of data collection, 80% of data analysis and conclusions and 20% of manuscript preparation: S<sup>20,90,80,20</sup>, M<sup>80,10,20,80</sup>.

The explicit nature of this system, dubbed Quantitative Uniform Authorship Declaration (QUAD), permits the reader to identify who contributed what, rapidly and easily. It should also discourage distortions of authorship by co-authors in positions of power and help reduce the numbers of honorary authorships.

Without external monitoring, it would be impossible to guarantee that all the authors have described their contributions accurately. However, the quantitative and transparent nature of QUAD should help reduce such behaviour.

Journals that have introduced

authorship declarations have seen only partial adoption by authors, but we hope that many more journals and authors will welcome the advantages offered by QUAD. Ultimately, this system will prove more useful than existing *ad hoc* methods when scientists and administrators are faced with funding and hiring decisions.

**Justus V. Verhagen**<sup>50,30,30,30\*</sup>,  
**Karin J. Wallace**<sup>30,30,30,10†</sup>,  
**Stephan C. Collins**<sup>20,40,20,10‡</sup>,  
**Thomas R. Scott**<sup>40,0,20,50§</sup>

\* *Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford OX1 3UD, UK*

† *Wellcome Trust Centre for Human Genetics, University of Oxford, Roosevelt Drive, Oxford OX3 7BN, UK*

‡ *The Wellcome Trust Sanger Institute, Hinxton, Cambridge CB10 1SA, UK*

§ *College of Sciences, San Diego State University, 5500 Campanile Drive, San Diego, California 92182-1010, USA*

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