

Debate: Peer review in science

Benno Nigg, Nuclear Physics at the ETH Zurich, Switzerland.

“Peer review is unreliable and non-validated. No serious scientist would ever use a research method that is unreliable and unvalidated for any research project.”

Walter Herzog, Faculty of Kinesiology, Human Performance Lab., University of Calgary, Calgary, Canada

“Peer-Review in Academic Science: Essential or just a Waste of Time, Money, and Emotional Capital

The first record of an editorial pre-publication peer review is from 1665 by Henry Oldenburg, a German theologian, diplomat, natural philosopher, and the founding editor of the Philosophical Transactions of the Royal Society, London. From these fledging beginnings, peer review evolved as an assessment of the quality of scientific work by the editors of journals that lasted until the beginnings of the 20th century. For example, Einstein’s four *annus mirabilis* papers published in 1905 were reviewed not by “peers” but by the editor in chief of the *Annalen der Physik*, Max Planck. The peer review process, as we know it today, is largely a product of the 1960s and 70s, and, for example, was only introduced by the journal *Nature* in 1967. The primary purpose of the peer review process is to assess the validity, quality, and originality of articles for publication or grants for financial support. Its ultimate aim is to maintain the integrity of science by filtering out invalid, fake, or poor-quality research. Peer review has obvious limitations: its expensive, time consuming, and not always accurate in assessing the merits of a scientific body of work. However, its limitations are offset by the many advantages, and maybe, an adaptation to Sir Winston Churchill’s quote on democracy says it best: “peer review is the worst form of scientific evaluation – except for all the others that have been tried.” Would you want to be evaluated by a non-peer institution, like Copernicus and Galileo were by the church, by a lottery system, as piloted by some granting agencies, do you recommend social media outlets to your students to learn about science, discoveries, and advances in the field or do you send them to peer-reviewed scientific journals? With so many opportunities to voice opinions today, recognizing quality in research and science will become increasingly more challenging in the future, and loss of the peer review process would predictably result in chaos. Now more than ever, peer-review is the best way to separate good scientific research from bad, and serious investigation from fake science. “

1. Benno Nigg

facultyprofile.csuohio.edu/csufacultyprofile/

Short Bio:

Born in Switzerland, Dr. Nigg studied Nuclear Physics at the ETH Zurich (Switzerland). In 1971, he started his activities in Biomechanics. In 1976, he became the Director of the Biomechanics

Laboratory at the ETH Zurich. In 1981 Dr. Nigg accepted an invitation to move to the University of Calgary, where he founded and developed the Human Performance Laboratory, a multi-disciplinary Research Center concentrating on the study of the human body and its locomotion. Currently, this research center has about 180 co-workers, working with micro- and macroscopic approaches on the understanding of movement, exercise and sport.

Dr. Nigg has received many awards and recognitions, including the Muybridge Medal, the Olympic Order, honorary degrees from the Universities of Salzburg and Innsbruck and an honorary professorship from the Shanghai University of Sport. Dr. Nigg's research concentrates on human locomotion with main emphasis on mobility and longevity and its application to movement related products such as orthoses, shoe insoles, sport shoes, surfaces and sport equipment. Dr. Nigg has collaborated with many major sport shoe, orthotics and sport equipment companies. Dr. Nigg's world-wide reputation as a biomechanist is documented by his h-index of 94 and the number of citations of 29,067 (Google Scholar: July 2020).

Dr. Nigg's research activities are documented by the many paradigms he proposed for sport shoes, insoles and orthotics and movement related injuries.

2. Walter Herzog

<https://contacts.ucalgary.ca/info/kn/profiles/196-1425>

Short Bio:

Walter Herzog did his undergraduate training in Physical Education at the Federal Technical Institute in Zurich, Switzerland (1979), completed his doctoral research in Biomechanics at the University of Iowa (USA) in 1985, and completed postdoctoral fellowships in Neuroscience and Biomechanics in Calgary, Canada in 1987. Currently, he is a Professor of Biomechanics with appointments in Kinesiology, Medicine, Engineering, and Veterinary Medicine, holds the Canada Research Chair for Cellular and Molecular Biomechanics, and is appointed the Killam Memorial Chair for Inter-Disciplinary Research at the University of Calgary. His research interests are in musculoskeletal biomechanics with emphasis on mechanisms of muscle contraction focusing on the role of the structural protein titin, and the biomechanics of joints focusing on mechanisms of onset and progression of osteoarthritis. Dr. Herzog is the recipient of the Borelli Award from the American Society of Biomechanics, the Career Award from the Canadian Society for Biomechanics, the Dyson Award from the International Society of Biomechanics in Sports, the Muybridge Award from the International Society of Biomechanics, and recently received the Killam Prize in Engineering from the Canada Council for the Arts for his contributions to Biomedical research. He is the past president of the International, American

and Canadian Societies for Biomechanics. He was inducted into the Royal Society of Canada in 2013.

3. Katherine Boyer

www.umass.edu/sphhs/person/katherine-boyer

Short Bio:

Katherine Boyer is an Associate Professor in the Department of Kinesiology at the University of Massachusetts Amherst with a courtesy appointment in the Department of Orthopedics and Physical Medical at the University of Massachusetts Medical School. Prof. Boyer received her PhD from the University of Calgary and completed a post-doctoral fellowship at the VA Palo Alto and Stanford University. Her research program focuses on quantifying mechanisms of mobility declines in aging and with injury and is funded by both the NIH and industry partners. Two key areas of interest are the impact of muscle fatigue and joint pain and pathology on the control and coordination of movement and their energetic consequences. She is also a member of the Executive Council for the International Society of Biomechanics leading the Student Grant program.