

Guest Editorial

The need for mentoring to ensure the success of junior physiologists across the globe

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Received : 17 June 2023

Accepted : 17 June 2023

Published : 01 July 2023

DOI

10.25259/IJPP_336_2023

Quick Response Code:



'We all know that mentorship is important. And yet, we don't seem to value it appropriately or recognise individuals who devote time and energy and passion to mentoring.' This quote from Magdalena Skipper, editor-in-chief of *Nature*, begins a podcast promoting three winners of the 2020 Nature Research Awards for Mentoring in Science.^[1] For many scientists, both researchers and educators, their success is the direct result of having mentors who played a crucial part in their training and professional development. Note the use of plural *mentors* as opposed to a singular mentor as certainly many of us owe a great deal of gratitude to a group of individuals who provided and continue to provide guidance and gentle nudges at various steps along our life's journey. It is common in science to applaud independence. However, independence does not mean that you have to do it all on your own. Rather, we all need to seek those who can challenge us to be the best that we can.

A 2018 editorial in *Nature Cell Biology*^[2] offers a description of the true meaning of a mentor in contrast to the typical dictionary definition of a mentor as a trusted counsellor, guide, tutor or coach which has its origin in Homer's *The Odyssey*. In this epic, Odysseus assigns his friend named Mentor to take care of his household and son Telemachus while he is away at war. Mentor failed pitifully in this role, but Athena (goddess of wisdom) stepped in to support Telemachus in challenging times; she proved to be very trustworthy as she guided him in decision-making and inspired him to take appropriate actions. It seems we should all strive to be an Athena rather than a Mentor. Athena's role in Telemachus' progress is what best defines a mentor. The editorial ends with these words of wisdom: *'Mentoring is a subtle art that cannot be learned theoretically. The best route remains to engage with colleagues with sincerity and openness and with the willingness to listen and guide rather than direct.'*

My life as a physiologist began because I heeded the advice of a wise high school guidance counsellor and a perceptive college professor. Years later I would come to appreciate that they were very important *mentors* in my pathway to having a rewarding career in academia. The first person to ever suggest I go to college was my counsellor in my junior year of high school; and a newly hired faculty member in the Biology Department at Loyola University of Chicago told me *'Sue, you really seem to enjoy Physiology. Why don't you get a PhD in Physiology?'* in response to my question: *'What do you do with a degree in Biology if you don't want to go to medical school?'* I am almost certain that had it not been for these two individuals, I would not have been motivated to go to college let alone graduate school! Advanced education was not an expectation in my family; there were no role models.^[3]

My pathway to being honoured as a University Distinguished Professor at Michigan State University in 2021 as well as the 2020 Bodil Schmidt-Nielsen Distinguished Mentor and Scientist

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Award from the American Physiological Society includes taking a proactive role in mentoring the next-generation of physiologists. I have done this not just for individuals who have spent time in my laboratory but by nurturing careers and stimulating an interest in physiology in individuals whose educational and career paths have crossed mine. I mentor undergraduate and graduate students to help them develop professional skills in scientific writing based on a course developed by the American Physiological Society. I introduced a physiology quiz at the annual Michigan Physiological Society meeting modelled after the Inter Medical School Physiology Quiz developed by Professor Hwee Ming Cheng (Malaysia). This quiz stimulates amazing enthusiasm in undergraduate students to learn physiology.^[4,5] In recognition of the importance of an early stage mentor who encouraged me to go to college, I have engaged in several activities with elementary and high school students that introduce them to science careers. These are just a few examples of being a mentor in a somewhat non-traditional (not just training a graduate student in research). Thus, I am excited to venture into a new mentoring activity that will reach global proportions.

As a member of the Board of the General Assembly (BGA) of the International Union of Physiological Sciences (IUPS), I was involved in collecting information from physiological societies across the globe to create a report on the state of the discipline for distribution at the 2022 IUPS meeting in China.^[6] A common theme of responding societies to the questionnaire used to create the 2022 IUPS-BGA report was that a value to being a member of the IUPS included the opportunity for international research collaborations and improving physiology education and research across the globe. Requests were made to have the IUPS facilitate support of physiology in developing countries, provide expertise and coordinate knowledge exchange, offer enriched resources for physiological techniques and online advanced courses, support exchange programmes for teachers and students and link societies in developed and other countries to take physiology research to developing and low/mid-income countries.

I was honoured when asked by the IUPS leadership to lead in the development of an IUPS Mentoring programme. This is a direct response to the following recommendations put forth in the 2022 IUPS-BGA report.

- Networks and working groups should be created, domestically and internationally, by IUPS and member societies to facilitate the exchange of knowledge and best practice in teaching and research
- IUPS should oversee a new Global Mentorship Building Platform to facilitate Mentor/Mentee relationships among physiologists at various career stages and in academic and clinical settings, to promote dialogue and aid career development.

The long-term objectives of this IUPS Mentoring Programme are to:

- Provide an opportunity for junior physiology researchers and educators to learn from more experienced physiologists as a way to promote career advancement
- Advance opportunities for global collaborations in biomedical, integrative and translational research in physiological sciences
- Provide consultation/education to mentees to promote grant writing skills to increase funding success for research and educational activities
- Facilitate access to online resources that advance excellence in physiological education
- Inspire the next-generation of physiologists across the world.

The format for the IUPS mentoring programme is envisioned to include a mix of virtual (email exchanges/Zoom meetings) and in-person experiences (scientific meetings, visits) to be determined by each mentor-mentee pair. It is also anticipated that the programme will benefit from access to already available online professional skills resources for training mentors and mentees.

The desired outcomes of a successful mentoring programme include:

- Career advancement and increased scholarly confidence
- Exposing mentees to new fields of inquiry and motivation for career advancement
- Mentees having freedom to share ideas, to get insights about work to be done and to use mentors as a 'sounding' board for brainstorming ideas
- Development of skills in creating effective learning materials for classrooms in undergraduate, graduate and medical education environments.

As an initial pilot programme, the IUPS has agreed to start a mentoring programme that will focus on young physiologists in Africa with an emphasis on mentoring in physiology education. A task force has been put together including individuals from across the globe who will begin to brainstorm how to bring this programme to fruition. Once plans have been finalised, leaders of African physiological societies and other African physiologists will be contacted to inform them of the mentoring programme. They will be asked to recruit 10–20 junior physiologists who could benefit from the programme. Members of the Task Force will coordinate pairing appropriate mentors with identified mentees. IUPS will create a repository of mentors who are interested in guiding the next-generation of physiological researchers and educators. Physiological societies across the globe will be contacted to seek individuals who would be interested in participating in this activity. The goal is to have a pilot programme start in association with the East Africa Physiological society meeting in November 2023.

After evaluation of the effectiveness of this pilot programme, the intent is to expand it to include young physiologists in other parts of the world. Moreover, the format of mentoring could encompass mentoring in research and in the development of leadership skills (e.g., developing the next generation of leaders of professional societies). This IUPS Mentoring Programme has the potential to impact the health of physiology education, research and professional leadership across the globe and to fulfil the goals of physiology without borders.

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How to cite this article: Barman SM. The need for mentoring to ensure the success of junior physiologists across the globe. *Indian J Physiol Pharmacol* 2023;67:75-7.