BIOELECTRICITY
Volume 7, Number 2, 2025

DOI: 10.1089/bioe.2025.0035

Editorial

Open camera or QR reader and scan code to access this article and other resources online.

Bioelectricity, Moving On. . .

Michael Levin, PhD[1] and Mustafa B.A. Djamgoz, PhD[2]

Indeed, bioelectricity is moving on and on, both the field and the journal! The field continues to expand in exciting ways, enriched by advances in many other compatible disciplines. For example, quantum properties in materials are now availing our community of new ways to sense voltage in living tissues, such as the new work by Ren et al. on the trionic optical sensing of voltage via quantum statistics published in *Nature Phototinics*,[1] and new ways to measure absolute membrane potential via fluorescence lifetime imaging such as the article by Roy et al. in bacteria.[2] Of course, as always, biology has beaten us to the punch with a myriad ways to sense and exploit the electrome of the world, as shown in the beautiful recent *PNAS* article by Garcia Robledo et al., revealing electroreception in hummingbird flower mites.[3]

To these developments in primary research in bioelectricity, we (M.L.) would like to add a personal note about the overall gestalt with respect to our field, as illustrated by a recent example. Over the last 25 years, publishing articles in bioelectricity has been somewhat difficult—significant content in each article, and in responses to reviewers unfamiliar with the ideas and data, needed to be provided to educate referees and editors on the state of the art in this important area. The biochemical paradigm has dominated for so long that many reviewers, raised in traditional molecular–genetic paradigms, found it difficult to believe there was another important modality. But over time this has shifted, and the communities in cell, developmental, and evolutionary biology, as well as biomedicine and bioengineering, are increasingly aware of bioelectricity. It was pleasantly surprising, therefore, to be reminded of this a few weeks ago, when we received reviewer comments on an article that was not about bioelectricity at all —it was about synthetic morphology of frog cell-based biobots (Xenobots). Trying not to fight too many battles at once, we had confined our speculations to conventional mechanisms of morphogenesis. To our delight, an anonymous reviewer, likely a cell biologist, chided us for not mentioning bioelectricity! They pointed out that we needed to widen our mental horizons beyond the traditional pathways we discussed in this article and take bioelectricity into account as an important input to changes of growth and form on developmental and evolutionary time scales. This was certainly a time that one was not inclined to argue with the referee and agreed with their assessment 100%. The landscape truly is shifting.

We would like our journal to continue to lead in this area, publishing the flagship articles that will continue to increase the visibility of the field and draw emerging talent to this fascinating research.

The current issue contains a mixture of articles as well as news of a novel feature: *Wonders of Bioelectricity*. We are delighted to announce that this will be managed by science journalist Sally Adee of the *We Are Electric* book fame. Our founding editor, Dany Adams, has sent a letter commenting on the landmark *Bioelectricity Cluster* meeting that took place in Oxford in April this year. We like to publish meeting reports so that we can inform the bioelectricity community of the various activities occurring globally in the field. As always, Ann Rajnicek has done a superb job with the *Buzz*, compiling a series of recently published must-see articles relating to bioelectricity. It is thus our aspiration to make *Bioelectricity* the leading one-stop resource for keeping up with the ongoing international events and developments in this growing field.

As always, and clearly, all these are about people! We are grateful to our contributing authors, reviewers, and Editorial Board members, especially our Associate Editors, to make it happen. The future looks bright for *Bioelectricity* with special issues on electroporation and health care coming out in September and December, respectively. We would like to continue highlighting interesting areas in special issues, so we would be delighted to hear from prospective guest editors with their ideas.

[1]Allen Discovery Center, Tufts University, Medford, Massachusetts, USA.
[2]Imperial College London, London, United Kingdom.

References

1. Ren Y, De-Eknamkul C, Sun F, et al. Trionic all-optical biological voltage sensing via quantum statistics. Nat Photon 2025;19(5):540–548; doi: 10.1038/s41566-025-01637-w
2. Roy D, Michalet X, Miller EW, et al. Toward measurements of absolute membrane potential in Bacillus subtilis using fluorescence lifetime. Biophys Rep (N Y) 2025;5(1):100196; doi: 10.1016/j.bpr.2025.100196
3. Garcia-Robledo C, Dierick D, Manser K. Electric transportation and electroreception in hummingbird flower mites. Proc Natl Acad Sci U S A 2025;122(5):e2419214122; doi: 10.1073/pnas.2419214122

—Michael Levin, PhD and Mustafa B.A. Djamgoz, PhD