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Science AMA Series: We're Dr. Johna Leddy and Dr. Jeff Fergus. We're here to talk about open science, The Electrochemical Society's Free the Science initiative, and the Society's forthcoming preprint server, ECSarXiv, which will launch in 2018. AMA!

ELECTROCHEMICAL_SOC [R/SCIENCE](#)

Hi Reddit! This is Johna Leddy, president of The Electrochemical Society (ECS). I'm joined by Jeff Fergus, editor of the Society's official meeting proceedings, ECS Transactions (ECST). Today we'd like to talk with you all about open science, our Free the Science initiative, and our new preprint server, ECSarXiv, built and hosted by the Center for Open Science's Open Science Framework.

We'll be back at 12 noon ET to answer your questions, ask us anything!

ECS Chief Content Officer & Publisher Mary E. Yess (username: ecspublisher) will also help to field questions.

More about us:

Dr. Johna Leddy: I'm an associate professor of chemistry at the University of Iowa, an alumna of Rice University and the University of Texas, and the current president of ECS. I've been an ECS member for over 25 years and have served on various committees within the organization. I'm also a former chair of ECS's Physical and Analytical Electrochemistry Division. My research interests range from fundamental electrochemistry through voltammetric methodologies and modeling to the technology of power sources. A major focus for me has been examining magnetic effects on electron transfer processes.

Dr. Jeff Fergus: I'm a professor of materials engineering and the associate dean for program assessment and graduate studies in the Samuel Ginn College of Engineering at Auburn University. I've served as the editor of ECST, ECS's official meeting proceedings, since 2013. I've also held positions on multiple committees within the organization and served as the chair of the ECS High Temperature Materials Division. My research interests are in materials for high temperature and electrochemical applications—particularly in understanding and mitigating performance degradation, such as chromium poisoning in SOFCs and capacity fading in Li-ion batteries.

The Electrochemical Society (ECS): ECS is a nonprofit scientific society that has been publishing continuously since 1902. We're an international membership organization that has over 8,000 members worldwide across more than 80 countries. Our mission is to disseminate and advance the science we steward through meetings and publications, and we believe the best way to do that is through transition to an open science paradigm. This mission is the driving force behind our Free the Science initiative:

www.electrochem.org/free-the-science. We believe that by opening and democratizing research, we can enhance and accelerate the science that will ensure our survival and sustainability on this planet. We already give authors the opportunity to publish open access in our 2 peer-reviewed, hybrid open access journals—the Journal of The Electrochemical Society and the ECS Journal of Solid State Science and Technology. Currently, over a third of our journal articles are being published open access. The upcoming launch of ECSarXiv will mark a major step forward for Free the Science toward the complete open access model we plan to one day implement, allowing all authors to publish for free and removing the paywall for readers.

We invite anyone who wants to know more about open science, Free the Science, preprint servers, or scholarly communications to ask questions here. For more info about us, check out our website at www.electrochem.org.

Edit: Thanks, everyone, for the insightful questions and discussion. That's all the time we have today. We had a great experience talking with you all—you raised a number of excellent points about the open science movement that we'll want to keep in mind as we

move forward. Until next time, please feel free to reach out to us with questions at oa@electrochem.org.

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How do you see today's vote on net neutrality affecting free science movements? For example, companies may be in a position to throttle access to data or research that is not in their interest, or in the interest of others aligned with them. What protections need to be in place to protect information access for research and the public?

[p1percub](#)

This is Jeff: Net neutrality is well aligned with the free the science movement, so you point out a valid concern. I don't know the specific types of protections, but open science does rely on open access to information.

How do you see today's vote on net neutrality affecting free science movements? For example, companies may be in a position to throttle access to data or research that is not in their interest, or in the interest of others aligned with them. What protections need to be in place to protect information access for research and the public?

[p1percub](#)

Hi, this is Mary. This is a huge concern for nonprofit societies, and especially ones like ECS, which is a small one. I can see large commercial publishers working out arrangements with ISPs so that their content/websites are given higher priority, or that websites like ours don't show up at all. And that's just talking about the content. Then there's the researchers trying to communicate with each other on various Web-based platforms (like open notebooks, open lab, COS's open science framework, etc.) or just plain e-mail. Maintaining net neutrality is critical. If it's reversed, I don't know how we can compete with the publishers with very deep pockets. Any ideas?

In your introduction you've characterized the ECSarXiv as a preprint service. Playing devil's advocate, I wonder what unintended side effects and dangers present themselves as a result of non-peer reviewed research being made public as a matter of presentation.

You've discussed several key reasons for the importance of an open access publication model. Will you allow academic feedback and commentary on preprint work a la PubPeer?

[adenovato](#)

This is Jeff: We do need to clearly communicate the difference between peer-reviewed publications and the preprint server. ECS prides itself on the quality of its journals and we need to be clear that the publications in ECSarXiv have not gone through the rigorous review process and do not necessarily meet this standard.

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[adenovato](#)

This is Mary. We started ECSarXiv because we want to provide another open access outlet for researchers to publish other types of research outputs, such as datasets, Python notebooks, slide decks, etc. These other research outputs are becoming important to funding agencies like the NIH and Wellcome Trust. About 3 years ago, NIH changed its grant report requirements to say that these other outputs were just as important as publications in peer-reviewed journals.

Is there any fear that the ability to publish for free will create a flood of unimportant/underwhelming papers ?

[ericwithakay](#)

This is Jeff: When I started my scientific career page charges were common for scientific publications. Those page charges went away for a couple decades and are now returning for open access publications. Prior to this move to open access, authors had become accustomed to not paying page charges, so I am not sure free publication will significantly impact the number of publications.

Having said that, maintaining a standard of high quality is critical to ensure that the publications are of value.

Is there any fear that the ability to publish for free will create a flood of unimportant/underwhelming papers ?

[ericwithakay](#)

This is Johna. Within the open access/ open science vision of the Electrochemical Society, all manuscripts submitted to ECS peer reviewed journals undergo critical review by well trained electrochemical and solid state researchers. Only manuscripts vetted by review are moved forward to published papers in the ECS journals. To avoid overwhelming the reviewers, manuscripts sent to reviewers have undergone an initial assessment by the technical editors. The ECS also supports publications in ECS Transactions with typically reports on meeting content. ECSarXiv is the newly introduced forum for presentation of ideas and content that are evolving. The ECS magazine, Interface provides a range of content and articles of general and technical interest, which well versed researchers are invited to write. Thus, a flood of trivial papers will not be published in peer reviewed journals where manuscripts undergo legitimate review. But the ability to publish open access through a not for profit publisher in a peer reviewed journal has the potential to disseminate high quality research and information to a wider range of researchers.

What is the value in having both a meeting proceedings and a preprint server? Aren't proceedings papers usually used to publish preliminary results? What is the difference between the two? Is there any value in submitting to both?

[missconstreu](#)

This is Jeff: There is overlap but some differences.

In fact, one type of ECST papers, what are referred to as standard issues, are being move to ECSarXiv beginning in fall 2018.

However, some proceeding volumes undergo peer review - albeit not to the same degree as a journal paper.

In addition, ECSarXiv allows for formats other than manuscripts, such as slides or dataset.

Although the first use of ECSarXiv will be for sharing work presented at ECS meeting, eventually, the plan is to also include work that is not presented at an ECS meeting.

How do you think the open science initiative can improve the use of electrochemistry knowledge and technology to tackle global warming?

[d_o_x_a](#)

This is Johna. Because electrochemical systems can in theory be 100 % efficient (no moving parts), appropriately engineered electrochemical processes and devices can provide greater efficiency than more traditional combustion processes. By making well reviewed information about electrochemical and solid state science and technology available through open access and open science, more researchers worldwide have access to the tools needed to advance the technology and fundamental science critical to overcoming critical societal issues in health, the environment, energy, water, communications, With open access and open science, more researchers are equipped to tackle critical problems and the public in general will be better informed.

How do you think the open science initiative can improve the use of electrochemistry knowledge and technology to tackle global warming?

[d_o_x_a](#)

This is Jeff: In addition to the efficient to the efficient energy conversion that Johna mentioned, electrochemistry is also important in energy storage (i.e. batteries) which is critical for renewable energy such as solar and wind. Also, ECS covers solid state science which is important photovoltaic cells and other technologies.

Hi guys,

My daughter is seven years old and already highly interested in science. She's currently memorizing the periodic table and reading a pretty advanced book about the elements.

I know she doesn't understand most of what she's reading but it's still fascinating that she's so interested in the elements.

Anyway, what were the ways your parents helped cultivate your interest in science? What were some things that, looking back, they did that greatly contributed to your learning or motivation?

Thanks in advance,

A dad

[MudButt2000](#)

This is Jeff: It is great to hear that your daughter is interested in science. I think it is important to point out the places where science is making an impact on peoples lives, so she can see that is not only interesting but has a positive impact on society. This could be through medical breakthroughs, providing clean water and energy or many other impacts.

Sometimes interest in science can wane in middle school and junior high. One of the reasons may be that the mathematics and basic science may be come more difficult and not as clearly related to the interesting applications (depending on how it is presented in school). It will be important to communicate that the basic tools are important to build the capabilities to be a scientist or engineer.

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Thanks in advance,

A dad

[MudButt2000](#)

This is Johna, daughter of chemist. Dad always listened, helped to dissect questions into manageable parts, applied patience, helped identify the quantitative answer where possible, and without fail, conveyed that thinking was the most critical (and the most fun) step. The opportunities came out of everyday events. When I was about 7, Dad hooked up a battery to a flashlight bulb and explained how the electrons flowed through the circuit. (When I showed this to my 6 year, my 4 yr old asked what is an electron? Still thinking on that one.) Be there in the everyday things, listen, and promote address of queries through thinking. Thanks, Dad.