



Bob Eisenberg <bob.eisenberg@gmail.com>

Biological Questions

Bob Eisenberg <bob.eisenberg@gmail.com>

Thu, Aug 27, 2015 at 7:13 AM

Reply-To: bob.eisenberg@gmail.com

To: "McClintock, Peter" <p.v.e.mcclintock@lancaster.ac.uk>

Cc: Ardyth Eisenberg <ardyth.eisenberg@gmail.com>, "Roberts, Stephen" <s.k.roberts@lancaster.ac.uk>, "Bob Eisenberg beisenbe@rush" <beisenbe@rush.edu>

Dear Peter and Ardyth,

Thanks for the nice words.....the key here is to ask the right questions.

Biology, like engineering, is fundamentally about devices, that are built to perform a specific function, i.e., to follow a specific device equation. Biology discovers the function, the structure that makes the function possible, and tries to control the function, usually for an implicit medical purpose. Engineering does the same thing. In biology, evolution has built the device; in engineering people have built the device, but the capitalist marketplace selects the successful devices somewhat the way natural selection chooses successful evolutionary adaptations in biology.

Biologists soon learn that they must understand the forces that make the functions work so they, like engineers, must become masters of physics and chemistry. BUT they ask different questions from traditional physicists and chemists, and because they are interested in devices, they must analyze spatially nonuniform systems. (Devices have inputs and outputs and those occur at different spatial locations, and have different equations, so boundary conditions FORCE spatial nonuniformity. Spatial nonuniformity in turn forces flows and make devices inherently NONequilibrium

As ever
Bob

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Bob Eisenberg (more formally Robert S.)

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View from New Office



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On Thu, Aug 27, 2015 at 6:07 AM, McClintock, Peter <[p.v.e.mcclintock@lancaster.ac.uk](mailto:p.v.e.mcclintock@lancaster.ac.uk)> wrote:

Dear Ardyth,

It is indeed a great shame that you will not be able to come to Lancaster, but I hope there will be another opportunity later that may fit your schedule better... However, it sounds very healthy if your law practice is getting busier (even if it implies a less-safe world for the groups you mention).

I certainly intend to be at both of Bob's seminars, and will be most interested to see how he handles the different audiences – I am sure I will learn a lot, about presentation skills as well as the content!

Best wishes,

Peter.

**From:** Ardyth Eisenberg [<mailto:ardyth.eisenberg@gmail.com>]

**Sent:** 27 August 2015 10:57

**To:** McClintock, Peter

**Cc:** Bob Eisenberg

**Subject:** Fwd: Advance warning

Peter -- Bob copied me on these messages, so I know more about what he'll be doing in Lancaster. (I truly regret not being able to come along: In an amusing but ironic twist of fate, my law practice became busier at about the same time Bob retired from his chairmanship. I'm enjoying it immensely, but it limits my travel. hmph)

My cheeky suggestion is that someone with teaching and research experience observe both of his Lancaster seminars and note how he teaches a foreign subject (like physics to biologists, and vice versa). I've said for years that the cross-disciplinary teaching and work are essential, but not enough people know how to do it -- or how to enable it. Perhaps this is a third topic of investigation for you?

Best to all. I'm back to making the world safe for small businesses, misled investors and disabled adults. AE

----- Forwarded message -----

From: **Bob Eisenberg** <[bob.eisenberg@gmail.com](mailto:bob.eisenberg@gmail.com)>

Date: Thu, Aug 27, 2015 at 4:17 AM

Subject: Re: Advance warning

To: "McClintock, Peter" <[p.v.e.mcclintock@lancaster.ac.uk](mailto:p.v.e.mcclintock@lancaster.ac.uk)>

Cc: "Roberts, Stephen" <[s.k.roberts@lancaster.ac.uk](mailto:s.k.roberts@lancaster.ac.uk)>, "Bob Eisenberg ([beisenbe@rush.edu](mailto:beisenbe@rush.edu))" <[beisenbe@rush.edu](mailto:beisenbe@rush.edu)>, Bob Eisenberg <[bob.eisenberg@gmail.edu](mailto:bob.eisenberg@gmail.edu)>

Dear Stephen

Great idea!

I would enjoy talking to the biologists a lot!!!

and it is the opposite of cheeky (whatever the opposite is) of you to suggest it! In other words,

"Thank you!"

My goals would be

a) to show the biologists that we deal with real biology

(selectivity of L type calcium channel as actually measured

in experiments; current voltage relations and selectivity of

ryanodine receptor--work of Dirk Gillespie, not me---in great

detail, actually predicting detailed experiments before they

are done)

b) to explain why math is needed and structural biology and molecular dynamics can contribute only a part of the story, certainly an essential part (structural biology) and a most helpful one on occasion (MD).

c) to show the UK approach to function (called physiology since Aristotle!) and how it is identical to what engineers do (specifically reverse engineering) and has identical goals, namely to understand enough to allow control of a system, with the MINIMAL detail needed for that.

This is my initial idea, but I am EAGER to hear suggestions and will send you a set of slides ahead of time for you (et al) to discuss and criticize and help me improve.

as ever

Bob

PS I am eager to spend as much time with you all as you wish, including time with students, graduate students, and postdocs if you would like that.

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On Thu, Aug 27, 2015 at 4:28 AM, McClintock, Peter <p.v.e.mcclintock@lancaster.ac.uk> wrote:

Dear Stephen,

I think that sounds an excellent idea, if Bob is willing to do both – one seminar explain the essential physics to biologists and one explaining the essential biology to physicists! It might indeed be better anyway, in terms of grappling optimally with two rather different audiences?

So I will cc Bob into this message to see what he thinks about the proposition.

Best wishes,

Peter.

From: Roberts, Stephen
Sent: 27 August 2015 09:17

To: McClintock, Peter
Subject: RE: Advance warning

Hi Peter,

Thank you for this. Sounds very interesting.

I have teaching most of that day (including a practical which I cannot move due to pressure on the lab space and no one in the division does ion channels!). This is a real shame. However, the

BLS seminars are on Wednesday afternoons (usual start at 4 pm) and I wondered (and I hope that you and Bob do not think it too cheeky) if Bob would be willing to contribute to the BLS seminars series. It sounds like he is aiming at biologists. I would be able to make the Wednesday afternoon also 😊. The 28/10/2015 is currently free

Best wishes,

Stephen

Dr Stephen Roberts

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From: McClintock, Peter
Sent: 27 August 2015 08:26
To: Roberts, Stephen
Subject: Advance warning

Dear Stephen,

Rob Young (our seminar organiser) has invited Bob Eisenberg to give a seminar in the Condensed Matter Physics series on at 15:00 on Friday 30 October. Although it is formally a CMP Seminar, the subject matter will be distinctly non-standard and aimed at non-specialists. In particular, Bob writes –

I would enjoy having a chance to show the
biologists that the physical approach can be important
biology, AND that has direct, immediate, and important
consequences for our daily lives (acid reflux drugs,
Viagra, Gatorade) that REQUIRE good science, good
biology, and produce good medicine.

Of course it will be during term with teaching etc, but I hope you will be able to encourage some of your colleagues to come. I think they would find it interesting. Title and other details in due course – we do not even have a venue at present because of the refurbishment!

Best wishes,

Peter.

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