

PhilInBioMed

THE MAGAZINE

- November 2019 -

To bring about change

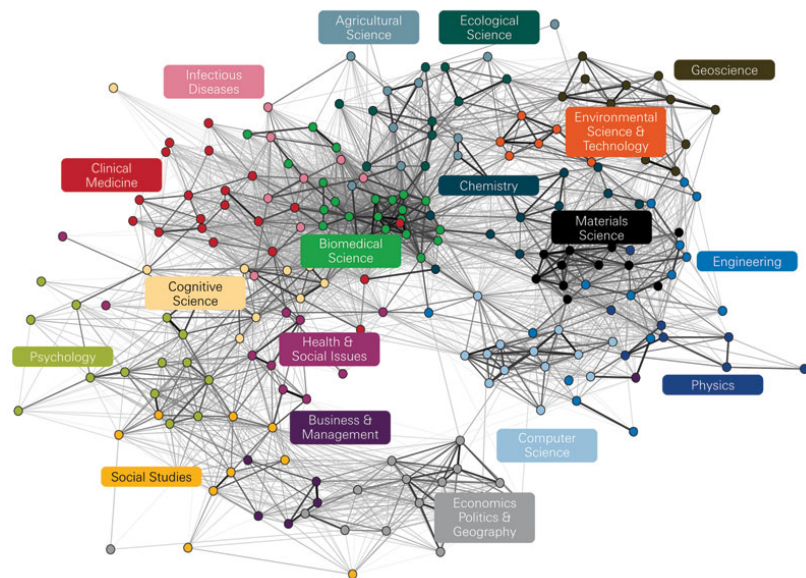
Dear PhilInBioMed members,

Interdisciplinarity is on the rise in a number of disciplines. In order to transform this trend into a lasting change, it still needs a lot of work.

From interdisciplinary training, over interdisciplinary networks, and successful interdisciplinary impacts, this edition highlights positive examples of interdisciplinarity in action.

Cordially, your

PhilInBioMedMagazine team



All sciences tend to ever more specialisation. However, the majority of research problems lie at the intersection of different domains. It is therefore necessary to train specialists who can still think out of the box. (Image: Rafols, I et al., Science overlay maps)

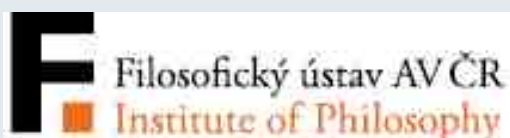
How to create an interdisciplinary future

There is a debate in the philosophy of science community as to how close the ties with the sciences need to be. The PhilInBioMed network promotes an approach where scientists and philosophers work closely together and where they mutually stimulate each others research. However, if this approach is ment to have a lasting impact, it is indispensable to include interdisciplinary training in the curriculum of young scholars. In a recent article Giovanni Boniolo and Raffaella Campaner ask the quesiton [Life Sciences for Philosophers and Philosophy for Life Scientists: What Should We Teach?](#)

In the Article they present two training models that have proven succesfull in making young philosophers and scientists susceptible to a common interdisciplinary approach. The first example comes from Milan where the *European School of Molecular Medicine (SEMM)*, a purely scientific and medical institution, created a philosophical PhD programm to train highly skilled scholars in the humanistic disciplines concerned with biomedical research and clinical practice.

The second part of the article takes a look at the philosophic training of scientists and, to quote molecular biologist Arturo Casadevall, "*How to put the Ph back into PhD*". The authors argue for an educational model in which philosophy and philosophers play a major role and they give examples of scientists who not only share this opinion, but actively promote the integration of philosophy in the life sciences training. In conclusion the authors note that interdisciplinary trainings in philsofpy and biomedical sciences are getting more and more popular, but it is important to jointly rethink research issues, training initiatives and institutional early career conditions, in order for the movement to have a lasting impact on the future of both fields.

Call for submissions



On the 4th and 5th of June 2020 the Czech Academy of Sciences organises a conference on **Conceptual and methodo-**

logical aspects of biomedical research in Prague, Czech Republic. Invited speakers will be:

- Lucie Laplane** (CNRS, IHPST Université Paris I-Panthéon-Sorbonne, Institut de Cancérologie Gustave Roussy)
- Barbara Osimani** (Faculty of Medicine, Polytechnic University of Marche at Ancona)
- Anya Plutynski** (Department of Philosophy, Washington University in St. Louis)
- Jaromir Sramek** (Institute of Histology and Embryology, Charles University)
- Jacob Stegenga** (Department of History and Philosophy of Science, University of Cambridge)

The organizing committee welcomes abstracts from philosophers and medical researchers. All submissions should address an area of medical/biomedical research, with the exception of bioethics. The abstracts should be no longer than 500 words, be prepared for blind review and send to pmpos@flu.cas.cz.

Deadline for the submission is **January 10th**. Notification of acceptance will be sent out starting in Mid-March. For more information visit [here](#) or contact Martin Zach at zach@flu.cas.cz.

Upcoming

December 2019

10th John Bickle, [Tinkering in the lab](#), Klosterneuburg, Austria

17th Phyllis Illari, [Why do we need evidence of mechanisms?](#), Bordeaux, France

January 2020

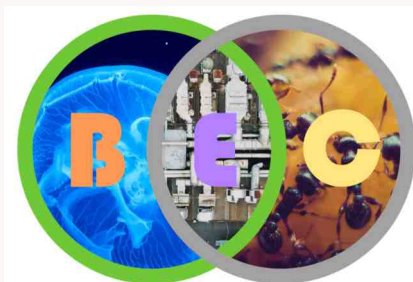
20th -21st 2nd [Philosophy of Cancer Biology Workshop](#), Bordeaux, France

February 2020

17th [Workshop on aging with Thomas Kirkwood](#), Bordeaux, France

The PhilHisSocBioEng network

While the PhilInBioMed network focuses on bringing together philosophers with biologists and medical doctors, there are of course many other sciences that would benefit from a close collaboration with philosophers. The [Biological Engineering Collaboratory \(BEC\)](#) is a network for all philosophers, historians and social scientists that wish to collaborate closely with biologists and engineers.



The collaboratory intends to stimulate interdisciplinary thinking and to help members find collaborators for projects, symposia and workshops. The topic of biological engineering is vast. In order to create coherence within the network the founders have laid out some [starting points to delineate a coherent research agenda](#).

The decision to form the BEC was taken following the 2019 ISHPSSB meeting in Oslo. While still young the network has already an impressive list of members, some of which are also members of the PhilInBioMed community. In the future more interactions between the two networks are possible, even though the topics differ, the interdisciplinary approach is common to both networks.

Those who are interested in joining the network can contact [Janella Baxter](#) (Philosophy of Science and Technology), [Dominic Berry](#) (History of Science and Technology) or [Rob Smith](#) (Science and Technology Studies).

Collaboration chronicle: Ecology, evolution and the genome

For this edition of the collaboration chronicle neuroscientist Catherine Belzung and philosopher Maël Lemoine have agreed to share their interdisciplinary work experience.

Catherine Belzung is Professor of Neurosciences at the University of Tours. Her research focuses on the alteration of the notion of pleasure in depressed people, the influence of high-fat diets on certain types of depression, neuroscience, and emotions.



Maël Lemoine is Professor of Medical Sciences at the University of Bordeaux. He has worked extensively on depression and mental illness. More recently he has turned towards working on aging: its biology, mechanisms, theories, definitions, boundaries, measurements

Could you explain in a few words the topic of your collaboration?

We have talked at length on various topics about mood disorders since we have first met, about 10 years ago. However, the main topic of our collaboration is methodological: it is about so-called ‘translational medicine’. We have investigated the nature of ‘extrapolation’ from animal models of mental disorders, mostly depression, to human populations. What we have tried to do is to characterize how it works, to assess whether it works and to what extent, and we are mainly interested in how it could work better.

We have written 3 papers together on that topic, two of which with others. The main paper was published in 2011 and has become a standard reference in the discussion of the topic in neuroscience journals, which we did not expect. It is both a review of the criteria that have been used in the field, namely, predictive validity, construct validity and face validity, and a proposal for a more detailed and precise assessment of the validity of this model. In retrospect, we both think that our proposal is too complex – 8 forms of validity, that may be more accurate, but it’s unpractical!

Since this paper, we have embarked on a much more ambitious work, namely, to reduce all forms of validity of animal models to just one, which is closest to predictive validity, and to provide an algorithm to assess the validity of animal models in general. This work is still ongoing, and has been running for years now. We constantly interrupt it to write on something else. We have thus written a chapter for a book on philosophy of pharmacology, and we are preparing a review of how good animal models have been to predict whether antidepressant medication would be efficient.

How did you meet?

We were in the same university. Maël first visited Catherine’s group in 2007. At the time, he was starting a research project on depression. Catherine was interested in the project, and invited Maël to teach together with her and other colleagues. The topic was science in general. We became friends very quickly, and published our first paper together in 2010. In 2011, Maël joined Catherine’s group and stayed there until he got a new position at the University of Bordeaux in 2018.

Could you each describe what your collaborator brings to this joint work?

Maël: Competence! Obviously, I am not a neuroscientist, and Catherine is. She is very willing to collaborate, and not just to chat about science. Apart from her personal qualities, which always make our collaborations a

pleasure, Catherine also has a sharp mind, is honest and admits she does not know something when she does not. She has a broad and deep knowledge of the fields and its actors, and also of its history. People think that I write the historical parts of our papers, but she does, not me! She's also ready to benevolently discuss even my craziest ideas, and she is listening to my suggestions – never dismisses them just on the face of things, but opposes arguments and, in the case she suspects I might be right about something, even if very disturbing for her practice, she is ready to change it accordingly. In short, she is serious and she takes me seriously – I'm not just her pet philosopher!

Catherine: I have been involved in the field of depression since many years, and Maël brings a completely different way to look at it, very disruptive. He made me discover new concepts and ideas regarding depression, for example the fact that maybe the failure to discover new efficient therapies might rely on the fact that depression is a heterogeneous disorder, including many sub-forms related to different etiologies. This was possible because he was reading a literature completely different from the one I was reading, but at the same time, as through his open-mindedness he had acquired the neurobiological knowledge we share in that field, he was able to communicate this to our community using our words. What I want to underline here is that Maël could shed light on our field because he has a real expertise in another field. He could enter in my world because I realized that he was very competent and precise, that he has deep and serious roots, so what he says is not just fantasy. At the same time, another quality he has is that he has respect for what we do and he tries to enter in it very seriously: he does not depreciate it. However, competence and respect, while necessary, are not sufficient to build strong and long-lasting collaborations. Other qualities were crucial too, mainly personal/human qualities including ability to inspire trust, pugnaciousness, resistance to frustration, ability to lose his own ideas. Friendship was very crucial too.

What are the obstacles that you have met during your collaborative work?

Time is difficult to find, as we have chosen to work on a very fundamental topic which is not central to either of our daily research. This limits the results of the collaboration. Other than that, it has proved difficult at times to make others accept that the collaboration is a scientific one: philosophers often don't take this work seriously, nor do neuroscientists. And in our experience of asking for funding for genuine interdisciplinary collaboration, we have the impression that funding bodies would prefer us to work less closely – that would be easier if Catherine did her scientific work in her own work package, and Maël did some ethical work in his own, without interference. As this is definitely not what we want to do, it makes that aspect of our collaboration more difficult.

Do you have suggestions as to how to improve collaborations between scientists and philosophers?

Just to follow their intuitions and do what they want to do, with maximum of seriousness. The introduction of philosophy in science is not the introduction of well-defined norms for a particular way of doing research. Philosophy is just a tool to re-introduce some free thinking into science, yet with as much intellectual rigor as possible.

What are the most exciting questions that you would like to address in your future collaborations?

Still the same topic, until we get a satisfactory answer or abandon the question because we discover it is ill-defined or has no answer.

Epistemic Diversity and the Question of Lingua Franca in Science and Philosophy

Epistemic diversity is the ability or possibility of producing diverse and rich epistemic apparatus to make sense of the world around us. Federico Gobbo and Federica Russo have published an [article in *Foundations of Science*](#) that discusses whether, and to what extent, different conceptions of knowledge hinder or foster epistemic diversity.



In the second part of their article the authors link this discussion to the widespread move in science and philosophy towards monolingual disciplinary environments. They argue that English, despite all appearance, is no Lingua Franca, and they give reasons why epistemic diversity is also deeply hindered in monolingual contexts. Finally, they sketch a proposal for multilingual academia where epistemic diversity is thereby fostered.

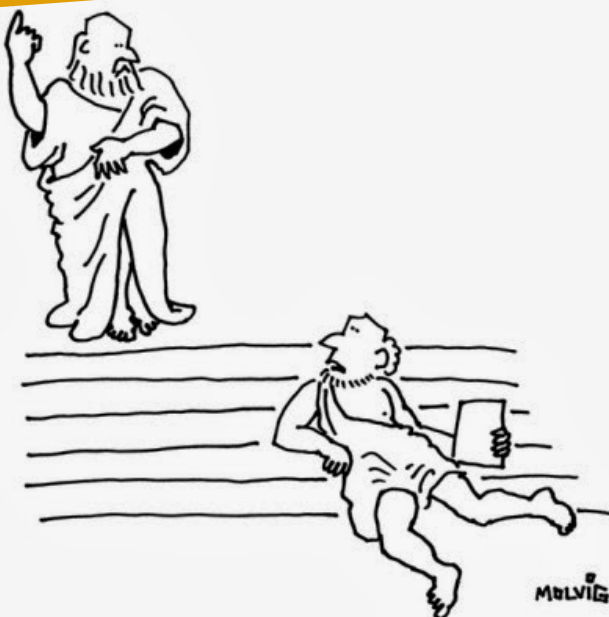
Theory vs. Tinkering

Anglo-American philosophy of science has been theory-centric since at least the dominance of scientific realism in the late 20th century. A recent focus on experiment tools and their patterns of development in laboratory-driven sciences like neurobiology challenges this theory-centrism. Tools that revolutionized neuroscience, at least in the eyes of neuroscientists, developed by way of atheoretical tinkering in the laboratory—by solving engineering and applied science problems, by trial-and-error, and even by sheer serendipity—and not by the systematic application of theory.

On December 10th John Bickle from the Mississippi State University will give a talk at the KLI in Klosterneuburg, Austria, on the advantages of

[Tinkering in the Lab.](#)

Unhinged



"Is this going to be on the midterm?" AllPoster

Interdisciplinary Best Practices



Idea #1 submitted by Matt Haber

While we often have a good overview of the worldwide who is who in our discipline, we might not know what people from other disciplines are working on three labs further down the corridor.

To get to know scientists and / or philosophers at your campus, invite them to your group meetings. Ask them to give a short presentation of what they do and with whom they interact. In turn you can give a brief introduction on what you are working on. Worst case scenario you lose an hour of your time. Best case scenario, you find common interests and even if no common project develops, your lab gains visibility outside of your domain.

How causal are microbiomes?

In its recent issue, *Biology & Philosophy* features a topical collection on causality in microbiome research. Responding to a target article by [Kate E. Lynch](#), [Emily C. Parke](#) & [Maureen A. O'Malley](#), the papers address different aspects concerning the question "how causal are microbiomes?". Among the contributors are *PhyllInBioMed* members [Melinda B. Fagan](#), [Gregor P. Greslehner](#) & [Maël Lemoine](#), and [Derek Skillings](#).



You can find the topical collection here: https://link.springer.com/journal/10539/topicalCollection/AC_b8251239639a292ea0b7f326fc4822e9

3 questions for Günter Wagner

Günter Wagner is Professor of Ecology and Evolutionary Biology at [Yale University](#), USA. In his research he uses mathematical modeling, comparative sequencing and transgenic techniques to understand the evolution of developmental control genes. He has won multiple prizes for his work, among them the prestigious MacArthur Prize (1992) and the Humboldt Prize (2007).



1. What sparked your interest for philosophy of science?

When I think back, perhaps the clearest answer is that I became interested in becoming a biologist, because of a philosophical question. I disagreed with the “imperialistic” reading of modern physics that was popular when I was a youth. The claim was called the “Unity of Nature” theory saying that with quantum physics we have all we need to know in order to understand all of nature. I found this position unconvincing in particular because of the creativity of the evolutionary process and had the feeling that there has to be something wrong with this argument. This sent me on a pathway to become an evolutionary biologist, in particular after I heard a talk by my future advisor, Professor Rupert Riedl. Riedl at the time was finishing his magnum opus “Die Ordnung des Lebendigen” which is a counterproposal against the then prevailing reductionist evolutionary theory, aka the New Synthesis, and also a prophetic book about the conceptual foundations of what was later called evolutionary developmental biology, or as I prefer to say, developmental evolutionary biology (Devo Evo). Needless to say that my time under Riedl’s mentorship was equally split between the more technical aspects of my dissertation [i.e. the population genetic theory of evolvability] and the concerns about the conceptual structure of evolutionary biology.

2. What is your main research focus?

It is hard to say what the “main” focus of a 40 year research career is, but I would rather answer the question what the main themes are. One major theme is evolutionary innovation, i.e. the mechanisms underlying major evolutionary transitions. Examples are the origin of novel cell types, the origin of mammalian pregnancy and also the evolutionary roots of the female orgasm. The other complementary theme is the biological basis

of homology, with cell type identity as an example and others more. Any interesting problem of the evolution of complex characters is attracting my attention, for instance the question of the reversibility of character loss, as in the case of digit reduction and re-evolution. Finally, the work on the evolution of female reproduction naturally led to serious efforts in comparative cancer research, which my lab is engaged in the context of a Center for the Systems Biology of Cancer led by Professor Andre Levchenko.

These themes lead me and my lab to research on the evolution of gene regulation (e.g. Hox gene clusters), transcription factor protein evolution, cell interaction and invasion. On the theoretical side, the theory of evolvability, the role and mathematical theory of gene interactions are foci of various research efforts. Important in the latter has been work on the application of measurement theory in biology, a topic right at the edge of theoretical biology and philosophy of science.

3. What are the topics you want to explore in the future?

How much future is there for me to explore at the age of 65? Clearly there are many loose ends and open questions that I will continue to pursue. The one that fascinates me most on the philosophical and theoretical end, in collaboration with my friend and colleague Gary Tomlinson, is the role and origin of historical individuals. A topic that has attracted a lot of attention in the philosophical literature, but, I think, has not been fully recognized for the transformative potential it has for biological and even cultural sciences. The social science impact is taken care of by Gary, as I will refrain from stepping outside of biology out of respect for the deep knowledge necessary to make meaningful contributions in any area of knowledge.

