

In the Spotlight—Established Researcher

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Ingo Brigandt is a recipient of the 2011 Martha Cook Piper Research Prize, the most distinguished award for junior researchers at the University of Alberta. From 2014 to 2024, Ingo held the Canada Research Chair in Philosophy of Biology at the University of Alberta. He is currently the First Vice-President of the Canadian Society for the History and Philosophy of Science, and will become its President in 2028.

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With whom and where did you study?

I studied Mathematics and Philosophy at the University of Konstanz in Germany, obtaining a Master's equivalent in 1999. My MSc thesis in algebra and mathematical logic was supervised by Jochen Koenigsmann. I then did my PhD in the world-renowned Department of History and Philosophy of Science at the University of Pittsburgh. My primary supervisor was the philosopher of biology Paul Griffiths. Paul is best known for criticizing gene-centric conceptions of development and empirically studying how genes are understood in contemporary molecular biology (Griffiths and Knight, 1998; Stotz and Griffiths, 2004). But he has also advocated for an EvoDevo approach to cognition (Griffiths, 2007). When Paul left for the University of Sydney in 2004, Anil Gupta, who was relevant to my dissertation topic of conceptual change, became my co-supervisor.

What got you interested in Biology? When did you know EvoDevo was for you?

While in high school, I was strongly interested in Mathematics and all natural sciences, including Biology. When I started at university, there was a clear connection between my new area of Philosophy and my focal area of Mathematics (through logic and the philosophy of mathematics). But I initially did not see a connection between philosophy and my longstanding interests in Biology. That changed during my undergrad period, when I took a philosophy of biology seminar with Gereon Wolters. I was immediately hooked... Since back then we did not have Bachelor's degrees, I continued toward my MSc in Mathematics (as the first possible

university degree), while at the same time taking biology courses to afterwards embark on a career in Philosophy of Biology.

At the University of Konstanz, I also did a rotation in the lab of Axel Meyer, an evolutionary biologist working on molecular phylogenies and the adaptive radiation of African cichlids, as a topic with a clear EvoDevo connection. While from the beginning my philosophy of biology focus was on Evolution, the interactions with the members of Axel's lab clearly moved my interests toward EvoDevo. (Axel is also a JEZ-B editorial board member—what a small world EvoDevo can be!) Another transformative influence during this period was reading the volume *Homology: The Hierarchical Basis of Comparative Biology*, edited by Brian Hall, the foremost EvoDevo pioneer in Canada (Hall, 1994). I had previously taken homology to be a settled concept defined long ago, but the chapters of this edited book displayed a diversity of perspectives on homology, including EvoDevo perspectives. Such conflicting construals of homology revealed to me a concept still in flux within current research, an intriguing perspective for someone having been fed a steady diet of biology textbooks. This also proved to be formative for my later dissertation, which was about the change of the homology concept and the gene concept.

Who was your most influential mentor?

That clearly was my dissertation supervisor Paul Griffiths. We happened to have quite similar interests, including EvoDevo, the concept of the gene, and homology (Brigandt and Griffiths, 2007). Among other things, Paul read and commented on my manuscripts that I, as a graduate student, was preparing for submission—which is very helpful in a discipline where most journal articles are single-authored. Among biologists, an important influence was Günter Wagner, who in 1999 had created JEZ-B as a second, new section of the *Journal of Experimental Zoology*. While a PhD student, in 2002 a paper of mine on homology was published (Brigandt, 2002). It must have piqued Günter's interest, as he emailed me about it. This started some exchanges where eventually Günter became the biologist on my dissertation committee.

A further mentorship-like opportunity was my participation in the 2001 History of Biology Seminar on 'From Embryology to Evo-Devo.' These seminars are weeklong summer schools taking place at the Marine Biological Laboratory in Woods Hole. The 2001 summer school introduced students like me to leading historians of biology, philosophers of biology, and biologists, including EvoDevo giants like Rudy Raff.

How can EvoDevo biologists fruitfully interact with philosophers?

EvoDevo biologists can easily benefit from philosophers' conceptual contributions. EvoDevo has seen the rise and transformation of many core concepts that have changed the shape of evolutionary biology: homology, developmental constraint, evolvability, evolutionary novelty, and niche construction. Philosophers have a good sense of the diverse potential roles a scientific concept can play, and steer our research focus away from less productive conceptual debates toward fruitful ways of employing concepts. EvoDevo biologists can also rely on philosophers' skills at scrutinizing tacit assumptions embodied by existing explanatory frameworks, for example, what is wrong with the traditional assumption that developmental biology could not possibly contribute to evolutionary biology given that there is no inheritance of acquired characters. This paves the way for developing broader explanatory frameworks, e.g., from

accounts that explain the evolution of standard characters (as everything deemed to be evolvable) to an explanation of how evolvability itself evolves.

As a good example of a highly successful collaboration, I point to the 2019–2020 project on [Evolvability](#), funded and hosted by the Center for Advanced Study (CAS) in Oslo. This project hosted fellows from various biological fields relevant to evolvability, plus a handful of philosophers. I spent Fall 2019 at the CAS, as did Laura Nuño de la Rosa and Alan Love—who are (not fully coincidentally) the two other philosophers on the JEZ-B editorial board. In addition to the weekly talks, reading group discussions, and lab meetings during the project, we also produced an edited book (Hansen et al., 2023), which works well for graduate students to learn about evolvability. In addition to a historical look at the multiple origins of evolvability research, our philosophical contributions included a study of what makes evolvability's status as a dispositional property scientifically distinctive and how the concept of evolvability functions to coordinate interdisciplinary research.

A great opportunity to get in touch and interact with philosophers is at the biennial meeting of the *International Society for the History, Philosophy and Social Studies of Biology* ([ISHPSSB](#)). This is a large, four-and-a-half-day meeting bringing together philosophers of biology, biologists, as well as historians and sociologists of biology. You will be too late for the call for papers deadline for the July 2027 meeting in Buenos Aires, Argentina. But the 2029 meeting will take place in Quebec City, Canada. As a summer school option, I previously mentioned the [History of Biology Seminars](#) at the Marine Biological Laboratory in Woods Hole. Another option is to invite a philosopher to a workshop, or be invited to a workshop involving philosophers.

What is your advice for junior EvoDevo researchers?

Submit to JEZ-B! This proved to be instrumental for my career. While a PhD student, I submitted to JEZ-B, getting my first paper accepted in a biology journal (Brigandt, 2003)—and it is still widely cited. This also drew the attention of then Editor-in-Chief Günter Wagner, who in 2005 invited me to contribute a historical vignette for JEZ-B (Brigandt, 2006). As a junior Assistant Professor, I organized two workshops on interdisciplinary integration in the context of research on evolutionary novelty, which in 2009 and 2010 brought together biologists and philosophers. Based on these interactions, I guest-edited a JEZ-B special issue on *Perspectives on Evolutionary Novelty and Evo-Devo* (Brigandt, 2012). Because of this, Günter Wagner invited me to join the journal as an Associate Editor, the first philosopher of biology in that role. And the rest is history...

Some further advice: Don't just stick to the tools you learned as a grad student and postdoc, but strive to innovate! EvoDevo thrives through developing new non-standard model species and generating novel perspectives. Seek out interdisciplinary connections! Become acquainted with the history of evolutionary biology! Because learning how old problems and explanatory frameworks came to be abandoned and new issues came to be added to the agenda of evolutionary biology informs your vision and prospects for future developments.

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