

Transcript

It's my great pleasure to be able to introduce this evening speaker Wahida Khandker who is senior lecturer in philosophy at Manchester Metropolitan University. In 2014 she published a book entitled *Philosophy Animality and The Life Sciences*. Early this year she published a new book entitled *Process Metaphysics and Mutative Life Sketches of Live Time* with Palgrave MacMillan and the book is an exploration of notions of organic life in the history of philosophy as well as in the histories of biology and medicine, and it's about this book that she's going to talk tonight. So over to you, Wahida.

Thank you, thank you very much for the invitation. As I said, I was. I was really looking forward to coming down to Coventry, but here we are. So what I'm going to do? I'm just going to share my. Part of my screen at least so that I can. Give my presentation, so bear with me as I as I work through this, right. That's too many slides. So what I'm going to do in so I'm going to. Scripted this for myself, but I'll provide an overview of the book. To highlight its key themes, and in particular those that speak to the chapter extract I provided in advance of today's session. And then in the last part of the presentation or summarize key moments of the chapter extra so it will involve me reading some parts of that out. But I'll try and explain it a little. Psycho Now the two most important philosophers in this book, A Ferguson and Whitehead. The festival, just to explain what about their work. I'm interested in a festival, Bergson, in creative evolution. He talks about the close relation between the theory of life and the theory of knowledge, that is the key to the study of life or living processes in some way involves an interrogation of our methods for gaining knowledge of different examples of life. We might summarize the methods employed by artists, scientists and philosophers alike in terms of. Call Chris. I'm in the endeavor as Bergson characterizes it to find the closest proximity to the real as possible. The resulting fluid concept must be specific to its object to such a degree that it is barely a concept. And this endeavor is, he says, an effort often painful immediately to place oneself in the very heart of the subject, and to seek as deeply as possible. An impulsion which as soon as found, carries one forward of itself. This impulsion once received sets the mind off on a Rd where it finds both the information it had gathered and other details as well. It develops, analyzes itself in terms. Who's in numeration, follows on without limit. The father one goes, the more is disclosed about it, never will manage to say everything. And yet, if one turns around suddenly to seize the impulsion belt, it slips away, for it was not a thing but an urge to movement. And although definitely extensible. It is simplicity itself. Now my book asserts an approach to the philosophy of biology that is, first and foremost rooted in a concern with our relationships with other species. And it's inspired by the quite desperate approaches that are collected under the term critical animal studies.

That is an interesting life precludes its disassembly in a laboratory and instead involves an immersion in its concrete existence out there in the world, in the environment, or the climate, which also necessarily entails a reconsideration of the ways in which our encounters with it have thus far been at best ignorance of its value and at worst, destructive. Now the book opens and closes, for example, with two stories of extinction expedited by our inability to see. First, the Bramble Cay Melomys, a species of rodent declared extinct in 2016. It was notable for being the first extinction to be formally attributed to the effects of climate change. Its habitat, one of the tourist straight islands, had been suffering repeated inundations due to rising sea levels. Now this mammal was not charismatic enough to catch the eye and inspire interest in it. The book ends with Reflections on the fate of the Tasmanian Thylacine. Australia's last large carnivore. Spared it is thought by a combination of its misrepresentation as a threat to settler, livestock and livelihoods, and some colonialist snobbery towards primitive marsupial mammals that we're seeing today. Fine. Wanted. In 1936 I said II philosopher central to the book Whitehead. Now whilst I draw significantly from Whitehead's process and reality. I don't seek to instantiate his work or undertaker. Detailed exposition of the text. I'm interested in this work for its presentation of a rich, multilayered view of reality that speaks to the different effects of viewing communities of living organisms through lenses, so to speak, of varying strength of magnification. Quoting from the book itself here. So what Whitehead means by a distinction between microscopic and macroscopic is a difference between the smallest unit of experience and actual occasion and the broadest given us of the actual world. Actual occasions give us the barast expression of the ultimate character of reality is process. Their processional character is vector like that is. Each actual occasion is directed towards something else. There is no further reduction of reality to some ultimate substance or reference to another reality beyond this one that might instead be substantial. Now, the directionality of actual entities is called a pre henschen this term divests the more traditional meaning of apprehension of any sense that it belongs to a consciousness. It's not that an identifiable I apprehends the tree over there. Rather, it is simply the case that there is a taking account of what is there from the perspective of what is here. I pre henschen then is a process of unifying. Giving an actual occasion, it's quality of connectedness to everything surrounding it. Now what we think of in our ordinary language is identifiable. Things are in fact collections or communities of actual occasions. Which we might also refer to as a community of pretensions. If we wish to accentuate their directionality, no such communities are the organisms that serve as the focus of Whitehead's philosophy of Organism. What we have then? Or organisms that are collections of process is Furthermore, each actual occasion. Each microscopic process repeats in microcosm what the universe is in macrocosm. Or the sense of each actual occasion as an unfinished process repeats at every level such that our sense of

the identity's of things must be redefined as a repetition of reasonably consistent characters across interacting actual occasions. Now in my book I take this set of statements as my starting point. What would an analysis of conventions and problems in biology look like if it was treated as the categorisation of different kinds and levels of process along whiteheadian lines? So to summarize, the structure of the book is in many ways its thesis. Different magnifications of process are illustrated through concrete examples drawn from a range of scientific studies. It brings together strands in the history and philosophy of science quiz. Is and ecology to rethink life in a way that is more in tune with its process is? Immersed as we are in a slow collective awakening to the problems of climate change. I want some books on methodology's. This book is is also a book about writing, drawing and creativity or the inability to write. The books resulting reflections on the tools that we used to think. And for me that included a return to writing and drawing with pen and paper to help me to identify and work on philosophical problems that interested me. It takes in a wide range of methods that scientists have used to describe different repeating patterns in nature. And the effects of moving between different scales or levels of process. No, just to talk about methodology, it's best to illustrate with some of the examples I discuss in the book. Festival avian ecology. Now look at different modeling methods used in the field of ecology in its concerned with the measurement and monitoring of populations and the effects of changes in population size on both individuals and the group, or even a species as a whole. The diversity of such models indicates the moving thresholds applied to species that might be labeled as variously Keystone, despotic, or invasive. So first take the example of the application of statistical models borrowing from certain problems in quantum mechanics. We can see the benefits of a quantum mechanical trade off in accuracy of measurement when removed from the level of individual members of a specific population to the broader regularity of the movements of the total population. And this is quoting, so that's we focus attention on larger spatial regions, longer timescales or statistical ensembles, for which macroscopic statistical behaviors are more regular. This is the principle technique of scientific inquiry. By changing the scale of description we move from unpredictable UN repeatable individual cases to collections of cases whose behavior is regular enough. To allow generalizations to be made. In so doing, we trade off the loss of detail or heterogeneity within a group for the gain of predictability. We thereby extract and abstract those fine scale features that have relevance for the phenomena observed on other scales in physics. This trade off is well studied and goes to the heart of the problem of measurement at fine scales. Quantum mechanical laws must replace classical mechanical laws. Laws become statistical and character dealing only with probabilities of occupancy. That's a lot last long quotes I'm gonna. Include here it's all images from from this point onwards now. Second historical and contemporary cases show us the complexity of the effects of actual fluctuations in

population size. I compare Alfred Russel Wallace's comments on natural balance using the example of the now extinct passenger pigeon. So each bird lays only one or two extra season and typically raising only one chick at a time. So the question is, how could it have become so abundant, especially when we compare it to other birds that produce greater number of numbers of offspring. As well as outlines, the explanation must be in the abundance and wide distribution of the pigeons. Main food source was the bird itself is capable of a very rapid and long continued flight so that it can pass without fatigue over the whole of the district it inhabits and as soon as the supply of food begins to fail in one place is able to discover a fresh feeding ground. The starting with a population estimated at three to five billion in the 19th century. Conservationists of since noted the surprising nature of the decline of this once super abundant species. Its final known example dying at Cincinnati Zoo in 1914. Now the favorable favorable conditions for the maintenance of such large roaming flocks, primarily the abundance of its main food source, as recounted by Wallace, were mitigated by its historical population fluctuations, and these are more recently discovered through ancient DNA analysis, so normally the species experienced Reccurring population fluctuations of large magnitude. From which it had been able to recover. However, some dramatic fluctuations under certain conditions, that is a high degree of stochastic City made the species particularly vulnerable to extinction. NASA maker best Philippe I'm gonna I'm gonna talk about another example. Which is that of black holes and all of this I hope will make sense in a few minutes. There are two chapters of my book, culminating in a discussion of Kip Thorne's collaborative work with visual effects technicians on the film Interstellar. I consider a number of books only and insights into the limits and possibilities of visual presentations of theoretical objects. No Kip Thorne speaks of his work with the visual effects team to render the images of what a black hole would look like as not just the visual instantiation of a set of precise mathematical calculations, it is a collaboration that resulted in new knowledge. So this is an image of the black hole as seen in the film. No. So to explain what's going on here. The centrifugal motions of a spinning black hole attracts surrounding objects and debris to it, creating the accretion disk around it, much like the rings of Saturn. As we can see in this image. Now the double Corona we can see around it is a depiction of gravitational lensing. And this was conceived through the combination of thorns calculations and their rendering by the visual effects team. So whatever is behind the black hole in relation to human observer on our side of it is still visible to us. The sphere swallow some light, but the rest is lensed around it, giving us the doubled image of both the starfield behind it and the accretion disk and thoughts. The thorns. Observation of this process of working with this team was, well, the. The lensing of this accretion disk was a. It was a surprise or surprising result of this collaboration, and it helped him to modify his own calculations, his own. Hey. Now, how does this relate to Bergen Bergson's philosophy? Now on the one hand,

of course, I do discuss some elements of his famous debate with Einstein in the book, but I'm more concerned with what the contemporary British artist Jammer Anderson cause the educational turn in art practice. And I'll come back to that in a moment. Now the work of Kip Thorne on the film *Interstellar* was an attempt to visualize the theory of the anatomy and appearance of black holes. Now we often see this image now. As a depiction of a black hole. No, but by way of a significant digression in the book I seek to reconcile Einsteinian Enburg Sony and thought in the infinities between methodology's in physics and philosophy for presenting unrepresentable objects. Compare these two images. So the image on the right subtracts one dimension from its calculation of the anatomy of a black hole, giving us a 2D3D rendering in the form of a funnel. It's used to teach students of physics a certain set of the effects of extremely dense matter on surrounding space. So from the perspective of a human observer experience of the warping of space in three dimensions would appear in the form of a sphere, giving us the image on the left. So what we would see is not a whole at all, but the curved space. Casting a shadow on the field of stars that we would otherwise see what the Reverend John Mitchell in his 1784 prediction of the existence of black holes, aptly named a dark star. Now I'm interested in the resonance between the two images and their pedagogical value. Both seek to communicate in imperceptible processes. But they also possess considerable limitations. And the discussion of this is, I think, pedagogically useful. Compare these two images. So the image, the funnel image of the black hole and the cone diagram. Hopefully this familiar from chapter three of *bug since matter and memory*. Now I use diagrams from chapters two and three of *matter and memory* to get my students to think about the virtual actual relation in terms of the dynamic of contraction and expansion. And the key is getting for getting the students to articulate the limitations of thinking the the the virtual is at the top and the actual is at the bottom of the diagram. I know and all sorts of other limitations and problems with it now. The analogy between these two diagrams here lies beyond their superficial similarity, and again, I think this is pedagogically useful. But I'll continue on and perhaps we can talk a bit more about it in discussion. But enough for now about black holes. So consider what I've discussed so far. Bergson's observations about the intertwined theories of life and knowledge. Whitehead statement that each actual occasion or process repeats in microcosm what the universe is in macrocosm. And then they pedagogical value of comparisons between visual and conceptual descriptions of time or process or process is. Now, in the chapter that was circulated. I juxtapose the works of a number of thinkers commencing with gutter. My guess is collected notes on the developmental process of plant growth, known as whose botanical writings serve as an early example of formalism in which the leaf is the protean form. For all other configurations of the plant from a seed to fruit. And then in the extracts I say the following. So here we are in fact presented with two interrelated tendencies. The vertical in the spiral. The vertical

tendency describes the process from germination, taking root and building up stalks and fibers and branches, and, crucially, we start seeing indication of Gert's aim to overcome a purely physical or physiological description in favor of some sort of impetus. Or true tendency in process terms where the vertical tendency should be looked upon symbolically as a staff basic to existence and preserving it for along period. The prolongation forwards, or upwards is exemplified not just in rigid structures of storks, but also in the climbing or creeping forms of vines. For example, in Ivy and bindweed. In contrast to this, the spiral tendency refers to the developmental reproductive Arianne nourishing element. As such, it is temporary and almost independent of the vertical. This is quoting Gerter operating an XSD soon exposed. Ruin and parishes joining the vertical it fuses with it to form a lasting union's wood or some other solid. No, the section concludes with the suggestion that his theory of metamorphosis begins to give way to what he terms the spiral tendency. The latter idea suggesting is a soda primacy of process over form. And I connect the spiral tendency to the recurrent image or theme in 18th century writings on aesthetics, starting perhaps with William Hogarth's essay the analysis of beauty. Now once it breaks and I compare this tendency within Curtis notes with Bergson's theory of an airline, but AI, which is grounded in simple observations made in his previous works, time and free will and matter of memory. That almost immediate evidence for the primacy of change is available to us in the inspection of the fluctuating intensities of attention or concentration that defines our own consciousness. Yet our habits of thinking everything from the manifold of our sensory experience to the metaphysical concept of time itself as a succession of discrete units, keeps us focused on a version of reality that can be likened to the mechanical operation of a cinematograph. And we can overcome this reductive habit. However, according to Berkson, and as I state in the extract. Life itself has evolved as an exploration of its own encounters with the world. Manifested in a plurality of forms of life that each blend different degrees of intellectual and instinctive contact with things as Bergson asks. What then, is the principle that has only to let go it's tension? May we say to detained in order to extend the interruption of the cause here, being equivalent to reversal of the effect? For want of a better word, we have called it consciousness. In order that our consciousness shall coincide with something of its principle, it must detach itself from the already made and attach itself to the being made. It needs that turning back on itself and twisting on itself, the faculty of seeing should be made to be one with the act of willing, painful effort which we can make suddenly. Doing violence to our nature but cannot sustain more than a few moments. So an analysis of life and of consciousness is simultaneously an analysis of methods. And the rest of the chapter extract is concerned with a number of potential criticisms of a primarily formalist approach in the methods of drawing and visualization in the Sciences and the arts. And I asked whether there are possibilities contained in drawing time lapse photography and animation that

complicate the assessments of their hidden mechanisms. What is the relation between the artist and her work? Now I take next Darcy Thompson's defense of morphology as a route towards the unification of the study of life's processes in biology with physics. His use of drawings, diagrams and mathematical models demonstrate the means available to us to conceptualize the action of forces that govern processes such as embryo Genesis. And again, as I say in the extract. The physical determinants. The changes in form differ according to the relative size and complexity of the Organism. That's problem that Thompson answers. Anna criticism of a passage in Darwin's origin of species. A Darwin's difficulty in mapping the potential dynamics of use and disuse onto variations in species of birds with a common ancestor lies in the phenomenon of the great resemblance between the fetuses of each species. Where is the forms of the adults differ greatly? And Thompson counters down suggestion that selection determined by use or disuse tends to be enacted upon the adult members of a species. Instead, he reiterates the difference between physical effects on smaller forms and those that occur on the greater magnitudes involved when dealing with individuals in later stages of life. In short, the developmental changes in an embryo armor greatly determined by general molecular forces. Once the changes in later stages, or increasingly idiosyncratic as the individual grows in size and form such an insight, Thompson notes refers us back to the phenomenon of recapitulation. So if ontogeny recapitulates phylogeny, it is because early developmental processes are shaped within common physical constraints. No, darling in the origin of species marvels also at observations amongst mathematicians, and this is quoting that bees have practically solved a recondite problem and have made their cells of the proper shape to hold the greatest possible amount of honey with the least possible consumption of precious wax in their construction. And Thompson explains that it's not, in fact an innate craft of the B, but a much more rudimentary process involving the interaction of the bees. Instinctive work with the physical principles of surface tension and the tendency towards equilibrium. And then finally I conclude my survey in the practice of the artist, Gemma Anderson. Anderson's attempts to visualize developmental process is in a pool, claimed Spired project called Isa Morphogenesis. Text the unification of science and art, not in the direction of an increasingly rarified positivism, but in an accentuation on different methodologies for thinking process. The purpose of the visualization is to encourage a kind of triangulation between the thinker, the artist and the object. The artwork drawing or diagram is not a representation of a finished concept. It is instead an integral third orientation towards the living process that's being studied. And in the extract. I know the following so in her book drawing us a way of knowing in art and Science, first published in 2017, Anderson reflects on the transformation of our own practice towards Isa morphogenesis, which is intended as an amalgamation of Darcy Thompsons grid transformations, the use of color graduation by Paul Clay and form since the

computer Modeling system developed by William Latham. And Anderson argues that pull, close practice and artworks can be read as a kind of morphology inspired by Gert's methodology. And developing its own visualization of objects in process. In particular, his use of gradations of color using layers of watercolor paint to signify the passage of forms through developmental sequence. And combining some speculative work on the possibility of rendering 3 dimensional objects in four or more dimensions with her readings of gutter, clay and Thompson. Anderson's method of ice morphogenesis proposes. She said the kind of drawing algorithm involving drawing actions verbs performed on a set of primitive shapes rather than from observation. The algorithm simulates possible analogs of developmental series based on principles similar to those that regulate plant and animal growth. And a little further, so again, just from the extract. Anderson's work in particular recalls Darcy Thompsons identification of forms as diagrams of forces and develops the morphological attempt to articulate the interaction between form and growth in the developing Organism. Now, Anderson's drawings of the process of mitosis. As we can see here as a continuous set of changes in a single image rather than a succession of images as snapshots of stages of the process effectively effectively combined the mathematical plotting of velocity as explained by Thompson. And the nonliving chemical analogs of mitosis. The mimic the appearance of mitotic division as a means of reflecting on the physical dynamics that subtend the living process. So the effort to visualize process will never capture the true dynamic of the whole. But it can carry thought some way closer to an appreciation of its complexity. And finally, I suggest that widening or a widening of Anderson's approach to incorporate the working methods of philosophers would be an intriguing extension of this project. So I hope that my presentation has gone some way to indicate how how this might be done.