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Kevin Lala interviews

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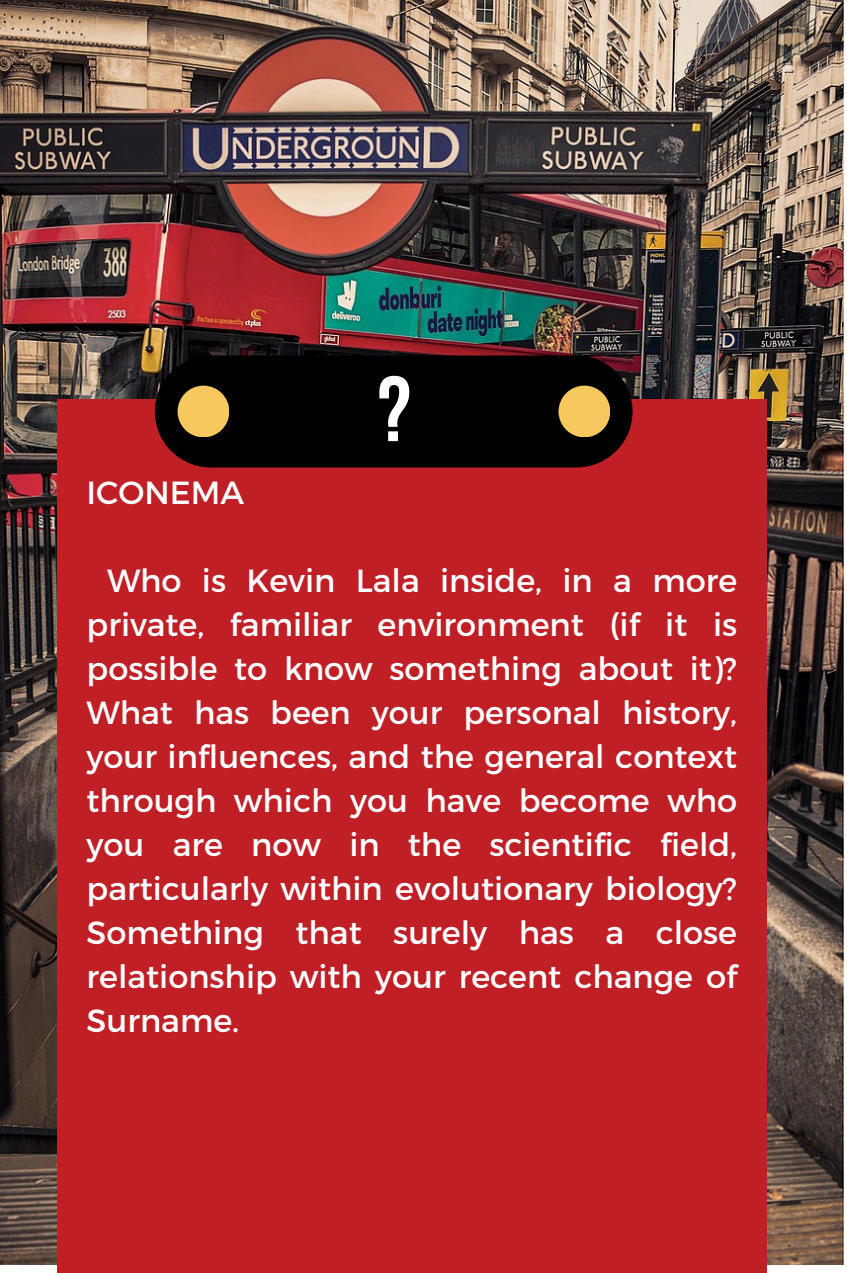
ANTHROPOLOGY
IN CONTEMPORARY CULTURE



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Who is Kevin Lala inside, in a more private, familiar environment (if it is possible to know something about it)? What has been your personal history, your influences, and the general context through which you have become who you are now in the scientific field, particularly within evolutionary biology? Something that surely has a close relationship with your recent change of Surname.

KEVIN LALA

I was born in England, to a white British mother and an Indian father. My father was a Parsi from Mumbai, who had emigrated to the UK. The UK in the 1960s-80s was going through an ugly period when there was a lot of racism.

Lala was my original family name, which my parents anglicized to Laland when I was 4, in an attempt to reduce the racism that they and their children experienced. I may have benefited from my surname being anglicized, but it did not sit right with me that I should still bear that name more than 50 years later.

I want to celebrate my ancestry, not hide it. I am proud of my Parsi Indian heritage and I am not going to be intimidated by racists. So, I marked my 60th birthday last year by changing my name back to Lala, and doing so makes me very happy.

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KEVIN LALA

Part of the beauty and simplicity of Darwinism is that all of life can be envisaged to evolve in the same way, through the natural selection of genetic variation. However, in my opiniona new vision of adaptive evolution is just starting to emerge within the evolutionary sciences, which has its own power and elegance.

Part of the motivation for that new way of thinking is the accumulation of vast amounts of evidence for non-genetic forms of inheritance, with countless resources other than genes now being known to be passed down the generations, including hormones, symbionts, epigenetic changes, antibodies, ecological resources, and learned knowledge.

We also know that adaptations can arise through the natural selection of this extra-genetic variation. For a century, 'soft inheritance' – the view that heredity can be changed by lifetime experiences – was regarded as disreputable.

Now it seems to be everywhere. And a broadened in scientists' understanding of inheritance is only part of what is making evolutionary biologists reflect.

Exciting new data suggest that natural selection is not something that just happens to organisms: their activities and behaviors contribute to whether and how it happens.

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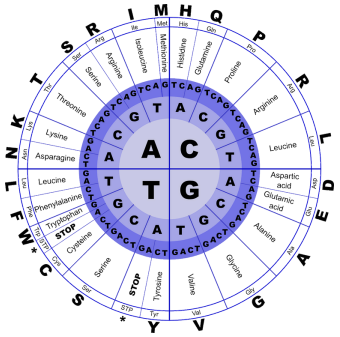
We live in times where practically everything is explained, or at least is tried to be explained from DNA, so why do we need a new synthesis that explains biological evolution? If, in addition, it seems that one's own biological inheritance is transmitted solely through genetics...

Without undermining the central importance of natural selection and other Darwinian foundations, a new understanding emerging within the contemporary evolutionary sciences implies that, say, yeast, oak trees, and human beings may each evolve in distinct ways; indeed, that all organisms may possess a characteristic set of evolutionary mechanisms – their own way of interpreting and implementing natural selection – contingent on how they develop.

The evolutionary process itself evolves, and the properties of organisms determine the form that natural selection will take.



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In this sense, what is the Extended Evolutionary Synthesis, and where does its relevance and/or applicability lie in contemporary biology?

Where does the idea of building a new theoretical framework for biological evolution come from?

It provides a first attempt to define the assumptions of the EES, describe the key ideas that lend it coherence, and specify some distinctive predictions.

Of course, the EES is contentious, but the fact that this scientific article has already been cited >1250 times is an indication that it has stimulated a great deal of interest and discussion.

Actually, I think of my personal position as aligned with several academic fields, or research programmes, within the evolutionary sciences that share a developmental perspective. These include evo-devo, eco-evo-devo, niche construction theory, developmental systems theory, as well as the extended evolutionary synthesis.

KEVIN LALA

Evolution by natural selection requires that: (i) variation exists between individuals; (ii) some variants leave more descendants than others; and (iii) offspring resemble their parents. Organisms fulfil these criteria and so they evolve, adapt and diversify, but this description is very general and vague. Evolutionary biologists need a way to think about the three principles of evolution by natural selection that is realistic enough to apply to real organisms, but simple enough to guide research.

For about a century, a genetic representation of the three principles dominated evolutionary theory. The genetic representation not only describesevolution in terms of genes, it also makes assumptions about the causal relationships between the three criteria for evolution by natural selection. For example, heredity and development are considered separate processes. There is nothing inherently wrong with this, but it is important to realize that the genetic representation is a viewpoint, and not necessarily a true representation of nature.

There may be other descriptions of biological causation that, in my view, are better suited to answer interesting questions about evolution. The Extended Evolutionary Synthesis (EES) is such an alternative way to think about the nature of development, the construction of heredity, and the causes of evolutionary change and adaptation. If readers want to know more, they can read our Darwin review entitled “The extended evolutionary synthesis: its structure, assumptions and predictions.”

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What does Niche Construction have to do with the EES? What is it and in a tangible way, where can we appreciate its effects in biological terms, and even anthropological, if we talk about the human being?

KEVIN LALA

Natural selection commonly operates on packages of mechanistically and functionally integrated traits. Theory shows that traits that are selected together because they are functionally related will tend to become genetically and developmentally integrated, forming correlated clusters whose variability significantly impacts fitness.

By modifying experienced conditions, niche construction also generates clusters of correlated traits, tying together the fate of niche-constructing traits, with morphological and other traits affected by the modified conditions, and sometimes switching the dimension of trait variation that dominates fitness to the novel cluster. In this manner, the development and activities of living organisms can determine the direction and strength of natural selection. We can see evidence for this in the evolution of our own species.

There is also good evidence that niche construction played a central role in the evolution of cognition and language, the origins of agriculture, and many other aspects of human evolution. And, of course, h umans can construct ‘ bad environments ’ as well as good ones.

A griculture and urbanization also inadvertently facilitated the spread of diseases, triggering selection for genetic resistance. Humans’ potent capability to regulate, construct, and destroy environments has also generated many current problems, ranging from deforestation and urbanization to climate change, while driving evolutionary change in animal and plant domesticates, commensals, and urban invaders.

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Some time ago you published a fabulous book called “Darwin's Unfinished Symphony,” where you ponder the role of culture in the human mind. Could you tell us a little more about it? That is, could you expand your view of the term ‘culture,’ and its relationship with mental or cognitive aspects?

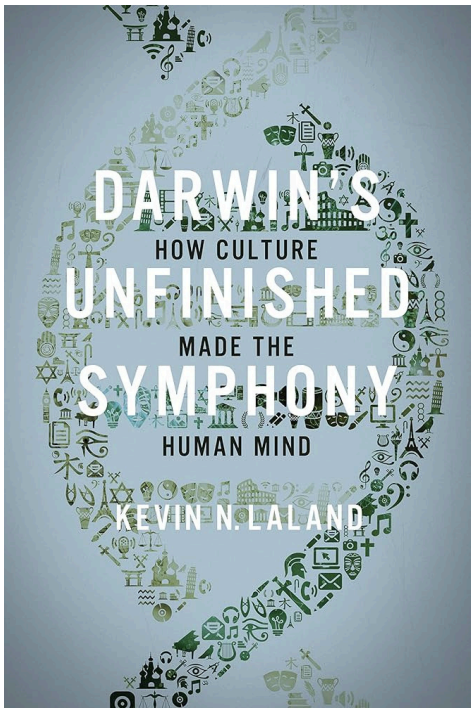
KEVIN LALA

Thank you for your generous words. We humans possess an extraordinary capacity for cultural production, from the arts and language to science and technology. Yet a scientific understanding of how the human mind and culture evolved from their roots in animal behavior has remained elusive. This challenge to understand the origins of human intelligence, technology and culture is what I labelled Darwin’s Unfinished Symphony.

As a scientist, I have studied this intriguing problem for 30 years, and that book drew on the findings from my research laboratory, as well as the work of other scientists, to present a new theory of human cognitive evolution. A key message of the book is thathumans are creatures of their own making.

The truly unique characteristics of our species—such as our intelligence, language, teaching, and cooperation are no adaptive responses to external conditions such as tclimate, predators or disease.

Rather, the learned and transmitted activities of our ancestors shaped our intellects through accelerating cycles of evolutionary feedback. Culture is not just the magnificent end product of an evolutionary process—it was also the key driving force behind that evolution.



In my book Darwin's Unfinished Symphony, I describe how from these foundations, human culture evolved through a runaway autocatalytic process in which innovation, social learning, tool use, and brain expansion fed back on each other.

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A relevant question arises for both biology and anthropology:
Do you consider that what we call 'culture' is something exclusively human?

KEVIN LALA

Yes and no. For evolutionary biologists like myself, it is helpful to adopt a broad conception of culture, in part so that we can understand how human's particular form of culture evolved.

Research into animal behavior has established that mammals, birds, fishes and insects all acquire knowledge and skills through social learning, and that sometimes this can generate behavioral traditions within populations and behavioural differences between populations.

I think it is ok to call this culture, just as long as we recognize that human culture has qualities – for instance, a reliance on symbols and language, or on norms specifying how we should and shouldn't behave – that are not generally found in other animals. Mostly animals copy useful things, such as how to find and process food, but social learning can generate extraordinary habits. For instance, capuchin monkeys possess habits of sucking of each other's body parts, whilst some chickens have learned a taste for cannibalism.

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Returning to the subject of the mind: If we look at our contemporary, hyper-technical environment, especially in electronic terms, without trying to be anthropocentric, it would seem evident that humans have a kind of different or special mental capacity. Do you think that the human brain has something or some special features that make it unique? If so, what is it that makes the human brain special or unique? That is, what apparently makes us unique? Is it something in our genes? That is, do we embody an evolutionary discontinuity in mental terms, or are we just one end of the spectrum of biological variability?

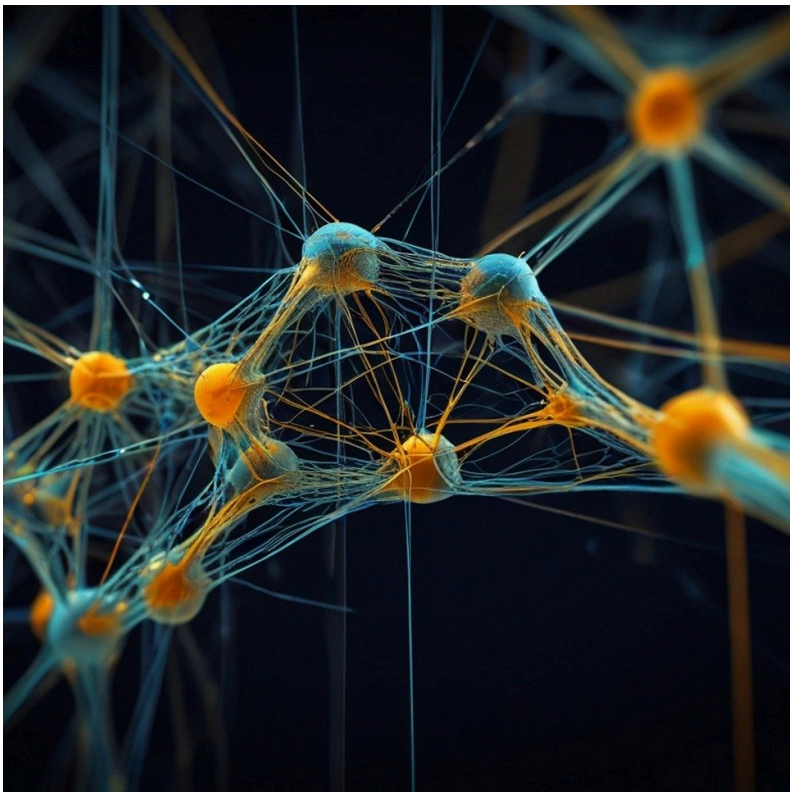
KEVIN LALA

That is a very interesting question! Humans have an unusually large neocortex, but it is exactly the size it 'should be' given the size of our brains – that is, it is allometrically aligned with the brains of other mammals.

Much research into comparative brain organization has sought to answer the question 'What makes human cognition unique?,' and just about any feature of human brains not in accord with the mammalian expectation has been given as an answer. In my view, however, more important are adaptations that arise through selection on whole-brain size, such as extending the duration of neurogenesis, or modifying the timing of developmental events such as birth and weaning – although these are rarely considered.

Our species' early birth and extended childhood, combined with the enhanced plasticity of an unusually large and powerful brain, result in a long period of childhood development during which humans are exceptionally well-positioned to learn about their world, particularly from their parents and other caregivers.

Experiments conducted over recent decades have revealed many similarities between the cognitive abilities of humans and other animals, and yet there is broad acceptance within the field of comparative cognition that in important ways humans are cognitively unique.



My view is that our superior brain power arises through interactions between several cognitive domains in which we excel – including memory, planning, tool use, problem solving, social cognition, and communication.

For instance, human understanding and use of tools comes largely from copying others and through language, while our proclivity for language learning builds critically on our capacities for joint attention and learning sequences of actions.

Thus, much that is exceptional about human cognition results from trait interactions and feedbacks, with culturally scaffolded developmental experiences building upon and reinforcing evolved biological differences.

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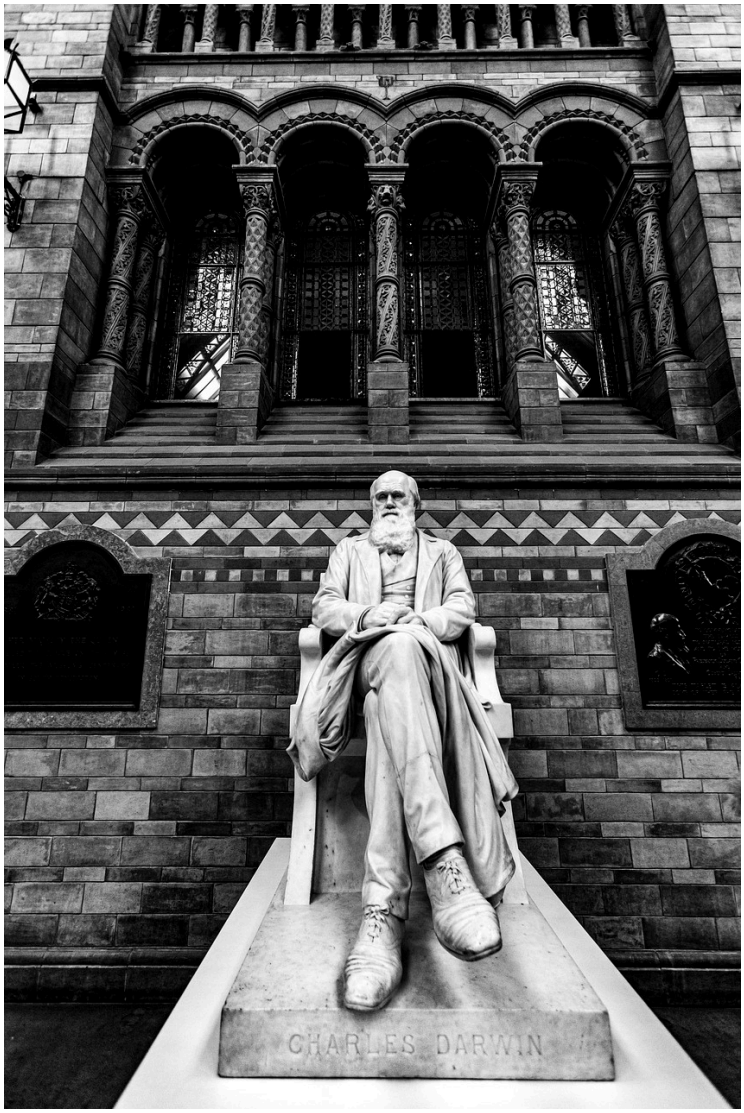
Starting from the premise that any academic discipline should have a social value, in the contemporary context, in a practical way, where does the social value of evolutionary biology lie?

KEVIN LALA



The reasons for this are complex and multifaceted, but in my view it is time to consider the possibility that traditional accounts of human evolution, which rely on the natural selection of random genetic variation, and in which humans are often uncompromisingly portrayed as evolving through the same processes as bacteria and viruses, might appear a little thin to some.

The most obvious answer is that evolutionary theory explains why humans exist (and the rest of life exists too) and how we came to have big brains, language, grasping manipulative hands, and all of our other extraordinary characteristics.

Humans are remarkably curious and thoughtful animals, so providing this explanation in a compelling evidence-based way is a genuine service,

I think. Charles Darwin described the challenge of understanding human evolution as: “the highest and most interesting problem for the naturalist.”

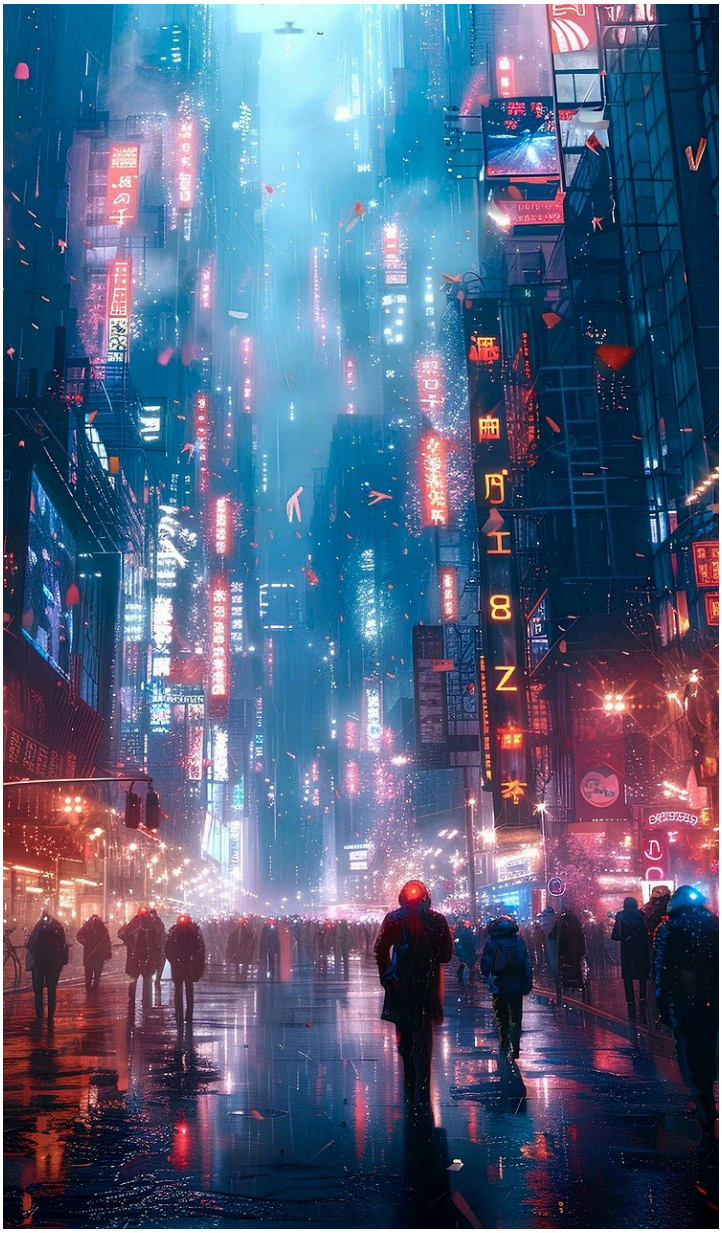
Of course, while there is no controversy among reputable biologists concerning the fact of human evolution, it is true that understanding and acceptance of evolution by the public is often disappointingly low.

Conversely, the increasing acceptance amongst evolutionary biologists that the evolutionary process itself evolves allows rich explanations for human evolution to be based on scientifically validated and widely observed natural processes.

That recognition situates human evolution within a wider explanatory framework without recourse to human exceptionalism.

For instance, humans have culture, but so do many other animals, whose phenotypic plasticity has also helped to direct their genetic evolution, and whose extra-genetic inheritance has also been important.

And that our technology is off the scale is not unexpected once the manner in which dynamical feedbacks between hands, brains, and social interaction networks construct physical and learning environments is appreciated.



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A topic of common interest for biology and anthropology is that of learning and innovation in cognitive terms. Could you expand a bit on this?

KEVIN LALA

While cultural drive may have operated in birds and whales too, in primates there were unique opportunities for social, ecological and technical forms of intelligence to feed back upon each other.

The result was a runaway process that climaxed with the awesome computational power – and hence learning and innovation – of the human mind.

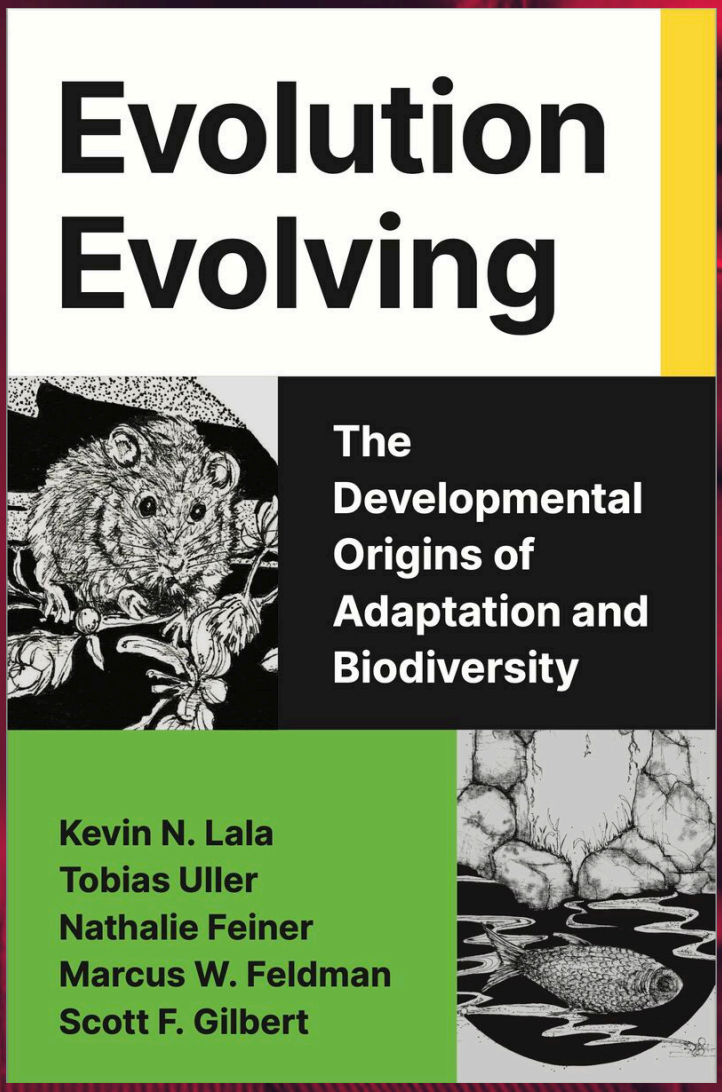
Part of our love for animals comes from the fact that they can be surprisingly inventive. For instance, apes have contrived clever means of extracting palm hearts from trees with vicious spines, whilst gulls have devised the habit of catching rabbits and killing them by dropping them onto rocks.

Yet, at the same time, there seems a huge jump to the capabilities underlying modern humans' ability to, say, design iPhones, compose symphonies, or send astronauts into space.

The big challenge is to understand how that transition was possible. It is undoubtedly complex and multifaceted. But studies of how the brain evolved in primates suggests a key role for a "cultural drive" mechanism, whereby natural selection favored more and more accurate and efficient copying, leading to the evolution of complex tool use and foraging, broader diets, longer lifespans with periods of infant dependence when novel skills are learned, greater innovativeness and better perceptual and learning abilities.

In fact, I've been working with some colleagues on a new book that attempts to explain this new view of how evolution works.

The book will be available for pre-order at the end of June. If you'd like to invite me for another interview, I can tell you more about it...



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Finally, what could you tell us about the future of evolutionary biology?

KEVIN LALA

Evolutionary biology is itself evolving, in my view not just through the steady accrual of new data and technologies, but perhaps in a more fundamental way, with the emergence of a new way of explaining evolutionary change. I believe new data calls for new ways of thinking: ways in which developmental processes are situated more centrally within evolutionary explanation than they conventionally have been.

How organisms develop and behave does more than impose constraints on natural selection: they also direct, and hence help explain, adaptive evolution. Of course, evolutionary biologists vary greatly in the extent to which they regard recent findings as demanding any reconceptualization, as well as on its scale and significance.

For that reason, some of the views that I hold can be contentious. However, it is wrong to portray those different views as indicative of any crisis in evolutionary biology. To the contrary, that diversity of perspective is a manifestation of a welcome pluralism, indicative of a healthy science.

Interviews Kevin Lala