The Physics of Emergence: Left Handed Cricket at UTD

Roger F. Malina in response to Mourya Viswanadha eloquent blog:
Feb 25 2024 x square root of a cricket bat +/- spin:

Hello Roger,

This is Mourya.

I am reaching out to share the draft of a blog post titled "The Magnus Effect: Exploring the Physics of Cricket through Shared Journeys," which I have been working on. You can read it on our ArtSciLab blog https://artscilab.utdallas.edu/blogs/ or appended to this blog

Given the relevance of the topic to our university community, particularly those interested in both physics and cricket and emergence, I believe this piece could make a valuable addition to our university website. Hence, I am seeking your guidance and potential assistance in getting it published.

Please feel free to review the content and suggest any changes or edits you consider necessary.

Thanks,

Mourya Viswanadha

Roger replies:

Thank you, Mourya, for the opportunity to complement, not compliment, and add to your blog post:
Here is some of my spin on your blog:
I

I had never heard of the Magnus Effect so I looked it up:

“The Magnus Effect is an observable phenomenon commonly associated with a spinning object moving through a fluid. A lift force acts on the spinning object. The path of the object may be deflected in a manner not present when the object is not spinning. The deflection can be explained by the difference in pressure of the

fluid on opposite sides of the spinning object. The strength of the Magnus effect is dependent on the speed of rotation of the object." (AI generated, Roger adds)

In astrophysics stars and galaxies rotate and spin but rarely exhibit the Magnus effect.

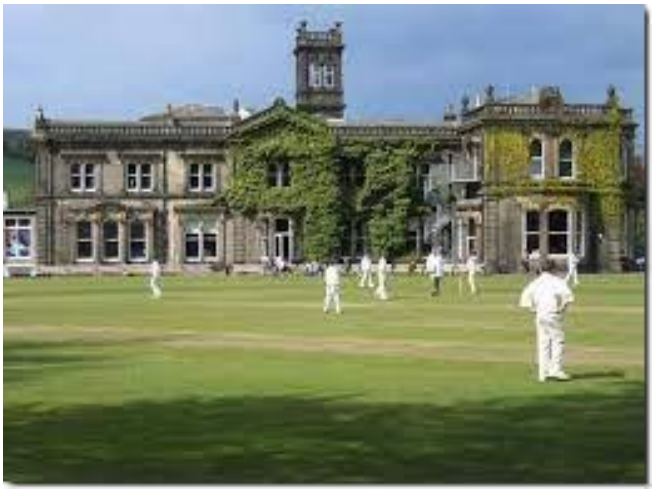
With Fred Turner and Robert Stern and others we are studying the emergence of the Arts and Humanities in our University of Texas at Dallas. I think that the Magnus Effect is relevant to understanding why the Arts and Humanities emerged at UTDallas when it was in no one's strategic plan. Pure auto-poesis triggered by the Magnus Effect. Spin is important in cricket and physics.

I , Roger, nickname froggy, first learned to play cricket when I was ten years old at Malsis school near Silsden in Yorkshire, UK in 1960. The Yorkshire Dales. To my consternation our school is called BAHT or Baht 'at'

"On Ilkla Mooar Baht 'at" (Standard English: *On Ilkley Moor without a hat*)[2] is a folk song from Yorkshire, England. It is sung in the Yorkshire dialect, and is considered the unofficial anthem of Yorkshire.[3] According to Andrew Gant, the words were composed by members of Halifax Church Choir "some 50 years after Clark wrote his melody", on an outing to Ilkla Mooar near Ilkley, West Yorkshire.[4][5]

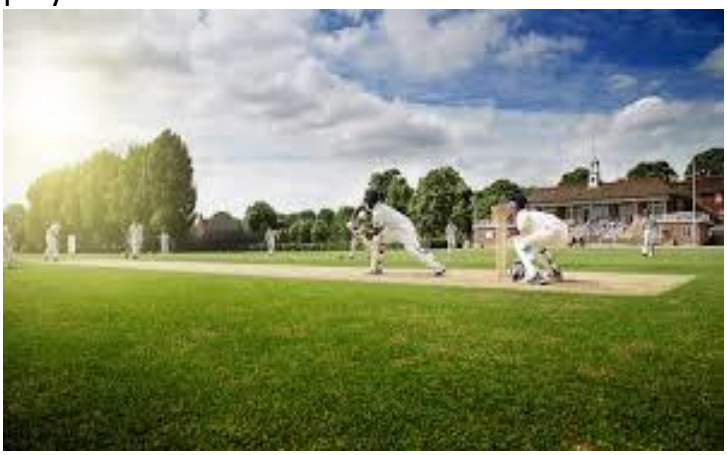
The BAHT school at UTD is https://bass.utdallas.edu/ the Bass school of the Arts, Humanities and Technology on Ikla Mooar Baht at (huh).

A key methodology of emergence is to notice coincidences, synchronicities and serendipities while avoiding apophenic extremes. Well, here I am playing cricket in 1960 BAHT without a hat



I found cricket boring but less dangerous than rugby. Mind you, playing cricket creates time and space when you can daydream waiting for something to do like catch a cricket ball that is exhibiting the magnus effect.

Then I went to Oundle School near Peterborough in 1964 but I never wanted to play cricket.

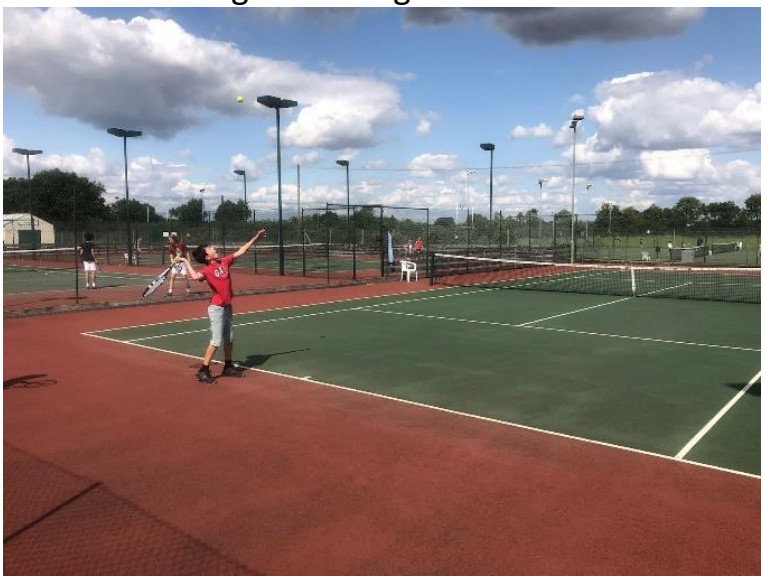


I just played tennis – it was more solitary and egotistical and I got to meet both men and women not just white male cricket players (mind you there were no people from India in our school). So I played tennis (and croquet with my grandmother) where the Magnus Effect is unstudied except in one bachelors thesis:

The influence of the Magnus effect in tennis Ingmar Scholte University of Groningen December 1, 2017 Abstract The Magnus force is a force that acts upon a rotating ball when the ball moves through a fluid. The spinning leads to a

deflection in the direction perpendicular to the spinning axis and the velocity vector. Tennis players strike balls with a lot of top- or backspin. In this thesis, we look to the behavior of a ball played with topspin. Different models are created to explain and calculate the Magnus force of a rotating ball. Finally, we use one of the models in an experiment to find the influence that the Magnus force has on the trajectory of a tennis shot.
(https://fse.studenttheses.ub.rug.nl/16434/1/Bsc_appliedMath_2017_Scholte_SIO.pdf)

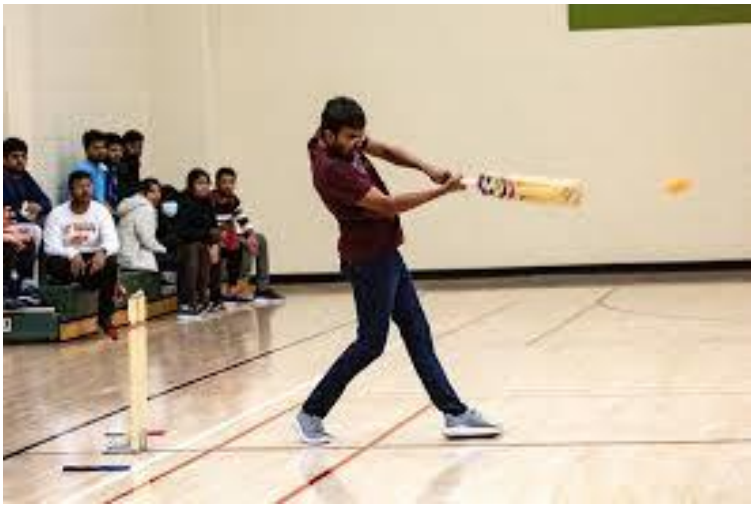
So here is a magnified Magnus effect:



Then I moved to Dallas Texas and learned that our ATEC building was built on a cricket pitch 50 years ago. Some of the founding engineers of our university were cricket players galore.

But there is no cricket pitch now where our Art Barn was, and then the Artbarn was torn down to be replaced with a stupid physics building (I am a physicist with a PhD who is ignorant of the Magnus effect.

So at UTDallas we have to play cricket indoors:



The nice thing about indoor cricket is you can study more carefully the physics of cricket- how and where and when to hit the ball so your friend cannot anticipate where it will go due to the various effects- after all atomic particles have spin too.

This is cricket in Dallas in 1966 while I was at Oundle school playing tennis:

https://magazine.utdallas.edu/2017/06/29/throwback-thursday-a-wicket-time/

In the late 1960s, when campus boasted little more than the Founders Building, the surrounding prairie land was ideal for a pick-up game of baseball or soccer — or cricket.

A cricket match was played July 2, 1966, on a makeshift pitch near where the Cecil and Ida Green Center now stands. Teams consisted of faculty and staff drawn from both the geosciences and atmospheric and space sciences departments of the Graduate Research Center of the Southwest (the University's precursor).

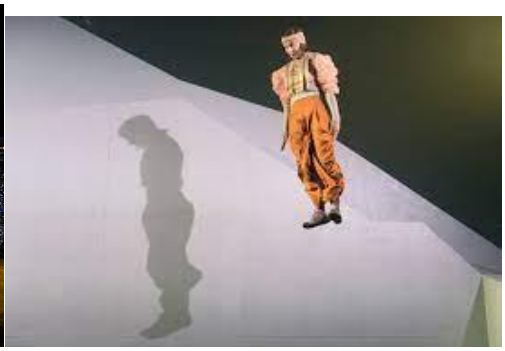
Al Mitchell, who chronicled the early history of the Graduate Research Center and

UT Dallas, wrote that "faculty and staff members of British origin joined in their own 'Fourth of July' (to show no hard feelings, they said)," a light-hearted reference to the defeat of the British by colonists during the American Revolution. The teams braved the July heat and nagging chigger bites, with geosciences claiming the laurels in a 63-24 victory.

Finally, now that I have written about the Physics of Loneliness during the pandemic: https://artscilab.utdallas.edu/2023/08/31/physics-of-loneliness/

And the Physics of Cricket just now, I cannot refrain from mentioning my amazing friend Joao Silveira. Trained pharmacologist, educator of engineers and Brazilian dancer.

https://www.youtube.com/watch?v=WnBys40z_mk who has applied the Magnus Effect to Physics and Dance without knowing it.
Dance Your PhD: Embodied Animations, Body Experiments, and the Affective Entanglements of Life Science Research

Let me end with an AI generated commentary by Mourya

I have emphasized in red the AI generated subservient tone of voice:

Little did I know that my passion for cricket and storytelling would not only lead me to new opportunities but also unite me with a like-minded individual, Professor Roger Malina.

My name is Mourya Viswanadha, and I am currently pursuing my master's in information technology and management at the University of Texas at Dallas. Before my academic pursuits in the United States, I had a cricketing background and cricket has been an integral part of my life. I played professionally in India, representing various age groups for my state side and engaging in club cricket in Hyderabad. Recently, I participated in a Cricket league conducted by the Nairobi Provincial Cricket Association in Kenya before moving to the States to pursue both my academic and cricketing aspirations. As a passionate cricketer and a student of science and technology, my path has been shaped by the love for cricket, Intersection of technology and storytelling, and the pursuit of knowledge.

Upon my arrival at the University of Texas at Dallas, it was pure coincidence I ran upon Professor Roger Malina at the ArtSciLab, a nexus where the arts and sciences converge to explore innovative collaborations. Professor Malina, a distinguished physicist, astronomer, and Executive Editor of Leonardo Publications at MIT Press, is renowned for his work focusing on connections among digital technology, science, and art. As the Associate Director of Arts and Technology and a distinguished professor at UT Dallas, Professor Malina's vast expertise spans various domains, from astronomy to digital technology. As an individual deeply interested in the intersection of technology and storytelling, I pitched my idea for a virtual reality immersive project titled "Qualia: Can Conscious Storytelling Transform Us?" to Professor Malina. To my delight, he approved the project, and it became my current focus at the lab.

But what does cricket have to do with our connection? Surprisingly, Professor Malina's own journey involves cricket. He had played cricket in the UK when he was ten years old, with his first match dating back to 1967. Coincidentally, I also started playing cricket at the age of ten. This shared passion for the sport served as the initial spark for our connection, paving the way for discussions beyond cricket and into the realms of science, technology, and storytelling.

Oops Mourya is left handed and Roger is right handed.

Cricket, a sport beloved by millions around the world, is not just a game of bat and ball; it's a showcase of fundamental physics principles in action. From the moment the ball leaves the bowler's hand to the precise timing of a batsman's shot, every aspect of cricket can be analyzed through the lens of physics.

Less beloved than soccer.

For instance, consider the trajectory of a spinning cricket ball. As a leg-spinner, I manipulate the ball's rotation to generate drift and spin, exploiting the Magnus effect to deceive batsmen. The spin imparted on the ball causes it to deviate from its straight path through the air, a phenomenon known as the Magnus effect. This effect arises due to the difference in air pressure on the two sides of the spinning ball.

Moreover, the collision between bat and ball is a perfect demonstration of Newton's laws of motion. When a batsman strikes the ball, the force exerted on it determines its speed and direction. According to Newton's second law, the force applied is proportional to the rate of change of momentum, resulting in the ball's acceleration. This acceleration, combined with the elasticity of the ball and the bat, dictates the resulting trajectory of the ball after impact. Batsmen aim to time their shots perfectly to maximize the transfer of momentum and send the ball to the boundary.

Furthermore, the conditions of the pitch play a significant role in determining the behavior of the ball. A dry and dusty pitch offers more friction, allowing spin bowlers to grip the ball better and extract more turn. On the other hand, a wet or grassy pitch reduces friction, favoring fast bowlers who rely on pace and bounce. Bowlers must adapt their strategies based on the conditions of the pitch to maximize their effectiveness.

In conclusion, cricket is not just a game of skill and strategy; it's a fascinating playground for exploring the laws of physics. By delving into the physics of cricket,

players and enthusiasts alike gain a deeper understanding of the intricacies of the game and the scientific principles governing it. So, the next time you watch a cricket match, take a moment to appreciate the physics behind every delivery, every shot, and every wicket.

Beyond my academic and cricketing pursuits, I am also fortunate to work under Professor Roger Malina as an Operations Coordinator for the Sigma Xi group, a prestigious scientific research honor society. This role allows me to further delve into the world of scientific research, complementing my passion for storytelling and technology.

Our shared appreciation for the physics of cricket has not only deepened our bond but also fostered collaborative discussions within the ArtSciLab. By integrating our insights from cricket into my immersive storytelling project, titled "Qualia: Can Conscious Storytelling Transform Us?", we aim to explore the parallels between the art of technology and storytelling, unveiling new perspectives on human perception and consciousness.

In conclusion, cricket has served as a unifying force, bringing together individuals from diverse backgrounds to explore common passions and forge meaningful connections. Through our shared journey, Professor Malina and I continue to bridge the gap between sports, science, and technology, demonstrating the profound impact of interdisciplinary collaboration in unlocking new avenues of exploration and discovery.

Let me just conclude (Roger's AI)(I keep mentioning AI because Mourya was accused of using AI to write his Qualia proposal).

The idea of the physics of originated with lab member Ayen Deng – a refugee from South Sudan a victim of sexism and racism all her life including in Dallas. We happenstance on the idea of doing a comic book called "Quanta' and explored the idea that one can use physics to eliminate racism and sexism from our human societies.

1. Are atoms racist or sexist- NO they are smaller than colour and don't have gender except via electrons..opps maybe atoms are sexist and prefer atoms with electrons to ionized ones.
2. Are molecules racist? No water loves every kind of human.
3. Are large molecules like viruses racist or sexist- yes some are.
4. So lets apply physics to eliminate sexism and racism in our societires by shrining humans to the size between water and nasty viruses.

This led during the pandemic to writing and thinking about the Physics of Loneliness. No need to elaborate given the splurge of psychological ailments triggered by the pandemic.

So the physics of cricket is not innocuous. Cricket is sexist- can you tell

https://www.theguardian.com/sport/2023/jun/27/english-cricket-is-racist-sexist-and-elitist-says-landmark-report

so lets shrink cricket balls to the size of atoms and yes lets become pions not pious.

spin, in physics, the amount of angular momentum associated with a subatomic particle or nucleus and measured in multiples of a unit called the Dirac h, or h-bar ($\hbar$), equal to the Planck constant divided by 2π. For electrons, neutrons, and protons, the multiple is 0.5; pions have zero spin.