A New Day

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One of the physics blogs I enjoy reading is by the mathematical physicist Peter Woit, called *Not Even Wrong*.[1] A recent post[2] provided a tantalizing teaser:

> I want to [link to] an insightful explanation of the history of string theory, discussing the implications of how it was sold to the public. It's by a wonderful young physicist I had never heard of before, Angela Collier.[3] She has a Youtube channel,[4] and her latest video is "string theory lied to us and now science communication is hard."[5]
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> … It's as hilarious as it is brilliant, and you have to see for yourself.

Collier delivered her talk lucidly and thoroughly—*all while playing a frenetic video game*! She claimed she used the length of the game to time her talk. Of course we can walk and talk, and ride bicycles and talk, but I have never seen anyone split their mental concentration between a fast-paced video game and an esoteric physics explanation of the history of string theory and supersymmetry—for over 50 minutes! And there was something about her presentation that was completely captivating. It was definitely a serious scientific talk, but the ludicrousness of the game-playing echoed how ridiculous the continued, misplaced fascination with string theory is. Naturally I had to learn more about this provocative physicist.

"First Generation Grad Students"

Her first video, "First Generation Grad Students"[6] about the trials of graduate students, and even undergraduates, who are the first in their families to attain such academic levels and who come from limited academic backgrounds, included a biography of her sojourn from a 120 student high school in Eastern Kentucky to a Ph.D. in physics at the University of Kentucky. (Decades ago I taught math at the University of Kentucky in Lexington for a couple of years.)

As usual, I found her discussion insightful and full of echoes of my graduate experience over 60 years ago—that in itself is a bit depressing. Of course abstract mathematics is somewhat different from the experimental physics and astronomy that she was involved with, but the parallels were still valid. One major difference was that I belonged to the group of students she discussed who benefited from a parent who had a advanced degree and who came from a high school which provided advanced courses, though still limited at that time compared to now. I did experience some

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1 https://www.math.columbia.edu/~woit/wordpress/

2 "String theory lied to us and now science communication is hard", 27 April 2023 https://www.math.columbia.edu/~woit/wordpress/?p=13482

3 http://www.acollierastro.com/

4 https://www.youtube.com/@acollierastro

5 "String theory lied to us and now science communication is hard", 21 April 2023 https://www.youtube.com/watch?v=kya_LXa_y1E

6 "First Generation Grad Students", 16 August 2021 https://www.youtube.com/watch?v=e-GKGF-zXi4

deficiencies, however, at the graduate level, having done undergraduate work at a small liberal arts college rather than a large university. On the other hand, I also did not have to work long hours at McDonalds that sucked precious time and energy from studies. Given the hours I put into studies I can't image how Collier managed to survive.

"A Scary Science Data Story"

I jumped to watch a later video "A Scary Science Data Story"[7] about the depredations of fake data in experiments on spiders that went undetected and uncorrected for over a decade. It was a fascinating expose of how the fake data was discovered, but it was an equally fascinating discussion of the impact the tainted early papers had on later research and on the professional integrity of scientists referencing these papers or even working with the perpetrator of the fakes.

"That Whole Pluto Thing Was Wild"

I next watched "That Whole Pluto Thing Was Wild",[8] which took the interesting view that the demotion of Pluto from planethood was a rare moment, perhaps never to be seen again, when the entire society understood a scientific happening and wanted to have an opinion. These opinions often were based on nostalgia or non-scientific arguments, seemingly showing their subordination to the hard facts of science. Then Collier took the discussion in a different direction by challenging the supposedly scientific definition of a "planet" that led to Pluto's demotion, and gave life to those who wanted to keep Pluto in its place in the firmament.

"Women in Space"

I was intrigued next to watch her "Women in Space",[9] which was a send-up of NASA's early difficulties in handling the idea of women astronauts, though the Russians, with whom they competed in everything, seemed to have no trouble with the idea. Collier's mining of historical detail and commentary and her wry humor were devastating.

A brief recitation of some of Collier's videos does not do justice to her efforts. A lot of contemporary videos, especially by the younger practitioners, are spoken rapidly, seemingly to keep them short and pithy. But Collier's conversational pace and judicial pauses that let important points sink in are masterful. She is a superb storyteller.

"Sexual harassment and assault in Astronomy and Physics"

She is so successful, that after her "Women in Space" video I tackled her "Sexual harassment and assault in Astronomy and Physics"[10] effort at over two hours!—an hour is usually my maximum.

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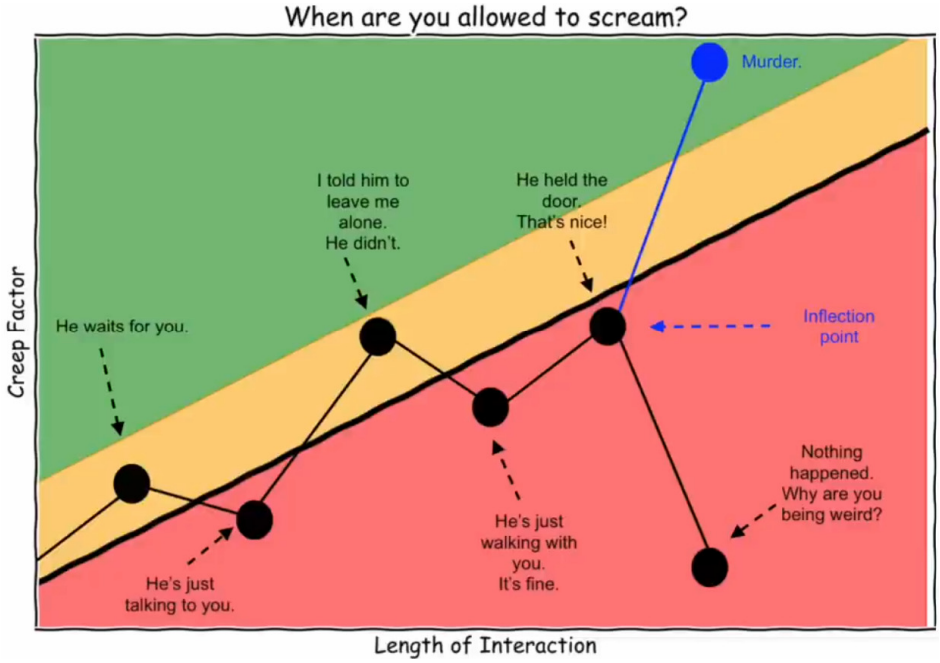
7 "A scary science data story", 11 October 2022 https://www.youtube.com/watch?v=qlas3TOi_CQ
8 "That whole pluto thing was wild", 20 November 2022 https://www.youtube.com/watch?v=TwCbMJmgShg
9 "Women in Space", 26 September 2022 https://www.youtube.com/watch?v=WBlzD6MZ9A0
10 "Sexual harassment and assault in Astronomy and Physics", 24 August 2021

This is certainly a fraught topic and has become even more timely with the intensifying war on women we seem to be anachronistically engaged in. Those of my generation and immediately after, who weathered the Civil Rights movement, the Vietnam War protests, and the Women's Liberation, never imaged we would be back at square one after 60 years. But maybe we are not quite at square one. Perhaps the marvelous talent of so many youth bursting forth in the new media heralds "a new day," or the perennial reaffirmation of the American hope. I have been impressed with the number of women and multiplicity of ethnic backgrounds that have taken to media, such as Youtube, to communicate the excitement of math and science and the possibilities for anyone to participate. Angela Collier's videos are certainly a prime example.

Her sexual harassment video was extremely well done. It was not polemical but rather very nuanced and insightful. She disarmed any general male defensive posture by claiming that the problem is not with all men, but rather a very small fraction of serial offenders. This observation explains why most men do not see the problem—because it is generally not an issue with them or their male friends. After recounting some specific, publicized cases of extended sexual harassment in the science world, Collier then presents a marvelously nerdy graph that captures the ambiguities of the problem from the female point of view.



I would have reversed the colors, since behavior in the area above the yellow band is unacceptable, whereas behavior below the black line can be interpreted as acceptable. As the length of an interaction with a female grows, the serial harasser evinces increasingly predatory behavior, but keeps it close enough to the black line to be ambiguous to an outside observer, that is, it is behavior that can be dismissed as innocent or not rising to the level of a problem. The black dots represent an actual situation that Collier experienced with a man that ended when she was able to close and lock a door on him and escape his stalking. She argues that the response by an outsider would be that nothing happened, so she should not make a fuss. However, she cited a case where all the events represented by the black dots up to the inflection point also occurred with another women. But she was not able to close and lock the door, and was raped and murdered.

Given the small number of men involved, Collier argued that an obvious solution would be to remove them from the situation. She admits this is a controversial solution. Many of these men are science paragons and the implication is that their contributions outweigh their bad behavior. But she counterbalances that argument with the huge number of women who are driven from science and could have made just as significant contributions. Collier has the courage to tackle the example of Richard Feynman. I have to admit I was rather appalled when I read his books years ago to learn of his repeated attempts to seduce the wives of his colleagues. Collier quoted some of his remarks from his books that I had forgotten and that were quite misogynistic. As a measure of the difficulty, my first reaction was that Feynman is not so easily dismissed in that his contributions were rather unique and not plausibly replicated by others. On the other hand (a la "Fiddler on the Roof") proven mathematical geniuses have died young and left the world bereft of their unique contributions as well, and we have to accept it. On a wider canvas we only have to look at the tolerance of serial offenders as presidential candidates to gauge the depth of this issue.

All of which is to say that Collier's presentation is nuanced, sincere, and heart-felt. She sheds light and empathy where indifference and pain are dominant. Her suggestions may not be the final solutions, but I found her discussion to be the most helpful and constructive of any I have come across. I certainly have a better understanding of the women's point of view, and that is essential.