Science Fiction Book Club
Interview with Karen Burnham (September 2021)

Karen Burnham is a physicist and electrical engineer working in the aerospace industry, and a book reviewer and critic on the side. Her writing has appeared in the New York Review of Science Fiction, Locus, Cascadia Subduction Zone, and Strange Horizons. In 2012 she was nominated for the British Science Fiction Award for Best Non-Fiction. She wrote the Modern Masters of Science Fiction book on Greg Egan, which was published in 2014. The book includes a rare interview with the famously press-shy Egan covering his works, themes, intellectual interests, and thought processes.

Eva Sable: Do you recommend a particular entry point for reading Greg Egan's work? I did read Zendegi and Permutation City 10 years ago, don't have strong memories or opinions about either book.

I generally recommend that people who enjoy short fiction start with *Axiomatic*, a collection of his work from the early to mid-1990s; I think it holds up very well over time and gives a sense of his breadth. Nowadays a similar recommendation would be *The Best of Greg Egan* from Subterranean press, which of course has more of his recent work.

For people who prefer novels, I may be biased because it was one of the first Egan books that *I* read (and also reviewed), but **Schild's Ladder** (2002) is my go-to. It's got far-future, post-humans, weird physics, and interesting social structures and the science in it is understandable to most science fiction readers. There are scenes in it that still make me laugh.

Damo Mac Choiligh: I have always been struck by how Egan blends the mathematical and scientific with such beautiful writing. It's clear enough that he is a talented mathematician and theoretical physicist who understands as well as the next person what the equations are saying, but where did the talent for turning this into prose come from? Did he study particular examples of those rare few writers who can write lyrically about science but retain intellectual rigour?

That's a lovely observation! To the extent you can track down Egan's "influences" they're almost as much non-fiction as fiction (Hans Moravec's **Mind Children: The Future of Robot and Human Intelligence** [1988] seems to have planted many story idea in Egan's early work), although he says that growing up he pretty much exhausted his library's store of science fiction in print up to the 1970s. I suspect that what we read as really beautiful writing comes from Egan's innate sense of trying to communicate very complex concepts clearly, which is especially hard when you're trying to convey things that are inherently spatial using only words. At the end of **Diaspora** (1997) I remember thinking that reading one of his passages was the closest I was ever going to get visualizing five dimensions.

Michael Everts: In Dichronauts, one of my all time favorite novels (to both read and review), we understand the walkers to see east/west and the siders to "ping" north/south. Maybe it is an insignificant thing to spend too much time thinking about, but is it your understanding that walker and sider have 360 "sight" without gaps or hesitation in field of vision? Or they are still limited?

This is where I have to own up to the fact that I haven't kept up with all of Egan's fiction since I finished the book. When I turned in the final draft the most recent work he had out was the finale of the **Orthogonal** trilogy (he was kind enough to send me a draft of Book 3 before publication so I could include it). Since then I've picked up a monthly short fiction reviewing column and haven't had the chance to read even a fraction as many novels as I'd like to. My sense from poking around his website (where he has detailed technical notes on all his more "weird physics" novels, which was invaluable to me especially in trying to explain the physics of the **Orthogonal** universe) is that there would be blind spots where neither the walkers nor siders could see due to the hyperbolic nature of space there, but don't in any way take that to be definitive.

Stevie Book: Gardner Dozois described Greg Egan as being the most influential hard science fiction writer since William Gibson. Which works by Egan would you consider to be his most influential?

I think that **Permutation City** (1994) did just about as much with the concept of uploading human consciousness as it was possible to do at the time, and a lot of authors working in and around cyberpunk in the early 1990s took notice. That combined with the exploration of modifying human consciousness in "Learning to Be Me" (1990) and "Reasons to Be Cheerful" (1997) seem to have stuck in the minds of many other authors working at the same time.

Stevie Book: Greg Egan often writes about transhumanism & posthumans, As plot is driven by character, how does he make these individuals --who are no longer subject to the limitations & rigours of the human condition-- sympathetic & their stories relevant to the reader?

Some people would say that he doesn't! But I agree with you, I've found his posthumans to be just as interesting and relatable as any of his near-future characters. One way I think he does it is to put them in situations where we recognize the outlines, even if the details are exotic. What I'm thinking of is how often his characters, especially his post-humans, end up in the classic "man vs. nature" conflict structure, where they have to *understand* their way out of the situation they find themselves in. This is hard for any of us in our lives and we can relate to their struggles. I think he also does a good job bringing in domestic details--who they partner with and why, how even posthumans might end up parenting, dealing with aging, etc.--that again tap into the universally recognizable human experience even with a far-removed slice of "humanity."

John Grayshaw: What makes Greg Egan interesting from a critical perspective? What first drew you to his work?

There are all sorts of reasons that people are drawn to science fiction, but as a technical person myself (physics and electrical engineering) there's a part of me that will always appreciate when science fiction gets heavily into the "science" end of the spectrum and helps me look at our universe in a different way. I think this is also why for at least a generation Isaac Asimov's "Nightfall" (1941) was lauded as one of the best sf short stories ever, and why I'd argue that Ted Chiang's "Exhalation" (2008) would have a

credible claim to that title now. So when I found Egan's work in the early 2000's it hit my sweet spot. He's also more willing to portray working scientists as protagonists than average.

From a critical perspective I think that Egan lies at an extreme that is illuminating about science fiction more broadly. With his stories where you really need to sit down and work out the physics in the margins such as **Orthogonal**, he's pushed the boundaries of how much intellectual engagement you can expect from a reader--no one would accuse Egan of underestimating his readership's intelligence! But he's done it at the same time that he's also had intensely character-focused stories such as "Reasons to Be Cheerful"--and he's won both audience and critical acclaim as seen in his awards list. That's a balancing act few others have pulled off.

John Grayshaw: Do you have personal favorites of his work? And why?

I think it's probably clear by now that **Schild's Ladder** is one of my favorites of his; but I also have a place in my heart for **Diaspora** (1997) because of the amazing directions in which human evolution opens up at the end. And the opening sequence of "Glory" (2007) is a masterpiece of hard sf.

John Grayshaw: What are some of Greg Egan's work that you feel should be better known than they are?

Diaspora, definitely, as mentioned before, and I also did a deep dive into "The Planck Dive" (1998) in the introduction to my book since I feel like it has all the strengths and weaknesses that make Egan the author he is. Even though the premise was probably driven by a particular science vs. postmodern humanities conflict that was flaring up in the late 90s, I think it holds up well.

John Grayshaw: Who were some of the writers Greg Egan grew up reading?

As a young reader he was hoovering up just about all the popular science fiction that was in print in the 60's and 70's, and he specifically mentioned Clarke, Asimov, Dick, and Delany.

John Grayshaw: Who are some writers that are Greg Egan's contemporaries that he enjoys/admires?

He mentioned not being particularly impressed with **Neuromancer** (1984) when it came out, but appreciating Rudy Rucker and Bruce Sterling more. (Which makes sense, *many* people who know I'm into Egan recommend Rucker, but I've never found the right entry point--something about his style hasn't worked for me so far.) He enjoyed Vernor Vinge's first stories about the Singularity but doesn't find it terribly convincing as a potential real-world event.

John Grayshaw: Does Greg Egan have favorites of his own works?

In 1993 he said "Learning to Be Me" was his favorite, and when I asked (the interview at the back of the book was the product of 70+ emails spanning 2010-2012) he cited "Reasons to Be Cheerful" both

because of how the focus on the materiality of consciousness ("which I think is one of the most important insights of the last three hundred years" he said) and also because of his satisfaction with how the style and narrative voices came out.

John Grayshaw: How has Greg Egan's degrees in mathematics and work as a computer programmer shaped his writing?

Obviously they've given him tools that's he's used throughout his career, both in terms of drilling down to the fundamentals of physics and playing with the math of the universe and programming the really cool displays of bizarre physics on his website. But I think his innate curiosity and scientific mindset has done more to shape his writing--this is the kind of person who plays with mathematical theorems for fun (see his Twitter account for more examples).

John Grayshaw: What kind of research does Greg Egan do for his books?

It definitely depends on the book; he traveled to Iran to gain experience for **Zendegi** (2010) but that isn't feasible for his off-world books. There are textbooks, arXiv articles, all the standard sources. I also appreciated this bit: "For a certain kind of hard SF, the nice thing is that you can usually check everything by consistency as well as against published sources. I used a few general relativity textbooks when I was writing **Incandescence**, so whenever I calculated something that was mentioned explicitly in one of those books, I could be sure I'd got it right; but for all the other results I needed, there were usually at least three different ways I could analyze the situation, so if I got the same answer by every route, I could be fairly confident that I hadn't made a mistake along the way."

John Grayshaw: What does Greg Egan like about writing short stories and what does he like about novels? And does he prefer one over the other?

That's not something that came up in the interview; he seems to pick the right length for the idea at hand, whether that's a short story for "Learning to Be Me," a novella for "Mitchondrial Eve", a standalone book or a full trilogy.

John Grayshaw: Greg Egan was asked in an interview with Andrea Johnson what the trick to including so much technical information into his writing is without losing readers and he said *"The real trick is to take it for granted that the reader is intelligent, engaged and curious, and would be bitterly disappointed if a story contained an amazing idea but then dumbed it down or glossed over the details."* …Does this make his writing too difficult for some?

Definitely! If you want some entertaining reading find Adam Robert's review of **Incandescence** in *Strange Horizons* and Egan's response to it on his website (one of the only times he's responded publicly to a review). You can find links to both at the Wikipedia page for the novel. But in 2012 Egan was pointing out that his hard physics books have historically sold better than his more near-future

humanistic ones and I suspect that now he's catering to his core fan base as well as writing the things that interest him the most.

John Grayshaw: Greg Egan does not attend science fiction conventions, does not sign books, has said that he appears in no photographs on the web, and always claims that none of his friends are other writers. Why is he so secretive?

I'll quote from a 2009 interview he did for *Virtual Worlds*: "It's funny; I spend my long weekends mowing the lawn and visiting friends, and get described as a "recluse" by people whose idea of normality is dashing around a dreary hotel somewhere trying to get photographed next to someone famous."

He's indicated that he's not much one for speaking in public, and that's a hindrance if you're trying to do publicity things for a writing career. But he's hardly a hermit; he was traveling extensively in the early 2000's to do work trying to improve conditions for refugees held by the Australian government.

John Grayshaw: Do you think this reclusiveness has hindered his career at all? Why do you think Greg Egan has never become a "household name?"

I think at this point his "there are no pictures of me on the internet" logo is part of his personal brand that his fans rather enjoy, and in a way it's brought him a slightly heightened "air of mystery". I think the reason he's never become a household name is simply because his writing is so niche. But he's definitely had the success I think he most desired: he hasn't had a day job since 1992 and has made his living solely through writing since then--the Hugo award and other nominations have to be a nice bonus as well.

John Grayshaw: What are some of the most interesting things you've found in your research of Greg Egan?

When I did my physics degree quantum physics was by far my weakest subject--it's one of the reasons that I later went to graduate school for electrical engineering instead of continuing in physics (also I truly love electromagnetics). In a great example of "if you really want to understand something, teach it," in having to explain the quantum physics in books like **Quarantine** (1992) I finally reached a deeper understanding of the subject than I ever had before. I was also glad to learn more about information theory (in the context of the question if it would be possible to upload/digitize human consciousness) from books by folks like James Gleick and N. Katherine Hayles. On that topic I've come to the opinion that uploading human brains is a bit like interstellar or intergalactic travel--there's nothing in the laws of the universe that prohibit it in any way, but from an engineering/logistics perspective it is apparently so difficult that I don't expect it to happen either in my lifetime or in any foreseeable future.

John Grayshaw: What was it like to interview Greg Egan? Did you actually meet or was the interview done remotely?

The interview was all over email, over the course of three years as mentioned above. He was incredibly gracious, and it helped that there was no rush to any of his answers so he could really respond thoughtfully as time allowed between his other writing tasks. I also tried to avoid pestering him at times when I knew he was on deadline for something. Looking back on it I'd say I didn't always avoid the trap of asking questions that tried to make myself look smart, but his answers are almost universally insightful. I was incredibly lucky to be able to ask him questions in parallel with the reading and research I was doing, so that when I tripped across something interesting I could shoot him a question about it in real time. (The timeline for the book was roughly that I wrote the proposal and had it approved in 2009, spent all of 2010 and half of 2011 reading everything Egan had written to that point, had my first baby in 2011, spent most of 2012 doing the research needed to be able to write intelligently about the different subjects I wanted to tackle in the book, 2013 getting the draft in order and through the editing process, and I finally got to hold it in 2014 a few days after my second son was born. By coincidence that process spans almost exactly the same time period as my tenure working at NASA's Johnson Space Center, 2009 - 2014.)

Speaking of gracious, he also sent me his entire database of every story he'd had published--when each one was first written, where it was first submitted, all the places where it got rejected, and where it finally got published with the dates. That kind of primary source was invaluable to me putting together a timeline of how his writing evolved.

John Grayshaw: In the interview with Andrea Johnson, Egan was asked specifically about your Master of Science Fiction book on Egan and he said:

I wouldn't use the word "Master" about anyone; outside the context of masters and apprentices in pre-industrial Europe, it sounds comically bombastic to me. But I suppose they couldn't call the series "Some modern SF writers whose work we hoped might be interesting enough to sustain book-length monographs." I'm grateful that Karen Burnham felt it was worth devoting so much of her time to the subject, but clearly I'm not part of the target readership, so I'll leave it to other people to offer opinions on the book."

…What was your reaction to this?

When I read that I felt a huge wave of relief. With the comment "clearly I'm not part of the target readership, so I'll leave it to other people..." I knew that whatever thoughts he might have about the book (and while he's never shared any opinions with me privately he also hasn't blocked my email address, so he must be fairly OK with it) he wasn't going to attack it (or me) publicly.

John Grayshaw: Gardner Dozois said that Egan writes fiction that changes "the way that other science fiction writers think about the future." Do you agree with this? Who are some of the writers he has influenced?

I do agree with this, especially in terms of a) how authors think about potential post-human futures (an example might be Charlie Stross's books like **Glasshouse** [2006]) and b) authors who really want to take

readers deep into esoteric territory--Ted Chiang springs to mind. Some folks who have been open about looking to or being inspired by Egan's work include Robert Reed, Joan Slonczewski, Gwenyth Jones, Alastair Reynolds, Jo Walton, and Karl Schroeder.

John Grayshaw: Are any of Greg Egan's works under option for movies or TV?

Not that I'm aware of; the fact that many of his works would be difficult to dramatize visually or to package for a mainstream audience contributes to him not being a "household name"--although when you think that Ted Chiang's short story "Stories of Your Life" got turned into a major motion picture in **Arrival** (2016)--Ted is one of the most brilliant fiction writers of his generation, but I couldn't say he's a household name either.

John Grayshaw: Does Greg Egan have any particular writing habits or routines he sticks to?

Reading back through my interview with him I realize that I didn't get much into the craft side of writing; probably because I'm not a fiction writer myself so those questions didn't spring to mind.

John Grayshaw: What are some of Greg Egan's hobbies other than writing?

He was deeply involved in humanitarian refugee work in Australia from 2002 to 2006, which informed quite a bit of his writing around that time. From his Twitter feed you can tell that he also simply enjoys playing with mathematics, both as research for his stories and just for its own sake.

John Grayshaw: What is Greg Egan's legacy?

I think we'll look back and say that his influence on the field was most pronounced in the decade from 1992 to 2002, when he was writing a wide variety of stories at a fairly blistering pace that covered both deeply humanistic topics as well as the most arcane scientific ones. He certainly showed that there's an audience that's willing to follow a writer down some pretty deep rabbit holes. He opened up realms of possibilities, especially for post-human evolution, that encouraged other writers to dream their own versions.

I'll close with this quote from our interview, which I suspect holds as true now as it did in 2012:

"If I'm pleased with one general achievement, it's to have contributed something to the very small subset of literature that engages in a meaningful way with the full context of human existence. The fact that we are part of a physical universe whose laws can be discovered through reason and observation is the most profound and powerful insight in our history, but most literature... either ignores it or trivializes it...

So, while I'm sure that the individual works I've written have only succeeded to varying degrees, I'm still proud to have done something to nudge the center of gravity of contemporary SF some microscopic distance toward a genuine engagement with reality."