Scala Exchange 2018

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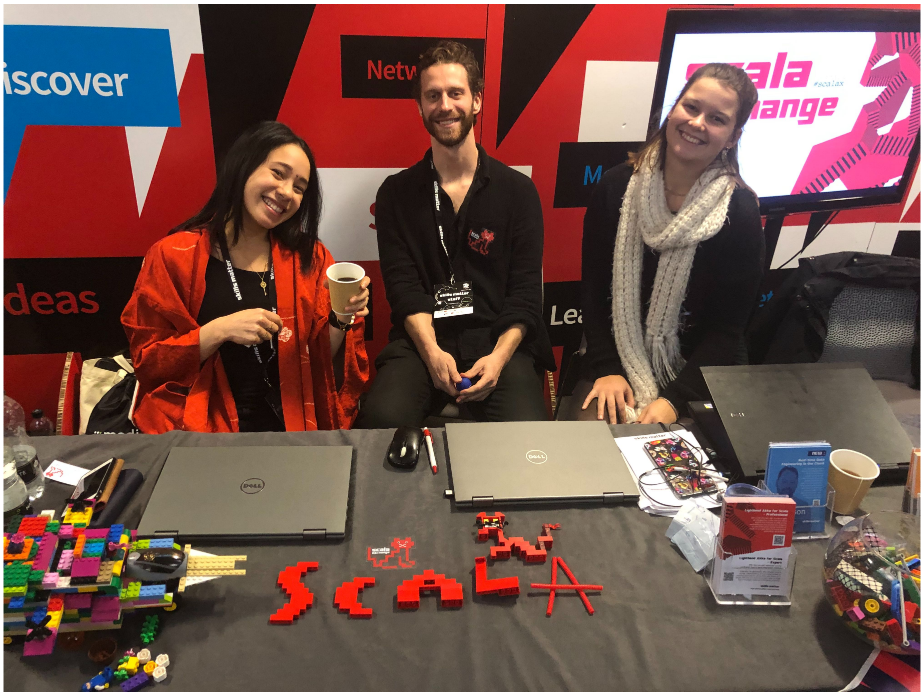
Scala Exchange 2018

- In 2018, I was lucky enough to go to 3 conferences!! Such is the munificence of Springer Nature
- Time to share back
- There were more than a few interesting talks, so I picked the 5-6 most notable, did a thumbnail sketch of those, and crammed it all into 22 slides.
- I'll skate lightly over the technical talks, and dwell more on the high-level and touchy-feely ones.
- If any of these spark your imagination, or if you want to dive into the detail, the full videos of them are all online and easily found.

The torch of Scala is still burning bright



and speaking of combustion, there was a “fireside chat” between Martin Odersky and Simon Peyton-Jones. Without an actual fire obviously.

As they are the respective frontmen for Scala and Haskell, expectations were high, and were not disappointed.

Martin Odersky (principal author of Scala)

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Simon Peyton-Jones (a lead developer of the Glasgow Haskell Compiler)

When champions meet

- SPJ: FP is on a long slow burn, fundamentally reshaping software development. It's a grand experiment. When the limestone of imperative programming has worn away, the granite of FP will be revealed! You are the granite.
- MO: The strongest influence on Scala initially was Ocaml
- SPJ: C.A.R. Hoare: "Haskell is doomed to succeed". Compile everything into a small statically typed core. There are 8 fundamental constructors for types. Everything else on top of this is just syntactic sugar.
- MO: On language size: Scala is unfairly regarded as large. In fact Haskell is slightly smaller than Scala but only if you neglect the language extensions! C# and F# are much bigger.
- SPJ: Haskell now has SO MANY language extensions that a lot of programs start with a whole page of them. Is the language menaced by heat death due to complexity? Somebody will come up with a clean implementation. Mostly, the cost of complexity is superficial - The main problem is just coping with the sheer volume of new features that people want to cram in, most of which can be cleanly accomodated with the existing architecture.

More words of wisdom from these giants of FP

- SPJ: I didn't think Rust could ever have a proper, sound foundation - but now it does!
- MO: want to add algebraic effects - like monads, but they commute!
- SPJ: don't quite know how to finesse the choice between being strict and lazy - make the language agnostic.
- MO: Macros are still very experimental. The community took control. Trying to sort it out with Scala 3. The compiler team is dragged behind - catching up with what the community wants.
- SPJ: GitHub are using Haskell for verification. They can't wait for the next version with its quantified constraints. Industry is actually more demanding of new features than universities.
- MO: I envy Haskell its significant white space.
- SPJ: Happy for Idris to crush Haskell! But first it would have to improve and generate lots more tooling. Meantime it's a wonderful source of ideas.

Meetings With Remarkable Trees by Bodil Stokke

- Part of the secret sauce of Clojure is PersistentVector, a novel and ingenious data structure for efficient hashmaps
- Based on Bagwell's theory of the relaxed radix, a mechanism for fast indexing
- The relaxed radix balanced tree (RRB tree)
- Can be derived by starting with a really simple (if quirky) algorithm based on arrays of 4 cells
- You list the performance characteristics of basic tree operations, then repeatedly tweak until everything is O(log n)

For the gory details, watch the video

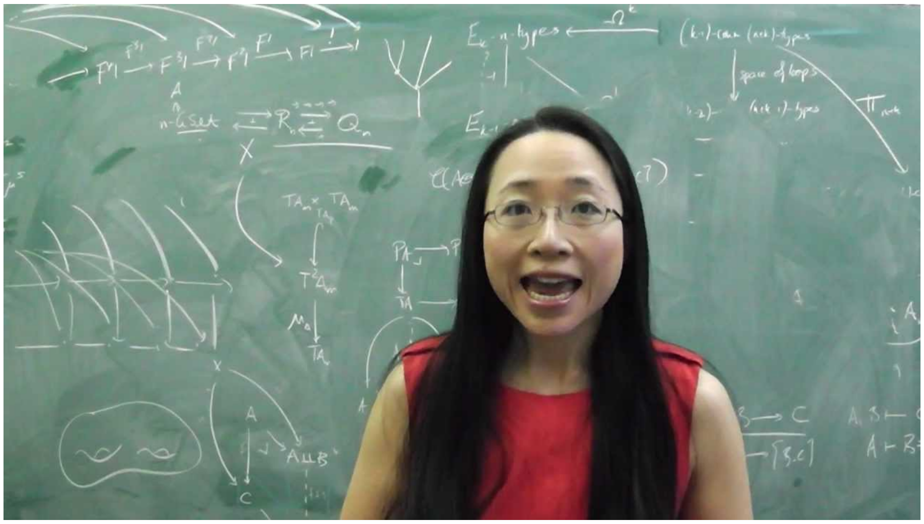
Cobind and Chill by Danielle Ashley

- This talk was about comonads, the lesser-known evil twin of monads. They are just the dual construction of monads, derived by flipping all the arrows!
- So it's the same theory, but has rather different interpretations and applications in the (pseudo-)categories we work with.
- One such application is digital signal processing (DSP).
- The speaker demonstrated a bunch of comonadic code which applied everyday signal processing operations (like Fourier transforms and convolution) in a typesafe way to decode analog signals from 1970s-era TV broadcasts.
- The punchline: decode the much-loved BBC test card complete with faithfully reproduced analog glitches with bleeding colours and spurious dots. So you know it's the real deal.

Heady nostalgia for the lost world of analog A/V technology

- One detail was that you can't use Arduino hardware for this, because the transmitting frequency is too high (16 MHz).
- Also the way that colour information was retrofitted onto the B&W signal is analogous to the retrofitting of stereo onto the monaural sound encoding used in Thomas Edison's original gramophone players.

Keynote: Conveying the Power of Abstraction by Eugenia Cheng

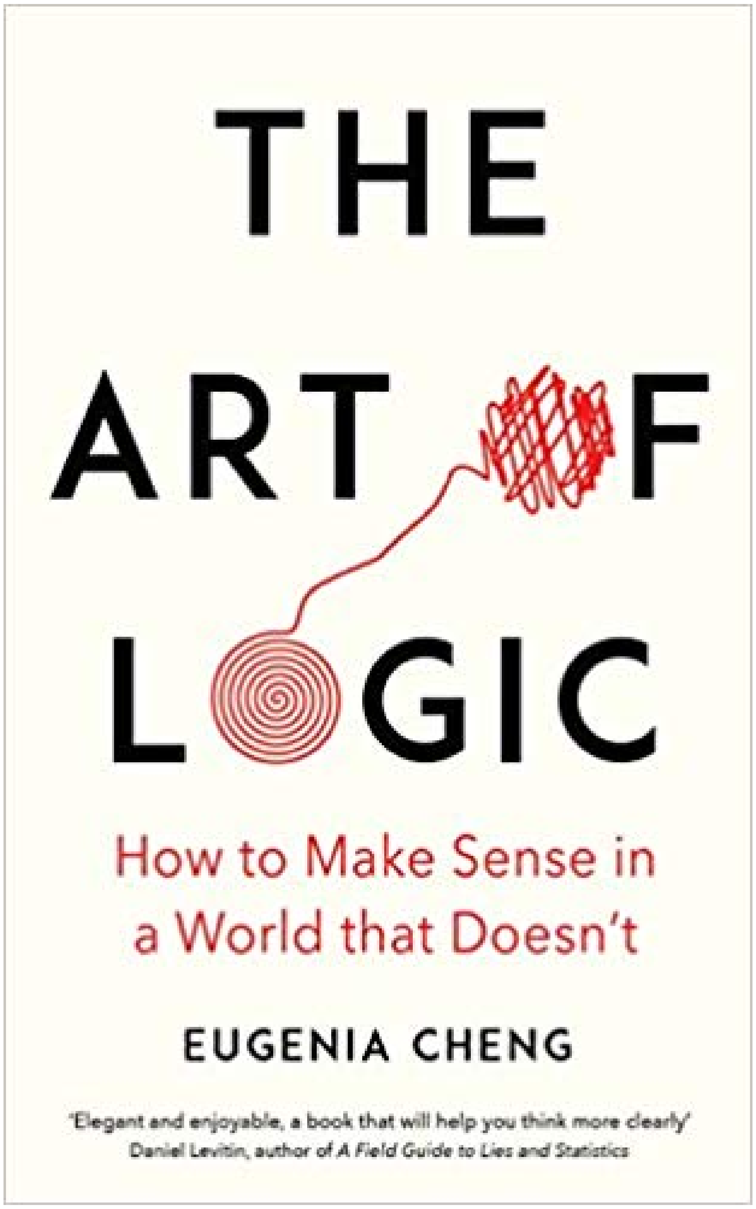


Eugenia Cheng is a mathematician and concert pianist who has become the unlikely media-friendly face of category theory.

It all started with the charmingly abstract Catsters videos (each 10 minutes long) which you can see on YouTube.

She also spoke at Lambda World, so is now active on the tech conference speaker circuit as well.

They were giving away copies of her new book:


THE
ART OF
LOGIC
How to Make Sense in a World that Doesn't
EUGENIA CHENG
'Elegant and enjoyable, a book that will help you think more clearly'
Daniel Levitin, author of A Field Guide to Lies and Statistics

It has a whole chapter just about analogies.

I regifted mine to my 10yo niece, who wants to be a famous woman scientist when she grows up.

Eugenia Cheng pursues a worthy goal

- Motivation: find out why people get turned off maths, fix it!
- Teaches maths/abstraction to art students at a liberal arts college in Chicago. The art students find it useful for “thinking about stuff”.
- She used to think of research on category theory as eventually trickling down to the real world. Now sees it as: A tool for helping us to think.
- Paraphrasing, maths is a tool for people who want to communicate ideas precisely and unambiguously.
- (Understatement) There are a lot of people very much not doing this in our world today.
- Gives examples of concepts from identity and gender politics where you can at least try to lower the temperature by clarifying the concepts under discussion.

Reminded me that this is why I like maths - it’s civilized, and it takes for granted that everybody’s decent and we’re all searching for the truth together.

The next talk is more of a call to arms:

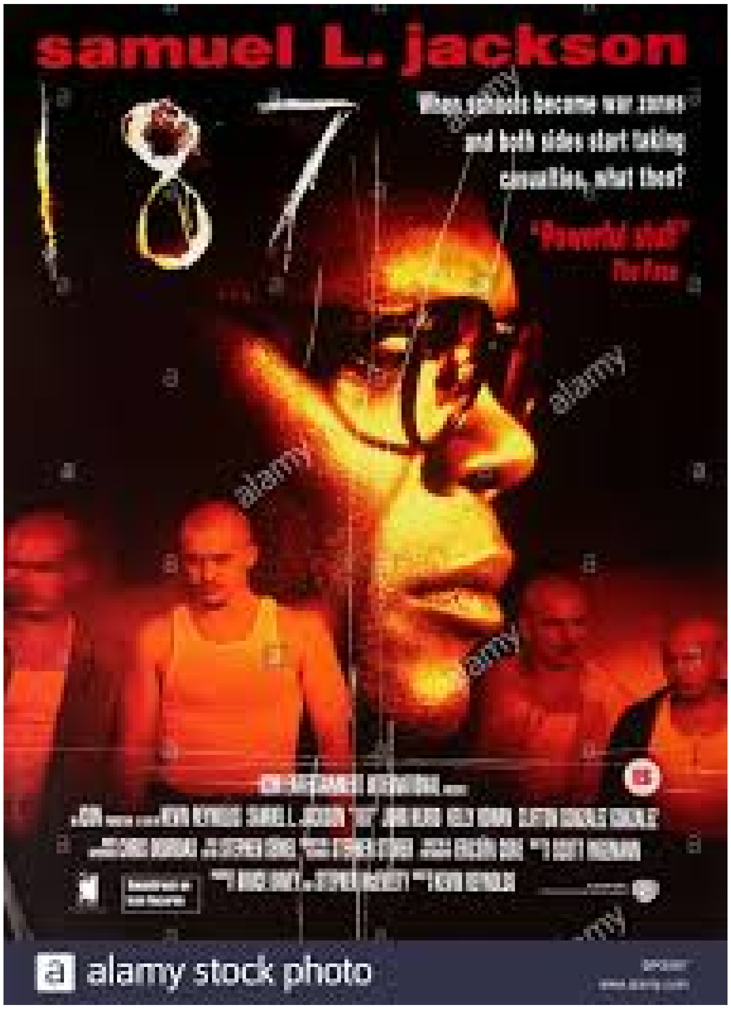
How to fix the UK software education crisis

TWO SPLENDID FREE GIFTS Inside!
The Magnet 2D
FREE! 2 Photogravure Postcards of BRITAIN'S DEFENDERS GIVEN FREE Inside!
The SIT-IN STRIKE at GREYFRIARS!
No. 1,511. Vol. LI.
EVERY SATURDAY.
Week Ending January 30th, 1937.

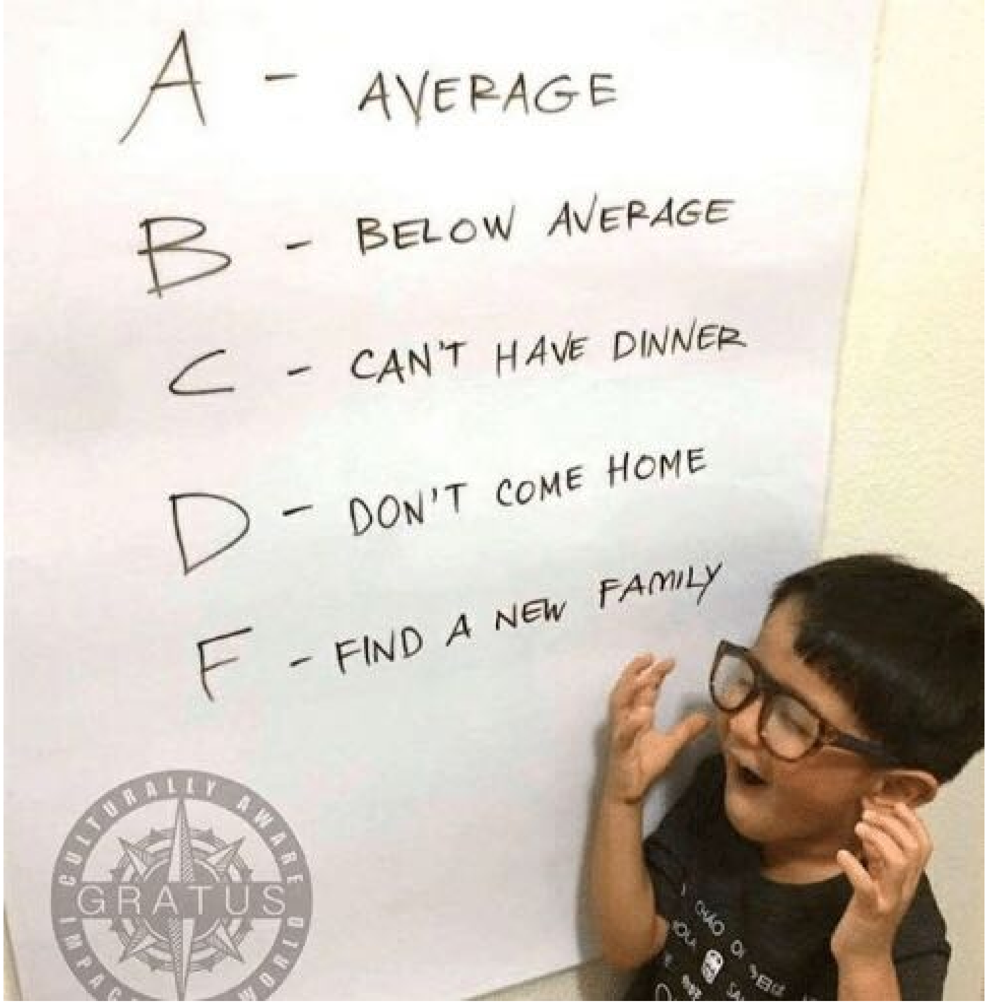
How lucky we all are here to be skilled, highly compensated professionals with good life choices

- Let's spread the joy
- Motivating you to volunteer in schools to help pupils interested in learning about technology.
- Initiative by Morgan Stanley: perhaps not the first name you'd think of in charitable initiatives, but they are really serious about this and support it at management level. It's even taken into account during annual performance reviews
- You have the skills to make up for the lack of teachers who can effectively teach this curriculum.

What is volunteer teaching actually like?



Schools vary of course



You want to be the willing helping the keen

- There are not that many schools in London.
- So actually, we have the numbers to make a major difference to pupil/teacher ratios.
- The model of helping directly in the classroom has been really powerful. Shows the pupils that “technology professionals” are normal people just like them.
- Surprising thing: how much the volunteers got out of it. Access to senior teachers in the schools.
- Fun of breezing through GCSE problems.
- See the light bulb go on - changing people’s lives.
- Also there are gifted pupils who’ve outgrown the school.

Where there's something indefensible, there is a career to be made for somebody defending it. This is why Nick Clegg now works at Facebook.

By the same token, here is a talk about your favourite build tool:

Principled SBT by Andrea Peruffo

People complain about SBT, but it's a powerful tool which would be hard to replace. Also it is interactive: there's a shell.

One problem is that typically you can't get useful guidance from Google, or even Stack Overflow.

Anyway, the core concepts are simple:

Settings - the variables of your build

Tasks - utility methods

Configurations - a place to put config info

Projects - folders for organizational units

Scopes - tie together 3 axes of project / config / task.

The talk made me realize that when moaning about SBT, I would have more of a leg to stand on if I had ever spent half an hour reading its documentation… which MUST have got better since the last time I looked at it.

Soon to support LSP (Language Server Protocol).

Another talk that seemed to strike a chord with the audience:

Keynote: Occupational Burnout by Jessica Rose

- Burned out? You can't build beautiful useful things.
- As a teacher she became weirdly obsessed with the human brain. A wet bobble of meat drenched in chemicals.
- Cognitive Psychology: gives us the vocabulary to talk about the brain hitting its capacity
- concepts of working memory, cognitive load
- typical failure mode: overload due to multitasking
- If you consistently overload your working memory, you will become burned out
- Occupational burnout has symptoms of mental and physical exhaustion: everything has been too much for a long time.
- Long term unavoidable stress. Mirrors, and may trigger, depression

Look around you and see the signs

- Are you cynical or critical at work?
- Do you have to drag yourself there?
- Are you irritable or impatient with people?
- Do you lack the energy to be consistently productive?
- Do you lack satisfaction from your accomplishment? Not feeling the wins?
- Do you numb yourself with food/drink?

Recovering from burnout takes a long time

- If possible take 6 months off with your horses. Say you're writing a book! No one ever asks to see it.
- Do less, in ways that won't damage your life. Outsource. Rely on friends and family. Start saying no (Do you want to practice?)
- Put on your own air mask before helping other people.
- Selective emotional investment.
- There are only so many things you can spend your time on.
- Protect your time.
- Concentrate on things that are meaningful
- Ask for help. (If nothing else it stops people asking you)
- Recharge. Spend time reading, or board games - do things that make your life better and are not energy sinks. Reduce stressors.
- Sometimes the logical conclusion to this is: quit your job.
- An audience member: why is burnout a recurring theme at conferences? Because in general, the industry has been hooked on cyclically destroying people for decades - and it's not sustainable.

For me, this was a timely reminder of previous places I've worked - investment banks, especially - and of the much better work-life balance we have at Springer Nature!

THANK YOU