

# *Rupert Young — My Story*

A thread on CSGnet

[From Rupert Young (2017.05.24 16.40)]

I am pleased to announce that after three years of hubble and bubble, my toil and trouble is finally over and my paper is published, in the Artificial Life journal. Commence the fireworks! (As long as there is not just indifference).

[http://www.mitpressjournals.org/doi/pdf/10.1162/ARTL\\_a\\_00229](http://www.mitpressjournals.org/doi/pdf/10.1162/ARTL_a_00229)

If anyone would like a not-to-be-distributed pdf copy send me a private email and I'll oblige.

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Regards, Rupert

On 26/05/2017 21:05, Bruce Nevin wrote:

Rupert,

You must be immensely proud of this achievement, and justly so!

This has such great importance. An existence proof, demonstrating autonomous control within an environment with arrangements and changes in arrangement that are unpredictable by the robot. A demonstration that no other theory (do they merit that term?) can match.

The recovery from deadlock uses a very simple means that may be an alternative answer to our questions about what happens when an organism meets insurmountable conflict.

/Bruce

[From Rupert Young (2017.05.27 11.30)]

Thanks Bruce, and Fred and Rick, for your kind words.

Yes, I am pleased that this has been published. Not just because it is a major journal, but also that it is not just a brief report of some results, but a substantial presentation of the theory. When I first submitted it (a less substantial document) I was buoyed that the first feedback I got, before reviews, from the editor (philosopher Mark Bedau), was that it had "significant merit". So all credit to him for recognising there was value there!

I concur with others that it is important to publish in high impact journals. I think there is a significant advantage of robotics over other fields in that actual physical systems are produced that everyone can see and touch; you don't have wait to replicate studies or experiments to actually see something.

So, I would encourage all to get involved in PCT robotics. We could do it reasonably simply with Lego robots implementing PC systems I have already created. Over the next few months I hope to have progress a PCT application and GUI, for the execution of PC systems, on robots like the Lego system. And you won't have to write a line of code!

When I left my day job three years ago to work on PCT full time I had two goals in terms of promulgating PCT. One was to try and get PCT robotics published in a major journal; I'll mention the other when I manage to achieve it (otherwise I'll keep quiet). So, as it is a substantial piece, in terms of the claims it makes with respect to conventional AI, even if people don't understand it, agree with it or like it, I hope it generates discussion and gets PCT more widely known.

I am motivated with the assumption, and confidence, that PCT will have its time. But as it is battling against ill winds we have to push it into the limelight, and I am hoping that building robots in the real world will capture people's imagination. But it has been a long road just to get to this point. In the mid-80s I was working in the most boring place in the universe, Kuwait, and had a lot of time to think about my own purpose and existence. At the same time I bought a Commodore Amiga, which, with a colour graphical screen and a whopping half a meg of RAM really catapulted computers into my life and imagination. So, with my dissatisfaction with my existence as it was, and my new found interest in the Mind and computer technology I did what anyone would do under the circumstances... I went and lived on a tropical island in Thailand (I'd lived there for four years as a child) for a year and a half and ran a business for water skiing and parasailing.

However, living on a tropical island is not all it is cracked up to be, with very little mental stimulation. So, I returned to the UK, and in the late 80's I heard about something I'd never imagined, but combined my two main interests at the time; Artificial Intelligence. I managed to get on a degree course as a mature student, and fancied being an academic. Most AI courses were Computer Science with a bit of AI, but mine was different. It was actually a BA as it combined AI computing, Cognitive Psychology and Philosophy of the Mind.

I was somewhat unimpressed by the state of AI and found the approaches unconvincing. This was exemplified by the dominant approach to computer vision being David Marr's static feature extraction methodology. Gibson's dynamic approach seemed more realistic so went on to do PhD with some intention of looking in to more "active" vision.

To be continued ...

Regards, Rupert

[From Rupert Young (2017.06.18 13.30)]

(Dag Forssell (2017.05.31 16.30 PST))

DF: Rupert, what an interesting story. I eagerly await the "To be continued" part.

Here goes.

So, on my PhD I started with an interest in "visual attention" as I thought that movement was important aspect of vision, rather than just the static information extraction approach of Marr. Though I wasn't really in tune with my department which was basically electrical engineering, and their philosophy was in line with Marr. I went there because they had a robot arm/camera I wanted to use. So, my supervisor and I didn't really see eye-to-eye, as he didn't have an interest the more active, bio-inspired approach. I had to toe the line and at one point he had me analysing images to extract measures of symmetry (yawn!). Going into my second year I still had no idea where my research was going.

Around this time I had an epiphany when I was walking around a supermarket. I was thinking of being in an art gallery, when you can't work out what a picture was. I realised that to recognise what was in the picture you sometimes had to move back or forwards. So, it

wasn't a matter of static "information" flow from the image to the observer, but the observer was able to influence the information by how they acted in the world. I wasn't quite sure where this would take me but it seemed important.

At some point I posted a message on a forum about how the neural architecture could implement simple mathematical functions. Someone called Shannon Williams responded and recommended a book called B:CP. Luckily there was a single copy in my University (Surrey) library so I sought it out and began to read. It was then that my head exploded! This seemed to provide significant answers to all my questions, and there had been no mention of it whatsoever on my AI degree. I had found a direction for my research.

Unfortunately for my supervisor it was around then that he had a personal crisis and withdrew from his supervisory duties. Fortunately for me my supervisor had a personal crisis and withdrew from his supervisory duties, which meant I was let to my own devices for about two years in which time I was able to focus on PCT research. Unfortunately for me after two years my department realised that I wasn't being supervised, and that I had been focussing on PCT, research that they didn't understand. This meant that I had to give up PCT research and work on a project which was in line with their way of thinking. This is why my thesis has two quite different themes. I thought that this might be a big problem for graduating, but fortunately the external examiner approved my thesis saying that he liked it because he thought it was "wacky!"

During this time I discovered CSGnet, and conversed with Bill. Surprisingly he invited me to stay at his place if I ever visited the US, and also offered me money to attend the CSG conference in 1997. I did wonder if I was being drawn into some sort of obscure cult and I would never make it back home! But I did attend (see attached) and was impressed with the hospitality. I stayed with Bill and Mary for a night at their place in Durango, and well remember watching the space shuttle live on his TV, and also looking at the moon through his telescope in the garden.

Anyway, in 2000 I completed my PhD, five and a half years after I started. Bill read my thesis and called it a "masterpiece", though I've since tried to find that email to no avail so maybe I was just dreaming :)

I had thought that I wanted to be an academic, but now realised that I could only do that if it involved PCT, as I would not want to teach subjects and approaches in which I no longer believed and thought were invalid. However, there were no PCT opportunities at that time. So, I decided to go into commercial IT. Bill Powers killed my academic career!

PCT had to take a back burner as I had the distraction of a large student loan to pay off and a new marriage.

However, PCT remained a passion of mine and occasionally I would return to it in my spare time. I spent quite a long time trying to apply it to the stock market, only to realise it was a fool's errand as the only action available, buying and selling shares, had no effect on the value of the funds invested. The only variable that can be controlled is the number of shares invested, which was of no use to anyone.

I discovered the Lego robots and started to implement some simple PCT systems on them. In 2009 I posted one such video on youtube. Two years later I noticed a comment on the video, which had been there for months. It was from a guy called Warren Mansell. We communicated and as I happened to visit Manchester to give an IT talk we met up for a beer. I was amazed to hear that someone was actually teaching a course on PCT at a real university and doing research as well. This inspired me to take my "hobby" seriously and that there was real potential to progress PCT-based robots.

In 2012 I went freelance so I could spend more time with my robots. And in 2014 as I no longer had the pesky distraction of a student loan, or a marriage, I stopped work to concentrate on PCT robotics full-time. I decided that what I needed to do was to get the PCT robotics approach published, to give it legitimacy, in the eyes of most of the world. So, I thought I'd write up the architecture and methodology I'd been working on in a paper. As it was January I thought I could do it in cold, wet UK or go somewhere more interesting. So I went to India and cycled 1,000 miles down the West coast from Mumbai to the southern tip (attached, me arriving in Kanyakumari). I did it over two months stopping off for a few days here and there to write on scraps of paper and then type it up when I could find an internet cafe. It was a very interesting and, at times, very dodgy trip, but I would

recommend it as a good way to write a paper, if time allows. The actual cycling gave me time to think about what I was writing so I think it turned out better than if I had stayed at home and written it all in one go.

When I returned to the UK I submitted it. The Artificial Intelligence journal rejected it outright, but the Artificial Life journal accepted it, pending review. They said the earliest they could publish it was August, of 2014. But that didn't take into the account what turned out to be a horrendously slow review process. It went through the review process twice and each time it took well over six months for me to get the reviews back. Thanks for feedback and advice I got from Rick, Martin and Warren through this time. Eventually it was accepted last summer, but not scheduled for actual publication until now.

So, I managed to achieve (and no-one is more surprised than me) the goal I set three years ago, and twenty years on I am also still part of the cult. More than ever I feel optimistic that PCT can be shown to have significant impact on robotics and fundamentally change the direction of the entire field. Hopefully, if that happens, it will have a domino effect throughout the behavioural sciences. That's the plan anyway :)

Regards, Rupert

For Rupert's two pictures attached to this last email, see next page. Names added by Dag Forssell.



Control System Group conference 1997. Durango, Colorado.

Left to right: Rupert Young, Brent Dennis, Mary Powers, Ed Ford, Rick Marken, Susan Souter, Bill Powers, Isaac Kurzer, Kent McClelland, Autumn Winter, Barbara Bollman, Lloyd Klinedinst, Christine Forssell, Tom Bourbon, Dag Forssell, Paul Stokes, Wolfgang Zocher

