David Duce

Interviewed by

Richard Sharpe

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By Zoom

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Welcome to the Archives of Information Technology where we capture the past and inspire the future. And I think today's contribution by David Duce should be a real inspiration to you, given the variety of his background. And it is Monday, 17th June 2024. I'm Richard Sharpe and I've been covering the computer industry, first of all, and then the IT industry, since the early 1970s, and now I really enjoy collecting the contributions to the Archives from people like David.

Good morning David. You were born in March 1950. That was the year of the Turing Test for AI, and Turing also completing the ACE at the National Physical Laboratory.

Auspicious year.

Oh, indeed, indeed. And you come on the scene as well. Where were you born?

I was born in Leeds, though, well, when I say in Leeds that's where actually my mother gave birth to me, although we lived in Pudsey, which is halfway between Leeds and Bradford.

Okay. And what was the status of your parents, what did they do?

My mother was a housewife, as was the custom in those days. And my father was secretary of my grandfather's group of companies, and my grandfather, his family background was in quarrying, and then he moved into building along with another brother and eventually built some houses, including the house where we lived, and he also built a small number of cinemas which were operated as a set of companies. My father was company secretary to that group of companies.

What we would today call, yes, a real combination, wasn't it?

Yeah, absolutely.

Very strange. Very strange. Did you enjoy school?

Yes, yes. I mean that's interesting because I have very few memories of primary school. I can remember my final teacher, a Mr Ellis. I remember him teaching us about simultaneous equations and I thought that sounded really interesting. And I vaguely remember doing the eleven-plus, but yeah, that's about my memories of primary school.

But you certainly passed your eleven-plus because you went to Pudsey Grammar.

That's right, yes, went to Pudsey Grammar, which was, yeah, it was a small local grammar school.

Good? Good quality?

Yes, it was, yeah. Yes, I mean given kind of how my career developed later on, I mean the most famous probably former student in chemistry was a man called S. F. Boys, who was sort of a well-known theoretical chemist in theoretical chemistry circles.

And you took to chemistry, did you?

Yes, I seemed to take to that, you know, very early on. It was probably a combination of making things: smells and bangs were always good because you were allowed to do that sort of thing in those days; and then the theoretical side of chemistry attracted me as well.

And did you do the other two, maths and physics?

Yes, I did maths and physics. And then on the languages side I did French and Latin.

Did you have to do French and Latin for university then?

Yes and no. French was compulsory as a school subject in those days, and then I think that the second language choice was a language Latin or German. At the time I started school, I think Latin was still compulsory for university entrance, although I

think that changed just before I was leaving school. I'm not too sure of the dates, but I think it was around that time that it changed.

And you left Pudsey Grammar with this slew of A levels.

Yes.

Did you go straight into University of Nottingham?

Yes, I did. Yes.

And the year is 1968, and that's a very interesting year. ICL was formed then, with how much of the UK market? 41% of the UK market. IBM had 23, NCR, 10. Do you remember them? NCR?

Ah yes, yes, yeah.

[00:04:46]

Intel was founded and IBM was planning a big change, because it announced that next year it's going to unbundle software and create a whole new space for a new software industry. And also you went in '68, now that's quite a rumbustious year for universities, was it?

Yeah, it was. I think Nottingham wasn't terribly interested in that kind of thing at the time. I mean I think we had to have a compulsory student sit-in at one point, but it was a very friendly affair and, yeah, it all got sorted out. But I mean Nottingham was small in those days, I mean it must have been about 4,000 students or so when I was there. So yeah, student unrest was not the top of the agenda.

Okay.

The price of beer in the student bar might have been.

[laughs] And the quality of the entertainments.

And the quality of the entertainments, yes.

So you got a first class honours in chemistry. And were you a sporty person?

No.

Just not.

No. That's a fairly firm answer. Spectator sports, yes, but not as a participant.

Did you commute or did you live in Nottingham?

Lived in Nottingham. I mean Nottingham was a campus university, so you know, when I was there I lived in the hall of residence for the whole of my undergraduate time there. And I mean the university – I can't remember how many halls there were – but I mean probably eight or nine halls of residence, and they were effectively sort of mini-colleges. You know, we used to have formal college dining. When I first went you had to be in by 11 o'clock at night and, you know, the usual set of restrictions.

[laughs] Yes. Which I was negotiating about at the University of Kent, where I was at the time. And we are, the vice-chancellor said, in loco parentis. I said, no sir, I don't think you are. The big beef was they wouldn't have a condom machine in the gent's lavatories.

Oh right.

You sailed through that with a first-class honours in chemistry, do you have any other interests apart from your academic work at university?

Well, I mean I was interested in Christianity so I was attached to a local church there and, you know, I had a group of, a circle of friends who were, you know, also

attached to local churches. I got involved in the local chemical society and things like that. But I didn't get so involved in club activities at the time.

Okay. You, then you went straight in, did you not, to the Atlas Computer Laboratory?

Erm, yes, but there was a PhD in between.

Oh, that's right, sorry. Had you met your first computer yet?

Yes. Well, in the summer of 1968. I mean at that stage the university had a KDF9 and, you know, one occasionally used to walk – well, it was attached to the engineering building – and there was this nice glass-panelled viewing gallery, if you like, so one saw this thing. But my introduction to computing was a summer course, a short course, that was organised by Eric Foxley, who at the time was director of the Computer Centre, and he gave a short course in ALGOL 60. So that was my introduction to computing.

The programming language without input and output.

Yeah, exactly.

I came across that because I was running programs, I was computer operator at EMI, electronics research and development, and this man was explaining ALGOL to me, and I said, how do you do input and output? He said, well, very difficult because there isn't any.

[both laughing]

Brilliant, I thought. What a programming language.

Absolutely, yeah. Just leave it, implementation dependent.

I ask this question of anybody who's deeply involved in software, and you have been, do you have a favourite language?

Er, I can write Fortran in anything. And I don't know, I don't really have a favourite language, I think it's more a question of deciding what it is you want to do and then choosing the appropriate tool for the job. So the things I've programmed in for web-based things, in Java for server side things, JavaScript client side, I've done bits and pieces of Python. But, you know, it tends to be dictated by the kind of libraries that I want to use, because I'm not a kind of build it all from scratch type of person. I like to find the bits and pieces and then put them together to achieve the task.

[00:10:21]

Lovely. I understand that. Yes, that was the first real programming language that I learnt, Fortran, and I thought it was marvellous, a bit of a jewel. I don't think it is now, it seems to have got rather overblown, has it not?

Yeah, I mean I had not looked at Fortran for years and years and years until I was doing something with my friend, Bob Hopgood, during lockdown, trying to recover a piece of software, and we, well, we discovered a variant called Fortran 5 that neither of us had ever heard of before. And to actually get this piece of software to run, we were lucky in finding Fortran compilers that still would accept Fortran 77 and had a legacy flag. And I know then I kind of looked at what modern Fortran was, and it was absolutely no resemblance whatsoever to what language I knew. And I can't remember who it was, somebody said something along the lines of, you know, there'll still be a language in 50 years called Fortran.

Not that it'll look very much like it.

Not that it'll look anything like the original.

It had an elegance to it, a simplicity, I thought.

Yes. I mean I came across Fortran really when I was doing my PhD and there was a computational aspect to that because we were effectively looking at molecular force fields and trying to reverse engineer force fields from spectral data. And the software

that, you know, the lab was using at the time was all written in Fortran, so, you know, I learnt Fortran. And yeah, I mean I found it a very convenient language for that kind of numerical computation.

The next language I had to learn, because we had a business application, was COBOL. Oh my goodness me, what a difference. As if managers were going to write COBOL. I'll ask you about the quality of software engineering later on, because your good friend Bob had some very trenchant words to say about it. So then you did eventually get to the Atlas Computer Laboratory. Were you chosen or did you choose?

I saw, well, the story goes that I mean when I was finishing my PhD, I mean I was faced with the question, do I stay in chemistry or do I move into computing, because, you know, computing had begun to fascinate me. And at the time the way into chemistry was through an unbounded sequence of post-doc appointments and there was no guarantee of positions in chemistry at the end of it. I mean chemistry was one of those disciplines that kind of went through peaks and troughs in the employment prospects and when I was leaving university it was in a trough. So I thought, well, maybe computing was the thing to go for, and I can remember sitting in the library of the Cripps Computing Centre at the University of Nottingham, pulled up an issue of *Computer Weekly* and lo and behold, there was an advert for the Atlas Computer Laboratory. So I thought, well, that sounds interesting, so I applied, and they chose me, I was selected.

Who interviewed you?

Bob Hopgood, Cliff Pavelin, Paul Bryant. It was a very memorable experience.

And so there the friendship was formed.

Yes.

Now, this was the Atlas machine built by Ferranti?

No. At the time that I joined the Atlas machine had just been decommissioned, so I think the last bits were probably literally going out of the back door. So the machine of the day was the ICL 1906A, George 4 paged machine. So I just missed the edge of, the last of Atlas.

What did the 'A' stand for in that number?

Oh, good question. It was somewhere in the bounds of A to F, and I don't think F ever happened. Yeah, I can't remember.

I think it had floating-point hardware, didn't it?

Yes, I think so.

[00:14:40]

Because I was running a 1902A at EMI. Anyway, so the 1906A, quite a big mainframe. And what were you doing there, what was your programming work there?

Well, my initial task was I joined Bob Hopgood's Basic Software group, and the Basic Software group was responsible for, you know, all the system software on the machine. There was a graphics component to the work, and then the way the lab was structured, there were then other groups who were responsible for application software, for user support, operation of the machine and so on. So my initial work was working on utilities for the 1906A that Graham Robinson at the lab had constructed – how do I put it – it was a sort of job submission and management system called Task, which was meant to present a much simpler to use user interface than if you were, you know, writing directly in George 4 command language. And Graham then also started work on a utilities system which incorporated a range of the 6A utilities. And the things I worked on were COPYIN and COPYOUT which were utilities for dumping things to mag tape and recovering from mag tape. So basically data transfer.

Okay. And do you enjoy that?

Yes, yeah. I mean that was, it was good, I mean I was working with a good group of people. I was programming in PLASYD. I mean I'd learnt a small amount of PLAN assembly language when I was doing my PhD, and PLASYD was a, well, kind of a structured version of PLAN, if you like, so I learnt that language. And yes, that was, yeah, it was good.

PLAN was the 1900 assembler, wasn't it?

Yes it was, yes.

Yeah, programming language 1900s, something like that.

Yes, something like that. Something like that.

I remember going on a course about it. And feeling quite bewildered. You then moved to Rutherford.

Okay. The Atlas Computer Lab was a separate establishment of the Science Research Council and then, I mean I have a terrible memory for dates, but it was probably around 1976, the director of the Atlas Lab, Jack Howlett, he was retiring, and there were questions, well, and the other context I suppose is that, you know, the Atlas Lab was in an era when there was one Atlas machine and everybody used it. The 1906A was in an era when there were lots of 1906As, DEC10s and other things around, so you know, the role of the Lab, I suppose, came under question as to what we should be doing. And the Lab then was absorbed into the Rutherford Laboratory, which was on the same campus just across the road, but the remit of the Rutherford Lab was much more high energy physics. So then the Atlas Lab became a division within the Rutherford Lab.

But still with your 1906A.

Oh yeah, I mean you know, at one level nothing changed.

Right.

At one level.

What did change?

Well, we were part of a much larger organisation and, you know, the remit of the organisation was not computing as it had been for the Atlas Lab, and Rutherford already had its own computing division which was supporting high energy physics work, so you know, the role changed.

You made quite a big contribution, did you not, to structured Fortran?

Yeah. I mean that was a sort of an interest that grew. One of the people working in the group at the time was Rob Witty and Rob had a very nice approach to the small-scale software engineering design, a graphical notation for representing software structure and so on, and I remember him giving a seminar and I thought that sounded really quite interesting. And I'm not entirely sure how I got into structured Fortran, but I decided that, you know, I mean, Goto Considered Harmful and all those sorts of things were around at the time, so I thought, well, you know, are there other ways of doing things. And I somewhere found a structured Fortran system which I acquired and then developed, and then kind of working with Rob, we integrated that with his dimensional design system. So, you know, it kind of, it sort of grew out of an interest but then, you know, it turned out to be really quite interesting and something that we pursued.

So you're a Dijkstra-ist are you? Ban goto?

Yes, well… Although I still sympathise with Professor Goto.

[00:20:30]

It seems to be a theme that runs through you, structured Fortran, formal reasoning, formal methods. Software development doesn't do enough of that, does it? Hello? Can you hear me?

I would argue it doesn't. Yes, I lost you for a moment, I don't quite know what happened. Yeah, I think people tend to, you know, kind of go straight in with perhaps not giving enough thought. I mean I once likened it to modern engineering, I mean…

You've frozen…

… for purpose.

I'm sorry, David, you froze. Modern engineering, you were saying.

Yeah. You would do some calculations first to try and reassure yourself that your design was going to be fit for purpose. The calculations might not always give you the right answer, but you know, they'll give you a degree of confidence and help you at an early stage to eliminate some things that will cause you a lot of trouble later on. So I see formal methods as being, you know, somewhat in that sort of category of helping you to clarify what it is that you're going to do and giving you some confidence that it is going to do the job that you intend for it to do.

When I became later on a journalist, I happened to find a man in Microsoft, of all companies, who was in favour of formal methods, and I interviewed him and he was on a campaign trail to try and get Microsoft to adopt formal methods. I thought, mm, good luck mate, good luck. Because people just go to code far too quickly, don't they?

Yes, I think so. I think there is a temptation to do that. And, you know, some of that I guess comes from productivity measures, from timescales, from pressure and so on, and then it ends up costing you far more.

Yeah, indeed.

Can I just – sorry – can I just interrupt you a moment. Can you hear the noise of our heating system in the background?

No.

Okay, good. It's just our boiler sometimes makes quite a bit of noise.

No, I can't hear it.

Good. Sorry.

I can hear you nice and clearly though. Now, you were implementing new interactive graphics systems weren't you, on minicomputers, quite powerful minicomputers?

Yes. I mean that came about from the Rosenbrock Report into support for engineering computing and, if I remember rightly, I mean part of the recommendations there were for purchase of a new large system, but also a number of smaller multi-user mini systems that would be deployed around university engineering departments. And we were involved in that procurement exercise. I got involved in benchmarking for that. But then the procurement having been done and Prime 400 [and] GEC 4070 machines were chosen as a result of that exercise. We then paid attention to, you know, what should be the basic software provision, what would be the kind of standard engineering provisions of the day. And that's how I got involved in the graphics side of things and, you know, the packages around at the time were things like GINO-F, and I was involved in implementing that. And then we developed our own in-house sort of smaller system called FINGS – Fortran Interactive Graphics System, as I remember.

[00:24:39]

Good. What was the GEC 4070 like?

Blue. From what I remember.

Was it a good machine?

Yeah, I think so. I mean the Lab's involvement, I think, with GEC range arose partly on the comms side where people were using earlier models of the GEC range as remote data entry devices and communications devices, and I think it turned out to be, you know, a successful machine in that area. And so, and then the 4070 was one of the workhorses then of the multi-user systems.

And you had Prime?

Yeah. I mean Prime was fun in those days, because I mean the Prime operating system was written in Fortran. And I think the great thing with that was you had to remember to compile it with the -r flag, which was recursive, and if you missed off the -r flag, that was bad news for the future of the operating system.

Now, that was a good machine, wasn't it?

It was, yeah, yes, yes. I certainly enjoyed working with that.

And that was when Boston was quite a centre, Prime was there, Digital Equipment was three, Wang was there. Seems to have faded away, why?

No idea. You know, go West, young boy.

True, true. Okay.

Yeah, I don't know. I mean I don't really know how these things come about. I mean I guess it's partly where are the opportunities, where are the commercial prospects better, perhaps proximity to universities, recruitment of highly qualified employees. I guess there's a whole range of factors that go into how these things come about.

You became technical secretary of the SRC's Distributed Computing Systems Research Programme. Can you tell us about that programme, please? That was in 1979.

Yes. I mean the programme started, I think from memory it was about 1977, and that basically, it was a recognition that distributed computing was probably going to be an important topic in the future, although nobody actually gave a very precise definition of what distributed computing was, which was good. So the programme was launched as a specially promoted programme, and perhaps unusually for the time, it had co-ordinators, so the first academic co-ordinator was Bob Hopgood and Gill Ringland from ICL was the first industrial co-ordinator, and Rob Witty was the first technical secretary. And I mean, and it was, they were basically working in support of a panel of the SRC Computer Science Committee. And the role of the panel was to award grants. So the role of the co-ordinators were in helping people to put forward good grant proposals and to help shape the form of the programme. So, if you like, you know, they were the panel's people on the ground who were interacting day-to-day with the growing community.

And was it a success, that programme?

I think it was, yeah, yes. I mean it ran until 1984 and, you know, I mean you kind of look at the people who were involved in the programme, the grant holders there, you know, many of them went on to doing very good work in the field. I mean Roger Needham was one of the early grant holders, Robin Milner, Tony Hoare, Samson Abramsky, Gordon Plotkin. There's a very long list of grant holders who, you know, in some sense that was, well, for some of them it was the start of their careers, the first opportunity.

Okay. You became academic co-ordinator in '82, and then responsible for a management panel of the operations programme. You're into management now.

Er, into technical management, yeah. Yes, yes.

How were you as a manager?

I think you probably should ask those whom I managed.

Did you enjoy it?

Er, to a degree. To a degree. I mean I didn't, you know, I didn't kind of make a career in management. I was kind of still more interested in technical things as well. I mean management has its own set of challenges, but I didn't see myself as a career manager.

[00:30:12]

Why do you think was that?

Personality, skillset, knowledge base. Whole range of factors.

Okay, I understand. You then were also involved, however, in organisation of two big conferences, weren't you?

I became involved fairly early on in the development of graphics, of the standards for computer graphics, and out of the Standards Committee in Europe grew the idea for the European Association for Computer Graphics, which was founded by Professor José Encarnação in Germany, Bob Hopgood was the first vice-chair of that. And I got involved in the Association partly because I think I joined, I'd gone to all the conferences prior to the founding of the Association, and then I went to the conference in Geneva where the Association was actually founded, and amongst the member benefits was a regular newsletter. And I remember coming back from the conference and saying to Bob Hopgood, where's the newsletter, why don't I get a newsletter. And the next thing I knew was that Bob had been to an executive committee, came back, gave me a pile of about 40 pages of his manuscript and said, can you type that up and typeset it. [laughs] And that was kind of how I got involved in Eurographics. So then I got involved with the executive committee and the newsletter, after four issues, actually turned into a journal, *Computer Graphics Forum*, and I was the co-chief editor of that for a period. And then I got involved in

organising the Eurographics Association's conferences as well. So that kind of got me into that, well, I mean, you know, it was a thriving young community, there'd been nothing of its kind before and it was, you know, a really dynamic, fascinating time.

You then became, when the DCS programme terminated, you became leader of the software engineering section of the Laboratory's Informatics Division. Isn't that a misnomer, software engineering?

[laughs] What part of it? Software or engineering?

Engineering. Put the two together. It's like political science.

Put the two together, yeah. I don't know. I mean I suppose it depends how you think of engineering. I mean I think of engineering as a principled way of constructing effective artefacts that are fit for some specified purpose. I'd give it that. I mean engineers might not think of it in that way, but that's kind of how I think of engineering. It's about producing things, but it's about having a set of techniques for doing so, about being able to produce things of quality, about being able to know what quality is, being able to measure quality, and having firm foundations on which those, you know, those techniques are based. And I mean I would like to think that those kind of considerations could apply to the construction of software. So in that sense I think software and engineering do belong together.

It's a little tentative there – 'I would like to think'.

Well, it's not been around for that long, we've been building bridges for longer than that.

We have. Sometimes not very successfully.

Well, no, but, you know, you make your mistakes in the early days, the question is, what d'you learn from them and how do you improve.

[00:34:18]

Ah, that's a good point. I can now ask you this question. Do you think that software engineering has improved?

I think it has, but I think there's a long way to go.

And where do you think the focus should be on?

I think improving the whole, the whole knowledge base, improving the ways that we decide what it is that we want to build, how we build up confidence in the thing that we're building is actually going to do the job at the end of the day. I, areas like that for me. But, I mean, you know, these remarks are made by me who could not be described as a practising software engineer constructing large systems to impossible deadlines, etc, etc, etc. But then that maybe needs some kind of culture shift to, you know, to appreciate what it takes to actually build something that is fit for purpose and is going to, you know, last in the long term.

And of course, ironically you're saying that as the investigation into the Horizon scandal carries on.

Yes. That was indeed in my mind as I was making those remarks.

What a surprise.

But then that's probably set in a much larger context as well, a larger sociological context, perhaps.

What do you mean by that?

Well, it's probably not just, you know, not just purely technical. You know, the kind of the notion that you have to defend the brand or, you know, those sorts of ideas which do seem to appear in the excerpts you hear in the news. I mean those things are not purely technical.

Okay, good. You got a grant from Alvey.

Yes.

To do what?

Well, that was looking at applying ideas of formal specification to computer graphics, which was an unexplored field at the time. And I think that came about partly because of the DCS programme, I mean I was involved in development of /IEC graphics standards at the time and our working methods there were formalised, but not formal, I mean we didn't have any good notations for writing down what it was that a system was doing. We made extensive use of structured English and so on for expressing, you know, what functions should do and so on, but we didn't have any formal, more formal ways of doing that. And I think it partly came out of, the first was that the British Computer Society Formal Aspects of Computing [Science] group used to have a winter meeting, a winter seminar at Imperial College, was a two-day meeting, and I remember one of those was the talk by Cliff Jones on VDM. And I went to that, and I thought well, that sounds interesting. And then in the Distributed Computing Systems programme we had an annual conference and one of the speakers there was Tony Hoare, who talked about the Z method, and I think that was the first that any of us had heard of Z at that time. And I thought well, that sounds interesting as well. So then I thought, well, do those methods have applicability in computer graphics. So that's kind of how I got into formulating that grant application, along with a colleague, Liz Fielding, who'd done the MSc in software engineering in Oxford and had done her dissertation with Cliff Jones, so she knew VDM. So that's kind of how that grant came about.

If you pull back a bit from that detail, which was very interesting, did you think that Alvey was a success?

Yes. I mean I think it was. I was not involved in the management of Alvey or, you know, that side of things at all. My involvement was reasonably peripheral because I mean I had a small grant under the programme, and then through a combination of

circumstances I ended up representing Rutherford in a larger project, which was the IPSE 2.5 project. I think Alvey was a success. I think it was, it was Roger Needham who once said something like technology transfer is best done on the hoof. And I think, you know, the Alvey Programme brought people together in a way that perhaps hadn't been done before, and engendered new co-operations which probably bore fruit in ways after that. So from my perspective I thought that was a successful programme.

[00:39:52]

Okay. Again, we're back to formal reasoning, aren't we? Yes?

Yes.

Good, good. In 1990, the acting head of Systems Engineering Division in Rutherford Appleton Laboratory Informatics Division, responsible for a research group of 18 researchers in knowledge and software engineering. What was the 'knowledge' part of that, David?

Well, knowledge in those days was intelligent knowledge-based systems, which was one of the pillars of the Alvey Programme. And expert systems were one of the topics of the moment in those days. So we had a small group of people at the lab who were basically supporting the IKBS pillar of the Alvey Programme. So yeah, from memory, yes, that's basically how that came about. So I mean one of the kind of side things that I did at that time was, along with a colleague, Gordon Ringland, we edited a book called *Approaches to Knowledge Representation*. And that grew out of a series of teach yourself seminars that people in the group had given on different approaches to knowledge representation from, you know, use of logic, structured frames, those sorts of techniques. And, you know, we pulled that together into a book, which I think was a successful venture.

But you were awarded a promotion, a merit promotion to grade 6, I don't know what grade 6 is, can you tell me? Oh, first of all, congratulations.

Oh, thank you. Yes.

What is grade 6?

Okay. I probably need to unpack that a bit. At the time, I mean across research establishments and I think more broadly across the civil service establishments, there were promotions that were awarded on the basis of individual merit that enabled the holder to, you know, pursue a course of research for a period of years. They were awarded for five-year terms, then they were reviewed after five years and, you know, were not guaranteed to be renewed. So that was the style of promotion and they were non-competitive in the sense that there wasn't a quota of individual merit promotions, but you had to meet the criteria for the grade. So in old money, grade 6 was Senior Principal Scientific Officer. If you look at somebody like Wilkinson who was at NPL, I think he was Individual Merit Chief Scientific Officer and then a few digits after it. So that was the scale. So SPSO was the lowest grade of individual merit promotion.

But you did get it, well done.

I got it, yeah. And it was rare. I mean I think I was, I think Bob said I was the first computer science professional to be promoted to that grade, probably depending on how you define computer science, but…

And you were able to slough yourself off from your management role as a result?

Yes, yes. I mean effectively somebody else in the, well, basically I was doing the job on a temporary promotion because the previous postholder had been seconded elsewhere, so I was doing it on a temporary promotion, and then I was in the position of being interviewed for the substantive post, and also being interviewed for the grade 6 individual merit promotion. And I chose the grade 6 individual merit.

[00:44:36]

Now, we're about… where are we now, let's see in the chronology. This is about 1990, isn't it?

Yes, that's right. Yes.

You actively participate in this ESPRIT project, 2463, what was that?

Oh, ARGOSI?

Yeah. A-R-G-O-S-I.

A-R-G-O-S-I, yes. Well, I mean that was a time when the lab was looking at European funding sources and it was the time, I think it was, well, there were people in technology department I think had got involved in European funding prior to that. I think it was the first time that our division had gone after European funding. So the ARGOSI project was about integration of graphics and OSI standards. So it was a combination of people who knew each other because we'd all worked together in graphics standards and, you know, from different organisations in the UK and across Europe, and then we had some commercial partners and the main commercial partners was Thomson-CSF in France. And what we- and there were basically two strands to the project: one was a strand that provided funding to enable continued participation in standards making activities; and the second strand was building a demonstrator of how you could put graphics standards and OSI standards together. And the topic we chose was, well, you know, imagine you're sort of planning a route as a truck driver from Rutherford Lab down to CERN in Geneva, which was something our transport section did, you know, we were carrying large instruments and so on, and you want to know, you know, what's the best route, are there obstacles on the way, where are the roadworks. So what we did was we had a map, we had a set of hazards that were represented as various icons and additional information, and they were represented as segments of a computer graphics metafile, and the computer graphics metafile was an ISO standard, and then the points along the route you would select, you know, any relevant hazards and display them on the map. And they were pulled from effectively

a computer graphics metafile using a facility in the file transfer protocol that allowed you to access a segment of a file. So it was basically representing hazards as graphical symbols, as graphical structures, and then being able to select, to pull them down selectively using the file transfer protocol. This might sound slightly reminiscent of some applications that have since taken off in the commercial world, but recall this was prior to the worldwide web, and prior to quite a lot of other developments.

Yeah, true.

Did we have the right idea? Yes. Did we realise we had the right idea? Probably maybe not.

There does seem in UK to be that disconnect sometimes, that we're not as fast as the Americans in moving from academia to, ah, we can make some money here.

Well, I mean I remember one of our partners in the ARGOSI project was the University of East Anglia, and they had a showcase evening of the computer science department for local industry and the general public, and we gave a demonstration of what we could do with ARGOSI at that open evening. I remember one guy came up to me and said, you know, yeah, I run a truck haulage company, when can I get it? And, you know, I just did not have the mindset to twig what he was saying.

You never moved into industry?

I never, no, I never did move into industry.

[00:49:18]

You were appointed an Honorary Chair of Computer Science at the University of East Anglia in Norwich. Do you like teaching?

Yes. I mean most of the teaching that I'd done was short courses, because, you know, I mean of course Rutherford wasn't a teaching establishment, but we did run short

courses for the community and I ran quite a lot of short courses on graphics standards and I quite enjoyed doing that. So yeah, teaching was something that I grew into. I mean I didn't do very much whilst I was at- most of my links with UEA were research links, but the teaching side kind of came later on.

You are also Associate Professor at the Institut National de Communication in Paris, how is your French?

In those days it was passable, it was passable. I could attend advisory board meetings which were in French and, you know, that was okay. And I gave the occasional seminar in French as well.

You also carried on in computer graphics, you're a member of the BSI and ISO standards committees in the graphics area, you've been secretary to the BSI committee since 1984. And more graphics, more graphics, more graphics. You moved into Oxford Brookes, when did you do that?

That was 2000.

Right. Why?

Well, if you recall, I was born in 1950, so I was approaching my fiftieth birthday, and I thought, well, do I want to stay where I am or do I want to make a change. And I thought, well, if I'm going to make a change I'm going to do it now, because there probably wouldn't be opportunities later. And there were a couple of opportunities came up that looked interesting and I was, I thought the Oxford Brookes opportunity looked interesting and, you know, I was appointed to the post. So I think it was partly, yeah, I mean I was interested in teaching, I hadn't done too much teaching up to that time so I was interested in the teaching side of things and I fancied, you know, combining teaching and research in that sort of way.

And what was the quality of the graduates and undergraduates at Oxford Brookes?

It was good. I mean we've had some very, very bright students over the years. You know, Brookes was not a Russell Group university, so I mean our clientele was different, but they were enthusiastic about what they were doing and we had some very good students.

How big is it?

Most of my teaching was done at MSc level. I did less at undergraduate level.

How big is it? Or was it then?

Phew, goodness knows. I mean nowadays, oh, how big's the department? I mean you have to remember I've been retired for nine years, so I am still associated with a department, I don't carry the numbers around in my head. We're probably around, what, 120, 140 intake, something like that, annual intake. But don't quote me on that, because…

No, no, that's quite alright, that's quite alright. You are very active in RAE panels, these are terrifying things, tell me about RAE panels.

[laughs] Well, that goes back to 1996, was the first one I was on, and that's when I was still at Rutherford. And the panel chair for that round was Robin Milner, and, so the panel consisted of obviously of academics, and then there were, you know, some people outside the academic community as well, and I think I was possibly nominated, you know, because of my involvement going back to the DCS programme, that I knew a certain amount about how academic research was done and how academic research had evolved and so on. So I think that was possibly how I came to be involved in that. And I mean it was, it was fascinating work. I mean in those days, I mean it's grown enormously since then, but, you know, we had a sizeable number of institutions and we reviewed their publications, reviewed their submissions, and that was all on paper, so you know, you chose a shady spot in the garden and set yourself to work. So it was a huge amount of work, but I mean it was really, it was fascinating because it meant one was forced to read stuff one wouldn't normally have come across. And that was really interesting, I mean I found out all

sorts of fascinating pockets of research that were being done that I just had no idea about.

[00:55:15]

Such as?

And, you know, and then one had to reach a consensus on, you know, how one was going to rank the submissions.

Such as?

What, how do you mean, in terms of the…

Interesting little subjects you didn't know were being researched.

Oh, interesting subjects, yeah. I can't remember whether it was that RAE or a later one, but there was somebody at the University of Kent who, you know, wrote the definitive book on garbage collection, which is still a definitive text. And I mean I knew people in the department, but I just did not know about that work. And that was, you know, it was really interesting to discover.

We've floated over one question about software which you might not have any views on at all – Y2K, the famous Y2K.

Y2K?

Yes. Were there any problems in your software for that?

No. Tried to avoid dates. No, there weren't. We didn't have any direct problems in that. I mean one could quite see why people could well have had very serious problems. Was it an equipment selling opportunity or a pending technological disaster? Who knows? But we did encounter date problems in a later project, so you know, dates were certainly no laughing matter.

You, and your work at OBU developed, but OBU is rather overshadowed by Oxford itself, isn't it?

Yes, it is, but then, you know, don't make the comparison between chalk and cheese, because we are very different things. But having said that, I mean quite a number of the staff in our department read computing in Oxford and, you know, a lot of us had contacts with people in the Oxford department and there was joint works between the departments and so on. So, you know, yes they are very different, but, you know, we had good co-operation between them.

And 2010-11, back to administration, head of department.

Head of department, yes.

Why did you lose your BCS accreditation?

[pause] We lost the accreditation, I think, for two reasons. The first was that the structure of our programmes at that time did not fit the pattern that BCS were looking for. And, I mean at that time, one of the strengths of Oxford Brookes was the modular degree programme, so the students had very wide flexibility in the modules that they could study and there were university frameworks that stipulated how flexible you had to be, so it was just not possible in those days to say, you know, thou shalt do the following 12 modules. That just did not fit within the wider university framework. So the degree programmes were loose in that sense. So, if you tried to do the BCS module mapping of, you know, skills, accreditation criteria onto modules, you end up with something that's very difficult to deal with, because it then becomes very hard to say, well, all these students have this capability, because of the flexibility of the programme. So I think that was one issue. I think another issue was probably we didn't understand that, and that kind of led to a bit of a disconnect, I think, with the panel at that time. So it's, you know, these things are always a bit of a variety of factors, but I think that was kind of what happened. And then, you know, I then got involved as head of department in how we got out of that.

[01:00:03]

And did you get it back?

And well, the way we got out of that was in part that things in the university were changing, you know, the university were reviewing programmes and the costs of programmes, the costs of having many more modules and the costs of few students potentially taking a module. So there was a general move in the university to, you know, to condense programmes. And that, if you like, actually played into our hands, because then we could come up with a set of programmes that were much more specific. And we came up with a set of programmes where we had a common core through the three years of the degree, and then with options in each of the years, which were then tailored to particular degree titles. And that was a framework and a set of programmes that was much easier to present to the BCS, and by that stage I'd become a BCS assessor and I understood a bit more about how BCS works.

You're titled retired now…

Yes.

… but you cannot have missed the debate about AI. And I have to ask you about AI. What is your general consideration or particular consideration about the current state of the development of AI?

I'm personally not a fan of AI, I think it has to be said, because it's, on one level it's kind of such a slippery thing, and I'm not a fan of the, well, you know, the hype around it and perhaps the general awareness of what it is and what it isn't and what machine learning can and cannot do, and what the basis is. So, I mean my personal preference is for things that are much more model-based, if you like, where you have an understanding of why the system is doing what it's doing. I'm less enthusiastic about things that give me an answer and can't tell me why they think it's the answer. So, you know, so it's a field I haven't worked in, so, you know, I speak as an outsider to the field.

What big mistakes have you made in your career, David, and what have you learnt from them? Apart from, that is, saying we should have a newsletter, and Bob saying, well, here you are.

Yeah, that was probably one of the good decisions. [laughs] I think you probably need to ask other people who've been on the receiving end of my decisions if they were good or bad. I'll give you an amusing one. You asked me earlier how my French is. Well, one of the Eurographics conferences in Poitiers, as was the custom, there was always a reception by the mayor, by the town, and everyone went along and it was part of the deal that the mayor would give a talk and we would listen attentively and then apply ourselves to helping them consume their drinks budget. Well, on that particular occasion the local organisers could not find a translator for the mayor, and they said to me, would I translate the mayor's talk into English, it was only going to be a couple of minutes. And I said no. And I kept repeating no, until there was basically no other option, so I said yes. And the mayor was a charming person, who started off very slowly about the history of Poitiers and so on, and that was alright, I could translate that. Then after about three minutes it started speeding up, and I have never been so embarrassed or scared in my life, and I think I ended up by saying, she just told a joke, to which the room erupted, and I just crawled under a table. And from that day forward I have had tremendous respect for translators.

Indeed. Indeed. I was part of a group that went to the USSR when Gorbachev was in power, and I did a paper on big systems in the West. And I'd typed it out, and I'm an appalling typist, and we kept on asking, what about the language, what about the language. And they being Russian said, oh, don't worry, don't worry, you know, it'll all work out. Because they don't plan anything. And what happened was this man stood up and read from my appalling typed notes, which were almost in English, straight into Russian. Unbelievable ability, unbelievable ability. Now, what he was telling them, I don't know. Very good. Now, is there anything you wish to say, David, as your contribution? This is your chance.

Well, I mean just to say how lucky I've been in the people I've worked with throughout my career, starting from Bob Hopgood, that range of people that I met in

the DCS programme, and the people I've collaborated with in projects since then, my colleagues in the department at Brookes. I mean I have just…

You've frozen.

… incredibly talented and dedicated people. And latterly with very able students.

Very good. Well, people are lucky to get you.

And the older I get, I think the more I appreciate that.

Thank you very much for that contribution, David Duce. And we were lucky to get you, thanks so much.

[end of recording]