



# **Professor Alan Dix**

Interviewed by

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*Welcome to the Archives of Information Technology. It's the 17<sup>th</sup> of March 2023, and we are on Zoom. I am Elisabetta Mori, an interviewer with Archives of IT. Today I'll be talking to Professor Alan Dix. I am in Riva San Vitale, Ticino, Switzerland, and Professor Dix is in Aberdeen.*

[00:00:28]

*Professor Dix is an author, researcher and university professor, specialising in human-computer interaction. He is one of the four co-authors of the university-level textbook Human-Computer Interaction. He is Director of the Computational Foundry at Swansea University, and Professor Fellow at Cardiff Metropolitan University. His research interests are eclectic, and include HCI, creativity, AI and data. He is a member of the SIGCHI Academy, and a Fellow of the British Computer Society. He is also a Fellow of the Learned Society of Wales. Welcome Alan.*

Thank you.

[00:01:11]

*Let's start with where and when you were born.*

OK, so I was born on the 28<sup>th</sup> of July 1960, in... I'll give the full address. 28 Bangor Street, in Roath Park, Cardiff, Wales. And I gave the full address because, I always love the fact that I was in 28 Bangor Street, and my birthday was on the 28<sup>th</sup> of the month, so... [laughs] And I was born in the, basically in the house that I lived in for eighteen years afterwards. Yeah.

[00:01:47]

*Can you describe your parents, your family?*

Yeah. So, in one way... So I have a, I have a sister. Well, come back to this in a minute, it's a little bit more complicated. But, I have a sister, so it was a brother and sister, mum and dad. In one way we were a classic, you know, a classic, you know, almost storybook family, you know. When you had the little First Reader books, you always had, father and mother, and usually a brother and sister. But my mum and dad were about a generation or even two generations older than most of my, the people I knew. So my mum was forty when I was born, and my dad was fifty-eight. And, and

had actually been married twice before. So I have nieces who are from both sets of marriages who, from the children of, the child from those. I have a half-sister who is about, presumably about eighteen to twenty years older than me; a half-brother of about thirty years older; and these nieces who are all my age. So... So, you know, life, it was, I didn't realise at the time how, that it's, it's not, not an uncomplicated family in one way, but actually in some sense we were also this very nuclear family. My dad was quite, had a car, which in those days was not common, especially in our sort of area. So there was only probably about three cars on the street. I mean by the time I was in my teens it was obviously chock-a-block, but, at that time, and, initially one of those little Ford, well a Ford Popular, the sort of, the sort of black cars that you see pictured in wartime movies, and then kept running for years afterwards. And, so that was a, a key part of my childhood. But also, because he was older, he, he died when I was, when I was nine, so, there was a sort of... But it was, in one sense an idyllic, you know, childhood in many ways. I think he had, particularly my dad had, shall we say, matured over a lifetime [laughs], so had all... so, had the, had the wisdom of a grandfather [laughs], and, and the patience certainly. So, so yeah, so a very [inaud]. But, life did get a lot, lot more difficult after he died, and, [inaud].

[00:04:21]

*What was your parents' occupations?*

So my dad was a carpenter. Well, way back, I think his first job, he used to be a, like a master craftsman with his father, and he used to... But this was way before I was born, many many years. And he had been a builder in between, had, had a café at one point, before he married my mum. And... But when I knew him he worked for the local authority as a, as a carpenter. So... What was really great was... I mean, one is, he did things in the house, and, it was always with sort of cast-off materials that were the leftovers from the jobs he did, you know, from, from work, the stuff, it was the days before skips, but effectively what would be in a skip nowadays. So we, our house was done in a very sort of, interesting DIY manner. But also, when I was in school he would, about twice a term he would come into the school to repair the desks and tables, again in days when things were repairable. Now you can't repair furniture in a school. So that was always quite exciting as a child, sort of, he'd come in and, I mean he would be there for a day or two. I mean I'd perhaps only see him once or

twice during that period, but, that, that sense of, I don't know, connection, and that. Yeah. I once visited his, where he worked, and all my, my writing were on this scrap paper that I think came from the office there where there were timesheets or something that had presumably aged and were no longer valid, so I could get to write on it. So, so there was a lovely sort of connection there. And one of my most treasured possessions actually is, you know, this will make me think about the lessons actually now that I've learnt that I hopefully pass on to others, but one of my most treasured possessions is, a wooden ship. And, my dad was doing some work in the kitchen, and there was a bit of scrap wood left over, and I said, 'Oh can you...' And I, and I will have been about three, perhaps, at the time. And I drew the point of a ship on the, on a piece of wood. And there was some dowel, some round, sort of a bit like a broom handle thing. And I sort of said, 'I want those there .' And he made one, as I drew it. He then... My sister said she wanted one as well, and he made one for her as well. Hers had better lines, because, he made it for her himself, but he made for me the one that I specified. It wasn't... He will have known that it will have been, slightly nicer [laughs], did it slightly... But, he gave away that to me, he gave that control and that ability. And that's something that I've been seeing, I mean particularly in recent years, working with community groups, coming back again, that importance of not always doing the thing that you think is best, even if you're right, and, and giving that power to other people. Yes.

[00:07:38]

*Very nice. And what about your mum?*

So, yeah, my mum. My mum had, yeah, she had been what is, I think a classic thing. She, she had been the person who had stayed at home with her, when her father, with her father and mother. She had worked, she had... She had actually... I mean, in the war she had actually been in Brecon, north of Cardiff, working for the Ministry of War, and, could tell you interesting stories, in the build-up to war as well, about the preparedness, and the change, the preparedness of, of the country. This is the lead-up to the Second World War. But she had then worked for the Inland Revenue for many years, but had been the person who stayed the term and looked after her mum when her mum got cancer and died. This was again all way before I was born. So, I think when she, she met my dad as, what effectively was a singles night, you know, in the

days [laughs] before you had apps. People actually physically met. And, my, my guess is, you know... I never talked about this a great deal, but my guess is, it was at a point in her life when she was not expecting, you know, she was, she will have been in her late thirties by this point, probably not expecting to have the sort of, a life on her own. She had never, she had always been the person who was supporting other people. And, yeah, I mean, was... So, I was going to [inaud] word. You know, you feel, you realise, particularly after her dad... She had this period of about eight years when she had that life, that, you know, she, she thought she wouldn't have. And then of course had a really hard period after that, because she was looking after us on her own, and, and things. But was also, also... You know, she had many faults as well [laughs], so not doing , thing. Many faults. But, she was, way until she died, she was eighty-five when she died, she was the person like, in the church who would be organising the trips for other people. You know, she was always the person who was doing things for people. Again, you know, the same was true of my dad. He was... You know, so I, I learnt, you know... You know, this is not the , [inaud] perfect in any way at all, but I learnt from her life, you know, the importance of giving, I think that's it, and doing things for people as, as much as doing for yourself. So I learnt a lot. But... Yeah, but she had been, she had been clearly a very bright child, but, not because she was a woman, I must say this. [laughs] She, her family had a sense , I think her eldest brother had gone to art college, and actually turned out to be quite a, Ernest Edmonds knew him, and, he was quite a significant artist in the time, including a little bit that was on the edge of digital art in, in the Sixties [laughs], the late Sixties. A little bit to that. [laughing] You're thinking, well, did they do digital art... Or... But, you know, people were starting to think at that time about computing and art. But I mean...

[inaud].

Sorry, go on. Yeah.

[inaud]?

Jeffrey[sp?]. So...

*Surname?*

Jeffrey Steele. Yeah. He... I, and I think I, I'm not sure if I ever, ever met him. He died a few years ago. Because he was, he was from my mum's older [inaud], and was, you know, sort of, so was quite, you know, going around the world and doing stuff at that point. And I think one of her other brothers went to university as well, [inaud] teacher. But, but basically there was no money, so she went to secretarial school, and would create these... They learnt, they used to learn real shorthand in those days, like these curved, the funny curly shorthand. I heard this wonderful story she told. There was a poem about a dragon that she'd do in shorthand, and when you finished it, there was a picture of a dragon on the paper. And I wish I had one, and I don't have one, so... [laughs] I'm always, whenever I meet somebody who knows shorthand, I say, 'Do you know the...' [laughs] You know, I'm sure it will have been something they'll have all been taught at the time.

[00:12:08]

One thing, you know, which again, well actually, this is very non-computer-y, but I think critical in terms of thinking about social justice and issues like that which are really crucial. When my mum married... I don't know if it was absolute or if it was just done, but she left her job, but she didn't leave it... I mean it's different, she had [inaud], but before, this is before, as far as I'm aware it's before she had my sister, who is older than me. And it wasn't because, because she was getting married and therefore she would look after the home, but because at that point, if you got married, the assumption was, you would leave your job, at the point you got married. Despite the fact that she had been working in that job for, twenty-odd years by that point. And, and at that point lost completely the pension. So all of her pension disappeared as she left. You only kept a pension at that point in public service [inaud]. So, this was... Yeah, which again, you know, if I think about later in her life, later, the difference that made, you know, there were people I visited, you know, who would have only been, you know, who, friends of hers that she had worked close beside, who took early retirement in their fifties, who were, clearly had, you know, comfortable pensions. Yeah, it's... I mean, so sometimes there are some really, I mean, I'm aware of really bad things that are happening in the world, but also, some of these things have got better, but it also constantly, again I have that awareness, as I'm doing my job now, about the impacts on different groups of people, and the way that we

need to make sure that all the things we do actually are about serving people, really helping them to, to have a better life, and not create these bad situations for people, yeah.

[00:14:08]

*Back to your childhood.*

OK. Yeah.

*So, which schools did you attend, and what [inaud] of those years?*

OK. So... So I went to, a couple of nursery schools, and then, Roath Park infants and Roath Park junior school, which were, probably about, no more than a quarter of a mile from my home. And, nowadays this sounds so weird, but I remember, for the first, like, really the first term, my mum used to walk, and perhaps a bit longer, but after a certain point, my sister and I would walk there each morning on our own, these back lanes, down these little back lanes. It was only, it was only perhaps, three or four streets away, down through these little lanes. So walking down these lanes is part of my childhood, these back, behind the houses you'd have these sort of, six-foot walls with the yards behind houses, and you'd walk in the lane between them, going to school. I was probably a bit of a precocious child. [laughs] I was... And, I remember, one of my cousins, who was quite a lot older than me, describing [inaud] that I was basically... The way she would describe is, almost like I was climbing over everything. So I think I was, probably nowadays they would, they would say I was, had ADHD, and put me on drugs. [laughs] But... So I was... I struggled to... I was always bright, and clever, but I was, lacked... I was, not careless, not deliberately careless, but, again, classic, you'd sort of see this and you'd think, of course, this makes sense. But I would always, I would, I was difficult [inaud] and very messy with things I did. And I can remember particularly, and this was, this was, I think still in infant school, where the class was organised from the bottom of the class to the top of the class, and there was a table, you literally moved up the table, you know, if you did good work. And if you [inaud] back [inaud] done/down. And then there was this, this table that sat below the bottom. And I would... What would happen is, I would move, effectively, move up the table, right, the long table [laughs],

because my work was usually good, you know. And then, I would do something wrong. I mean not naughty wrong, but just, make a complete mess of something, not do something. And I, half my time I was on the sort of, the table at the bottom, the table below everything. [laughs] So, yeah, so that was, that was an interesting time. So, yeah, so, yeah, again, you learn... I sort of take that through, and the, the way... Oh. Let's get this right .

[00:17:10]

I remember in high school being told that... I don't think this is quite true, but in the days of Eleven Plus exams, which is when, at eleven you used to do an exam, and it said whether you went to a grammar school or a, a secondary school. That had gone. It was a comprehensive system, so a single school system when I was there. I was told by a teacher in the high school that in the days of the Eleven Plus exam, you know, as a son of a carpenter I would not have got into the grammar school. I don't think that was entirely true, because people did, people did break through, but the, the breakthrough was hard. And that importance of being able to make a, or change your situation, I think is really critical, you know, and, again, just stays with me so much. Anyway, I was there for... Yes. I guess the other thing, which would be a nice little story there, which is, a bit more science-ish, you know, [laughs] [inaud]. So two, no, two. One of them, which is going to have a social bit as well, was, in my... The class you join at school, before your properly in the school, it was a reception class, it was a sort of, like, one term to get you used to being at school, and you start to learn your lessons. I can remember the f still, the umbrella, or, it was an umbrella or a walking-stick. Was it a walking-stick or umbrella? Anyway. The handle. I can remember being taught the f in school. But there was also these wooden blocks which were about this big. And you'd get to sort of go... There was a sandpit, a little sand table, there was various things you got to do, [inaud]. And, I remember the blocks. And one of the times when my dad was visiting the school to do the, the tables, and he came in to see me , and he talked to my teacher, and I, and I don't know whether I overheard, but I think, I think he told me afterwards, that he had had this conversation with the teacher, and the teacher said, 'Oh yes, this is...' I mean this was like, under four – no, under five, I was, just, just coming up to five. And, and the teacher said, oh, you know, looking at me doing the blocks, saying, 'Oh yeah, he's a, he's clever, he'll make an engineer one day.' Right. Now... And I, I'm going to put this in context. I think when she said engineer, what she will not have meant was an

engineer in the university. She will have meant somebody, you know, turning, things like that. What I think nowadays is, what would that teacher say about me? 'Oh, he's clever, he'll get into Amazon workplace some time.' Because the jobs that she was thinking of don't exist in Britain any more. So, the aspirational path is really missing, which is very sad. Anyway, sorry, that was... I keep getting back to these social stories, because they are really important.

[00:19:49]

The other one, though, was, I did... I said, I didn't normally get into trouble, except by accident. So I was sort of, a bit compliant in some ways as a child, sort of, [inaud], but very, but, not very good at actually always getting things done right. [laughs] But one time when I probably was being a bit naughty was, I broke a window. And it was... The caretaker's house was attached to the school, and it was the window of the caretaker's house. And the teacher came round, and I said, [whaling] 'No, not me, it wasn't me, it wasn't me.' But it was me. [laughs] And... But what I never told... I did admit that it was me who broke the window, and I had thrown this stone which had broken the window. But what I didn't admit was the real reason for doing it. Because I thought they would be really angry. [laughs] Because the real reason that I had for doing it was, that I had seen on television something, and presumably in schools programmes, about weathering and the way, you know, the cliffs, the sand thrown by the sea on them. And so I thought, well if I throw... And I wasn't throwing it at the window; I was trying to throw at the wall, but I wasn't a very good shot, so I hit the window instead. [laughs] I thought, if I throw this stone at the wall [inaud], I will turn the whole of the wall into a beach. And then we can... [laughs] So, my goal was complete destruction of the school. So I never told them that, because I thought they'd be annoyed. [laughs] Anyway, there we are, that was my first school. [laughs] Yes, is that enough about that school? Do you want to move on? [laughs]

[00:21:30]

*So, what were your favourite subjects, and your most successful subjects?*

OK. So, I think... I mean I always liked maths I was, I was... I mean I like... I was... I mean I've always been interested, I have always been interested in everything, I mean that's true, but I was always, particularly mathematics. I can

remember my mum teaching me, and I'm again probably about eight or nine, that she had obviously been taught when she was at school, to do, just at the time when we were being taught to do long division, she also told me how to do long square roots. There's a sort of mechanism for doing square roots that looks a bit like long division. And, and I can remember also with my mum, we were working out how long a million seconds was. I think we were working out how many seconds in a year, was my question. And, that's stuck with me since, and I've [inaud]. So yeah. Do you know, do you know how long a million seconds are? No? No, or how many seconds in a year? No?

*Oh yeah, we can do the maths, of course.*

Yeah. Yeah. It's about thirty, it's about thirty million seconds in a year. I can remember that. It's about a million seconds in twelve days. And, yeah, I remember doing that when, you know, I was in junior school with my mum, as a fun thing, [laughs] and she enjoyed it as well, doing that. Yeah, so she left school when she was, she'll have been, fourteen or fifteen, but you know, clearly really, you know, just liked doing that kind of stuff. Yeah, so, so that's, that's... And actually years later I was interested in slow time. slow-paced things. That's been a theme actually that's at times been a theme that I've come back to at various points in my academic career, thinking about from an HCI point of view. But I remember once, there was a period when we were thinking about slow time. So, rather than things like kilohertz and megahertz and stuff like that, thinking about microhertz, right? So, so rather than kilohertz, thousands of, millihertz, thousand seconds, twenty minutes-ish, instead of megahertz, millions of times a second, microhertz, once every million seconds or so. Two week-ish on intervals. You know, and, and in our lives are this, nanohertz things. And nanohertz is, you're talking about, thirty years is a nano-, is the nanohertz frequency. So yeah, so anyway. And that, and, you know, I'm pretty sure the reason why that jumped into my head, when we were doing that, when we were thinking about those things, came from, from that, Mum.

[00:24:15]

Sorry, I didn't mention, I went to Howardian High School, which was a comprehensive school in Cardiff. I was fortunate there, because my sister... In those... Nowadays people get more choice of school, but there, you had lines. You

know, if you're this side of the line you go to this school; you're that side of the line, you go to the other school. And my sister was, went there. And then they changed the line. And so all of my class, nearly all my class, went to a different school. But my mum asked that I could go to the same school that my sister was going to, to make life simpler, and I was accepted. And I think it was a better, it probably was a better school for me to be in, although I got separated from some of my friends because of that. But it was also, although it was in physically a different position, my mum had actually gone to Howard Gardner School when she had been a child, when she had been at high school, although it was in a different part of the city at that point, and it moved. I'm not sure why it moved, but it moved at some point. So... But yes, still, yeah, mathematics was probably my, my, just my, my joy. [laughs]

[00:25:23]

*Well speaking of mathematics.*

Mm.

*In 1978 you participated to the 20<sup>th</sup> International Mathematical Olympiad in Bucharest, Romania?*

That's right, yes.

*Were you still at high school?*

I was. So, I'm just going to give you a little background to how I got there, because I think that's quite important. So, I... So, I had done my, my, you know, my O Level exams at that point, which was the sixteen-year-old exams at that point. The school used to, one class did mathematics O Level a year early, so, in fourth year of high school rather than the fifth year. And until that year they had, what they had done in the remaining time was just done some extra maths, and did a further maths then. But our year they decided to do, for the first time, computing, and we did a CSE in computing, which was sort of slightly more practical computing for sixteen-year-olds, and there was different exams at that point. But we did a computing year. So I had

done a little bit of computing. That's number one. So I then... So this was... Sorry, go on.

[00:26:38]

*Can I ask you, what did it mean to do computing? Were you using a computer, what model was it?*

[laughs] Oh crikey, yes. Yes. So, by... Yes. Yes yes. So, obviously we, we'll have drawn [inaud]. Computing at that point, and this was true later on into the A Level as well, was very broad. So, we did everything from a, a thing called Cecil, which was a version of assembly language. It wasn't a real assembly language for a real computer, but it was a made-up one to train you on assembly language. So assembly language. We did BASIC as a high-level language. But we also talked about, you know, applications in banks, in... So we, we thought about the applications in society and the way people use computers, as well as talking about the details of how you programmed them at the bottom. We have lost a lot of that in computing; computers come so oriented, a lot of computing [inaud], you know. So with HCI, obviously you're constantly pushing people towards the, you know, how does this actually get used? When I first learnt, those were not, that wasn't a question that was asked, certainly during those exams. Whether that was true in universities, it might have been slightly different, but that wasn't, within the exam we did, at that stage. So this was at sixteen I did that year, between the fifteen and sixteen.

[00:28:00]

So, I then went on. I was doing double, I was doing two maths. I was doing separate, applied, and pure maths at A Level, so I had double lots of maths; physics. And, it was... A friend of mine actually did the heavy work of that, and we had sort of... He found out that some people from Bishop of Llandaff School, which was the sort of, private school attached to the, for the choristers attached to the cathedral, were doing a computing A Level with the local FE college. And then... I'm not sure, he must have found out through somebody who knew somebody or whatever. And then the teachers inquired, and then the two of us used to go on a Friday afternoon to the FE college, which is, changed its name, but is now the campus of the University of, Cardiff Metropolitan University, where I now work as well as at Swansea. So that's really nice, I've sort of gone back to those roots. So two things there. So there's two

crucial things were happening around that time. So one was, because I was doing that, I was doing the computing, but in addition they had a library, in the FE college, and in the library there was a load of maths books, which I don't think would have been used by any of the students in the FE college at the time, because they would not, they were more advanced than that, but, I think they were ones that one of the lecturers obviously there was getting, more because they wanted to read it. And there were lots of, quite a lot of them were things like *Group Theory for Engineers*, there was quite a lot of these 'for engineers, which I found were much better written maths books than maths books for mathematicians. Not because they're dumbed down, but because they're written with purpose in mind, as well as the maths. But in addition... So I was doing that. And in addition, I also watched the Open University, which was the televised, the Open Access university, which had all these programmes televised. Now, it's all done through the Internet; at that point, it was televised. And I would, on a Saturday morning I would just watch whatever was there. When I, I'd get up... I used to have to get up before the rest of the family to make the fire in the morning, and I would get up at, get the fire... Because there was no hot water until the fire was lit. So I'd get the fire lit, and, [inaud]. And then I would watch an hour or so of Open University programmes first thing in the morning. And they covered everything. You know, they covered everything from sort of, art and history and the environment, the, and obviously maths programmes as well, which I particularly liked, and science programmes. And it was just glorious.

[00:30:43]

But crucially... So what it is, it was, that was glorious, because it was very broad stuff and that. But also, I did, I knew bits of maths which were advanced. They were actually not hard, but they were advanced. So, the school, so I went to Howardian School, was also very good in that they, they had... Each year they put students into, I mean, usually it was just one or two, into the entrance exams for Oxford and Cambridge. Actually it had always been Oxford, actually. I think more humanities side. How that happened, because most comprehensive schools wouldn't do that, they might... And there were usually, there were two forms of entry into Oxbridge at that point, one was straight, I've done these A Levels, you get an offer, at eleven you put them in, which is what most universities were doing. But there also these entry exams. And they were mainly done by private schools the year after people had done their A Levels. There was an extra thing. So, people do their A Levels, they do two

years of, of their sixth form studies. They would get their exam results, and then they would do this extra term, when they were tutored heavily by people and so on. Obviously the school didn't do that, our school couldn't do that. And it was also done in our fourth year, because, our fourth terms, which was during our second year of sixth forms. So there was no additional tutoring, but they just did it for people. And, they had been quite successful, every year or two somebody got in. But usually... It's always been Oxford. And again, just one of those things, so many things are just... You know, you have to grasp the opportunities I think. You know, it's not about just things happening to you, but also, you realise so many times that, things are given to you, and blessings you get without realising, you know, without necessarily realising how crucial they were at the time.

[00:32:34]

But Trinity College in Cambridge did a, I think it was a weekend, but it was a two- or three-day thing, for comprehensive, aimed at comprehensive school students. So... I think it was part of their wider, trying to widen their participation, because most of their people were coming from fee-paying students and that. And so they were trying to reach out to the sort of public education system. And so myself and one other person from the school went to that. And so, when I came to saying, you know, where do I want to go to university? you know, I had some local ones in Wales, I put Warwick down I think, because it's, it's, really interesting maths they did at Warwick. But also, I put Trinity College in Cambridge, right? And we did, I did this exam in the fourth term, so that's my first term of the second year of my sixth form studies. And, I mean, I mean obviously, I was going to do my stuff anyway, but also, things like, having done this extra study, you know, things, not studying, because it was just, joy of reading these books and things, that were advanced but not, meant there were some questions on it were just so simple, to be honest. [laughs] Because, you knew things that you weren't expected to know. Others, you know... I mean my, my choice of, also between Cambridge and Oxford, was, the Oxford exams looked too easy. [laughs] So... Whereas the Cambridge ones looked hard, so I thought they must be good. What I didn't know is, Trinity is *the* place for mathematics. I didn't know that, I had no knowledge of that at all. And it was purely because they had run this, this outreach event. So it was both fortunate... Because I did the scholarship exam, well I did these exams, I not only passed them, and got an offer based on them, with the exception of my French O Level, I had to do my French, I had failed my

French O Level three times by that point, but I had, I had to pass my French O Level. So that was my... Because, you had to have a language, that was the thing, you know, it didn't have to be Latin or Greek any more, you had have a language. I did eventually pass it in my fourth attempt, but... But, but I didn't have to do any... They didn't care about my exams, because I had done, I had done the entrance exam. And I got a scholarship. It wasn't a lot of money, it was a small amount of money, it wasn't a lot of money. But it was more a prestige thing.

[00:35:06]

Because I had done the scholarship, the Maths Olympiad people, from the British Maths Olympiad, of course, look at that. They contacted, I'm not sure if it was myself or the school, which way they did it, probably through the school I think actually it would have been. And then the school put myself and a few other people... And I think they then continued for years afterwards to do that, I don't know how long, to do this every year, into the British Maths Olympiad, which is sort of, an exam-based one. I got on to the British team. I had never, I had probably never travelled for more than, perhaps 200 miles from my home. I was trying to think. I'd been to Southampton, was probably the furthest I had been, and Isle of Wight, that was probably from, before. Flew via Frankfurt, I remember flying to... Getting a passport, and not realising I needed a passport, and like, three weeks before, realising, they said, 'We need your passports to get the visa.' [laughs] [inaud] passport. Having to go to Newport, to get to the passport office and get a passport, an emergency passport. Because you're so ignorant of all these things. Seeing policemen with guns in Frankfurt Airport was a shock. You know, now it's, you just expect it at every airport. I never, the idea of a policeman with a gun. In Romania they had, they had holsters, but I was told they couldn't afford the guns, so they kept their sandwiches in their holsters. [laughs] That's what I was told; whether it was true or not... Also seeing Romania, and, I mean both going abroad and being abroad for the first time, but also I had all these ideas of the, the Iron Curtain, and it's all going to be repressed. I mean you know, this element, there certainly were elements of that [inaud] thing, but also, being... I mean it was, to be honest, also, if you look at the history of Romania, it was the time when Ceausescu was, shall we say, at his maximum popularity before, I mean, a year or two afterwards, things would look very very different. But, you know, but certainly, having to rethink my preconceptions of what that was like.

[00:37:13]

And then, with my maths hat on... I had spent my life feeling like this alien from Mars, and suddenly discovering there were other alien life forms as well. [laughs] And it was, it was so liberating, you know, being, you know, being amongst other aliens basically. [laughs] That was, that was such a, you know, just such a joy. And then, you know, we did our, you know, the actual Olympiad bit is basically like a couple of, four-hour exams basically, that's what it is, you're doing hard problems, a small number of hard problems. And... But then we went, we went to the sea, and, and saw things, and, just being in a different country. Almost, probably almost ending up in prison, but, that was... [laughs] I'll answer this for you. I can see you're going to ask this. Oh sorry. We went down to the sea and stayed, stayed in, I think it was an agricultural college there, and one day went to this children's village. So like, like pioneers, but Romania did everything different, so they weren't all pioneers there, but it was like that. And, there was, they did a concert, the school, the children there did a concert, in honour of the Olympiad people there, in the evening. And I remember saying to Radu[sp?], who was our interpreter, I said, 'Somebody going to thank them for this?' And he went and chatted with some of the others. [laughs] 'You.' [laughs] [inaud]. So I had to give the, go and give the sort of, the thank you to these, these people. So then we got to the, shall we say the, the official closing ceremony. We're back in Bucharest for the official closing ceremony for the thing. And there's the Minister of Education there, who, who was a formidable Eastern European woman, who [inaud]. And, she was sat in the middle of the things. And I came up at one point, and there was like a lectern bit in the middle, and I gave a thank you for the thing. And at one point everybody burst out laughing. And I thought it was, while I was trying to say thank you to the place we were at in Bucharest, which was another agricultural college, I thought I'd just pronounced it badly. [laughs] Like trying to say Aberaeron. [laughs] I mean people will think, have I done it right? [inaud], but... Anyway, I thought that that was it. It wasn't. You, you're aware I use my hands quite a bit. So I had been saying [inaud] like this. The Minister of Education... And there is a point where she goes, 'Ah!', like that [laughs], because my hand [inaud] slapped her in the face. [laughing] So...

*But you didn't realise that?*

I didn't... [laughs] I had no idea at the time [inaud]. After which it was... All the interpreters were schoolteachers, so I could do no wrong, after that point. I mean if I had actually made contact, who knows where I would be at this point, you know, still languishing in a, in a jail in Romania probably, yeah.

[00:40:15]

*Well how did the Olympics go?*

Well, I got... So, I did, I did a, I got a... Oh crumbs. I got... I didn't get a top prize. Did I get a second or third? I can't remember. I got a prize. I also got a special, I've forgotten what I got then. I got a special... I also got a special medal for doing one of the problems, so, sort of, the best solution to one of the problems. So I got... But, that was, I was never quite sure about that, right. Because this was actually after the official closing ceremony, even though, the medals were done. So I have a medal which was, was it a second or a third prize medal? I mean quite... I mean it's not like you, it didn't mean there was a lot of [inaud], there was a chunk of [inaud]. But I also got this extra medal. So I ended with two medals. If you look at the official record, it doesn't mention the special medal, or the, I haven't managed to find any documentary thing. I was told, and I did a presentation, you know, like for one of the problems, and, and this problem, there were two, I did a different kind of solution, so it was, there was one solution, the one they were expecting, and I did a, a different kind. So, so it could, it could really be for that thing. And I just think it's just not recorded, those, those ones, clearly. But I also had this inkling that maybe it was just [inaud] Minister of Education [inaud]. So, anyway, I had two, I had this extra medal, which might be for that. [laughs] Yes.

*And how many of you were in the British team?*

Eight, I think. Eight. Yeah. We had a little bit of an advantage that year, because, the Russians and the... The Russians didn't send their team. And, there were various stories about why they didn't send a team. Because there would have been, you know, always one of the strong teams. One of them... Well, yeah, different story. One of [inaud] Romania anyway. And Romanian [inaud] was a little bit of a... [laughs] Yes. [laughs] The other was because the, I think it was the year the Chinese

came for the first time, and there was a bit of tension there as well. So anyway, there were stories about that. Now, the British team gets [inaud]. I mean, in those days there was a few teams, not [inaud], the US team, the Russians would . certainly the Chinese and the Vietnamese team, had like, two-, three-week camps before where they have intensive training. Nowadays the British team I think does do that, and has funding to do that. I mean our day, we just turned up and, yeah [laughs], and did it. But...

[00:42:56]

And, one thing I found fascinating was, quite a lot of years afterwards, you know, probably about twenty years afterwards, I remember, when I was looking , things , coming up and finding my problem sheets from it. And, several of the ones I'd look at and I'd think, I knew, I knew... You know, you know like you learn, it's like any test, there are styles of question you get, right. And, and so, you, you learn, you learn a bit for a test. It's not really problem-solving. I think of it as puzzle-solving. Puzzles are things which have clue solution . You know they've got a solution, you know you've been given all the information. That's different from a problem. A problem, you might not be able to solve. You might have information that's, that's, you don't need, you know, that's real problem. But they're puzzles. And they had styles, they had styles. And some of them I looked, I thought, I knew how to do this [inaud. [laughs] I had no idea how to start on them. And then there was one, and I just thought, is that a problem? You know, as in, it was, it looked so trivial. And, I find it really interesting, and it is about this whole thing about the way you look at the world, you know, and you some- And, and I do, I, I don't always succeed, but one of the, I think, I like, I really like it when, when you look at something in a different way, sometimes things are, almost impossible, become absolutely trivial. Or vice versa. [laughs] So I, I unlearnt a lot of things which would have helped me, but I also, it was really fascinating, thinking about the way your mind has changed, the fact that, things that were easy are now difficult, and, the other way round. Anyway, yes. [inaud].

[00:44:46]

*So, that was the summer of '78?*

OK, yes. So that...

[inaud]...

Yeah, go on. Yes.

*So that was summer '78. So when you left Romania, then you were back, you went back to the UK, and then you moved to Cambridge, right?*

Exactly, yeah. Yeah, that's...

*1978, until 1981, you got your degree in Cambridge.*

Yes.

*In the meantime, you also got another diploma.*

Yes. So I... So when I went [inaud], I was, I was clear... So, I had sort of expected that I would be, you know, like, you know, at school you're, you know, there, I've forgotten what is the right word. There's a phrase for this, isn't there. But anyway. I thought I would level up, at some point I would sort of find myself [inaud]. But actually I was, I was, shall we say at the front, fore, you know, towards the forefront of people in Cambridge. And, so I... And I was sharing the rooms with somebody who had gone to the Maths Olympiad as well, a guy called Richard Borchers, he got the Fields Medal quite a few years later, when he was forty. Because they always wait till the last possible minute to give it. And that's the oldest you can have it. But, he, I mean he had been, it was his second Olympiad, he had been to the Olympiad the year before that as well. And we were completely, completely isometric – not isometrically, iso-, [laughs] whatever, completely opposite personalities. [laughing] And, you know, we, we sort of, you know, we got, you know, we got on, we got on each other's nerves quite a lot during Romania. And we had both put down on our, for different reasons... So for Richard, Richard it was so that he could buy lots of maths books. He had shelves of maths books, it was amazing. For me it was more to do with home situation. So... But anyway, we both put down on our sort of, accommodation request forms, we both put down we were happy to be in shared

room, which in Cambridge doesn't mean you had to share bedroom, it just means you've got two bedrooms and a shared living room. [laughs] Different, you know, so not, not shared in a sort of deep sense. But we both said we would be happy with a shared room, and our criteria was, as cheap as possible. [laughs] And so, that's why we end up together, for two years we were there sharing. So that was quite good. But... And, I think it was partly, partly because of that... So he was starting, I think he, he... I think he just, I think just, he knew his way around better, things. And, he was going to both secondary [inaud] advanced lectures and I tagged along and went to, thing. And I basically stopped doing the first-year lectures, because I was, I wasn't... You know, I knew... I was doing the problem sheets for them still, but I wasn't needing to do the lectures, because I had done, I had sort of... All of this prep that I had had from the Open University, from the FE college library, meant that I had basically covered all that material. And, he found out that there was about, one or two people a year, or, you know, would skip their first year and go straight into second year, and do the secondary exam. And I remember asking around Christmastime my director of studies to do that, and he sort of went [inaud]. And then I had, in my second term... Again, this, [inaud], I'm so, I still like this, I'm not very good at sort of pushing myself [inaud]. But anyway. Second [inaud], I was doing these individual ones, and we were, it turned out about halfway through he had intended me to be in the second year, we were still doing the first year problem sheet. So it was only about halfway through I started getting the proper ones. But anyway, I, the end [inaud] was, I did do my second year, I did my second year exams in my first year, and then finished my exams, so I went to third year. But the, the rule for graduating isn't that you had done your exams; it's, you had done your exams *and* you had been there for three years. So I had this spare year.

[00:49:10]

I did consider doing computing, and looked at the computing, effectively computing third year, but I didn't think it was very challenging, to be honest. [laughs] I did [inaud] as well actually, that was, I never thought [inaud], or philosophy possibly, but... And I had looked at... But in the end, what most people... So what Richard did was, did the pure maths Part III. So there was like a fourth-year course you could do, in pure mathematics. There was also an applied maths one, which was basically things like gravity, you know, sort of, special relativity, general relativity, that kind of thing. But, I always had, so I've always had this tension between my head really as a

pure mathematician's head, you know, theory, I'm theorising, I'm always abstracting, I'm always, doing things. But also, that bit of my dad in me, right? So when, I, when I see a table, I'm sticking my head under it to see how it's put together. And that wanting to be practical, hands-on. So what I did, there was a diploma course, a, a postgraduate diploma in mathematical statistics, and I, I had only done, I think one stats course during my previous stuff, and, and stats, it's a bit like computer science, it's sort of, looked on a little askance by mathematicians, because it's a bit too practical. [laughs] But I decided to do that. And I was the first person who had done the fast course, as in done, done a two-year course, who did that, for thirteen years. There had been somebody thirteen years before who had done that. And, I... So that's how I did that. However, because I hadn't graduated, I couldn't formally... I, I did the course, I did the exams, but I couldn't formally have the diploma. So I... As you have noticed, [laughs] there's little star rows in my CV because I, diploma [inaud], and little stars. Well actually, it's not, because I couldn't formally have it. [laughs] So it's always made a little sort of, a complicated story in the CV. But... But yes, so basically... And obviously I've used that stats a lot since as well, and, a year or two back published a HCI book, so as well as the, the big HCI textbook, I have a *Statistics for HCI* book, where I, it's all about the not doing the maths bit, but about trying to make the mathematics understandable and comprehensible. So it's about trying to make it mean something in there, not just up there, and I think that's so critical, yeah. Anyway, yeah, that's... [laughs]

[00:52:01]

*After this, how did you end that, getting the PhD in computer science?*

OK. So that's a few years. Took a few years. So... I mean, [inaud] had, you know... I know... I mean one... As I was coming to the end of my, my maths course, I started thinking, well what, you know, basically, job, thinking about jobs. I was getting married too, just, we got married on the 4<sup>th</sup> of July in 1981. So we had just literally... I think it was a week after graduation, I think we had the graduation, that's right, and we were, [inaud]. And... So I was also thinking about, thinking about jobs and that. So one option was, to stay on and do a PhD at Cambridge, and, I, there was... I was planning to do that with, in fact the guy who had... I said thirteen years previously somebody had done the fast course, and it was the person who had

been the supervisor of that person who had then died in a climbing accident not long after doing his PhD, but had been... And, I was... The plan was, I was effectively going to pick up work from the line that had been [inaud]. [laughs] So that was... And I'm not ... Presumably some work had happened in between, but basically, in that, in that area. But there was also... I mean this was partly about family responsibility, and, and feeling probably I needed to get a proper job, which was... [laughs] Partly there's also, though, my, even within stats, I had effectively ended up going to the most theoretical part of it. [laughs] And so, I was, there's this bit of me that was pulling to be more practical. I thought about computing. There was obviously lots of people doing computing jobs, but, they were, I think I sort of didn't want to just work for big, for companies making money for somebody, and wanted to do something that was slightly different. So... And I.. The careers people at Cambridge had no idea of research positions. I mean, I mean [inaud]. You know, there were... There weren't as many as there are now, but there were research positions in universities. The careers people didn't know about those. They certainly never suggested thinking about those. Maybe they thought that I would be , the academics would think about, I don't know. [pause]

[00:54:36]

I... And I can't remember... It was just, it presumably was just that there was a job advert for a mathematician in the National Institute of Agricultural Engineering, which was in a place called Silsoe, which is halfway between Bedford and Luton, so about, forty, fifty miles north of London. And I went for the interview there, and, there were bright painted tractors. And, you know, as a child I used to have this Ladybird book, *Tootles the Taxi*, and it had a, each page there's this little poem, doggerel poem, about, you know, like the taxi had a, you know, a face on its, on its, you can imagine , and the, the headlamps are little eyes, and stuff like that. And one of them was a tractor, and I loved tractors. So, once I saw the painted tractors, I obviously had to go there. And so I was there for two years, and I was doing computational modelling. So I was doing maths but also doing computer models of maths, of electr- I still can't say this, after all these years, unless I'm very slow. Electrostatically-charged hydraulic drop sprays. [laughs] So you're putting, like, a charge on them, and they get attracted to the drop , is the idea. And I was modelling how that behaved. On computers which would be, at that point, several million times slower than today's ones, so, you had to really simplify things to get them...

Crucially also, another little story there. Lots of stories that come out of that, but one of them was... I was doing this computational modelling, but it was grossly simplified. You know, I couldn't, there was nothing, it was not high resolution, you just couldn't do it. I had to simplify grass, floppy grass into sheets of... You know, so the real model was that if you had sheets of parallel metal going like that towards you. You know, effectively that's... And, at a very coarse scale, because that's all you could do.

[00:56:40]

What I did do, though, was, classify, you know, does it mostly go to the top of the crop? Does it mostly go to the floor? Does it most, does it get spread reasonably well? And then you'd look at the, the range of parameters you were doing, and you'd look at them and you could see, there's a region where it's reasonably well; there's a region where it's, too much at the top; there's a region it's too much at the bottom. I want it in the nice region. And what you could do is, look at the parameter and say, if I'm here, what are the strategies for moving myself into this region? I might make the, you know, perhaps I might think, I'd make the charge higher, or I'd make the drop size smaller. Now, the accuracy... You know, the relationship between the model and the reality was so far, there was no way... I couldn't say, if you do it at that drop size, it'll be OK. But what I felt was reversed was, the direction. So the model, what you're able to do is get this qualitative, from doing this really precise mathematical modelling, turn it into a computational model, but which you know was not an accurate and faithful representation of reality. [laughs] But what you did is, you, you got a sense for, the behaviour of the stuff. And, what I call, I use, the term I've been using recently, I mean, this is really over the last few years, is qualitative and quantitative reasoning. You've got qualitative [inaud], you do lots of work [inaud], and you get qualitative understanding. And, this was my, probably... You know, if I look back you can probably find, you can find other examples, but for me, it was probably my first really intense experience of realising that I do this really intensely computational, precise but not correct, view. But what you get from that is an understanding that you can then apply into the real world. So, that was important.

[00:58:30]

I then... OK, that's [inaud]. Sorry, [inaud]. I then [inaud]... Our first baby was coming [laughs], right? So two years after this, two years in, first baby coming. So I started to look for jobs near where Fiona my wife's parents lived, up near Carlisle.

And so, there was a job in Cumbria County Council doing COBOL programming. So, which, for a history of HCI is obviously, [inaud] computing rather than HCI [laughs] is quite significant. You know, and it was old by that [inaud]. You know, if you were, if you had done a computing course in a university, they would have, you know, if they had mentioned COBOL, they would have spat as they did it, you know. You know, it was already seen as being sort of... I mean it was fascinating though, because it was done in, COBOL was written in near-natural language. Well, no, it's not, but it tried to be language that was comprehensible. And actually, I went to work there, I was there for a year, and, but one thing, again... There's a couple of really crucial things that happened during that year. So one is, when there was a, a change to any program that either printed cheques or changed the data files that would print cheques, so if you changed the payroll record or something like that, the change was recorded in a, in a sort of folder, which the auditors would look at. Now the actual code for these programs was thousands of lines long, it had been through multiple computers with different things, like... You know, so like, the cheque printing program was written as if it was lines of the cheque, because, at some point in the past there wasn't enough room to build the whole cheque as a single image, you had to build it line by line. You had, you had some places where there were like, one- and two-letter names[inaud] fields, because the compilers in the past have run out of name space, so they had to have short names to make them fit in. You know, so there was this whole history, even at that time, so we're talking, so, we're talking now 1984-ish, something like that, 3 or 4. Even at that time, you were looking at a 20-year history embedded in this code, that there was, there was archaeology within the code itself. But crucially... You see, you would not have understood... I mean, you couldn't, it was hard to understand even to program the complete code. You know, you could find bits and change them. The auditors certainly wouldn't have understood the code as a whole. But because COBOL is written in this near-natural language, you could read changes. You know, it was blatantly obvious if you said, you know, 'add £1,000 to...' You know, if name equals Alan Dix [inaud] £1,000, you'd have seen it. You know, it would be blatant. If it was in, if you can imagine the same thing in C++, or [inaud] [laughs], you know, no way. So, there's a, there's a really important human... Well, human-computer interaction [inaud], in the information system sense [inaud].

[01:01:33]

The other thing I did was, I was using transaction processing systems. So this is where, you've got a semi-smart terminal. I mean smart, I mean character terminal, but where it can, it manages the forms, just like web pages do now, right? So [inaud] very like, when it came on to web programming it was just the same. And what those things have... And these are still used in at a point of sales terminals. So things like IBM CICS, it was ICL computers, but I mean CICS [inaud], it's the equivalent of that on the ICL computers. So, so still heavily, heavily used. So what you would get in your code is, you would have this thing that says. 'There's a screen full of information.' So what I had trained to do, when I had done computing in the formal thing, what you would expect to have is, you know, like a flow diagram, read a line, send some results; read a line, send some results. No. Here's a form full of information, that came vaguely from somewhere. [laughs] Do something with it. And, the code I inherited by the people who had started this, which was, I did the first write... I know this sounds [inaud], but I did the first code [inaud] at the place, we did updates through this. They had only done information. All the updates [inaud]. I was doing the first updating ones.

[01:02:54]

So what did I do? You know, how do I deal with the complexity of things? You wrote this code, which was sort of like, branching, saying, 'Duh! there's a field, there's one of those fields, so it probably would have been from this form.' But then there was this, probably it was this stage [inaud]. I mean it was, this, this tree of decisions, trying to work out where this form was produced from, and therefore what to do with it. That's all I did, was, I wrote a flowchart. But I didn't write a flowchart of the code. I wrote a flowchart of the interaction. I didn't have the words for it, right? Because the code, you could understand, and you could write that. And, I labelled each box in my flowchart. And when it was a display box, that label was put into a field [inaud] display. So a bit like dropping a cookie or something like that. Then my code would basically say, 'What's the label?' I know where it is. And then my code wasn't the flowchart, because the flowchart was going back and forth [inaud]. But I [inaud] compiled that into a template thing, but basically, took the new and said, 'If you've got this screen, this is the thing you do next,' and then you do that. It meant... Debugging was so... You know, I'd get this, this problem, [inaud] I've got this problem. I'd say, 'What screen number is it here?' Trivial. I, I could turn over, I could turn around corrections in hours, which sounds like really slow, but

in times when you're talking about weeks to do corrections, this was brilliant. But I had learnt... I was using formal methods to do interactive systems. I didn't know that as a term, I didn't know that to be... And it took years even when I was doing formal interaction to realise that's what I was doing. [inaud] it made a huge difference. It improved my productivity 100-fold, compared with colleagues. It meant that, I was, had [inaud] which were controllable, you knew what was going on, you could fix, that you could understand, you could... And I used the same flowcharts [inaud] the coding to talk to the clients, [inaud] internal thing. And it made sense to them. Oh it was... Yeah, anyway, so anyway, so [inaud]. That was... That's how I got into computing, but not to do the PhD. So, you were, you are trying... Yes. [inaud] the next question. [laughs] Yes. Yeah.

[01:05:31]

*So, you [inaud]... Your thesis was entitled 'Formal Methods and Interactive Systems: Principles and Practice', right?*

Yes. Yes, yeah.

*And, you had it at the university of York.*

Yes.

*In the Department of Computer Science.*

Yes.

*So...*

So, how I came to that, is, obviously, during this time, although I was doing this, and [inaud], I was aware, this is... Yeah. I, I needed, I needed to be back in a university. It was sort of evident. My sister-in-law, who was also co-author on the AI textbook that we did in '96 on the HCI textbook [laughs], was, but had been doing English at that point, her... For one week she was in, she had been going out with a guy, for one week they were engaged, and then I think she realised, [laughs] the commitment of

the engagement made her realise, this wasn't for her, and then broke it off. So there was one week... I hope I'm not giving too much of her story away, I'm sure she'd be happy with it. So for one week they were engaged. And during that week they visited myself and Fiona in Carlisle where we lived at the time. And... So again, whether this is, yeah, whether this is happenstance, whether this is fate, you know, whether it is a blessing, I'll let you use your own interpretations. And he said, 'Oh, there's a guy in my church who works in computing. You know, would you like me to introduce him?' And I said, 'Yeah.' And I don't know whether we did this by letter or phone or... We didn't have phones, so we can't have done it by phone. I don't think we had a phone at that point. Anyway, I don't know how we actually communicated, because there was obviously no email at that point. Anyway, he did... You know, I mean it was one of those things you sometimes say to people but you don't do. But he did. And you talk to the person, and he contacted . A guy called Colin Runciman, who's a functional programmer. And, and he said, 'We've just got this project funded from, and it's the first round of Alvey funding,' right? I didn't know about the Alvey bit at that time, but this was, came from that. And I went and visited them, and they offered me, either to do a PhD with him, or to do an RA position, based largely on getting family positions , where , did an RA position, but I did my PhD while I was being paid as a researcher, for that. And, I had... You know, the HCI side of this, I had, I mean I wouldn't have known, I certainly didn't know anything to do with, any terms around that, although the term HCI [inaud] probably a little later. But that was basically how I ended up there. It was, you know, happenstance, chance, or fate, as a, [laughs] I'll let you fill in your terms for that. And, yeah, and that really shifted the course of my career quite, you know, dramatically, yeah.

[01:08:28]

*OK, so, we are up this point where you, you know, you got your PhD funded by the Alvey Programme.*

Yes.

*So let's have a short break from your personal history and let's make a little bit of clarity. So, the Alvey Programme had a strand that was called Man Machine*

*Interface, that what eventually will be human-computer interaction. But. if we think about these terms, we can also think about user experience design.*

Mm.

*Interaction design. User-centred design. User interface design. And going back, we had, you know, human factors and ergonomics. So, if you had to, you know, navigate these terminologies, how would you explain the main differences, or [inaud] these terms?*

So, so one is, I think several... Yeah, so things like human factors and ergonomics, which existed, certainly before, certainly before the terms, and before the, the concept of being a field or group of people had arisen for HCI... I'll use HCI as a generic thing, and then I'll branch from that. So those are just... And date back things, so things like Brian Shackel, 1959, advanced computers. So you can look back quite a long way on this. And a lot of these were contributing disciplines that came together. Really actually, HCI, MMI and CHI, so computer-human interaction, which is the American SIGCHI, ACM [inaud], they were really, probably all arising almost simultaneously, because, I think the first CHI conference, something like '82, '83; the first British HCI conference was in, '85, or 4. You probably know those better than me actually. [laughs] Anyway, one of those. [pause] I think 5. 5, that's right. I'll have started working in York for, and my first paper... I wasn't at that first HCI conference. Colin presented. But, it was, my first ever HCI paper, as opposed to papers in pesticide science and things like that, or crop protection officers I think, you know, my sort of back-up job, but my first computing, academic paper, was, was at that conference. So, so these terms, yeah, they were, they were floating around. I don't know how common, whether they were coined... So things like the MMI stream in Alvey, I don't know whether that, the MMI phrase was being used before that within [inaud], or whether it was coined for that stream. I mean very crucially, and I'm sure you'll, you'll come across this with other people you talk to on this issue, it was, it would never have arisen out of academia, at that time, within UK. It wouldn't have arisen with the importance. The Alvey streams... You know, if you had said... You know, it's not that they would have said, you know, it doesn't exist, but if you'd said, 'We want to do five areas that we're going to put money into in

computing, what could they be?', no academic would have said, man-machine interface, or human-computer interaction, or computer-human interaction. But, the industry people said, this is what we need. You know, this is what actually makes it worth . And, and so that was... And actually, if you look at it, as well as the MMI stream, there were, there was a straight, I've forgotten what it's called now, but it was an expert system or intelligent system stream. There was also things like Vision, and, I think Speech, were two of the other. I'm running out . Perhaps there were six streams. I'm trying to think, because there was, what the other streams inaud]. But, but it's interesting even then, those things were ones which had that human element to it, although were much more about the technical aspects of vision and, and speech. So it was, yeah, so really... I can't remember what [inaud] name , but it was really, really crucial that, that that came from there. So those were developing around the same time. Really, later on... You've got to look a little later for when interaction design, and user experience [inaud] substantially later came out.

[01:13:05]

And, to some extent, you know, I mean, if I was to distinguish them, I would say that, HCI, and MMI, CHI, are the academic discipline, they're the study of. But HCI has always had this, this mixed thing. And, there's a classic paper, John Long, where, and, and [inaud] name, Dowell, but... not Anthony Dowell, [inaud] [laughs], anyway, Dowell, on, on whether HCI is an engineering discipline or a craft discipline or, or science. I was trying to remember the third thing. You know, where does it fit, you know, what is it? But there's always been... So there's always been this sort of, the study of it. And then there's the design of it. And they're so intermingled. It's, it is hard to, to pull them apart. But, I think it's more towards... But again, I'm sort of thing, my feeling is, it's more towards that sense of which, this is a production discipline, and, and, particularly around the dotcom years, so this is like, '99, 2000, you know, '98 even, going into that, you had a lot of start-ups and, and design houses, and a lot more... So, going on around that. So, so I think, this idea that [inaud] design Also, at different points, HCI has had this little bit of identity crisis, you know [laughs], are we a science, are we engineering? Things like that. You know, so sometimes they look to bridge-builders, we want to be like, you know, people who, architects who design bridges and buildings, you know. Sometimes it's been the engineering, sometimes it's design, not to be designers and stuff. So, there's a little bit of navel-gazing going on there. But also, I think part of it is about this, your job

title. So what is your job title? Your title... You're not... Human-computer interaction is not a job title that you would give to somebody in a company. Whereas interaction design, there is. So partly it's about this, this sort of designer envy.

[laughs] [inaud] designers, they get to wear black polo-neck shirts, because they're cool, you know. [inaud], you know, they're not seen as nerds; they're seen as cool, you know, it's just... Right? So there's a little bit of that. But also, this bit about, in the job title. And I... And everyone's going to distinguish... Now in practice, if you look in academic courses, you know, whether it gets called interaction design, whether it gets called HCI course, doesn't make a... You look at what's taught, or it doesn't make a ha'p'orth, you know.

[01:15:45]

But, my feeling is, that's why that developed [inaud]. And I think it is quite important, because... You know, again, it depends where you draw boundaries, because, and if you want to look at other disciplines that surround and connect, there's the, the sort of information systems-y world, but, the world... And CSCW, computer-supported cooperative work, sort of intersects here as well. They often have, shall we say, more of an organisational and more of a process, and sometimes more a political view. And, sometimes HCI gets, almost boxed by being... You know, the joke actually, when I first joined, first started being in HCI, the joke was always about round edges to windows. And actually, I'm looking, my Mac now has round edges to Windows, and it was sort of like, you know, it was sort of like the, the frivolity bit, you know, it's like... You know. And people always complained that they would get called in to look at things after everything was done, just to prettify stuff, right? And that sense that, that actually what really matters is not just, it's not just what it looks like. It's not just the thing that's happening at this moment, right? We are using Zoom, right, in order to, actually to do a computer-mediated communication, but it's got controls, we'll have used things to set the record mode, and stuff like that. So we've interacted directly with Zoom. We've also interacted through Zoom, which is, which is interesting. But also, this recording is going to go into the AIT archive, it will become part of, you know, bits will go on to the website. There is this, this ecology around it, which is not separate from this moment, you know. And you have to [inaud]... And [inaud] HCI, you know, there's a point at which you've got to say, yeah, this is more management science, you know, than... But, I, I certainly have quite a broad view of HCI [inaud], and it's about the understanding of computers

working with people. And the actual, the British Computer Society HCI conference, its subtitle is People and Computers, and it has always been. And I think that's really quite important [inaud]. And if you think about [inaud] bridges, you know, obviously at some point you've got to say, this is political science, this is not, thing. But it is very broad, very broad. Whereas I think, I always feel interaction design boxes you back down towards [inaud]. So, I, I preferred to say, say I'm an HCI person rather than do that move. I mean to some extent it's badging, it's always been badging, you know, it's about, you know, you, you create a new badge and therefore you can, you can sell things to a different market, to a different subject. And in academia, that's really crucial. You're always being... You know, funders always want to do something new, you know, they [inaud] just doing the old sale thing. So some of it is that, but there are some differences.

[01:18:50]

UX is different though. So, I mean, one sense it's not. If you look at somebody who had an interaction design label now, they might have called you [inaud] design if they [inaud]. Often it makes no difference at all. You know, it's what they do. But the crucial bit is, and I think this is very important, it's in the evolution of HCI in the broad sense as a discipline. But it's actually not about HCI. It's about what's happening in the world. So what's happening in the world, you have the Web. And the Web... You know, I mean, [inaud] personal computing forums, you can sort of... You know, was it... You know, there's domestic computing on the Web, but the Web really pushed domestic computing. And it changed who was in control. And I mean, [inaud], this is true to some extent. So, this is partly, the growth of HCI as a discipline at all was when personal computing meant professionals use computers, as opposed to, basically blue collar, white collar workers, working class, middle class, right? So while it was typists typing away doing double entry of numbers, whether... And, you know, to some extent engineers [inaud], engineering's always been in this sort of, in-between ground. But you know, it's OK, there's been a few nerds in the computer rooms, and in the programming, and there's been the people shoving tapes into computers and doing that. While it was those, there was not a discipline of HCI. You know, you got odd bits, like Brian Shackel's work, [inaud]. When people with more, higher wages started using it, two things. One is, they were higher up the food chain in terms of decision-making, but also of course, they become more valuable than the computer. And that's why we've got HCI. That's it, that's why we've got

interaction design HCI. That's, that's the... You know, look at the nexus of it, that's when it's happening. And that's why.

[01:20:53]

The difference with the Web is, that pushes it now into the domestic market, into the personal market, but not just personal as in doing my job, but personal as in, doing my life. And if I'm doing my life, and something isn't fun, I'm not going to do it. You know, you have to... Now that's true, you know, I actually... You know, it goes back. Satisfaction was always one of the three goals in the ISO standard, and, goes back before the ISO standards, in terms of making good HCI. But it was always ignored. [inaud] was, you know, effectiveness and efficiency, and people forgot the satisfaction bit, you know. Oops! Yeah, oh yes, [inaud], there's another one, what was it?, you know. [inaud] you can get away with [inaud]. We actually know that if people enjoy their jobs, they do better jobs. It's always been important, but you could, you could afford to ignore it. You could sort of not, not put it centre stage. But when it's somebody in their home deciding whether to use one thing or another, the joy, the pleasure, the desirability, is absolutely... And that's I think why experience and then user experience time became important. Now [inaud] in practice, if you look at what's done, it's not so... I mean, the sensitivity has changed, you know, as in, whoever you are, you are now thinking about that experience, in a way that you didn't 20 years or 30 years ago. But that... You know, but, so, so I, I'm going to say, it's sort of like, 50 per cent branding, perhaps even [inaud] I was talking about earlier. I remember, going, going to Romania was a Pepsi land. Only if you had dollars, but it was a Pepsi land. You know, if you went to other countries, they were coke lands. There used to be... You know, now, now you can get everything everywhere, but, you know, it used to be... You know, brand... But branding, really really crucial. You know, can you tell the difference? Well, I reckon I can, because I'm a coke man, but, you know... [laughs] Who knows? But... Yeah, so, it's 50 per cent branding, and... But then, but it also, you can actually track the nature of computers in society through that name change. And it actually, it does reflect deep, real things as well.

[01:23:09]

*So if we go back to the Alvey Programme, OK?*

Fine. Yes.

*Go back to the Alvey Programme. We go back to man-machine interface, and we go back to industry, you know...*

Yes.

*[inaud] MMI.*

Yes.

*What do you think it was that industry got from Alvey, and from academics, that it really used? So can you name some, outcomes, that were actually, you know, adopted by industry, and perhaps were, I mean, influential at the time, or even later, and not just at the time, can you think of something?*

Yes. So, I'm going to say, and it's interesting as well, the, the influences, I'm going to say the, probably the most important influences, are human rather than technical [inaud] as in , the, the patterns of training and going into industry. You know, I'm not saying, you know, there will be specific things that have been developed at different times [inaud], and it's true of computing in general that have been important. But, I'm going to say, probably the most significant influence is the way in which people being trained in HCI entered industry. That was particularly obvious, again if you look, that's a dotcom-y period, around sort of 2000, the Ergonomics Unit in UCL, which had been, you know, doing 30-odd master's students for, goodness knows how many years, [inaud] a long, long time [inaud]. I remember visiting a design house. I had been... This was, I was now, you know, we might come back to it, but I was, I was dotcomming at the time. [laughs] I was, we had a, a start-up. But I was also invited to give a talk at a day conference on, it was just about mobile stuff, but it was a sort of industry-facing conference. It wasn't a, an academic conference. And I remember, I mean I gave a talk at that, but also somebody else gave a talk who was in a design house, and I can't remember, but it was particularly interesting, something which she had said. And we were chatting afterwards, and she said, 'Come and visit.' So I went and visited, at the time. And this was, it had grown from nearly nothing to, I think there was about 50 people there. Almost all of them had come from the

Ergonomics Unit. And, you know... They almost certainly were not doing the kind of... There was a particular style of work that, that, I mean particularly from John Long and, and [inaud], which was quite a, thing. I don't think... It wasn't, there weren't, they were not doing that style. They weren't taking the pattern of how to do stuff from there. But what they had was a, an orientation. And it's something I remember, going way back into, so now we're back, going back into the Alvey years, from discussions with people like Richard Young and Thomas Green at that time, where, they were looking, you know, we were looking at different things, we were looking at [inaud] usable models, and user models, different kinds [inaud]. And one of things we kept coming back to was, almost, and this is sort of both, reduces but also says what you want . It's not the particular things that we were talking, or, or about ourselves, [inaud] we were teaching were not important. But probably the biggest thing that you did, by any of these mechanisms, whether it was doing task analysis or whether it was, whatever you were doing, was the orientation [inaud], the way you changed your mindset, to thinking about [inaud]. And so, so you might use a technique that you never use after. I mean I, I mean I see this with myself in mathematics. I still have a mathematician's head, when I do things that are very unmathematical. You know, if I look at, you know, the state of the world, and politics, I use a mathematician's head. There are patterns of thought that I, I pull out. And there's a similar sort of pattern to thought about, understanding that people matter, understanding the complexities of that. And there's, there is knowledge there, you know, there's knowledge you learn, there's disciplines you learn. But also, there is an attitude, and a culture, that goes through. So I'm going to say that's the most important.

[01:27:47]

[inaud] that's not the only thing. If I was going to go to Alvey and say, some of the immediate things that came out of it, one of them was, the closer connection, I mean this is irrespective of HCI, between universities and industry. So, not only did [inaud] drive, I mean for HCI, the drive came very much from industry, but the way Alvey was set up created lots of either direct collaborations, or, like the project I was employed on, was a purely academic one. [inaud]. However, we had an uncle, we had an industrial uncle, and the industrial uncle would visit, you know, periodically. Nowadays it would be Zoom calls [laughs], but then, would, you know, a couple of times a way would come, and we would, we would show what we had been doing,

we'd talk about it, and there's be guidance . And that, that is... Again, actually, if you look around Europe, it's, you know... Probably in Germany I'd say that has probably always been strong, but in the UK, it had lots of bits of Europe , but not, you know, and certainly it's been much slower coming round. And Alvey really drove that.

[01:28:56]

Things that had a very, very immediate impact would be work, for instance, at Loughborough. I mean, I think that had probably long term less impact. You know, it's interesting, if you looked at... But, but what they were doing, they were taking the actual methods that were being used by big industry at the time, and by defence industry as well, you know, which have quite long, complex procurement processes and stuff like that. And they were saying, how does HCI, how does human factors, enter into these processes? Where do we place it in this process so that it happens, you know. And where the place is, it's not one place, it's, because there's usually early stuff about understanding needs; there's stuff later on about evaluation, there's bits in the middle, and more about the, the design of the interactions. But placing at those. That worked... As far as I'm aware, and I don't, others will know the details of this more than me, but, as far as [inaud] was actually going in, entering into those processes. And once they were in those processes, anybody who worked for the relevant big organisations had to follow that process. Now, you know, to be honest, [laughs] the style of the kinds of things [inaud] asked to do, felt crude in one way. It was sort of, [inaud] people, you know... You know, 90 per cent of people after 90 minutes would be able to do 80 per cent of tasks [inaud] 70 per cent of [inaud]. [laughs] However, of course, you know, from what I've just said, what that means is, there were fixed points when even if you box-ticked a little, you were forced to think about those things. So, I'm sure there was lots of box-ticking that went on in the way [inaud] [laughs], yes, we've done that. But, you couldn't do that box-tick without [inaud]. And actually, you'd have to do some sort of study or experiment or whatever to do that. So you, you would be faced with, people having, having issues. So yeah, so anyway, so, lots of, lots of different things. But it's, it is quite, it's, it's never easy tracing these paths I think.

[01:31:06]

*OK, so... So you spent roughly ten years at the University of York, 1984-1994. Can you describe the work environment locally, the projects you worked on, [inaud] Colin Runciman.*

Yeah. So, yeah, so the, the project I first worked on was this Alvey project, which was called the Five Man Project. And they actually were men. You know, it wasn't man used in the generic, which was acceptable. I mean it was moving. I remember in Cambridge, it was, there were people, thing. But, it had sort of moved, shall we say, to more, from that sort of discussion to more mainstream. So it was already becoming questionable, but probably not so at that point. But they were men, they were men. [laughs] Which says everything about academia at the time probably. But anyway. Andrew Monk, Nick Hammond, and... Andrew Monk, psychologist, who stayed working in HCI, although, you know, as a sort of sideline, because as a psychologist you weren't allowed to spend too much time on HCI. And done, I mean loads of interesting things way beyond that. Nick Hammond, who always had an interest in sort of hypertext and learning side. Some really interesting ideas around hypertext, sort of, being lost along the way. Colin Runciman, who was the functional programmer, so the formal person. Harold Thimbleby, who had been with Richard Bornat, and did his PhD with Richard Bornat in Queen Mary, and had... And this was one of the times, as part of that process, had had this idea of generative user-engineering principles. So, so sort of generative, rules that you can apply in lots of places, principles, general principles. And then Michael Harrison, who had been working for Inmos, and had been, if I get this right, leading a project that did the interactive, the, the development environment for, for coding the Inmos chips. So these were the parallel processing chips that were crucial, a very important part of that parallel processing side [inaud] at the time. Interestingly enough, and I say, I don't know where the ideas came, but I know that was, the editor for that was one that used indentation for structure, as in, it was built into the editing environment, which now, and you see in a number of languages, but was, was [inaud] then. So, so Michael was new out of industry, he had been working in industry, and was moving into academia. Harold had obviously come out of his PhD. Colin was the sort of theoretical slant on the computing side. So those, those were the people who sort of drove that, that project.

[01:34:08]

I also worked alongside Eliot Miranda in that, who, who never really, didn't do a lot of the work he was supposed to do for the project, but, while he was there, implemented the first non-Xerox Smalltalk implementation on a, on a non- Because, the Smalltalk was very much using the hardware, the Xerox hardware. So he had to work very hard to get even reasonable performance on stock hardware. And, you know, he was, he would... His ratings were, you know, if he was getting five per cent of [inaud] performance, which was [inaud], he was very pleased, because, yes, and you were not, you were not running on more hardware, you were running the thing. He also went on to make the first colour Smalltalk. So, the Xerox ones were all black and white; this was colour. He did the first colour. That was after he had left, went to Queen Mary afterwards, and, and while he was at Queen Mary, the first colour Smalltalk. So the first colour Smalltalk was in Britain, in Queen Mary. And, I, I've forgotten his name. Paul. Paul, Paul. [inaud] put on the... Ah. On the psychology side there. [inaud] Paul... As far as [inaud], he left, he didn't stay in academia, and I lost track of him.

[01:35:28]

But anyway. I... So I did some three years on that, which was about, and that was, the project was about [inaud] methods and HCI, and it was built around these [inaud – sound: weps], and how you could formalise these general principles. And, that... And I did my PhD in that whilst doing that project. I remember the first time, sitting in a project meeting though/there, and, with Andrew and Nick, and, you know, so these were psychologists. I had... So I was sitting in this meeting with psychologists. And I'm thinking, they're going to be reading every bit of my body language [laughs] and stuff, you know. And of course nothing could be further... They knew nothing of that stuff, because they were, they were sort of, straight down the line, hardcore... Well, I mean, Nick did applied stuff, but, you know, these ones, they were more traditional psychology, you know, you do experiments on people. All this man-watching stuff, or people-watching stuff, is, you know, that sort of, fuzzy things, you know. [laughs] That wouldn't get you any, very far in the psychology department [inaud]. So I knew more about that sort of, shall we say more clinical side of psychology than they did. [laughs] Well I was scared to death. I just thought they were going to read every little twitch of my face, [inaud] my whole inner life would be poured out [inaud]. Anyway. So that was this. Anyway, I learnt about

psychology a bit as well, [inaud] psychology slowly . And the internal politics within psychology as well, [inaud], from that.

[01:36:55]

I then... I submitted my PhD. I was doing my PhD whilst working on that. I submitted my PhD, quite proud of this, exactly three years from when I started. Now not many people in the UK do that. Part of the reason for that was, I was the breadwinner. By that stage we had two young children, right, so, Esther had been born before I went to Carlisle; Miriam, or Louise as she was then, was born while I was at York. And so I had two, we had two young children. I was the sole breadwinner, right? I had gained a two-year EPSRC, or SERC as it was called then, Science and Education [sic] Research Council [Engineering], two-year postdoctoral fellowship. So it was a personal fellowship, I applied for and got that. And... But, I couldn't start it until I had submitted my PhD. I didn't have to have finished it, but I had to have submitted it. So, there was... Basically, I either submitted my PhD, at three years, or there would have been a pile of [inaud] in the streets and crying babies. [inaud]. There is something about pressure sometimes works [inaud]. [laughs] What I do remember from that stage is, when I did that, and later on I turned it into a book, and a book , and then I did other major things, when I got to the end of that, there was probably about a two- or three-week period when I crashed. You know, I remember, you know, being up all night printing it, you know, using every printer in the department to do it. And this was early days of laser printing. And you had got no screen previews, you could only, when you were doing corrections, you could only print stuff to see them and stuff. Oh, yeah. So... But also just the physical thing of printing, [inaud], I think it was three copies I needed to submit, you know, just getting those printed physically. I spent all, you know, literally through the night using every printer. But I crashed. And I did that after, I did a book based on it, [inaud].

[01:38:52]

And then there came a point in my career, this is some years on, where, every time you did something like that, and, [intake of breath] and you finished it, and then you could never say, because there's the next one coming, you know. [laughs] And... Which I don't think is helping, you know. So I think... Yeah, that, that idea [inaud] doing, sometimes doing the work, whether it's working through the night, and pushing stuff to the limits, and, you know, ignoring the hours, you know, is fine. But

what we should do is have, you know, if we're doing that, we should do the opposite. And that has almost disappeared, and that's really, really sad.

[01:39:25]

So anyway, I had a two-year postdoc after that, and, at the same time was a, I was on, which I was sort of not a formal part of, I was connected to, was, there was a further three-year project under the CSCW programme, where John McCarthy and Peter Wright in particular were... Well crumbs, which came... So John McCarthy... Peter Wright came late, later I think. Oh crumbs, I'm losing track. Well anyway. But John McCarthy was certainly involved at that point; Peter Wright [inaud] a different project. And also, Victoria, Victoria, Victoria, Victoria. Oh I've forgotten her second name. It's terrible. She was working on the computer side. She moved out into industry later. Again, people, [inaud]. So Victoria... [pause] Anyway. She, she worked along [inaud], she did work at CSCW, and then moved into industry and did stuff in industry. And so, those people patterns are really crucial in terms of the flow of knowledge [inaud].

[01:40:26]

Crucially during that time, that CSCW project included a prototype system that had a chat window, but also had a, a sort of like, 2D layout [inaud]. If you think like Miro, something like that. You know, black and white [laughs], no colour. I just think, you know, very, very pixelated, because the screens were [inaud]. But basically, it's a sort of, it was a, a drag-it-around area [inaud].

[01:40:56]

Oh, I should mention too, that reminds me. During Alvey years there was also another project running in York called Eclipse. And Eclipse was an integrated development environment project. It was about developing programming environments. And it did things. It developed its own databases, and did stuff like that. But there was a guy called Roger Took, and Roger, he had done [inaud] conversion in, I think, that's right, but, things... Anyway, he came in, he came from a background, a non-computing background. But he developed this graphic display thing that was then used for... So it was the sort of, the infrastructure. So... I was trying to think what the equivalent would be, be, but, the toolkit shall we say. So it, you know, for doing Windows and stuff like that. But instead of saying, 'I'm going to have a button, and I'm going to have a window [inaud] object, and have [inaud] like that, what he did, it was more like a straight graphic. You got rectangles, you got

circles. But also you had things like containment relationships. And you know, the ability to say, this is contained in this, but can be moved by the user; or this is contained by this [inaud] can't be. So if you want to do a button, you have something that has effectively used those primitives to, to encapsulate, [inaud] create something which could then be replicated and go. So, that was really... And then that, that was used to generate all of their user interfaces and things. So it was the, the thing that allowed them to do that. So the tooling, really important.

[01:42:34]

And sometimes it could constrain. And, remembering my dad as a woodworker, right, I mean woodworker, if you have... The grain of the wood does that [inaud] the surface, right? If you cut that way, you snip off grains. And that works well. If you try and do that, your tool basically keeps doing that. And you either end up, big chunks off, or it's really hard work. You call going in the right direction, going with the grain. Tools, and substances, have a grain, have a preferred direction. If you are really careful, you can do anything with them: well not everything, but a lot with them. You can work wood across the grain. You need really sharp tools to do it, you know. But, it's much easier to work with the grain. And so what happens is, you learn to work with the grain. When you have a computing toolkit, what you do is, you work with the grain too. So, design of the toolkit, the underlying structures, even if they're in principle [inaud] equivalent you can do anything you like, [inaud], computer people love to say their programming language is truly [inaud], you can do anything with it. Well yes, so was the Turing machine, you know. [laughs] You know, I'm not going to build my, my user interface as a Turing machine, but... This was really, you know, it was... I mean it wasn't per-, I mean again, I'm sure not perfect in many ways, but, but it was really good. The other thing was, the design environment for it of course was built in it, [laughs] of course, and, you had, from the beginning, and I've seen this now rarely, even now rarely see this, it had the, shall we say the, the whizzy [inaud] view, the view where you could see your blobs on the screen, your things inside things. It had properties, because they had properties like, whether they're movable or not, [inaud]. But it also had a tree view that showed the structure of things, the containment relationship. So if you imagine, if you're a PowerPoint user, and you do groupings, and how difficult it is sometimes to select the right thing in the group, because you click it and you end up, thing. That was all done in the tree view. I've seen that WordPress have actually got this now in their, I mean,

this is [inaud], in their current [inaud]. Still very rare to see this, really, really [inaud].

[01:45:01]

Anyway, sorry, I... I went off-stream back into Alvey. But, Eclipse... So that was, that was a programming environment project. It was not an MMI stream project. But, the human-computer interaction bit was really, really crucial. And, I said, unfortunately not... As far... I've been struggling actually to find where I want to [inaud] to present it, to find [inaud]. Perhaps because it was a bit of a sideline for that project, it didn't get published properly at all. And... So hence a lot of the lessons have got lost, because, you know, it does, it is important to tell people about that, thing. Yeah. Anyway, I think I went off-stream. So I'll let you put me back on-stream.

[01:45:46]

*So, I'm going to just ask you, if you can briefly, [inaud]...*

[laughs] Yes.

*...the, let's call it the geography, or the anatomy, of the British HCI unit.*

Yes.

*So in other words, the BCS HCI community, there were meetings, there were conferences. There were several, you know, locations where things were developed.*

Yes.

*You know, relevant people. And, you know, it would be nice if you could, you know, track [inaud].*

Yes.

*[inaud] also how these centres evolved.*

Yes. I'm bound to miss people, so I'll, you know, thing. But, obviously York was one of the centres early on. Loughborough, in two ways. So there was... So, so... And York... I mean, there was work happening at York, and say, before this point, in that sort of area. But really, the growth of HCI as a big, as a strong area in York, happened because of Alvey. UCL Ergonomics Unit had been going on way before that, Loughborough similarly. I mean Loughborough had two strands. They had the, the human factor strand, which was the sort of, the Brian Shackel and the work there, which was very much oriented toward industry and these big industry, and the SSADM, the big methods that were being used. But then there was also a strand within computer science, particularly Jim Alty and Ernest Edmonds, that had, I mean a variety of things actually, sort of, stuff to do with architectures and that, but also quite a creative strand to it. So, so they were both... So both Jim Alty... I mean obviously lots of people around them, but, both Ernest Edmonds and Jim Alty both, they are both technical people. I mean, Ernest Edmonds is one of the people who was involved in the SIGCHI model, which is the early architectural models of, for building systems. Again, what's underneath [laughs] makes a big difference to what comes to the surface. But... But also, both of them, Ernest Edmonds more I think from a visual arts point of view, Jim Alty more from a, an oral or, sorry, a musical point of view, there is that sort of creative strand running through there as well. I probably saw more at the time than non, the other... You know, both [inaud] that there was, [inaud] more the technical side. But of course because of that creative strand, then led, you know, in and out of the HCI world. So I would, I wasn't seeing all of that picture, I was seeing bits of it.

[01:48:36]

QMW, I mentioned that in, in relation to, to Harold Thimbleby, Richard Bornat, but also Peter Johnson and, there's another figure there who's name I've forgotten now, but, I mean Peter Johnson particularly and the group around there. There was another Alvey project there which was, different. That sort of thing, elements overlap, but was very, it was different, things we were doing in York, but, very strong work. And the first British HCI conference was held out of QMW, the second one out of York.

[01:49:14]

You know, also... [inaud] think... Glasgow... I was trying to think when Glasgow... Glasgow came, slightly later I feel, when it started to grow. You know, probably, only a few years later, I think... There was certainly some work in

Edinburgh around the... [inaud] not... Because it was such an important strand, you got lots, you know, even the Alvey projects that weren't part of the MMI stream, sort of could see the importance. It's a bit like, there was a time when every, nearly every [inaud] library paper you saw had a little bit of zed in, which is the form of notation that was developed in Oxford . Because, everybody thought they needed to do a bit of formal stuff. [laughs] And a little bit of that. So there was a sort of, lots of...

[01:50:00]

I'm trying, I'm sure I'm missing major centres. What was very crucial, though, and I was going to say, there's the centres, which are important, right, and that's, and, and certainly UK funding, and I think this is happening in a lot of parts of the world, is, often trying to create those. So, so like the doctoral training now, a lot of the funding is going to these doctoral training centres. So at Swansea, we've got, well two that are connected in the, in the Computational Foundry, you know, one which is joint with a number of universities in Wales, and one which is sort of like people-centred AI , which is focused within the Foundry. And the idea is, you bring lots of people together, and you get, you get benefits of mass, and stuff like that. Which is important, I mean [inaud]. And so the centres are important, the centre's important, and they give you that, you know, that ability to talk with other people.

[01:50:50]

But what was really crucial, and through the Alvey years, and then also, particularly there was the CSCW programme that was launched by, I think DTI actually, but anyway, it was a industry stroke, you know, one that was again, trying to get industry and academia working together, post-Alvey. And both of... And these... But also, the, the HCI Group itself within, within the BCS, all had lots of small day meetings. IEE as well in London have this, they have lots of subjects, but there was, you have a series of HCI-oriented ones there as well. And you know, to be honest, you know, there would probably, one interesting meeting every few weeks, three or four weeks. You didn't get to all of them; you went to some, and that . As a PhD researcher, this is where you would cut your teeth in presenting to other people, usually in a constructive environment. Once or twice I saw examples when it wasn't so constructive [laughs], but, mostly constructively. But certainly a lot easier than, you know, facing a conference of 200 people. And it was where you learnt about what other people were doing. Now, again, if you were in a big group, so say you were somebody in the Ergonomics Unit with 30-odd people in a sort of master's, and quite

a lot of PhD students, you had lots of interchange. Now, it's always good to see other points of view, but you know, to be honest, you know, you probably didn't need it. But there were lots of odd pockets around. So as well as the sort of, like the big sites where lots of people are, you had people... You know, there might be one academic with one or two... So like Dan Diaper in Liverpool at the time, I think, I don't think he had anybody else there, I think it would have been him and perhaps a PhD student or two. Alistair Sutcliffe in Manchester, well in UMIST at that point. I don't think there was a big group around him, you know. I know he was on the edge, because his requirements were again, it's all, these, these edge things. But he was doing work...  
[01:52:56]

So having that national way of people to connect up, that isn't just about the big international conference, was absolutely, personally it was formative, but for so many people it was formative, and is virtually lost now, you hardly see those. I think the reason is, partly, there are so many of these international conferences, people just, do that. But as a, it almost doesn't matter for those big concentrated centres. And I think it probably still does, because it is about learning, you know, see the world outside your little, little group. But, you know, but you can get away, shall we say, without it. But, it is the case that there are lots of scattered people, so, and there is not the provision for all those scattered people there was then. And that is really sad, to be honest. I mean, I would, you know... You know, how to, how to... Helen Petrie, who is the *Interacting with Computers* editor now, but has been doing a series of online things to try and, do some of this element, but it is, it's not the same. You know, I mean it's good, really, really good, fantastic what she's doing, but it's, there is something different about that bit when you go to those day meetings, and, they're gone. It's really a... Sorry, that wasn't a very positive point was it [laughs], but it was... Well it's, it's something I wrote . [laughs] But yeah, no, but it was really important, absolutely important. Because it's the ecology of the, of the HCI community as a whole, which is absolutely crucial, mm.

[01:54:37]

*So, if we want to summarise what happened between 1994 and let's say 2018, your academic career, you know, professional career...*

Yes.

*Perhaps we'll have another, other chances to go deeper into these [inaud].*

[laughs] Yes.

*[inaud], you know, to, to wrap up...*

Yes.

*...and give some time also for further reflection.*

Yes.

*So, in 1994, you left York.*

Yes.

*In 1966 – 1996, sorry, is the first edition of your AI book.*

Yes.

*You had, you were working also as a technical director for aQtive [inaud].*

Yes.

*a-q-t-i-v-e.*

Yes. You just say aQtive, yeah. [laughs]

*Yes. I'm doing this for the transcript purpose [inaud].*

Yes. No no no, that's right. Yes.

*And, also vfridge, the, you know, University of Lancaster. Birmingham. But also, the time you spent on Tiree, a little island on the west coast of Scotland, and, you know, the Tiree Tech Wave too, created from there.*

Yes.

*It's still ongoing.*

Yeah. I mean, we haven't had one for about a year and a half. I mean obviously COVID really kicked that, made it very difficult.

[01:56:25]

*So, can you briefly describe what [inaud]...*

Yeah. Yeah. So...

*...[inaud] situation to another.*

Mm.

*So we arrive to 2018, and the Computational Foundry in Swansea. So, do you think there are, like, you know... So I'm asking the mathematician of you...*

Yes.

*...[inaud] fraction. [laughs]*

Yeah, yeah yeah. So... It's... I guess the... [pause] I mean some of the reasons were sort of, you know, career, family, financial, and things like that. And that... And certainly things... We moved also in '94 to Cumbria, and lived there. And so, so part of my things were, were places I could commute to from there, and, I was doing a lot of, you know, week commuting where you go away and come back, and thing. So Huddersfield was partly, Janet, who was, Janet Finlay was co-author, sister-in-law, [inaud] [laughs] things like that. Had already, was, was already in [inaud].

That was one of the reasons I went there. And we ran, we ran one of the editions of the British HCI conference from there. That was also, at that time, when the CSCW programme was quite strong. And, Stafford, you know, the reasons that I... Yeah, probably just complicated family reasons, all sorts of things why I ended up there. But, that was an interesting period, because then I, I was being, I was on, formally on a management contract. I was Associate Dean. And, so different stories about that. And, interestingly enough, I almost had more time to do research then than I have sometimes when I've been on a more standard academic track, because, I would do longish days, but on the whole I would go in, you know, maybe leave the house, start, be in the office half eight; leave five, half five. And that was it. And then, I did my, I did my research job outside that time mostly. You know, I did some, you know, it might have been, if it was, it was a paper that I was doing some editing on, thing. But real research. But, the, the, shall we say the, the day job bit finished. So this is like, you remember Einstein working in the Patent Office. You know, that was a deliberate, as far as I'm aware that was a deliberate choice, because he thought he would have more time to do thinking in the Patent. I think he, actually, to be honest, in the Patent Office as well I think, to be fair. But, but there is something about, you know, there is a, there is, I suppose, a strength and a weakness to academia's [inaud], so it's quite hard to keep track, thing. [pause]

[01:59:18]

The more... Actually, then, the, the move to Lancaster was, I had worked for a long time with, at Lancaster, with the likes of Tom Rodden and Ian Sommerville, and, but also that was synchronised with, although actually came slightly after. So... So, yeah, so towards the end of the time I was at Stafford was when we, was when we started aQtive, but it didn't start... The start-up... In the States, dotcom was already kicking off. In the UK it wasn't. It was very short-lived [inaud] in the UK. So when we were applying, when we first approached venture capitalists in '98, we had this eye to, to what was happening on the West Coast. But 3i at the time, we were completely... So 3i, as a venture capitalist company, mostly did things like big management buyouts, that kind of stuff. You know, so it was venture but not, [laughs] you know, not, not so adventurous. We were completely left field, you know, we... When we were small, as an investment, but that doesn't necessarily mean it's good, because it eats up as much internal time, but, we were much more risky, much more on the edge of things than anything that they had. I mean, a year

later they were being, pouring money into start-ups. So, I think we had a sort of, 600k investment from them, and they partnered with another, another company in fact to do it. But it was... You know, I think it was a real coup, because it was before the dotcom took off, and it was... So it was, it was, if you're a venture capitalist, if you're... If you're an angel investor, what matters is, it's your money. If you're a venture capital and you're the investment manager, if you do what everybody else is doing, and it's a bad call, nobody blames you. If you do something that nobody else is doing, and it's a bad call, you get the blame. So there's a... So the venture capital industry is risk-averse in one sense. It's not. It is risk... It's more risky than other investments, but you still stay within parameters. So that was really important. Interestingly enough, vfridge, which was our spin-out from aQtive, got funded after the dotcom crash. Not enough, it was always funded to the level, we had a maximum of quarter of a million; we only spent, in the end, 225 and then [inaud], it was not going to go. But it was always dependent on the investment market picking up again for the high tech, and it didn't soon enough. But there was... That was good.

[02:02:06]

But anyway, I was... So we, we had already moved it to Cumbria, and so I was part-time at the dotcom, and then I moved part-time to Lancaster, and then eventually full-time. And first of all doing in aQtive, and then, when we clearly weren't going to get... You know, so, the dotcom crash happened just when we would have needed the next [inaud], and you put it off, funding, to the last possible moment. And [inaud]. So anyway.

[02:02:34]

But... But interestingly enough... So, so the, you know, in terms of things happening now, or, you know, happened later, aQtive was an intelligent internet interfaces company [laughs], and vfridge was a social network company, apart from we didn't have the words for it. We used to talk about the... Oh crumbs. Ah. I've forgotten my words now. But basically, we were looking towards a sharing... Websharer, the websharer, somebody called it. We were looking towards this idea of people sharing rather than publishing, which was [inaud], ahead of its time. I mean so many times there have been things, well actually like the work in that, back in the Nineties, early Nineties, '92, when I was talking about bias in, in machine learning. Far too early. I mean this was only, probably about four or five years too, or two or three years too early. So that's how I ended up at Lancaster, just... I'm just working

[inaud]. Tom almost instantly moved to Nottingham, and [laughs], not because I went, I should say, but, I was quite... I mean, I mean it's good, we continued to work together on, on projects between Lancaster and Nottingham. And... But then... I was trying to think how long. 2008, so that's, eight years after I moved there, I had a sabbatical. It's the only sabbatical year I've ever had in a university. Various reasons, I've just missed having sabbaticals. And, I... But I was so busy in the run-up, I didn't have time to plan it properly. So I did do a visit to Rome, I did a month in Rome, with [inaud] in Rome. And... And... But, I hadn't really planned it.

[02:04:25]

So we thought... We talked about going somewhere remote and get somewhere. And so we thought, well, we've got a year here where I don't have to be in the university every day. If we don't do it now, when will we do it? So, we, we had been to Tiree once before for two days. So we went again to buy a house. [laughs] I mean you know, literally, literally, yeah. I mean obviously we went to look at the houses. So parts, if we decided it wasn't so nice there, we wouldn't have done it. But, literally we had two, two nights there I think it was, I think it might have been, at the most three, but I think it was two nights there, so a day in the middle and, arriving and leaving days, before we went to buy the house there. And, it was... It was one of the few times I'd say in our life where we feel we've really, sort of not gone with the flow, but really just done something that felt good to do but not, not, that is outside our expectations, you know, that was less driven by life and more us driving life. And, too often I think, done with being driven by [inaud]. And Tiree was really... I mean, then... The original idea was, I'd probably, do things like work the term in Lancaster and go back there and we'd get a little two-up two-down in Lancaster and use that. And in the end, I got to the end of the year there, and I thought, I can't go back to being an academic like I used to. And dropped to 50 per cent. And then did 50 per cent at, then picked up another 50 per cent with Talis, which is the software company that I worked for for about eight years as well. And, to be honest, the Birmingham move was a combination of, well three things. One is financial, that the pensions, they did some changes in pensions, and, if I had stopped working for the university, I would have lost a lot of value on my pension. Actually, a bit like my mum, but not as dramatic, I wouldn't have lost [inaud].

[02:06:28]

Now in the end, they then, in 2016, basically changed the rules, retrospectively, so that, basically, I needn't have done that. And, you know, I didn't go abroad, because the rules of the pension meant that if I had stopped continuity I would have lost value. And... But in the end actually, when they retrospectively changed the rules, meant, I needn't have done that. So I was deliberately, I wanted... I had thought about working, not necessarily full-time for aQtive, but more, perhaps a higher percentage but keeping [inaud] time. So in the end I went to 20 per cent Birmingham and 50 per cent of aQtive, which meant, 50 per cent of my time wasn't paid for by anybody. So, I'm an academic, I just did academic stuff, of course. And I still mostly did the stuff that came, you know, things hit you all the time as an academic. It's hard, I found it very hard to keep control, my control. But, I was only paid for two-thirds of my time. So, in 2013 I could just say, I'm going off for three months and, go walking, and walk round Wales. And that was what enabled that. There was no way I could have chosen to do that if I had had a, sort of a more formal academic job. And so even... So rolling on that, and so, I was only 20 per cent of Birmingham. Oh, actually the other reasons for going to Birmingham. So, there was reasons to stay in academia, not dropping... You know, there was a part of me thought, actually, I might be a better academic, I could do more academic things by not being an academic. Yeah? And I think a lot of academics feel like that sometimes. The reasons, partly there was this financial reason, but also Russell Beale, who was a long-term collaborator, another of the authors on the HCI textbook, was there, was building the HCI group in Birmingham. And also, Talis was based in Birmingham, so it was very, you know, there was logistics. Because I was basically, you know, going, about every three or four weeks I was driving, either driving or flying up, either down to, to [inaud]. And it's a day trip in each direction, so you, you want to make the most of it. So, so that was that.

[02:08:45]

But, yeah, so, yeah so that takes us to 2018. That was there you wanted me to get to. Oh, and Tiree Tech Wave was of course happening then, so Tiree Tech Wave... When I first went to Tiree, I thought, there was something about the openness of the environment that just, changed the way your head worked. And so I just... I had always thought this was a good thing to bring people to. And there was always multiple things. Partly it was about bringing academics, technologists, designers in, to help free their minds, to help them think about things differently, but also to

introduce them to what life was like in a rural environment, and a sort of marginal environment in many sense, socially as well in terms of sort of, average incomes and things like that, and then partly also knowing that if the places at the edge have a future, then technology has actually go to be a significant part of it. They're usually very poorly technology supported, because of the communications and all things like that, but to be honest, if they're going to survive, they have to be the other way round. So there was this combination of things. And the Tech Wave always sort of did, sort of, bits of all of those. But basically, that was all about bringing people together, and saying, get on with it. Not... You know. And the glorious outcomes that happen when you have no planned outcome. And in academia, you know, we are constantly pushed to have fixed, pre-defined outcomes that we say we're going to have, and actually, the best things happen when we don't have that. And the Tech Wave was a, a celebration of that.

*Sounds really nice.*

[laughs]

[02:10:35]

*So... And the reason I wanted you to arrive to 2018...*

[laughs] Yes.

*When you became Director of the Computational Foundry at Swansea University; also because, [inaud] the context were in July 2022, and it was a remote event of course due to the pandemic, you organised the history of British HCI workshop [inaud].*

So... Yes. so July 2020, [laughs] rather than 2022, but, but yes, exactly, that's right.

[inaud].

No no, that's right. Yeah. So yes, so why... So first of all, I was going to just do a little explanation of how I ended up in Lancaster – not in Lancaster, sorry, in

Swansea. And, you know, Matt Jones had, well, was PI for, as in the funding, but also the people around, there was a big group of people involved in it, for the, the Computational Foundry's project. It was funded by Welsh Government, but European money, [inaud]. So, I always say, the Foundry building, right, just sort of like... So the, it's a sort of £30-odd million project. The building part, it was about £20 million of that. But, I say, you know, there's sand underneath, which was also probably polluted sand because it's an old chemical works, so it was built, [laughs] that whole [inaud] campus. It was supposed to, it's supposed to be cleaned up, but they were very careful when driving piles and stuff to not drive material that's deep to the surface, because they're not 100 per cent sure, but, it should be clean underneath. But anyway, the sand underneath, heavily polluted, but you know, for South Wales, for the ex-industrial nature, probably represents the area very well. But anyway, the sand underneath is 100 per cent Welsh. Everything above it is European through and through. So, [laughs] it's quite a nice sort of thing. Anyway. So a big, big funded project. They were looking for a director for the Computational Foundry. And the vision of the Foundry was, was what brought me there. So, it was, it was... It was lovely to come back to Wales, and partly the thing of serving Wales in general, coming back to Wales and doing things on my own. But I mean I had not lived in Wales since I was eighteen. So that's been where I've learnt, well I am still learning Welsh, I've not learnt it, but I'm learning Welsh, and my wife's learning Welsh. So that's been really wonderful. But the, it was also a personal wrench, because, we had got very embedded in Tiree and that, and our identity had got very, you know, things like the Tech Wave, but other things. So it was very very hard.

[02:13:28]

But the, the vision of doing really strong computational research, that is for the good of people, you know, that's at the heart of the Foundry vision, and that was, that was great. And also, you know, I said it's the way that was embedded into the Welsh context as well. So I was, you know, very much driven by, you know, doing, you know, going there because, because of that vision. So that's, that's really crucial. Of course when I got there, as well as other things... Well I knew, I know John Tucker from many years back, so, originally from a formal methods point of view, so, I remember, I think I'll have met him first at a British Colloquium of Theoretical Computer Science in Liverpool University. I went there, and I was doing a presentation about fixed points, that's right, which is connected to the functional

programming world actually, yeah. So not about [inaud] at all. And then the year after, with Hussein Zedan, we ran BCTCS in York. And so, anyway... And years back, I remember going to Swansea, invited by John to do Formal Methods in HCI presentation in [inaud] series and stuff. [inaud]. But... So I knew him from well before. But, but what I didn't know about was, his interest in history in general, and... So... In fact before... When I was still thinking, this was an informal thing, before, thing, the, the Foundry was being built, but, I went for a visit, an informal visit, and John sort of took, showed me the building being built. But also, took me to the Hafod Copperworks where they were doing work, which is, which is the last, you know, the, the last of the copperworks that used to just fill the valleys north of Swansea, and, and pollute them pretty badly as well. And... But... But then... But even then, I don't... I was trying to think whether he taught [inaud].

[02:15:42]

But certainly after I got there, one of the early things he did was show me, and talked to me about the history of computing collections [inaud]. And... So I was aware of that, and sort of, wanting... And we had sort of talked about things, and talked about things that would, would help that along and stuff. I had already donated my collection of the newsletters from the British, the *Interfaces* newsletters from the British Computer Society HCI Group that I had, and I had been trying, and getting odd ones from people to try and fill in some of the gaps. So we had already started to do this.

[02:16:15]

And so, yeah, pandemic. We were going to be doing, this wasn't because of the pandemic, we were going to be, for the... The HCI conference that year was going to be in Keele, and I had, I would... Yes, I was going to be doing the Doctoral Consortium. And I thought, well I'll be, I know I'll definitely be going, because of that, so I might as well put in a workshop proposal. And we thought we'd do a workshop proposal, knowing that... You know, because when I think, I... You know, when you mail people and mention things, a list, people often respond very, you know, much, with lots of... You know what it's like, you, you mention the past, and people have lots of stories. So yeah, we, we were going to run this at the conference in Keele. And there was actually going to be a problem with this, which was, several of the co-organisers were already retired, and so, they wouldn't be able to have any form of funding to go to the conference. And this is an interesting issue in

terms of, of how you organise things. And conferences are pretty expensive, even when you try and keep them as cheap as you can, they, they always end up expensive. So we knew that was going to be a problem, and, thing. But then the pandemic struck, and the conference was cancelled. And, so first of all, and I think it was this order around, I contacted the conference chair and, with relation to the Doctoral Consortium. Because I realised, as an academic, OK, you don't present your paper this year; maybe you will next year or the year after. If you're a doctoral student, you know, a year is a long time. And so, we did a virtual Doctoral Consortium that year. And it actually went, I mean, really really well. It was different but... You know, some things were less good, because it wasn't base-based ; other things were a lot better actually, you know. So there was things we could do which we couldn't do in the base space . But also, I think because of that, also thought about, well we're virtual, so, we can still run this workshop virtually, you know. And we had started doing... You know, we were starting to get, becoming creatures of Zoom and that. And of course, one of the strengths of that meant that all these people who might have struggled to come were able to come. And, so it was actually, probably more effective through being a virtual workshop than, than otherwise. And, and it meant there were several people from, who probably wouldn't have come to the conference, from abroad, probably wouldn't have come in, that came to it. So that's it. And that sort of, set us on the path... You know, we, we sort of meant to do one the year after again, and you know, things don't always come... [laughs] We're not always , sort of, getting the organising going. But certainly, it showed that real set of people who were interested in it, and, and lots of people who couldn't come to it who expressed interest. So it really sort of, showed that there was a core of, of excitement around trying to sort of capture that story. Yeah.

[02:19:15]

*So if you look at your career.*

Yup.

*[inaud] proudest achievements?*

Mm. I mean I think... And I'm going to say, I always see this in two lights. So one of them was that 1992 paper on, where I basically foresaw the problems of gender and ethnic, social bias emerging in black box machine systems. And, and I remember when I first actually re-read it after many many many many many years, and, I had wondered if I had read back things into it that weren't there, but actually it was the other way round, there was more there than I had imagined. And things that still were, were speaking today. So some things... You know, people are aware of the issue now. So I thought that was going to happen [inaud]. It's partly because it was happening at one of those, you know, the AI was going like that, and everybody was getting really excited. And so I was saying, well, you know, what's going to happen there, right? And then of course what happens is, AI went like this . [laughing] And it took another 25 years before it came back [inaud]. So, so partly [inaud]. I'm also a little ashamed, and I think, I think, I think probably, I'm probably slightly unfairly ashamed of that, when I've thought about it. You know, you sort of see it in different... Emotionally, there's a sort of shame. I actually look at myself and say, there's good reasons [inaud]. But, I did what academics do, which is, I published it, I had done my job. And I moved on. And I knew it was important. [inaud] I didn't realise it was important. But I felt like, well I've told the world. Now they know about it, I can go off and do my [inaud] bit . And... So just like, you know I was talking about Roger Took, and presenter, and the fact that it wasn't... I mean that's not his fault I think, that was more just dynamics of that project at the time. But, the fact that I can't, even knowing about it, it's hard for me to point other people at that work, because it's not in, in [inaud]. So that's partly about being available, and obviously that's sort of archival stuff, but also, promoting things. If something's really important, I've realised I should promote this. Having said that, at the time, career stage was different, so, you know, you have different expectations of people at different points, but also, the mechanisms were not there. You didn't have the, the conversation, you didn't have the Web, and you didn't have Twitter, and, things like that. So, it was, probably really hard, and particularly to reach outside of your immediate community. So, you know, it was all you could do was hope for the permeability of your community. So there was good reasons for it. But still, there's a bit of pride and a bit of shame attached to that. But I still think it was, yeah, I mean, prescience beyond, you know, amazingly so. I mean other times... I mean I mentioned obviously the Web stuff where we were... You know, again that was

probably only a few years ahead, but looking, looking forward. But not... But neither of those, I'd say, have major, it's interesting, impact, as in, the first of those, particularly, looking back, you know, it didn't, that was [inaud] it didn't have the impact. So I'm proud of it, of seeing that it was going to happen, but, also, both, you know, [inaud], pressed is the word, but that sense in which you're, you know, you realise you had seen it. It's a bit like Cassandra [laughs] shouting [inaud] Troy, and still the horse comes through the gates, you know. And, you know, part of me feels a bit like that. So, it's, it's both a high point, but also a low point. But having said that, that is often true of life I think.

[02:23:09]

*So, continuing like, to think about, you know, HCI, like now, [inaud].*

No .

*[inaud], you know, in, also in our everyday life.*

Mm.

*So what do you think are the biggest challenges and opportunities for AI and HCI in the next ten years?*

OK. Yeah. [pause] So, I think there's two, there's two sides to this, and often when I've given talks, and things, things like, actually when I've talked more recently about the sort of AI and bias side of things, I've often [inaud], it's awareness that at the end there are, shall we say societal choices, some of which are outside of our hands, but some of which we can at least do things that push in the right direction. So I have this, there are... You can sort of predict the way things are going. Now, you know, that can be more or less good and be... You know, at various times of AI, either things have happened far more slowly than we'd ever think, and sometimes, at the moment things are moving far more quickly than you would ever have imagined, even... Even two years ago you couldn't have imagined where we were now. It's, it's quite [inaud]. However, there are directions things move in because of the nature of the sort of, technology and economics and the way in which companies work, and

particularly because this is driven predominantly from the commercial side, you know. And, and... You know, it's not that it's not academic, I don't mean that academics aren't working in the areas, but the, AI as such, not AI and HCI, but the AI is, is, I'm going to say a lot of the driving power of that is coming from commercial sources. And, by its nature, there is a dynamic to that, the way it works. Some of that replicates old technology, and you can see patterns, if you look at the history of technology you can see some patterns [inaud]. AI is different though. So I say, there's a pattern there. There's also things that you feel it could and should do, and this is... but will not naturally happen. So things that naturally happen, some of which are good things, some of which aren't. So there's this, what's going to happen, or what's likely to happen, and then I have, the challenges for me are about, the things, the good things that are going to happen, great. To get those, let them happen, you know. What can we do to perhaps address some of the potential problems? So like these issues about sort of bias and that are, are deeply embedded, and it is still the case that most of the time when people talk about bias, they believe that it is only about human bias that is getting imbedded into data and then into algorithms. And, the truth is, if you train an accurate algorithm, in some... If you do [inaud] accurate algorithm with certain kinds of dataset, you end up great. But there are other kinds where you will, you will create an equally biased and discriminatory algorithm, because of the nature of the underlying phenomenon that you're dealing with. And unless we deal with that, we're, we miss the point.

[02:26:31]

I mean as... You know... I mean sometimes that's because, because effectively, into the datasets is built the nature of society, and the nature of society is not equal and fair and stuff, and therefore it comes out to them in different ways. So for instance, you know, if you looked at... Well, if you look at myself, right. I am, I come from a... You know, I'm not, you know, I'm not the poorest of dark backgrounds by any means, but I'm, I was brought up on benefits. My mum was on widow's benefit. So I'm, you know, I'm, you know, put in... I had free school meals, which is one of the other definitions that's often used. There's different ways you can do it. You know that, background is a, is a predominant predictor of results, of school results at age eighteen, and ongoing. So if you, if you were to do a predictor of my outcomes at, say, twelve, right? You know, an accurate predictor would say, nah, never going to get to university. And that would be an accurate... You know, it wouldn't be

accurate for the individual, but one that was on aggregate an accurate predictor. So an accurate predictor would be a bias predictor. It would, it would pigeonhole you in to the group based on group characteristics. You know, and of course, the reason for those group characteristics, it's itself based on prior social, thing. If we don't really grasp that, it's really crucial. So there are some crucial things there.

[02:28:09]

Also... AI. So I'm going negative, sorry, going to negative things, because it's important, these things. The positive things aren't going to happen. So, I mean it is, you know, it is quite incredible... I mean things like... I mean, with caveats, things like the use of ChatGBT and the way that can do... Because of course, what it does is replicate the, what it's doing is, it's like a good copyist, it's copying style, and styles can be good and they can be bad. But it's, it's really impressive. I've seen some of the results on coding, and again, you've got to be careful, because it can replicate bad coding as well as good coding. But, it also can accelerate, you know, that, 'Oh I need some code that's approximately that, and, it's there. We should check it, you need to check it, but, checking is easy, it can be easier than doing it. So it's a really really good thing. The other thing that worries me a lot with the layout is that, technology, digital technology undermines anyway the assumptions of free market economics, because it creates artificial monopolies, right? And we saw this, you know, this first became, things like, you know, Microsoft... I mean, with the [inaud] Internet Explorer was the first time that was explored perhaps most heavily in the courts and that. So you get this, this distortion of market economics. And the success, and also the failures, so both these, of, but shall we say the success of society over the last century, has been that, within certain, certain things, not for everything, but market economics doesn't work too badly. You know, free markets don't work too badly. They're not brilliant, and they can be, [laughs] [inaud] things. But they don't work too badly. The assumptions of market economics have been broken by digital technology. But AI intensifies that. It means that, you know... We are talking... There's a recent government report come out, and it's looking, and the, the amount of compute power being used by the large AI models is doubling every three to four months. Right? You know your Moore's Law, right? [laughs] Yeah, and even then, people worry about Moore's Law breaking, but you're talking about computer, available, the, you know... To be able to put stuff in, you're talking about doubling, and prices reflect this somewhat, every eighteen months doubling capacity. That

means the, the ability to be able to do a given level of outcome, is fast outstripping anybody but the biggest pockets. Those biggest pockets of course come through these [inaud]. And of course [inaud] intense [inaud] the natural monopolies, [inaud] monopoly of availability. So we have a real societal problem with AI. So this isn't a HCI problem in terms of this stuff. And I mean there's lots of issues around that. I mean, in terms of the details of interaction, a lot of it's about how you, you deal with the fact that, that computers, when they've got AI, like computers [inaud], like humans are fallible, and how we deal . There's things we can talk about around that. But these big societal problems are really crucial.

[02:31:38]

On the other side of this, we could, we could imagine AI addressing some of our societal problems, addressing the disparities of education. You know, not fully addressing, because that doesn't happen, but that, doing things that could help things. So, so I think, you know, if we want AI to serve people, to be working with people, to be working for people, we need to, from a technical point of view, we need to understand about working alongside. So, so something that's not a pure tool base, but neither is, you know, there's things we see with, so a gig economy where people are basically told what to do by AI. You know. So, it's easy to do one or the other, you know, you... But the thing is the tool and you use it, or the thing controls you. Really hard to get things that work side by side. And that will interact with social things, but I think the bigger challenge is, the big, big challenge, is, is, how we both counter some of the, the massive global, and it is global, distortions and changes in the nature of what global economics is like, and that has been changed by AI. On the other hand, how we can use AI in a productive way. But... Now, the latter of those, the very last of those, is, is the sort of, the real challenge point for academics in AI, because... The things... There are the things that need to be prevented, and they probably aren't technical things, they're probably legal and, and jurisdictional issues, right? You know, the technicians, the technology people have to inform those discussions, but they're not going to change what goes on. What we can do though is address the things that don't happen naturally in industry. Not trying to do the things that industry wants. This is the opposite of Alvey. Right? So Alvey was brilliant, [laughs] in, in pushing forward the things that industry needed at that time, but now, industry is doing, in AI industry is doing all the things that it can do, and, to be honest, mostly better than [inaud]. We need to do the things that industry won't do.

And, you know, it's about making AI accessible to more people so that it can help you and me as well as large companies, you know. And some of that will happen through, through the industrial panel, so it's, it's where it, [inaud], but we should be addressing the gaps, we should be identifying where industry won't do the good things that should happen, and then, and then doing those things. So that's our challenge.

[laughs]

[02:34:22]

*Thank you. So, what advice would you give to someone willing to pursue your career today? So you [inaud] gave a lot of advice, but this is for [inaud]?*

It is. Yes. It is... There's a part... Yes, so, I guess this is... I'm sort of thinking about the, you know, if imagine I'm the artist in the garret, you know, with, you know, and if it's an opera, I've got consumption and I'm about to die, right? You know, so what am I going to say? Am I going to say, 'Don't be an artist, be an accountant'? No. So there's part of it... And it's not quite the same, it isn't the same, but, there's a part of me that, like that artist, still would push towards the academic, you know, routes and stuff. However, academe... So I have been, you know, I've worked in industry, so I have a, and I've worked across large ranges of academia in the UK, more than most people have, and different kinds of university [inaud]. So I've got a much, a very broad range of, of thing. [pause] But, yeah, it is really hard. I mean, so there's a little bit of me has... I mean now, less often, I used to have, about every few months I have a dream about still being a mathematician, because, there's a bit of me that, you know... My true love is still mathematics, to be honest, you know. Having said that though, I am also intimately aware that there are, and this is a challenge, again, for HCI, and I think within HCI it's a challenge too, few people who really try to grasp fully both the human and the technological side. So, so partly... So I'm now reflecting back on my answer, so I'm thinking advice, I'm thinking what I might have done differently, and stuff like that. [pause] Yeah, so, I find I really hard to do... It is... I mean...

[02:36:27]

OK. I'm going to do a little, a little sort of spin back. vfridge. Right? So vfridge is this sort of social media-y thing. It was, it was... But actually had connections back to the work we had done on conferencer and CSCW, because it was a, a two-day

[inaud]. It was like having little Post-it notes on your fridge, but with magnets you could drag around. But it was shared, so, it was like a family fridge, you could do stuff. So it was very funky, very nice. Still looks a little pretty, yeah. I mean it is very, you know, in its time, but, you know, yeah. And, I wrote a, a retrospective on it, I can't remember, more than, about fifteen years afterwards, it was mid-, mid-2010s. And... So what went wrong? You know, why, why aren't I a billionaire, basically? Yeah? Yeah, why, why, why are people talking about Zuckerberg rather than, than Dix, and, and Beale, because, you know, Russell was, thing, and, [inaud]. And, I mean part of it was the timing, you know, and, you know, pure chance, you always have to have [inaud]. But part of it... But you know, so I think... And I think 90 per cent of it's that. I think whatever we had done, we'd have been hit by time . Financial, both in terms of financial support, because it just, the money wasn't going to come, and also, but also, you know, the, the technical readiness of the Web at that point, it was difficult to implement things, and, and the, the amount of Web presence in the domestic market. But also, our vision was, the websharer vision. What are the... We... You know, there is a future, a potential future of the Web, which we weren't sure was going to happen, because all the pundits at the time were saying it's going to turn into television, and, they were saying there's a potential future which is much about sharing, about people sharing with each other, which is... And [inaud] just arisen , although, yeah, it's got it's [inaud] sides, but it's also [inaud]. And then we said, what kind of, if that is a potential future, what can we do to create that future, what piece of software? And we went for vfridge. But vfridge had this sort of, dragging things around, which was a real pain in the butt at that time to be honest, it was really hard doing all that sort of stuff. You know, DHTML just, was just coming along. Oh, yeah. None of the Ajax, be able to talk to the back end, the front end. You had to do all sorts of tricks and horrible stuff to get it running. Lots of, you know, lots of... You know, good little tricks, hacky tricks, [inaud] tricks. But we had a version... But also we were aware, this wasn't going to run on every browser. And as a shared thing, you have to be able to work for everyone. So we had a mobile version, which was good, yeah? [laughs] With [inaud], which is, very limited. But also had to have something on-screen that didn't involve dragging things around. So we had one that was like, columns of notes. So, I was trying to think what it would be a bit like. So, so like this Facebook feed, but more that, it could be multi-column as well. And to be honest, it was pretty funky and pretty... And we had ragged edge, it

had the ragged edge notelets and stuff, right? And it had little magnets. Yeah, it was, it was funky enough. But it wasn't, it wasn't, you know, it wasn't the proper thing. You know, it wasn't the proper thing at all. It was equally good for the long-term vision, right? So it was good for the vision. And we lost sight of the long-term vision. I lost sight of the long-term vision. Yeah, because it got wedded to the nice, because it's nice, the layout, and the dragging things around. It wasn't necessary, the vision .

[02:40:00]

And one thing that I'm aware of that I do in my life, and I've seen it, and I still do it, and I'm [inaud], is that, I lose track of the long-term vision, you know. And my vision, I don't necessarily mean the grand world changer thing. What is it for your life? You know, what's important? And, it's easy, especially if you're interested in everything, especially if you like helping other people, it's easy to lose track of that. I'll go back... I don't know if you know your, any of your Bible stories, but the, the one, there's the one where, where, there's the loaves and fishes, if you come across that. So, so there's loads and loads of people, they haven't got any food. A little boy, you know... So, nobody's got any food, but a little boy comes with, with two fishes and five loaves, and Jesus sort of blesses it. And they distribute it and everybody gets fed. Right. So that's, that's that. Everybody knows that story. Immediately after that, Jesus says, 'We're off to Capernaum boys.' Right? And, you know, and the Disciples say, 'No no no no no no no no. There's lots of people here, there's lots of more blind people here, lots of more crippled people here, there's lots of more people with demons here. You've got to stay, you've got to stay, you know, and look after...' He says, 'No, we're off to Capernaum boys, because that's where we're supposed to be.' Right? Now how you know that is, is another matter. But, it wasn't that the things weren't good, they were saying, but there's the best thing, the best thing to do. Now it's obviously hard for them to know what that is, so there's, thing. But it's so easy, I find, to get lost doing the good things, and sometimes the things that you should be doing get forgotten. And that's... I don't know how... It's difficult to do to keep that eye on the ball, and saying, that's really where I should be, and not get lost. And, you know, it doesn't mean you never do any of the bits around the sides, but to lose yourself in, in all of those things, which are equally, which are good in themselves, and yet actually are perhaps not the thing that you should be doing that'll make the big impact to the world. Anyway, [laughs] Ok, so... I don't think I've

made a particularly good job of that in my life. I keep missing that. But, if I can help somebody else to, you know, to think about that, that'll be brilliant.

*Thank you, thank you Alan, it's been a real pleasure talking to you today. Thank you.*

OK, thank you.

[End of Interview]