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Novel Cohorts
Podcast Series

Dan Housman, Chief Technology Officer of Graticule, and Julie Jacko from University of Edinburgh discuss how Scotland's rich data ecosystem, AI innovation, and collaborative research culture are shaping the future of health informatics and life-sciences partnerships.

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Dan Housman (Graticule):

Hello, This is Dan Housman from the Novel Cohorts Podcast, and I'm here with Julie Jacko from the University of Edinburgh. It's great to see you again, Julie, you and I probably worked in the 2000s way back, when you were in the US, and I know you've crossed the pond, so I'd love to hear about some of that journey, why you decided to move over.

Julie Jacko (University of Edinburgh):

Sure, I'm happy to, I think we may have first connected in Minneapolis, Minnesota, back in the day that's taking us back quite some time. And so I have been in Edinburgh for over two years. I moved here in August of 2023 to accept a chaired professorship at the University of Edinburgh in the College of Medicine and Veterinary Medicine, and in particular the Usher Institute. And the Usher Institute within the college focuses on our tagline is people, populations and data. So we're very much focused on data science, clinical medical health informatics and the use of data to help improve the health of human beings and of animals. So I began that post two years ago, and you know, I came over because it was the right opportunity at the right time. I really felt like the community here, and the work that they're doing is so well aligned with my research and where I envisioned my research going that I was delighted to be able to come over. Edinburgh is a place I have visited a number of times, and in my life is one of those cities that remains at the top of your favorites list after you visited a few times, and for me, Edinburgh was one of those cities, so it's a grand adventure.

Dan Housman:

So on our side, we work a lot with life sciences companies, and I think they work with us to collaborate with different academic institutions, different medical centers, what's what's special about Edinburgh, what's the heritage about it, and what makes it different?

Julie Jacko:

Well, at the University of Edinburgh, as an institution, is, you know, one of the ancient universities in Scotland and in the UK. So you know, it goes back about 500 years. And the

medical school itself is just approaching its 300 year mark. So we're talking about time frames that as an American, are kind of mind blowing when you think about it. And for me, what was really interesting is kind of this book's ending concept. I had been, my prior appointment had been at NOVA, Southeastern University in Fort Lauderdale, Florida, and Nova, while I was there, was standing up the newest medical school, the newest MD program in the United States at the time, and I had an opportunity to participate in launching that medical school and getting it fully accredited by LCME, to coming across to UK and having a professorship at the oldest medical school in The UK. So it's kind of an interesting, bookended experience of having been a part of the newest in the US and the oldest in the UK.

Dan Housman:

And we always think about data and patient data, and what we can access and what we can do with it. What kind of resources have you found there, and have you been developing?

Julie Jacko:

Well, that's one of the things that was so exciting about coming over that I should have mentioned, mentioned in the context of the legacy of the institution. One of the things that was so attractive to me about coming over was data, in fact, because Scotland has really been a leader in the UK, as well as globally, with respect to the availability of data for purposes of research. So in Scotland, every individual who has access to the NHS, its health service, which would mean most everyone has a unique identifier, and that unique identifier enables us to do a really great job with clinical data here in Scotland. So we have a lot of very, very interesting data sets that enable us to do some really innovative work, and it was particularly evident during covid. Several of my colleagues just did absolutely groundbreaking studies during covid because of the nature of the data we have available here, and we continue to have big ambition with respect to data as compared to, say, for example, colleagues in Europe, colleagues in the US, it's something that makes us really unique.

Dan Housman:

And you know, AI's suddenly appeared on the radar. Everyone had their fun with ChatGPT. How is that starting to leak into what you're doing? Are you seeing a lot of AI projects? Is it something that's a big, big part of the local scene?

Julie Jacko:

So for those of us who have been around a while, like me, yeah, I you know, AI has been around a while. It's actually something I remember at the beginning of my career, 30 years ago, there were colleagues who were doing work in this area called artificial intelligence, and, and so I feel like what's happened is that there has been, of course, there's been advancement with respect to AI, but also such growing awareness of the general public about AI, and finally, our ability to harness it for everyday activities, which I think is what's making this particular era especially unique. Now, the University of Edinburgh has steeped in history with AI doing some

of the most pioneering work in the 1960s in AI at the University of Edinburgh. So we have a really deep history here in AI development and innovation. I think AI touches in one way or another, in just about every conversation that I have, whether we're talking about research and we're talking about handling big data, or I'm in conversations about innovation and the development of tools and technologies, AI, is always a part, it's always a part of the conversation. One of my projects that is at the forefront of my mind right now is a project that's been ongoing for nearly 25 years, and that is, I am editor of the Human Computer Interaction Handbook, which is the handbook in Human Computer Interaction, or HCI. The first one was published in 2003 the the second one in 2008 the third edition in 2012 and I, literally last night, submitted the entire volume to the publisher for the fourth edition. And what was really interesting about producing and editing that fourth edition were the changes that took place between 2012 and 2025 so the third edition and the fourth edition, and making sure that the fourth edition is fully updated. So much of that was about the advancement of AI. So you know, when we talk about the new content in the volume that reflects what's happened since the third edition in the field of HCI. That conversation is, you know very much about AI.

Dan Housman:

So what are some of the specific things that are happening in the human computer interaction or the work you're doing? What are the projects? What are the changes?

Julie Jacko:

So here at the University of Edinburgh, last year, a colleague of mine and I were asked to map the landscape, specifically the AI and data landscape as it pertains to health. So we convened a collection of workshops in January of 2025 and ended up getting about 85 colleagues from across the university in a room three times to map that landscape and talk about our strengths as an institution. And of course, the research that I'm doing with my team is part of that landscape. And what was so interesting to me and to my colleague Claire Blackburn, who worked with me on this, is that not only are we leading in advancement of the state of the science and the state of art in AI and machine learning and the actual science of that. But we're also working in application areas that are related to diagnosis and prognosis of disease in both animals and humans, in treatment and management of disease in healthcare operations themselves, as well as patient engagement, monitoring and support. So a good example would be in the area of remote monitoring, for example. So in the context of my own work, I'm leading a team that we call ourselves NEST. The abbreviation for our group is NEST, which stands for Neurodevelopmental Embedded Systems and Technologies, and it's a hub of activity that we formed where AI is very much front and center. And the premise of that hub is that we are monitoring, we're monitoring key drivers of brain health in children from birth to age five, the premise being that there are some key drivers like like sleep, physical activity, stress, social engagement, nutrition, that if monitored in a healthy and ubiquitous way, would enable parents, caregivers, teachers, to be able to identify earlier behavioral indicators of neurodevelopmental delays, And they could therefore get help sooner for potential, potential conditions like autism,

epilepsy, ADHD, etc. So when we're embedding sensors in what we call environmental artifacts within a child's environment could be toys, could be the tray of their high chair, could be the bed, their bed, their clothing. And those sensors themselves are breakthroughs in engineering physical sciences, because we're my colleagues, who are experts in quantum sensing and areas where you can really embed sensors in a transparent way. They're not obtrusive at all in the environment. And with these we can collect immense amounts of data related to those behavioral drivers, and so in order to make sense of those data, to be able to identify patterns and trends and do modeling and prediction, you need machine learning and AI to be able to do that. So that's a great example of a project which fits within that landscape I spoke about under the broad heading of patient engagement, monitoring and support, because it enables it enables families, parents, caregivers, teachers, to enable self monitoring of very young children, so that action can be taken earlier in the trajectory of the condition, and they can perhaps get interventions that are needed earlier, which yields better outcomes and healthier brains over the course of one's lifetime. So that's just one example. Happens to be an example from the work of my team, and that would be an example of remote monitoring and smart health. And that's just one of countless examples that I could I could share

Dan Housman:

That's pretty amazing work. Thinking about it from the lens of the listeners of this podcast would be the life sciences folks, so people who are working in pharmaceuticals and med devices, what kind of collaborations either have you done, or do you foresee doing? What would you love to do if you could wave a wand to be able to work with, you know, the top 10 pharma companies? What kinds of projects would you want to work on?

Julie Jacko:

Oh my gosh, that's such a great question. And you know what? I think one of the things that happened as a result of Brexit here in the UK is that those of us who conduct research in the UK and rely on extramural funding to do it, so government funding to do research, we lost access to European funds, right? And that's been a pretty significant challenge here in the UK, just recently, we were able to get re-access to what's called Horizon Europe Funding. Horizon Europe Funding often involves key partnerships between European institutions and UK institutions. And often involves partnerships like, say, with pharmaceutical companies. So, you know, Novo would be a great example of one Copenhagen based company that everybody wants to work with. And so I think that there's, I mean, there's a whole plethora of work that can be conducted, and is conducted in partnership with pharmaceutical companies, with medical device companies. In my own case, because I'm not working, my team is not working in areas of drug delivery specifically, or in the development of drug relevant therapeutics, but I have colleagues in the college who are very much involved in work and are spinning out companies that are doing work in that area. And I know that the partnerships with pharmaceutical companies are absolutely essential. With regard to medical device companies, the project where I just gave you the example of the sensor embedded AI enabled environmental artifacts,

is a great example of a project where we have partnered with medical device companies. In fact, the hub that I mentioned that we have formed, called NEST, involves about 65 industrial and commercial and third sector partners, and so medical device companies are interested in technologies like this, because there's lots of applications for technologies like this. We've happened to have chosen one that's applicable to child birth to five, which we know is critical in the development of children. But you can imagine there's all kinds of examples of examples of where these types of technologies could be relevant. So we form very productive bi directional partnerships because we benefit from them. They help us to accelerate our discovery. They help us to engage along an innovation path, well pathway more efficiently, more expediently, than we could on our own. And in turn, they get access to the expertise that we have, residents in the hub partnership, but also the early stage innovation that we're very good at producing through partnerships like this.

Dan Housman:

It sounds like you'd be able to execute, given all the resources, some of the things that are critical path issues for life sciences companies in what we're now calling implementation science, which is that third hop. You know, the first hop would be, how do we get an FDA approval? The second would be, how do we get reimbursed? The third question is, well, are people really using this and how do we get true market access? Because just those two things does not mean patients get found who have a disease that's treatable. You know, they're drugs that stop working. And you have to get to a second line. Things have gotten very complicated, given the landscape of more products coming to market that are all covering some of the very same indications. So I'm wondering about your thoughts on patient identification, clinical decision support. Is that kind of research happening? Because it sounds like it's happening in the sort of neurodevelopmental hub, but there's so many other applications where we could be going into the medical records or even bringing in new devices and observations.

Julie Jacko:

Yeah, you're getting to the heart of some of the big challenges that we grapple with here, not just in the UK, but I believe that these challenges, I know that I encountered them in the US as well, and the challenges as a as a systems engineer, I am expert in implementation science and how you build test beds to iteratively produce higher and higher fidelity prototypes of tools and technologies You're developing, to assess whether they're effective at point of care, and one of the big challenges that we have as researchers is being able to partner with clinicians and administrators at point of care, to be able to create test bed environments where we can actually implement and test and evaluate the solutions that we create. So sometimes the solutions I'm involved in creating are more process solutions. So we're creating new care pathways, for example, in healthcare, to help reduce waiting times here in the UK, or to help enable patients to get access to resources sooner or treatment sooner. And other times, we're actually talking about things, devices or tools, other times, we're talking about software or dashboards. How do you get those in place where you can determine whether you're actually achieving the gains or

the ROI that you projected you would be able to achieve with that tool, technology or process. And I'll speak about the UK based upon my most recent experience. The NHS in Scotland is a very heavily burdened resource for its population, and wait times can get really long depending upon the nature of the condition for which one is seeking care. And there can be long waits for surgery, for example, certain types of surgery in particular, the system is overburdened and underfunded. I think it's broadly recognized that that's the case, and as a result, this system tends to be more risk averse because they're simply trying to deliver care, given the state of the sector and the resources that they have to work with. And so one of the things that we're working on the College of Medicine, veterinary medicine, is working in partnership with NHS Lothian, which is the NHS here in Edinburgh, and in particular the Royal Infirmary, which happens to be located with where The Usher institute is, to focus in areas that are big pain points for the NHS, to see if we might be able to breakthrough some Exemplar projects, successful exemplar projects enable some of these advancements and inventions to be embedded in the test bed environment, enabling us to more quickly traverse that Innovation Pathway that needs to be traversed. Now we're fortunate. In the Usher Institute, we have a clinical trials unit, the Edinburgh clinical trials unit, which is very nice to have as part of the organization, because it does enable our clinical academics, as well as our non clinical academics, to work hand in hand with people who are experts at setting up academic clinical trials. And that also enables us to engage in innovation, effectively.

Dan Housman:

So what are you most excited about in terms of you know, what you're working on, what you can work with, life sciences company, what? What's exciting these days?

Julie Jacko:

I think what is most exciting to me right now, at this moment, was, first of all, shipping that handbook off to the publisher, pretty damn good, I have to say. And I should give a shout out to the fact that there are 59 chapters in that handbook, and there's like 155 authors from 21 countries who contributed. So it's been a massive community effort within the HCI community to bring that together, which has been, really, it's genuinely, one of the most rewarding things I've done over the course of my career. So I'm very excited about that, and that's something that will be published in 2026 so I'll let you know when that's out. You can check that out. Maybe we could have another conversation. We can talk about the highlights of human computer interaction, input exactly, but the NEST project that I spoke to you about is one of the things that's also really front and center, and it's something that I'm immensely excited about. It's one of the most collaborative teams I've ever led. Have ever been a part of. I think one of the things that makes the team so exciting is its diversity, the fact that I'm a systems engineer by training, working within a medical school on grand challenges and population health, and the people on the team are I'm working with Scientists and engineers. I'm working with physicians who are expert in pediatrics, experts in neurology, and people who are informaticists, so focused on data science, it's just a really diverse collection of academics, but it's equally complemented by the

diversity of the industrial, commercial and third sector partners that we have involved in the hub. So it's just one of these unicorns that is highly collaborative. Can have a really big impact. We have big ambitions. We're competing for significant external funding. And I think the opportunity to work with companies who believe in the mission and recognize the value and the diversity of the expertise, and are able to invest at one level or another, is magical. I mean, that magic happens at the intersection of disciplines and sectors always.

Dan Housman:

So I'm curious about the NEST, because I know the life sciences companies, they're trying to figure out how to sub-segment some of these diseases that have broad categories, like epilepsy. At least one conversation I've had has been, well, epilepsy might be 25-30 different diseases, if you think about it, from what you're going to treat them with, in terms of drugs, because if we're talking pharmaceuticals, do you think that there's going to be genetic information you're collecting in this hub? Are there going to be ways to tease out the different subtypes of these disorders using all this extra data?

Julie Jacko:

So at the moment, we are focused on behavioral markers, because at those ages, behavioral markers can tell us a lot about what's happening with respect to a child or an infant's neurodevelopment. So we're beginning with behavioral markers, but there's no reason that it would not progress to biomarkers and genetic markers, and then being able to pair up or combine those with a variety of markers to have even more precise indicators of what's happening, and that's because that's where power lies. Yeah,

Dan Housman:

I can imagine, like there's always this interesting question of the FDA's of the world, they like good markers, and they're a little more distrustful of behavioral markers, because they can't judge a drug's efficacy based on someone's observation as easily. So obviously, I think there's going to be an interest in the true biomarkers. Obviously, anything could be a biomarker, but if it looks like a lab test, or it looks like a genetic test, you suddenly have this definitive answer of the levels beyond the normal range, or this is a loss of function for this gene. So it could be interesting as you get there

Julie Jacko:

I think that you're absolutely right. And the reason that we went the route of focusing on behavioral markers first, is because it enables self management. And so our focus was, can we enable as much as possible to happen in these home environments or school environments or carer environments with respect to detection of abnormalities or challenging behaviors that one may go undetected or unnoticed for some time. So the premise initially is to enable the earlier detection of behaviors that are indicative of something bigger. And so the natural progression

then would be to enable this to happen in these, in these community type settings, home and community settings, and then pair them with what can happen in clinical and hospital settings.

Dan Housman:

Well, certainly there's a lot that could be taken from it and translated into projects that will be sponsored by pharmaceutical companies. You know, it might look different, I think in the, you know, for example, if someone has a psoriasis drug they're looking at, you know, when did someone fail their first line therapy? Who's and I think a big question that often comes up is, where are we going to get all these observations that a patient's not doing well after they've already been treated with something, you know, and it may not be in the medical record, or maybe in the medical record, and I'm hoping we're getting better at bringing information from the patient into the medical context, because that, I think, is a big gap.

Julie Jacko:

It's a huge gap. You're absolutely right, and it's a huge gap at those early stages, those birth to the five year stage. And so you're right that there's huge value in that.

Dan Housman:

So it would be interesting to see also how you think about scaling. So let's say it all works, and in the lab, how you get this working in the US and in the rest of the UK or the rest of Europe. How are you going to pull that off?

Julie Jacko:

It's going to take a big investment. So I really think that scaling is essential. And so we're beginning regionally. We're forming a partnership which is Scotland and UK centric to begin, and we're working with third sector partners who are youth serving partners, partners who specialize, especially in working with children who have neurodevelopmental delays or who are neuro diverse. And I think that that scaling can happen through those partners. So there lies the strength of those partnerships. And then ultimately, if you can demonstrate success in those environments through partners. And you work, we work hand in hand with the commercial arm of the University of Edinburgh. It's called Edinburgh Innovations. And the folks who are working in Edinburgh innovations to support things like spin outs and other types of entrepreneurial activity within the university, they're expert at doing that, so we work hand in hand with them to ensure that we can actually engage and scale up and spin out, and bringing these types of tools and technologies to broader audiences globally,

Dan Housman:

Sounds really exciting. I know I've taken a lot of your time. It's been wonderful chatting any parting thoughts or big ideas you see for the future?

Julie Jacko:

Yeah. I mean, I think despite all of our talk about AI and tech advancement and all the ways that our world is changing so quickly in that realm, and I think, it's important, to emphasize some of the statements I made earlier when you asked what what's really exciting me right now, what excites me the most is the the collaboration and interaction and engagement among, In my case, the members of my team who are all focused on making the difference in that early childhood age group. And it really, still really comes down to working together and working together on shared interests and shared goals. And I think that's true between nations as well, that collaborative spirit that can do spirit, that spirit of, if we win, you win, mentality and I think it's important to restate that or or remind ourselves of that

Dan Housman:

That's wonderful. Well, thanks so much, Julie. And look forward to talking maybe in 2026 when you have the book out, which should be not too far away. And , you know, obviously no one can read the current version, the one that's for 2026 for another few months, but it may be an interesting work in the context of the kind of projects we're all trying to do.

Julie Jacko:

I really look forward to that. Thank you so much, Dan, I appreciate it

Dan Housman:

Thanks. Julie