

Perspectives on an impactful academic Career: An Interview with Alex 'Sandy' Pentland, a Leader Researcher at Massachusetts Institute of Technology

Alex Paul Pentland¹ , Vinícius Brei^{1,2} , Alina Flores² 

¹ Massachusetts Institute of Technology, United States of America

² Universidade Federal do Rio Grande do Sul, Brazil

How to cite: Pentland, A. P., Brei, V., & Flores, A. (2024). Perspectives on an impactful academic Career: An interview with Alex 'Sandy' Pentland, a leader researcher at Massachusetts Institute of Technology. *BAR-Brazilian Administration Review*, 21(Suppl.), e240227.

DOI: <https://doi.org/10.1590/1807-7692bar2024240227>

Keywords:

computer science; computational social science; academic career; interview

JEL Code:

M10


Publication date:

December 23, 2024

Corresponding author:

Vinícius Brei
Rua Washington Luis, 855, CEP. 90010-460, Porto Alegre, RS,
Brazil
brei@ufrgs.br

Editor-in-Chief:

Ricardo Limongi 
(Universidade Federal de Goiás, Brazil).

Editorial assistants:

Eduarda Anastácio, Kler Godoy and Simone Rafael
(ANPAD, Maringá, Brazil).

ABSTRACT

This interview with Alex 'Sandy' Pentland, one of the most distinguished researchers in computational social science, Senior Research Fellow at Stanford Institute for Human-Centered Artificial Intelligence, and Toshiba Professor of Media Arts & Science at the Massachusetts Institute of Technology (MIT), offers insights into his academic journey, research career, and impactful publications. The conversation reflects on essential milestones that shaped Alex Pentland's career, exploring the influence of his experiences as a young student and the importance of an intellectually stimulating environment in fostering academic growth. He also shares insights into following technological trends, focusing on publications addressing real-world problems, and managing a robust and impactful research lab (Human Dynamics) at MIT. This interview provides an in-depth view of his experiences and insights, offering guidance and inspiration for students and scholars.

Data Availability: BAR – Brazilian Administration Review encourages data sharing but, in compliance with ethical principles, it does not demand the disclosure of any means of identifying research subjects.

Plagiarism Check: BAR maintains the practice of submitting all documents received to the plagiarism check, using specific tools, e.g.: iThenticate.

Peer review: is responsible for acknowledging an article's potential contribution to the frontiers of scholarly knowledge on business or public administration. The authors are the ultimate responsible for the consistency of the theoretical references, the accurate report of empirical data, the personal perspectives, and the use of copyrighted material. This content was evaluated using the double-blind peer review process. The disclosure of the reviewers' information on the first page is made only after concluding the evaluation process, and with the voluntary consent of the respective reviewers.

Copyright: The authors retain the copyright relating to their article and grant the journal BAR – Brazilian Administration Review, the right of first publication, with the work simultaneously licensed under the Creative Commons Attribution 4.0 International license (CC BY 4.0) The authors also retain their moral rights to the article, including the right to be identified as the authors whenever the article is used in any form.



Thinking about your (academic) background, can you identify the important milestones that made you the researcher you are? (Vinicius Brei)

Alex Pentland: The key formative effects and situations were when I was just beginning university. That was a time when computers were becoming available to many people so that you could get them in high school and college. That was a rising thing you should know about and consider. And it still is today. Like AI, it still is now like the nth generation of that. It will continue for quite a while.

Moreover, it is this idea of being able to formalize algorithms and formalize things that we do to understand them differently. It was quite an effect to say: "Now I am going to do something where anytime there is a mistake, it is my fault." Because the computer does exactly what it is told, you have to learn to think through things in a way that is not typical of almost anything, except maybe pure math or things like that.

At the same time, or shortly after, I started working in a research lab. It was a national research lab focused on the environment, where I was a junior programmer. Nevertheless, what fascinated me was the things computers could not do and people could do so easily. Like, for instance, if you looked at a satellite image, a human could trivially pick out where the roads are and the houses and things like that. For computers, that is difficult. And that fascinated me, as we could not understand people the way we understand accountants, accounting, numerical things, or something like that. The point for a researcher is that you need to identify significant, longstanding problems, such as understanding humanity (Voelkel et al., 2024). You need to pick technologies that will begin to open doors. So today, there are AI and biology technologies that are just amazing, and combinations of the two. If applied to answer significant questions, those things will yield returns (as a researcher) for 30 or 40 years. The great questions are, for instance, how do you live a healthy life? How does society work? How does the human mind work? You should combine these questions with technology trends. You need to consider the significant trends, like demographics, that will continue for 30 or 40 years. Likewise, you should consider (technologies) like computers and biological engineering, coupled with some of the great classical research questions, such as how people work.

The thing that almost everybody gets caught by is falling into the trap of being part of an existing discipline. People say, "I am going to study this thing in this narrow way," and both are wrong. I mean, thinking narrowly about a discipline.

Do you mean limiting your research trajectory to an academic department, a square on the university organigram? (Vinicius Brei)

Alex Pentland: Yeah, the academic departments or a department in a company. Imagine you are in charge of marketing research. Marketing is essential, but much more important is knowing people's desires and how to fulfill them. You should not be limited by marketing because there will be blind spots in the marketing mantra. Similarly, all commercial or academic fields rarely consider that technology is changing so quickly that things that look entirely crazy today may become commonplace tomorrow. So, being hooked on technology and innovation trends is also critical. You need to do those things to have a valuable career over the long term.

Are you always trying to follow technological trends, or do you always have significant problems you want to solve? Do you shift your approach to those research problems depending on the technology of the moment? (Vinicius Brei)

Alex Pentland: Remember the big picture and have a strategic direction. I am interested in how computation and human behavior fit together. However, there is also the tactical aspect. The thing that's valuable to people right now is how these new generative AI things work with human teams (South et al., 2024). That is what occupies everybody. So you have to know about it but look at it from the longer-term perspective. For example, everybody is now trying to use LLMs in various ways. Nevertheless, reflecting that they will be very different three years from now is worth remembering. Moreover, things that look impossible now are going to be commonplace then.

Think about these questions; do not be limited by what you can do now. Think about where it is going to go. An example is that in the 1990s, we looked at wearable technology (Turk & Pentland, 1991a). We had head-mounted displays and little computers you wore on your side and wireless. All of that was crazy at that time. There were no such things. There were not even cell phones. By building some crude versions, you could see how that would interact with human groups. What were the issues? Things like people hate cameras and glasses. The fact that you can record your whole day is transformative. Until then, the only thing you could do

was to take notes at the end of the day. After developing and testing the equipment, we contacted people to get their impressions. Pay attention to the current technology and be ahead as a tactical approach so that you can write papers or start businesses or something that will be important in the two or three years after they come out and are visible

Can you recall impactful career decisions that shaped your path? (Vinicius Brei)

Alex Pentland: Several things were important and unusual. For instance, going and working in a research place as a junior programmer allowed me to see how that works and realize that I had a great deal of freedom, paid reasonably well, and had attributes of a good career choice. Later, I decided I needed an advanced degree to gain credibility and know more about how people worked, so I applied to psychology and AI departments. At that time, there were not many AI departments. Because I had worked at the research place, people accepted me into their program because I had research experience. Very few had (AI) research experience then. Similarly, when I looked for a faculty job, the Media Lab was just starting at MIT, and everybody advised me against it, claiming that it was an unconventional, nontraditional environment. However, if I created a startup at a university like MIT, even if it crashes and burns, I would learn a lot and meet many people. Of course, it did not crash and burn. So that was a great thing. The thing that the Media Lab offered, though, was a place where you could do research that did not fit into one discipline. You could look at the gaps between disciplines and secure enough funding to do that so that you could at least get experiments started there. Whereas (research in) most places were narrow. For instance, you had to do computer science, you had to do marketing, or you had to do whatever. There, my goal was to think about where the world is going. Those are important parts. In between, when I graduated from MIT, I went to Stanford as a lecturer and worked as a researcher at the Stanford Research Institute. That turned out to be important because each university has this group of people it talks to but does not talk to most people. So when I went to the (US) West (coast), I met a group of people I'd never even heard of who were influential researchers just because they were not on the radar at MIT and vice versa. Of course. So, I am doing the same right now: I am on the West Coast, where there are many people that I would never have heard of at MIT but are very interesting. So, the network of people that I work with and so forth continually grows, and that is critical.

In parallel to your remarkable career as an individual researcher, you have also built a robust and impactful research lab (Human Dynamics) at MIT, connecting talented researchers and companies. How can one develop such a solid and impactful research lab? What skills do you need, and which decisions did you take to build such a great lab? (Vinicius Brei)

Alex Pentland: I think that the critical thing is, first, not doing what everybody else does, not in the little narrow swim lanes that you see in academics or industry, but trying to think ahead about where is the technology and the market and society going, and what will be the huge problems that people will have in four, five, eight years. One of the things that is amusing, but I am very proud of, is receiving the invitation to give the keynote at the annual meeting of J.P. Morgan, the giant investment bank. They introduced me as somebody who was always eight years ahead of everybody else. I said, well, that is amazing.

Do you have a crystal ball (laughs)? (Vinicius Brei)

Alex Pentland: I do not have a crystal ball. However, it is relatively easy. You just have to learn from the past and ask, what are the usual ways things develop? They are encouraged by money, international politics, and many things. You can learn to see the future well, not in detail, but you can know. For instance, I am an advisor to a sovereign wealth fund with enormous money. They are determining what to invest in for the next 40 years.

40 years? That much ahead? (Vinicius Brei)

Alex Pentland: Well, that is what you need if you are a country and need to support your people, i.e., (think) 40 years (ahead). How can you do that? Well, you can say several things. First, the world's population is getting older on average. So, the aging population has enormous effects everywhere. What are people going to do? They will need many more elder care facilities and things like that. They are going to have labor problems because there are going to be a lot fewer young people. You can look at Japan and see how they are doing because they are 20 years ahead of us. Thus, that is something you can invest in for 40 years.

Second, another thing you can invest in is some form of climate change, different from what everybody else does, which is trying to do carbon capture or something like that because a million people are doing that. However, what will happen, and it is just undeniable, is that we will not be able to reverse all that in just a few years. That is just not going to happen. And not for any cynical reasons, because it is very difficult to re-engineer everything without letting people starve to death because they do not have any energy, food, or other basic needs. So, we will need a great deal of climate mitigation. Cities at sea level are going to have to move up. How is that going to happen? Other cities will get bigger. Cities will move to the local mountains, things like that. That is just a simple example of these sorts of possible changes. So, (it is essential to) think about what you will do (as a researcher) about climate change and rising sea levels and what will happen. The question is, what are you going to do about it? What industries will be built?

Third, another trend is the same that has been guiding my entire career — digitization. There is more and more data about more and more things all the time (Lazer et al., 2009). Moreover, as you put that data together and ask about patterns, we have seen that you get things like generative AI. Understanding those patterns is going to take time to happen. Generative AI is amazing, but there will be more amazing things. We must use patterns to help manage medicine, food production, and trade, problems we will have for a long time. They are not going to get solved in a year. Those will get solved over a couple of generations or stabilized.

So these are three things that you could invest in or guide your career path on that are guaranteed. Those are going to happen. You could be in that area solving problems. This will result in a very long and productive career. Plus, if you notice, they are not disciplinary. They are very broad. How do you deal with a changing demographic pattern with fewer young people? Well, that means reorganizing how the institutions in society work. That is what you need to ask: Where is the world going? — not from an angry or partisan point of view, but an inevitable point of view. Next, you must ask: What can I do if that happens? What are the areas I need to be touching to do all that?

One challenge young scholars face is the pressure to publish on theoretical gaps early in their careers. However, I have noticed that your research is primarily problem-solving-oriented. You have published impactful papers in top journals, focusing on real-world issues rather than just only theory. Is this approach something you developed later in your career, or have you always prioritized problem-solving from the beginning? (Vinicius Brei)

Alex Pentland: Always done that. Here is a slightly cynical view of academia. The people who do theory in any particular area form a very isolated community that does not accurately pay attention to the world around them. They have a relatively isolated discussion from anything you would consider an impact. Occasionally, they invent something completely new. That is amazing. However, if you look at what they are doing, they are always missing huge areas. So, for instance, like in economics, it is evident that bubbles and panics, overinvestment, and crashes are the most essential features of economics. However, economics starts with the assumption that everything is in equilibrium. Those things cannot happen. They assume those things that cannot happen. Then they develop little equations and (try to) solve (those) things. But, by starting from that assumption, you have missed the biggest, most significant things.

There are many ways to look at the theory and say, “well, but an important part still needs to be included.” You can only make that argument to theoreticians if you have solid empirical evidence. So it is that type of combination where you say: Well, here is the theory, and we can think about edge conditions or extend it slightly. There may be a completely (different) compelling example with actual data that impacts the future that people cannot ignore. People ignore all sorts of things, but if it is going to transform an industry or a society, they cannot ignore it because too many people will jump on it, and they will have to deal with it — that has been a signature of mine (my work).

I will give you an early example. Early on, I did a lot of machine vision, and it was all focused on machine parts, recognizing screws and bolts, and things. I thought: I do not care about screws and bolts; if you engineer your factory correctly, you will never have to find them using machine vision. The thing that you (need to) care about is people. Is there a person I am going to run into? Who is that? Is that the right person to do it, and so forth? So, we started a (research) field looking at people to understand expressions and gestures (Wren et al., 1997). At the time, all the psychologists thought this was immensely complicated. You had to find (face) edges and group them. There were many papers about doing this. Then we said: Wait a second, it may be easy. It could be a type of advanced pattern recognition that, today, one would call machine intelligence or machine learning. It turned

out that (that research showed) you could beat everything else that was in the field at the time by using these things that were incredibly simple and looked a lot like neural networks. So everybody said: That is interesting! Is this simple neural network thing much better than all the theorizing you have been doing? It was much more straightforward than we thought, not symbolic reasoning; it was pattern recognition (Turk & Pentland, 1991b). That took the field by storm.

In most places, you can find similar things. For instance, take the Atlas of Opportunity that you are working on. Numerous social properties involve community connections (Alrasheed et al., 2024). However, we could only see that once we had the correct data. (We may ask) What is wrong with this community? Why do they not talk to anybody else in the city? They can't because they did not have the buses, highways, or whatever. So they are a little like ghettos. Somebody who is cut off from the rest of the city is not going to be able to do well. Nevertheless, we never looked at that before because we needed the data. We could not see it. It implies a different theory about people.

If you look at what society does, you must learn math (at school). However, what the theory says about why isolated communities do not do well is not about that at all. You do not need degrees to do this. You need to interact and learn from others, copy them, and find opportunities to help. So, it is a very different type of learning, a very different process of integrating into society. You could not write a paper saying schools do not count. Instead, you could say that social learning and learning from others about current practices are fundamental. Furthermore, when we map that out, we find it predicts income distribution and crime, among other phenomena. If that predicts all these things and others we care about, without using the classic way of thinking, then we better think about how we structure education and society.

Thinking about the legacy you are building, in addition to your significant academic contributions, your involvement with organizations like the Club de Madrid¹ and Davos Forum highlights your broader influence. Do you aim to transform mindsets, inspire (Vinicius Brei)

Alex Pentland: There are many different ways to have an impact. Most academics just write the paper and hope somebody will pick it up and use it. One of the key things in being successful and having an impact is learning to talk to different people. You were talking about my lab earlier and all these different companies and government people (that we work with). Over the years, I have learned to speak to them about what research means to them and how it can solve their problems. A mistake academics always make is to talk (only) about their work. They should talk about why you should care about their work, whoever you are talking to. Impact, to me, explains some of the blind spots that everybody in society has, how we need to look at those, and some of the simple things you can do to make things work better. The industry cares about it, as does the government and philosophers. So you have to talk to all these people and get them to think in this new way (related to your research results). That's the way you have an impact. The other thing, of course, along with that as an academic, is that you get to have lots of young, sharp people coming through your lab who will go off and do things. You can get them thinking the same way and build a critical mass of people thinking in ways that wouldn't have happened otherwise.

Do you have any additional advice for young scholars beyond focusing on problems and avoiding narrow academic thinking? If you were in your early 20s, possibly just starting a PhD, what insights would you want to hear from a world-class researcher like yourself? (Vinicius Brei)

Alex Pentland: The key thing people are not taught, but is true, is that half of your effort has to go towards inventing new things and improving things, while the other half must go into effective communication. And I don't mean just talking to people. You have to pick problems that communicate their importance. When you write (publish) your paper, you never talk about it. Other people are somehow supposed to discover it. That's pretty hopeless. You have to get out there. A typical thing for a young person just starting is to pick a field or a couple of fields you can compete in and write papers for because you have credentials. But some fields are hungry for new ways to think or new applications, where you can recruit many other young people like you to start (for example, by organizing) a workshop in person about, for instance, data for development. (After getting data, you may find) There's all this phone data and data like that. It might be useful for understanding how to help solve poverty, inequality, and problems like that. We started (by organizing) a little conference. It was off to the side of the big conferences, but we recruited many young people who were enthusiastic about it. Eventually, it became the central conference. What you're doing is connecting to other people who share your interest in having an impact, looking at things differently, and building community to move that forward. And as that community grows, it will naturally become a focus of attention for a broad range of people.

NOTE

1. The Club de Madrid is a global forum of democratic former heads of state and government who leverage their experience to promote inclusive democracy, sustainable development, and peace. Operating as a non-partisan, non-profit organization with over 100 members from 70+ countries, it works with a global network of advisers and partners across sectors to strengthen public policies and leadership through dialogues and advocacy at both national and international levels (Club de Madrid, 2024).

REFERENCES

Club de Madrid. (2024). *About Club de Madrid*. <https://clubmadrid.org/club-de-madrid/>

Alrasheed, H., Flores, A. F., Brei, V. A., & Pentland, A. P. (2024). Examining Socio-Economic Isolation in Urban Spaces. In R. Thomson, A. Hariharan, S. Renshaw, S. Al-khateeb, A. Burger, P. Park, & A. Pyke (Eds.), *Social, cultural, and behavioral modeling* (Vol. 14972, pp. 184–194). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-72241-7_18

Lazer, D., Pentland, A., Adamic, L., Aral, S., Barabási, A.-L., Brewer, D., Christakis, N., Contractor, N., Fowler, J., Gutmann, M., Jebara, T., King, G., Macy, M., Roy, D., & Van Alstyne, M. (2009). Computational social science. *Science*, 323(5915), 721–723. <https://doi.org/10.1126/science.1167742>

South, T., Drean, J., Singh, A., Zyskind, G., Mahari, R., Sharma, V., Vepakomma, P., Kagal, L., Devadas, S., & Pentland, A. (2024). *A roadmap for end-to-end privacy and security in generative AI*. <https://mit-genai.pubpub.org/pub/m4msmss4>

Turk, M. A., & Pentland, A. P. (1991a). Face recognition using eigenfaces. *Proceedings of IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, pp. 586–587. <https://www.cin.ufpe.br/~rps/Artigos/Face%20Recognition%20Using%20Eigenfaces.pdf>

Turk, M., & Pentland, A. (1991b). Eigenfaces for recognition. *Journal of Cognitive Neuroscience*, 3(1), 71–86. <https://doi.org/10.1162/jocn.1991.3.171>


Voelkel, J. G., Stagnaro, M. N., Chu, J. Y., Pink, S. L., Mernyk, J. S., Redekopp, C., Ghezze, I., Cashman, M., Adjodah, D., Allen, L. G., Allis, L. V., Baleria, G., Ballantyne, N., Van Bavel, J. J., Blunden, H., Braley, A., Bryan, C. J., Celniker, J. B., Cikara, M., ... & Willer, R. (2024). Megastudy testing 25 treatments to reduce antidemocratic attitudes and partisan animosity. *Science*, 386(6719), eadh4764. <https://doi.org/10.1126/science.adh4764>

Wren, C. R., Azarbayejani, A., Darrell, T., & Pentland, A. P. (1997). Pfnder: Real-time tracking of the human body. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 19(7), 780–785. <https://doi.org/10.1109/34.598236>

Authors




Interviewee

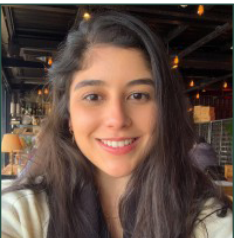
Alex Pentland 
Massachusetts Institute of Technology
77 Mass. Ave., E14/E15 Cambridge, MA 02139-4307, United States of America
pentland@mit.edu



Interviewer

Vinicius Brei 
Universidade Federal do Rio Grande do Sul
Rua Washington Luis, 855, CEP. 90010-460, Porto Alegre, RS, Brazil
brei@ufrgs.br

Massachusetts Institute of Technology
77 Mass. Ave., E14/E15, Cambridge, MA 02139-4307, United States of America



Interviewer

Alina Flores 
Universidade Federal do Rio Grande do Sul
Rua Washington Luis, 855, CEP. 90010-460, Porto Alegre, RS, Brazil
alina.flores@ufrgs.br