Transcript for Episode with Eden Medina
SPEAKERS
Joe Aguilar, John Galante, Eden Medina

+++++MUSICAL INTERLUDE+++++
INTRODUCTION

John Galante
Hi, I'm John Galante, I'm a historian of Latin America who specializes in migration and relations between South America and southern Europe. I also teach history and global studies at Worcester Polytechnic Institute, otherwise known as WPI.

Joe Aguilar
And I'm Joe Aguilar, a fiction writer. I specialize in speculative fiction and Chicano literature. I also teach creative writing and literature at WPI.

John Galante
And you are listening to *Crossing Fronteras*.

+++++MUSIC INTERLUDE+++++
HISTORY OF SCIENCE AND TECHNOLOGY (IN LATIN AMERICA)

John Galante
And today we have with us Eden Medina, a historian of science and technology, and their relation to politics, with a particular focus on Latin America and, and Chile. Thank you for being here today and joining us.

Eden Medina
It is a pleasure to be with you both today. I'm looking forward to our conversation.

John Galante
Thanks. So I was wondering if we could start with sort of a more at a more general level and you could talk a little bit about science and technology studies, the history of science and technology, those kinds of things. What what does it bring to, you know, the study of history, or even just, you know, kind of interdisciplinary fields to kind of be looking through those lenses of like, science and technology studies?

Eden Medina
So I'm, I'm a faculty member, in the area of Science and Technology Studies. And STS, as it is often called, is an interdisciplinary field. Sometimes people think of it as an umbrella, depending on how you want to approach it. For people who primarily use methods from the Humanities and Social Sciences to study science and technology, broadly put.

So I identify as a historian, I'm primarily a historian of technology, although some of my work also does, you know, science and technology, it's hard to draw that boundary. But you know, one of the things that STS and History of Science and Technology do very well is they look at the practices and the moments and the contexts that give rise to how we know what we know. And also how we build the world around us.

So for example, you might be looking at a laboratory to see how a particular experiment over time gave rise to a particular finding, or a particular way of knowing the world. Or the history of technology, for example, you might be thinking about an invention, and why, why it looks this way, and not another way, and what sorts of moments, moments of inflection, were really crucial and making, a particular object technology process, you know, look the way that it does and what other alternatives are out there.

So in a broad sense, Science and Technology Studies is just a really good methodological toolbox for understanding how we know what we know, and the material world that we've created.

John Galante
So there's this sort of debate, I guess you could call it among historians? And most people say it's some of both, but between sort of gradual change versus kind of radical change, right? How does change over time occur? Does it occur across, you know, broad swaths of evolution in thinking, knowing, being, institutional development, etc., etc.? Or does historical change occur more because of revolutionary moments? Do think that studying science and technology, because innovation can change things so quickly, that it makes you think, more towards the quick change, or the radical change.

Eden Medina
I mean, I can I can see where you're coming from. And there certainly are scholars who are who are interested in that, you know, who are interested in moments of scientific revolution, or perhaps technologies that are considered revolutionary, you know, quote, unquote.

John Galante
Game Changing. game changers?

Eden Medina
Game changers, yeah. I mean, for me, I'm really, I'm just really interested in seeing the nuances of how things come into being. So for me, it's not about whether something is quick or slow. It's about how does it connect to a particular context. And that's what I want to understand. There could be a decision that's made very quickly that leads to you know, changes that are quite substantial. It could be something that people think will be quite substantial and then doesn't go the way that they think that it will. But one of the reasons why I'm really drawn to the to the methodology of History is because I really like that that nitty gritty empiricism, of being able to go back and see those negotiations in those relationships, and understand why our world is the way it is.

Joe Aguilar

I don't want to switch the subject entirely. But with Cybersyn, and the Project Cybersyn, nd the your study of older technologies. I'm curious about what value these kinds of older technologies have for us now, and and why choose to focus on these older technologies in your research.

Eden Medina
One of the valuable things I think that has come out of the study of the History of Science and Technology in Latin America, is that we have certain narratives about technology, right? That we often embrace. Many times, these are narratives about genius inventors, who create technologies in garages, and they go on and they change the world. Or we have, you know, ideas about technological innovation, that it's about Google or Microsoft, or IBM, you know, at a different moment. You know, we have these tropes about technology.

And what I think Latin American experiences really bring to the table are a different set of historical contexts, a different set of experiences, a different set of communities who are involved in the work, a different set of power relationships, and different stakes. At the end of the day, you know. And the stakes are tied to geopolitics, they're tied to all kinds of things.

So So project Cybersyn, was a project initiated by the the Allende government in Chile, during the 1970s, to try to regulate the economy using data that was not real time, but that was recent, recent data. It was an attempt to use computers to create a nationwide telecommunication system, it was an attempt to collect data from factories daily, and process this data so that you could make predictions about future behavior. And moreover, it involved the creation of an operations room that, you know, looks like something out of a science fiction movie. So you know, a very futuristic modern vision of what technology could do, you know, in in a very ambitious, forward-looking way.

But when you delve into it, you see that it was using technologies that were not the most sophisticated of the time, but were using them in very creative ways. And the reason for that goes back to what people had access to. You know, Chile was in the midst of an economic blockade, so they couldn't get, you know, a lot of the component parts or technologies that they might have wanted to. Chile had fewer than 50 computers in the entire country. So the fact that they could dedicate one mainframe computer to the system, you know, actually was a considerable investment of resources.

And you look at people who are working under these conditions of constraint. And you see tremendous creativity. And part of the, you know, the way that we see this creativity is how people are taking technologies that are not cutting edge, but are putting them together in ways that are just quite extraordinary. And I think that that is something that we can draw inspiration from as we continue to build technologies for planned obsolescence, as we need to think in ways that are more sustainable. And so perhaps we need to be thinking more about how we all can perhaps design our lives, you know, under conditions of constraint, and do so in innovative and highly creative ways.

John Galante
Yeah, there does seem to be, I mean, that a lot of the innovation is in that adaptation. Right?

Eden Medina

Part of the place where we're adaptation comes is pushing back against narratives of something being universal, and of being, you know, universally applicable to people everywhere.

You know, we think about technologies, for example, that come out of US high tech culture, startup culture, as being the universals that should be exported everywhere, but that isn't necessarily what people everywhere need, or can use, or perhaps is even the best solution for them.

So one of the things that we see, when we look at Latin American experiences with science and technology is we see this negotiation, you know, sometimes between thinking about technology as a as a universal, but then also thinking about technology as something that is highly contextualized.

And so part of the story of adaptation and thinking about technology as being local, is about putting it in its context, thinking about the people who are using it, who are designing it, who are adopting it, and adapting it, and to try to tell a greater diversity of these stories. And that that is really, that is really wonderful. And it is something that adds richness to the way that we think about possibility in how we design our technological systems.

When you look at technology in the context of Latin America, you also see historically that there has been a tradition of always seeing science and technology as something that is political. Right. So I think, here we our default is that, you know, sciences is objective, and then when someone claims something else, you know, we go, ah, you know, we have that moment of shock. But I think, you know, in Latin America, yes, science is political. Yes, technology is political. And so thinking about, you know, in the 1960s and in the 1970s, there was a push to think about how do we orient science and technology in ways that will better serve Latin American communities. So yeah, so adaptation certainly is part of the story. And I think that that is that that's useful for how we think about technology more broadly.

Joe Aguilar
I'm interested in what you said, and I'm asking this as somewhat of an outsider to the field, but about science and technology as being seen more political in Latin American contexts. Why, I guess just a really simple question, why is that?

Eden Medina
Uh huh. So, you know, there, there are a number of ways that I could respond to that question, I think one way that we can think about it is that when science and technology is bound up with particular trade relationships, or when particular kinds of knowledge or certain groups of people are seen as having scientific knowledge, or having technological prowess, and other groups of people are seen as not having that.

And so, governments, politicians, people needed to think about if they're going to talk about economic development, if they're going to talk about industrial growth, if they're going to talk about raising the standard of living, it is not something that can only be thought of in abstract terms, it is not something that can only be thought of in global terms. You know, it is something that is very local, it is something that is about power. It can't be divorced from that.

John Galante

I mean, there is a relationship maybe with like Dependency Theory in that sense.

Eden Medina

Absolutely. Yeah. So that's, I mean, that's my, my subtle reference. So you know, thinking about, you know, Dependency Theory, which is coming out of, you know, Latin American schools of economic thought in the 1960s and 1970s. And so, Dependency Theory very much mapped onto efforts to say, you know, import substitution is not enough. You know, we need to take it further, we need to think about how we are orienting everything towards national problems, national needs, community problems, local needs, and that those decisions, those are those are political decisions just as their economic decisions just as they are scientific and technological decisions.

+++++MUSIC INTERLUDE+++++
Salvador Allende and Cybersyn

John Galante

So then you have this government of Salvador Allende that emerges and is revolutionary, it's reformist democratic, nationalist, maybe?, certainly looking for Chilean answers right to to Chilean issues, perhaps, and it is approaching this, this effort to build a technological resource to more efficiently run its affairs. Let's, let's think of it in the broadest terms. So how did some of those issues that you're just talking about dependency/politics, how did the Allende government consider those? Right? And did that affect its use adoption adaptation of technology, right?, and how so?

Eden Medina 16:32

So so just to give an introduction to the Allende period. So Salvador Allende was President of Chile, between 1970 to 1973, he was elected democratically, he won a three way race by a very narrow 1.3% of the popular vote. So he won by a plurality, not by a majority. And he won on a platform of implementing a peaceful road to socialist change, you know, what some called, it would be a revolution with empanadas and red wine. So it would be something that had a distinctively Chilean flavor, but wouldn't have bloodshed, right? It might even be enjoyable, right? You know, something that would not have a cost.

And part of the way that he was going to bring that about is he was going to preserve democratic institutions. So Congress would continue to make laws, he would continue to preserve civil liberties, so freedom of the press, freedom of speech, that would also continue. However, there would be certain economic initiatives such as the nationalization of the most important industries in Chile.

There were also other initiatives, including an agrarian reform, one of the most important programs for Chilean children was to give them, you know, a half a liter of milk a day in the form of powdered milk rations. So there were there were a number of different programs underway to help make Chilean society more just.

And so part of that was figuring out how do you raise the standard of living of the working classes of the poor and working classes. And part of the answer to that is, well, maybe if we can create more goods, and you know, give people more money in the form of higher wages, people can purchase goods, and that will raise their standard of living. So that was that was a major part of the Allende program. And this was actually called the Battle of Production. This was a particular line of economic thinking, if we are able, you know, if we're giving people more money to spend, and we don't have more goods, that's going to cause inflation. So we need to also have, you know, production keep up with demand as a way of controlling inflation.

And so this became a problem. hHow do we take control of an economy, the most important industries when we've never done it before? And so this is this is a central problem that the Allende government was facing.

And the response, one of the responses that they developed, was put forth by the person who was the general technical director of the organization, the state organization that was in charge of the nationalization effort, a man named Fernando Flores was reading, you know, knew of work by a British cybernetician, named Stafford Beer. And Beer was using ideas from cybernetics to manage a firm. They were these ideas about how do you transform, you know, in this case of firm into something akin to a biological organism, you know, something that can respond to complexity do so quickly, and maintain its identity, and survive.

And we can think of how that idea could map onto what the Allende government wanted to do, right? You have a democratic structure, you want it to maintain its identity, but you're also introducing all of these changes in terms of the economy and in terms of social relationships. So you want that government to be able to adapt to these changes, and survive while still remaining a democracy.

And so Flores ends up inviting Beer to come to Chile. Beer receives this invitation, he's like, I'm not gonna let anyone else go, it's going to be me. So he comes to Chile and he starts to work on a project that would eventually become known as Project Cybersyn, which was this project to use telecommunications networks and, you know, a mainframe computer and software to read and collect data and analyze it for predictive power to help the government manage the nationalized sector of the economy, in hopes of winning the Battle of Production.

Now, just as a as a side note, I will say that Allende had won as the head of a coalition. Not everyone agreed on the way forward. There was a lot of debate, discussion, tension, or worse. He had somehow managed to bring people around a certain set of principles, you know, we want to do this, we want to improve child welfare, we want to nationalize the most important industries in the economy. But because there was such diversity in those parties, one of the things we see is we also see a diversity of approaches in terms of how people wanted to address that.

And so, in my work, science and technology can help us see that diversity. One of the things that I think is interesting about the history of science and technology, and how we understand Latin America and Latin American history, is it's really a way for us to see how political ideas and ideologies and goals are transformed into praxis. So what are people doing, and they try, and they try something, and maybe it

doesn't work, and then they try something else. And they're in discussion with other people about other possible avenues and opportunities. And for me, that is really interesting, that connection between the theoretical, the idea of the ideology, and what people actually do. And so, you know, in many ways, the Cybersyn story is a way for us to see that.

Joe Aguilar
And kind of along those lines to I'm fascinated by the idea of socialist cybernetics, and how these, you know, Stafford Beers' theories were put into practice in terms of the construction of project Cybersyn. Um, and it sounds like it was a transformative experience for him too I think I was listening to an interview with you where you said, he went into businessman, and came out of hippie, which was, that sounds like an amazing story on its own. But I'm just curious, how did the theory look like in practice in terms of project Cybersyn?

Eden Medina
Sure, so just to foreground this, Beer has written a number of books, you know, on his cybernetic theory, so I'm going to be I'm going to be simplifying, But one of the key ideas in Beers work is the viable system model. And so part of the viable system model was creating, you know, the series of five systems that he mapped out, which in the biological version of the model is everything from the individual organs in your body, to the cerebral cortex in your brain, but recognizing that it's not a hierarchy. That you, you know, the highest level is connected to the lowest level, that you have these redundant communication channels, that sometimes you need to govern from above and sometimes you need to have your organs be operating on their own, or you would just be overwhelmed. And you wouldn't be able to handle that degree of complexity.

And to think about how you might structure an organization, how you might build communication channels, how you might reengineer social and organizational relationships, to give an organization that kind of redundancy, to give it that kind of ability to toggle between, you know, bottom-up and top-down control, and to give it the ability to respond to changes in its environment. So that is something that he was really interested in, how could he bring those ideas that he had developed for the steel industry that he developed for the publishing industry, to the Chilean economy, to make it more adaptive and responsive?

So that is one line of Beer's thinking that we see. And also, like, his viable system model was something that was, you know, it was recursive. So, you know, the worker also is a viable system. The factory is a viable system, you know, the enterprise is a viable system, the government is a viable system. So they all kind of could fit nested one in one inside the other.

Another idea that he had that, you know, is interesting, is he had an idea of, of building a liberty machine, which is.

Joe Aguilar
Could you say more?

Eden Medina

So, yes, so he published an essay called "The Liberty Machine." And for him, you know, again, he was starting to think about, you know, how do you how do you regulate organizations, but how do you do so in ways that you make, for example, government's more responsive and effective. And so this is where he starts to think about, you know, what could happen if we had data, like recent data that we could put in the hands of, for example, government decision makers, so that they could act based on data, rather than politics or position. Then maybe we actually could preserve liberty, right, even as we're encouraging, you know, different kinds of governance. And so there's a futuristic cyber operations room for Project Cybersyn. And, you know, that operations room can be traced back to the ideas that are expressed in his in his liberty machine.

John Galante
As you're talking, on the one hand, I'm thinking about like, mid-20th-century Structuralism. And then, like, this kind of fractal view of the world. But on the other hand, when you start talking about data and responsiveness, and, you know, it leads more to the adaptation to this allowing for particularity, and nuance and local, maybe conditions. How did he feel about this? Or how did the Allende government feel about this? Because in the time suggests that Structuralism may have influenced this thinking. Right? But at the same time, it does seem like, there's not this overarching view that you can just replicate what you did in the steel industry to the Chilean national industries.

Eden Medina
I mean, it's occurring, the work is occurring in an interesting moment, I would say also in the history of cybernetics. When you look back at this moment, you look at Beers work, you look at his contemporaries' work, I mean, these are people who are very vested in systems, right? You know, you can go into a factory, and you can create a flow diagram of how the system works, right, you can go and you can, you know, look at an economy and you can create a diagram about how this system works.

But at the same time, that doesn't fully encompass it, because he was recognizing that, we have complex systems, and then we have exceedingly complex systems. And exceedingly complex systems are systems that we're never going to know in their entirety, but we will know how they behave.

Thinking in today's terms, part of me thinks, wow, that's actually kind of similar to perhaps what, you know, Google might say, in terms of, We don't need to understand everything that goes into it, we just need to know what people do, right? And if we know what people do, then we can make predictions about, you know, what they might buy or what they might search for, etc. We're going to develop systems that describe how, you know, the phenomena we're studying, how it works. We recognize that it's probabilistic, we recognize that it's more complicated, we're going to focus on behavior rather than knowing you know, what it actually is. But at the same time, you know, this is kind of before people were starting to think about critiques of objectivity.

So at least in in cybernetics, what comes next is what's known as second order cybernetics. All of a sudden, people are starting to think about oh, but you know, the observer, different people might actually see systems in different ways. And so therefore, you need to, to incorporate the observer in this, in your study as well. So it is this this interesting moment, in terms of who goes into the system,

what goes into the system, and how we understand, you know, what is in those boxes? And why that might matter or not.

+++++MUSIC INTERLUDE+++++
DESIGN AND MATERIAL CULTURES DURING ALLENDE GOVERNMENT

John Galante
I thought we could change gears a little bit, but sticking with Allende government by thinking a little bit about design in relation to the revolution. Revolution? Should I call it that? By thinking about design in relation to the reformist Allende government?

Eden Medina
The Chilean road to socialism.

John Galante
There you go. Thank you.

You know, you shared with us an article, or an introduction to an edited volume, that had a number of images that made me think a lot about the use of design in reformist government activity.

We're also talking about a period of time, the 60s and 70s, where design was just so cool, and so innovative, and so different. And, you know, color TV is shaping those kinds of things, the Space Age is shaping, you know, those kinds of things, and fashion and interior design, architecture, so on and so on.

And I'm curious as to how intentional it was by the Allende government to be pushing towards those innovations, those fringes, those new forms of design, in a purposeful way, right? So, is it intentionally thinking, well, we need to be *avant-garde* also, right, in design?

Eden Medina
So so what you're referring to is, I have a project right now that is an exhibition that opened in Santiago, Chile at the *Centro Cultural La Moneda*, which is the the cultural center of the presidential palace, and an edited volume that is going to come out very soon in Spanish and English. And this is a project that is a curatorial project that I co-curated and an editorial product, a project that I co-edited with Hugo Palmarola and Pedro Alonzo, who are both faculty in the School of Architecture, Design and Urban Planning at the Catholic University in Santiago.

And so one of the things that we have been looking at, and this project is tied to the recent 50-year anniversary of the military coup in Chile that took place on September 11, is we've been looking at histories of industrial and graphic design in Chile as a way to understand how people try to create new visual languages and create new material cultures during the three years of the Allende government. And what we found is, actually, it's really fascinating, both in terms of objects and images and processes and initiatives, but also thinking about the ways that they came about.

You know, so part of your question was, you know, did the Allende government tried to be *avant-garde*? And I would say the answer is, is no. It was it was an innovative political project. And that political innovation opened a space for technological innovation, artistic innovation, musical innovation, I mean, so many things happened during that short period.

So part of the story is just the the nature of change and what it galvanized. So people who before had been marginalized, you know, people before who had been oppressed saw an opening for social change. And that created a kind of, you know, optimism and euphoria, and a sense of possibility, right? And that can be generative. So I think that that is part of the story.

I think another part of the story is that, you know, during the Allende period, many young people came to positions of power. So, for example, Fernando Flores, who was the general technical manager of the organization that was leading the nationalization efforts, just an incredible, you know, position of responsibility was 28 at the time. You know, and many of his contemporaries who were doing this work were also in their 20s. So, you know, they were young, and they were open to different possibilities. So I think there is also that energy in it as well.

There are moments of serendipity. So, you know, a number of these industrial design projects came out of an organization, a government organization, known as Intec, which is the state Technological Institute, which was the first government organization to have a dedicated Industrial Design Group. So this was an industrial design group of trained designers who were working to create new products, machinery, goods, to change the standard of living of Chile's, you know, poor and working classes.

And then something else that's going on, you know, which I had alluded to previously, is that, you know, Allende it was the head of a governing coalition, this coalition had come together around a certain set of principles, but it wasn't always clear how you should implement them. And as a result, in many cases, people tried to implement them in many different ways, and often in ways that were not coordinated.

So let me give you an example. And this is an example from the book and the exposition. One of the most important initiatives that the Allende government had for children was a program called, you know, the half-liter of milk for children. And it was to give them a ration, to give children, pregnant mothers, pregnant women, breastfeeding mothers, rations of powdered milk to, you know, improve nutrition levels. So this was something that had been communicated publicly, but how do you, how do you make that happen? You know, so on the industrial design side, we see industrial designers designing not one model of spoon to measure powdered milk, they designed 10 different models of spoons to measure powdered milk and eventually, you know, would fabricate one, right? So, creating the tools that would allow the precise measurement of powdered milk to happen.

But at the same time, there are public messaging campaigns. Beautiful posters were created to help, you know, communicate to mothers about the need of giving your child milk or the need to, you know, take care of your child and in certain ways to help decrease childhood mortality. Ready. So there are just multifaceted approaches to try to address these different social, economic problems, you know, within the context of political change. So I think having that space for diverse approaches, having young

people, having a moment of political transformation that people were very excited about, and a sense of different possibility. I think all of this came together, in a way where if you look at what came out of that time period, if you look, aesthetically, if you listen to the music, if you look at the, the technologies, the breadth of technologies. Everything from agricultural machinery, to a box to hold fish at the ports, to help people who are doing the fishing, to help them transport the fish in ways that weren't soggy cardboard boxes, to the powdered milk spoons, to televisions that people could purchase with less money, which made political speeches more accessible, among other things, there all of these kinds of projects.

And there are many explanations for why it happened in this particular moment. I don't think it was a decision of we're going to be *avant-garde* right now. It was we want to bring about this kind of social, political, economic change. And for a number of reasons, this breath of creativity, this breath of trying to change material culture, this breath of visual ingenuity, also came along with it. Yeah.

John Galante
I mean, if you crack it open, right?, like you're, you want change. There isn't a formula for it.

Eden Medina
Correct, Correct

John Galante
And so how do you make that change? You allow bottom-up innovation to occur, in some sense. And this is what, in some ways, the, the opposite of status quo-based conservatism.

Eden Medina
It's a sense of where we're going to try. Yeah, we're gonna try this. And if it doesn't work out, we're going to try something else. So actually, the book and the exposition are both called "How to Design a Revolution." And it's not like the book or the exposition are providing an answer, like, this is how you should do it. Rather, it is it is addressing how did people in the past when they when they looked at these really difficult challenges, how do we increase literacy? How do we improve childhood welfare? How do we manage an economy? How do we decrease technological dependency? Like these really big questions or problems. How did they see design, Right? visual Culture, material culture, as a way forward?

+++++MUSIC INTERLUDE+++++
EXHIBITION AT LA MONEDA PALACE

Joe Aguilar
So I'm curious to hear a little bit more about the exhibition itself at La Moneda, maybe just the process of curating it, what it looks like, researching it, anywhere you'd like to go with that.

Eden Medina
Sure. So the exhibition opened in the *Centro Cultural la Moneda*, which is an exhibition space that is right beneath the presidential palace, *La Moneda*, in downtown Santiago. It is called "How to Design a

Revolution: The Chilean Road to Design" in English, English translation. When you enter into the exhibition, there are a series of nodes that look at specific challenges, whether they be social, political, economic, etc., and then show how people responded to those challenges using design.

So to give one example, one of the challenges is when we've already talked about in depth, how do you manage an economy, and we respond to that by having built a full-scale replica a full-scale reconstruction of the Cybersyn operations room. I think it makes an impression for for a number of reasons, you know, first of all, as you mentioned, it's very futuristic, it looks like something out of, you know, Star Trek or a Kubrick film.

But I think in the ways that it's been covered in the press, it's often referred to as you know, a socialist dream, or maybe as a utopia. And I think when you are standing in it, and maybe you're sitting in one of the chairs, and you're pressing a button, you realize this was real. So it is not a dream, it is not a utopia, it actually is effort, energy, you know, creative spirit and commitment to build something like this, under conditions of constraint. And you also see how this futuristic space was created using technologies that were not so cutting edge.

So we have, you know, a number of nodes that are looking at, you know, different challenges and how people, people responded. Another one is how do you reduce technological dependency. And so we look at, you know, a number of projects that were developed by the Intec, Industrial Design Group, everything from agricultural machinery to furniture for for homes, plates, cups, you know, that could be manufactured in Chile for, you know, and made accessible to Chilean people. As well as projects that were outside of the state Technological Institute. Even the Citroën Yagán, which was Chile's automobile for the people that, you know, retailed for a lower cost and.

So that, in general terms is the central curatorial concept. I started working on this project three years ago, with Hugo Palmarola and Pedro Ignacio Alonso. We had known each other before. We had collaborated before. In fact, Hugo I had known for over 20 years. And we shared an interest in histories of design during the Popular Unity period, histories of technology, you know, thinking about material culture, visual culture. And we decided collectively that we wanted to do something for the 50-year anniversary of the Popular Unity. That this was coming, it was important, and we felt that we had something to contribute. So we have worked since then, you know, we have the book coming out in Spanish and English with Lars Mueller publishers, which is a Swiss publisher who's going to help us distribute the book internationally.

But you know, I will say, and again this gets back to the question of what the History of Science and Technology and also design contributes to Latin American History. I mean, the Popular Unity period is arguably one of the most studied periods in the history of Latin America. There has been a lot written about it. There has been a lot of interest in it. But I think, you know, speaking personally, as the curator of this exhibition, you know, standing in the main exhibition hall, and hearing music from the period, and just being surrounded by this wealth of objects and images that were created in this short timespan for the goal of social and economic and political transformation, and just being surrounded by that, is just like it, is this feeling of creativity, that is just incredible. And it's very moving.

And I think, you know, people have been coming, and they haven't realized, I don't think people realize how creative that period was. Young people are coming. I think it's really, it's really powerful as a way to understand the Allende period. And I would argue, to also understand what was lost when the military coup came along, and cut these initiatives short.

John Galante
Yeah, I'm little, I'm really curious about the public reaction on two fronts. One is, you know, what, have you heard from people who have maybe had some of those experiences of just being blown away by the, by the exhibition and what it taught them about the period of time and the government.

I think the other side of it is, has there been any resistance to the exhibition?

Eden Medina
I would say the reaction has been overwhelmingly positive, that people are moved, that people are intrigued, that people are engaged. We've been seeing crowds at the museum. So attendance has been very good. We've been seeing young people visiting. So, you know, people of all ages, actually, we've been we've been seeing visiting the, the exhibition, which is really wonderful.

And, you know, while I have seen critical comments about, say, individual projects. So, you know, take, for example, the history of project Cybersyn, right, you know, people can say, oh, you know, that never would have worked. Or, you know, oh, that was, you know, a flight of fancy. Or, you know, pick your pick your criticism, you know. So you do see that.

But I think on as a whole, an overwhelming whole, you know, people have just been pleasantly surprised, moved. Its design, you know, it is something that perhaps maybe is coming at the issue from from the side, and it is something that really conveys just the optimism of the period. So I think, you know, you don't have to be vested, say, in socialist transformation or an economic nationalization, or in recreating the Allende period, in order to find value, inspiration, a sense of possibility that could be generative. I'm still going to be processing and still gonna be be thinking and watching and listening. But I think it's doing something.

Joe Aguilar
I think it's so cool that you reconstructed project Cybersyn. And not only had it just sort of as a thing that people could look at, but it sounds like people can sit in the chairs and interact with the things. What was the process of actually reconstructing that like? How did that happen?

Eden Medina
So we've been working on it for a bit. It has been, it has been a lot of work by a very talented team. So we have been very fortunate to have worked with just skilled, dedicated, talented individuals in a range of areas.

So I would say that it started first with us figuring out, we knew we wanted to do something with with Cybersyn. We knew that that we wanted to have it be part of the the exhibition in some way. But we didn't know exactly what. And so, you know, my co-curator, Pedro Ignacio Alonso, he was the one who

said we should just do the whole thing. So we said, Okay, we're gonna, we're gonna do the whole thing. And then we started, you know, looking into what exactly that would take.

And we were fortunate in that a lot of the original design plans survived. And, you know, something that I haven't mentioned about the the exhibition, but is but is also a powerful part of it, is that many of the objects, I would say most of the objects, whether there are reconstruction or an original. You know, if they're an original, the object itself survived. If it's a reconstruction, that means plans for it survived, survived a military coup, survived state terror and efforts to, you know, to destroy, or put at risk, the people who had these materials, you know, to give them motivation to destroy these kinds of materials. And they survived. So each document, each object has its own story of survival. There's also there's also something there too, that's, that's very powerful.

So, with regards to the operations room, we were lucky that some of the original designers, whether it's, you know, Stafford Beer who took documents from, you know, from Chile with him. Gui Bonsiepe, who took documents, he crossed the Andes, you know, fleeing Chile into Argentina. He had documents in the back in the trunk of his car, you know. Rodrigo Walker, Fernando Shultz. You know, different people had different pieces, Peppa Foncea, who was one of the original graphic designers, you know, we have original sketches of the different widths of the arrows that she was playing with for the data visualizations. We had just so much raw material, in terms of document that that survived. And so that provided a basis for us to work off of.

That being said, it certainly was not a complete archive. And we made a promise to ourselves early on that we wanted it to be as faithful a reconstruction as possible. So that meant that the original designers were part of the process from the outset. We collaborated with them they saw early sketches, designs, provided input, you know, we're, we're grateful for that. And Peppa Foncea while I was down there was meeting with graphic design students at the Catholic University, trying to make sure the colors were the exact right colors as the ones that she used in her original data visualizations.

So we had architects involved, we had designers involved, I took two mechanical engineering students from MIT down with me. And they, you know, they had spent the spring working with me reverse engineering the electronics from the room from archival circuit diagrams. So we didn't really have a manual that told us precisely how the system worked. But you can read a circuit diagram as a kind of primary source and reverse engineer it from there, which is what they did. And then, you know, were able to build the system in, you know, modern electronics.

So it was, I mean, we really worked to make it as faithful as possible. And we're fortunate to have just a tremendous team of people working with us to make that happen.

John Galante
I mean, of course, you're thinking of memory, and what would come of the Allende government and Allende himself. But the maybe the exhibit is not ideologically driven, which potentially makes people look at it in a different way. But it doesn't sound like you're introducing the severity of what's to come in the exhibition, right? You are trying to demonstrate what was, right, and give it life.

Eden Medina

We are I mean, we're looking at graphic and industrial design during the Allende period. Right. So that is the material that we are sharing with the public. But I also think that, you know, controversial historical moments require a sensitivity in the way that you tell them, that can be very tricky, because otherwise you will alienate people.

One of the best ways to do that is to is to be honest, to tell what happened, to convey that to audiences, to not make it that, you know, you're telling a heroic story, you know, you're not telling something that is a utopian story. You're showing, this is the context, this is what people tried to do. And actually, that's enough, like, that's pretty inspiring.

So, for example, right, as you walk in, we have a large photograph and enlargement of a photograph by Ted Palumbaum, who lived here in Boston, a photographer for Life magazine. And it is a photograph of a woman in a news kiosk, you know, right after the Allende election. But you look at that news kiosk and you can see all of the publications that are at that news kiosk. And it just shows you like the breadth of freedom of the press that was available during that time period. And I've seen people wander in, and they just remember all of the different publications, right. And so even just seeing that photo is a moment of memory.

John Galante

And maybe like, you don't have to, because it's not opening at the anniversary of the election of Allende. It's opening during the anniversary of the end of the Allende government. Right? So it is already filled with that experience in some ways of the coup, which for those who don't know, was a military led coup, right?, supported in some ways by the United States and the CIA, where Allende was either killed or committed suicide, there's still some debate about that. And a dictatorial government, led by Augusto Pinochet was put in place until the early 1990s. Right?

And so I'm wondering what, like this, this is playing maybe a role in truth and reconciliation, to some degree, right, given when it's being opened.

Eden Medina

Speaking honestly, I think it's tricky. And I think, you know, September 11, it is this point of inflection, right, it is a point of inflection, where the Popular Unity ended violently and where 17 years of dictatorship began that resulted in gross human rights violations. You know, the most horrific are, of course, disappearance and execution, but also, you know, torture, exile, you know, many, many different kinds of human rights violations that took place during that time. According to official figures, you know, 3,200 people lost their lives for political reasons during the Pinochet dictatorship.

So it is it is this moment of inflection. And I would say personally, if I'm looking at that anniversary, the most important thing to think about is justice, and that there still is not justice for the crimes that have been committed during the Pinochet dictatorship. And I have sympathy with that with that position. And think that you know, if we're thinking about memory during this period, that that is something we cannot lose sight of. That that is very, very important that we continue to remember and discuss.

At the same time, I would say that there are spaces for many different kinds of memory and that having that breadth of memory is also important. And that having that breadth of memory can do different kinds of work for different people. And I will give an example. So for some of the designers who participated, you know, shared their archives, worked with us, you know, the Popular Unity period for them has been something that has been emotionally fraught. You know, you're doing all of these projects, you're, you know, you're giving everything you really believe something is going to come about. And then it all ends. And maybe you're in exile, or worse, right. You know, how do you find some kind of how do you relate to that period? And so, I think, you know, that, that perhaps seeing your work on display being made accessible to the public, people taking an interest in it, that that is doing something that's that's important.

But I would say that, you know, the anniversary, it is a tricky moment. And, you know, we can't lose sight of this broader narrative of what came after.

+++++MUSIC INTERLUDE+++++
TRUTH AND RECONCILIATION

John Galante
Yeah, which is certainly seems to be influencing your, your movement, in terms of your scholarship, in terms of more of an interest in truth and reconciliation. And I wonder if you could, you know, introduce us a little bit to your to your work on that front, and then bringing in the Science and Technology Studies to that piece of the Chilean experience of the 20th century and onward, I guess.

Eden Medina
Sure. So my current project, you know, it shares some similarities with my with my previous work, in the sense that I'm interested in using science and technology as a way to understand a process of political change. But the context is very different. And the specific kinds of science and technology that I'm looking at are very different.

So I have a book manuscript that I'm about to complete. The working title is *The Remains of Dictatorship: Forensic Identification and Error in Chile's Democratic Transition*. And the book focuses on a specific, specific burial site. So as I mentioned, during the Pinochet dictatorship, it's estimated that around 3,200 people lost their lives, for political reasons. And the largest anonymous burial site that was used by the military is a site called Patio 29. And this is a grave site at the back of the general cemetery in Santiago. It is the space where the poor people, who don't have families, you know, people who, you know, don't have someone to claim their body where they historically have been buried.

But in the months following the military coup, the number of murders that were taking place at the hands of the military or those in their employ, you know, the number of dead was so high that it overwhelmed the morgue. And the morgue needed to figure out what to do. The military needed to figure out what to do. So the cemetery is right across the street from the morgue. And so bodies were transferred from the morgue to this to this burial site, and hundreds of human bodies were buried there during the dictatorship.

When Chile returned to democracy, 126 sets of these mortal remains were exhumed. Chile started to perform forensic identification on these remains with the idea that they would be returned to their families for burial. So by 2002, about 96 sets of these remains had been identified and returned to their families. And then in 2006, it came to light that at least half of these identifications were wrong.

And so it is a different story. It is one of science and technology, and hope and possibility and desire during a moment of political change. In this case, it is about democratic transition, and how do we face our past of these gross human rights violations? But it is one that takes a different path. It is one that takes a path from certainty to uncertainty and revictimization, nd then what happens next.

So yes, so that is that is the story. You know, I think it is it is relevant for how we understand democratic transition in Chile. I think it is relevant for how we understand the relationship of science, technology and human rights. But I think it's also relevant for how we look to science and technology to give us certainty in domain areas that are defined by their uncertainty, and in high risk, you know, highly charged, highly emotional areas like forensic identification of human rights victims. What happens when it's wrong? And what did we do then?

Joe Aguilar
One quote from the excerpt of your project that really stuck with me is your aim to quote decenter, the role of the computer and the larger historical narrative. And I wondered how that fits in with the project and what the aim of that is.

Eden Medina
Yea, so, so, you know, as happened with the the history of project Cybersyn, you know, something similar happened here. I happened to see a documentary film that had been made in in 1998. I think I saw it around, you know, 2002, thereabouts. But it's called *Fernando ha vuelto*. *Fernando is Back*. And it is a documentary film that shows the process of how the Medical Legal Service, which is, you know, the scientists that identify a set of remains and issue a death certificate so that they can be returned. How they went about identifying a set of remains, you know, using the scientific techniques that they had at their disposal, how they described their findings to a family member, in this case, Fernando's widow, and then you know, the story of the family upon seeing the remains and their reaction to it.

And this documentary featured a particular scientific technique, known as cranial facial superimposition. And this is a technique, it is a computer-based technique. It doesn't have to be, but in this case it was, where you have a photograph of the victim, preferably where they're facing forward and smiling, so you can see teeth, and you have the skull of from an exhumed sets of remains, and you can map one on top of the other, and you can look for cranial metric points of similarity. And so if they all align, then that is seen, you know, as further evidence that that this set of remains do indeed belong to this particular person. And so this is what you see in the documentary film.

And when I saw that, you know, I was so taken, as a historian of computation, to see how computers were being used in the domain of human rights work. And so I kind of flagged it, and I said, I want to come back, like, I want to come back and look at computer history in the domain of human rights work.

And by the time I had returned to the story, it came out that, you know, half of the remains from that particular site had been misidentified, including the case that had been featured in this documentary film. So like what you see on screen, you see the alignment of the photograph in the skull, and you as an audience member, you say, Oh, yes, I see that, you know, I accept that that that is true. It turns out that it wasn't true at all. And that, you know, just as the widow is receiving, you know, the wrong set of remains, we as an audience member have also been told a truth that isn't true. And for me, that was that was just very, I don't know, that was very striking.

And so I wanted to tell that history. But it ended up being very difficult for me to tell that history because I'm talking about the history of computing, in the context of human rights work, in the context of atrocity in the context where so many other things matter more, right? I mean, computers in this domain, they matter so little, but yet, they're important, because they show us a, you know, they show us what techniques this *Servicio Medical Legal* was using, what resources they had at their disposal, how truth was being produced, relationships between the states and families and how they come apart. I mean, you could see so many things.

So I'm going to say, I'm going to tell you the story, I'm going to tell you computers are not the most important thing, all of this stuff over here matters. But yet I can show you, you know, all of this by looking at this particular technique in the *Servicio Medical Legal*. And so that's what I was trying to do by saying, you know, decentering the computer in computer history and that we as computer historians have an ethical responsibility to not give too much weight to our object of study. But that doesn't mean we we shouldn't be doing what we're doing. We just have to be more careful and more rigorous.

John Galante
It affects how we think about truth and reconciliation.

Eden Medina
You, you know, I I agree. And, you know, it's, it's, again, it's one of these instances where you come in kind of, you know, from the side, coming in, you know, at a science and technology angle, but then it turns out that that entry point actually allows you to get at a lot of the things that you just laid out. Right.

So, you know, a classic STS question is, you know, how, how do things come together to produce a truth that holds, right? So from a controversy, you know, how is it that, you know, certain data or scientists or organizations or what have you, How do they all come into alignment to produce something that can hold? And we certainly see that here, you know, what kinds of data, what kinds of funding, what kinds of techniques, what kinds of motivation. You know, how do they come together to produce an identity?

But we also see that other part, right, how does it come apart? And actually, it took a lot for it to come apart. And you know, that that is a very interesting story that is very grounded in the specificities of how Chile has responded to its human rights violations. And so, so we can see that. So yes, I would say that it is it is a very rich story, for understanding truth, for understanding attempts for repair, and also to understand what is unique about the Chilean experience in the aftermath of human rights crimes.

John Galante

And I wonder if the stakes of Truth and Reconciliation change if the objectives change? Or if it's, you know, I just, you know, I'm curious, right, as to whether that, that there would be any adjustment in the approaches, objectives, meaning, interpretation, of Truth and Reconciliation over time?

Eden Medina

I mean, I think what you're asking is a very complicated question. I think it's a very personal question. Yeah. You know, I think, you know, different family members, different stakeholders, would respond to that question in a very different way.

As a researcher, one thing that I have found is how violence endures. And while violence, it's not the same violence, it's not the same violence of disappearance or torture. But as people are still pushing for responses, accountability, some kind of repair, maybe, you know a glimpse of justice. You know, how a non-responsive state or the ways that a state can respond can inflict new forms of violence. And that is something that has stood out to me, how decades later violence endures.

+++++MUSIC INTERLUDE+++++
TEACHING AND NEW TECHNOLOGIES (AI)

John Galante

Yeah. You know, what you've said about Science Technology Studies and the History of Science and Technology, that sort of thing, is so interesting, especially as it pertains to Latin America, and the state, and politics And I'm curious as to how this impacts your teaching, right? You're a professor at MIT, a lot of your students are, maybe all of your students are technologically driven, in some sense. And what does that mean in the classroom? Right? How, what's your what's your approach, been, how have your students reacted?

Eden Medina

So I love this question. So when I started in this field, one of the things that I wanted to do is I wanted to help technical students understand the social dimensions of the technologies that they would be developing. And in part that was personal. So I started off as an electrical engineer, but what really, I wanted to be doing, and while I was doing electrical engineering, I ended up wandering over to what was then called Women's Studies, and now it'd be called Gender Studies, and would learn about how science and technology were socially constructed, about power relationships that went into them. You know, it was not my problem sets where you, you know, you solve a mathematics problem, and you you know, put the answer in a box and you're done. Your circuit works, you're done. It was so much more than that.

And, you know, also felt that students who are building the next generation of technological systems or who are, you know, in labs looking for, you know, new scientific knowledge, that they also need to understand how science and technology are contextual, that their particular perspective shapes what questions they're going to ask, the kinds of conclusions that they draw, and the kinds of relationships they form as they're disseminating knowledge or collecting data, right? That these are all social relationships.

So I, for me, MIT is just a perfect place for me to be. You know, the students are they're brilliant, they're engaged. And I think that there is a greater awareness now that, yes, science and technology are social that, yes, ethics matters. And I think part of this has come about with the revelations about artificial intelligence and bias in artificial intelligence systems. I mean, this is not new to students, students know this, they see this. So being able to be part of those conversations is something that, you know, I really value and enjoy doing.

One of the things that I feel that I can bring to the conversation is. You know, one of my core beliefs, science and technology are global, they're global, right? It's not it is not one history, there are many histories, all parts of the world, different communities have their stories. So what I try to do in the classroom is I tried to bring Latin America, Latin American history, Latin American experiences, into the ways that students learn about technologies, you know, or the systems that they're building or thinking about data. You know, so that is something that that I do, I do, prioritize, you know, in my work to try to get that that geographical diversity. And I also feel that by doing that, we do see a broader range of possibility or inspiration, or, you know, the kinds of cases that we that we can learn from. But yes, I enjoy teaching technical students.

John Galante
Are the stakes higher now? Like thinking about AI, or genetic engineering, robotics, and so forth. Not to say that prior technologies, technologies haven't been revolutionary in so many different ways. But do you think the stakes are higher around those ethical questions?

Eden Medina
We've had worrisome technologies for a long time. Right. So we have we have our own set of worrisome technologies right now. But certainly, I mean, during the Cold War, we had worrisome technologies. You know, during the world wars, we had worrisome technologies. You know, so I, you know, if we're going to create a spectrum of anxiety and tech, you know, I don't think we're in an outlying moment.

That being said, I do think, you know, whether it's students are getting it more in high school, you know, there are documentaries on Netflix. I, you know, I just think that there is a greater awareness that tech is social and that the social dimensions of tech have consequences.

And it could be in part, you know, as I mentioned, from awareness about racial bias, gender bias in our artificial intelligence decision-making systems. It could be about climate change and climate crisis, which students are very, you know, aware of. It's just very palpable that that science and technology affect people and that human decisions play an important role in the kinds of, you know, knowledge we create in the kinds of systems that we build. So I don't know, I don't think I would put it necessarily on a scale of anxiety. But you know, I would think about it maybe on a level of students sophistication. And thinking about these issues at the undergraduate level, I would say that I've seen a change in that for the better.

Joe Aguilar

So moving away from the question of anxieties around technology. Is there optimism around artificial intelligence? Like, what? Where's that optimism? Generally, I've heard a lot of fear mongering, especially as somebody who teaches writing, we're scared of ChatGPT. We don't know what to do about it. It's going to replace us in some way. But are this is there a case for optimism?

Eden Medina
So I would say personal optimism. I don't know if I can, if I can speak, you know, to broader forms of optimism around around ChatGPT, which, you know, certainly we have a lot to, to figure out and contend with, and make sense of. But I would say, you know, for the first time I had students use ChatGPT for homework assignment. This past spring, I do a data and society class. And so ,you know, I had students write an OpEd on a recent data issue using ChatGPT. The only thing they couldn't do is they couldn't just ask Chat GPT to write the Op Ed, you know. They, they had to put some kind of human effort into it. And they had to write a reflection paper about it. And I would say, you know, if we're thinking about optimism, about a third of the class refuse to use it, which I found fascinating. Because you would think MIT, you know, students are going to be, you know, very gung-ho in terms of technology, you know, they would be early adopters of the technology.

And the reasons were fascinating. So, you know, some students cited environmental concerns. So we know that large data centers that are doing these calculations, use a tremendous amount of electricity, use a tremendous amount of water. And they didn't want to contribute to that for, you know, a simple homework assignment. Other students, you know, I had one student who wrote fanfiction, and she did not like the extractive ways that these technologies worked, you know, for the creatives, and you know, against the creatives in her community.

You know, so there were just all these these little moments, and, you know, we're gonna figure it out, we're gonna. Like, new norms are going to emerge. But I think just like the hesitance and the critical thinking, and the reflection about the experience of writing, about greater environmental consequences, creativity consequences, you know, for me that was a moment of optimism.

John Galante
I like that, thinking about it individually, or personally. But what about politics? I think, part of the anxiety, maybe, right, is not how I'm going to be using this, but how other actors, how powerful actors could potentially mobilize this.

Eden Medina
I mean, I think this is going to be an incredibly rich moment for future historians of technology, to say the least, yeah, right. I mean, because we have, you know, labor movements that are that are pushing back, you know, in ways that they haven't pushed back in a while. So we're seeing, you know, more of those negotiations than in the past. We're seeing calls for different kinds of regulation, we're seeing different nations taking different steps towards regulating this, you know, in a technology that by its nature, crosses borders, which will be fascinating to see. There are interesting intellectual property questions that are being raised, you know, if an algorithm generates something, who owns it, that's something that we're going to be be figuring out.

So definitely, it is, that is an interesting time that we're that we're living in. And, you know, as someone who is a historian, you know, when you see these, these moments open up, and you can see that messiness, like, that is fascinating. So I, you know, that that's part of the reason why I think this moment is, you know, is just very interesting, because we can we can see it. And, you know, I suspect in future years, it'll also be a moment that historians will will find a lot to do. Fair enough.

John Galante
Well, thank you so much for all of your insights, all of your comments, all of the, you know, really fascinating descriptions of your work, different elements of your work. I really appreciate your time and the conversation and the insights. Thanks so much for being here.

Joe Aguilar
Thank you.

Eden Medina
It's a pleasure. Thank you for how having me.

+++++MUSICAL INTERLUDE+++++
CREDITS

John Galante
You've been listening to *Crossing Fronteras*. I'm your co-host John Galante, a historian of Latin American and an Associate Professor at Worcester Polytechnic Institute as well as the creator and executive producer of the podcast series.

Joe Aguilar
And I'm your co-host Joe Aguilar, a fiction writer and an Assistant Professor at WPI, and an executive producer of the podcast series.

John Galante
This show surveys the unique ecosystem of contemporary scholarship and art being generated by scholars and creatives in New England who are working in Latin American and Caribbean Studies.

Joe Aguilar
Our series producer is Jill Ruby. Original music for our series was written, performed, and recorded by Carlos Odria. This podcast was recorded at PRX Podcast Garage in Boston, Massachusetts, with the help of Magdiela Matta. Additional support came from a fellowship provided by the Global Labs at WPI, with special assistance from Steve McCauley, Varun Bhat, and Sam Ollari.

John Galante
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