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***OPTIMISTIC OUTLOOK* PODCAST | EPISODE TRANSCRIPT**

"From Rockets to Affordable Housing: The Startup Leader Disrupting Construction"

Featuring:
Peng-Sang Cau, Director of Siemens for Startups, Siemens Digital Industries Software
Nick Callegari, Founder, Chief Engineer & CEO, Verustruct

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Description: The construction worker's son who learned to build spacecraft is about to disrupt a $1.4 trillion industry that hasn't changed in 70 years.

Nick Callegari spent his childhood summers working construction sites alongside his father, a laborer who still builds walls in Florida using the exact same methods he used 30 years ago. Then Nick went to work as an engineer at SpaceX, where he watched a team challenge every assumption about what's possible and accomplish the extraordinary.

That contrast haunted him.

41% of America's construction workforce retires by 2031. We're already millions of homes short. And Nick's own family experienced the crushing pain of housing insecurity, so he understands the problem that faces millions of American families.

So he left SpaceX and rockets behind to solve it.

In this deeply personal episode of The Optimistic Outlook, Forbes 30 Under 30 founder Nick Callegari reveals how his company Verustruct are using mobile robotics and AI-powered 3D printing to build affordable homes at a scale traditional construction never could, and why this matters to investors, manufacturers, and anyone who believes advanced technology should serve basic human needs first.

Host Peng-Sang Cau — a Cambodian refugee, former founder, and now Siemens' startup ecosystem leader — brings her own story of survival and technology's promise to this conversation about who gets access to the future we're building.

You'll discover:

- Why the housing shortage is a skilled labor crisis that automation must solve
- How the Verustruct mobile 3D printing system works differently and with greater agility than any other 3D printing technology for homes
- What $2.1M in pre-seed funding means for construction's digital transformation
- Why "the future is here, but not evenly distributed" — and what Siemens is doing about it
- The personal pain that drives mission-focused founders to tackle society's thorniest problems
- How Siemens for Startups partners with innovators from concept to automation at scale

This isn't another startup story. It's about how we're finally applying spacecraft-level innovation to the fundamental right of shelter.

For leaders in construction tech, real estate development, automation, venture capital, or manufacturing: this is the conversation about where digital transformation meets demographic crisis.

Conversation:

This is such a complicated problem. We need a lot of different people and a lot of different stakeholders that are actually contributing to this future vision. But I see a world where everyone has a roof over their head in some capacity, whether it's multifamily, single family, and no one feels the stress of being cost burdened.

Intro
00:07
Hello, I'm Lauren Espin. Today on the optimistic outlook, we explore how bold engineering, entrepreneurial grit and a human, centered mission could help solve one of the most pressing challenges of our time, the global housing crisis. Guest host Peng Cau leads the conversation a refugee from Cambodia turned entrepreneur and innovation leader, Peng co-founded Transformix engineering and scaled it into a global automation company, later acquired by ATS Corporation. Today, she leads the startup program at Siemens digital industry software, where she helps deep tech founders turn breakthrough ideas into real world impact. Her guest is Nick Callegari, founder and CEO of Vera struct, a public benefit corporation developing robotic construction technologies designed to build affordable, sustainable and beautiful homes at scale, a former SpaceX structures engineer with a master's degree in engineering from UC Berkeley and an MBA from Yale, Nick is applying lessons from aerospace engineering and his own family's experience in construction to rethink how homes can be built faster, smarter and more affordably

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together. Peng and Nick discussed the massive housing shortage facing the United States, the future of robotic construction, and how advances in AI software and hardware could transform one of the world's oldest industries. They also explore the personal motivations behind mission driven entrepreneurship and what it takes to build companies that aim not just for profit but for lasting social impact, from space engineering to housing innovation, this conversation is about challenging the status quo and building a future where everyone has a place to call home. And now let's listen to Peng and Nick.

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Hey, Nick, welcome to the optimistic outlook podcast. It is a pleasure to have you with us. I'm looking forward to exploring your company's vision, the challenges you're tackling and what this means for the industry. Awesome. Very exciting.

Thank you for having me on All right, let's start with the problem. Nick for listener who may not familiar with the housing crisis numbers, can you paint the picture of the problems you're solving. You know, there are different estimates on how many people are short houses in the US, where it's anywhere from four to 10 million homes that were short. And so that's a large housing supply that we need to fill. And it's a multi faceted problem. It's not just a supply side problem. You know, there's also problems with permitting, housing regulations, etc, but we have to fill the supply side first. And one additional issue that's exacerbating that is the fact that the people that are actually building these homes in the US, they're now retiring. So 41% are expected to retire by 2031 and so we're already seeing a shortage in supply of, you know, it really started during the recession, and it's only grown since then. We've had an increase of demand that's, you know, outpaced the, you know, surplus of supply that's coming online. And so what we've had to do, you know, is look at it from a different angle. If we don't have the people to build the housing right now, we're losing a lot more of them the next five years because they're aging out. My generation, other generations, don't want to go into construction. What can we do instead to help fill this housing supply gap. So it's kind of like what bear shakes looking at and what we're thinking about approaching. So that's really interesting Nick because looking at you and your background, you did not come from the construction side. What kind of got you going from this, you know, getting into construction from someone who came from a different background. So, you know, it doesn't look like on my resume. I'm from a construction background, but actually a lot of my family is in construction earlier. So my dad's a construction worker. He's worked on walls all of his life. He still do it to this day in Florida. So I grew up working summers with them, and so I was exposed to the industry from an early age. My aunts and uncles are contractors as well and subs, so they do electrician work, plumbing work, glazing work, so windows, you know, also fenestrations, doors, etc. And so I've had a lot of exposure in different avenues, but I never really pieced it together until my time at SpaceX. Okay, so let's go back to that a bit. You began your career designing space structure at SpaceX. Take us back to that time Nicks like SpaceX operates at the edge of performance, efficiency and material optimization. What did that environment teach you that stay with you, combined with your family experience and your collective experience in the construction space? It's interesting to think about that time in my life, and it definitely shaped the way that I think about how we solve very thorny technical challenges now, and so I saw how if you have enough resources and enough technical talent and enough of a culture where you're able to challenge the status quo, you can really achieve some amazing things and some extraordinary things. And.

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So being in that environment and seeing how everybody banded together, they weren't afraid to challenge requirements, I think that got me thinking about, okay, what are some other really big, thorny problems out there that maybe we haven't applied this framework to, because I've seen it work at SpaceX, and some of the things that they're able to achieve when I was even there and I was able to be a part of really shape the way that I think about what is possible. And so, you know, on the no for like, a personal journey, I felt like the work that I was doing was very cool. Felt like I was contributing to the SpaceX mission, but I felt that I can contribute more in another domain that hadn't been addressed as acute, and that was haptic for me. And so I was like, Okay, how do I get into this, this field of work, you know, had the background, you know, family background in construction, not personal background. And so I had to start building out that repertoire, and ended up going to Yale for an MBA to do that. So that's really cool. So I think what I heard from you is that SpaceX being the visionary company that it is, kind of, it's an environment for you to challenge the status quo. And you saw construction having been raised in that environment as a status quo that needs to be disrupted. Is that a fair statement? That

06:16
is a fair statement? Yeah. And, you know, I had a little bit of an inkling that things hadn't changed much in construction since, you know, I was a kid, to the time I was thinking about it in SpaceX and beyond, because my dad was doing the same thing that he was doing when I was a child, the same scope of work, the same problems were coming up, just in kind of like, different shapes and sizes. It's the same thing. And all the houses look the same. And you can kind of see it, and it's something that, you know, it takes a while to build housing stock, right?

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But I don't think that's a good excuse for the fact that we have such a huge shortage and such large swaths of technical talent here, and, you know, all types of talent in the US. And so why can't we address this problem with the skills that we have here?

07:01
So you actually started the company as an idea doing your MBA at Yale two years ago. Since then, you've closed an oversubscribed 2.1 million pre seed round and were named to the Forbes 30 under 30 list. What does that recognition mean to you personally, and what were the hardest lesson you've learned about entrepreneurship so far that you didn't learn at Yale as an MBA student.

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The problem is so huge in the way that I think and the way that my brain is wired, I'm thinking about, okay,

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it's not about the recognition, it's about self and problem. And so I see it as we have just begun this journey. We're on step one, essentially, in the grand scheme, being able to actually deliver housing stock that's going to make a meaningful impact, and it's going to be something that people can actually afford. And so I don't even think about those things much. It's like I'm focused fully on the problem. And how do we get this technology to the next stage, to where it could actually start being deployed in the field. So that's kind of the way I frame it. And you know, it's been, it's been helpful with the team here, and we're just fully focused as much as we can be on what is the next step? What is the next step? Because if you look at all the work that we have to do to get to the point where we're actually delivering 10s of 1000s of units of supply a year. It's a lot. It can be very daunting, and so it's one step at a time.

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You said something earlier that I kind of caught on about this being a software using software for a traditional industry. Maybe we can elaborate about that, because I know you're aiming to make ad printed home affordable, which are usually typical, using massive gantry and fixed system, but your approach, as you just mentioned, is different. Can you maybe walk us through that a bit?

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I think in housing, there's a lot of stigma associated with certain terms. So we hear modular we think of a certain thing. We hear factory built housing. We think of something else, maybe even like RVs, etc. And people really want to feel like they have dignity living in the structures they live in. And they want to see a certain type of structure in their community. So there's a lot of like nimbyism, not in my backyard, associated with certain types of building approaches and certain types of structures. And so the way that we frame the technology is that we need to develop something that will deliver beautiful, sustainable architecture that people actually want in their backyards. People will feel dignified living within it's safe, it's code compliant. How do we do that? That is what we set out to solve. So the way that we're approaching it is different than the current construction three printing on the market. It's different than modular. It's somewhere in between and somewhere totally different as well. And so the way that we do it is using a slip form approach.

We use a translational slip form device that's actually depositing each layer with a certain cross section that allows the device to articulate and scale.

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Yeah. And so in a nutshell, we're testing the structure that's being printed. We create smooth walls and sharp corners, which is very important for community adoption, and we can perform multiple tasks at the same time. On the job site, you could have essentially multiple robots that are riding along these walls, performing separate discrete tasks or the same task at the same time, which allows us to automate a lot more of the process help alleviate some of the labor burdens that are experienced right now with like the immigration crisis, with people aging out of the workforce for construction, and also allows us to really reduce the amount of time and money that's going into some of these projects while still delivering a very compliant, very safe, very sustainable product. So your technology is really the software as well as the robotic system. Are you actually building robotic system as well? And you what you're going to be, I assume you already have an MVP. And is that MVPs already in the market with construction companies?

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Yeah, yeah. So we're building both the hardware and the software just to make our lives, you know, a little bit more difficult, right? Of course, why make it easy? Why make it easy? Yeah, yeah, exactly, yeah. But, um, it's a it's a really interesting point too, because the way that we see it for our hardware to work as effectively as we think it can, we also need to focus on the software as well. The software is an enabler. But where we can, we don't want to reinvent the wheel. So if we can use materials that already exist, a lot of people do really good work, sustainable concretes, or sustainable cements that help, you know, create sustainable concretes and other admixtures associated with that, I think we can help buy down a little bit of that technical risk. And if we build our structures in such a way that they adhere to ACI, 318 and 318 so these are like big building codes for either masonry or post beam construction. It's going to help us actually be able to build more housing stock because we match what's already being built. We're just doing it in a different way. So the final result is similar, but the approach is different. And so the software side helps us a lot too. Just because we need to be able to plan out exactly what we're trying to build, we want to map out all the paths for the printer. And then we also want to make sure that what we produce in the software can show the consumer like this is what you're going to get. This is the analysis for the structural, for the thermal, for the carbon footprint. And people can tune their buildings within our software.

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You know, we talked about earlier how much regulatory requirements are in the construction industry. If you are building, you know, you're building software and hardware, and you're doing it in your factory,

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I assume, then tell me if I'm wrong, that you can further test, you know, make sure that the regulatory requirement or approved in your software and hardware, so that when they are on site, that process a lot quicker. Is that part of the reason for, you know, not just the automation speeding things up, but having to cut through the red tape by be able to prove out the concept approve, you know, deal with making sure the regulatory required are met and then go to site

13:02
Correct? Yeah. That's like the most efficient approach that, you know, we're trying to take is if we can get approval and buy in beforehand, before we even built. So they look at the plans on the software side. We test wall sections we've already constructed in our factory, and then after we've got all those pieces together, then somebody can look at the plans on the city side say, like, if you can meet this, like, what you're saying, you're actually going to achieve here, you'll be good to go. Then we can actually take our struggle, take our device on site, print on site, and show in real time that we're meeting a certain bound of tolerance to what we said we're going to ride MVP, what we said the structure was going to be able to behave as et cetera, and showcase that to the people that are inspecting, to the engineers, whether they're on site for the city or whether they're somewhere remote, and they could just review video assets or photo assets after the fact or during the fact. I think it's going to expedite the process a lot for us and a lot for them as well. So you're building the physical world and the software world, because you know, you want life to be difficult

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based on your experience. How can innovation in hard tech be just as transformative as in the apps world or the software world, even if it moves at a different pace? This comes down to can hardware move at the speed of software? I'm an accelerator right now, and they like to say this a lot, and I think it can if you're very strategic about how you're actually developing the hardware, you're taking more of an approach of we need to test as quickly as possible. One great thing about software is that you can compile code and test something within the same day and actually get user feedback. That save you as well. If you're very good about it. With

hardware, it's a lot more difficult. But with advances in AI and automation, manufacturing, etc, we're seeing this, this wave of, you know, new methods coming online for creating parts and components and assemblies that we didn't have before, and designing those as well, such that you can actually go.

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From beginning, the beginning of a design cycle, through analysis, manufacturing and testing in a matter of weeks versus years. And so that's the approach that we're taking as well. We're trying to iterate on a prototype, like a full scale prototype, every three weeks, is our goal. So we start from scratch on design, and then work through the analysis, the manufacturing, assembly and testing, and then get to a pool with gleaned insights from that, and then we build on that prototype for the next one. And so if we can go at that speed, I think hardware can actually iterate a lot more quickly, and you could see this acceleration of hardware development to match the pace of software development. And I think you hit on a really core part, right? I mean, this is part of the reason why I joined Siemens, because, you know, in 2012 when I had my own company, I was building digital twin and went to the market for it. Whereas, like you said, if you're able to build a digital twin of your system from beginning to end, you can really test out that digital product, whatever that may be, before you even build a physical product. And so it allows you that speed. Is that fair? I mean, this is why you joined the Siemens for startup program. Is that part of the reason?

16:08
Yeah, yeah. I think the you know, the companies that are doing it really well have had experience doing it, not as well before, just because they weren't they didn't have the capabilities that we have now. And so, you know, some of these more legacy companies, like Siemens, that just have so much exposure, so much experience in different domains, can actually, you know, be the best at executing on, you know, helping create some of these digital twins and working through, you know, CAD and FEA, etc, for These startup companies and larger companies alike,

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to really accelerate the pace of development on the hardware side by leveraging software tools. So it's pretty exciting. It really is. You know, I love this sector and where it's moving, right? I I was the CEO of an automation company for 32 years, or 22 years, I should say. And I used to say, I wish this exists when I was starting in 1995 so I think you were just that kind of a Cust of how hard tech can transform at a speed a soft tech. So I think that's awesome.

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I've been in the startup ecosystem for 30 plus years, and what I found is that a lot of companies fails not because of the technology. A lot of time is the commercialization or thinking about what the customer want, you seem to have taken a very different approach. And is that, from your experience being in the construction industry, where you're like or something else that you know, start that thinking of, what is it that the end customer care about and build a technology to support that problem, rather than the other way around?

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Yeah, I appreciate that. I would actually say it goes back to my experience at SpaceX. When I was there, I was an interior design engineer, an interior structures engineer, along with, like, a primary structures engineer, but one of my major jobs is working with astronauts from a human centered design standpoint. How do we create these structures that they're going to actually experience and interact with when they're in zero gravity of space? And that's a very difficult thing to do when you're on Earth and you don't have those resources to test people floating around. We tried some zero G flights on this stuff, I puked all every place.

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Great experience. Really had to test the structures, you know, and you had to go up there and see how the astronauts interacted with them. But I think that experience really got me thinking about, okay, like what I think might be best for someone is not necessarily what they think is best for them. And do you take the approach of like, Steve Jobs, really, okay, we know what's best for the consumer. They're gonna eventually adopt this. Or do you take a different approach, where it's like, okay, we should actually listen to the consumer first and foremost. And I think there's pros and cons to both approaches, but for something as sensitive as housing that people are living within, they're spending most of their time in these structures, you really have to listen to the consumer, to the person that's actually living in the home, because it's so important well, and I think you touch on a really important part, right? Like the steep jobs of the world is creating something that doesn't exist. They're truly disrupting a sector or whatever, right? How we live, how we listen to music, how we watch TV or whatever. Whereas you are doing some you're disrupting an existing old industry. So I think their approach have to be different, because if you go too far off without listening to what the potential customer want. I think that's a recipe for failure. Would you not agreed?

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I think that's correct, and it's such an interesting time right now, too. On that note, because we were kind of at a threshold before where the Henry Ford's we were able to.

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Automate once the industrial revolution happened, certain very mechanical tasks, like very bare bones, human labor tasks, we could automate to increase efficiency for certain like production plants, right? But we could only go so far based on what control algorithms we had, PID control, etc. But we've gotten to a point now where human cognition, the AI of the world is also starting to become something that we can leverage, software leverage AI for. And so now we are able to increase that threshold and automate things that we couldn't automate before. And so the complexity of a construction task just could not be automated efficiently prior to the dawn of AI. Now we're in a world where we could actually leverage these tools and become a lot better at automating very complex tasks, because we're able to automate tasks that typically required a lot more human cognition before. And so we're not replacing it completely. It's a supplement, but it's a supplement to the point where we're increasing that threshold for what we're able to automate. So for anybody listening right now like this is the time to automate some of those more complex tasks, whether it's housing or something else, right, those really thorny problems, this is the time to solve them.

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I think it's so commendable and inspirational for someone so young to think about societal issues and wanting to figure out how to take your skills and make that impact and also drive your passion. Ironically, like, you know, I used to people used to ask me, when you start your business, did you have a business plan that you just carry on? Like, no, I just wanted to work with a bunch of friends and have an environment where I get up every day and do something fun, right? And that was for me and built for, you know, for an engineer, you want to build something that's physical, that you can touch and feel. I wanted to build a company, to me, that's physical and fun at the same time. But I know there were heart moments right there. There are many heart moments and many more that will come. What do you do? Nick, when your morals down, or the team's not feeling so great, because there will there are tough moments, what do you say to yourself and to your team?

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I think a lot of people will sugarcoat this aspect, and it can get tough sometimes. And you know, three weeks ago, we were testing a prototype that we're working on, and we had such high hopes for it was the first full scale one with all the slip systems we

needed, and it didn't go the way I wanted it to, and it was tough, and you have to put on that brave face in front of your team, be like, we can do this. We're tackling a really tough problem. It's not going to be perfect and sunshine and rainbows all the time, right? And the point is that we have to persevere and keep going. If you keep going, keep going and keep going, eventually you'll figure it out. Like we're human beings, that's what we do. But when it gets hard for yourself, like, even like, that night after it's like, you're kind of, you know, reflecting turn like, is this the right decision? Am I doing the right thing? And when you're working on a startup, I'm sure you've had this experience as well. There's no one telling you what is right or wrong necessarily. You have to make those decisions for yourself, and you have to live with them, and it's hard to know if there was the right decision until it's already been executed as hindsight bias, right? It's 2020, but yeah, you know, when you're in the moment, it's really tough to know what's going to actually happen. And so I just lean on people. I think you know what can bring me up the most, and hopefully a lot of other startup founders do is the fact that you're not going through this alone. Even though you're alone in your particular startup journey, there are other founders that are also working on similar difficult journeys, and you guys can find, you know, solace within each other. I think that's super important. And we're humans, and we need that human connection. And so important not only from like we're building housing for people, they need to feel dignified living with them, though. We need to connect with the customer, but also for the founder and the team. They need to connect with each other. You need to connect with other founders to tackle these problems that need to be solved in the world. And I agree with you. I used to have a CEO Round Table of other with other founders, because at the end of the day, it is lonely at the top, because even when things are really bad, you cannot show to your team, your customer, your suppliers. You know, it's all internal, but to your point, we're human, and we have to have an outlet. So I created a CEO round table in which we can learn from each other and be able to take you know, what I call the emotional dumping right, where it's a safe space, where you can just talk about what you're going through. I think that is so critical that a lot of founder missed out, and I'm glad you're getting that early on, because you can't do this alone. I don't care who you are, so maybe you want to Steve's job. Elon Musk, I don't know

24:53
what has been your single proudest moment since starting the company, and how has building this company changed you as a leader?

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Weird. We're still building our devices to actually deliver housing stock, and I think I'm predicting my future proudest moment will be when we're able to give the keys to a new home, that first home to someone. And yeah, there might be some tear shed, for sure. I wanted to be invited when that happened, by the way. No, I do I want, I want to have, I want to have the camera there ready to take that moment when you shed that first tier. Because I think that would be so powerful, right to know that your journey results in someone having a home.

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Yeah, yeah. And I think you know something that's become apparent to me during the startup journey, and my proudest moment so far has actually been from my team. And you know that failure experience I had before, when after that, everybody got together, and instead of Waller in sorrow, like, oh, this didn't work and giving up, everyone is back to the drawing board. And they were like, giving each other support, and they were having, they were laughing, having a good time. And I saw the impact that it not only like, not only one could make on society through what you deliver, but also for the people that are working for you. And like you're a team. You're working together, and that's their life too. This is their livelihood. And so it kind of like opened my eyes to, oh, you're not just making an impact for what you're delivering, but also what you're generating with the company itself and what's inside the company in that culture. And that made me really proud in itself. And so I was like, wow, okay, even if things go south, like people learned here, they had a great time, and we should still try as much as we can. You it,

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who has most influenced you as a founder, and what's the best leadership advice that you received and who gave it to you?

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I would say my dad actually, in terms of who's influenced me as a founder, because he, you know, had his hand as a small business owner as well. Now he was a laborer for construction, specifically did stucco and ephes on walls, and he had like a small crew with him when I was growing up, two or three people, sometimes a little bit more than that, depending on the season. But you know, seeing how he led his team, and I was so impressionable and young at that time, but the things that he would do like, the little things like, he always like, made sure to give them bonuses, and like, help them out, and he would help their families out, and he was always looking out for them with those little things that he didn't have to do, but he did anyways. That

taught me what a real leader looks like, right? Like, you're executing on these tasks, but you're looking out from your team first and foremost, right? Because without the team, you're nothing.

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Yeah, that's awesome. I love that. And you're absolutely right. Because at the end of the day, if you want a team that is loyal to you and your mission and your vision of what you're going to build, you need to fight for them.

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So one more question. You've described housing as human right, and your mission is to make homes safer, more affordable and more sustainable as the company scale. Paint us a picture. What does that look like 10 years from now?

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This is kind of what gets me up in the morning. This is what drives me is like, what does this future look like? And I'm open to the idea of, maybe it's not all us, right? This is such a complicated problem. We need a lot of different people and a lot of different stakeholders that are actually contributing to this future vision. But I see a world where everyone has a roof over their head in some capacity, whether it's multifamily, single family, and no one feels the stress of being cost burdened. My

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parents experienced housing insecurity for periods of time when they were growing up. I heard stories about it. I see the issues in my family, you know, immediate and extended family as well. Some of them are still experiencing some pretty severe housing and other issues related to housing insecurity as a stem of the initial problem. And so I always thought it was unfair, like, why did they have to go through that? You know, I was fortunate enough to where my dad had a stable job as a laborer, and we had a roof of Earth, right? We had food on the table every night, and he made sure to provide that for us, even he'd be able to work crazy hours traveling around the country, etc. And it just didn't feel like something with so much technology booming around my childhood in terms of, like, oh, we have the phones now, iPhones and these things and, like, all these crazy gadgets, like, how have we not solved something so fundamental to human nature? You think of like,the Hierarchy of Needs

31:56
we're solving for needs that are not in the right place in the hierarchy, my opinion,

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like 50% of renters right now in the US are cost burdens and capacity. 30 ish percent of people that own their homes are cost burdened as well, or like, are trying to oh no, and so that is a problem itself. 2.8 billion people in the world have some form of housing insecurity. That's insane. And so that world is like, those numbers aren't nearly that order of magnitude anymore, ideally down to zero, if we can get it there. And I think it's possible to do that when we have, you know, we're sending up

32:39
data centers in this space, right? If we can do that, which we didn't even dream about 20 years ago, why can't we solve this material problems? Honor? And I think we can. I think, you know, water insecurity, food insecurity, other things that could also be solved as well in parallel. And I think all those things will be solved in the next 1520, years, if we keep up with the current pace of technological innovation, and actually get people together and execute on that?

33:05
Well, I think anybody can, it's going to be you, Nick and your team that you're building up right now. So I'm going to sit on the sideline applause you go along and root for you, because I think it's it such a bold vision, and 1020, years from now, I can't wait to see what you build. So thank you so much. I appreciate the time. Thank you.

33:26
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