

## Doing What Works The Blue Economy Episode 1 Feat Nathan Churches 08/09/23

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### SPEAKERS

Dr. Nathan Churches, Ashanti Blaze-Hopkins

#### Ashanti Blaze-Hopkins

Welcome to Doing What Works: Exploring the Blue Economy, a podcast series that dives deep into the vast potential and challenges of the blue economy. I'm your host, Ashanti Blaze-Hopkins professor at Santa Monica College's Center for Media Design. Together, we'll navigate the uncharted waters of this exciting and rapidly growing sector. Joining us on the podcast today is someone who is going to help us wade through one particular area of the blue economy. He's a self described all around marine biology nerd who simply wants to know how marine organisms work. He's also a professor and the co founder and Chief Science Officer for Holdfast Aquaculture, a company that provides resources to strengthen and expand the sustainable aquaculture industry. Dr. Nathan Churches. Hello, thank you for joining the podcast today.

#### Dr. Nathan Churches

Yeah, thanks for having me. Happy to be here.

#### Ashanti Blaze-Hopkins

So there is one question that we are going to ask every single guest that comes on to The Doing What Works podcast and that is what was your first job ever? And what did you learn from that job that helps you today and the work that you do now?

#### Dr. Nathan Churches

Yeah, that's such a great question. I, I will say that my first job ever, as a teenager, I was probably 15 or 16, we'll say it was at a big box store. And what I learned there is that big corporate worlds were not my thing, not my wheelhouse. My second job, I think is much more relevant to this discussion, I learned that I didn't want to work in big stores. So I went to my local marina in Olympia, Washington, just north of there a little place called Boston Harbor Marina. And I applied for a job there, I was like, let me work for this small mom and pop shop. And what they ended up doing was sticking me down with the oysters and the mussels and the clams. And I was on a salmon gutting line actually, at the beginning, they wholesaled salmon out of there. And so that was one of my first jobs. And it is very relevant to the work that I do today. I learned what seafood was, what good sustainable seafood is, what sort of seafood

directly from the ocean in front of you looks like. And it honestly changed my entire life trajectory, just getting that job. So it was a foundational event for me.

**Ashanti Blaze-Hopkins**

That's amazing. So right away. I mean, it seems like you knew right away, this is what you wanted to do. This was the trajectory that you wanted to be on, you know, right in the middle of it. You want it to be a part of kind of what we're now calling the blue economy, but I'm sure back then you didn't know that, that's what you were getting into?

**Dr. Nathan Churches**

Oh, yeah, definitely not. I just saw it as a job. And it honestly took a couple of years for me to realize how special of an opportunity it was to work on the water and in the water and with people who organize their life around that. That's sort of a lifestyle. And for me, I went into commercial, you know, fish monitoring and commercial fishing. Afterwards, I still didn't really realize the vast potential for conservation and sustainability. It was just a way for me to be outside, which I love doing. And only in my sort of later college and PhD career did I start to understand the conservation aspects, the food equity aspects and all of the good stuff that comes along with sustainable aquaculture and the blue economy.

**Ashanti Blaze-Hopkins**

So you know, we talk about this sprays blue economy, and I will say that when I first heard about it, I was like, What is this? What does this mean? I don't know what the blue economy actually entails? Can you share with our listeners, in layman's terms. What is the blue economy? What does that entail? What does that mean for the state of California?

**Dr. Nathan Churches**

Yeah, that's a great question. I think the blue economy just means anything that happens in the ocean, right? That's, that's an economic activity. It's a huge word, right? When people talk about the blue economy, they're talking about fishing, they're talking about things like underwater robotics, aquaculture, conservation, wind and wave energy, harnessing all kinds of stuff, when we're talking about the blue economy. However, when people nowadays talk about the blue economy, most of the time, they're talking about making these industries sustainable or even regenerative actually having a helping function towards the ocean. So that's how people are typically referring to the blue economy today, asking questions like, you know, how can we harness the oceans vast resources, while helping maintain it at its current level, or maybe even improving it a little bit in the process.

**Ashanti Blaze-Hopkins**

It's so interesting, because I feel like the blue economy is really forward thinking, you know, about what resources that we have, and the fact that they are going to run out eventually. So how do we make sure that we are living in a way that is sustainable for our environment, for our children for, you know, marginalized communities, all of those things. You particularly work in the area of aquaculture. Can you tell me a little bit about what exactly that means? You know, I know obviously, "aqua" is in it. So we're talking about water. But what does that mean to be someone who is in the space of aquaculture?

### **Dr. Nathan Churches**

Yeah, aquaculture is a huge word. I think when I say aquaculture, another word that's very similar that comes to mind is agriculture, right? Agriculture encompasses so much stuff, right? It's just growing stuff on land. That's what agriculture means. Aquaculture is the same thing. It's growing stuff in the water. That could be freshwater, it could be saltwater. And it could be things from algae, to shellfish, to fin fish, and everything in between. So aquaculture is a massive, massive word. Specifically, when I talk about aquaculture, I'm usually referencing the kind of aquaculture that I do, which is shellfish and seaweed and kelp farming. And I refer to those as low trophic aquaculture. Now, that's kind of a big word. But what that means is things that are really close to sort of the base of the food web or the food chain. And I think that those are the most sustainable ways to perform aquaculture and how aquaculture fits into the blue economy is multifaceted. There's so many different ways that it fits into the blue economy, all of these other things that I talked about, including fisheries, robotics, wind and wave energy harnessing, right, they all have infrastructure and presence in the ocean. And aquaculture can either be a component of that presence, for example, making an aquaculture farm under the wind farm that's going to get planted in the ocean, or it can help improve things like wild fisheries, right, reduce the amount of pressure on wild fisheries that currently exist, so that both can live in harmony, you can still get your wild fish in a sustainable way. But you can supplement the proteins that come from the ocean with farm raised products. And so there's so many different ways that aquaculture fits into that giant term, blue economy.

### **Ashanti Blaze-Hopkins**

It's so fascinating, because I think if you think about the food that we get from the ocean, you think about fish or muscles or you know, shellfish or all of those things. I think you don't often think about them being grown, right? You just think, oh, there's fishermen, and they go on the boats and they catch the food, and then they bring it to my grocery store and I buy it, I put on my plate and I eat it. And there's so much more to that, you know, and I feel like the work that you're doing with Holdfast really dives deep, you know, not to be punny, but it really dives deep into this blue economy and aquaculture. Can you share what it is exactly that Holdfast is doing? What were the challenges in starting Holdfast? And what were some of the successes that you've seen, and the new developments that you're working on now?

### **Dr. Nathan Churches**

Yeah, Holdfast is my company that I run with three other people at this time. When I first started, I basically was in my PhD program. And as a little side note, I don't recommend that you start a business while getting a PhD. It was a lot, but several years ago at this point. And I'm still here. So you know, what can I say? But I started hold fast because during my PhD, I was working at the Wrigley Institute for marine science at USC. It's this amazing marine facility on Catalina Island. And I was really interested in population genetics, essentially how DNA moves through ocean organisms, especially things like shellfish. And I realized that I was doing aquaculture from start to finish, I was taking the Mamas and the Papas, I was making a bunch of babies, and I was growing them up to essentially market size. And I was doing it at a research scale. And I met Diane Kim, who is senior scientist at the Wrigley Institute, she still is. And we started chatting about how we might make this into a company that can both bring research and development and science and meets industrial goals as well. And so we've

brought on a couple of other co-founders at this point, who both have incredible chops in the meat

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distribution and seafood distribution industry and also in the aquaculture practitioner space. So just literally building those systems. And that's how we got started back in 2018. Initial challenges for Holdfast, there were there were quite a few, I think space was one of them. Finding access to sea water is another, I mean, we're in SoCal, right, it's prime real estate, ocean real estate is expensive. So finding the right fit there was a challenge. But we were able to do that. And in large part due to this collaboration with our landlord AltaSea, and AltaSea is an incredible blue economy incubator facility down in the Port of Los Angeles. It has a ton of momentum. I'm sure we'll talk more about that later. But they gave us the opportunity to have space over you know, in the Port of Los Angeles over the water. And it's really, you know, been no looking back since we started collaborating with them. So that was how we started, right. And what we're working on now is basically we have two arms, two major arms of the company. We have a research and development side where I get to nerd out on all the science stuff and help guide that and then we have a commercial production side which I'm also involved in, but some of my other employees and co-founders are involved in more heavily. They're the research side, we do stuff like try to understand what is different in the DNA of organisms that have been exposed to ocean acidification and survived. Right? That's a key part, and survived. What does their DNA look like that's different than those that either don't make it or unexposed? So that breeds, or theoretically, that project will breed ocean acidification, resilient mussels, oysters, for example. Were also really, really interested at Holdfast and bringing in California native species to the market. So we have tons of delicious, I mean, I'm talking top choice foods that grow right here in California, especially in southern California that are not really on the market currently, as available options when you go down to the seafood bar. So we're working on projects to develop some of those. And then we're also working in the food, seafood equity space. So we're really interested in making sure that the products that we grow, don't just go to the, you know, the rich folks up on the tallest houses on Palos Verdes Hill, right, we want to make sure that everybody in our community has access to these foods, because I think that's a right for people that live by the ocean. And so we're doing things like working with community services on limited in South Central LA to put on events like the South Central Sustainable Seafood Festival, where we're highlighting our local products that we develop, educating people on what they are, and how to cook them, to make it you know, palatable and exciting when you see these products. So that's the research arm and then the commercial arm is what we do is we make seeds, right, farmers need seeds, corn farmer needs a corn see, an oyster farmer needs an oyster seed, it's really that simple. And seeds, when we send them out to the oyster farmers are just tiny, tiny, tiny little oysters that are often only a few millimeters large. And that's what they will plant on their ocean farm. Okay, and and the the process of making seeds can happen on land in hatcheries. And that's what we do. So we send, we send oysters, we send mussels, clams, kelp, seaweeds, you name it to ocean farmers who, you know, want these products. So that's the commercial end of the business there.

**Ashanti Blaze-Hopkins**

That's interesting, I never really think about, you know, oysters, or any kind of shellfish as, here's a seed. Here's a seed so that you can continue to grow this population, it's just not something that you think about. So you know, it's fascinating that this is the space that you're in. But I really love that area of equity, where you're working with the community in South LA, to make sure that there is access to sustainable proteins, you know, in an area where oftentimes there can be food deserts, you know, so tell me this, why is this work so important? I think you've touched on it a little bit with the equity piece

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and the sustainability piece. But why else is this work so important? Why should people care? The everyday person walking down the street. Why should they care that this work is being done?

### **Dr. Nathan Churches**

People should care about this work and the oceans because everybody is connected to the ocean. You may not realize it, you may be somebody who says I don't even like oysters. Why do I care about oysters? Or, you know, I've never tried to kelp in my life. It doesn't matter that you don't see it every day necessarily. But every person on this planet is connected to the ocean, the health of the planet is connected to the ocean. So stuff produced in the ocean is connected to online food chains, for example, the ocean does tons of nutrient cycling for us, the ocean effects weather patterns and climate generally, and most importantly, in my mind is one of the largest carbon sinks on the planet as well. So the oceans need to stay healthy. And I think the blue economy and aquaculture as a part of that can help maintain the health of the oceans. So with that in mind, I think learning how to sustainably retrieve foods from the seas is an extremely important goal for the future of California. I think it's important for the West Coast in general, but also just the world as a whole. You know, when I lecture about this topic in my classes, I've got a whole list of reasons that I dive deeper into, about why you should care about aquaculture specifically. And that includes things like the equity issue, we're talking about, world hunger just in general, there are plenty of coastlines that have really poor communities with vast ocean coastlines, right. That means we're not harnessing proteins from the ocean efficiently enough. We've got things like collapsing wild fisheries, the ever present climate change and ocean acidification issues, right? These are all major issues. Right? And they're a bit of the the tree hugger type issues, right? Like these are issues that people that that sort of, you know, have a compassionate streak, want to think about, but there's also the business aspect of it. Think about economics, we have a double digit billion dollar deficit of seafood in this continent every year. So North America imports 10s of billions of dollars more seafood than we sell or generate in house. It's just a nuts and bolts, economic opportunity. So even if you don't care about all of this environmental stuff that I'm blabbering on about, it's just there's money here. Okay. And so I think it's an incredible opportunity to produce foods from our neck of the woods, right? And dramatically reduce things like greenhouse gas footprints, and make money. And at the end of the day, it's also you're going to generate a lot of really tasty food, that's at the end of the day, when I sit down to eat, I want a delicious food for me. And so--

### **Ashanti Blaze-Hopkins**

Yeah, I mean, who doesn't love a good plate of seafood? Especially, you know, if you're on the coast, you know, I grew up on the Virginia coast. And that was like a thing, you know, especially in the summertime, crabs, and you know, all of these different seafood that you would look forward to eating on in certain seasons. Right? So, I will say that, it's, it's interesting, because there's an education component to this, right, that, you know, not only do we want to ensure that people understand what the blue economy is, what aquaculture is, and how that relates to the sustainability of our society, but also, how are we training the next generation of folks to be able to take on the jobs that are obviously going to pop up related to the blue economy. So you do a lot of work in creating curriculum, especially around aquaculture, I would love for you to talk about the curriculum that you created and helped create here at Santa Monica College. And what do you think that's going to do to help this future workforce? That's going to be needed in the state of California and likely in other parts of the world?

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### **Dr. Nathan Churches**

Yeah, that's a that's a great question. I think, as an entrepreneur, when I think of the future of the workforce, I kind of draw a bit of a blank, it's really hard for me to find people that come into my facility that know how to turn on the pipes, keep the water where it should be, keep it away from where it shouldn't be and raise the animals, it's tough to find skilled aquaculture technicians, especially on the US West Coast. And so, at Santa Monica College as the aquaculture faculty lead, I worked with a really extensive advisory board comprised of members from across the entire west coast. And basically, we sat down and came up with was a list of criteria that a functional employee needed to meet before they came into their facility, and could be, you know, an asset to that business. And so essentially, what we came up with is a two tiered program, you can take a one year program and sort of just get your chops down, get your basics in aquaculture, understanding things like how plumbing works, basic husbandry, basic spawning, and stuff like that. And then you can opt for a second year, which can be done partially online. And you can get a two year certificate that will teach you things like boating safety, basics of navigation and diving, you can sort of fill in a few gaps with a few different electives there as well. And so the end goal here is to fill this gap when I go and post an ad on, you know, wherever it is, LinkedIn, I want to find somebody that can use PVC glue and keep an animal alive. And I think we're going to accomplish that with our new program at SMC.

### **Ashanti Blaze-Hopkins**

And these are high paying jobs, you know, these aren't entry level minimum wage type of jobs, correct? I mean, this is something that can really change the course of you know, a student's life when it comes to what's going on with their finances and how they can take care of their family and all of those things.

### **Dr. Nathan Churches**

Yeah, I think so. I mean, one of the stat that I think of is, I want to say it's 80 to 85% of people that are owner/operators, or managers at aquaculture facilities in the country, have zero higher education, they got to where they're at, because they showed up at a farm, got the job and worked until they were, you

know, able to either buy out their previous owners or become managerial staff. And I think that even though the jobs that the program will produce that SMC will probably put people towards the lower end of the totem pole initially, but you know, room for vertical growth in any company, including mine, for example, is massive, right? As soon as you understand my facility, if you show up and you can keep animals alive, I'm willing to, you know, give you raises and move you up our totem pole. So I think that the potential for people that graduate from this program is huge.

### **Ashanti Blaze-Hopkins**

And the skills are transferable. So it's not like if you get a job at one particular, like Holdfasts for instance, it's not like this is the only place you could ever work with those skills that you have gotten from the certificates that you've gained from Santa Monica College, right? This is something that could help, you know, springboard students into the entire blue economy and they can move up, not just within one organization, but within several.

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### **Dr. Nathan Churches**

Absolutely, time on boats is huge. Just working on things that go into saltwater has such a huge advantage if you can put that on your resume anywhere in the blue economy. I mean, if you get a degree in aquaculture, you're going to understand things like water chemistry, you're going to understand basic waterflow physics, you're going to understand animals. And in the process of that, you're going to also understand some of the ecology and conservation issues that come with the modern aquaculture sector. So it's going to be great for anybody that graduates. You can go in many different directions with these technical degrees.

### **Ashanti Blaze-Hopkins**

When will the certificates be available for Santa Monica College for folks who are listening who might be interested in taking on these certificates and going through the programs?

### **Dr. Nathan Churches**

Yeah, we hope to launch in 2024. We're shooting for spring. And we hope to have our first cohort graduate by the end of 2024. So I mean, the time is coming up really quickly. And we anticipate relaunching the program every spring and fall semester. So it should be on a cycle that continues in that way. But if you're interested in this program, right off the bat, keep your eyes open for spring 2024.

### **Ashanti Blaze-Hopkins**

If you had kind of a dream state that you were able to create for how the blue economy is going to move forward, specifically with aquaculture. What would that be? What does that look like for you?

**Dr. Nathan Churches**

Yeah, my dream state of California specifically, would be that in 30 to 40 years, towards the end of my career, I think you would take a trip out to the US West Coast offshore areas, and you'd see a robust economic sector that's regeneratively, farming the oceans. And when I say regeneratively farming, I mean, not only are we getting good, nutritious proteins from the ocean, but the actual practice itself is helping rejuvenate the oceans. So for example, the equipment itself can be helpful. Studies show that simply adding three dimensional structures in the water column can help increase biodiversity in certain areas. But the organisms themselves can help, right? Shellfish and seaweeds can remove tons of nutrients and tons of carbon. But also, there's add on effects, right? There's adjacent conservation efforts that are going to come with these types of large products and a large and robust aquaculture industry. So that's one part of it. And then, you know, greenhouse gas footprint on my food is something that I think about pretty regularly. And so I think that, you know, this is a totally different sector of the blue economy. But I hope that the engineers can get us to the point where the boats that are harvesting are powered by renewable energy, and I want to see the products delivered to local ports, and people can come from local areas to get local foods, right. There's so many delicious species, like I said, that are just right outside of our doorstep. Let's eat some southern California seafoods. So that's, that's my dream state.

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**Ashanti Blaze-Hopkins**

It's lunchtime and that's making me very hungry. So let me ask you this, what would be the hurdles or the challenges you think, to getting to that dream state? What are the things are going to prevent us from getting there? Or at least slow us down?

**Dr. Nathan Churches**

Yeah, I think that there's massive potential for the aquaculture industry, specifically, most focused on low trophic, you know, bottom of the food web aquaculture like shellfish and seaweeds. The major problem for me as an entrepreneur right now is just getting into the water. California has robust permitting processes that you need to go through in order to put anything in the water. And I'm absolutely happy that we have those in this state, right, I want to take care of the oceans. But at a certain point, those permitting processes are a little bit difficult to navigate and require multi-year investments from companies. And so while we hope to have a farm in the ocean someday, it's been a really long road for us to get to the point where we're actually ocean farmers. And I think that's the biggest hurdle. But I do think that there's some momentum towards changing that. And I think a major factor or function, I should say, in changing that will be getting regulatory agencies in the same room streamlined so that a person like myself who has expertise and funding can come in and farm the oceans in a sustainable and responsible way.

**Ashanti Blaze-Hopkins**



What do you think is working right now in the state of California when it comes to what the state is doing to focus on the blue economy, even in the aquaculture space, but also in other spaces in the blue economy? What's working?

**Dr. Nathan Churches**

Yeah, I think what is working is momentum. I think there's more working than there isn't. So I want to make sure that I say that. I think that there are many institutions that are starting to organize and developed to meet the needs of the emerging blue economy. And it's really, really an exciting space to be in. People are starting to realize that the healthy blue economy is great for everybody. It's great for everybody who never even touches the ocean. But it's great for the, you know, ocean facing sector as well. So it makes fiscal and ecological sense. So some of these groups like AltaSea, I've already mentioned a little bit, they have this enormous facility in the Port of LA and they're capable of being this incredible breeding ground for the blue economy sectors, including things like wind and wave energy, blue robotics, exploration and sustainable aquaculture. There's federal agencies like NOAA, the National Oceanic and Atmospheric Administration, there's an aquaculture opportunity area or an AOA in Southern California, they've identified that this is one of the best places to start on low trophic aquaculture specifically with shellfish, it's it just makes economic sense and ecological sense. There are other entities in the education space as well. So at Santa Monica College, we're building this certificate program, but I know that there are some other groups College of the Redwoods up in Northern California, and some colleges down in the San Clemente area that are also seeking to develop this workforce. And so all of this is sort of, I mean, it's this cauldron of bubbling energy, it's a really, really exciting space to be in. And I do have quite a bit of hope that, you know, in 30 years or so, we're going to be at a completely different space, it's going to be revolutionary, what happens in our oceans in the next few decades.

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**Ashanti Blaze-Hopkins**

This feels like such a fun time to be exactly where you are right now.

**Dr. Nathan Churches**

Absolutely. I mean, imagine if somebody sat you down and was like, we're going to start California agriculture in the next 10 years. And then you were the first one to figure out, hey, maybe an avocado works, or an almond works, or whatever it is, what an incredible opportunity. And I think that's really where we're at. We're at the start of a revolution in our oceans.

**Ashanti Blaze-Hopkins**

That's amazing. Let me ask you this one last question. What do you think other states especially, you know, those seaboard states or other countries that are coastal countries, what can they learn from what California is doing?

**Dr. Nathan Churches**

Well, that's a great question. Because I think, you know, it's a bit of a double edged sword with the permitting thing in California, not only do we have robust permitting and criteria that you

need to meet in order to farm in California, but that also gives us this opportunity to set the standard for the best, most regenerative, most sustainable, best for the oceans aquaculture industry here. And so I think what they can learn is how you break down barriers and make a sustainable industry. I think California has a lot to learn as well. I mean, they're excellent programs in states like Maine and Alaska. And so I think it's a two way street. Right. I think that continuing to come together and talk about hurdles and successes is going to be necessary for any state to be successful in the future.

**Ashanti Blaze-Hopkins**

We have to kind of work together to get to that dream state, don't we?

**Dr. Nathan Churches**

Absolutely.

**Ashanti Blaze-Hopkins**

Dr. Nathan churches, thank you so much for sharing your insights and expertise with us. This was such a great conversation. I feel like I learned so much. Listening to you.

**Dr. Nathan Churches**

Anytime. Happy to be here.

**Ashanti Blaze-Hopkins**

Fantastic. Well, thank you all for joining us for this incredible journey through the blue economy. We hope this episode has inspired you to explore further and more and more about this vital sector. If you enjoy Doing What Works Exploring the Real Economy, be sure to subscribe to our podcast and leave us a review. Stay tuned for more exciting episodes that push the boundaries of knowledge and open new possibilities.