

**Episode One of Citizen Science: Stall Catchers, featuring Guy Calkins and Pietro Michelucci.**

*Transcript*

**Justin** Welcome to the first episode of Citizen Science, the new podcast from SciStarter. This show will spotlight the many different ways that individuals and communities are exploring and changing the world around them through public participation in science. Episodes will feature conversations between project developers and volunteers, with subjects ranging from climate change to biodiversity to Alzheimer's research to community science projects focused on environmental justice and much more. These conversations will showcase the important relationships that make these projects successful, what kinds of problems and questions these projects are trying to address, and how you can get involved. Before we get into our first episode's conversation, let's introduce ourselves. I'm Justin Schell, I'm a librarian and media producer. I passionately believe that everyone can participate in science and through this participation can address the most important questions and challenges we face on local, national, and global levels.



**Caroline** I'm Caroline Nickerson, and I'm the Managing Editor of SciStarter's Syndicated Blog Network and the Community Manager of Citizen Science Day. I love empowering others to tell their citizen science stories. These narratives are how we understand the field and inspire each other! We'll take turns hosting and facilitating the conversations in each episode. Our first episode is a conversation about the EyesOnAlz project, and specifically the Stall Catchers game. Stall Catchers asks volunteers to look for stalled blood vessels in videos of mice brains, as a way to advance the science of understanding and treating Alzheimer's disease. We'll talk to Pietro Michelucci, director of the Human Computation Institute, which runs the EyesOnAlz project, and Guy Caulkins, a volunteer "Super Catcher" who not only helps with detecting these stalled blood vessels in the game, but also has utilized his experience in marketing to plan the Stall Catchers Megathon. This unprecedented worldwide event coincides with Citizen Science Day on April 13th. We'll get into much more detail about the Megathon, Stall Catchers, how the project is helping advance Alzheimer's research, and how you can contribute to the project. Without further ado, here's our conversation with Pietro Michelucci and Guy Caulkins.

**Caroline** Pietro, Guy, would you like to introduce yourselves and give a little bit about your background? Maybe Pietro first?

**Pietro** Yeah, you bet. It's a pleasure to be here, thanks for inviting us. So yeah, my name is Pietro Michelucci. I founded the EyesOnAlz project that created the Stall Catchers game and I'm also Director of the Human Computation Institute, which is a research institute that tries to advance the science of crowdsourcing for the purpose of societal benefit. So how can we create systems that link computers and humans together so that they can cooperate or collaborate and solve

problems that can't otherwise be solved by humans alone or machines alone. This EyesOnAlz project is one example of applying that kind of science to a real world problem, which is of course trying to find a cure for Alzheimer's disease.

**Caroline** Great. And then Guy do you want to introduce yourself?

**Guy** Yeah, I'm Guy Caulkins. I'm a recent retiree, a couple of years ago and I'm a volunteer. And I found Stall Catchers, through the *Crowd and the Cloud* PBS special. I was, it struck my attention, caught my attention, as I was looking for ways to volunteer and give back to the community. And was looking for things that I could do from home, and fell in love with it right from the beginning and have been doing it ever since.

**Caroline** Guy, was that the first time you'd ever done citizen science, when you first played Stall Catchers?

**Guy** That is the first time. Back when I was in high school many, many years ago, I actually did participate in the, I think it was with the Audubon society bird watch activity around Christmas time. They do their annual bird count, so that was actually my first citizen science participation back then. But this was certainly in the digital age and being able to do something online. This was kind of re-engaging with it after a 40 year career.

**Caroline** Fantastic. I'm sure when you first did it you probably didn't know it was citizen science. You thought you were just doing something for school perhaps?

**Guy** With the Audubon society. Yeah, the bird count. I didn't quantify it or it wasn't really called "citizen science" at the time.

**Caroline** Yeah. And it's still really popular today. I know the bird count is one of SciStarter's featured projects around that time of year. So. Very cool. Very, very cool. So we know what brought Guy to citizen science, it was watching *Crowd and the Cloud*. Pietro you created Stall Catchers, correct?

**Pietro** Yes, so I'd been supporting the development of this new field called human computation, which I was describing before, which is about building collective intelligence systems out of humans and machines to solve problems and spent several years with the research community trying to kind of help mature the field in different ways, but I wanted to come out of the ivory tower and be more grounded and do something applied. And so I created the Institute and then worked with some other people to try to apply this new powerful technology to make a positive difference in the world. And I was very fortunate because a mutual colleague, Janice Dickinson, connected me to Chris Schaffer, who's a biomedical engineering professor at Cornell University. And then he described a problem that they had related to analyzing data for their Alzheimer's Disease research and I saw a real opportunity there to actually apply these methods and citizen science to solve that problem. That was how the project began.

**Caroline** Awesome! And is Stall Catchers the main output of the Human Computation Institute?

**Pietro** So I'd say that it's currently our most active project. We have other projects in the works, but this is the thing we spend most of our time and effort on. It's been one of those things where the reach and importance and engagement of the project with the Alzheimer's community has increased its sense of value and importance for us. And so it becomes this kind of virtuous cycle of, you know, motivation and enthusiasm to pursue this vigorously.

**Caroline** Cool. Okay. Very cool. So Guy, you're playing Stall Catchers, you were playing Stall Catchers right before we recorded this podcast. So we know how you learned about it. But what kept you involved?

**Guy** The content had an immediate connection with me. I have a Great Uncle who suffered from Alzheimer's. My wife's grandfather also suffered from Alzheimer's. And so I had an immediate connection with Alzheimer's as a disease that people are suffering from. The citizen science part was the fact that looking for things I could do on my own time, 24/7 kind of a thing, that I didn't have to schedule around it, if you will. Citizen science, in general, I'd say many of the projects in citizen science and particularly Stall Catchers, gave me that opportunity. I can play it on my time, when I have time available. And it just fit nicely with that schedule. And I had that purpose in mind with Alzheimer's.

**Caroline** Definitely. And one thing I've heard people say about Stall Catchers is it has a really cool community. Guy, since you're part of that community as a user, could you describe that a little bit about how people are able to play together?

**Guy** Well, there's several factors. One, they do have a chat feature, in the Stall Catchers game, which allows us to catch up with one another, you know, exchange things that are happening in our lives. So we've developed, if you will, a community of friends, people that we've never met and live in various parts of the country and the world. But still have some camaraderie and a chance to exchange. The other part is the periodic competitions, "Catch-a-Thons: they call them, which are interesting little competitions, friendly competitions. We join a team and the teams can compete on a friendly basis with one another to see who can score more points. So the point-based earnings that you can do in this game makes it a lot more fun and you can kind of compete again with one another on an ongoing basis.

**Caroline** Very cool. So basically, if, I don't know if we've really gotten into this yet, but how Stall Catchers works is you watch videos of mice brains and you identify stalled blood vessels. Pietro maybe you could give us some more details about how that contributes to research outcomes on your end?

**Pietro** Yeah, you bet. So the the main research agenda that Stall Catchers is supporting is to understand the role of brain blood flow in Alzheimer's disease. So we've known since the

beginning of Alzheimer's Disease that patients have about a 30 percent reduction in brain blood flow compared to people who are healthy, but we have never understood why until recently. So the Schaffer-Nishimura lab at Cornell made some important discoveries in the last couple of years ago about how the blood flow is reduced and basically what they figured out is that it's these tiny little blood vessels in the brain called capillaries that are stalling. They end up getting blocked and there was no blood flowing through them. Even though it's only about two percent of those that are getting stalled, the downstream effects result in a 30 percent overall reduction in brain blood flow. So there's less oxygenation in the brain and it's sort of the equivalent to that feeling you get when you stand up suddenly and you feel light headed. It's that lack of oxygen that causes that. And one of the important findings was that when they were able to restore the blood flow to these capillaries, they got the complete restoration of blood flow to the rest of the brain and the cognitive effects of Alzheimer's went away. The memories were restored and the depression went away. Now these are studies that are being done in mice, so I want to be clear about that in, and of course, as the research advances and promising drug targets start to appear, then there's always the issue of translating the mouse results into humans. So in Stall Catchers, what we're trying to do is actually figure out how many capillaries are stalling in a given mouse brain, so you might have a healthy mouse, you might have a mouse with Alzheimer's disease, they're given the human version of Alzheimer's disease, and then maybe some of the mice are given a particular drug or chemical compound that we think might alleviate those stalls. And the only way to know if the stalls are going away is to go in and individually count them and that's a very painstaking, time consuming process. And it would take the Cornell lab six months to a year to analyze the data from a single experiment just to answer one research question. With Stall Catchers and with, you know, many people putting their eyes on these blood vessels, we've been able to accelerate that by a factor of about three or four. So now we're answering research questions in only a couple months, and as we get more people playing Stall Catchers, we expect to accelerate it even more.

**Caroline** That's awesome. So that's a little bit about the research outcomes. Now I want to pivot somewhat to how the two of you work together. I think you have a really awesome and unique volunteer-project coordinator relationship because Guy is able to use some of his expertise to help Stall Catchers do projects like the Megathon. So maybe you both can comment about how Guy has been working with you and how maybe other projects could use their their volunteers' expertise in a similar way.

**Pietro** I'll start just by, and then I'll turn it over to Guy, but I'll start by saying that Guy is what we call a "super catcher." So our community of volunteers are called "catchers" because the game is "Stall Catchers" and they're catching stalls. Our "super catchers" they're in this sort of top one percent of people in terms of their participation, time, and activity. Guy has been with the project for quite a while. He'll be able to tell you how long, but he's also been I think a real source of support and mentorship for other players in the game and just, an indispensable extension of our team. So we're absolutely grateful to Guy and also some of our other super catchers. Guy, maybe you can say better from your perspective what it's been like to have that kind of role.

**Guy** My background is kind of an interesting twist of many different careers and interests. My education is in STEM so I am an engineer in math, but my real world experience took me in through industry and had a chance to experience some marketing as well as science and technology. And then I was also, later in life, had an opportunity to go in and do some teaching at various levels. All of that coming together, gave me some unique and interesting perspectives on this game. So I was able to first and foremost, you know, offer some, some thoughts on just playing the game and game play and the technology, some of the things that we were seeing just through the user interface as a super catcher, and what was working well and what wasn't working well and what could be improved upon. I've been playing almost two years now. Early on, had provided some of that feedback to Pietro and the team. As we have been moving forward now and getting ready to scale up and try to move the game further and faster and try to accelerate the rate and the pace at which we're doing the data analysis, I said well gee I've got some marketing background and as a volunteer and would be happy to at least offer some thoughts and advice on ways that we might be able to move forward and find more volunteers that can join the join the team and increase the class of super catchers that we have, and just volunteers in general that want to play.

**Pietro** Guy I think you really exemplify this sort of untapped global resource that we have, which is that people go through their lives, they have careers, eventually, they retire and then they have all this kind of latent expertise that these, you know, different abilities and some folks really appreciate being able to continue to, you know, apply their experience and wisdom that they've acquired over the course of their life to things that continue to give back. And I think Guy that's been a theme for you is like, okay, now that I'm retired and I have some extra time, how do I give back? And I think, you know, that's really laudable. And I think there are others like you out there who might not know about citizen science and who have a lot that they could bring to citizen science and how it can impact the world in beneficial ways.

**Guy** I think that's exactly right. And I think that's a general message for all citizen science projects is, there are people out there willing to help well beyond just the playing of the game, and we do have some expertise and we'd be more than happy to offer it. And I think with Stall Catchers, it was through the forum that they had established early on in the interface that allowed for some of that communication to take place and the exchange of ideas. and then Pietro and his team just being open to the idea that there are average citizens out there who can contribute. And welcomed me in providing advice and input and thoughts. It has been a very warming to me and fulfilling.

**Pietro** I think that's a great point. I mean, for us, we realized quite early on in the project that we really didn't know what we were doing. And there really isn't a long history of online citizen science projects that one can draw from. And in some sense, if you've seen one citizen science project, you've seen one citizen science project. Each one has its own unique requirements and aspects to it. But the thing I think that's been the saving grace for this project is the community itself and I guess, our recognition that, that we, we need them. We rely on them to tell us what's working and what's not working. Thanks to Guy and a few others who have been vocal, we've been able to get some really great feedback that's helped to shape the platform and the project and the

way that we engage folks. That old saying that it takes a village and it really, it takes the whole village and we're just so grateful to have that kind of support from our community.

**Caroline** So I think this fits in really well with how Guy's been helping with the Megathon. So first Pietro, maybe you can summarize what the Megathon is, and how Guy has specifically helped you and then Guy, of course, can also add onto that.

**Pietro** The Megathon is completely unprecedented in terms of scale in a citizen science initiative, in the sense that we're aiming to have a one hour event that's synchronized in the sense that everyone who participates, and we're aiming to get 100,000 people to participate at their local libraries, will be playing Stall Catchers at the same time. We're going to have a dataset with 100,000 blood vessels that need to be annotated. We're going to collect a million annotations in that one hour. And at the end of that one hour, we're going to answer a single research question that would have taken the Cornell lab six months to a year to answer. This would be a Guinness World Record if we carry this off. Thanks to Guy who is a former Kodak executive in charge of global marketing or something pretty fancy like that, is giving us a crash course in how do you engage 100,000 people to do something like this. He's giving us a roadmap and kind of walking us through the paces. So it's just amazing when you think that Guy is one of our catchers, he heard about the game, he came, he started playing the game. Now here he is, helping us develop a marketing strategy so that we can actually reach that scale of participants and then make this huge research impact.

**Caroline** Definitely. So Guy, how would you describe your involvement so far with the Megathon specifically?

**Guy** Yeah. as Pietro has said, trying to reach to 100,000 people is an extremely large task. And just providing some focus, asking some key questions: who are the potential recruits that you're looking for and how were you trying to reach them and trying to just ask those deep dive questions about how are you reaching, what are you using, what are the methods, what are the messages that you're going to send that's going to cause these potential players to try the Stall Catchers game, try citizen science in general? That messaging is an important aspect of understanding what people value, what is important in their lives. Just like I said, I have a connection with Alzheimer's in my family, so I fall into one of our categories of retired Alzheimer's-connected people. Not that I have the disease, but I am very familiar with the disease and the impact that it has. So how do we reach people like myself who are a natural for joining Stall Catchers? It's just a matter of focus and then coming up with the specific approaches to get that message out and getting people to react.

**Caroline** Definitely. Stall Catchers is all ages. We've been describing it as an intergenerational activity. So we got retired people like Guy, we got Danish children who are playing. Pietro told me a funny story the other day where apparently they were cursing in Danish on the message boards. They removed it quickly, of course, so no one could get offended, but it's really a global worldwide activity and the Megathon will bring everyone together into an event where you can actually compete against each other day of. We're hoping to have different libraries competing on the

leaderboards. I think it's gonna be really awesome and it wouldn't succeed without all the different pieces: without Guy giving us advice about how to get the message out, without Pietro making sure everything works on the computer side so it doesn't crash. I mean we have lots of components and lots of great people who really believe in this. So I know I'm really grateful from SciStarter side, liaising with the libraries and getting them involved, that we have Guy's marketing knowledge and Pietro's technical knowledge to make the libraries comfortable and anyone else who wants to participate. So if you're listening to this podcast and you want to play Stall Catchers and you want to organize a Megathon event, just let us know and we'll help you. We're here for you. I think that's enough on the Megathon side of things. Maybe we can end with where we see Stall Catchers going and then we also have some concluding questions about what you want to see on the podcast. So before we get to that, Pietro, how do you see Stall Catchers is progressing in the next few years?

**Pietro** We're at a point now, it's a really interesting time for Stall Catchers because the Cornell lab has seen the data coming out of Stall Catchers and has seen the validation studies and compared it to their own results. And they trust Stall Catchers to provide the data quality level that they need to do their research. So they're giving us data sets now that they have not themselves looked at and they'll take the results from Stall Catchers as the actual research result. They'll do their own final pass on that to make sure, but the good news is that this pileup of data that they have, because of how long it takes to analyze the data, can now be funneled into Stall Catchers. So, so they already have a backlog of several data sets that we'll be pushing into Stall Catchers over the next months. One of these will be for the Megathon itself. And these are all related very directly to identifying a treatment target for the disease that alleviates these stalled capillaries. It's very exciting to see that there's this very direct connection between the work that's being done by the Stall Catchers volunteers and the research that's coming out. There's another very exciting development which is that we've been in contact with other disease researchers who have heard about Stall Catchers and asked us, we have similar kinds of data, is there some way that we could put our own data into Stall Catchers and get it analyzed? So one disease that would fit the Stall Catchers platform very well is sickle cell anemia, which is actually compared to many diseases kind of underrepresented and understudied. So to be able to help advance sickle cell anemia research, of course, would be very exciting. And the task's a little different in the sense that in Stall Catchers you're trying to say, is blood flowing through this vessel or not? In sickle cell anemia, you're talking more about the shape. Is this a twisty vessel or a straight vessel? So it, you know, if someone gets tired of doing one kind of analysis, they can quickly potentially switch over and do another kind. So I think we envision adding other disease types to the Stall Catchers platform in the future or we might have a side by side platform. But there's plenty of Alzheimer's disease data and even if we do identify a promising treatment for Alzheimer's using Stall Catchers, a treatment, you know, always has a side effect profile and an effectiveness profile if you will. And so with any kind of a pharmaceutical drug, there's always the goal of improving it, reducing the side effects, improving the efficacy. So I don't think Stall Catchers will be going away in the foreseeable future at all, and as we progress and as we're able to analyze data faster and faster with a growing community of catchers, were going to be accelerating Alzheimer's disease research and hopefully other disease research as well.

**Caroline** Fantastic. So do either of you have any other final thoughts, anything we didn't discuss yet that you want to say about Stall Catchers or the Megathon?

**Pietro** I don't know, Guy. What do you think?

**Guy** From my perspective, we've covered most of it here and I'm excited, the Megathon hopefully it's going to drive up some of our numbers in terms of the number of players that we have which will help to accelerate the analysis of data. I mean obviously we're, we're looking forward to the Megathon event itself, but also hopefully can see tens of thousands of these people continuing to play into the future.

**Pietro** That's really well said. And we obviously keep an eye on our trends and we know that the more folks who have signed up to play Stall Catchers, the more people who end up playing on a daily basis. And like I said today we're analyzing the data about three to four times faster than the lab. We'd like to see that get up to at least 10 times faster than the lab so that we're actually answering research questions in a few weeks. That would really speed up the pace of development. There's a larger goal here too, which is that Stall Catchers is a citizen science project and it's not the only one out there. There are lots of great projects out there that are also making beneficial impact on the world. And Stall Catchers is a great and easy way to get involved in citizen science in the first place and then once you try it out, it's easy to branch out and try out some of these other projects. So I hope folks will consider all the options that are out there.

**Caroline** Definitely. That leads me to my next question, which is more community focused and for our next episodes of the podcast. So for both of you, what is a topic that you think we should focus on in a future episode? Maybe you could also give some perspective on another project that's not Stall Catchers that you're excited about and you want people to know about. And maybe if you know of any guests that you think we should invite and have on the show, just feel free to shout them out.

**Pietro** So, I think everyone has a different kind of type of activity that's engaging for them. You know, so there are folks who like to do Sudoku every Sunday morning and who like those kinds of puzzle games and other people like word games. And I think the same thing applies to citizen science. So I like these geometric games a lot. And so I've always really enjoyed a game called Phylo p-h-y-l-o where you actually see these genetic sequences as these colored squares. And you can see, this is the gene for a mouse, this is the gene for a monkey, this is the gene for a human. And you're trying to kind of just slide those back and forth until you get the best alignment and you have these scores that go up and down to show you how good the alignment is. And by doing this you're actually helping to figure out which genes might be relevant to certain diseases or not. And as you're playing it, you know, you're actually helping to do something good in the world. That's one that always comes to mind for me.

**Guy** I would encourage people just as Pietro said, to also explore. And I think that that would be an interesting topic is just to discuss the variety of citizen science projects that are available. I've looked at many different projects as well. Eterna is one that I've enjoyed. It's a more difficult task. It's solving puzzles, but again, if you're into solving puzzles, the challenge of that can be a very interesting. EyeWire is another one which has some unique skills that are required to do that particular project. There's such a wide variety. Many of the Zooniverse projects, the animal conservation pieces that are out there, looking at photos and identifying animals. That can be something that everybody can do and I'll say a little bit easier, whereas Eterna and the EyeWire projects are a little more difficult. You get all the way over to the Mark2Cure kinds of things where, you know, it's reading comprehension and biomedical research. Not everybody's going to be able to do that. But if you can, certainly your skills and your background could be utilized in that kind of a piece. Just look out there, there are many, many, many different citizen science projects available and exploring those can be just as much fun and interesting to look and see what's out there.

**Pietro** I really like those examples and it reminds me that I think a lot of those are online examples. There are also activities that take you away from your laptop and out into the great outdoors. So another project I really enjoy is iNaturalist where I can go take pictures of any wildlife that I see. I might see a bug that I've never seen before and I can snap a picture on iNaturalist and then some bug expert will identify and figure out what kind of bug that is. And then it also helps researchers figure out which bugs are thriving in which areas. You know, different animals can be sentinels for environmental health, There's a lot of what we call participatory sensing projects out there where you go out and you either make observations yourself or you use a device to capture a picture or you might even use an air quality measurement device. Some of these projects will actually equip you with the tools that you need to go out and take scientific measurements. There's a whole spectrum of stuff for anyone who, who's enthusiastic about doing science.

**Caroline** Definitely, I know one woman contacted me the other day and said, I don't have internet in my house, can I still do citizen science? And I said yes! One library in particular, so the Maricopa Library district in Arizona, they have kits you can actually check out and they're going to be activating those for Citizen Science Day especially. For everyone listening, I hope that you get involved with Citizen Science Day on April 13th as well as in the Megathon on that day.

**Pietro** You can learn more about the Megathon at [Megathon.us](http://Megathon.us). You can play Stall Catchers at [StallCatchers.com](http://StallCatchers.com). Yeah, we'd obviously just be thrilled to have more folks getting involved in this.

**Caroline** Thank you so much to both of you for chatting with us today.

**Pietro** Thanks so much for having us.

**Caroline** As Pietro mentioned in our conversation, the Stall Catchers Megathon will be held on April 13th as the featured event of Citizen Science Day, which is presented by SciStarter, the

Citizen Science Association, with support from the National Network of Libraries of Medicine-Pacific Southwest Region and Arizona State's School for the Future of Innovation in Society. You can find out more about how to get involved in the Megathon at [www.Megathon.us](http://www.Megathon.us). For more on Citizen Science Day, and how to find or create events happening in your area, and access resources created for you, please visit [scistarter.org/events/citizen-science-day](http://scistarter.org/events/citizen-science-day).

**Justin** Citizen Science is hosted and produced by Caroline Nickerson and Justin Schell, in conjunction with SciStarter. Special thanks to Daniel Arbuckle, SciStarter's web developer. You can find a transcript of this episode, as well as more information about the podcast at [SciStarter.org/podcast](http://SciStarter.org/podcast). Our podcast should be available in all the major podcatchers (iTunes, Google Play, Stitcher, Overcast, and others). If you can't find it, drop us a line at [info@scistarter.com](mailto:info@scistarter.com) and we'll get you set up. In the meantime, we'll have a new episode in a couple weeks! Thanks for listening and we'll talk to you soon.