

Oral-History:Sara Kiesler

About Sara Kiesler

Sara Kiesler was born and raised in Washington, D.C. She first attended Simmons College in Boston where she studied psychology, specializing in social psychology. She later completed an M.A. in Psychology at Stanford in 1963 and Ph.D. in Psychology at Ohio State University in 1965. Following graduation, she came to Carnegie Mellon where she worked in the Computer Science Department and in the Social Sciences Department until 1998 when she moved to California to work at Interval Research Company. After working at Interval for a few years, she returned to Carnegie Mellon in the School of Computer Science and became involved in her first robotics project-Nursebot. Since then she has worked on several other robotics projects, including Ro-Man and the Human-Robot Interaction Conference. Currently, she is the Hillman Professor of Computer Science and Human Computer Interaction in the Human Computer Interaction Institute at Carnegie Mellon.

Her research interests include the application of behavioral and social science research methods and theory on group collaboration, and human-technology interaction. She has received several awards and honors, including becoming a fellow of the American Psychological Association, and in 2002, election into the CHI Academy. Her awards include the Lifetime Achievement Award in 2009, the Allan Newell Award for Research Excellence in 2013, and the International Communication Association Williams Prize in 2015.

In this interview, Kiesler discusses her career in robotics, focusing on anthropomorphic robots, human-robot interaction, and cognitive and social design. Describing her involvement with projects such as Pearl, she goes on to describe her involvement in organizing and developing the HRI conferences. She reflects on her transition from social psychology and computer interaction to human-robot interaction, and comments on its relationship to human psychology and its future development.

About the Interview

SARA KIESLER: An Interview Conducted by Selma Sabanovic with Peter Asaro, IEEE History Center, 23 November 2010.

Interview #728 for Indiana University and IEEE History Center, The Institute of Electrical and Electronics Engineers Inc.

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It is recommended that this oral history be cited as follows:

Sara Kiesler, an oral history conducted in 2010 by Selma Sabanovic with Peter Asaro, Indiana University, Bloomington Indiana, for Indiana University and the IEEE.

Interview

INTERVIEWEE: Sara Kiesler

INTERVIEWER: Selma Sabanovic with Peter Asaro

DATE: 23 November 2010

PLACE: Pittsburgh, PA

Early Life and Education

Selma Sabanovic:

So if we could start with you introducing yourself, and telling us about where you were born and went to school.

Sara Kiesler:

Oh, my goodness. Okay. All right. My name is Sara Kiesler. I was born in Washington, D.C., and I grew up there. My dad was a government official in the Securities and Exchange Commission, and my mother was a biologist. And I went to college – Simmons College, in Boston – and then I went to Stanford University, and when my advisor left, I left, too, and I went off and got married, and moved to Ohio State University, and that's where I finished up. I actually did my dissertation at Yale University, but my degree's from Ohio State.

Selma Sabanovic:

What did you study at those places?

Sara Kiesler:

I was in a psychology program, specializing in social psychology.

Selma Sabanovic:

And who was your advisor?

Sara Kiesler:

And my advi – my first advisor was Leon Festinger, and after that, Timothy Brock. They are both social psychologists, very well-known experimentalists. So my background was in experimental social psychology, and I didn't have any field experience outside of the lab until after I graduated.

Selma Sabanovic:

<laughs> So what did you work on for your thesis?

Sara Kiesler:

Oh, my thesis. My thesis was a study of gratitude, but... I did a variety of studies on attitudes and on social relations. I very quickly got interested in groups and teams and group work, so after a while I specialized in group interactions. And when I came to Carnegie Mellon, there was a government crackdown on, quote, "social science research," which periodically happens. It looks like it might be happening again pretty soon. And I decided to look into how people were using computers to communicate. It occurred to me that there were a lot of people out there saying that great things were happening, and there was a lot of hyperbola about better decision-making and better organizations and better groups, and so on, but I wasn't sure, so because – my actual funding at the time was for an engineering project on consumer participation in standard setting, but the money was held up, and so I was kind of fooling around, and I decided to run some experiments on people using e-mail, essentially – the equivalent of e-mail, or chat – to communicate group decisions. And the first subjects that we ran couldn't come to a joint decision. They argued, they – I just couldn't figure out what was going on. And so – and – but when we put the same people, with a different decision altogether, in the same room, they were fine. So I couldn't figure out what was going on, and I came over to the Computer Science Department at the time here, and they said, "Oh, that's flaming. That happens all the time online." And so that was the beginning of my studies of technology and how it can change human behavior and relationships.

Interval Research Company

Selma Sabanovic:

When was that?

Sara Kiesler:

That was back in the eighties. So I did that research for a while, and did a lot of work on group interaction using computers, and a lot of other things related. At the time, I was working over in the Social Sciences Department at Carnegie Mellon, and I just got more and more interested in new computer-based technologies, so I decided that maybe I wanted to change careers and work a more applied setting, and making things. So I moved to California in 1998, just at the height of the dot-com era, and I worked at a company called Interval Research Company, and it was there that I saw my first kind of homemade robot, and – but I wasn't involved with that project at all. And I did a lot of work on consumer Internet services and... well, all kinds of things – all kinds of new, fun technologies. But after about a year, I knew that – I could see the beginning of the end of <laughs> the dot-com. I could see this company was struggling, and they just weren't going to make it. There was a lot of tension around this company. So I want to interrupt right now and say I don't want this on.

Selma Sabanovic:

Okay. Yeah. Just let us – any of the part about them being in trouble?

Sara Kiesler:

Yeah.

Selma Sabanovic:

Okay.

Sara Kiesler:

I mean, I –

Selma Sabanovic:

That's fine. The microphone got flipped upside down there.

Sara Kiesler:

Oh, okay... All right, so where were we? We were – I was at Interval, and I was engaged in a lot of very interesting research, but I could tell that the crash was going to come. It was pretty obvious that companies were making claims they couldn't – we called it "vaporware." They just couldn't back it up. And there were all kinds of new online services, and the world wasn't ready yet. Not enough of the population was willing to use a credit card online. It's amazing to think about it now, but... so I decided to look for another job, and at that point, I considered several things, and Carnegie Mellon hired me back, but in the Computer Science School.

CMU Robotics

Sara Kiesler:

So I came back here, and... I worked... let's see. I'm trying to remember how I got involved with the first robotics project. You know, I can't remember – oh, yes. Okay. I remember now. When I came back, Sebastian Thrun was just starting the Nursebot Project, and he was a very broad kind of inclusive person, and he was calling on nurses and social scientists and all sorts of people to help him build a robot that would help elders in their homes. So I joined that project and helped write a proposal that was ultimately funded under the so-called ITR Program of the National Science Foundation. And it was a five-year interdisciplinary project to develop Nursebot, which was a robot that would help the elderly. And to me, it was fascinating to think that there would be some robot in the house, doing things. I don't think I bought the idea of a robot really being helpful, but the idea of interacting with a robot seemed pretty interesting. And Pearl was very anthropomorphic. It was – you know, it had – smiled, it had eyes, it had... <laughs> it had a personality. And I had a new graduate stu – or a new undergraduate at the time, who was very interested in it, as well.

Selma Sabanovic:

Who was that?

Sara Kiesler:

Her name was Jennifer Goetz. G-O – Goetz. Goetz. Yeah.

Selma Sabanovic:

It's G-O-E-T-Z, right?

Sara Kiesler:

G-O-E-T-Z. Yeah. Jen Goetz. Yeah. And Jen – I'm trying to remember if she was an undergraduate or a master's student at the time. I think she was an undergraduate, but I cannot remember. So after – we worked together for about a year. That was right around 9/11. Yeah, I remember that. She and I worked on a paper that very day. And she went off to Berkeley, to their Ph.D. program in psychology, and now she's graduated, working at Middlebury College. So... anyway, Jen and I didn't have a robot. Well, we had sort of – I mean, yeah. Nursebot was being developed, so we didn't have much access to Nursebot, but we tried some early experiments in having Nursebot encourage elderly people to exercise. And it was just amazing to me that people just, "Oh, okay, well, I'll talk with a robot," and they just went ahead and did it. And because we wanted more robots to work with, we bought these play robots – toy, Lego-type robots – and we used a Wizard-of-Oz technique, which is pretending that the robot talk: you know, stand in another room, put a microphone on the

robot, and have the robot talk. And I still have some interesting videos I can show you of people's responses to those robots. They seemed to assume that they were just like people. And I think now – looking back on it, we just thought, "Well, this almost seems dishonest. These people are imputing something to these silly robots." I mean, there was a robot that looked like a car, and I still remember a student getting down on the ground and looking at this car, and saying, "How fast do you go?" <laughs>

Selma Sabanovic:

Was the car actually speaking before they did that?

Sara Kiesler:

Yes. The car had come in and say, "Hello, I'm Bob." <laughs> And so it was the human voice that cued off people to just have the expectation that everything else would be human. So I got very interested in the subject of anthropomorphism, of robot personality, of people's interactions with a robot – you know, how much they'd put up with a robot – and I had various students that had all kinds of conjectures: "Well, should a robot be bossy, or should it be – should it take advice or give advice?" And, "I mean, do people want to be talked down to by a robot that knows more than you do?" And I had a postdoc come who was very interested in the kinds of knowledge that we impute to robots, and, for example – her name is Venus Lee, and she's now at NUS, a university in Singapore, and she had the idea that if people thought a robot was built in China, then it would know, of course, all about the Great Wall and about Beijing and other things, and if it were built in New York, then people would assume the robot knew all about the Empire State Building and even less-well-known venues. So... yeah, so that got me started, and our experiments went very well. Sometimes you'll go into a research area, and it's a struggle to get something. I mean, it just seems like – well, I've been there many times, but this was comparatively easy. And it was interesting. At first, the reception in the robotics community was – well, this has nothing to do with robotics. <laughs>

Selma Sabanovic:

Where did you try to publish it first? Where was this?

Sara Kiesler:

We sent our first – I'm trying to think. Where did we sent our first...? All I know – I'm trying to think whether it was the CHI, SIGCHI Conference or whether it was some robotics conference, but all I remember, it was turned down, and people thought it was ridiculous. But I was convinced we had something there, so we sent an improved – oh, well, yeah. I should say the early studies also had problems with measurement. We didn't know how to ask people questions. For example, we thought, "Well, we'll ask them about a robot doing such and such a thing, and then we'll ask them about a human doing such and such a thing, and we'll compare their answers." But what we realized was that a robot, for example, writing, and a human writing, are two completely different things, and people's standards are based on each species, if you will. For example, if you say, "My dog communicates she's hungry," and, "My child communicates she's hungry," people don't see this as the same message, because their basis of comparison with the child is with children, and with dogs, it's with dogs. So robots seem to be their own category, and you can't use the usual kind of control groups, and so on, that I had assumed we could use. So we did struggle a little bit, even with how to do convincing, credible experiments; how to make them come across so people felt – designers of robots and people who worked with robots would think, "This is useful. This is something I needed to know."

Ro-Man Conference

Sara Kiesler:

So the first real success was called – it's called The Ro-Man conference and I can't – it was started originally – originally, it was a Japanese conference on robotics. I forget what Ro-Man means; something about –

Selma Sabanovic:

It's like "human-robot."

Sara Kiesler:

Yeah. It's "human-robot" – robots interacting with humans. And so the first paper was presented there. Now, this was not a big-deal conference. It wasn't even archival, but it was the first time we'd gotten something accepted, and so we went there, and I remember we got a Best Paper award. <laughs> And I was just shocked. They loved it. Yeah. So... yeah. So that – you know, when you have a success like that, where all these people that have known – been in a field for 25 years, they give you – I mean, it could've been a blue ribbon, I don't know, but it was encouraging, and we felt like, "Well, we're on the right track."

Selma Sabanovic:

What was the paper on?

Sara Kiesler:

That study had to do with – it was one that Jen and I did together, having to do with matching a robot's personality to the type of task the robot is supposed to do. So a lot of people at the time were talking a lot about emotional robots that would be social and fun, and people would love them, and it seemed to me that if you go to the doctor with a serious illness, you don't want the doctor to be happy and fun and... <laughs> making jokes. You know, you want the doctor's demeanor to be matched to your condition, and I thought the robot's demeanor also should be matched to the kind of task it was doing with you. So we ran a very cool experiment in which the robot was either training you to do yoga exercises, and some of them pretty difficult, or training you to do a jelly bean task, where you're trying to make new recipes out of different flavors of jelly beans. And so one task was more serious than the other, and we varied the robot's personality. In one case it told jokes, and in the other case it professed sympathy for all the effort you were taking, and the difficulty of holding these positions, and so on. And it worked. We got very strong results that they liked the happy, funny robot when they were doing the jelly bean task, and they liked the serious, caring robot when they were doing the yoga task. So that was that study. And we've done other studies along those lines after that, having to do with making a robot adaptive to a person's context and life situation. Yeah. So...

Other Robot Projects

Selma Sabanovic:

So you had the first kind of big success at Ro-Man, and how did that inspire you to continue, or what other projects –?

Sara Kiesler:

Well, we still – we had – so by that time, Sebastian was moving to Stanford. I remember he tried to talk me into going, as well. And... we should not put this in the video, either.

Selma Sabanovic:

Okay.

Sara Kiesler:

<laughs> Yeah. So that project was just about ending, and they were changing personnel on it, so I did take Pearl, so I still have Pearl in our kitchen lab, which I can show you, if you'd like to see it. And we continued to do studies with Pearl, and we did a lot of fun projects with Pearl, and – but at the time, I got pretty interested in how robots would be designed physically – you know, what their form factor would be, and should they be big or small? I mean, big didn't seem to go very well in people's homes, and too small would mean they'd be bending over. So I paired up with Jodi Forlizzi, and we submitted another grant proposal to do cognitive and social design of robots, and we got that award, too, and that was another big, big project – multimillion-dollar project. And so then we were able to bring in a whole bunch of students, and design students and behavioral students and robotics students, and they all worked together. We met as a big lab, and we worked on just a variety of subjects. Aaron Powers, we brought in, and he had been in my Human Factors class. We hired him as lab manager. And so we did just a whole run of very successful studies, I think. Not all – at that point, because Jodi was interested in going to homes and studying robots in homes, we went out in the field, and her students went out in the field. So we started expanding our methods and thinking a lot more broadly. And so what else?

Selma Sabanovic:

When you were designing Pearl, did you have input in the way Pearl looked?

Sara Kiesler:

Okay, yes. One of our early projects was to redesign Pearl's head. We – the early Pearl was based on an earlier robot called Flo, and it had a LED mouth that was – it was – at the time, it just didn't work properly. It didn't have expressions. You couldn't smile. And so we decided to design a head, and I wanted a head that was modular, that you could change the lips from gray to pink, if it were female. You could make it – the eyes big or small. You could change the eyebrows, and make – we also wanted the form of the head to change. I wanted to know – there's old research showing that baby – people like baby faces, so we made a round head, and then we added chin or height to give more, quote, "intelligence" to the robot. And if you added the chin and the head, then it started looking like a monkey, or an ape, so... yeah, we did that. That was a big project, to redesign Pearl's head. And we did other – lots of other studies on interactions, on how robots should give advice, and my student Cristen Torrey did her dissertation on that work. So we had several dissertations. Carl DiSalvo, who's now at Georgia Tech, and Cristen is now at University of Michigan in a postdoc program. Aaron went on to iRobot, and he's now changing jobs, but I can't remember the – he's coming to a – going to a new company. And I know I'm forgetting someone else. <laughs>

Selma Sabanovic:

There was Bilge?

Sara Kiesler:

Hmm? Bilge. Bilge! Yeah, Bilge was wonderful. He went – yeah, he also graduated. His work was on gaze, and modeling human gaze, and then making robots that could change their gaze like people do. And we did all sorts of fun things. For example, when people are lying, they'll often – like if you ask them, "Do you like this object or that object better?", and a liar is trying to dissuade you, they'll quickly look at the one that they really like first, and we got a robot to do that, too, and the same things happened, in terms of giving people cues about lying. So yeah, that was a lot of fun. Another thing that Bilge did was to go into hospitals and look at hospital robots. And I forgot to say, also, that this big project we had was also a collaboration with Stanford University, and so my former student, Pamela Hinds, got involved in robots. She was also taken in by the whole thing, and so she now has her own line of research on that.

HRI Conference

Sara Kiesler:

But at the time, we collaborated on a bunch of things, and we created a special issue of – what was it? – the HCI Journal in Human-Robot Interaction. Yeah.

Selma Sabanovic:

And was that about the first time that somebody had kind of put together a special issue on HRI, or some...?

Sara Kiesler:

You know, I think it was – it was certainly the first time that sort of what I'd call scientific studies were put together with empirical data, and so on. There were other social robotic pieces, but I think that might've been the first time that a whole bunch of people did systematic empirical work. Not all of it was quantitative. Some was qualitative, but systematic studies of human-robot interaction. So we meant it as a kind of an introduction to a new field, and we thought, "Well, if we're going to do this, then it needs to be an area of research. It needs more people, and we need to encourage more people to be interested and involved in it." And it worked, so... but some of this is muddled in my head, you know, the different histories of – <laughs> I can't remember, for example, who decided we needed to have a Human-Robot Interaction Conference. I know I was at the first one, but I can't remember how that happened. I think... I mean, I didn't run it, that's for sure, but I know that at some point, a whole bunch of us got together and said, "Wait a minute. We need have a really good conference, and not just a kind of... essays and things, but some real research, serious re – you know, good research."

Selma Sabanovic:

Who was in that initial group of people?

Sara Kiesler:

Well, Alan Schultz had a lot to do with the construction of it. I mean he was very much into that, and he and Greg Trafton, who is – I mean they were doing interdisciplinary work at the time. So it was the various groups around that were doing interdisciplinary research and were interested in being involved, and Cynthia Breazeal. I mean I think anybody who is anybody now was – and they were all involved from the beginning, I think, except you guys that were the students, kind of came in after that.

Selma Sabanovic:

So in terms of organizing the first conferences you were involved in other – <laughs>

Sara Kiesler:

Oh, yeah.

Selma Sabanovic:

How did that go?

Sara Kiesler:

I was on the program committee because I was very concerned. I mean we didn't know. Would we even get any papers? Would people want to come? There are plenty of conferences around. I mean we didn't know if it would work, but it seemed to generate some interest and excitement. I mean we had this – another thing. Pam

and I applied for money for a graduate student workshop or conference and we did that out in Carmel, and that was amazingly fun and we got Scaz out there and a professor from Korea and Pam and I and Jodi.

Selma Sabanovic:

Jodi was there. <laughs>

Sara Kiesler:

Yeah, and a whole bunch of students, and I'm really glad we did that. Most people do workshops for the mookie mooks, you know, the high up people, but we really wanted to do something for graduate students that would build the field and make sure that there was a cohort that knew each other that when we were all gone there would be something left, and I think that worked kind of well, yeah.

Selma Sabanovic:

Yeah, I was there, so among all of us we were very impressed to be there and it was great. <laughs> Thank you. <laughs>

Sara Kiesler:

Yeah. The only issue was that there were – I mean I was amazed. There were three times as many people applying to go there as we could possibly accommodate, so it was difficult because people who weren't chosen naturally didn't have that initial start with all the contacts and the help with each other.

Selma Sabanovic:

So how has the conference been developing from the first one? Who were the kinds of people who decided to come to that one, and did you get a lot of submissions?

Sara Kiesler:

Yes, we did – I mean I think the selection rate was only – it started maybe 35 percent, something like that, and then it went down and down and down. I think last year it was only 24 percent or something like that, which meant that we had – a standard rate for a very good conference is 24 percent selection or less, and so we must've had maybe 200 or 250 submissions. Alan was very strong on having a one-track conference, and his idea was if you're going to have an interdisciplinary conference then everybody's got to be in the same room because if you have a design track, a behavioral track and a computer science track then they'll all separate and go to different rooms and there won't be any interaction. So we decided to have a one-track conference, and that has meant that we've had to limit the number of papers and limit the conference itself. So it was at the beginning pretty informal. I mean the people who were interested in volunteering they volunteered. There were no elections. There was nobody that said, "Who's boss?" It's mumble, mumble, mumble. "Okay, this is- you're now program committee," and it was a lot based on volunteers who decided, "Yeah, I want to run things." <laughs> So Alan was very interested in running it and getting it started because he was with the navy lab and he had some resources to get it going. And Julie Adams and Holly Yanco and various people volunteered to try to get sponsors and, well, all the things you need to do. So the last conference, you know, you have this, okay. It's beginning. It's new. We're all headed for the new future, and then you start to hear complaints. "How come she's on the program committee and I'm not on the program committee?" You know, "Who appointed you to be boss?" Well, we started to hear rumblings at the last conference and so we had a meeting, invited everybody who was on the so-called program committee and conference committee, and it was a huge group because people came who weren't invited, and we decided, well, we have to now become a little more bureaucratic. We have to have some rules. We have to have standards. We have to be on the same page with regard to what country we're meeting in. Is this really international or is it national? And there was a lot of

concern about right in the middle of a recession having an international conference. It's still an issue. You know, the next conference is in Switzerland. I don't know who's going to be able to afford to go there. But we decided, well, if we want to be international we have to meet internationally, and the Europeans were very insistent on that. So the conference started as an American conference but pretty quickly if you want to be in robotics you've got to be international because Japanese and Europeans are so active in robotics and in many ways ahead of us, so we can't be too nationalistic. So there has been a group that's been working online all year trying to systematize the conference.

HRI Journal

Sara Kiesler:

And we also decided to have a journal, and we've been working all year off and on, you know, keep on plugging away at the difficulties of starting a journal, and we don't want it to be a traditional journal, so there was a lot of discussion about that.

Selma Sabanovic:

How is it going to be different?

Sara Kiesler:

Well, it will be free, for one thing, and it'll be online. And we're going to try to experiment with new kinds of articles; for example, short articles, tutorials, pieces for children. I mean if it's online it can be anything, and it doesn't have to all look like a book and a journal. So people have different opinions but we'll have different sections and they'll do different things, but we're going to try to experiment with content so that – you know, as long as the writing is good and the presentations are good it will be a little bit different. The other thing we're going to do is have additional material available such as videos. In fact, this video could be linked to it and then you'd have an issue that dealt with maybe HRI's history and then you might have ea link to videos and interviews with the people who were involved, so yeah. Or data sets are another one, so people who want to do data mining and want large data sets could access data sets that are kept at the journal website.

Selma Sabanovic:

Right, and as far as I know there was some desire to have, for example, videos and that kind of thing online so that more people could do the research, but that didn't go anywhere. <laughs>

Sara Kiesler:

Yeah. But the idea now is to allow for all kinds of ideas for special issue and for – yeah, so – are much more open to the contributions of others. For example, after some roboticists saw our SnackBot robot, "Wow! My robot doesn't have to look like this idiotic piece of machinery. It can actually have a head. It can look, you know, fun, and- and people love it. They're gonna give it a name," and so they brought in designers and design thinking to try to make a robot just look like it fits in this very world and not in some other world. <laughs> I think also the kinds of work that Bilge did, for example, on modeling human gaze has – that technique of watching humans very closely and then modeling that I think has opened up roboticists to think about how you could create human models for robots. Another development is Hiroshi Ishiguro in Japan has been a huge fan of behavioral science and its contribution. I mean he's a leading person in human/robot interaction. He's created these androids that interact, and from early when he first started building these he reached out to behavioral people like Karl MacDorman and others, Bilge. Bilge went over and worked there. And furthermore he saw that a lot of that help came from the U.S., and it linked him with another culture and that our science was better. Their robotics was better; our science was better. So by putting us together he could get his papers

published in scientific journals, and we had the value of having Robovie as – one of the Robovies came over to University of Washington, Peter Khan's lab, and Kanda went over there. So this greater interaction with people in other countries has really helped as they've seen the value of these different perspectives. But, you know, there are several levels of interdisciplinary work. There's one level that's just you make a proposal to a granting agency and you mention three disciplines and it all looks wonderful, and there's a theme, a title, and then they go their separate ways after they get the money. And then the next level is, well, they have some sort of cooperation. Maybe they send each other students. They have maybe a kick-off meeting and maybe they even build a robot, but still the work is not really integrated. And then there's the third level, which is truly integrated, interdisciplinary work, and that's still pretty darn hard, I would say. Jodi and I have a project with a roboticist over at Intel, and this robot is called HERB, and HERB has arms that grasp. And it's been a struggle to figure out how this robot should hand you things. So when the robot was first developed it picked up, say, a bottle of water and stuck it in your face because it didn't know that you're not supposed to hand things that way. And so the question now is how do you model the way it should be given that the robot is not going to be able to act just like a person because handing over an object is really – there are really two people there. When I hand you something I wait and see if you're ready to take it, and you give me a signal by maybe looking at me, and then I adjust what I'm doing to you. So this is a two-way street there. That's very, very hard to do with a robot because how does a robot really know what your intent is, and so it's still very hard to collaborate and to try to help advance robotics and our understanding of what it should be. It's still a very hard thing, and in part it's because of constraints of the hardware, the software, and also of our ability to model humans at a very detailed level. So it's one thing to say, "Well, people show their intent and they look you in the eye, but exactly when do they do this because the robot doesn't know generalities. It has to know exactly on what second is it supposed to try to make eye contact, and at what second does it move its arm forward, and when does it actually release? What are the exact cues that it needs? So it's extremely hard to try to integrate the information at the level of human cues and robotic movements, so that's a hard problem. And so I feel that we still struggle to integrate our work.

Collaborations

Selma Sabanovic:

And so who have been your collaborators across the years other than Sebastian, particularly from the robotics side?

Sara Kiesler:

From the robotics side? Well, I've collaborated a little bit with [Reid Simmons](#), with Sidd Srinivasa, with his robot HERB, with Paul Rybski who's working on our SnackBot project, and with – let's see, on specific robots. Let's see. Who else? I know I'm forgetting somebody –

Selma Sabanovic:

It's okay. <laughs>

Sara Kiesler:

–who's going to be upset. <laughs>

Psychology and Computer Interaction Influences

Q2:

What were some of the key theoretical concepts that you brought from social psychology and computer interaction into the field of human/robot –

Sara Kiesler:

Well, I think I was the first person, and this could be disputed, but the first thing I wanted to do is bring in this idea of mental models, of people having a mental model of what a robot is and what a robot's doing. So I had done some other work on mental models and expectations, and so that was one of the concepts. Another one was this idea of common ground, and I mean that just spread like wildfire. In fact, that was the conceptual theme of a paper I did for another Ro-Man conference. Yeah, the idea that there's give and take between the robot and the human, and they have to reach common ground and they have to adjust each other's behavior to this common ground. And another one – well, there was – my student, Minh Le, has been working in behavioral decision theory and behavioral economics and biases in decision making, and I've sent all of my students over to work with George Loewenstein, who's a very famous behavioral decision theorist, and they brought back ideas from there to use in our research. And so Minh definitely took it to heart, and she will have a paper I think at the CHI Conference now on using behavioral economics in design, and now I have a new graduate student that also has that interest, and she's very interested in having behavioral economics affect robotics, robotic design. So I think my work is different from many others, I guess, because I usually do use theoretical concepts whether they're from social psych or from some other field because I need a theoretical framework to know how to go forward. I'm a pretty abstract thinker, I guess, and I need that kind of framing to give people an idea of what the heck I'm trying to do. It's not just for this robot, this time, this particular setting we want the robot to do "X," but why do we want all this? And there are some principles, I think, that need to motivate human/robot interaction. Yeah, so I mean we've used all kinds of things, ideas about stereotyping. When we talk about anthropomorphism, you know, why is it that people like Pearl with a baby face? Well, it has to do with people's automated stereotypes that they just bring to mind. They can't help it. Or why is it that they expect a Pearl with red lips and a female voice to know more about dating than Pearl with a male voice and gray lips? <laughs> So we've used a lot of concepts from psychology and social psychology and from communication theory.

Selma Sabanovic:

And do you think that learning about human robot interaction has given you a different understanding also of human psychology?

Sara Kiesler:

Well, I became extremely interested in anthropomorphism because of what I saw people doing with the robots that were – well, they were kind of "Wizard of Oz," but some of them were very little. So as a result of that I became interested in how people anthropomorphized animals, and in fact I have a study published in a journal called Anthrozoos, which came about as a result of just this wondering. Where is this coming from and what influences that? And we even ran a study where we gave beta fish to people as pets and looked at the development of their attachment over time and their anthropomorphism, and that was an experiment in which half the people were given a pet of their very own and the other half were given a beta fish just to take care of it temporarily until we could get theirs, supposedly. And we were looking for how the active ownership of something, of an animal, of a pet or any object, for that matter, changes people's reactions, their anthropomorphism and their attachment. And we did another project called the Pet Rock Project in which we gave people a rock and had them paint it anything they wanted. And then we looked at their attachment to it, their willingness to sell it, their price, <laughs> and also did they attach their own personality characteristics to the rock, which they did. And that study was published in a consumer research journal. So as a result of this it sometimes sparks other things. I tend to be not too constrained by my own field, and so if I do something that's fun and seems like it's worth publishing somewhere <laughs> I do go off and do it.

Selma Sabanovic:

How is it being a social psychologist in a computer science department?

Sara Kiesler:

Well, I don't think anybody knows I'm a – I just got elected to be an ACM fellow, and I'm not sure – possibly the committee on it. They must've looked at my background. But it wasn't because of my work as a social psychologist. That's past. No. It's for contributions in the broader field of information and technology. No, I can't say that I've made any contributions to computer science, per se. <laughs>

Future of HRI

Selma Sabanovic:

And where do you see the field of HRI as going?

Sara Kiesler:

I think it's at a crossroads. First of all, it turns out that it's really, really hard to build economical robots that make sense. I think iRobot has done an incredible job of selling vacuums that people will actually buy, but there aren't too many other commercial robots around that are – I mean there's of course industrial robots, but we don't have a NurseBot, and we're not going to have one for a long time. So there's a real issue also with whether you need an embodied robot to do a lot of things. There are many devices that do lots of stuff. Like, well, there was an idea that you should have a robot on your countertop that would remind you how to cook or how to exercise or to cut your eating, but why do you need a robot? Why can't that just be your iPhone that pops up <laughs> and reminds you? So it's not clear to me whether there will be an HRI. It might be that we have to think about it more globally. And the funny thing is that I believe the CHI Conference may have gotten more submissions in HRI than the HRI Conference did this year. Maybe not. I'm probably exaggerating. Yeah, I am exaggerating. But there were many submissions, and since I'm on both committees I couldn't figure out why it is that museum robots, toy robots, nursing robots, all these different kinds of robots are now being sent to the CHI Conference rather than the HRI Conference. For example, a robot that is helping a hospital – and there was a study about touch, whether a robot should touch a person and how. Why is this at the CHI Conference and not at the HRI Conference? This says to me that CHI is starting to say, "Wait a minute. HRI is really HCI. We want it." So if these fields – you know, these fields could easily merge, and it could threaten HRI as something separate and special, so it's possible. The research won't go away, but whether it's its own field or whether it drifts towards ICRA or some of the robotics fields or towards CHI, it could split off like that, and a lot of it will depend on the jobs and the hiring and whether people will actually be able to make a career in HRI. Right now it's really a question to me whether that's possible. I kind of think that departments in, say, computer science are not going to hire people who are just doing HRI. They're going to want something broader than that.

Advice for Young People

Selma Sabanovic:

Do you have any advice, then, for young <laughs> people who would be interested into going in the HRI direction?

Sara Kiesler:

Oh, Ink it's extremely challenging, but I think having a broader conceptual picture or a broader array of things you're working on would be a very good idea so that you're not pigeon holed into a too narrow field and all your contacts are too redundant. So I'm all for having specialization but also having some breadth.

Q2:

Great. Thank you very much.

Selma Sabanovic: Yeah, thank you.

Sara Kiesler: All right.