Interviewer: If we can start by having you say your name and where and when you were born that would be great.

Alicia Casals: I'm Alicia Casals. I was born in Barcelona and I've been working there after studying industrial engineering at the University… Universitat Politècnica de Catalunya. And then I began working at the School of Industrial and Informatics, computer engineering and there I start my career.

Interviewer: How did you get interested in engineering or in robotics and computer science?

Alicia Casals: Well, at the beginning, just after finishing my career in industrial engineering, my degree, I start becoming teacher at the university. And we start to working more in computer technologies and started doing things in vision until my advisor, that's Josep Amat, he traveled with the Catalan delegation to Japan for an industrial creation see how automation progress and so. And he came back enthusiastic about the new thing that we didn't know at, that was robotics. And so from then we start and I think we start to do research of what robotics were, that it seemed that it had to be something promising for the future. And we start working on that studying-- basically what we did at the beginning was teaching, because nobody around us knew about robotics. And so people start becoming aware that robotics was something interesting in the future. So industry came to us and asking for teaching courses trying to see how robotics can benefit the company. And so and this is what basically we start, mainly at the beginning teaching. And then later on some years later it was when Spain entered into the European community. We with our collaboration that we had the strong relation with LAAS in Toulouse. Then we worked with them and get a European project. And then we start really, after having had previously a small national project on the beginning of robotics, then we start working in an international corporation with other groups and so doing a big step for work.

Interviewer: What were some of the first robots you became familiar with after this trip in Japan? What were some of the things that you realized were there?

Alicia Casals: Well, at the beginning it was basically a toy because it was in the early '80s and-- well, there weren't more automation than really-- so. Of course, the one that became familiar was the PUMA from Unimation. It was the typical robot that exist by then at the universities. And from them, well, starting with ABB robots it-- robotic arm, industrial robotic arm. We have the first experiences we had once with some robots that

ABB borrow us. And then we start to doing some practices and things with the students, and then became more familiar with that. But in what refer to research basically, it was in mobile robots because the project was on mobility and so vision and detection, tracking, navigation, and our <inaudible> center area from mobile robots.

Interviewer: You didn't do manipulation. You did more in the mobile.

Alicia Casals: Well, as a research-- well, we work on arm manipulation just to become aware to teaching. And it was later on with this first project that we start with mobile robots navigation and so more planning of vision, vision applied to robotics.

Interviewer: The small national project that you mentioned that was the first one, what was that?

Alicia Casals: It was basically some automation with robotics manipulation and so, yeah, building our own specific device for doing simple things.

Interviewer: Who did you work with on that?

Alicia Casals: It was our group, along this first project. The first national project you mean, yeah.

Interviewer: Who else was in your group?

Alicia Casals: Well, my advisor then was Josep Amat. That it was the professor the university in my department. And that is basically and then many other-- by then it was a colleague Vicente Ario [ph?] and other colleague that has been moving to industry and mainly basic students that's collaborate with us.

Interviewer: Did this happen during your PhD?

Alicia Casals: Yeah, yeah. I was doing my PhD. My PhD was in robotics object recognition. The recognition the objects through the shape of the curvature of the contours. So it seems very old now.

Interviewer: What did you do after your PhD?

Alicia Casals: Well, continuing at the university. So we start this international collaboration and we start moving from applications. Basically I've been Barcelona with the university, the polytechnical university. And we have evolving to other fields of application. We started thinking on industrial application that was robotic it was by then. But then, as we've had other technological applications for disabled for example. We start thinking on the possibility of using robotics for disabled people and we built our first assistant robot and it was a soft robot on the-- just a robotic arm made by foam rubber modules. That was in collaboration with a hospital <speaking Spanish>. And from then, later on we were changing to other applications, basically steered by industrial or other fields. So we have been attractive for biologists to work on underwaters. Then a surgeon came to us and we entered into the surgical field. And so we have been deriving the research to these areas that's-- doesn't seem that have interests and have more challenging problems. But it has been a natural way of evolving as the needs around us steer us to change and try to solve problems.

Interviewer: Can you tell us a little bit about this first pro-- the European project, the big one? Who did you work with? What kinds of problems were you working on?

Alicia Casals: Well, basically, our first period was basically oriented to vision applic-- or robotics using vision. And so basically, our first big work was a tracking system with which we had different applications. And it was nice because we had a competition even, with MIT. Because we had not big resources to research so we develop ours around hardware without using big computers. So working with our own software, we reach real-time operation. And that was, I think, a very nice thing because we did a specialized device that it was for a while the first system or the quickest system that would operate in real time. So we do attract following of stripes and on the road and for vehicle navigation or tracking a person. Just keep a vehicle, keeping a distance from that. And competing with the connection machine, we're reaching the higher sign. Of course, we were much more specialized but, in this particular application, we got a faster response.

Interviewer: you mentioned that you were working with LAAS in Toulouse on that project?

Alicia Casals: Yeah, with this project. It was the project in-- wow. I don't remember now the name. It's this came later. It was a Spring project with LAAS and MATRA, other big companies, Oxford University. That is basically a mobility, mobile robots for automation or for applications, and basically using vision.

Interviewer: Was this that first European one with LAAS?

Alicia Casals: Yeah, it was our first European project.

Interviewer: Was that with Rachid Alami or who were the LAAS…?

Alicia Casals: Yeah, it was Georges Giralt. Georges Giralt basically was the one that we got more stronger collaboration and then it came Raja Chatila, yeah.

Interviewer: Around what time was that?

Alicia Casals: It was '87, I think it was begun. So about 87, if I'm not wrong.

Interviewer: What kinds of projects did you do after that?

Alicia Casals: Well, when then directly we work on the next European project was with Philips trying to eliminate one of the part of the process of building the screens. So it was a [redacted] project. That's the second one, also working in vision. And then we have been deriving more to different kind of applications, underwater robotics and service robotics, and then to medical.

Interviewer: You mentioned that you also started working early on on disability with soft robots. How did you get interested in that particular problem?

Alicia Casals: Well, we came also again attracted to the field of disability because we have a blind student that asked us to build a specific keyboard. So we built for him a keyboard able to write in Braille and receive the response. It was one of the first prototypes on this area. And as-- after doing this, that was something technological development, having some local grants for doing that. We thought that if we were working in robotics and we had felt that we can contribute somewhere, it was our initiative in this case to start building this robot. And we contact some systems centers and from there, we started working on this area. And that's why then came other, on the opposite way. Some people from outside came to us, "If you do this, why cannot do that?" And so then we start with surgery and so.

Interviewer: You mentioned that you started figuring out what type of ways you could help. What were some of the ways that...

Alicia Casals: What kind of?

Interviewer: In these early studies on using robots to help as assistive machines, how did you start figuring out what might be some areas in which robots might be helpful?

Alicia Casals: Well, you see a robot that's an arm that can help. I'll say, initially, we thought that an assist-- well, I think, at the beginning at least, when we start looking at what robotic was, so coming earlier, we saw that the first application of robotics was basically a civil engineering tool. The first publication, more than industry of our-- on civil engineering on some kind of assistant arms and hands. So that inspired you to think that you can do something similar. And the idea was to change from a rigid arm to a soft arm, that it by itself is intrinsically safe for the user. And on the other side is great challenges because the flexibility of the arm, it produces problems of control, uncontrol, problems. And so challenge is to solve how to control the position of an arm that is soft and moving.

Interviewer: Do you remember whose work this was that you had seen early on about the arms?

Alicia Casals: Let me see. I think it was maybe the UTAH Hand, and it was an arm. I don't remember. I remember now the UTAH, UTAH Hand I think.

Interviewer: What kinds of projects did you start doing on this assistive robotics domain?

Alicia Casals: Okay, basically we start with this-- the project that launched as to the-- is was this. Then we also do, let's say, other industrial applications, so manipulation basically based on vision, controlling robot through vision. And this what, in which we spend some years on also robot mobile robots at the beginning. But then, at the-- about '92 or '3, they came to us, either biologists asking that they want to do exploration under sea and a surgeon that had problems. And we start in these two different fields that, although they are different, they have some common things that is deliberation or this kind of interaction with humans. And from then, we start more strongly on the underwater. We think we were the group that start the research on underwater robotics in Spain. And also in laparoscopic surgery, in which we do the first application that was a real clinical intervention in '96. Think it was the first or one of the first interventions using a robot holding a camera to assist the surgeon. It was an industrial robot so what we develop is not the robot itself but the system that controls the robots. So to see the viability of one robot controlled by vision to assist the surgeon on that. And in what refers to underwater, what we did the project was often in deliberation and the main goal was also to use vision and tracking for control on the vehicle underwater. Controlling position, tracking, moving objects, taking samples, stabilizing the vehicle in front of a structure if it has to do some actuation, things to the reference point of a vision image and all that.

Interviewer: What were some of the challenges and interesting results that you got from these different types of work?

Alicia Casals: Okay, I think the challenge was always real time. So-- because there was a lot of research, a lot of achievements doing, let's say, important advances, scientific advances. But the fact is that, for most of applications they were conceived for, couldn't be applied because they were not real-time. So we were, let's say, strong in developing our own hard. By that time, computers were not so-- operate so at highest peak like now. So having our own specialized board and even a computer, an industrial computer, developed by a company close to us, we could have some real-time applications for tracking systems. And I think this was the first thing that the project has in doing research and doing advances in the field.

Interviewer: In which project? You said it was the first in "this project." Which project are you referring to?

Alicia Casals: Well, this is the European project we have with LAAS. In this, we had this first application and then we had a contract with a digital corporation. That was in agreement with our computer engineering school, in which we develop a 3D vision also for tracking and object recognition and this. That's another step, and pushed us to develop.

Interviewer: When was that around?

Alicia Casals: It was-- think '95 maybe.

Interviewer: Who were some of the people that you worked with on these various projects?

Alicia Casals: Okay, it was our group. In this case was our group alone.

Interviewer: Did you have some other-- you mentioned the collaboration with LAAS-- did you have some other collaborations with <inaudible> this?

Alicia Casals: With them or with this group, with LAAS and with Oxford University and with MATRA we have this project. And we worked with Philips and other university for the second project with, let's say, a more industrial application.

Interviewer: How was it working with a-- was it different working with industry versus working with other academics? What were some of the differences?

Alicia Casals: Yeah, well, the fact is that we work with companies close to us for inspection, for example, of lighters. So our first area was mainly vision. That industrial applications was in vision because the robotics applications at the beginning was basically in the car industry. So they came to the big companies. That's already had the robot's coming from abroad and so they had more lessons, technical aspects solved. So our application was more projects of inspection, industrial inspection so something can be automated. Things that the lighter has at the beginning has a very high or some more flat flame that you will automatically graduate the heat. And it was the kind of applications that we did at the beginning. And, with the time, as we began to see that there were problems, someone came to us asking if we can start with a company. So we start a company that was robot and vision. ROVISEC was the name. So we start developing some industrial projects and, at the end, it went to doing big project with the manufacturing of money in Spain. So, at the end, they bought the company because they wanted to rely on a small company of doing all the inspection of the notes. And so finally we have to just sell the company, and we have been following with that. And now we combine industrial projects with research projects, but mainly now our research projects are mainly oriented to the medical field. Either surgery with rehabilitation or assistance to disabled.

<brief interruption>

Interviewer: Was the company your company? Were you involved with the...

Alicia Casals: Yeah, I was involved in the company for a while.

Interviewer: How was it working with a startup for...

Alicia Casals: Okay. It's a different experience because-- okay, it was now then trying to move more to the industrial projects and seeing what happened there. And so we see different-- in many cases, it was a problem of building a specific robot for welding or for-- or because they appeal the needs of a specialized attachments in industry. And okay, this has been experiential. It takes not very long because, at the end, they wanted to buy the company, so. We created it because we saw that we develop things and at the end they didn't came up to be useful somehow. And this was the way to be closer to the industry. But, at the end, you see, you never know how things will go, and maybe this access is too that. You cannot afford keeping with it as a small company, having the big

responsibility of controlling of the quality control of the notes of Peseta. It was the currency we had at the moment.

Interviewer: How do you feel both working with industry and also having your own kind of entrepreneurial moments-- how did that affect your robotics work? What kind of benefits you see?

Alicia Casals: Okay, we have, of course, partial dedication to the company because there were more specialized people there. And so it was fine to combine the both thing, teaching and doing work to the university and having more attention to more. And assessing, not being there all day working but more assessing. Seeing and solving, let's say, the problems that are more difficult to solve in a company than we'll solve at the university.

Interviewer: Did you realize that there were particular new issues, perhaps, that are out there, that you might not see in the laboratory?

Alicia Casals: Of course. Of course you see that industry is a different thing. They want things work efficiently quickly, simple. I mean, at the university, you see challenges. You see what new things you can do. And so this is really a different thing. We need this work as cheap as possible, as quick as possible, and so.

Interviewer: You mentioned also that you then also started working more with doctors and in surgery. Can you tell us a little bit about those experiences? How is that?

Alicia Casals: Okay, well, it's really incredible because, for us, or me particularly, you think robotics industry, manufacturing. And this was the beginning and for maybe 10 years our work was this. And when they came to us and say that there were other fields, you really have to enter to other worlds. That was really fascinating because at the beginning you think robotics is a wide field that has mechanics, it has informatics. That has a lot of things. But, at the end, you see that it's much more than this because you have to work with surgeons, with therapists, with psychologists. And so it really enriches and you see a big world. You see also that robotics-- okay, at the beginning you say-- where you have-- you buy a robot arm and you program and you put vision and you put intelligence and you grow. But, at the end, you see that many, many of the field problems, in surgery for example, are with specific devices. So sometimes in that I need to enter a balloon, inflate the balloon inside. So I say, "I want to program a robot," and do things like that. And at the end the real problem was built strange things, crazy things from the point of view of what you are doing just to reach that point in flight and see and

give a space to operate inside. And so the problems are completely different and so you have to change your mind. It's also the question of enough language. So you talk to surgeons. You talk to-- now we are working in neuro-rehabilitation so we have to work with a specialist in neurology. And so language, way you're thinking, the problems to solve, you see that really is not to control an arm to do something but to control an arm that has to interact with a person. That has to be safe. That the person has to be aware of it, understand-- or to the robot that adapts completely to the needs of the person. That that's continuously changing and that a person may be unaware of the possibilities of have to control it. So the robot has to adapt to the real needs and so it's completely different thing.

Interviewer: You mentioned that you built— as you said, crazy new machines.

Alicia Casals: Yeah, yeah. Sometimes you say, "I went to the normal robotics and you'll find the things that are really in it are the strange mechanisms and inventions and things like that."

Interviewer: Can you describe some of the things that you built and the applications that you built them for?

Alicia Casals: Okay, so you see that some of them are difficult or really the problem is difficult to solve. But what I can say-- okay, specific. Sometimes what I'm building is procedure defining procedure. Because you are talking with the surgeon and sometimes it's difficult to get funds for. Because when the one that asks you for doing things is not a company having moneys, a hospital, and what you need is-- okay, you need this solution but what do we need? Money for developing, for building, for paying people working on that. So sometimes when there's more projects in which we more dedicate to change the procedure for example. In surgery, we think more as mechanic people. And so maybe one of the key things is that, looking with our eyes, we change the way they work because they are used to some procedure in a given way. And looking from a genuine point of view you see, "Okay, this is more practical to doing like this, entering this point, holding and having special small devices to hold things." And it's bad because, when operating in the abdomen, you have to operate with instruments entering into the abdomen and the difficulty of dexterous operation. For example, of inserting a grate for hernia, and unroll was a problem. So this more than building something. Was how to proceed and how to hold on the different points on that.

Interviewer: How did you find working with surgeons and doctors? How did you mediate these two different types of expertise?

Alicia Casals: Okay, I think it's a good experience because the fact that we have been working with them is because they felt that they need something. I always believed that robotics is an intelligent tool to help people. So they say, "If you have instruments, try to help us." So they see the limitations they have with the hands and so they open your mind on different problems and the experience is understanding the real problems they have and imaginating in these environments how to solve them.

Interviewer: When were you working on these projects?

Alicia Casals: When?

Interviewer: Mm-hm.

Alicia Casals: Well, we have to combine with the teaching so we work, let's say, partially half-time sometimes going to hospital or sitting in the intervention. Analyzing the kind of problem and then bringing the problem back to the university. When it is possible getting funds from companies or from the hospital or from some course. And then try to attract people and assist them doing PTs [ph?] or doing just a specific task for starting this. So assessing all these process.

Interviewer: What kinds of places did you get funds from? Which companies?

Alicia Casals: Okay, sometimes it has been special companies that need-- or that are, for example, a company that is developing prostheses or artificial bones or things like that. Want somehow to participate in projects or helping the hospital. So some of them come through the hospital to us to solve problems, sometimes not directly for direct surgery but for learning. One of the things that surgeons sometimes have is that they don't know how to operate or what is the best procedure or not. So robotics is a way of systematizing a process so we can do cooperations. If you do like this, for example, for prosthesis of the shoulder, the prosthesis has to be inserted more or less. How you know it is better? We all are different so if one procedure and a different procedure is better on the other, you never know if it is the procedure itself or if it is your bones, the tissue or whatever. Or the kind of rehabilitation you do after. And so, in this case, well, these companies that build bones are interested in investing on prosthesis. They're interested in investing on developing some knowledge in this sense. And sometimes the money come from the relations with us. They come with their providers and others come from calls of projects we have been working in cooperation on International Research Program. We have had continuous cooperation with them, trying to advance in this.

Interviewer: Was this something that you started in the '90s or <inaudible>?

Alicia Casals: We started working in surgery about, yeah, '92/'93, and from then, we've got continuously collaborating.

Interviewer: And so what were some of the-- you mentioned making some changes in the process. What were some of the other kind of robotics challenges, or challenges for you, technically or intellectually, that came out of this type of work?

Alicia Casals: Okay. Maybe the technical problems is the physical architecture of the robot, because, for example, we are-- when the surgeons have a problem, we studied them in the lab. We develop software, we work in control algorithms based on vision and the centers we need, in order to provide some intelligence. And you work with industrial robots. The robots we have in the lab for research. But then you see that the robot is not really-- it has not really the adequate architecture for doing that. And so the challenge is to adapt and sometimes, to build, we have to build our our own robot. We have now start a new company in surgical robot, just to solve the problem that the robots you have are not adequate-- are adequate to evaluate and to progress and to advance now. Because all the main control aspects are solved. Oh, basically operating as _____ are solved, but then you find that the physical architecture or the economy is not the adequate. So that has-- I mean, that's with the build our own company, and build our own robot. And the specific architecture, and redundancy, because you need redundance to be able to reach— for example for laparoscopic-- all the abdominal area. So these are the challenges, the new designs.

Interviewer: And what kinds of arms were you using in the lab?

Alicia Casals: What kind of arms?

Interviewer: Right? That you — that just said that turned out not to be-- <laughter>-- sufficient.

Alicia Casals: Okay, we have the commercial robot, we have the ABB robot, robotic arm, stable robot. We have KUKA robot. This is more the typical, we have now the Baxter, the two arms robot. And these are the robots we have in the lab. Just for developing new knowledge, and intelligent systems.

Interviewer: And can you tell us a little bit more about your arm and your new company for the arm?

Alicia Casals: Uh huh. Okay. So we are working in this new company that, of course, it has a long trajectory, 'cause you know that in these areas, you need a long process for having accreditation and regulations and so we are in this period. We start this company in 2012. And we have developed our own robot, has taken a lot of time previous to that. And to see how to transfer all these development on the advances in system teleoperation, we have been developing for years our contact with Mayo Clinics has encouraged us to really have something that is really useful, for industry, not just being in the lab. And okay, we are now in this long process. We have the robot, we have the technology, but it is in the process of passing on the regulation on the project. And then that's it, the possibilities of commercialization that we will see in the future.

Interviewer: And so you mentioned you were working with the Mayo Clinic?

Alicia Casals: Mm hm.

Interviewer: As part of-- how did you get in touch with the Mayo Clinic?

Alicia Casals: Okay, we have been in touch with them through courses in Masters. We have the head of surgery in Mayo Clinics in Arizona coming to Barcelona for a course, for teaching. And well, we met in these courses he visited our lab, he saw the possibilities that interest for the clinical process to advance. So they invited us to go there and presented our research to the group. And from that it starts the tightest cooperation, this medical assessment to see how to proceed. And so we have also a big team of hospitals in Barcelona interested in what we're doing. And so this-- well, all the clinical process wants to be solved thanks that we have these strong ties with them. Then, of course, they are interested in testing and see how to proceed.

Interviewer: So how does the process go of kind of going from this research, basically a research robot that you've developed something that's commercializable medical device.

Alicia Casals: Okay, you need just-- well, the process is terrible. Unfortunately, if you really want to go ahead, you need in some expert person that do more than the control and the guiding on this procedure. So we technically solve all the steps that this more specialized and built-in in starting companies, in launching companies, that do sort… all the regulatory process. So, fortunately, we have not to be really there. Because we don't know really how to do. And when we think what we thought in the past, "How will we

proceed to say, well, there's no way to go that way." But finally, we have someone that is pushing us to do all the necessary steps. So we need to have this, we have to do this demonstration, now we have to do the first trials with animals, and okay, always like a dictate that we are proceeding like this.

Interviewer: And where do you get funding to do all of those steps?

Alicia Casals: Well, by now, we have private funding. And so we have all-- the first part, of course, come from the research in university, and in the institute of Bioengineering with which I am also working now. And so as a result of the research, we could build the first prototype. But then when we finally fix to start a spinoff, then it is our problem to get funding for that. And this came from private funding. So we have some patents and we have to convince people that invest, people that what we are doing is good. That it's promising. That it has risk, of course. And they have beliefs, so we have been getting money to advance.

Interviewer: And is your funding from within Spain or the European Union or--

Alicia Casals: No, this is provide-- by now it is Catalan fund.

Interviewer: And do you-- are you going to be commercializing mainly in Europe or in U.S. as well?

Alicia Casals: First in Europe and then in U.S. But first step is Europe. Good luck, yeah.

Interviewer: And so what are some other projects that you've worked on over the years that you'd like to mention?

Alicia Casals: Okay, we are working now in reha-- neurorehabilitation, too. That is also a really amazing area, because you have to deal with robots, wearable robots. So in that case, it is the person behind. And not only the physical aspects of it, also psychological-- if it is controlled by the brain, by thinking. This is, we have a collaborative project with other groups in Spain, and so we have to combine, let's say, physiological signals with central signals. And we have also to combine the action of robotics with the action of external electrical stimulation. So that means acting on the limb directly with the robot, or acting on the muscle through electrical stimulation. And so they are different things. This is a kind of perturbation to our control systems from the point of view, of physiology, we force the user to use their own body when possible. So the signal doesn't reach the

muscle, it is externally but we stimulate the muscle to do that. Okay, other groups do this. But the exoskeleton has to notice and has to react on how the hand or the leg moves, and accordingly control the different joints to really do the reaching action, or the walking action needed. So that puts special problems on control, because it has to be, in the case of walking stable, and safe, for the user, so we cannot force the user, and at the same time, we have to let the user do as much as possible. Because the user has not to be a passive element. It has to be active, but working naturally and with possible the capabilities of re-learn, the actions of walking or reaching or dressing also.

Interviewer: And who are some of your collaborators on this project?

Alicia Casals: We have the CSIC, that is a group in Madrid, it is the Council of Research in Spain, the different centers of council of research in Spain. We have different groups in Zaragoza, San Sebastian working differently in virtual reality, because the stimulation of the user to do rehabilitation is important. Or using a specific batteries and, okay, all the things involved. And the group of Zaragoza is working on brain machines interface, so we have to integrate all these different aspects, and we are using-- cooperating with the Hospital of "Tetrapléjicos" of Toledo, that's provided the users that really need this technology. And so it's a very nice consortium.

Interviewer: And I was just looking a little bit at your website, and also I notice that you, kind of part of what you work on, which definitely makes sense, is that you're doing so much work that's kind of integrated robotics with people in different ways. There's also on human modeling humans. Could you tell us a little bit about that aspect of your work, how do you, you know, integrate what the person is doing into how the robot behaves?

Alicia Casals: Okay, so what this is more in the area of assistive technology. So we have assist in area for all this development in robotics in kitchen. So when you expect that robot assists you, it is necessary that the robot understand what you're doing. So in this aspect, we use vision, cameras, 3D cameras, to recognize the human movement. And so if we detect, or if we can interpret what I'm doing is like assisting a person can help you if he or she knows what you want to do, and if you don't reach, you can do. So what we are working is in detecting the intention of the human through this movement, knowing the sequence of, let's say, the context, what is happening. So if possible knowing all the steps in the natural action. So if I'm holding a glass, and I have a bottle of water, I will think that it goes to the fire, wanted the robot pour it. So there is some actions that I expect, and others not. And these help to contribute to the robot capability of decide how to practically, not needing the user. Say, "I need this. Move to that position, and do," so not to be explicit, but more natural, and being help.

Interviewer: Right. And what are some of the different kinds of findings that you've had in that area that you think are exciting?

Alicia Casals: Okay, so if I'm, while I think that the main problem is that everything you want to do needs-- every time you want to decide, recognize, move into, etcetera, everything needs a lot of computation. So it is important always to try to simplify and maxim-- see what is the important information you have to get to conceive what is happening. So then this simplification of the problem that is one of the main research. Now I want to simplify algorithms, because you have become out of data images provide a lot of data. And you have to deal with it.

Interviewer: So what are some of the ways that you've been using to deal with that?

Alicia Casals: The ways to deal with that? Well, as to tell "does it exist?", thinking, testing, and trying, I think is the normal way of saying the state of the art, and try to imagine it how do things to improve looking at the disadvantages of every technology, of every methodology, and try to solve these small things in order to improve a little bit of this. Because many, many people is working in this same area everywhere. So what you can expect is doing this more contributions in some of them, and being interactive and assist them, and can produce a step further on research.

Interviewer: In this work, do you collaborate with any psychologists, or you mentioned you do in some of your other work?

Alicia Casals: Yeah, well, we have, we collaborate with some assistive centers that deal with disabled, just to see a little bit. There are a lot of things that have to be solved before really treating with the special needs, but you have to be aware not dedicate a lot of work to things that at the end won't be useful. And so by now we are more having assessment than a real day-to-day collaboration, because the fact of recognizing activity, there is a lot to do before really having real users for that.

Interviewer: And so do you also do user studies with some of the clients of those places, or some of the patients or residents?

Alicia Casals: The question is what?

Interviewer: Do you bring <clears throat>, sorry-- do you bring some of the people who might need assistance to try out the robots, or use and go observe them?

Alicia Casals: Okay, in the case of things like a big infrastructure here, you need to bring the users there. In the case of exoskeleton, should we go to the hospital. Besides there are more severe disabled people, or patients that really cannot move easily. So we have the integration aspects and all the evaluation in hospital, so. But of course, in teaching environment, you have to bring. But in that case, they are users that really cannot move around. And the aim is that they can have an autonomous life. So they can move and they can come to the lab.

Interviewer: Can you tell us a little bit about maybe some of your students, or other people that you've worked closely with, what have they gone on to do?

Alicia Casals: Okay, so we have different levels of students. We have undergraduate, and we have PhD students. And they are different. Some of them stay for some time with us, just half a year, doing his final master project. And then so it's nice, because it's rotational, so we change continuously. They are just starting, so they know the last developments, the last simulations they have just learned. And this is a nice experience. But they have also to learn a lot with us. So you spend times teaching them. And then you have the PhD students, and they already have some background, and we have them for a longer time. So we can be more like them, like more colleagues and working together, I think so. This is--

Interviewer: Do you have any PhD students that have gone on to stay in robotics? Or--

Alicia Casals: Okay, in general they like the field. And unfortunately, we have not much possibilities of staying, so when possible, if they can, they stay. Sometimes they prefer to go abroad for a post-doc, because it's also a nice experience to see different places. So it's diversity. But unfortunately we cannot grow infinitely in the university. Now we are not in a very bad-- I mean a very good situation, and because we are not-- and due to the crisis, we cannot grow. So unfortunately, now it's very easy that when they finish, they left, into industry, or to somewhere else.

Interviewer: And since we're talking about the students now, we ask everybody this question, but if you could give some advice or something to think about for young people who are interested in robotics, what would that be?

Alicia Casals: Okay. Okay, I think it's important to think on the kind of applications of the orientation on the ethics of robotics, on the efficiency of the work, and so trying to really solve what the problems, because it's a very wide area, so it's easy that the projects solve things but don't reach anything in particular. And but mainly I would say that that's

important, and the applications orientation of robotics because the robotics has a wide field of applications, and I think they have-- they can be very good, they can be as a tool, as an assistant tool, they can be good. We are working in the medical field, so we basically work in robotics for aiding people. So that is a fantastic area of research we consider. And so many people come, because of that. Because they like the field. Well, that's it, I would say.

Interviewer: I also noticed that you did a significant amount of service work both for IEEE, you were the Vice President of RAS and also one of the founders of EURON, and of Spanish Robotics Chapter.

Alicia Casals: Mm hm.

Interviewer: Could you tell us a little bit about all of those?

Alicia Casals: Okay, things--

Interviewer: One-by-one.

Alicia Casals: Things go, yeah, sometimes unexpectedly, and you find the opportunity. I think mainly I think to start with a trip to Japan in which we saw the need of having a little bit organization. Having an organization in Europe, because we saw that America has more or less a network, and Japan has a network, and they were organized. And in Europe, nobody knew each other, or very few. So it was decided in this joint collaboration trip of Japan-Europe meeting that we get organized to do something. So from that discussion it was decided to try to get some funds from the European community. And so part of the people that were starting on that created this organization. And so you are getting work, and work, you see that the challenges, the interest, the real effect, because EURON was a fantastic thing. I think that it first changed the way how Europe researchers contact each other and know each other very well. And even after the eight years that we have been formed, it has been able to survive alone and keep doing every year an annual meeting that bring us together and to a common effort. So from that, you are getting involved and involved. And that's what happened. You see that you can contribute here, you see, yeah? And so I get involved also in IEEE, we organize, I was the General Chair of ICRA 200-- 2005. And well, this a lot of effort, a lot of contact with people, and I was up in North to collaborate with other people and see how you can contribute to this community. From that, I get involved with AdCom of RAS, and then to some responsibilities there, being aware that there were a chapter in most of the countries and not in Spain, so someone has to do this. So I did it. And so in Spain there

is, oh, there is a nice network organization, so we introduced this other, let's say, hat of uniting people and having some visible face to the IEEE-RAS Society.

Interviewer: And how would you describe robotics in Spain? Are there particular things, perhaps, that are paid attention to more than other countries, or--

Alicia Casals: I'd say that there are a lot of more mobile robot. I think too much from-- I think it's too much-- but many, many people is working on the mobile robots. Very few in the surgery, three-four groups that I think's researching in surgery. And there was groups in rehabilitation, and that's fine, but I think that the big amount of research is in mobile robot. Navigation--

Interviewer: Why is it so popular?

Alicia Casals: It's popular, maybe, I don't know, but it's really, that's what I would say is the big area.

Interviewer: And for this trip that you said that you made to Japan that was motivation to start your own, when was the trip? And where did you go? And who else went?

Alicia Casals: It must be '99, it was '99, yeah. It was organized by the "Mission de France", or the "Mision Francesa", on the Japan. I don't know what this was in Japan. Or Japan Society of Robotics. And so they went more or less to share a typical workshop, to share experiences, to see each other. And there was a small delegation, and I was invited by Georges Giralt of Toulouse to join this Committee, and it was really a nice experience, and a good city to grow all this. So it was really fruitful.

Interviewer: And who else worked with you to start up EURON?

Alicia Casals: Okay, well, I think that the key person was Henrik Christensen who was the leader by then. In the team it was, oh, there were a lot of people from Italy and from France, you know, who was there. Herman Bruyninckx was also one of the key people there. And later on has been the key person to-- the key person to follow-up with that. Rüdiger Dillmann was involved, Bruno Siciliano was involved. And--

Interviewer: And what was some of the process? Were there--

Alicia Casals: People from KUKA, you know, and there was some people-- and now the follow-up is more combining, industry and university research centers and so.

Interviewer: And what were some of the ways that-- how did you kind of start getting people engaged, or being able to talk more together? What were some of the things that--

Alicia Casals: Okay, I think people is very prone to cooperate, so if there is something is happening, people want to be there. So nobody want to be apart, so it was really easy to push. And after the first idea, there were a meeting organized, I think it was in London. And so many people volunteered to go, and then they start organize. It was, I said, the beginning, because there were some funds to do meetings. So if something is happening in Europe, you are in Europe something is happening in robotics, you can get some fund, allow partially to go. So you are, as researcher, I was obliged to go and participate and see what happen, and see how you can contribute and how you can benefit, because at the end is what-- what, the benefit of all of us is what makes things grow. And so in the sense, it's a natural rule. So you called, you said, "We organize this thing," and it's a natural, you just need to disseminate, so people is aware of that. And then it grows on.

Interviewer: And where did the initial funds come from?

Alicia Casals: From Europe.

Interviewer: From the EU?

Alicia Casals: Yeah, yeah. Well, there were this small committee preparing a proposal. And then from the meeting for organizing this, and so create this feeling of Europe, as unity and research into us funded by the community. So this money was basically to organize things. And to launch these things. It was repeated, renovated for two terms. And at the end, we grow enough to say, "It has to be keep alive." And so now there is the Society, there are people that subscribe to Society, they forgot, and it leaves alone. Companies are also there. So they fund, so partially.

Interviewer: And as somebody who's been involved in these various organizations, and also as one of the members here of the all-female organizing committee, do you see-- what do you see as being some of the challenges and possibilities then?

Alicia Casals: Okay, it's really getting more women involved, because around robotics, there is less women than men. So we, well, we are trying-- well, I think from the university we are trying to attract people to technology, and we done success matching, and we do special sessions, we do special talks, and this is difficult because it's like a natural education and environment that you find all along your life. And probably there are also some feelings why it's a logical need or preference in specialization. I find that in robotics, working in the medical field, it really attracts more female. And so from the point that I'm working on medical robotics, I feel there are more students that came to our class. So I was teaching robotics with maybe less than ten percent females and medical robotics with maybe thirty percent female. So things change. But I think it's difficult to focus this point, because you can motivate, but you motivate when they are there. But sometimes it's difficult that they really reach doing the specific studies to reach the positions. And then when you have levels of responsibilities, so, well, working conditions, labor conditions, are also difficult, and sometimes some of the women that reach some level, and the one or cannot further due to other job positions or family responsibilities and so on. So it's not an easy problem. I think it's an unsolved problem. And there are a lot of initiatives trying to, let's say, discuss, debate, find the promotional things, motivate women to fight for things that it's difficult, because every woman is not always in favor of getting much involved.

Interviewer: And I mean, do you think it's something of a priority for some of the organizations? So for example, the committee that was formed here for ICRA with an all-female membership. Is that part of a desire to show more women that it's possible to get involved?

Alicia Casals: Okay, I think that is-- I think there are special actions that are surprising, but maybe they point that focus-- something happens, why there are few females around in this area. And so this action has more of a, let's say, psychologically influencing and being aware that something happens, why many students start working, and then when doing activities, responsibilities, they don't come up to higher level. So it's a way to pay attention to this fact, because sometimes you find things normal. "This is only with men, and it's normal." And sometimes you need some reaction and say, "Okay, this is not normal." In that case, there's no special reason why there are not females here. And so this is a special action that. I was surprised myself at the beginning when I was told that, that would be organized by female and get surprised and say "it's good", but say, "Okay, it's something that's pushed and try to take attention on this fact." And so it's, in this sense I find it's good. And we expect good results and say, "Okay, women can do good things."

Interviewer: Do you know how that decision came about?

Alicia Casals: Okay, they were mentioning that it was a talk with George Lee, I don't know exactly what's the George Lee initiative or maybe due to the lack, or I don't know exactly.

Interviewer: Well, thank you. Is there anything else you would like to add or any project or people that you've worked with, or anything that you think we've missed?

Alicia Casals: I don't know. We talked a lot. <laughter>

Interviewer: Did you have anything you wanted to add?

Q: No.

Interviewer: You're good. Okay, that's all!

Alicia Casals: Okay!

Interviewer: Okay, that's all. Thank you very much!

Alicia Casals: Okay, okay, thank you.

End of AliciaCasals.mp4.m4v