Interviewee: **Hsueh, Ya (Phil), Ph.D.**
Interviewer: **Karen Thomas**
Date of interview: **April 6, 2006**
Category: **FSU**
Status: **Open**
Tape location: **Box #52**

Thomas: Dr. Hsueh, can you tell me about how you became interested in oceanography and your development as an oceanographer before you came to FSU?

Hsueh: Sure. Going way back to my bachelor's degree, I was in civil engineering. Then an opportunity presented itself at Johns Hopkins University where they had the Geophysical Fluid Dynamics scholarship. That was in the Civil Engineering Department at time at Johns Hopkins University. And I applied there and got an assistantship. I should retract that Geophysical Fluid Dynamics scholarship wasn't there at the time I entered into Johns Hopkins University on research assistantship in the Department of Civil Engineering. Then after a couple o f years, the fellowship came up, became available. It is during that period of time my transition from engineering discipline into science took place.

Thomas: You are a native of China. Why did you choose to study in the United States?

Hsueh: At the time of my graduation from university in Taiwan, everybody saw that as an opportunity. And there isn't a whole lot of opportunity at other places. The US is the only attraction at the time.

Thomas: That must have been incredibly competitive. How did you qualify to be able to —

Hsueh: It is, it is. Typically, [a] university like Johns Hopkins won't even look at you unless you are number one or two in your class. In my case, I wasn't [laughs], so it's an aberration that they granted me a research assistantship.

Thomas: So from fluid dynamics to oceanography – how did you get into the field?

Hsueh: Right. My advisor at Hopkins was George Benton, who was a meteorologist. That's when I began to learn about the environment. After that, I went to University of Washington for my post-doc and a couple of years of working in meteorology and decided that oceanography would suit me better. That's when I applied to FSU, in 1967, I believe, for an assistant professor position in oceanography. Apparently that was the beginning of oceanography in this university.

Thomas: So you saw an advertised job opening at FSU. Did you consider other places or

what attracted you?

Hsueh: Yes, I did. At the time, I basically went by what my advisor told me, and also my (for lack of a better word) boss at the University of Washington, Professor Robert Fleagle. They tipped me off on these jobs. You know, when you are just out of your Ph.D. program and you're knowledge of where the jobs were are very limited. So I relied on their suggestions and I applied a few places. I basically picked to come to Tallahassee, I don't know why.

Thomas: There's an opportunity here.

Hsueh: There is an opportunity here. I suppose I was attracted by the fact that this is a nascent development place.

Thomas: So you were attracted to a department that was just getting started —

Hsueh: Actually, at that time — you know, this is something I can't remember, whether there was a department already or there was just a program. I think it was just a program —

Thomas: That's correct.

Hsueh: — that essentially evolved from an institute of oceanography that was here for some time. So when they had this "program," I decided to join it.

Thomas: Why do you think that you are the person that got that job? What unique things did you bring?

Hsueh: I think it's perhaps the fact that I'm really interested in dynamics as versus description. I think that might have tipped the scale. But I'm not sure, because at the time we don't have any oceanography that's interested in dynamics here. But however, the program's very closely tied with Meteorology Department. I think there were good dynamicist in Meteorology Department. At the time, it was rated a pretty high program, the meteorology program. And so they thought that maybe they need somebody who's interested in dynamics of the ocean.

Thomas: So from the beginning, the relationship between oceanography and meteorology was strong and helped you get this position.

Hsueh: I think that's a fair statement.

Thomas: Can you talk about — I know that you're a physical oceanographer —

Hsueh: That's right.

Thomas: — and so certainly you have a physics background as well. Can you talk about — was there a strong relationship with the Physics Department? Because oceanography is such an interdisciplinary field.

Hsueh: Yes, but the relationship between physical oceanography is mainly with the Meteorology Department. The other disciplines — I remember we had professors in biology who were participating in this program, and also geology. But I don't remember physics at the time.

Thomas: Interesting. So what did you find when you came here? Describe the department as you remember it in 1967. What were the people like and what was going on at the time?

Hsueh: You know, essentially I felt, as far as I'm concerned, this program could very well be a part in the meteorology program. Because everybody around me – I'm the only oceanographer, physical oceanographer, at the time. Dr. Sturges wasn't here and the rest of the physical oceanography group, the oldest members, they were not here. So my feeling was that it's really an annex off the Meteorology Department.

Thomas: Interesting. Who hired you then? Someone in the division of oceanography hired you, even though they had strong ties with meteorology.

Hsueh: I think Carl Oppenheimer, the biologist who was the chair at the time, offered me the job. I cannot be certain.

Thomas: We may end up interviewing Dr. Oppenheimer at some point, but what do you remember about him?

Hsueh: A tall fellow [laughs].

Thomas: He is tall. He was the one who kind of started oceanography at FSU.

Hsueh: Yes. And then Dr. Goodell, I remember, who is a geologist who had something to do with the department. As you know, the order of business at that time was to convince the university to have a Department of Oceanography.

Thomas: How did they do that? What was the argument they used?

Hsueh: [laughs] I just don't remember. I don't understand what really was going on. I suspect it's because this university has a fertile ground for oceanography, because you have a strong Meteorology Department, a strong Biology Department, a strong Geology Department. You've got essentially all the disciplines necessary, all the ingredients. And besides, there was an Institute of Oceanography. I didn't think it was too hard to convince the university to have a Department of Oceanography.

Thomas: I would imagine that in the early years that attracting new faculty like yourself was one of the primary objectives. Did you participate in any search committees or in the process of bringing other faculty to FSU?

Hsueh: I don't remember actually participating, because I'm such a junior member. Not at that time.

Thomas: So what kind of research did you do in the beginning and what kind of research were others doing in the late '60s?

Hsueh: You know, at the very beginning, as I was just out of the meteorology program at the University of Washington, it's natural that the area that I'm going to be working in was mainly meteorological oriented, but applying my knowledge about the fluid dynamics aspect of it. You know, come to think of it, I don't know when my first grant started. Maybe I could take a look at this – it's been a long time. I have a list of my grants.

Thomas: Sure. Who was your first grant from?

Hsueh: Office of Naval Research. It was '69, two years after I got here, I landed my first grant. There was always Jim O'Brien as a co-principal investigator – two of us. I remember vividly that we went up to Washington to try to get the support from the Navy. You know at that time is the beginning of what we called International Decade of Ocean Expedition, IDOE. And that was an opportunity for funding, '69 to '70 – International Decade of Ocean Exploration, IDOE.

Thomas: And that was through the Office of Naval Research?

Hsueh: Yeah. Our grant was from Navy. Of course, the IDOE is a national program.

Thomas: Federal?

Hsueh: Federal program, yes.

Thomas: So what was the grant for and where did you go to do your research?

Hsueh: I think it's the coastal upwelling, and that's my first contact with coastal oceanography, which would become my major focus.

Thomas: What location did you —

Hsueh: Oregon - Washington coast.

Thomas: Do you feel like that was a successful project? Did you solve problems or find

what you were hoping to find?

Hsueh: Oh, at that time, it's an exciting subject and there are so many problems that we didn't understand the dynamics of. So it's very easy to get excited. Every day it seems that you discover something about the currents and about _____[??] biology of the coast of Oregon and Washington.

Thomas: I assume you were out in a boat with a team of people.

Hsueh: Yes, sometimes.

Thomas: Describe to me what that was like.

Hsueh: These boats – I forgot the name of the Oregon boat – (something starting with a C) – but it's a small boat. It's like the fishing boats you would find in Carrabelle these days. And that was my first taste of going to the sea. It was scary and I have seasickness, so I wasn't very comfortable. But I don't go out very often, maybe once or twice during this IDOE coastal upwelling project, because my work is mainly on a piece of paper with pencil.

Thomas: So tell me what kind of thinking did you do or what was your analysis?

Hsueh: It's essentially theoretical analysis of how the currents behave, and together with the upwelling phenomena.

Thomas: So you were relying on data collected mainly by other people.

Hsueh: For verification of my ideas.

Thomas: Tell me what upwelling is.

Hsueh: Upwelling is the vertical movement of ocean water from deep to the surface. It's very difficult to measure that because that velocity is typically less than one centimeter per second. At that time, we simply have no way of making direct measurements. So it's important at that time to understand what is horizontal movement of water that accompanies that vertical movement we think are there. That's where my training in fluid dynamics becomes useful.

Thomas: I know that the oceanographers that I've talked to so far, they have a primary focus of research, and that may play out over ten or even twenty years. Can you tell me — you know, you talk about the excitement of starting a new research project and going out to the ocean a few times and that your topic was upwelling. How did that play out over time? What did you find out about upwelling and what were you surprised by and how did that particular research interest develop and change over time?

Hsueh: It's been my focus for — let me see, I think it's been quite a few years, probably close to ten years. I think it gives me opportunity to be familiar with the coastal oceanography because the proximity of the population to it makes it very significant place to work. Gradually, however, this also gave me a chance to look at the interaction of the deep ocean with the coastal ocean, because coastal upwelling as a phenomenon doesn't stand there alone; there was all these connections that made it very interesting. So in fact, at the very beginning, first time I came here, I was doing laboratory experiments with the ocean currents, a simulation of ocean currents in what we call dishpan experiments. You put a dishpan out on top of a turntable. You turn it and look for the flow of water in that dishpan. And the first experiment I did is to simulate the "Gulf Stream." So actually I had an interest in deep ocean to begin with, and then I was attracted by the opportunity to study coastal oceanography.

Thomas: But they turned out to be very interrelated.

Hsueh: Yeah, very. And to this day, the interrelationship between the coastal ocean and the deep ocean is still part of my focus.

Thomas: What were some of your conclusions about that?

Hsueh: It's like if you have a current flowing off the Oregon coast, right? And let me see now – towards the Equator — even if you don't have anything else, the interaction between this open ocean current, which isn't very wide, hundreds of kilometers wide, but it rubs against the coast – that could produce a vertical motion simply because the current's rubbing against kind of a slope or kind of a shelf. The water movement near the continental slope or shelf is going to go up. That's very counterintuitive, but it turns out like that. So that's one of the papers I wrote.

Thomas: What kind of implications does that have for —

Hsueh: That basically says that if — you see, off Oregon it's very interesting – the wind blowing towards the Equator and it generates a current towards the Equator. And the Equator water current generates an upward motion. I'm using gestures, but I realize you're looking at it opposite from me. So when the current is going this way, towards Peru, so you have Hawaii over here – so that basically strengthens the upward movement of the deep ocean water off the coast of Oregon and Washington, and that's why the water is so — I was going to say cold, but cool in the summertime. And that's because there's a lot of deep water movement to the surface.

Thomas: Does that have applications, for instance, for environmental concerns?

Hsueh: Oh, tremendous, tremendous. The climate we just touched upon. That's why in the summertime, San Francisco has its coldest weather. Not in the winter; it's the summertime. And that's why the fishing industry is so great – salmon, for instance – and used to be anchovy. That's when Cannery Row was so prosperous off the coast of California, northern California. The impact is tremendous.

Thomas: It there's an exchange of water between the coastal and deep ocean that your saying with this fluid dynamics, does that also mean that the coastal water is more impacted by pollution, I would imagine, that that's going down into the deep ocean?

Hsueh: I'm not so sure about that, because coastal currents tend to stay near the coast, except for this upwelling circuit. Obviously, the water comes up to the surface, it will move offshore. Now, how much pollutant that brings away from the coast, I'm not very sure. But the coastal currents basically – what we call a trapped current, is a trapped current, because of our shore _____[??] along the coast.

Thomas: So you told me some of your conclusions about upwelling. Did it seem as if that topic kind of played itself out, and you came to a point where "I'm really not interested in upwelling any more; I want to move on to something else." Like, how did you decide —

Hsueh: That's a very good question. Really, there are so much still, even today there is still so much questions to be answered about the coastal upwelling per se. I'm not even talking about coastal circulation; I'm just talking about coastal upwelling. There are so many things we still don't understand. For instance, what's the time scale of — you know, the coastal upwelling is not a steady what we'd call phenomena. It's changing with time. Now we're talking about decadal change and we're talking about climate change. How is it reflected in coastal upwelling, changing the pattern of the coastal upwelling. Things like that is still at the forefront of research.

But I got away from it, and the reason is another opportunity back at the time of 1979. That was just a few years after President Nixon went to China, my home country. And all of a sudden, opportunity opened up for scientific cooperation which Chinese desperately needed because of their cultural revolution, their science research except in the area — a few area the government sees military values of — drops off to nothing, really. They have no graduate students, no professors. So when the National Ocean and Atmosphere Administration, NOAA — I don't think there is a NOAA at the time, but I'm using what the name they use right now — when the US government, let's say, Department of Commerce, decided to start a scientific cooperation with China, I was picked to be one of the team. So five of us (I'm the only Chinese) – I think five of us, at the beginning anyway – participate in this project. The subject of the cooperation is about the sedimentation of Yangtze River outflow into East China Sea. It's the sedimentation process that was the focus of this Sino-American cooperation, the very first one in oceanography.

Thomas: So the five scientists were all based in the United States and you were the only one —

Hsueh: I can remember — John Millirman is the geologist who is the chief of this group, John Millerman. And then Robert Beardsley from Woods Hole — John Millirman was also from Woods Hole at the time. Donald Rhodes from Yale. He's a biologist. Beardsley is a physical. And then Bob Aller, a chemist from University of Chicago at the time. I think that's all of us. Later this group becomes slightly bigger.

Thomas: So this group was funded by the US government to —

Hsueh: Yeah, it was funded by NOAA or the Department of Commerce.

Thomas: — go to the Yangtze River in China. And the purpose of this was to —

Hsueh: To look at — you know, there is this tremendous amount of sediment carried by Yangtze River. And the purpose was to find out how is the sediment deposited in the East China Sea. And how much of the sediment actually reached the deep ocean.

Thomas: And why did they want to know that?

Hsueh: Of course, for the Chinese it's one of the most important subject because of from the viewpoint of harbor problems in Shanghai. So they really wanted to know how they can figure out how much sediment are going to be affecting the harbor, and also how the sediment flow to the south along the coast. So it's all coastal oceanography again. But _____ [??]. So again, it's how this source of sediment tie in with the sediment we found in the deep ocean – other people found in deep ocean. And that is a very important scientific issue, because Yangtze River happens to be one of the biggest river with biggest sediment load in the world.

Thomas: Is it actually creating new land?

Hsueh: It's not really. The sediment flows away from the coast, except for the part, you know, trapped near shore. And that's nothing but trouble, because you have to dredge every year in the harbor.

Thomas: How long did you spend in China on this project?

Hsueh: From 1979 to 1982.

Thomas: And you stayed there the whole time?

Hsueh: No, no.

Thomas: You went back and forth.

Hsueh: That's right. We run experiments.

Thomas: What did you find out?

Hsueh: Well, we found out, for instance, the tides have a lot to do with how the sediment is flushed out of the river mouth. And we found out that there are sediments that actually reached the Okinawa trench, which is the start of the deep ocean, across a very wide shelf in the

East China Sea. We found out how this river water of the Yangtze River – the river water is fresh, therefore it stays on the surface, and what's the behavior of the river water. Now we know the river pool has a lot to do with Sea of Japan, of all places. The renewal dynamics of deep Sea of Japan is tied to how much Yangtze River water reaches Sea of Japan. So it's unbelievable, all these new things that came out. Now people are interested in the oxygen in the Sea of Japan. Of course, renewal of Sea of Japan is important to how much oxygen gets mixed back down in the ocean for biology purposes or all kind of things.

Thomas: Did you make presentations to Chinese officials and was your ability to speak Chinese helpful in that?

Hsueh: Oh, yes. Very helpful. I had to do a lot of oral translation and that was a lot of pressure on me. My English wasn't that good at that time, and the Chinese, I had already forgotten a little. So it was a tough situation.

Thomas: So you were a key person, then, to be able to translate the findings and —

Hsueh: In some way.

Thomas: — into a form that the Chinese could use and understand.

Hsueh: Yes. At the time, of course, _____[??] English.

Thomas: You have continued to do research on the coast of China and in Japan. This project ended in '82 — actually, I want to step back a minute. In the course of more than a decade, were there new technologies or new methodologies that came in, because I imagine that would change quite a bit.

Hsueh: Yes, yes, a very very good question. I think towards the end of this China endeavor, we began to make use of devices, instruments, that are capable of — make frequent measurements of currents in the ocean at different levels and for a long period of time. And that is a revolution, because now we not only know at a given instant which direction – what's the speed the water is moving, but we now begin to have an opportunity to know how this current changes in time. I'm talking about horizontal currents. That's still the most accessible aspect of ocean movement to us at the time. Now I think we have devices to make a measurement of vertical movement. So the advancing of the current meter technique, or what we call the moored current meter technique – that is, you moor an array of current meters to the bottom of the ocean. You take a couple of those railroad wheels and put at the bottom – sink it, and on top of it you tie a string, a cable with current meters tied to the cable. So you can make a measurement at different levels. And when the time comes to get this current meters back (of course all the data at the time was stored in the current meter itself) — telemetering won't come until a little later of information. So when the time comes, like three month, you got back to the spot where you have the current meter array moored and send down an acoustic signal release the current meters.

Then you wait on the boats to catch that string of current meters. And then you go back and look at the data.

Thomas: Interesting. Was there a computer? How was the data actually measured inside these meters?

Hsueh: Inside these meters — you know, there is the rotor, anemometer. So you basically let the water move the anemometer or rotor, and inside the casing of the current meter you have a device that counts the revolution. And then that's for speed. And then you have the van and you have a compass, essentially, to tell the direction of the current. And that basically started me thinking about making use of that to make measurements in the Yellow Sea. So my next project was looking at the circulation in the Yellow Sea. This time, actually, I would be doing all the hard work, collecting data, risking all the instrumentation that could easily be lost. Each string is like $100,000. And this was funded by the National Science Foundation.

Thomas: Each string costs $100,000? Oh, my gosh! So if you lost it, it was really huge. Did they often get lost? Did you ever lose one?

Hsueh: I lost one. Only one current meter.

Thomas: But not the whole string.

Hsueh: Not a whole string. And the interesting thing — this is 1986 — the interesting thing is — I say interesting, but is a risk — is the place I make measurement is from the mouth of the Yellow Sea north, and actually beyond the 38° parallel. And while we were about to drop our instruments, the moorings, we got a call from the State Department on the ship that if we put the current meter instruments in, we may have no way of getting them back because they won't allow us to go back there again.

Thomas: And that was because there was some kind of tension —

Hsueh: Because there is tremendous amount of tension between North Korea and South Korea, and the 38° latitude parallel is what we call the Demilitarized Zone. It goes through the Yellow Sea, too. But we dropped the mooring and successfully recovered it on a South Korean ship. I think it was in 1986; the mooring was for, I think, three months. And that was the first time current in the Yellow Sea have been measured with that kind of long time period.

Thomas: Tell me, when did you become chair, and tell me about your activities as chair of the department. Was it something that you wanted to do, or that you felt obligated to do?

Hsueh: The latter, always. I paid my dues. I was managing physical oceanographer for NSF for one year. That's what they call a rotator – rotator program manager – from '80 to '81. And after that, I came back and took one term of chairmanship here, '82 to '85. And I thought

that was all I needed to do [laughs]. But I guess I did another term as chair of this department '89 to '91.

Thomas: What were some of the challenges that you faced as chair? What kind of things did the department need to do?

Hsueh: I really didn't face too much, because every time, if I remember correctly, every time I became the chair is after Dr. Sturges term. I basically tried to keep a steady progress of this department in the direction that we all agreed that we should go, which is to develop a very strong physical oceanography program.

Thomas: How did you do that? What was key to strengthening physical oceanography?

Hsueh: We first have to get a —

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Thomas: We were talking about your time as chair and strengthening physical oceanography, and that you also followed Tony Sturges as you became chair both times.

Hsueh: Yes. Let me fill in a little bit on that. Dr. Sturges perhaps told you that had a retreat. That was during his tenure as the chair. At the retreat, the whole department decided, because of the limited resources of the state at the time, we have to concentrate on one thing at a time, and the decision was to strengthen the physical oceanography group to make it a nationally known program first. And then we would branch into biology, chemical oceanography, but decided to leave out geology simply because of resources. Geology, if you wanted to do that right, you would need a lot of investment in _____[??] equipment.

Thomas: What was it about physical oceanography that made it the focus of the resources?

Hsueh: First of all is because our tie with meteorology. So we can come out of very good relationship with a rather good department, one of the best departments at the time in this university. And the other reasons are Physics Department, because we do have physics department here and there were, I believe, an interest in having oceanography program as a minor in physics department. And the other reason for concentrating on physical oceanography is because the investment that's needed is not that much if you concentrate on dynamic oceanography. And we already have myself here — I think at the time, Ruby Krishnamurti, and we all more or less — she's much more theoretical and much better than me in terms of doing oceanography on a piece of paper. And we already have some foundation for that. So that's how we decided we would go physical oceanography, and dynamic oceanography at that. And I must say, we did very well. Now this department is known for its theoretical dynamic oceanography and ranked nationally.

Thomas: Tell me some about how the department developed — for instance, I'm very interested in this faculty retreat and the ideas that were exchanged there. Did that become an annual phenomenon? Did you do that every year or just that one time?

Hsueh: No, no. Actually that was one time, and I think we did one more time, if my memory serves me right. But the first time, when Dr. Sturges was the chair, was the most important one, I think, for the last forty years.

Thomas: As both a member of the department and as the chair, how would you describe interactions between the faculty in oceanography?

Hsueh: Oh, Karen, that's the thing. This is the most congenial department I have ever seen. There was practically no friction to speak of. This is marvelous, because you think of different disciplines that are put together in oceanography.

Thomas: But that wasn't necessarily true at the very beginning, I understand?

Hsueh: No, that was certainly not true.

Thomas: How did you change that?

Hsueh: I think we got rid of people [laughs].

Thomas: Got rid of problems —

Hsueh: We got rid of people. We got rid of — I don't know if *we* did that, but probably people in the upper administration saw that, too. I'm not going to mention names, but people you don't see here today are obviously people that we got rid of.

Thomas: Did that have an effect on the research and the productivity of the department?

Hsueh: Oh, tremendously, tremendously. Because, to put it bluntly, I don't think they're doing good science, those people who are not here anymore. Therefore, they are essentially taking resources from what we wanted to do, which is real dynamic oceanography. I'm talking about physical oceanography, obviously. And so if they were still here, they would be doing things that I think is much more applied. Maybe they think that would be a good thing; maybe we would be able to get more grant money or what have you. But we're not going to get as good recognition.

Thomas: That's an interesting point, that applied science is considered less prestigious than theoretical science.

Hsueh: At the time. Because you have to remember, our concern for environment, the

popular concern for environment, didn't come of age until now. You're talking about twenty, thirty, forty years ago. What is considered prestigious is going to be good science.

Thomas: I think that's a theme that keeps coming up. The people that I've talked to believe that even when receiving grants from agencies, that scientists should have pretty much complete freedom to pursue their own research and really shouldn't have a lot of limitations or guidance —

Hsueh: — mission-oriented that are short-sighted.

Thomas: That's had a lot to do with the way this department developed —

Hsueh: Yes.

Thomas: — with the focus on theoretical science —

Hsueh: Not necessarily. Now we're branching out. But at the time, I believe that that's true. But of course, you know, not really to do this at the expense of the observation, either, because we do need data; we do need data. And Dr. Sturges is a very good example of somebody who's very good at the dynamics but who is an inclination toward making observations. George Weatherly is another one. So we try to build a group that is not necessarily theoretical, but it's good at dynamics.

Thomas: So far, you haven't talked much about your teaching. And one thing that — it seems that the faculty in this department fairly individually pursue their own research interests; there's not a lot of faculty to faculty collaboration on research – or is there?

Hsueh: There is. Like O'Brien and me. Early on we were together — of course, later on he branches off to climatology, which I didn't care very much at the time. And George Weatherly and I have written paper together. And O'Brien and I have papers together, of course.

Thomas: So there has been some collaboration.

Hsueh: There has been to the extent that our interest overlaps.

Thomas: Because the impression that I've gotten so far is that most of the faculty work with their graduate students but they don't necessarily work with each other as much, or very seldom, actually.

Hsueh: Well, actually, as I mentioned to you, this is a very congenial group. We talk a lot with different colleagues, at least within a discipline. You know, a coffee hours and bumping into each other in the hall. I would say there is a fair amount of that interaction, yes. We didn't have to make appointment to see each other.

Thomas: Tell me then about your teaching and your interaction with graduate students.

Hsueh: Okay. My way of teaching is essentially apprentice. They basically follow a general direction that I give to them, and I generally let them develop their methodology, their ideas, and sometimes even their writing, which I always didn't like. But I try to make it, you know, it's their effort in their dissertation or thesis. So I give them a lot of independence, essentially.

Thomas: Have there been examples that you can think of where that has been difficult or where a student has made some errors or that you felt like you should have been more closely watching them?

Hsueh: A couple of times like that. There are also times when I am disappointed to the slowness of the response. After fifteen PhD students, you've seen a lot of different — I think fifteen is right.

Thomas: You don't necessarily have to name names unless you want to, but what have been some of your most satisfying moments with graduate teaching or with working with graduate students?

Hsueh: It's hard to single out a given moment. I think I had good moments with even the worst student [laughs]. You know, when you see that they did something on their own. That's a rare moment, but that's one of the best moments. Or they follow through on what you have suggested and then the result turns out to be positive.

Thomas: How much of your time, as a percentage, would you say that you spend in teaching versus doing research?

Hsueh: If you count directing PhD students, that time together with classroom teaching all together, I think it's somewhere from — you know, when you're young, you tend to do more research — probably 50% to 70% doing teaching.

Thomas: But that may overlap with your research if you're doing research with graduate students.

Hsueh: Yes, right. So there is not a clear-cut separation.

Thomas: How have graduate students contributed to your research? Like what would you not be able to do if you didn't have graduate students?

Hsueh: Early years when I was learning to make observations in the field, I would say if I didn't have the graduate students, I couldn't possibly pull the experiments off.

Thomas: So they were the ones in the field doing the observations.

Hsueh: Labor – observations, yeah. Later on, the students contributed to help me in creating computer program codes for numerical studies of oceanography. That again, if I didn't have the help, I wouldn't have done that, because my training is theoretical. So now I'm without any students, and I'm working on a paper which is very, very theoretical, and it's all on piece of paper; it's right here. Because all these other endeavors would necessary incorporate other people's effort. It's very difficult these days to do it by yourself.

Thomas: So that's one way that oceanography has changed; it's necessarily become a more collaborative discipline?

Hsueh: Yes, of course. And also, we tend to be more inter-disciplinary, getting involved with biologists, geologists.

Thomas: So you don't think it was always inter-disciplinary; it became more so over time?

Hsueh: Definitely. I think it comes with the awakening of people about the environment, how complicated it is. It's just not a laboratory for physical oceanographers. It's much more important than that.

Thomas: Can you give some examples of how physical oceanography has — you say that there's a growing understanding of how complex the environment is – what has physical oceanography in particular contributed to that understanding?

Hsueh: Well, the first problem we discussed, coastal upwelling, is just one — and the answer of over-sedimentation process is another, because essentially I have to work with geologists, sedimentation geologists. And in fact, all the problems that I worked on and am still working on is a part of the big effort to understand the environment. For instance, the Yangtze River pool water going to Sea of Japan that changes the oxygen count of the Sea of Japan water is another that has to do with biology. I can think of numerous topics like that I've been involved in as a physical oceanographer, but yet the bigger picture is one of the environment.

Thomas: How does the department's mission and this growing collaboration with other scientists and other disciplines, how does that fit into FSU's mission and how has the administration helped Oceanography to do that? Do you understand what I'm saying? Or has it?

Hsueh: Yeah, but — definitely it has, because more and more you can see the cooperation across departments or disciplinary boundaries are being encouraged. And I think it's the realization of the university that all these environmental problems are problems whose solution would not come unless we all work together, the biologists, the geologists, oceanographers, and meteorologists. And if we are going to — in terms of environmental science, if we're going to put this university on the map, so to speak, we would have to come together to do these things

that are much more visible to the outside. You know, it's a visibility, essentially. It's exposure that we talking about in terms of, I believe, the mission of the university.

Thomas: Can you give some examples of ways that oceanography has increased the visibility of FSU or the scientific community here?

Hsueh: Oh, tremendously. I think as I mentioned to you, in terms of dynamic oceanography, this is considered one of the best places. And participation in mainstream programs like IDOE is another way that the oceanography programs begin to earn some visibility for the university. And the research in terms of near ocean surface atmospheric turbulence, for instance, is another aspect that made this university more visible. I've only mentioned — a part of me doesn't have to do research now, but _____[??] problems also are solved here that made the meteorology department a top department. Like Krishnamurti's hurricane research, that's another one. That's something to do with ocean, but we don't talk to him very much. So there's a number of topics.

Thomas: How specifically has the administration encouraged this kind of increased visibility? I mean, there's funding, there's all sorts of things that have to happen in order for these —

Hsueh: Yes. The funding, of course, of our research are always external. In fact, this department earns external funding money completely out of proportion of the size of the department. I think at last count we were per capita external funding level in this department is probably number two or number three in this university. And that, by the way, earns visibility as well. The way the university can (which doesn't mean necessarily they did) encourage this sort of effort is by giving us more line items for positions. That have kind of come slowly. That's understandable, of course, because all the departments are trying to do the same.

Thomas: Can you remember ever going in and talking to members of the administration, deans or provosts or people like that, and making a case for that?

Hsueh: Yeah, one came immediately to mind. That was during Gus Turnbull's tenure. He was the provost or vice president for academic affairs. I was the chair in this department at the time. At the time, there is a movement to form a national consortium of oceanography programs, or basically lobbyist group in Washington DC, to lobby the Congress for research funding for oceanography. And FSU was left out, because it takes money. They require, I believe, $2,500 is the membership fee. At the time it's a lot of money for a membership fee. So I had to go to Gus Turnbull or argue with him about why the university should pay that membership fee, and he did for a couple of years, too, I think. And that membership is very important, again, for the big boys are there and you want to be there.

Thomas: And what came of that membership in that consortium?

Hsueh: Nothing. Nothing specific, but it's just essentially a lobbying group for all of us.

Thomas: So they can't point to a specific benefit, but in the grand scheme of things, FSU needed to be part of that.

Hsueh: We need to be part of that if you want be in a number one group.

Thomas: You mentioned the IDOE, you mentioned this five-member panel that you were on with the Chinese and US government collaborating. Can you talk about some other, either national or even state level professional or scientific organizations that —

Hsueh: I was for some time (I forgot the number of years or the time period) — I was on the advisory committee for the Northwest Water Management District here in the state of Florida. We were trying to solve the problem of Apalachicola Bay. That problem is still there, and I still se no solution, because of the fighting among the states for the water, for fresh water. So I was on that for several years.

Thomas: And would you consider that a service activity?

Hsueh: A service activity.

Thomas: Obviously you didn't get paid to do that. That was something that you used your knowledge of coastal oceanography and —

Hsueh: Right. Exactly right.

Thomas: Did you make any suggestions, and were they taken or not? How do you think that problem should be solved, ideally?

Hsueh: That's very difficult for me. I didn't come up with a real solution. I only come up with ideas how Apalachicola Bay can manage to survive with the water problems, like knowing where the oyster tends to congregate at locations. In fact, I have a theory – I never published it – still in here – about why the oyster bars are the way they are right now. It has to do with tides and tidal mixing off the estuary water and the river outflow. But these are the kind of things, I suppose too detailed to be picked up by people who are concerned with bigger problems, that is, to get the water down here — policy makers, and they involved state of Georgia, Alabama, and Florida.

Thomas: And the solution to one problem of providing fresh water may be contrary to the solution of oyster population.

Hsueh: Exactly. Very tough problem.

Thomas: So in interacting in that political sphere, did you feel like you were at a disadvantage or did you want to be —

Hsueh: I feel out of place as a scientist.

Thomas: So you didn't want to be a politician, really.

Hsueh: No, no way.

Thomas: Did you feel like they just didn't listen to you or —

Hsueh: I feel they just try to give lip service to the scientific community; that's what they're doing. And that the decisions are going to be made in spite of. It's always like that.

Thomas: So what were they more concerned with in the scientific perspective that you brought in?

Hsueh: Well, the scientific answer to the problem is very simple. It's just that not enough water — if you don't have enough fresh water into the estuary, the salinity of the estuary, the degree of saltiness of water in the estuary increases. When the salinity increases, you being to invite a parasite into your oysters. So the oysters industry will be dead. So that's the scientific input, essentially.

Thomas: So you can't divert the fresh water —

Hsueh: You cannot continue to divert water of Apalachicola River away from the ocean.

Thomas: But politically water is so important that it's going to trump —

Hsueh: Yeah. The big cities like Atlanta and developments _____ [?? #712] upstream, they are going to continue to take water away.

Thomas: I think I am at the end of most of my questions. Is there anything else you wanted to share or is there any kind of wrap-up comments that you wanted make about your career?

Hsueh: I think this department as been wonderful to all of us, and the fact that I'm still sitting in an office that I can call my own after retirement in 2003 – that's unbelievable. In most departments they'll put you out. The current department chair made us, three of us who retired, an emeritus advisory committee. So that was a very wonderful gesture. I also see that the university is beginning to find ways to fund programs like this better. I think the recent initiative of Pathway to Excellence that was started by the president is a marvelous thing.

Thomas: What kind of things need to be funded most that have not been funded?

Hsueh: We need to get more expertise in oceanography. For instance, with all the satellites up there and the advance of satellite usage, we don't have many — I don't think we have anybody here that is an expert in satellite oceanography. Just some things that came to my mind. I'm very happy here.

Thomas: So some things don't change. The problem when you first came to this department was the need to build and expand the faculty, and you're still

Hsueh: We're still doing that; we're still needing that. Because the process is so slow. It's very slow; it's very hard to gather resources you need.

Thomas: My understanding is that the size of the faculty has remained virtually the same in the past thirty years or so.

Hsueh: Because of retirement; you take three away and you just essentially put three back. We have been at this size for a long time, probably ten-twenty years. That's a long time.

Thomas: Is there anything else?

Hsueh: I must say, Karen, I'm very pleasantly surprised by the kind of questions you asked. I'm still trying to figure out how do you know to ask all these very perceptive questions. I'm very much pleasantly surprised.

Thomas: Thank you.

End