

**THE BIRTH AND EARLY ADOLESCENT SCIENTIFIC
COLLABORATION BETWEEN
MEXICO AND THE UNITED STATES IN ENSENADA,
BAJA CALIFORNIA,
SINCE 1970.**

By: M. Carmen Chavez, Oceanographer

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The Birth and Early Adolescent Scientific Collaboration between Mexico and the United States in Ensenada, Baja California, since 1970.

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Part I. Introduction and civilian help.

In Ensenada, collaboration between Mexico and the United States began in the middle of the 1960's, when professors and several research scientists from Scripps Institution of Oceanography at the University of California San Diego in La Jolla visited Ensenada for brief periods to teach various courses to the first undergraduate students in Oceanology, at that time the only aspirants to such a career in Latin America (Fig. 1 and Fig. 2)

These pioneer students had to prepare for their courses from material in English only, even in the 1970's because "Oceanography" was such a young science that only publications in that language were readily available (Fig. 3 and Fig. 4). Many of the students became very skilled in understanding written English, but unfortunately they had frequent problems with conversation, inhibiting their interactions in scientific matters with English-speaking people (Fig. 5 and Fig. 6). However, some then were able to study for their Masters in Science or Ph.D. degrees in universities in the United States, initially at Oregon State University, and later close by at Scripps Institution of Oceanography of

UCSD, and also at San Diego State University (at that time called San Diego State College).

It was by these pioneers (Fig. 7), like Kazuo Nishikawa from Ensenada (standing, wearing glasses), returning to the School of Marine Science (now Marine Science Faculty) and presenting courses that the students there could have a much better comprehension of Oceanography. This was the beginning of the several scientific institutions existing in Ensenada today. Of course, the efforts and dedication from many people in both sides of the international border were very important for the birth of the “scientific city”, i.e. the city and port of Ensenada, today with more scientists per capita than any other city in Mexico.

Mrs. Helen Hill Raitt (Fig.8), Scripps Institution of Oceanography’s chronicler, author of *“Exploring the Deep Pacific”* (Norton, 1956), and one of the first women to sail aboard SIO’s research vessels was founder of “The Oceanids” and “People to People” programs. These are social organizations for providing support to UCSD’s foreign students and staff during their introductory period on campus. Helen Raitt was the most enthusiastic promoter organizing support for the library of the then School of Marine Science in Ensenada, and its students (Fig. 9 and fig. 10); many of us have good memories of her and her enthusiasm. She had considerable difficulty in convincing SIO’s researchers and staff to select and pack scientific journals and books that might be useful for our library. Many of us still remember those students’ years when several groups had the opportunity

at various times to live in the homes of People to People members or in UCSD's International Students' Center. This occurred during summer vacations spent by many students from the Escuela Superior de Ciencias Marinas taking English courses in the community of San Diego or SCUBA diving certification courses at SIO.

PART II. Several early and ongoing collaborations.

At CICESE (Center for Scientific Research and Higher Education in Ensenada), the students come primarily from other regions of Mexico, but also from Latin America and Spain. Dr. Ruben Lara, born in Ensenada and a former director of IAI (Inter-American Institute for Global Change Research) from 1993 to 1997, studied for his bachelor's degree in the School of Marine Science (ESCM), and for his M.Sc. at CICESE in Ensenada and for his Ph.D. at Oregon State University, Corvallis. After 1997 he returned to CICESE as researcher. Later he was also the Director of Pronatura Península de Baja California, a non-profit organization dealing with the conservation of nature in collaboration with Mexican authorities. Dr. Lara studied at CICESE under the guidance of Dr. Saul Alvarez Borrego, also a graduate from the School of Marine Science and from Oregon State University, who has been the youngest director of CICESE (from 1975 to 1989). Ruben Lara collaborated as Ph.D. thesis co-advisor with Dr. Stuart Hulbert from SDSU in a very extensive program on hypersaline lakes in the Salton Sea in Southeastern California. The project was funded by CICESE, but with field experiments and laboratory work at SDSU. Dr. Hulbert gave total support to this collaboration, in which CICESE's graduate students were supported as if they were full time students at SDSU. Scientific collaboration here was truly fundamental, similar to the enduring multiphased collaboration with Scripps Institution of Oceanography. Since 1983 Lara has collaborated with Dr. Edward Brinton from SIO-UCSD in La Jolla, who has been involved continuously with Latin American students there. At present Dr. Brinton is

Research Biologist Emeritus in SIO, studying euphasiids and zooplankton ecology in general. One special collaboration has been his research with Ruben Lara, together with Berta Lavaniegos from CICESE. About Ruben Lara, Brinton says, “he encourages communication, he makes you feel do ‘something’ “. And he adds that until Berta Lavaniegos came, there was no study of zooplankton being taught at CICESE, and that Ruben Lara usually arranged this sort of liaison, inviting specialists.

About the CALCOFI (California Cooperative Oceanic Fisheries Investigation) conferences SIO’s Edward Brinton recalls these were “probably the closest collaboration. It is social, it has always been a good social time and a good opportunity for people to get some experience with science. It has always been a good international event. If not for the Mexican participants the CALCOFI conferences would not have been so lively. “They gave it an international flavor”. He adds that the collaboration between Mexico and the U.S. is a good experience to understand what kind of research is possible in Mexico, and that “we have to learn this from every standpoint, getting people to become interested in things that are practical and possible to do, not so theoretical, although everybody is interested in models. There is an economic interest, but a research site is not just doing economic exploitation. Make people learn, tell them about things possible to do that they may have never thought of “. This collaboration has mainly been in helping students who are interested in thesis work.. No formal agreement was ever necessary.

When asked to summarize his feelings with regard to this collaboration and how he himself had benefited, Brinton answered: “each time I worked with somebody, these were very ambitious serious people. They would get literature, read it, learn how to identify organisms; they wanted their mistakes corrected. People at CICESE are pretty bright and they are serious in marine science. I benefited by following the work of some of them. With Berta Lavaniegos and Ruben Lara in the Gulf of California, you always learn something. That’s the advantage of teaching. It’s a stimulus. You do things that you probably would not do otherwise, in my case because I am mainly in research at SIO”. Brinton’s on-site collaboration in Ensenada has not continued because there have been no recent students undertaking the type of plankton ecological research that he dominates.

While head of Inter-American Institute for Global Change Research, with an office in Washington D.C., Ruben Lara had the opportunity to interact with people from the US’s National Oceanographic and Atmospheric Administration (NOAA), some of whose staff are science managers for international programs. The budget for IAI came primarily from the U.S. National Science Foundation, although it also had support from NASA, OEA, and the World Bank. Ruben Lara (personal communication) feels that until now, in Mexico, such work is not adequately recognized. However, later he did have a project with IAI.

As one current example of the well-developed sophistication of this Mexico-U.S. collaboration, scientists in Ensenada have worked in two NASA projects, one being Sea WIFS (i.e. Wide Field Sensor) which employs an ocean color sensor that measures chlorophyll *a*, and optical transparency. One of the principal investigators involved in this project, Dr. James Mueller from CHORS (Center for Hydro-Optics and Remote Sensing) at UCSD has worked in Mexico for many years. He states that the objective of the collaboration is to use time series of Sea WIFS images to model and monitor productivity in the Gulf of California, and to relate variability in productivity to large scale atmospheric forcing associated with the meteorological phenomenon EL NIÑO. There are various hypotheses as to the possible responses within the Gulf of California: for example, the long-recognized varved diatomaceous sediments in the Guaymas Basin. As a long-term goal this project tries to establish the criteria for evaluating observations of surface layer biological changes revealed in the sediments deposited during EL NIÑO. Near-term goals were the biological, optical and some physical measurements.

It is important here to emphasize this continuing USA project, Satellite Sensor “Sea WIFS”, which was initiated in 1993, just prior to Dr. Ruben Lara taking an office in Washington for the Inter-American Institute for Global Change Research (IAI). Cruises were carried out on board CICESE’s R/V *Francisco de Ulloa*. Dr. Ron Zaneveld from Oregon State University specializes in researching marine optics, and he is a major

component of this interdisciplinary project (R. Lara, personal communication). Zaneveld has worked with scientists of Ensenada for many years.

Sea WIFS has been primarily a program for generating data on the optical and biological properties in the Gulf of California. Much of such information is called “ground truth”, that is, field information for calibration and evaluation of each new sensor being placed in a satellite to measure color of the ocean. This project continues the observation of the color of the ocean begun aboard Nimbus 7 with the Coastal Zone Color Scanner (from approximately 1978 to 1986). From 1986 until 1993, there had not been a sensor on board a satellite. The Orbview 2 USA satellite, a joint venture from NASA and a private company, is being used. The Sea WIFS sensor has been in orbit since July 1997; until October 1997, the time of this interview, it had been still in a calibration status. Dr. Ruben Lara explained that the Gulf of California is a region with very strong gradients of all variables, thus allowing measurements of large changes in a short period of time. Additionally, for studies by remote sensor, one of the greatest advantages of the Gulf of California is its very low percentage of cloudiness. Obviously this program is not being done as it might have been in the 1970’s, when Mexico did not have the human resources for doing such research; today, side by side with USA scientists. This is true collaboration, by equals at the same level of knowledge. This type of research is so important to develop; it sustains the interest in collaboration on the part of the U.S., but gives Mexico access to high technology, here, very expensive optical sensors not yet available there.

Another outstanding collaboration has been that of Francisco Suarez with SDSU's Dr. Gordon Gastil and other U.S. scientists. Francisco Suarez, who had been an undergraduate student at the Marine Science School in Ensenada, studied for his M.Sc. at San Diego State University from 1975-1977. His thesis advisor there was Dr. Patrick Abbott, a field geologist. Francisco Suarez joined CICESE in 1977. From 1982-1990 he was director of its Division of Earth Science, and from 1990-1997 he was Administrative Director there. He had worked in collaboration with SDSU's Gordon Gastil since 1963 at the School of Marine Science in Ensenada, mapping the geology of Baja California. Based at CICESE, Francisco Suarez (personal communication) worked from 1985-1986 with Gastil studying the San Miguel Fault, and jointly taught some courses on field geology of the Sierra San Pedro Martir, during the summer. His scientific collaboration with U.S. scientists continued in 1984-1988 with Dr. Gordon Ness from Oregon State University on the tectonics of the Gulf of California. Francisco Suarez worked in land while Ness collected geodesic data on board an OSU research vessel. Collaborating with geophysicist Dr. Thomas Rockwell from SDSU from 1989 until the present Francisco Suarez has studied the paleoseismology in northern Baja California. Another enduring Suarez F. collaboration (from 1992-1993 until today) is that with Dr. Timothy Dixon (of Caltech's Jet Propulsion Laboratory in Pasadena and now of University of Miami). They are working on geodesic measurements in the Agua Blanca Fault. Francisco Suarez also reports field work with seismologist James Brune, University of Nevada, but until recently from SIO, not only in Baja California, but also in Oaxaca and in Guerrero. He notes that many of the strongest earthquakes that occurred

from 1979 to 1982 were studied jointly. With regard to his early collaboration with SDSU's Gordon Gastil , Francisco Suarez tells us that Dr. Gastil is recognized in Mexico as a pioneer in the geology of Baja California, because he knows it as "his own house".

Another undergraduate from the School of Marine Science in Ensenada, Vinicio Macias, studied from 1981-1984 for his M.Sc. in physical chemistry at the University of the Pacific in Stockton, California. From 1985-1992, he worked with Dr. James Mathewson for his Ph.D. in a Joint Doctoral Program on Analytical Chemistry at SDSU, there researching also part-time with Dr. Albert Zirino in electro-chemistry. Albert Zirino collaborated with Vinicio Macias from approximately 1990-1998, at the Instituto de Investigaciones Oceanológicas (IIO: Institute for Oceanological Research from the Autonomous University of Baja California), initially with symposia led by Vinicio and Zirino. Vinicio Macias tells us that Zirino, a person with international reputation, strongly reinforced the group at IIO. In 1999, ready to retire from the U.S. Navy, Dr. Zirino received a job offer from IIO, simultaneously receiving one from SIO; he chose SIO.

On March 1999, at the time of this interview, Dr. Vinicio Macias was working in the Southern California Coastal Water Research Project that coordinates activities of several state of California agencies and the nation's EPA (Environmental Protection Agency). On that date, a meeting was held in San Francisco with one of the agencies in the group,

the EMAP (Environmental Monitoring and Assessment Planning). Vinicio Macias as a member of its Steering Committee, as the Mexican liaison/counterpart. They study the Southern California Bight, from Point Conception south to Punta Colnett, and also to Ensenada.

PART III. The biography/quotations of Nicolas Grijalva, the key Mexican pioneer.

To make all this possible it was necessary to await the fulfillment of a dream, the dream of the founder of CICESE (Centro de Investigación Científica y Educación Superior de Ensenada), Dr. Nicolas Grijalva y Ortiz. Nicolas Grijalva (Fig. 11) was the first Mexican to obtain – in 1964 - a Ph.D. in Oceanography (Natural Science); he studied for it in Germany (University of Hamburg).

In 1966, Dr. Charles S. Cox, a professor at Scripps Institution of Oceanography, who had been teaching physical oceanography for a while at the School of Marine Science in Ensenada as a volunteer, met Nicolas Grijalva at the Second International Oceanographic Congress, in Moscow. Cox told Grijalva about that small undergraduate school in Oceanography in the city of Ensenada. Nicolas Grijalva was at that time working at UNAM in Mexico City, but about a year later appeared at the house of Charles Cox, with whom he has been doing research ever since. In the late 1960's Grijalva, became the director of the Escuela Superior de Ciencias Marinas (now a faculty of the Autonomous University of Baja California: UABC, as in Spanish).

However, Nicolas Grijalva always kept the vision of also having in Ensenada an institution that offered students M.Sc. and Ph.D. program studies (Fig. 12). His dream did bring into being CICESE and later other similar institutions from which Ensenada one day could become a “university city”; as it now truly is. This dream became a reality

as a result of his meeting in Ensenada - in December 1969 - with the then candidate campaigning for the presidency of Mexico, Luis Echeverria Alvarez (Fig. 7). On that occasion Grijalva outlined his vision to the candidate; as president Echeverria then made it come into being.

As explained in Nicolas Grijalva's own words: "I made my studies in Mexico City, at the UNAM; then I continued in Paris, France, and finally studied Physical Oceanography in the Mathematical and Natural Sciences Faculty of the University of Hamburg in Germany; my minors were physics and mathematics. I got my Ph.D. in July 1964 and then returned to Mexico where I worked at the National Autonomous University of Mexico (UNAM)."

"In 1966, during a Meeting in Moscow, I met Dr. Charles (Chip) Cox, and we became good friends. He invited me to work with him at Scripps Institution of Oceanography in the University of California San Diego in La Jolla, California and to help develop a small School of Marine Sciences which already existed in the town of Ensenada, Mexico."

In 1968 I went to work with Chip. I did scientific research there, I also taught. Then I went to Ensenada and became director of the Marine Sciences School. During my time in office, I did all I could to make a proper institution. The curriculum was changed. The students graduated. They obtained proper jobs. Even a new building for the school was

constructed (Fig. 9). As the years passed, I entertained the idea of a scientific center in Ensenada.”

He continues explaining about the reasons for having such a center; mainly that Mexican authorities were spending great amounts of money by sending students abroad to obtain their education. Also, at that time there were no physical oceanographers in the country; they could well be educated in Ensenada. This would improve greatly Mexican education, and the knowledge and experience of North American scientists nearby could be tapped.

Nicolas Grijalva thought that this center would be another pole of education; at that time such only existed in Mexico City. He remembers: “In 1969 Luis Echeverria was in his presidential campaign, traveling widely in the country. I received him in the building of the Marine Sciences School in Ensenada. He and I had a private talk in which I explained my ideas to him about a scientific center. He was agreeable. He promised to remember when he was in office. Next year he was elected president, and he called me and asked me to come to Mexico City. The beginnings of the new center.”

“A new scientific federal foundation in the country was initiated. It was CONACyT (Consejo Nacional de Ciencia y Tecnología). I was asked to approach Mr. Eugenio Mendez Docurro, the General Director, and Dr. Raul Ondarza, Head of Scientific Research. As a first step, they gave a grant to UNAM to carry out a program by me in

Ensenada. To do this I had to convince the principals, faculty and staff in UNAM. It was a painful experience.”

“In 1971 the grant was approved and I took faculty members, as well as administrative personnel to Ensenada. But after a year the UNAM took away their support and I had to continue alone. That year was full of events. Some of them were negative. The worst was a vice in many educational institutions in Mexico; politics. But on the other hand, I was able to carry out some positive ones in 1972; I organized a national scientific meeting there, which was attended by scientists from all over Mexico. North American scientists also attended.”

Nicolas Grijalva adds: “The scope of seriousness of the center became more defined (Fig. 15). On the Mexican side scientists became aware of the great potential for collaboration with North Americans. This may have been the activity that set the whole thing on wheels (Fig. 16). The disciplines contemplated in Ensenada were physics, oceanography, geophysics, electronics, and astronomy. The idea that I had was to give the new institution a big push. Then it would gain momentum that would persist for many years.”

And so it did; today CICESE has international recognition as a scientific institution (Fig. 17 and Fig. 18). After the School of Marine Sciences, (now Facultad de Ciencias Marinas) and after the establishment of CICESE, the Institute of Astronomy and later the Institute of Physics of the UNAM were established in Ensenada, too. Graduate students

then played an important role in teaching at the “preparatoria” level, which is studied in Mexico just before an undergraduate university career. The Ensenada campus added more career options, and other universities from Mexico also offer graduate studies here in Ensenada.

Nicolas Grijalva also explains that “a strong connection with Scripps Institution of Oceanography was built” when CICESE started, and that in the next year it was extended to several departments of the University of California San Diego, to the San Diego State College (now university), the University of Arizona at Tucson and to Mount Vernon University in Houston, Texas.

At this same time CONACyT was restructured. The new chairman was Gerardo Bueno. Grijalva continues “much attention was given to the new institution in those days. I invited him and a group of important politicians and scientists to visit Ensenada and also La Jolla where they visited the Scripps Institution of Oceanography and had talks with the faculty. After this, they were convinced of the feasibility of the new institution and it was alive and kicking.

There were some important facts that linked themselves together to give life to the new center of research and education. They were: the neighborhood of Scripps Institution of Oceanography, and the University of California, San Diego, and the willingness of its research and administrative staff to work with CICESE; the existence of natural research

areas in the vicinity, like the Gulf of California and the Baja California Peninsula; the acceptance of Mexican scientists to move and work there; the political *zeitgeist* and the willingness of the Mexican Federal Government. As far as I am concerned I think of the many positive facts that contributed.”

PART IV. The close involvement and dedication for many years of Jim Brune, the devoted and loyal North American.

James N. Brune (Fig. 19), earlier a Director of the Seismological Laboratory of the California Institute of Technology, Pasadena was working at the Institute of Geophysics and Planetary Physics (IGPP) in SIO from 1969 to 1989. He started his work in Baja California in 1978, before there were seismicity studies yet being done at CICESE, but he had commenced his collaborations in Mexico in 1965 with the Institute of Geophysics from UNAM. His first Mexican graduate students were Alejandro Nava, Alfonso Reyes and Luis Munguía. More than three decades later, Professor James Brune still has an office in CICESE, which is used occasionally by invited scientists when he is not in Ensenada. Since 1989 his principal academic base has been the University of Nevada, Reno.

Dr. Cecilio Rebollar, who was Head of the Seismology Department of the Division of Earth Sciences of CICESE from 1995 to 1999, had worked in collaboration with Dr. Brune from 1973 to 1977, when Brune was in charge of a seismological network around the Gulf of California. This network had been assembled by 1969 under Dr. Cinna Lomnitz from UNAM. Following that early collaboration, Cecilio Rebollar worked for his undergraduate thesis at the Instituto Politécnico Nacional (IPN: National Polytechnical Institute). All the initial earth sciences graduates at CICESE worked there

in projects that helped them finish their undergraduate thesis. Some students came from the Autonomous University of Baja California (UABC), others from UNAM, still others from IPN. The students that came from Mexico City received scholarships and traveling expenses to study at CICESE. Cecilio Rebollar (Fig. 11) then worked with James Brune of IGPP in La Jolla in studies of micro-seismicity in the Agua Blanca and San Miguel Faults.

Today, their scientific relationship is as colleagues, aiding, suggesting, reporting on land geophysics (Fig. 20). CICESE's scientists work now at the same research level that US scientists do. Cecilio Rebollar tells us that James Brune is like their "father", adding, "so every time that he comes to CICESE we treat him very well". Brune now has several students at CICESE who do research there. Cecilio Rebollar remembers that when Dr. Luis Munguía, Rebollar himself and other students were going to enter Ph.D. programs at universities outside Mexico, James Brune designed a special test for them, sponsoring them with a letter of recommendation. From that group of students, Luis Munguía studied at SIO, Cecilio Rebollar at the University of Alberta in Canada, and others at University of Texas Institute of Geophysics, Austin.

Dr. Luis Munguía tells us that Dr. James Brune has been one of the initiators of seismology in Mexico. Luis Munguía was, until September 2001, Director of the Division of Earth Sciences at CICESE, and he is one of James Brune's earliest Mexican graduate students. He received his masters degree at CICESE in 1973; later (1976-1982) he

studied at UCSD's SIO for his Ph.D., and stayed there one more year as a post-doc. The topic of his Ph.D. thesis is: "Strong Ground Motion and some Mechanism Studies for Earthquakes in the Northern Baja California-Southern California Region". His own scientific collaboration with James Brune started before 1976.

Commenting on James Brune's ongoing collaborations in Mexico, Luis Munguía cites the seismological network (Fig. 21), and the accelerometers network in Mexicali. In all, Brune has been working with Mexico for more than 30 years. Munguía adds "Jim is an excellent person, very fine and patient with his students. Day to day, we always learn something when we talk with him." James Brune comes to CICESE periodically and gives seminars; additionally, he reminds them when it is time for a seminar. Luis Munguía thinks that this is a very nice thought on Brune's part, because they know that they can count on him. Munguía considers this association "perfect, wonderful". With regard to Brune's attitude towards Mexico, Munguía explains that it is very positive; "every time he comes, he shows interest in what is happening here".

In reality, then, perhaps the foremost and most lasting example of collaboration between CICESE in Mexico and Scripps Institution of Oceanography in California, has been that in seismology in cooperation with Jim Brune during his years in La Jolla. Overall, he has 21 publications with CICESE scientists, ranging from the 1970's to 1995, with topics

such as “Seismicity and Tectonics of the Northern Gulf of California Region, Mexico: Preliminary Results, Related to Cerro Prieto”; “Source Mechanism and Aftershock Study of the Colima, Mexico Earthquake of January 10, 1973 in Inland Mexico”; and “Source Spectra and Site Responses from P and S Waves of Local Earthquakes in the Oaxaca, Mexico Subduction Zone” (1995). Fittingly, researchers from CICESE that have published most with Jim Brune are Alejandro Nava, Luis Munguía, Cecilio Rebolgar and Alfonso Reyes (Fig. 22).

In 1997, the Seismological Society of America awarded James Neil Brune its Seventeenth Harry Fielding Reid Medal (Fig. 23), (See: Seismological Research Letters, Vol.68, No.5, pp. 757-762, September/October 1997). CICESE itself also awarded him a Commemorative Plate in friendship and recognition some years ago.

With regard to the Seismological Society of America’s Seventeenth Harry fielding Reid Medal, the following was cited by his colleague Ralph J. Archuleta:

“Jim has shared his work and ideas with more than 151 individuals including mentors, colleagues and students”.

“Jim knew that plate tectonics was more than a hypothesis and realized the importance of making measurements closest to the source. So in 1969 he initiated a joint seismic

network (Fig. 21) with Mexican seismologists, in particular, Cinna Lomnitz, to measure earthquakes in the Gulf of California, the spreading center for the San Andreas System.”

“Perhaps there is no area of earthquake research that Jim has had more profound effect than in the study of the earthquake source itself. Today we take it for granted that earthquakes are complex events with heterogeneous distributions of slip.”

“If there is any one paper with which Jim is identified it is his 1970 paper “Tectonic Stress and the Spectra of Seismic Shear Waves from Earthquakes”. This paper has been cited so often, with respect to the size of the field, that in 1987 the editors of the Scientific Citation Index dubbed it a Citation Classic”.

In this citation Archuleta also said: “I would certainly be remiss if I did not call attention to Jim’s continuous collaborative efforts in earthquake research in Mexico (Fig. 24 and Fig. 25). Starting with the seismograph array in 1969, the digital accelerograph array in Mexicali Valley, the present northern Baja California array, and the Guerrero strong motion array, Jim has maintained his collaboration for nearly 30 years. It’s more than just instruments and data. Jim is a fully vested partner in the education of Mexican students and the evolving seismological research programs”.

M. Sc. Luis Mendoza from CICESE explains about current research with Dr. James Brune: “The project RADIUS which started in 1998 in the city of Tijuana was sponsored by the United Nations with international advice from GeoHazards International (GHI) where Dr. Brune is a member of the Board of Trustees. This project is now included in the development plans of the municipality. In 1999-2000 GHI-CICESE gave advice to Tijuana and Mexicali in the GESI (Global Earthquake Safety Initiative) project.

The United Nations evaluate the results of GESI applied in 29 cities of the world and recommends its application to 300 more cities. The GHI-CICESE collaboration (Fig. 26) agree to apply GESI to 10 more cities in the country of Mexico. Dr. Brune takes part in a meeting with CONACyT, UNAM, NATIONAL CITY PROTECTION, CENAPRED and Non-Governmental Agencies in Mexico City, to present the initiative and to ask federal and state officials for support.

At present, the Mexican Earthquake Safety Initiative is in process, under the coordination of CICESE and GHI as international advisor.

CICESE and GHI agree to create a non-profit organization at international level”

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FIGURE 1. First building of the Escuela Superior de Ciencias Marinas (School of Marine Sciences), created under presidential decree of December 15, 1960.



FIGURE 2. Biologist Pedro Mercado, the first director (1960-1966) of the Escuela Superior de Ciencias Marinas.



FIGURE 3. President Adolfo López Mateos visits the Escuela Superior de Ciencias Marinas in 1962.



FIGURE 4. One of the periodic 1960's visits to Scripps Institution of Oceanography for soccer games between SIO and students from the Escuela Superior de Ciencias Marinas. The gentlemen in suit are professors Carl Hubbs (left) and Pedro Mercado.



FIGURE 5. Staff and students from the first three generations of the Escuela Superior de Ciencias Marinas, in the first building, which was an old warehouse next to a federal “preparatoria” school.

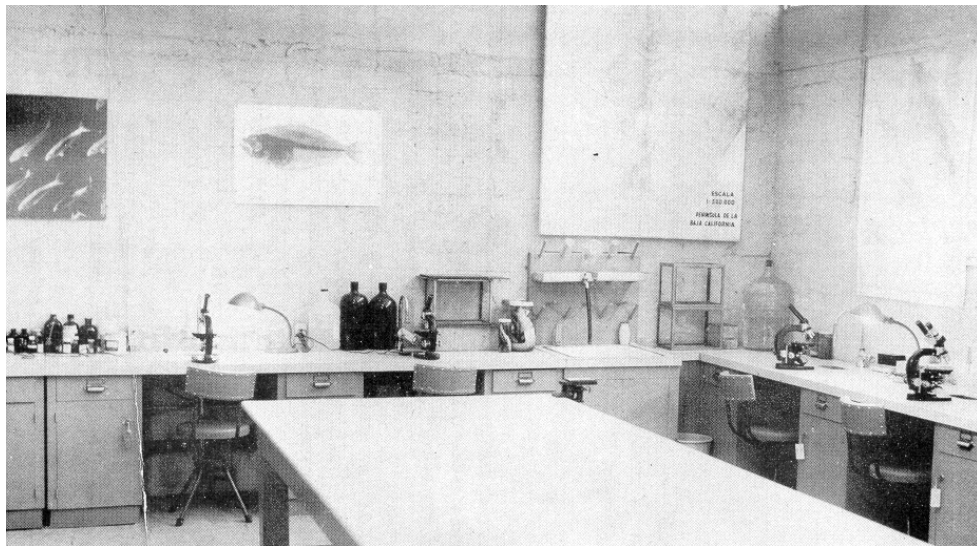


FIGURE 6. First laboratory of the Escuela Superior de Ciencias Marinas.



FIGURE 7. President Luis Echeverría Alvarez (seated center) visits the Escuela Superior de Ciencias Marinas on January 30, 1971. Oceanologist Carlos de Alba Pérez (left) was the first graduate of ESCM to become its director. Oceanologist Katsuo Nishikawa was the director of the Instituto de Investigaciones Oceanológicas (Institute of Oceanological Research) in Ensenada.



FIGURE 8. Mrs. Helen Raitt, Scripps Institution of Oceanography's chronicler, wife of Dr. Russell W. Raitt, at home in La Jolla about 1965. In this picture she is with Dr. Carl Eckart, director of SIO's Marine Physical Laboratory (1948-1952).



FIGURE 9. The Escuela Superior de Ciencias Marinas under construction, in 1974 (aerial view).



FIGURE 10. Dr. Roberto Millán, present (2006) director of the Facultad de Ciencias Marinas.



FIGURE 11. Dr. Nicolás Grijalva (checked jacket, rear) founder of CICESE, with first graduate students (Cecilio Rebollos fourth from left to right, rear).



FIGURE 12. CICESE's earliest staff members, with Dr. Nicolas Grijalva (center).



FIGURE 13. CICESE's computer room in the 1970's.



FIGURE 14. CICESE's staff members in the 1980's.

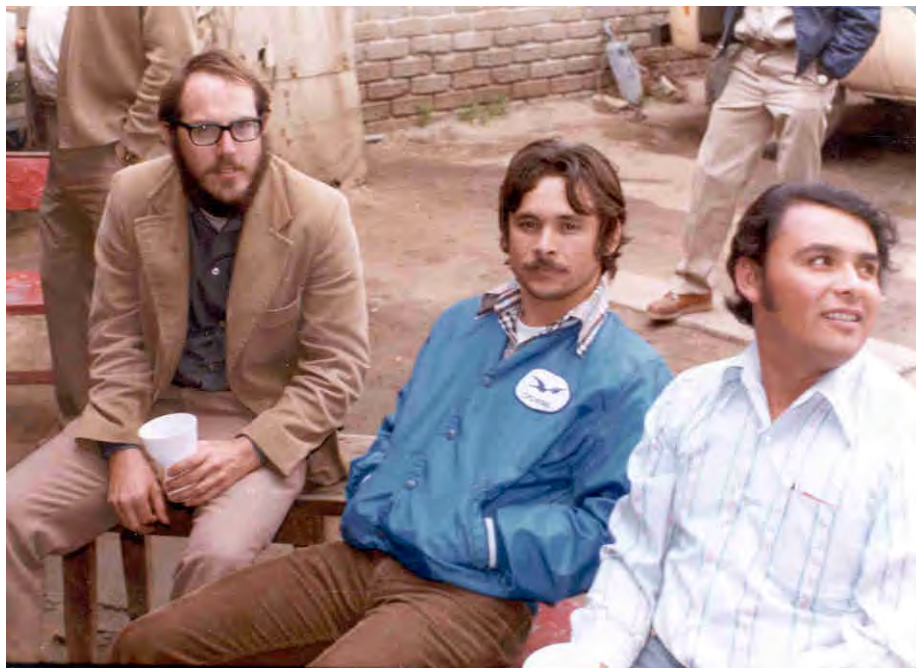


FIGURE 15. Javier García of CICESE's Meteorology Department, and Manuel Santana of the Administration with former meteorologist Gerald G. Vogel (left).



FIGURE 16. CICESE's computer's techs in the 1970's.



FIGURE 17. CICESE's Research Vessel Francisco de Ulloa, based at Ensenada.



FIGURE 18. CICESE's present facilities.



FIGURE 19. Dr. James Neil Brune.

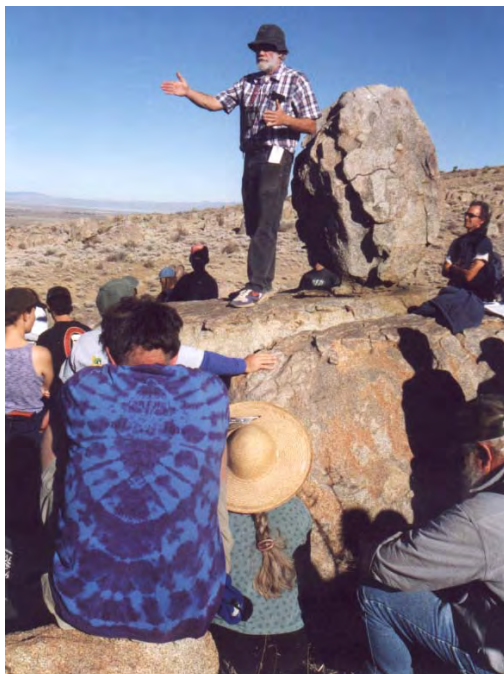


FIGURE 20. Dr. Jim Brune conducting geological field trip.



FIGURE 21. RESNOM (Red Sismológica del Noroeste de México: Seismological Network of Northwestern Mexico) operating since 1978.



FIGURE 22. Dr. Jim Brune with Dr. Raul Castro, M.Sc. Alfonso Reyes and Dr. Luis Munguia (from left to right), of the CICESE Earth Science staff.



FIGURE 23. Seventeenth Harry Fielding Reid Medal, awarded to Dr. Jim Brune in 1997, by the Seismological Society of America.



FIGURE 24. Dr. Jim Brune being interviewed for TV after a meeting in Mexicali (1998).



FIGURE 25. Dr. Jim Brune (center) with some of his Mexican students and associates at CICESE.



FIGURE 26. Dr. Jim Brune (center, sweater) with members of GeoHazards and CICESE in Palo Alto, California (2002).