It was in early November 1964 that I first saw the magnificent Arecibo 300 meter radar/radio telescope. Thomas Gold, then Director of Cornell’s Center for Radiophysics and Space Research, had invited me to visit the observatory, then named the Arecibo Ionospheric Observatory, in order for me to decide whether to accept an offer to be a research Associate at the observatory and use the telescope for radio astronomical research. I was completing my Ph.D. work at the National Radio Astronomy Observatory in Green Bank, West Virginia, where I had used the then new 300 ft transit radio telescope to study interstellar clouds and planetary nebulae.

It was love at first sight so to speak, but much more so when my first observations of planetary nebulae with Arecibo resulted in easy detection of all targets and with high signal to noise ratios (Slide 1).

All one needed was a few short sleeve shirts and lots of observing sources.

Even though at the time Arecibo functioned at low frequencies, the ingenuity of the electronics staff managed to make observations up to 611 MHz. Of course, the telescope visibility was restricted and my best sources were outside the visible cone. Yet again with no fear we built an extendable boom 32 ft long (Slides 2 & 3) and when attached at the edge of the paraxial structure one could see about five degrees extra in declination and thus
observe at transit the giant Orion nebula at the south side and the Andromeda galaxy at the north side.

Slides 2 & 3: Photos of the boom

Arecibo was an exciting place to be in the late sixties, particularly with the discovery of pulsars, where the Arecibo telescope was the ideal instrument to study these peculiar new pulsating radio sources. Visitors from all over the world used to stream in and out and having lunch with world famous scientists was a usual occasion. The added pleasure was that the observatory was not a monolithic scientific enterprise, but was the foremost world observatory for ionospheric studies, planetary radar studies and radio astronomy. Of course the observatory became much more prominent in radio astronomy following the upgrade in 1974 that allowed observations at 21 centimeters and higher frequencies.

During the fifty years of extraordinary research much of the effort was put in by graduate students who worked hard for their research programs (one was even awarded the Nobel Prize).

Even more recently, the Gregorian upgrade and the ALFA multibeam observing system have added significant observing power to the world’s most sensitive radar/radio telescope.

Fifty years of pioneering science has made Arecibo one of the world’s pre-eminent facilities and we congratulate the entire staff for their hard work and dedication to the Arecibo “El RADAR”.

I am very sad to have missed these celebrations, but I am having surgery so I can walk again without pain, I hope.

Here are a few highlights of research work with graduate students. HI absorption/emission studies across the galactic plane in the direction of background radio sources enabled us to measure the distribution of the HI spin temperature and discover the not strongly absorbing interstellar phase with temperatures of hundreds of degrees and even above
1000 K. (slide 4). At the same time we were observing radio recombination lines from HII regions in a large survey (Slide 5). We were observing HI from binary galaxies when we accidentally detected a large HI region with no apparent optical counterpart. This Leo cloud seems to be a primordial baby galaxy in formation (Slide 6). Our work with binary galaxies continued with wide pairs (Slide 7), and close pairs (Slide 8), and at the same time we were also conducting a survey of OH/IR stars. At present we are using the ALFA seven beam system to survey the visible galactic plane to detect radio recombination lines (Slides 9 & 10). In one band we are able to detect about ten such lines and coadding these gives a very good S/N value for our detections.

Slides 4 & 5: Spin temperature of neutral hydrogen (left) and data from the radio recombination line survey (right)
Slide 6: The Leo Cloud

Graduate students have played the major role in this body of work from Alan Parrish, John Dickey, Vern Pankonin, Harry Payne, Sean Colgan, Peter Silvergate, Steve Schneider, George Helou, Jayaram Chengalur, Tyler Nordgren, Bin Liu, and with the collaboration of the theoretical astrophysicist, the late formidable Edwin Salpeter.
Slides 7 & 8: Papers on wide (left) and close (right) pairs of galaxies

Fig. 7.—The 12 H II lines in the direction of the H I region, S245. The HI85 and HI76a spectra are spoiled by H I. Note that due to the velocity frame set in Section 3, the H I, Her, and CIV lines lie at +61, +61, and +61 km s\(^{-1}\), respectively, from the origin. The drop off on the left-hand edge of the spectrum, from ~300 to ~250 km s\(^{-1}\) is caused by the polynomial baseline fitting, and the region has not been included in the calculation of the rms noise in the spectrum.

Slides 9 & 10: Radio recombination data from the 7-beam survey of the Galactic plane showing individual spectra (left) and the coadded data (right).

We wish to think that the best is still to come from Arecibo. There is enormous potential in using the large collecting area of the telescope and we are looking forward to the next 50 years.