The color of science

UNAM’s Institute of Mathematics:
70 years after its establishment

Carlos Prieto de Castro

When Dr. Javier Bracho, director of the Institute of Mathematics, asked me to write a historical overview of the institute, the first thing that came to my mind was: "Why me?" Immediately I got the answer: "With age comes wisdom".

And although I am not the oldest one, I realized that 50 years have already passed since I first set foot in the facilities of the University. My father took me to San Ildefonso to collect information about the enrollment process in the high school. Then it was still Prepa 1 and there I received my first surprise: my father introduced me to none other than Carlos Graef, who still worked there. Afterwards, my father and I remembered what Sotero Prieto—my uncle Sotero—used to say: "The three most brilliant minds in Mexico are Alberto Barajas, Nabor Carrillo and Carlos Graef." It was then that I started to learn about the great minds that kick started mathematics in Mexico and established this Institute.

The history of the Institute, which I write, is a very personal account and does not have any rigor. In my opinion, the history goes back to the second decade of the twentieth century when in 1912 Sotero Prieto, a young man of only 25 years, taught the first course of advanced mathematics, Theory of analytic functions, in the School of Advanced Studies in the recently inaugurated National University of Mexico. With this and other courses offered in the National High school, he ignited the light which enticed many people. The most important at that moment were Manuel Sandoval Vallarta and Alfonso Nápoles Gándara. The former was student of don Sotero only during high school, but Nápoles stayed with Sotero for several years, until Sotero sent him to the Massachusetts Institute of Technology (MIT) to study his PhD.

Instead of obtaining his Ph.D., don Alfonso chose to study 14 subjects per semester for two years. Courses which he passed with excellent grades. He did that in order to acquire the biggest possible quantity of knowledge and to pass it in Mexico. His passion, nevertheless, was differential geometry which he had learnt with the famous Danish mathematician Dirk Struik.

In my personal opinion, a more formal precursor of the Institute of Mathematics was the establishment, in 1932, of the Mathematics Division of the Antonio Alzate Scientific Society, where Sotero Prieto gathered those interested in mathematics and physics to explain and discuss their research topics. There Sandoval Vallarta spoke of cosmic rays, Nabor Carrillo of celestial mechanics, Alfonso Nápoles of differential geometry. Also there don Sotero gave a famous course about the history of mathematics, based on the works of Jean-Etienne Montucla and Florian Cajori.

In 1934, when Dirk Struik visited Mexico and thanks to the success of his lectures, the rectorate of the university, presided by Manuel Gómez Morín considered appropriate to create a School of Physical and Mathematical Sciences which would not be attached to Philosophy and Letters, instead it had to have some freedom and be more closely associated with engineering and chemistry. In January of 1935,
the creation of the School was approved. Its first
director was also the first director of the School of
Engineering, Ignacio Avilés, soon to be replaced by
Ricardo Monges López.

In 1937, engineer Monges, director of the recently
created National School of Physical and Mathematical
Sciences, precursor of the School of Science, requests
the Council of the University to grant their Ph.D. to
Jorge Quijano and Nápoles Gándara without
presenting the corresponding examinations due to the
lack of qualified personnel which could apply them in
Mexico.

That same year, Monges López proposes to the
rector, Luis Chico Goerne, the creation of the Institute
of Physics and Mathematics Research, which began its
activities on 1 February, 1938 under the management
of Alfonso Baños.

In October of 1938 when Gustavo Baz was rector of
the university, the project to create the School of
Science and Institutes related to each undergraduate
program taught in it was proposed to the Council of
the University. In November 1938, the Council of the
University approved the project to create the School of
Science and the Institute of Mathematics and
transform the Institute of Physics and Mathematics
Research into the Institute of Physics. On 1 January,
1939 the School of Science starts offering courses. The
Institute of Mathematics begins activities on 30 June,
1942 with Alfonso Nápoles Gándara as its first
director, who was successful in the efforts he had led
after the tragic death of Sotero Prieto in 1935, creating
an institution which could teach mathematics, and
another one which could create new knowledge.

The research in the Institute was organized in three
divisions: pure mathematics, in charge of Alberto
Barajas Celis and Roberto Vázquez García;
foundations and logic in charge of Francisco Zubieta
Russi and applied mathematics in charge of Carlos
Graef Fernández. Nápoles Gándara and these four
young researchers, that at that moment or shortly
before had finished their master’s degree, were the
whole members of the Institute. Afterwards, one by
one other enthusiastic members who graduated
from the School of Science joined in. The Institute was
located in a chamber of the first floor of the Palacio de
Mineria having a view to Tacuba Avenue and the
street of La Condesa.

In 1943 and 1944, George David Birkhoff visited the
Institute of Mathematics on a program sponsored by
the U.S. Government designed to supervise the
development of mathematics in Latin America and
especially in Mexico. The influence that this program
had over the first researches was very significant,
especially in the research done by Alberto Barajas and
Carlos Graef Fernández in mathematical physics and
the research done by Roberto Vázquez and Javier
Barros Sierra in geometry. As a result of this working
relationship, Barajas and Graef visited Harvard
University in 1944 and 1945.

During that time George David Birkhoff and some
of his colleagues at Harvard organized, with great
success, a campaign for the donation of books and
journal collections to the Institute’s library. Today this
library is named Sotero Prieto, and that was the first
step taken to establish the most important library of
mathematics in the country.

After the sudden death of Birkhoff in 1944,
Solomon Lefschetz, one of the most brilliant
mathematicians of the 20th century was appointed to
take care of mathematics in Mexico. His influence in
the development of mathematics in Mexico is
prodigious. It is not an accident that the Mexican
government conceded him the Order of the Aztec
Eagle. Lefschetz was appointed extraordinary
researcher and he visited Mexico every summer. If I
remember correctly, his last visit was in 1966, the same
year that Nápoles Gándara’s term ended and Roberto
Vázquez took office.

Among all good things that Lefschetz did for the
Institute was that he managed to help undergraduates
from the School of Science in pursuing graduate
studies in the U.S., particularly in Princeton
University. Such is the case of Roberto Vázquez, Félix
Recillas, Emilio Lluis, Guillermo Torres, Samuel
Barocio, José Ádem and Humberto Cárdenas. He also
supported Samuel Gitler, Francisco González Acuña,
Santiago López de Medrano and Alberto Verjovsky.
When University City was built, the Institute leaves its office in the Palacio de Minería and uses for the first time floors 6 and 7 of the Tower of Science. This location had to the east a beautiful view of the Faculty of Medicine with its mural by Francisco Eppens, and to the west, the magnificent campus, the Tower of the Rectorate of the University and the Central Library with its marvelous mural by Juan O’Gorman. Below the Tower of Science, at one side of the old auditorium of the School of Science, we used to enjoy the mural of José Chávez Morado which shows the figures of Nabor Carrillo, Alberto Barajas, Carlos Graef, Alberto Sandoval and others, whom we greatly miss because they are symbols of our scientific tradition.

In 1972 and until 1984, Humberto Cárdenas succeeds Roberto Vázquez as director of the Institute. During this time, the Institute had an amazing growth, and for the first time we use the building in which the Institute is currently located. It is also during his term that the project Guanajuato is launched, which finally had as outcome the creation of the Center of Research in Mathematics (CIMAT), in Guanajuato. Raymundo Bautista is appointed director from 1984 to 1994, difficult years due to the economic crisis. In those times the National System of Researchers is created in order to help researchers who did not migrate to another country or to some private institution. Nevertheless, the library of the Institute was substantially enlarged. Also the Unit of the Institute in Morelia begins its activities. In November 1992, Alfonso Nápoles Gándara, aged 95, dies. Five years before, he had been the first member of the Institute of Mathematics to receive the National University Award in the teaching of exact sciences. Up to now 15 members of the Institute have received that prize, also six have received the National University Recognition for young academics. In 2012, María Emilia Caballero obtained the one for teaching and José Antonio de la Peña the one for research.

Three members of the Institute have also received the Mexican Academy of Science Award, another one the Luis Elizondo Prize and one more the National Award of Science.

During the term of Luis Montejano, from 1994 to 1998, the Unit Cuernavaca began its activities, and during the term of José Antonio de la Peña, from 1998 to 2006, the north wing of the Institute was enlarged, opening new offices for scholarship holders, for computing and for the recently opened communication office. The library was also enlarged making it more attractive and comfortable. Javier Bracho, director since 2006, and now in his second term, enlarges and makes more comfortable the coffee room, consolidates the Morelia Unit, making it the Center of Mathematical Science, and starts the operation of the Oaxaca and Juriquilla Units. He also makes possible the dream of many researchers: to have an auditorium that fulfills the needs of the Institute.

In that way, UNAM’s Institute of Mathematics can continue to be in the avant garde in the research, teaching and popularization of mathematics.

Carlos Prieto de Castro was born in Mexico City. He studied physics and mathematics in the School of Science in the UNAM. There he obtained his master’s degree in mathematics. He obtained his PhD. degree at the University of Heidelberg, Germany. He is a researcher in UNAM’s Institute of Mathematics, and he is member of the National Researchers System (SNI). His research field is algebraic topology. He is member of the Mexican Academy of Science. He obtained the National University Award in 2009 in the field of exact sciences. He has written half a dozen books and around 70 articles both of research as well as science popularization.

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