Ladies and Gentlemen,

Thank you for inviting me here to help celebrate this momentous occasion—the 50th Anniversary of the founding of the Vacuum Society of Japan (July 12, 1958). I am here representing the International Union of Vacuum Science, Technology, and Application—IUVSTA. IUVSTA is a society of societies with 32 member nations and VSJ is one of our larger members. In total, we represent more than 15,000 scientists, engineers, and technicians world-wide who work in vacuum-related fields. In aggregate, we provide a world-wide platform for the promotion, proliferation, and education in fields of interest to IUVSTA. As President of the Union, it is my pleasure to congratulate you for 50 years of contributions through collaboration and education, to advance the forefront of basic research, applied research and development, and manufacturing and marketing in areas related to vacuum science, technology, and its practical applications. It is a remarkable achievement.

50 years has past, it is hard to fathom. In 1958, I was 7 years old and about to enter elementary school. The launch of Russia’s Spudnik spacecraft which took place on Oct. 4, 1957, less than a year before, had shaken the free world and galvanized us into action. Internationally events took place that year that would open up whole new areas of opportunity for my generation—and I took advantage of them. Vacuum science and technology was a new field and in the right place at the right time to take full advantage of what I feel was the “golden age of scientific discovery.” Vacuum S & T was being organized into national professional societies and Japan was at the forefront of this movement.

Let us look for a moment at what Vacuum S & T has enabled that has effected society and mankind because our legacy and contributions to scientific discovery is impressive. I tend to group these contributions in 4 areas: 1) scientific techniques that require vacuum, 2) processing techniques for material design that require vacuum, 3) the study of phenomena which occur in vacuum or a controlled environment, and 4) technologies developed that required the first three.

1. Scientific techniques that require vacuum include:
   a. those that depend on charge particle probes such as electron and ion-based spectroscopies and mass spectrometry
   b. particles that need to travel a distance without a collision
   c. fundamental surface science (chemistry/physics/material properties of surfaces)

2. Processing techniques—thin film deposition, lithography/patterning, manipulation of matter at the nano—length scale.

3. Phenomena which require vacuum or controlled environment—including accelerators and high-energy physics facilities, semiconductor manufacturing facilities, many phenomena associated with space travel.

4. Technology—I will mention only one—vacuum tubes/transistors/ICs/calculators/digital computers, optoelectronic devices, and sensors,

And it hasn’t just been the Scientists and Engineers who have made the contributions. Vacuum Equipment Manufacturers have risen to the occasion to develop ever-more sophisticated vacuum equipment that allowed advances to continue at an unprecedented rate—with new methods of pumping (including challenges of pumping hazardous gases), new metrology tools based on methods that were themselves discovered in vacuum.

And finally, these fields grew so rapidly that Standards Organizations were required and created to standardize and codify a rigorous set of standards. These organizations have worked hand-in-hand with manufacturers and researchers to allow advancement in these fields to proceed even faster.

The VSJ has been there for the whole journey. Professor Okano will brief you on the local activities but I wanted to mention the VSJ contributions from an international perspective. The VSJ has demonstrated leadership internationally from the beginning in collaboration, promotion, and education in the fields of interest to vacuum science and technology. This is evidences by international conferences hosted and held in Japan.

IVC-8 1974 Kyoto
IVC-15 1995 Yokohama

My first trip to Japan

Ted Madey was President of IUVSTA. Many of you may remember Ted Madey—he passed away unexpectedly last month. Ted was not like many scientists who are opinionated, rude, hard-headed, with huge egos—Ted was just the opposite: kind,
altruistic, an ambassador, an outstanding scientist, educator, family man, and a remarkable human being. Please join me in a moment of silence in remembrance of our colleague who did so much for this field.

VASSCAA-4 Matsue, Japan October 28-31, 2008 (Vacuum and Surface Science Conference of Asia and Australia)
ICTF-15 2011

The VSJ has a long-standing reputation in science leadership and is continuing to show leadership, particularly in Asia—Korea, China,

So what does the future hold for vacuum S & T? For the next 50 years, I believe that Energy and Environment will be our biggest challenge as the global population approaches 9 billion people. Vacuum S & T is poised to be major contributions in (1) getting us off the carbon cycle with nano-scale design of catalysts, (2) electrification of the transportation sector where nanotechnology will again make revolutionary changes in the way we store electricity (batteries and ultracapacitors), and (3) advances in the fuels for next generation nuclear reactors.

The future is bright and there are plenty of challenges out there whose solutions will require vacuum S & T for another 50 years. I wish you continued success—good luck and God Bless.