

## ARTURO A. AYÓN

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**OBJECTIVE** To contribute, at an Executive Level, to the realization of new MEMS products and technologies through innovation, analysis, technical development and team effort.

### RELEVANT EXPERIENCE

#### **Founding Director, MEMS Research Laboratory**

Dec. 2003 – Present

#### **Associate Professor (Tenured)**

#### **University of Texas at San Antonio**

Joined the Electrical Engineering Department to initiate MicroElectroMechanical Systems (MEMS) teaching and research activities and to found the UTSA MEMS Research Laboratory. Introduced the courses Electronic Devices, Introduction to MEMS Technology and Integrated RF-MEMS Devices. Interfaced with Sony Semiconductor to secure a \$2,200,000 microfabrication equipment donation which was installed in the UTSA Microfabrication Facility. Founding Director of the 4600 ft<sup>2</sup>, class-100 laboratory which encompasses photolithography, plasma etching, thin film deposition, metallization and metrology. Founding member of the first company spun-off from UTSA to commercialize the patented utilization of self-assembled monolayers on drug-eluting medical implants. Thersams was incorporated in June 2006. Established research programs on microwave devices with the Army Research Office. Secured research grants from the Army Research Office, San Antonio Life Sciences Association and the Texas Advanced Research Program.

#### **Director, MEMS Business Development**

September 2000 – November 2003

#### **SONY Semiconductor, San Antonio, TX 78230**

Reported directly to the President. Established MEMS program at Sony San Antonio. Structured MEMS business development plan including personnel, revenue projections, profit margins, marketing policies and capital investment. Determined strategic MEMS devices for development on site. Supervised MEMS personnel to model microfabricate and test MEMS applications. Planned and implemented MEMS technology Road Map to demonstrate and enhance the portfolio of MEMS processing units. Worked with and supervised MEMS development managers to detect and address the needs of technologists exploring a wide array of MEMS applications including: Optical Switching and Networking, Image Projection Structures, Field Emission Devices, OLED and Flat Panel Displays, Surface Acoustic Waves, Accelerometers, Gyroscopes, Pressure Sensors, Infra-Red Sensors, Laser Thermal Scanners, cooling microstructures, and DNA chips among others. Established cooperation agreements with other Sony sites in Japan and Singapore. Proposed and demonstrated a new scheme for micromanufacturing high-density OLED displays. Appointed to the 6-member Sony Corporate MEMS Working Group that defines and advises Sony's strategic direction regarding MEMS technology. Established MEMS business projects as a solid and steady source of revenue at Sony San Antonio by demonstrating, qualifying and taking to mass-production a DNA-chip and a MEMS microphone, employing QS 9000 methodology.

#### **Research Scientist**

May 1998 – August 2000

#### **Massachusetts Institute of Technology, Cambridge, MA 02139**

Participated in the development of all pertinent micromanufacturing protocols for the pioneering field of Power MEMS: micro-rockets, turbochargers, turbine engines for micro air vehicle, micro-combustors, turbopumps and other microturbomachinery applications. Planned, performed and analyzed designed experiments to characterize a Deep Reactive Ion Etcher (DRIE) as well as fusion, anodic and thermo-compression wafer bonding. Data collected and analyzed statistically. Participated in the development of new processing approaches for high temperature ceramics such as Silicon Carbide and Cordierite/Mullite. Proposed and demonstrated parallel processing for multi-stack wafer projects opposite to serial processing. Research was conducted at the MIT Microsystems Technology Laboratories.

**Post-Doctoral Research Associate**

May 1996 - April 1998

**Massachusetts Institute of Technology**, Cambridge, MA 02139

Involved in the microfabrication of the first micromachined gas turbine engine, and subsequent projects: micro motor compressor and micro-generator. These highly interdisciplinary projects represented a new paradigm in the generation of electrical power as well as a novel approach to microengines. The utilization of high density plasmas and wafer bonding technology permitted the etching of silicon trenches with depths in excess of 500  $\mu\text{m}$  and the assembly of devices requiring stacks of up to 7 single-crystal silicon wafers. Research was conducted at the MIT Microsystems Technology Laboratories.

**Ph.D Graduate Research Assistant****Cornell University**, Ithaca, NY 14853

August 1992 - April 1996

Conducted the microfabrication and testing of microwave applications of high aspect ratio, cantilevered structures using high resistivity silicon substrates: out of plane, tunable transmission lines and wafer free dipole antennas operating up to 40 GHz. Research was conducted at the Cornell Nanofabrication Facility.

**President****Plásticos Industriales**, Guadalajara, Mexico

November 1986 - July 1989

Assumed direction of commercialization of plastic commodities in Guadalajara. Expanded market to cover Northwest and Central Mexico. Tripled annual sales effort. Promoted growth of organization. Achieved high levels of employee morale.

**Manufacturing and Quality Engineering Manager****IBM Mexico**, Guadalajara, Mexico

October 1985 - November 1986

Supervised 11 engineers in the design and overall technical support of production line for S/5360 and S/5362 computer systems. Determined the manufacturing floor layout, specified required tools, designed operator assembly stations, provided and updated manufacturing routes, implemented engineering changes, specified quality control checkpoints and tests, highlighted acceptability criteria, compiled field performance and feedback to manufacturing line. Systems were exported to Latin America, Australia, New Zealand, Thailand, Korea and Japan.

**International Assignment, Engineering Liaison****IBM Corporation**, Rochester, MN 55901

November 1983 - October 1985

Represented Guadalajara Plant in the decision process for new engineering releases and product introduction strategy. Assessed the impact of engineering changes on overseas suppliers, parts inventory, finished product distribution centers in Far East and Latin America and delays from vendors updating tooling. Interfaced technical difficulties and concerns between manufacturing plant and development groups.

**Manufacturing Engineer****IBM Mexico**, Guadalajara, Mexico

June 1983 - October 1983

Worked as an integral part of the support team for computer systems production line. Updated manufacturing routes for S/5360. Provided technical support to field engineers and vendors. Earned rapid promotion to more skilled and responsible assignments.

**Systems Technician****Unisys Mexico**, Guadalajara, Mexico

September 1982 - May 1983

Provided technical support for computers, terminals and printers. Calibrated oscilloscopes and electronic equipment according to preventive maintenance plan.

**ACADEMIC EXPERIENCE****Associate Professor (Tenured)**

Engineering Analysis I,	2005-2006
Engineering Analysis II,	2005
RF-MEMS	2005-2006
Bio-MEMS	2005
Introduction to MEMS	2006
Electromagnetic Engineering,	2004-2006
Electronic Devices,	2004-2006

Electrical Engineering Department

**University of Texas at San Antonio**  
**Teaching Assistant.**  
Electricity and Magnetism, 1992-1993.  
Plasma Physics and Controlled Fusion, 1993.  
School of Electrical Engineering.  
**Cornell University, Ithaca, NY 14853.**

**Lecturer.**  
Partial Differential Equations, 1988-1989.  
Vector and Tensor Calculus, 1988-1989.  
Probability and Statistics, 1988-1989.  
School of Engineering.  
**Universidad de Guadalajara, Guadalajara, Mexico.**

## OTHER PROFESSIONAL ACTIVITIES

### EDITOR

Proceedings of the Symposium on *Materials Science of Microelectromechanical Systems Devices (MEMS) IV* of the Materials Research Society, Volume 687, Boston, Massachusetts, November 26-29, 2001.

Proceedings of the Symposium on *Nano and Micro Microelectromechanical (NEMS and MEMS) and Molecular Machines* of the Materials Research Society, Volume 741, Boston, Massachusetts, December 2-6, 2002.

Proceedings of the Symposium on *Micro and Nanosystems* of the Materials Research Society, Volume 782, Boston, Massachusetts, December 1-3, 2003.

### SEMI MEMS ADVISORY GROUP

Contributing in defining the role of SEMI in the MEMS community. The ultimate objective of the MEMS Advisory Group is to create and deliver a report with recommendations on the services that SEMI should offer to best support the MEMS industry, October 2002 – April 2003.

**PROGRAMMING** Fortran, SAS, Mathematica, Macsyma, Basic.

**LANGUAGES** Fluent in English, Spanish and French.

**SOCIETIES** IEEE, **Senior Member**,  
American Vacuum Society,  
Electrochemical Society,  
Materials Research Society

**EDUCATION**

1996	<b>Doctor of Philosophy</b> Nuclear Science and Engineering <b>Cornell University, Ithaca, NY 14853</b>
1992	<b>Master of Science</b> Nuclear Science and Engineering <b>Cornell University, Ithaca, NY 14853</b>
1983	<b>Bachelor of Science</b> Electronic Engineering <b>Universidad de Guadalajara, Guadalajara, Mexico</b>

**SPECIAL** Experienced in all relevant areas of **Microfabrication** and extensive clean room environment experience: CAD design, Mask preparation, Wet processing (including RCA cleans, KOH, TMAH, EDP and a variety of acids), Photolithography including image reversal, Reactive ion etching (RIE), Magnetic reactive ion etching (MERIE),

**SKILLS**

Electron cyclotron resonance etchers (ECR), Plasma enhanced vapor deposition (PECVD), Deep reactive ion etchers (DRIE), Wafer bonding (fusion, anodic, thermo-compression and room temperature wafer bonding), Low temperature oxidation (LTO), Low pressure chemical vapor deposition (LPCVD), Thermal oxidation (dry and TCA), Annealing, Ion milling, Thermal and electron beam evaporators, Sputtering systems, Profilometers, Wire bonders and CO<sub>2</sub> supercritical dry. Proficient in a variety of **Metrology Tools:** Ellipsometers, Interferometers, Scanning electron microscopes (SEM), Auger Analysis, Fourier Transform Infrared Spectroscopy (FTIR), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Photoelectron Spectroscopy (XPS) and Microwave Network Analyzers.