

## CURRICULUM VITAE

### **Maria Lupe Marquez Brazao**

Venezuelan, born in Los Teques.

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### **OBJECTIVE OF THIS CURRICULUM**

To opt for a post as Researcher for either Industry applications of Dispersions and Emulsion Technology or as a Professor at science and research centers, Industry or academic institutions, Universities, etc.

### **WORK EXPERIENCE**

#### **From April 1990 to February 2003**

@ **PDVSA-Intevop**. Research and Development Center of Petroleos de Venezuela.

Last Position: Senior Researcher. Emulsion Formulations. Department of Heavy and Extra-Heavy Crude Oil Exploitation.

#### **March 2003 to September 2003**

Universidad central de Venezuela. Facultad de Ciencias. Escuela de Quimica. Professor of Chemistry Laboratory under-grad courses for Physics, Chemists and Biologists.

#### **Currently**

Research Associate. Post-Doc position @ Chemical Engineering Department, North Carolina State University. Raleigh NC. USA. Advisor: Dr. Peter Kilpatrick.

## FORMAL EDUCATION

<b>Institution</b>	<b>Obtained Degree</b>	<b>Date</b>
<b>Primary Sch.</b> Escuela Sagrado Corazon de Jesus	<b>Primary Sch.</b>	1975
<b>High School.</b> Liceo Dr. Jesus Munoz Tebar and Instituto Victegui- Los Teques	<b>Science High-Sch Diploma</b>	1981
<b>University.</b> Universidad central de Venezuela. Facultad de Ciencias	<b>Bachelor in Science. Chemistry</b>	1987
<b>Post grade.</b> Universidad central de Venezuela. Facultad de Ciencias	<b>Dr. in Science. Mention in Chemistry</b>	1992

## PROFESSIONAL DEVELOPMENT

### COURSES AND WORKSHOPS

Programming Pascal Course. Universidad Central de Venezuela. 1987. Latin-American Workshop on Physics. IVIC (Venezuelan Institute for Scientific Research) 1990. Petrophysics by Invited Professor M. Sharma. CEPET (Petroleum Training Center). Venezuela 1990. Basic Reservoir Engineering Workshop. CEPET Maracaibo, Venezuela. 1990. Iberoamerican Workshop on Crystallography. Los Andes University. Merida. Venezuela. 1990. English. Level III and Level IV. PDVSA-Intevep. Venezuela 1991. Course on Surfactant and Emulsions by Dr. J. L. Salager. Los Andes University. Merida. Venezuela. 1991. Courses: Integration to UNIX under Sun Platform. Open Windows GUI. Productivity Tools UNIX and Introduction to the development GUI's in DEVGUIDE. PDVSA-Intevep. Venezuela. 1991. Course on Sun Workstations. Intevep. Venezuela. 1991. Programming in "C" Language. Intevep. Venezuela. 1991. I International Workshop on Chemical Physics. Los Andes University. Merida. Venezuela. 1992. Course Introduction to Biosym Software for Polymers and Catalysis (insight II and Discover). San Diego. CA. USA. 1992. Workshop UNIX Productivity. Venezuela 1993. System Administration by Silicon Graphics. PDVSA-Intevep. 1993. Workshop on Asphaltene Precipitation. PDVSA-Intevep. 1994. Course on Emulsion Stability by Invited professor Th. F. Tadros. Intevep. 1994. Course on Interfaces, Emulsions and Foams by Invited Professor Ivan Ivanov. Intevep. 1994. Course Polymers and Surfactants in Solution by Invited Professor Bjorn Lindman (Lund University< Sweden). PDVSA-Intevep. 1995. Course on Colloidal Science of Surfactants by Invited Professor R. Rusanov. International Center of Education and Development. CIED-PDVSA. Venezuela. 1995. Workshop on Atomistic Molecular Modeling of Amorphous Systems by Molecular Simulations Inc. applied to interfaces and complex fluid simulations. San Diego. CA. USA. 1995. Workshop on Information Active Protection. PDVSA-Intevep.

1996. Workshop on "Seven Habits of Highly Effective People" Intevep. Venezuela. 1996. Course on Surfactants and Interfacial Phenomena by Invited Professor Milton Rosen. Venezuela 1996. Workshop on Projects Financial Evaluation and Investment Decisions. Intevep. Venezuela. 1996. Course Surfactants and Emulsions II. Invited Professor J. L. Salager. Intevep. Venezuela. 1997. Course on Experiments Design. Intevep. Venezuela. 1997. Workshop on the Design of Drilling Fluids. PDVSA-Intevep. Venezuela. 1998. Course Fundamentals of Thermodynamics and Fluid Mechanics. Intevep. Venezuela 1998. Workshop on Rock-Fluid Interactions. PDVSA-Intevep. 1998. Course Surfactants and Polymers in Aqueous Solutions, by B. Lindman, Bengt Kromberg, Krister Holmberg and Bo Jonsson, Lisbon, Portugal. 1999. Workshop ABC-Protection of Information Actives. PDVSA-Intevep. 2002.

## CONGRESSES, SYMPOSIA AND CONFERENCES

Asociacion Venezolana para el Avance de la Ciencia (Venezuelan Association for Science Improvement) AsoVAC XXXIX Convention. Caracas. Venezuela. April 19-20. 1989. "Four Wave Mixing Signal Symmetry Properties in The Frequency Space".

XX Congreso de Quimicos Teoricos de Expresion Latina. (XX Congress of Theoretical Chemists of Latin Expression) QUITEL XX. Merida. Venezuela. October 12-17. 1992.

Asociacion Venezolana para el Avance de la Ciencia (Venezuelan Association for Science Improvement) AsoVAC XLII Convention. Caracas. Venezuela. November 15-20. 1992.

"Theoretical Study on the Microscopic Properties of non-ionic surfactants"

Asociacion Venezolana para el Avance de la Ciencia (Venezuelan Association for Science Improvement) AsoVAC XLIII Convention. Merida. Venezuela November 14-19. 1993.

"Rheological Properties of Water and Oleic Solutions of Nonyl Phenol ethoxylated surfactant family".

"Physic-chemical Properties of Alkyl-phenol Ethoxylated Surfactants. HLB as a function of Molecular Length and Intermolecular Energies".

10<sup>th</sup> International Symposium on Surfactants in Solution. Caracas. Venezuela. June 16-30. 1994.

2<sup>nd</sup> Conference on Molecular Modeling. Rio de Janeiro. Brazil. October 26-28. 1994.

International Symposium on Micelles, Microemulsions and Monolayers: Quarter century Progress & New Horizons. Gainesville, FL. USA. August 28-30. 1995.

Asociacion Venezolana para el Avance de la Ciencia (Venezuelan Association for Science Improvement) AsoVAC XLV Convention, Caracas. Venezuela November 19-24, 1995.

"O/W emulsions Stabilized by Nonionic Surfactants: Atomistic Simulations of Thin Liquid Films"

III Congreso Venezolano de Quimica. (III Venezuelan Congress of Chemistry). Caracas, Venezuela. November 10-14. 1996.

"Computational Chemistry Applied to Study Clay Swelling Mechanisms".

"Adsorption of Surfactant Binary Blends to the water/air interface driven by Diffusion. Numerical Approach".

I Jornadas de Investigacion basica Orientada en exploracion y Produccion (I Workshop on Basic-Oriented Research in Exploration and Production) Research and Development center of Petroleos de Venezuela. PDVSA. Venezuela. November 12-13. 1996.

Simposio de Simulacion Molecular y Tecnicas Experimentales en Problemas de Petroleo. (Symposium of Molecular Simulation and Experimental Techniques on Petroleum Problems) Mexican Institute of Petroleum (IMP). Mexico City. Mexico. April 6-7. 1998. (Invited Attendant).

12<sup>th</sup> International Symposium on Surfactants in Solution. Stockholm, Sweden. June 7-11, 1998.

“Interaction of Shale and Polymeric Additives in Water-Based Drilling Fluids. Molecular Modeling Approach”.

II Jornadas de Investigacion basica Orientada en exploracion y Produccion (II Workshop on Basic-Oriented Research in Exploration and Production) Research and Development center of Petroleos de Venezuela. PDVSA. Venezuela. October 1-2. 1998.

13<sup>th</sup> International Symposium on Surfactants in Solution. Gainesville, FL, USA. June 7-11, 2000.

III Jornadas de Investigacion basica Orientada en exploracion y Produccion (III Workshop on Basic-Oriented Research in Exploration and Production) Research and Development center of Petroleos de Venezuela. PDVSA. Venezuela. November 15-17. 2000.

Sexta Conferencia Latinoamericana de Fisicoquimica Organica. (6<sup>th</sup> Latin American Conference on Physical organic Chemistry). Margarita Island. Venezuela. December 2-7, 2001.

“On the Adsorption of Crude Oil Native Acids on the Water/Oil Interface. Experimental Study”.

“On the Adsorption of Surfactant-Polymer Blends at Water/Air Surfaces”.

Conference on Heavy Organic Deposits. HOD2002. Puerto Vallarta. Mexico. November 12-17. 2002.

“On the Atomistic Simulation of Mixed Surfactant Monolayers at the Water/Oil Interface. Natural-Surfactant/Nonionic-Surfactant Binary Systems”.

## **PUBLISHED WORKS**

Tesis de Licenciatura (Bachelor Thesis): “Spectral Diffusion in Non-linear Spectroscopic Techniques”. Universidad Central de Venezuela. Facultad de Ciencias. Escuela de Quimica. 1987. Caracas. Venezuela.

Tesis Doctoral (Ph.D. Thesis): “Optimization of The Model used to Study Nonlinear Spectra in The Frequency space”. Universidad Central de Venezuela. Facultad de Ciencias. Escuela de Quimica. And Quantum Optics Lab. @ Center of Physics. Venezuelan Institute of Scientific Research (IVIC) 1992. Caracas. Venezuela.

“Polarization Spectra of Homogeneously and Inhomogeneously broadened two level systems”. *Journal of The Optical Society of America B*. 2145-2149. 1990.

“High-pump-power effects on resonant nearly degenerate four-wave-mixing signal for homogeneously and inhomogeneously broadened two level systems”. *Physical Review A*. **47**, 5, 4185-4192. 1993.

“Hydrophile-lipophile balance of alkyl ethoxylated surfactants as a function of intermolecular energies”. *Journal of Computer-Aided Molecular Design*. 8, 273-282. 1993.

“Molecular Study on the Structure and Interfacial areas of Nonyl Phenol Ethoxylated Surfactants”. *Colloids and Surfaces A*. 99, 207-220. 1995.

“Molecular Dynamics Simulation of Isopropyl Naphthalene Sulphonate at the water/heptane interface”. *Colloids and Surfaces A*. Physicochemical and Engineering aspects, 106, 135-148, 1996.

“Molecular atomistic Simulations of Clay Swelling in water Dispersions”. *Molecular Engineering*, 7 367-383. 1997.

\*More than 40 Confidential and Secret Technical Reports for PDVSA-Intevp. The Research and Development Center of Petroleos de Venezuela. They were mainly devoted to optimize emulsion formulations, their stability and performance for various applications in the oil Industry: Orimulsion<sup>TM</sup> the emulsified Venezuelan Fuel, Asphaltene Precipitation, its Prevention and Remediation, water-based and oil-based Drilling Fluid Formulations, Enhanced Oil Recovery, etc.

## **EXPERIENCE, KNOWLEDGES, SPECIAL SKILLS AND COMPUTER SCIENCE**

- Assistant Professor for Physical chemistry, Organic Chemistry and pre-university Courses. Chemistry Analyst at The Universidad Central de Venezuela. Services Laboratory.
- Quality Control and Analysis of Surfactants and Additives for Orimulsion<sup>TM</sup> (Emulsified fuel, formulated and manufactured by PDVSA).
- Research on Clay water dispersions and Polymer formulations applied to Drilling Fluids formulation.
- Measurements, models and simulations for the understanding of interfacial phenomena.
- Experience in Computational Productivity Tools (Microsoft Office, Lotus).
- Codes development in Pascal and Fortran for PC and Sun, Silicon Graphics Workstations.
- Specialized on Molecular Mechanics and Molecular Dynamics Simulations by using Biosym/MSI/Accelrys software. Applied to model water/oil interfaces, polymers, electrolytes and surfactants in solution, self-assembled structures, solid surfaces, and solid dispersions. Calculation of molecular interactions, solubility parameters, molecular conformations and system configurations.
- Construction of amorphous cell models by applying 2D and 3D Periodic Boundary Conditions. Simulation of Thin Liquid Films and Surfactant Adsorption at interfaces.
- Experience on (Static and Dynamic) Interfacial and surface tension measurements by different techniques: pendant drop, expanding drop, spinning drop, maximum droplet (bubble) pressure, Wilhelmy Plate, Nuoy Ring, Langmuir Through. Measurement of contact angles for wettability analysis.

- Experience on rheology measurements. Viscoelasticity studies on crude oil and emulsions. Capillary viscosimetry applied to study the phase behavior of complex fluids (waxy crude oils and asphaltene unstable crude oils), under formulation, temperature and pressure changes.
- Experience in evaluation of crude oil asphaltene stability. Experience with most ASTM methods on crude oil analysis and commercial specifications. Determination of asphaltene content. SARA analysis. Separation and analysis of acid fractions. TAN determination. Water content.
- Experience on defining criterions for selection of chemical additives with several potential applications for oil Industry. Evaluations based on structure characterization techniques, qualitative and quantitative chemical analysis and compatibility tests.
- Evaluation of water in oil emulsion stability by critical electric field measurements (currently at NCSU). Studies on both real crude oil and model systems. Evaluation of binary blends compatibility and synergy effects. Evaluation of different polarity crude oil fractions.

## **HOBBIES**

Running: Three times finisher of Caracas Marathon (2000, 2001 and 2002) and two times NY City Marathon (2001 and 2002).

Traveling,

Reading

Cooking and

Pets.