



Technische Universität München
Physik Department E19

CURRICULUM VITAE
Dr. Vladimir García Morales

December 2010

Personal data:

Given Name: Vladimir

Family Name: García Morales

Date of birth : 7 June 1978

Place of birth: Valencia. SPAIN

Position : Postdoctoral Researcher

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1.- Education:

Ph. D. (Physics) "European Doctorate", Summa cum Laude, University of Valencia (2005)

Lic. Thesis (Physics), Grade A, University of Valencia (2003)

B. Sc. (Physics), Grade A, University of Valencia (2002)

2.- Academic Positions:

2010 - Institute for Advanced Study - Technische Universität München – Carl von Linde Junior Fellow. Postdoctoral researcher.

2007-2010 Technische Universität München – Postdoctoral researcher and teaching assistant.

2002-2007 University of Valencia – Research fellow and teaching assistant.

3.- Docent activities:

2007- "Exercises on Nonlinear Dynamics and Complex Systems" at the Technische Universität München, Physik Department.

- 60 hours per academic year in the period 2003-2005 at the Univ. Valencia, Faculty of Physics.

Main Topics:

2004-2005 Fluid mechanics

2003-2005 Statistical Physics

2003-2005 Thermodynamics (experimental techniques)

4.- Honors and fellowships:

2010 Carl von Linde Junior Fellowship
(Technische Universität München – Institute for Advanced Study)

2007 Prize of Extraordinary Achievements during the Doctorate
(Awarded by the University of Valencia to the best Ph. D. theses in Physics)

2006 DAAD Scholarship for a short stay in Germany (Technische Universität München) as a postdoctoral researcher.

2001 Prize of Extraordinary Achievements during the Graduation in Physics
(Awarded by the University of Valencia to the best M.Sc. grades in Physics)

5.- Professional affiliations:

2001- Thermodynamics Division of the Spanish Royal Society of Physics

2001- Spanish Royal Society of Physics

6.- International Academic activities:

Technische Universität München (Unit E19, Interfaces and Nonlinear Dynamics), München - Germany, Postdoctoral researcher (May - October 2006)

University of Porto (Laboratory of Electroanalytical Chemistry), Portugal, Visiting scientist (April-June 2003 and June-July 2005)

7. – Invited talks and seminars

“From microscopic dynamics to Thermodynamics: Irreversibility, phase transitions and thermal properties”. Seminar held at the Departamento de Física Aplicada I from the Universidad Complutense de Madrid, Madrid (22 November 2006).

“Fluctuation enhanced electrochemical reaction rates at the nanoscale”. Invited talk at the Institut für Physik – Stochastische Prozesse, Humboldt-Universität Berlin (10 February 2010).

“Spatiotemporal pattern formation in chemical oscillators”. Invited talk at the Dipartimento di Chimica – Università degli Studi di Modena e Reggio Emilia, Modena, Italy (17 September 2010).

“Breakdown of the Butler-Volmer electrochemical kinetics at the nanoscale”. Invited talk at the Dipartimento di Chimica – Università degli Studi di Modena e Reggio Emilia, Modena, Italy (17 September 2010).

8.- Training courses and specialized formation

1. Training Course on *Charge Transfer at Electrified Liquid/Liquid Interfaces*. Helsinki University of Technology; Helsinki (Finland), 20-25 January, 2001.

2. Course on *Spectroelectrochemical Techniques for Probing Structure and Reactivity at Molecular Interfaces*. Ecole Polytechnique Fédérale de Lausanne (Switzerland) ; Lausanne, 2-5 October 2000.
3. *IPP Summer University for Plasma Physics*. Max Planck Institut für Plasmaphysik (Garching), Berlin (Germany), 11-15 September, 2000.
4. *International Symposium on Nanochemistry*. Instituto de Tecnología Química (UPV-CSIC) - Universidad Politécnica de Valencia; Valencia, 4-5 March, 2002.
5. *EPA Summer School "New Perspectives in Photochemistry"* . HRSMC (Leiden University, University of Amsterdam, Vrije Universiteit); Egmond aan Zee (Holland), 28 June-2 July 2003.

9.- Participating research grants :

- 2006-08 : "Design and Functionality of Nanoscale Electrochemical Devices", STREP, NEST programme of the European Union, Contract No. 028669, P.P. : Prof. Dr. K. Krischer; Network Coord.: Prof. Dr. K. Kontturi.
- 2005-07 : "Ionic transport and selectivity in nanopores with fixed charges: predictions from continuous models", Ministry of Education and Science of Spain, DGICYT, MAT2005-01441, P.P. : Prof. S. Mafé.
- 2002-06 : "Supramolecular Self-Assembly of Interfacial Nanostructures", RTN, IHP programme of the European Union, HPRN-CT-2002-00185, P.P. : Prof. J.A. Manzanares; Network Coord.: Prof. Dr. J. Vos.
- 2002-05 : "Organisation and Reactivity of Functionalised Nanoparticles at Liquid Interfaces", Ministry of Education and Science of Spain, DGICYT, MAT2002-00646, P.P. : Prof. J.A. Manzanares.
- 1999-02 : "Controlled release of ionic drugs through charged membranes", Ministry of Education and Science of Spain, DGICYT, PB98-0419 , P.P. : Dr. J.A. Manzanares.
- 1996-01 : "Organisation, dynamics and reactivity of electrified liquid/liquid interfaces", TMR programme of the European Union, ERB-FMRX-CT960078. P.P. (Spain): Dr. J.A. Manzanares; Network Coord.: Prof. Dr. D.J. Schiffrin.

10.- Publication list:**10. 1. – Book Chapters**

1. **V. Garcia-Morales**, J. Cervera and J. A. Manzanares

“Nanothermodynamics” in *Handbook of Nanophysics Vol. 1, Principles and Methods*, K. Sattler, Ed. (Taylor & Francis, New York, 2010) ISBN: 9781420075403, ISBN 10: 1420075403

10. 2. - Research articles

24. **V. Garcia-Morales**, A. Orlov and K. Krischer

“Subharmonic phase clusters in the complex Ginzburg-Landau equation with nonlinear global coupling”
Phys. Rev. E **82** 065202(R) (2010)

23. **V. Garcia-Morales** and K. Krischer

“Fluctuation enhanced electrochemical kinetics at the nanoscale”
Proc. Natl. Acad. Sci. USA **107** 4528 (2010)

22. H. A. Santos, **V. Garcia-Morales** and C. M. Pereira

“Electrochemical properties of phospholipid monolayers at liquid-liquid interfaces: development and applications” *ChemPhysChem* **11** 28 (2010)

21. I. Miethe, **V. Garcia-Morales** and K. Krischer

“Irregular Subharmonic Cluster Patterns in an Autonomous Photoelectrochemical Oscillator” *Phys. Rev. Lett.* **102** 194101 (2009)

20. **V. Garcia-Morales** and K. Krischer

“Normal-form approach to spatiotemporal pattern formation in globally coupled electrochemical systems” *Phys. Rev. E* **78** 057201 (2008)

19. **V. Garcia-Morales**, R. W. Hölzel and K. Krischer

"Coherent structures emerging from turbulence in the nonlocal complex Ginzburg-Landau equation"
Phys. Rev. E **78** 026215 (2008)

18. **V. Garcia-Morales** and K. Krischer

"Nonlocal Complex Ginzburg-Landau equation for Electrochemical Systems" *Phys. Rev. Lett.* **100**
054101 (2008)

17. **V. Garcia-Morales**, J. Pellicer and J. A. Manzanares

"Thermodynamics based on the principle of least-abbreviated action: Entropy production in a network of coupled oscillators" *Ann. Phys. (NY)* **323** 1844 (2008)

16. **V. Garcia-Morales** and S. Mafé

"Monolayer-protected metallic nanoparticles: limitations of the concentric sphere capacitor model"
J. Phys. Chem. C **111** 7242 (2007)

15. **V. Garcia-Morales**, J. Cervera and J. A. Manzanares

"Pore entrance effects on the electrical potential distribution in charged porous membranes and ion channels" *J. Electroanal. Chem.* **599** 203 (2007)

14. M.C. Martins, C.M. Pereira, H.A. Santos, R. Dabirian, F. Silva, **V. Garcia-Morales** and J.A. Manzanares

" Analysis of adsorption of phospholipids at the 1,2-DCE / water interface by electrochemical impedance spectroscopy: A study of the effect of the saturated alkyl chain " *J. Electroanal. Chem.* **599**
367 (2007).

13. H. A. Santos, **V. Garcia-Morales**, L. Murtoimäki, J. A. Manzanares and K. Kontturi

"Preparation of nanostructures composed of dextran sulfate / ruthenium nanoparticles and their interaction with phospholipid monolayers at a liquid-liquid interface" *J. Electroanal. Chem.* **599** 194
(2007).

12. **V. Garcia-Morales** and J. Pellicer

"Microcanonical foundation of nonextensivity and generalized thermostatics based on the fractality of the phase space" *Physica A* **361** 161 (2006)

11. M. Chirea, **V. García-Morales**, R. Gulaboski, C. M. Pereira, J. A. Manzanares and F. Silva
"Electrochemical characterization of polyelectrolyte/gold nanoparticles multilayers self-assembled on gold electrodes" *J. Phys. Chem. B* **109** 21808 (2005)
10. H. A. Santos, M. Chirea, **V. García-Morales**, F. Silva, J. A. Manzanares and K. Kontturi
"Electrochemical study of interfacial composite nanostructures: PE/ Au NPs multilayers assembled on phospholipid/DS monolayers at a liquid-liquid interface" *J. Phys. Chem. B* **109** 20105 (2005)
9. T. H. Silva, **V. García-Morales**, C. Moura, J. A. Manzanares and F. Silva
"Electrochemical Impedance Spectroscopy of Polyelectrolyte Multilayer Modified Gold Electrodes: Influence of Supporting Electrolyte and Temperature" *Langmuir* **21** 7461 (2005)
8. H. A. Santos, **V. García-Morales**, R. J. Roozeman, J. A. Manzanares and K. Kontturi
"Interfacial Interaction between Dextran Sulfate and Lipid Monolayers: An Electrochemical Study" *Langmuir* **21** 5475 (2005)
7. **V. García-Morales**, J. Cervera and J. Pellicer
"Correct Thermodynamic forces in Tsallis Thermodynamics: Connection with Hill's Nanothermodynamics" *Phys. Lett. A* **336** 82 (2005)
6. S. V. P. Barreira, **V. García-Morales**, C. Pereira, J. A. Manzanares and F. Silva
"Electrochemical Impedance Spectroscopy of Polyelectrolyte Multilayer Modified Film Electrodes" *J. Phys. Chem. B* **108** 17973 (2004)
5. **V. García-Morales**, J. Cervera and J. Pellicer
"Coupling theory for counterion distributions based in Tsallis statistics" *Physica A* **339** 482 (2004)
4. **V. García-Morales**, T. H. Silva, C. Moura, J. A. Manzanares and F. Silva
"Ion transport through polyelectrolyte multilayers under steady state conditions" *J. Electroanal. Chem.* **569** 111 (2004)
3. S. Mafé, **V. García-Morales** and P. Ramírez
"Estimation of pKa shifts in weak polyacids using a simple molecular model: effects of strong polybases, hydrogen bonding and divalent counterion binding" *Chem. Phys.* **296** 29 (2004)

2. J. Cervera, **V. García-Morales** and J. Pellicer

"Ion size effects on the electrokinetic flow in nanoporous membranes caused by concentration gradients" *J. Phys. Chem. B* **107** 8300 (2003)

1. **V. García-Morales**, J. Cervera and J. Pellicer

"Calculation of the wetting parameter from a cluster model in the framework of Nanothermodynamics" *Phys. Rev. E* **67** 062103 (2003)

10.3- Papers on Physics education

2. J. Pellicer, **V. García-Morales**, L. Guanter, M. J. Hernández and M. Dolz

"On the experimental values of the water surface tension used in some textbooks" *Am. J. Phys.* **70** 705 (2002)

1. J. Pellicer, **V. García-Morales** and M. J. Hernández

"On the demonstration of the Young-Laplace equation in introductory Physics courses" *Phys. Educ.* **35** 126 (2000)

11.- Communications and contributions to congresses (selection)

7. **V. García-Morales**, R. W. Hölzel, K. Krischer

Coherent structures in the nonlocal complex Ginzburg Landau equation: a bifurcation analysis approach. Engineering of Chemical Complexity, Berlin, May 25-27, 2008

6. **V. García-Morales**, K. Krischer

Stochastic Analysis of Nonlinear Electrochemical Oscillators, Minisymposium Oral Presentation (30 min.), International Conference on Physics and Control, PHYSCON2007 (Potsdam, Germany). September 2007

5. H.A. Santos, M. Chirea, **V. García-Morales**, F. Silva, J.A. Manzanares, K. Kontturi

Electrochemical Study of Interfacial Composite Nanostructures: Polyelectrolyte/Gold Nanoparticle Multilayers Assembled on Phospholipid/Dextran Sulfate Monolayers at a Liquid-Liquid Interface. Poster. Electrochem2005 (Newcastle, England). September 2005

4. M. Chirea, **V. García-Morales**, J. A. Manzanares, C. M. Pereira, F. Silva

Electrochemical characterization of polyelectrolyte/gold nanoparticles multilayers deposited on gold electrodes

Poster. Electrochem2005 (Newcastle, England). September 2005

3. T.H. Silva, S.V.P. Barreira, **V. Garcia Morales**, C. Moura, J.A. Manzanares, F. Silva

Ionic transport through polyelectrolyte multilayers: the capillary membrane model

Oral presentation. VIII Iberic Meeting of Electrochemistry/XIII Meeting of the Portuguese Electrochemical Society (Covilha, Portugal). July 2005.

2. **V. García Morales**, J. Cervera, J. Pellicer

Calculation of the critical wetting parameter by means of a mean-field cluster model in the framework of Nanothermodynamics. Poster. XXIX Meeting of the Spanish Royal Society of Physics (Madrid, Spain). 7-11 July 2003.

1. **V. García Morales**, J. Zúñiga, J.A. Manzanares

The velocity profile in a channel flow cell. Poster and presentation. Euroconference on Modern Trends in Electrochemistry of Molecular Interfaces (Majvik, Finland) 28 August – 3 September 1999.

12.- Other activities:

- Referee for *Physical Review Letters*, *Journal of the American Chemical Society*, *Langmuir*, *Nanotechnology*, *Journal of Physics: Condensed Matter*, *Physics Letters A*, *Physica A*, *Proceedings of the Royal Society of Physics A*, *Journal of Physics A* and *Entropy*.