


PERSONAL INFORMATION

Liviu-Petru Zarbo

 67-103 Donat, 400293 Cluj-Napoca Cluj-Napoca (Romania)

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 liviu.zarbo@itim-cj.ro

POSITION APPLIED FOR

Scientific Researcher 1

PROFESSIONAL EXPERIENCE

04/11/2014–Present

Scientific Researcher (CS, CS2)

INCDTIM Cluj-Napoca, Cluj, Romania

- RDI activities
- Research team coordinator.

01/01/2010–31/03/2014

Postdoctoral Research Associate

Institute of Physics ASCR, Prague, Czech Republic

- RDI activities

01/08/2007–31/12/2009

Postdoctoral Research Associate

Texas A&M University, College Station TX, United States

- RDI activities
- Teaching activities

01/09/2002–31/08/2007

Teaching and Research Assistant

University of Delaware, Newark DE, United States

- RDI activities
- Teaching activities

01/09/2001–31/08/2002

Physics Teacher

Gen. School, No. 5, Zalau, Romania

- teaching

TEACHING AT UNIVERSITY
LEVEL**2009 Fall:** Instructor for PHYS201 at *Texas A&M University*.**2002 Fall:** Teaching assistant for PHYS201 at *University of Delaware*

EDUCATION AND TRAINING

09/2002–08/2007

PhD

University of Delaware, Newark DE, United States

10/2000–06/2001

MSc.

University Babes-Bolyai, Cluj-Napoca, Romania

10/1996–06/2000 **BSc.**
University Babes-Bolyai, Cluj-Napoca, Romania

09/1992–06/1996 **High-School Diploma**
Theoretic High-School, Zalau, Romania

PERSONAL SKILLS

Mother tongue Romanian

Other languages	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
French	B1	B1	A2	A2	A2

Managerial Skills

- Research project manager: research team coordination.

Digital competence

- Linux. MS Windows, high performance computing,
- programming in Fortran 77/95, C, C++, JAVA.
- Scientific software: Mathematica, Maple, Turbomole, Gaussian, Abinit, etc.

ADDITIONAL INFORMATION

Projects won in competitions project manager: 2015-2017: *Universal Multiscale Simulations for Hydrogen Storage in Novel Materials*, UEFISCDI, PN-II-RU-TE-2014-4-1309, Romania.

Awards University of Delaware Disertation Fellowship (2006).

Professional affiliations *Member, American Physical Society.*

Simulation Codes Developed

- quantum transport (Landauer-Buttiker) code for simulating electronic and spintronic transport in mesoscopic systems such as 2DEG in nanostructures and graphene nanoribbons;
- nonequilibrium Green's function code for investigating local charge and spin densities in nanostructures;
- semiclassical Monte Carlo simulation code for used for analyzing the spin diffusion in the microchannel of a spin Hall transistor;
- k.p-based codes for investigating spin-orbit torques in magnetic semiconductors.

Scientific Publications (over 600 citations)

1. B. K. Nikolic, S. Souma, L. P. Zarbo, and J. Sinova, *Nonequilibrium spin Hall accumulation in ballistic semiconductor nanostructures*, Phys. Rev. Lett. **95**, 046601 (2005).
2. B. K. Nikolic, L. P. Zarbo, and S. Welack, *Transverse spin-orbit force in the spin Hall effect in ballistic quantum wires*, Phys. Rev. B **72**, 075335 (2005).
3. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Mesoscopic spin Hall effect in multiprobe spin-orbit coupled ballistic semiconductor bridges*, Phys. Rev. B **72**, 075361 (2005).
4. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Imaging mesoscopic spin Hall flow: Spatial distribution of local spin*

currents and spin densities in and out of multiterminal spin-orbit coupled semiconductor nanostructures, Phys. Rev. B **73**, 075303 (2006).

5. B. K. Nikolic and L. P. Zarbo, *Extrinsically Versus Intrinsically Driven Spin Hall Effect in Disordered Mesoscopic Multiterminal Bars*, Europhys. Lett. **77**, 47004 (2007).

6. L. P. Zarbo and B. K. Nikolic, *Spatial distribution of local currents of massless Dirac fermions in quantum transport through graphene nanoribbons*, Europhys. Lett. **80**, 47001 (2007).

7. Alexey A. Kovalev, Liviu P. Zarbo, Y. Tserkovnyak, G. E. W. Bauer, Jairo Sinova, *Piezospin Polarization of Currents in Nanostructures*, Phys. Rev. Lett. **101**, 036401 (2007).

8. R. L. Dragomirova, L. P. Zarbo and B. K. Nikolic, *Spin and Charge Shot Noise in Mesoscopic Spin Hall Systems*, Europhys. Lett. **84**, 37004 (2008).

9. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Spin Currents in Semiconductor Nanostructures: A Nonequilibrium Green-Function Approach*, Chapter 24, page 814 in Volume I of "The Oxford Handbook on Nanoscience and Technology: Frontiers and Advances," Eds. A. V. Narlikar and Y. Y. Fu (Oxford University Press, Oxford, 2010).

10. J. Wunderlich, A. C. Irvine, Jairo Sinova, B. G. Park, L. P. Zarbo, X. L. Xu, B. Kaestner, V. Novak, T. Jungwirth, *Spin-injection Hall effect in a planar photovoltaic cell*, Nature Physics **5**, 675 (2009).

11. Liviu P. Zarbo, Jairo Sinova, Irena Knezevic, J. Wunderlich, T. Jungwirth, *Modeling of diffusion of injected electron spins in spin-orbit coupled microchannels*, Phys. Rev. B **82**, 205320 (2010).

12. J. Wunderlich, B. G. Park, A. C. Irvine, L. P. Zarbo, E. Rozkotova, P. Nemeč, V. Novak, Jairo Sinova, T. Jungwirth, *Spin Hall effect transistor*, Science **330**, 1801 (2010).

13. D. Fang, H. Kurebayashi, J. Wunderlich, K. Vyborny, L. P. Zarbo, R. P. Campion, A. Casiraghi, B. L. Gallagher, T. Jungwirth, and A. J. Ferguson, *Spin-orbit driven ferromagnetic resonance*, Nature Nanotechnology **6**, 413 (2011).

14. C. Ciccarelli, L. P. Zarbo, A. C. Irvine, R. P. Campion, B. L. Gallagher, J. Wunderlich, T. Jungwirth, A. J. Ferguson, *Spin gating electrical current* APL **101**, 122411 (2012).

15. H. Kurebayashi, Jairo Sinova, D. Fang, A. C. Irvine, J. Wunderlich, V. Novak, R. P. Campion, B. L. Gallagher, E. K. Vehstedt, L. P. Zarbo, K. Vyborny, A. J. Ferguson, T. Jungwirth, *An anti-damping spin-orbit torque originating from the Berry curvature*, Nature Nanotechnology **9**, 211 (2014).

16. Gonzalez-Zalba, MF, Ciccarelli, C., Zarbo, LP, Irvine, AC, Campion, RC, Gallagher, BL, Jungwirth, T, Ferguson, AJ, Wunderlich, J., *Reconfigurable Boolean Logic Using Magnetic Single-Electron Transistors*, PLOS ONE, **10**, 4, e0125142 (2015).

17. Hang Li, H. Gao, Liviu P. Zârbo, K. Výborný, Xuhui Wang, Ion Garate, Fatih Doğan, A. Čejchan, Jairo Sinova, T. Jungwirth, and Aurélien Manchon, *Intraband and interband spin-orbit torques in noncentrosymmetric ferromagnets*, Phys. Rev. B **91**, 134402 (2015).

18. Daniel Bilc, Liviu P. Zarbo, Sorina Garabagiu, Eric Bousquet, and Liliana Mitoseriu, *High field properties of typical perovskite ferroelectrics by first-principles modeling*, submitted (2016).

19. Daniel I. Bilc, Calin G. Floare, Liviu P. Zârbo, Sorina Garabagiu, Sebastien Lemal, and Philippe Ghosez, *First-Principles Modeling of SrTiO₃ Based Oxides for Thermoelectric Applications*, J. Phys. Chem. C, **120**, 5678 (2016).

20. Liviu P. Zarbo, Marius A. Oancea, Manolis Klontzas, Manolis Tyllianakis, Ioana G. Grosu, George Froudakis, *Electrically enhanced hydrogen adsorption in metal-organic frameworks*, 10.26434/chemrxiv.8209304.v1 (2019).

Conference Presentations

- *Vibrations in Glasses Encounter Quantum Chaos*.

APS March Meeting 2003, Austin, Texas.

- *Pure and Impure Spin Currents in Mesoscopic Four-Probe Semiconductor Nanostructures with Rashba and Dresselhaus Spin-Orbit Couplings*.

APS March Meeting 2005, Los Angeles, California.

- *Mesoscopic Spin Hall Currents and Spin Densities in Multiprobe Ballistic Semiconductor Nanostructures*.

SPINTECH III, Awaji Island, JAPAN August 1-5, 2005.

- *Imaging Stationary Flow of Spin Hall Effect-Induced Spin Densities in Mesoscopic Nanostructures*.

APS March Meeting 2006, Baltimore, Maryland.

- *Imaging massless Dirac fermion flow in graphene nanoribbons.*
APS March Meeting 2008, New Orleans, Louisiana.
- *Monte Carlo Simulation of Spin-Injection Hall Effect.*
APS March Meeting 2009, Pittsburgh, Pennsylvania.
- *Monte Carlo Simulation of Spin-Injection Hall Effect in Spintronic Devices.*
Techcon 2009, Austin, Texas.
- *Modeling of diffusion of injected electron spins in spin-orbit coupled microchannels.*
APS March Meeting 2011, Dallas, Texas.
- *Current Induced Spin Torque in Uniform Semiconducting Ferromagnets.*
2nd Advanced Workshop on Spin and Charge Properties of Low Dimensional Systems, Brasov, Romania, 2011.
- *Current Induced Spin Torque in Uniform Semiconducting Ferromagnets.*
Frontiers of Quantum and Mesoscopic Thermodynamics 2011, Prague, Czech Republic.
- *Spin-gating of a conventional aluminum single electron transistor.*
APS March Meeting 2012, Boston, Massachusetts.
- *Antidamping Spin Orbit Torque in Semiconducting Ferromagnets.*
Frontiers of Quantum and Mesoscopic Thermodynamics 2013, Prague, Czech Republic.
- *Spin-Orbit Torques in Semiconductor Ferromagnets*
Processes in Isotopes and Molecules 2015, Cluj-Napoca, Romania.
- *Influence of electric field on methane adsorption in metal-organic frameworks,*
College on Multiscale Computational Modeling of Materials for Energy Applications 2016, Trieste, Italy.
- *Electric fields as means to improve the hydrogen storage capacity of metal-organic frameworks,*
EMR 2017, Lisbon, Portugal.
- *Increasing the hydrogen storage capacity of IRMOF-1 via applied electric fields,*
Nanotech 2017, Paris, France.
- *Properties of Thermoelectric Oxide and Silicide Thin Films,* Euronanoforum 2019, Bucharest, Romania.