Maribel Núñez Valdez

Helmholtz-Zentrum Potsdam
Deutsches GeoForschungsZentrum (GFZ)
Sektion 3.6 Chemie und Physik der Geomaterialien
Telegrafenberg D-14473, Potsdam
GERMANY

Goethe-Universität Frankfurt am Main
Inst. f. Geowissenschaften
Altenhoeferallee 1 D-60438 Frankfurt a.M.
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CV last update: Oct 2020

Scientific Experience/Interests

Modeling of materials under extreme conditions of pressure and/or temperature; condensed matter physics; density functional theory; ferroelectricity; motion in strong magnetic fields; nuclear physics-quantum chromodynamics; theoretical high energy physics; applied physics to geosciences; teaching university physics (theory and laboratory); developing teaching laboratory manuals/classroom curricula.

Employment

W2-Professor. Goethe University Frankfurt am Main.
Atomistic Modeling of (geo)Materials
Institut für Geowissenschaften, October 15, 2018 – present

Researcher. Section 3.6: Chemistry and Physics of (Geo)Materials.
Helmholtz-Zentrum Potsdam, GFZ, February 2017 – present

Research Fellow. Computational Materials Discovery Laboratory.
Moscow Institute of Physics and Technology, May 18 2015 – December 2016
Group Leader: Prof. Artem Oganov

Teaching Assistant/MS Project Supervisor. Department of Materials Theory.
ETH-Zürich, Fall 2013, Summer 2014, and Fall 2014

Postdoctoral Associate. Department of Materials Theory.
ETH-Zürich, January 28, 2013 – April 2015
Advisor: Prof. Nicola Spaldin

Optional Postdoctoral Training (OPT) Department of Chemical Engineering and Material Science.
University of Minnesota–Twin Cities, November 2011 – October 2012 (hired 50% time)
Advisor: Prof. Renata Wentzcovitch

Teaching Assistant (Recitations and Laboratory) School of physics and astronomy/Chemical Engineering and Materials Science Department
University of Minnesota–Twin Cities, September 2004 – December 2010

Education

Ph.D. Condensed Matter Physics (Theory). University of Minnesota–Twin Cities, October 31, 2011
Thesis: Structural and Elastic Properties of Iron-Bearing Mg_2SiO_4 Polymorphs at High Pressures and Temperatures: A First-Principles Study
Advisor: Renata Wentzcovitch

M.S. Theoretical High Energy Physics. University of Minnesota–Twin Cities, August 31, 2009
Paper: Bogomolny-Prasad-Sommerfeld (BPS) black holes
Advisor: Prof. Arkady Vainshtein

M.S. Nuclear Physics. National Autonomous University of Mexico (UNAM), June 12, 2004
Thesis: Baryonic states in a schematic model of constituent quarks and gluons.
Advisor: Prof. Peter Hess

B.S. Physics. National Autonomous University of Mexico (UNAM), January 2003
Graduated *summa cum laude*.
Thesis: Quantum Mechanics with dissipation in magnetic fields.
Advisor: Prof. Peter Hess

Mentorship as main/only PI

* Artem Chmeruk, doctoral student, GFZ/Goethe University Frankfurt am Main, July 2020 – present

* Johannes Wagner, jr. postdoctoral researcher, GFZ, May–Nov 2019 and (1/2 time) Dec 2019 – Apr 2020

Mentorship as senior postdoc

* Martin Ruminy, experimental doctoral student, ETH-Zürich, 2015

* Hendrik Th. Spanke, master student, ETH-Zürich, Summer 2014

Research Experience

Postdoctoral Research. Moscow Institute of Physics and Technology, May 18 2015–December 2016
I investigated and developed methods to design and study efficient thermoelectric materials using an evolutionary algorithm, density functional theory and classical Boltzmann transport theory. Efficient thermoelectric materials are highly promising as alternative energy sources.

Postdoctoral Research. ETH-Zürich, January 28, 2013 –April 2015
I investigated structural, electronic and ferroelectric properties of layered perovskite-related oxides of the form $RE_2Ti_2O_7$ for RE=Pr, Nd, Gd and Tb, and $BaMF_4$ for M=Mg, Zn using within density functional theory.
I studied computational methods for treating strongly correlated electron systems.

I collaborated with an experimental team to understand and describe phonons of $RE_2Ti_2O_7$ pyrochlores for RE=Tb, Ho using first principles calculations.

Postdoctoral Research. University of Minnesota–Twin Cities, November 2011 – July 2012
I modeled and computed superhard materials' properties, such as diamond and c-BN, under extreme conditions.

I continued the study of iron-bearing polymorphs at high pressures and temperatures in the context of planetary models.

Doctoral Research. University of Minnesota–Twin Cities, 2009 – 2011
For my PhD work I modeled and computed ground state properties, equilibrium structures, equation of states, elastic tensors, bulk and shear moduli, sound velocities, azimuthal polarizations, and transversal anisotropies of iron-bearing $\alpha - \beta - \gamma$–$(Mg_{1-x}Fe_x)_2SiO_4$ polymorphs under extreme conditions of pressure and temperature.

M.S. Theoretical High Energy Physics Research University of Minnesota–Twin Cities
I reviewed literature on black holes in supergravity. I studied extremal dyonic black holes in four dimensions and supersymetry together with their thermodynamical properties. Finally I assessed the Bogomolny-Prasad-Sommerfeld (BPS) states and their marginal stability in the context of supergravity and the connection between these BPS states and extremal black holes.

M.S. Nuclear Physics Research UNAM

I investigated the extension of a phenomenological schematic model for quantum chromodynamics (QCD), which was originally developed only for the mesonic spectrum, to include baryonic features. Particularly, I studied the appearance of exotic baryonic states, such as pentaquark and heptaquark states.

Undergraduate Quantum Mechanics Research UNAM

I investigated the motion of a charged particle, represented by a wave packet, through a dissipative medium in the presence of a strong magnetic field. We found that in average, the particle follows the classical path augmented by a quantum mechanical contribution.

List of publications

In preparation

* **Núñez Valdez M.**, S. Speziale, et al. On EOS compositional-relevant garnet's to the Earth's upper-mantle.

Under Review

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Preprints

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Peer-reviewed Publications

* J. Wagner† and **M. Núñez Valdez**, *Ab initio* study of band gap properties in metastable BC8/ST12 Si_xGe_{1-x} alloys, Appl. Phys. Lett. **117**, 032105 (2020).
`https://doi.org/10.1063/5.0010311`
† : *Postdoctoral advisee.*

* **M. Núñez Valdez** and Spaldin, N. A., Origin and evolution of ferroelectricity in the layered rare-earth-titanate, $R_2Ti_2O_7$, Carpy-Galy phases, Polyhedron **171**, 181-192 (2019).
`https://doi.org/10.1016/j.poly.2019.07.018`

* **M. Núñez Valdez**, Bruschini E., Speziale S., Bosi F., Fregola R. A., D'Ippolito V., and Andreozzi G. B. Reexploring the cation ordering and magnetic cation substitution effects on the elastic anisotropy of aluminum spinels, J. App. Phys. **124**, 175901 (2018)
`https://doi.org/10.1063/1.5050064`

* Taran M., **M. Núñez Valdez**, Efthimiopoulos I., Müller J., Koch-Müller M. and Wilke M. Spectroscopic and *ab initio* studies of the pressure-induced Fe^{2+} high-spin to low-spin electronic transition in natural triphylite-lithiophilite, Phys. Chem. Minerals (2018)
`https://doi.org/10.1007/s00269-018-1001-y`

* **M. Núñez Valdez**, Efthimiopoulos I.,Taran, M., Müller, J., Bykova, E., McCammon, C., Koch-Müller, M., Wilke, M. Evidence for a pressure-induced spin transition in olivine-type LiFePO4 triphylite, Phys. Rev. B **97**, 184405 (2018)
`http://doi.org/10.1103/PhysRevB.97.184405`

* **M. Núñez Valdez**, Allahyari Z., Fan T., and Oganov R. A., Efficient technique for computational design of thermoelectric materials, Comp. Phys. Commun. **222**, 152-157 (2018)
`http://doi.org/10.1016/j.cpc.2017.10.001`

* Ruminy†, M., **M. Núñez Valdez**, Wehinger B., Bosak A., Adroja D. T., Stuhr U., Iida K., Kamazawa K., Pomjakushina D., Haas M. K., Bovo L., Sheptyakov D., Cervellino A., Cava R. J., Kenzelmann M., Spaldin N., and Fennell T. First principles calculation and experimental investigation of lattice dynamics in the rare pyrochlores $R_2Ti_2O_7$ (R: Tb, Dy, Ho), Phys. Rev. B **93**, 214308 (2016)
`http://doi.org/10.1103/PhysRevB.93.214308`
† : *Experimental PhD student who I mentored in ab initio calculations.*

* **M. Núñez Valdez**, Spanke H. Th., and Spaldin, N. A., *Ab initio* study of the ferroelectric strain dependence and 180° domain walls in the barium metal fluorides $BaMgF_4$ and $BaZnF_4$, Phys. Rev. B **93**, 064112 (2016).
http://doi.org/10.1103/PhysRevB.93.064112

* Da Silveira P., Holiday A., **M. Núñez Valdez**, Gunathilake L., Yuen D. A., and Wentzcovitch R. M., First principles elasticity workflow in the Vlab Science Gateway, Proc. of XSEDE'13 Conference, Art. 42, New York, NY, USA (2013)
http://doi.org/10.1145/2484762.2484823

* **M. Núñez Valdez,** Z. Wu, Y. G. Yu, and R. M. Wentzcovitch, Thermal Elasticity of $(Fe_x,Mg_{1-x})_2SiO_4$ of Olivine and Wadsleyite, Geophys. Res. Lett., **40**, 290-294 (2013)
http://doi.org/10.1002/grl.50131

* **M. Núñez Valdez,** K. Umemoto, R. M. Wentzcovitch, Elasticity of Diamond at High Pressures and Temperatures, Appl. Phys. Lett., **101**, 170912 (2012)
http://doi.org/10.1063/1.4754548

* **M. Núñez Valdez,** Z. Wu, Y. G. Yu, J. Revenaugh, and R. M. Wentzcovitch, Thermoelastic Properties of Ringwoodite $(Fe_x,Mg_{1-x})_2SiO_4$: Their Relationship to the 520 km Seismic Discontinuity, Earth and Planet. Sc. Lett., **351**–**352**, 115–122 (2012)
http://doi.org/10.1016/j.epsl.2012.07.024

* **M. Núñez Valdez,** P. da Silveira, R. M. Wentzcovitch, Influence of Iron on the Elastic Properties of Wadsleyite and Ringwoodite, J. Geophys. Res., **116**, B12207 (2011)
http://doi.org/10.1029/2011JB008378

* Da Silveira, P., **M. Núñez Valdez**, R. M. Wentzcovitch, M. Pierce, and D. A. Yuen, Virtual laboratory for planetary materials (VLab): an updated overview of system service architecture TG'11 Proceedings of the 2011 TeraGrid Conference: Extreme Digital Discovery ACM, Art. 33, New York, NY, USA (2011)
http://doi.org/10.1145/2016741.2016777

* **M. Núñez Valdez,** K. Umemoto, R. M. Wentzcovitch, Fundamentals of elasticity of $(Mg_{1-x}, Fe_x)_2SiO_4$ olivine, Geophys. Res. Lett., **37**, L14308 (2010)
http://doi.org/10.1029/2010GL044205

* **M. Núñez Valdez,** S. Lerma, P.O. Hess, S. Jesgarz, O. Civitarese, and M. Reboiro, A schematic model for QCD III: Hadronic states, Phys. Rev. C **70**, 035208 (2004)
http://doi.org/10.1103/PhysRevC.70.035208

* **M. Núñez Valdez,** S. Lerma, P.O. Hess, S. Jesgarz, O. Civitarese, and M. Reboiro, Modelling pentaquark and heptquark states, Phys. Rev. C **70**, 025201 (2004)
http://doi.org/10.1103/PhysRevC.70.025201

* **M. Núñez Valdez,** P. Hess, D. Schuch, Quantum mechanics in dissipative systems with strong magnetic fields, Phys. Rev. A **70**, 032103 1-5 (2004)
http://doi.org/10.1103/PhysRevA.70.032103

* **M. Núñez Valdez,** P. Hess, O. Civitarese, and M. Reboiro, A toy model for QCD: Hadrons, penta- and heptaquarks, AIP (Nuclear Phys) **726**, 243-244 (2004)
https://doi.org/10.1063/1.1805955

Honors and Awards

2020 Project "*Ab initio* modeling of materials inspired for and by georesources under high pressure (Cont.)" approved and awarded 1.5×10^6 core-hours for the JUWELS supercomputer at the Supercomputing Centre Jülich (1 May 2020 – 30 April 2021).
Corona year.

2019 Project "*Ab initio* modeling of materials inspired for and by georesources under high pressure" approved and awarded 0.8×10^6 core-hours for the JUWELS supercomputer at the Supercomputing Centre Jülich (1 May 2019 – 30 April 2020).

2018 Project "First-principles modeling of Earth-related materials (Cont.)" approved and awarded 1×10^6 core-hours for the JURECA and JUWELS supercomputers at the Supercomputing Centre Jülich (1 May 2018 – 30 April 2019).

2017 Project "First-principles modeling of Earth-related materials" approved and awarded 0.5×10^6 core-hours for the JURECA supercomputer at the Supercomputing Centre Jülich (1 May 2017 – 30 April 2018).

2016 Helmholtz Association of German Research Centres e.V. W2/W3-program for excellent female scientists, W2 funding winner (Nov 30, 2016).

2015 "5top100" Research Fellowship, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia.

2012 Travel Scholarship Award, Consortium for Materials Properties Research in Earth Sciences (COMPRES) 2012 Annual Meeting, Tahoe City, CA, USA.

2011 Travel Scholarship Award, Consortium for Materials Properties Research in Earth Sciences (COMPRES) 2011 Annual Meeting, Williamsburg, VA, USA.

2010 Scholarship Award, Cooperative Institute for Dynamic Earth Research (CIDER) Summer School, Kavli Institute for Theoretical Physics (KITP), University of Santa Barbara, CA, USA.

2010 Travel Scholarship Award, Consortium for Materials Properties Research in Earth Sciences (COMPRES) 2010 Annual Meeting, Stevenson, WA, USA.

2009 Outstanding Student Paper Award, Mineral and Rock Physics, 2009 American Geophysical Union (AGU) Fall meeting, USA.

2008 Scholarship Award, Summer School: Prospects in Theoretical Physics. "Strings and Phenomenology", Institute for Advance Study, Princeton, NJ, USA.

2007 Scholarship Award, Summer School: Prospects in Theoretical Physics. "The Standard Model and Beyond", Institute for Advance Study, Princeton, NJ, USA.

2005 Excellence in Teaching Award, School of Physics and Astronomy, University of Minnesota–Twin Cities.

2002 Gabino Barreda Medal (best physics student), National Autonomous University of Mexico.

Presentations

26. American Physical Society March Meeting. Denver, CO, USA, 2020.
Contributed talk, "Novel tunable band gap BC8/ST12 Si_xGe_{x-1} alloys: insights from first-principles calculations". Presenter: postdoctoral advisee J. Wagner

Contributed talk, "A first-principles study on the phase stability of $Mg_{1-x}Fe_xN$ alloys: the unconventional rock-salt occurrence under high pressure.

25. Theoretical Chemistry, Postdam University , Potsdam, Germany, Dec 4 2019 Invited talk, "*Ab initio* investigations of high-density Fe_3N"

24. American Physical Society March Meeting. Boston, USA, 2019.
Contributed talk, "A First-Principles Study of Two High-Pressure Modifications of Fe_3N".

23. American Physical Society March Meeting. Los Angeles, USA, 2018.
Contributed talk, "*Ab Initio* and Experimental Investigations on the Influence of Cation Ordering on the Elasticity of (Mg,Mn)Al_2O_4 Spinels".

22. **Goethe University Frankfurt/Main.** Frankfurt am Main, Germany, October 2017
Invited talk, "Understanding our planet atom by atom".

21. **55th EHPRG Meeting: High Pressure Science and Technology.** Poznań, Poland, September 2017
Contributed talk, "A first-principles study and experimental investigation of structural and magnetic properties of M1M2(PO_4) olivine-type materials at high-pressure".

20. **Colloquium of the Institute of Earth Sciences, Goethe University Frankfurt/Main.** Frankfurt am Main, Germany, June 2017
Invited talk, "How-to quantum model our planet from down inside and more".

19. **Colloquium of the Institute of Earth and Environmental Science, Potsdam University.** Potsdam, Germany, June 2016
Invited talk, "Understanding Earth's interior from quantum modelling".

18. **III International technological forum "Innovations. Technologies. Manufacturing"** Rybinsk, Yaroslavl region, Russia, April 2016
Contributed talk, "Working towards the design of efficient thermoelectric materials".

17. **American Physical Society March Meeting.** Baltimore, MD, USA, March 2016.
Contributed talk, "Evolutionary structure search of efficient thermoelectric compounds".

16. **Deutsche Physikalische Gesellschaft.** TU Berlin, Germany, March 2015
Contributed talk, "*Ab initio* investigation of ferroelectric domain walls in barium fluorides".

15. **Gordon Research Conference: Multiferroic & Magnetoelectric Materials.** University of New England in Biddeford ME, USA, August 2014
Contributed poster, "Ferroelectricity in layered perovskites $Re_2Ti_2O_7$: Potential candidates to search for the electron electric dipole moment".

14. **Swiss Physical Society Annual Meeting.** Freiburg, Switzerland, July 2014
Contributed poster, "Potential multiferroic $Re_nTi_nO_{3n+2}$: Candidate materials to search for the electric dipole moment of the electron".

13. **American Physical Society March Meeting.** Denver, CO, USA, 2014.
Contributed talk, "$A_2Ti_2O_7$: Candidate Materials to Search for the Electric Dipole Moment of the Electron".

12. **Consortium for Materials Properties Research in Earth Sciences (COMPRES) Annual Meeting.** Tahoe City, CA. 2012.
Contributed posters 1-2, "ThermoeIastic Properties of Olivine, Wadsleyite and Rinwoodite: Their Relationship to the 410 km and 520 km Seismic Discontinuities".
Contributed poster 3, " Elasticity of Diamond at High Pressures and Temperatures"

11. **American Physical Society March Meeting.** Boston, MA, USA, 2012.
Contributed talk, "Structural and Elastic Properties of Iron-Bearing Olivine Polymorphs at High Pressures and Temperatures: A First-Principles Study".

10. **American Geophysical Union Fall Meeting.** San Francisco, CA, USA, 2011.
Contributed poster, "Thermoelastic Properties of Wadsleyite and Ringwoodite $(Fe_x,Mg_{1-x})_2SiO_4$: Their Relationship to the 520 km Seismic Discontinuity".
Coauthor in posters, "Thermoelastic Properties of Olivine and Wadsleyite $(Fe_x,Mg_{1-x})_2SiO_4$: Their Relationship to the 410 km Seismic Discontinuity" and "New workflows and resources in the VLab cyberinfrastruture".

9. **Consortium for Materials Properties Research in Earth Sciences (COMPRES) Annual Meeting.** Stevenson ,WA, USA, 2011.
Contributed poster, "Influence of Iron on the Elastic Properties of Wadsleyite and Ringwoodite".

8. **American Physical Society March Meeting.** Dallas, TX, 2011.
   Contributed talk, "Elasticity of iron-bearing olivine polymorphs investigated by first principles".

7. **American Geophysical Union Fall Meeting.** San Francisco, CA, 2010.
   Contributed poster, "Influence of iron on the elastic properties of wadsleyite and ringwoodite".

6. **American Geophysical Union Fall Meeting.** San Francisco, CA, 2010.
   Coauthor in contributed talk, "Deep Water Cycle: its Role in Earth's Thermal Evolution and Plate Tectonics". (Outcome of my participation in the CIDER school research project).

5. **Cooperative Institute for Dynamic Earth Research (CIDER) summer school.** Santa Barbara, CA, 2010.
   Contributed poster, "First Principles Elasticity of Olivine".

4. **Consortium for Materials Properties Research in Earth Sciences (COMPRES) Annual Meeting.** Skamania Lodge, Stevenson ,WA, USA, 2010.
   Contributed poster, "Fundamentals of Elasticity of $(Mg_{1-x},Fe_x)_2SiO_4$ Olivine".

3. **American Physical Society March Meeting.** Portland, OR, USA, 2010.
   Contributed talk, "First Principles Elasticity of Olivine".

2. **American Geophysical Union Fall Meeting.** San Francisco, CA, USA, 2009.
   Contributed poster, "Fundamentals of elasticity for Fe-bearing forsterite".

1. **International Conference on Nuclear Physics, Large and Small: Microscopic Studies of Collective Phenomena** Morelos, Mexico, 2004
   Contributed poster, "A toy model for QCD: Hadrons, penta- and hepta-quarks".

Teaching

January 2020 Lecturer. Special topics: Phase transitions (MSc course).
Crystallography Department, IfG, Goethe-Universität Frankfurt am Main

April 2019 Lecturer. Block course: Elasticity of Solids (MSc course).
Crystallography Department, IfG, Goethe-Universität Frankfurt am Main

Fall 2014 Teaching Assistant. Solid State Physics and Chemistry of Materials I (MSc course).
Recitations and Grading; 39 students
Materials Theory, ETH-Zürich

Summer 2014 8-week MS Project Supervisor.
Designing and assessing of an 8-week project for a student.
This project is one of the requirements to obtain the MS degree in Materials Sciences at ETH-Zürich.

Fall 2013 Teaching Assistant. Quantum Enabled Materials I (MS course).
Recitations and Grading; 39 students
Materials Theory, ETH-Zürich

Fall 2010 Teaching Assistant. MATS 4001 Thermodynamics of Materials.
Recitations and Grading; 39 students
Department of Chem. Engineering and Material Science, University of Minnesota–Twin Cities

Summer&Fall 2008, Spring 2009 Teaching Assistant. Introductory Physics for Biology & Pre-medicine II.
Discussion and Laboratory; Summer, 1 section: 9 students; Fall and Spring, 2 sections/term: 33 students
School of Physics and Astronomy, University of Minnesota–Twin Cities

Fall 2007, Spring 2008 Teaching Assistant and TA team head. Introductory Physics for Biology & Pre-medicine I.
Discussion and Laboratory; 2 sections/term: 33 students
School of Physics and Astronomy, University of Minnesota–Twin Cities

Spring&Fall 2006, Spring 2007 Teaching Assistant. Introductory Physics for Biology & Pre-medicine II.
Discussion and Laboratory; 2 sections/term: 29 students
School of Physics and Astronomy, University of Minnesota–Twin Cities

Fall 2005 Teaching Assistant. Introductory Physics for Biology & Pre-medicine I.
Discussion and Laboratory; 2 sections: 29 students
School of Physics and Astronomy, University of Minnesota–Twin Cities

Summer 2005 Laboratory manuals development. Introductory Physics for Biology & Pre-medicine.
School of Physics and Astronomy, University of Minnesota–Twin Cities

Fall 2004, Spring 2005 Teaching Assistant. Introductory College Physics I.
Discussion and Laboratory; 2 sections: 29 students
School of Physics and Astronomy, University of Minnesota–Twin Cities

Professional Service to the Scientific Community

* Reviewer of articles for various journals, 2010 – present
* Reviewer for German Science foundation (DFG) proposals, 2020
* Member of faculty hiring committee at the Institute of Geosciences, Goethe University Frankfurt am Main, 2019 – 2020
* Seminar organizer of Sec. 3.6 Chem. and Phys. of geomaterials at GFZ, 2020 – present

Other Education-Teaching Involvement

Commenting On & Grading Student Writing workshop, Center for Writing, University of Minnesota–Twin Cities, Summer 2010.

Student Recruitment, Annual meeting of National Societies of Black and Hispanic Physicists (NSBP and NSHP), February 2007 and April 2008.

Seminar: Physics Teaching (1 credit), University of Minnesota–Twin Cities, Fall 2005

Laboratory manual development for calculus-based mechanics Introductory Physics for Biology & Pre-medicine I), University of Minnesota–Twin Cities, Summer 2005

Science Education course: Teaching University Physics (2 credits), University of Minnesota–Twin Cities, Spring 2005

Professional Associations

American Physical Society (APS)

Laboratory/Computer Skills

- ◇ **Construction/Design.** Basic machining skills (lathe, mill, drill press, etc.), soldering and brazing, basic electronics.
- ◇ **Scripting/Programming.** UNIX, HTML, Fortran, Mathematica, Matlab, Gnuplot, quantum-ESPRESSO, VASP, CrystalMaker, XCrySDen, VESTA, XMGRACE.
- ◇ **Computer Administration.** UNIX, Linux, Mac OS.

- ◇ **Productivity Software.** LaTeX, Word, Excel, Powerpoint, etc.
- ◇ **Experience using high-performance supercomputing facilities.** Run and optimization of simulations using large scale parallel computer resources.

Languages

Spanish Mother tongue

English Fluent (speaking, listening, reading, and writing).

German Beginner A2-B1 (speaking, listening, reading, and writing). Institute Goethe, Mexico, University of Minnesota–Twin Cities, ETH-Zürich.

Russian Beginner A2 (speaking, listening, reading, and writing). National Autonomous University of Mexico, University of Minnesota–Twin Cities

Japanese Beginner A1-A2 (speaking, listening, reading, and writing) as well as culture-specific skills (do's and don'ts). University of Minnesota–Twin Cities.

Personal Interests/Hobbies

Long distance running (half, full and ultra marathons), biking, traveling, painting,...