

Curriculum Vitae

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Education

Ph.D., Physics (with distinction): Universidad de la Republica, Uruguay, Aug. 2012

- Advisor: Prof. Rodolfo Gambini
- Dissertation: *Two dimensional models in loop quantum gravity*

M.Sc., Physics: Shiraz University, Shiraz, Iran, Jul. 2006

- Advisor: Prof. Azizollah Azizi
- Dissertation: *Dynamical cellular networks: A new approach to quantum gravity*

B.Sc., Physics: Kharazmi University, Tehran, Iran, Dec. 2002

Positions Held

Assistant Professor, Monterrey Institute of Technology (ITESM), Mexico, Sep. 2018-Present
Classical and quantum gravity, black hole physics, emergent spacetime, modified gravity

Postdoctoral Fellow, Universidad Autonoma Metropolitana, Mexico, Sep. 2014-Aug. 2018
Classical and quantum gravity, black hole physics, emergent spacetime, QFT in curved spacetime

Postdoctoral Fellow, UNAM (Centro de Ciencias Matematicas), Mexico, Sep. 2012-Aug. 2014
Classical and quantum gravity, black hole physics, algebraic QFT, modified gravity

Publications

The list of authors is in alphabetical order, not by the order of contribution.

1. H. A. Morales-Técotl, S. Rastgoo and J. C. Ruelas, *Modified effective dynamics of the Schwarzschild black hole interior from path integral approach*, 2018, Submitted to Phys. Rev. D, arXiv:1806.05795 [gr-qc].
2. Y. Bonder, A. Garcia-Chung, S. Rastgoo, *Bounds on the Polymer Scale from Gamma Ray Bursts*, Phys. Rev. D **96**, 106021 (2017), arXiv:1704.08750 [gr-qc].
3. H. A. Morales-Técotl, S. Rastgoo, J. C. Ruelas, *Path integral polymer propagator of relativistic and non-relativistic particles*, Phys. Rev. D **95**, 065026 (2017), arXiv:1608.04498 [gr-qc].
4. A. Corichi, J. Olmedo, S. Rastgoo, *Callan-Giddings-Harvey-Strominger vacuum in loop quantum gravity and singularity resolution*, Phys. Rev. D **94**, 084050 (2016), arXiv:1608.06246 [gr-qc].
5. S. Rastgoo, M. Requardt, *Emergent Space-Time via a Geometric Renormalization Method*, Phys. Rev. D. **94**, 124019 (2016), arXiv:1606.08073 [gr-qc].
6. H. A. Morales-Técotl, D. H. Orozco-Borunda, S. Rastgoo, *Polymerization, the Problem of Access to the Saddle Point Approximation, and Thermodynamics*, in Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity, World Scientific, 2017, ISBN: 978-9813226593, arXiv:1603.08076 [gr-qc].
7. A. Corichi, A. Karami, S. Rastgoo, T. Vukašinac, *Constraint Lie algebra and local physical Hamiltonian for a generic 2D dilatonic model*, Class. Quantum Grav. **33** 035011 (2016), arXiv:1508.03036 [gr-qc].
8. H. A. Morales-Técotl, D. H. Orozco-Borunda, S. Rastgoo, *Polymer quantization and the saddle point approximation of partition functions*, Phys. Rev. D **92**, 104029 (2015), arXiv:1507.08651 [gr-qc].
9. S. Rastgoo, M. Requardt, *The Structurally Dynamic Cellular Network and Quantum Graphity Approaches to Quantum Gravity and Quantum Geometry - A Review and Comparison*, Journal of Cellular Automata 10/2015; **10**(5-6):341-392, arXiv:1501.00391 [gr-qc].
10. S. Rastgoo, *A local true Hamiltonian for the CGHS model in new variables*, 2013, arXiv:1304.7836 [gr-qc].
11. R. Gambini, J. Pullin, S. Rastgoo, *Reply to comment on “Small Lorentz violations in quantum gravity: do they lead to unacceptably large effects?”*, Class. Quantum Grav. **29** 088002 (2012).
12. R. Gambini, J. Pullin, S. Rastgoo, *Quantum scalar field in quantum gravity with spherical symmetry*, J. Phys.: Conf. Ser. **360** 012005 (2012).

13. R. Gambini, J. Pullin and S. Rastgoo, *Quantum scalar field in quantum gravity: the propagator and Lorentz invariance in the spherically symmetric case*, Gen. Relat. Gravit. **43** 3569 (2011), arXiv:1105.0667 [gr-qc].
14. R. Gambini, J. Pullin, S. Rastgoo, *Small Lorentz violations in quantum gravity: do they lead to unacceptably large effects?*, Class. Quantum Grav. **28** 155005 (2011), arXiv:1106.1417 [gr-qc].
15. R. Gambini, J. Pullin and S. Rastgoo, *New variables for 1+1 dimensional gravity*, Class. Quantum Grav. **27** 025002 (2010), arXiv:0909.0459 [gr-qc].
16. R. Gambini, J. Pullin and S. Rastgoo, *Quantum scalar field in quantum gravity: the vacuum in the spherically symmetric case*, Class. Quantum Grav. **26** 215011 (2009), arXiv:0906.1774 [gr-qc].

Works in Preparation:

1. R. Gambini, J. Pullin and S. Rastgoo, *Quantum gravity in terms of observables*, in preparation
2. C. Lämmerzahl, S. Rastgoo, *Geodesics and accretion disk close to a quantum black hole*, in preparation
3. S. Rastgoo, *Implementing complete backreaction in scattering of scalar field on a black hole spacetime*, in preparation
4. S. Rastgoo, M. Requardt, *Entanglement and nonlocality in multilayered emergent spacetimes*, in preparation

———— Talks and Presentations

Invited Talks:

- **Black hole interior in non-perturbative canonical quantum gravity: the singularity resolution**, *The Fifth International Conference on Mathematics and its Applications (5CIMA)*, Sep. 3-7, 2018, University of Puebla (BUAP), Mexico
- **The continuum limit of metric spaces: a renormalization framework for the emergence of space(time)**, *MexiLazos 2017*, Nov. 16-17, 2017, ICN, UNAM, Mexico City, Mexico
- **Black hole singularity resolution in loop quantum gravity**, *Field Theory, Gravitation and Cosmology Workshop (Taller de Teoría de Campo, Gravitación y Cosmología)*, Oct. 17-18, 2016, Universidad de Puebla, Mexico
- **Polymer Quantization, Saddle Point Issue, and Black Hole Thermodynamics**, *MexiLazos 2015*, Nov. 12, 2015, IIMAS, Mexico City, Mexico
- **Towards the resolution of the singularity of the CGHS black hole in loop quantum gravity**, *MexiLazos 2014*, Nov. 14, 2014, Universidad de Puebla, Puebla, Mexico

Contributed Talks:

- **Emergent Space(time) from Renormalizing Discrete Metric Spaces**, *Loops 17*, Jul. 3-7, 2017, University of Warsaw, Poland
- **Emergent continuous spacetime via a geometric renormalization method**, *Fifth Tux Workshop on Quantum Gravity*, Feb. 13-17, 2017, Tux, Austria
- **Geometry From Renormalized Pre-geometry**, *MexiLazos 2016*, Nov. 10-11, 2016, Universidad Autonoma San Luis Potosi, Mexico
- **Spacetime emergence through a geometric renormalization method**, *GR21*, Jul. 10-15, 2016, Columbia University, New York, USA
- **From discrete to continuum: Lessons from the Gromov-Hausdorff space**, *Fourth Tux Workshop on Quantum Gravity*, Feb. 18, 2016, Tux, Austria
- **Polymerization, the Problem of Access to the Saddle Point Approximation, and Thermodynamics**, *Fourteenth Marcel Grossmann Meeting - MG14*, Jul. 12-18, 2015, University of Rome La Sapienza, Rome, Italy
- **Dilatonic black holes in LQG: two recent results**, *Loops 15*, Jul. 6-10, 2015, Erlangen, Germany
- **Polymerization and saddle point approximation issues in dilatonic black holes: a toy model**, *Third EFI winter conference on Quantum Gravity*, Feb. 16-20, 2015, Tux, Austria
- **On the singularity resolution of the CGHS black hole**, *Second EFI winter conference on quantum gravity, black holes and dynamics*, Feb. 10-14, 2014, Tux, Austria
- **Towards resolution of the singularity of the CGHS black hole**, *International Loop Quantum Gravity Seminars*, Dec. 10, 2013, Online talk
- **Constraint Lie algebra and true local Hamiltonian for all the 2D dilatonic models**, *MexiLazos 2013*, Nov. 7-8, 2013, Universidad Autónoma Metropolitana (UAM), Mexico City, Mexico
- **Constraint Lie algebra and true local Hamiltonian for the CGHS model**, *Loops 13*, Jul. 22-26, 2013, Perimeter Institute for Theoretical Physics, Waterloo, Canada
- **An analysis of the CGHS model in new variables**, *GR20*, Jul. 7-13, 2013, University of Warsaw, Warsaw, Poland
- **Vacuum state and propagator of the scalar field in spherically symmetric loop quantum gravity**, *MexiLazos 2012*, Nov. 9-10, 2012, UNAM, Morelia, Mexico
- **Ashtekar's Variables for 1+1 Gravity**, *Loops 11*, May 23-28, 2011, Madrid, Spain
- **Dynamical Cellular Networks**, Institute of theoretical Physics and Mathematics (IPM), 2006, Tehran, Iran

Seminars:

- **Treatment of black holes in nonperturbative canonical quantum gravity**, Instituto de Física, Universidad de la República, Apr. 16, 2018, Uruguay
- **Loop Quantum Gravity, Polymer Quantization, and The Relation Between Them**, Escuela Superior de Física y Matemáticas, IPN, Feb. 23, 2018, Mexico City, Mexico
- **Confronting Polymer Quantization of Photons with GRB Experiments**, *Amsterdam* meeting, University of Amsterdam, Jun. 28, 2017, The Netherlands
- **Loop Quantum Gravity: An Introduction**, Physics Department, UAM-I, Mar. 7, 2017, Mexico City, Mexico
- **Emergent Space(time) as Renormalized Pre-geometry**, The Quantum Gravity Group, Radboud University, Feb. 22, 2017, Nijmegen, The Netherlands
- **Quantum black holes, information paradox and some of the proposed solutions**, Gravitation and Field Theory Department, ICN, UNAM, Nov. 26, 2015, Mexico City, Mexico
- **The black hole information paradox and some of its proposed solutions**, Physics Department, UAM-I, Feb. 10, 2015, Mexico City, Mexico
- **Resolving the singularity of the CGHS black hole in loop quantum gravity**, The Gravitation and Field Theory Department, ICN, UNAM, Apr. 24, 2014, Mexico City, Mexico
- **A beginner introduction to loop quantum gravity**, Physics Department, University of Michoacan (UMSNH), May 31, 2013, Morelia, Mexico
- **Ashtekar's Variables in 1+1 Dimensional Gravity**, Centro de Estudios Científicos (CECs), Sep. 30, 2009, Valdivia, Chile

Posters:

- **Space-time From The Viewpoint Of Dynamical Cellular Networks Model Of Quantum Gravity**, *Second International Conference On The Ontology Of Space-time*, Jun. 9-11, 2006, Concordia University, Montreal, Quebec, Canada

———— Teaching and Supervision

Teaching:

– Graduate courses:

- *Gravitation II*, Universidad Autonoma Metropolitana, Mexico, Second trimester, May-Aug., 2018
- *Quantum Field Theory I*, Universidad Autonoma Metropolitana, Mexico, Third trimester, Sep. Dec., 2016

- *Gravitation I*, Universidad Autonoma Metropolitana, Mexico, First trimester, Jan.-Apr., 2016
- *Classical and Quantum Black Holes*, Universidad Autonoma Metropolitana, Mexico, Second trimester, May-Aug., 2015

Supervision:

- Co-supervision, M.Sc. students (main advisor: Prof. Hugo Morales-Técotl)
 - Melina Guadalupe Ruiz Pérez, Universidad Autonoma Metropolitana, Mexico, 2016-2018
 - Jairo Villafuerte Lara, Universidad Autonoma Metropolitana, Mexico, 2016
 - Daniel Humberto Orozco Borunda, Universidad Autonoma Metropolitana, Mexico, 2014-2015
- Co-supervision, Ph.D. students (main advisor: Prof. Hugo Morales-Técotl)
 - Juan Carlos Ruelas Vázquez, Universidad Autonoma Metropolitana, Mexico, 2017-2018
 - Ernesto Flores González, Universidad Autonoma Metropolitana, Mexico, 2016

Teaching Assistant:

- *Physics I (Mechanics, Thermodynamics)*, Universidad de la Republica, Uruguay, two semesters, 2012
- *Physics II (Electromagnetism, Optics)*, Universidad de la Republica, Uruguay, two semesters, 2011
- *Graduate Quantum Mechanics*, Shiraz University, Iran, two semesters, 2005-2006
- *Undergraduate Quantum Mechanics*, Kharazmi University, Iran, two semesters, 2002-2003
- *Undergraduate Astrophysics and Cosmology*, Kharazmi University, Iran, two semesters, 2001-2002

Private Tutoring:

- *SAT and ACT preparation*, Blue Ivy Coaching, Mexico City, Sep. 2017-Aug. 2018
- *Physics IB (high school)*, Blue Ivy Coaching, Mexico City, Sep. 2017-Aug. 2018
- *Math IB (high school)*, Blue Ivy Coaching, Mexico City, Sep. 2017-Aug. 2018

———— Scientific Visits and Conference Participation

Visits:

- Instituto de Física, Universidad de la República, Uruguay, Apr. 9 - 20, 2018
- Institute for Theoretical Physics, University of Amsterdam (UvA), The Netherlands, Jun. 2017
- The Quantum Gravity Group, Radboud University, Nijmegen, The Netherlands, Feb., 2017
- Centro de Estudios Científicos (CECs), Valdivia, Chile, Sep. 20 - Oct. 5, 2009

Conference Participation:

- **CarloFest**, Conference for the celebration of the 60th birthday of Carlo Rovelli, May 23-27, 2016, Marseilles, France
- **Summer School on Cosmology**, Aug. 4-15, 2014, ICTP, Trieste, Italy
- **SIGRAV graduate school in contemporary relativity and gravitational physics, XI Edition: Gravity and the Quantum**, Jun. 1-6, 2014, Centro di Cultura Scientifica Alessandro Volta, Como, Italy
- **Second Erlangen Fall School on Quantum Geometry**, Oct. 7-11, 2013, Friedrich-Alexander-Universitat Erlangen-Nurnberg (FAU), Erlangen, Germany
- **Workshop on scalar fields and dark matter**, Oct. 2-4, 2013, University of Michoacan, Morelia, Mexico
- **Quantum Gravity in the Southern Cone V**, Jul. 28-31, 2010, Buenos Aires, Argentina
- **International School in Quantum Gravity**, Jul. 19-27, 2010, La Plata, Argentina
- **PASI Quantum Gravity Summer School**, Jun. 23 - Jul. 3, 2010, Morelia, Mexico
- **School on Gauge/Gravity Correspondence**, May 19-30, 2008, ICTP, Trieste, Italy
- **Quantum Gravity in the Southern Cone IV**, Oct. 22-25, 2007, Punta del Este, Uruguay
- **Second School Of Cosmology**, Aug. 28 - Sep. 2, 2004, Institute of theoretical Physics and Mathematics (IPM), Tehran, Iran

———— Awards and Fellowships

Awards:

- Honorable Mention, Gravity Research Foundation, 2011

Positions/Research Grants and Fellowships:

- Postdoctoral grant, CONACyT (National Council of Science and Technology), Mexico, 2016-2018
- Project grant, CONACyT, Mexico, 2015-2017
- PRODEP postdoctoral fellowship, Universidad Autónoma Metropolitana (UAM-I), Mexico, 2014-2016
- Research grant, SNI (National System of Researchers), Mexico, 2014-2020
- DGAPA postdoctoral fellowship, Universidad Nacional Autónoma de México (UNAM), Mexico, 2012-2014
- Research grant, ANII (National Agency of Research and Innovations), Uruguay, Jun. 2011-May 2013
- ANII Ph.D. fellowship, Universidad de la República, Uruguay, 2008-2010
- PEDECIBA Ph.D. fellowship, Universidad de la República, Uruguay, 2007-2008

Visit Grants:

- From Instituto de Física, Facultad de Ciencias, Universidad de la República, to visit regional institutes, Semester 1 and 2, 2009
- From Centro de Estudios Científicos (CECs), Valdivia, Chile, to visit the institute, 2009

Conference Grants:

- Second Erlangen Fall School on Quantum Geometry, from the school, 2013
- GR20, from the conference, 2013
- International school in Quantum Gravity, from Argentinean “strings@ar network”, 2010
- PASI Quantum Gravity Summer School, from NSF, 2010
- School on Gauge/Gravity Correspondence, from International Center for Theoretical Physics (ICTP), Italy, 2008
- Quantum gravity in the southern cone IV, PEDECIBA grant, from Universidad de la República, 2007

Professional Memberships

- SNI (National System of Researchers), Mexico, 2014-2020
- Accredited Evaluator of CONACyT (RCEA member), 2015-present
- SNI, Uruguay, 2011-2013

Refereeing

- Referee, *Class. and Quantum Grav.*, *Phys. Rev. Lett.*, *Phys. Rev. D*, *Phys. Rev. X*
- Member of the Mexican CONACyT referee committee, for
 - Fellowships awarded for studying abroad, 2015
 - Projects to receive grant for “Investigación Científica Básica 2015”, Oct. 2015

IT Skills

- Mathematica
- Maple
- Python
- Visual Studio (Visual C++, Visual Basic)
- VBA and advanced Office
- Advanced hardware and software troubleshooting

Leadership, Outreach, and Other Skills

- **Amateur astronomy:**
 - Leader, construction of four Newtonian telescopes including the main mirror, Kharazmi University, 1999-2003
 - Educator, amateur astronomy, observation, and telescope making, Kharazmi University, 1999-2003
 - Organizer, numerous observation night events for students and public, Tehran, Iran, 1998-2005
- **Languages:**
 - English (fluent in reading, writing and speaking)
 - Spanish (very good in reading, writing and speaking)
 - Persian (native language)

References

- **Professor Rodolfo Gambini** (Ph.D. advisor)
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