

Curriculum Vitae

SAEED RASTGOO

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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, July. 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, York University, Canada, Jan. 2020-Present
Classical and quantum gravity, black hole physics, emergent spacetime

Assistant Professor, Monterrey Institute of Technology (ITESM), Mexico, Oct. 2018-Dec. 2019
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.

1. K. Blanchette, S. Das, S. Hergott, S. Rastgoo, *Black hole singularity resolution via the modified Raychaudhuri Equation in Loop Quantum Gravity*, 2020, [arXiv:2011.11815](#) [gr-qc].
2. R. Gambini, S. Rastgoo, J. Pullin, *Gravitation in terms of observables 2: the algebra of fundamental observables*, *Class. Quantum Grav.* **37** 145013 (2020), [arXiv:2003.01589](#) [gr-qc].
3. H. A. Morales-Técotl, S. Rastgoo, J. C. Ruelas, *Effective dynamics of the Schwarzschild black hole interior with inverse triad corrections*, 2018, [arXiv:1806.05795](#) [gr-qc].
4. 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].
5. 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].
6. 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].
7. S. Rastgoo, M. Requardt, *Emergent Space-Time via a Geometric Renormalization Method*, *Phys. Rev. D* **94**, 124019 (2016), [arXiv:1606.08073](#) [gr-qc].
8. 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].
9. S. Rastgoo, Y. Tavakoli, J. C. Fabris, *Phenomenology of a massive quantum field in a cosmological quantum spacetime*, *Ann. Phys.* **415C** (2020) 168110, [arXiv:1511.08823](#) [gr-qc].
10. 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].
11. 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].
12. 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].

13. S. Rastgoo, *A local true Hamiltonian for the CGHS model in new variables*, 2013, arXiv:1304.7836 [gr-qc].
14. 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).
15. R. Gambini, J. Pullin, S. Rastgoo, *Quantum scalar field in quantum gravity with spherical symmetry*, J. Phys.: Conf. Ser. **360** 012005 (2012).
16. 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].
17. 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].
18. 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].
19. 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].

———— Talks and Presentations

Invited Plenary Talks:

- **Effective evolution of the interior of the Schwarzschild black hole in non-perturbative quantum gravity**, *The Winter Meeting on Geometry and Physics*, Jan. 23-25, 2019, University of San Luis Potosi (UASLP), Mexico
- **Dealing with further corrections to the effective dynamics of the Schwarzschild’s interior**, *MexiLazos 2018*, Nov. 26-27, 2018, Universidad Autonoma Metropolitana - Iztapalapa, Mexico City, Mexico
- **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
- **Geometry From Renormalized Pre-geometry**, *MexiLazos 2016*, Nov. 10-11, 2016, Universidad Autonoma San Luis Potosi, 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
- **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
- **Vacuum state and propagator of the scalar field in spherically symmetric loop quantum gravity**, *MexiLazos 2012*, Nov. 9-10, 2012, UNAM, Morelia, Mexico

Seminars:

- **Effective Schwarzschild interior, Raychaudhuri equation, and singularity resolution**, Gravitation and Field Theory Department, ICN, UNAM, Oct. 29, 2020, Mexico City, Mexico (remote seminar)
- **Loop quantum gravity and black hole interior**, Cosmology Group, Physics Department, Sharif University of Technology, Aug. 9, 2020, Iran (remote seminar)
- **A glimpse of quantum gravity and quantum black holes**, Colloquiums of Department of Physics & Astronomy, York University, May 3, 2020, Canada
- **How is spacetime quantized in Loop Quantum Gravity?**, Universidad de Guanajuato Campus León, División de Ciencias e Ingenierías, Sep. 12, 2019, Mexico
- **Effective polymer dynamics of Schwarzschild interior via path integral: challenges and new results**, Theoretical Gravity Group, Department of Physics & Astronomy, Louisiana State University, May 9, 2019, USA
- **Nonperturbative canonical quantum gravity: basics and some applications**, Universidad de Guanajuato Campus León, División de Ciencias e Ingenierías, Feb. 19, 2019, Mexico
- **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**, *Amster-Dark* 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

Contributed Talks:

- **Interior of Schwarzschild: further quantum corrections, issues and remedies**, *Seventh Tux Workshop on Quantum Gravity*, Feb. 11-15, 2019, Tux, Austria
- **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
- **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 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
- **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

———— Teaching

Graduate courses:

Trimester II, 2018 (May-Aug.)

- *Gravitation II*, Universidad Autonoma Metropolitana, Mexico

Trimester III, 2016 (Sep.-Dec.)

- *Quantum Field Theory I*, Universidad Autonoma Metropolitana, Mexico

Trimester I, 2016 (Jan.-Apr.)

- *Gravitation I*, Universidad Autonoma Metropolitana, Mexico

Trimester II, 2015 (May-Aug.)

- *Classical and Quantum Black Holes*, Universidad Autonoma Metropolitana, Mexico

Undergraduate courses:

Fall Semester 2020-2021 (Sep./2020 - Dec./2020)

- *PHYS1800 (Physics I for engineers)* , York University, Canada

Winter Semester 2019-2020 (Jan./2020 - May/2020)

- *PHYS3010 (Intermediate Classical Mechanics: Lagrangian and Hamiltonian formulations)* , York University, Canada
- *PHYS4310 (Undergraduate Research)*, York University, Canada

Fall Semester 2019-2020 (Sep./2019 - Dec./2019)

- *Physics I (Mechanics)*, Monterrey Institute of Technology, Mexico
- *Physics II (Fluids, Oscillations, Waves, Thermodynamics)*, Monterrey Institute of Technology, Mexico

Winter Semester 2018-2019 (Jan./2019 - May/2019)

- *Physics I (Mechanics)*, Monterrey Institute of Technology, Mexico
- *Physics II (Fluids, Oscillations, Waves, Thermodynamics)*, Monterrey Institute of Technology, Mexico
- *Mathematics and Physics for Architecture and Industrial Design*, Monterrey Institute of Technology, Mexico

———— Supervision

PhD students:

- Keagan Blanchette, September 2020-Present
- Samantha Hergott, September 2020-Present

Undergraduate students:

- Tony Chu, PHYS4310 (undergraduate research course), Topic: Hamiltonian gauge systems, York University, Canada, Jan.-Jun. 2020

Help in supervision during my postdoctoral period:

- Ph.D. students (principal advisor: Prof. Hugo Morales-Técotl)
 - Juan Carlos Ruelas Vázquez, Universidad Autonoma Metropolitana, Mexico, 2017-2018
 - Ernesto Flores González, Universidad Autonoma Metropolitana, Mexico, 2016
- M.Sc. students (principal 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

———— 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-Universität Erlangen-Nürnberg (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
- **GR19**, Jul. 5-9, 2010, Mexico City, Mexico
- **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:

- “National Researcher Member” medal and recognition , Monterrey Institute of Technology, 2019
- “Honorable Mention”, *Gravity Research Foundation*, 2011

Research Grants and Fellowships:

- Junior Faculty Fund grant, York University, Canada, Winter 2020
- YUFA Minor Research Grant, York University, Canada, Winter 2020
- 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

———— Professional Memberships

- York University’s representative in “European COoperation in Science and Technology (COST)”, project “Quantum gravity phenomenology in the multi-messenger approach”, March 2020-Present
- Canadian Association of Physicists (CAP), 2020-Present
- Canadian Institute of Particle Physics (IPP), 2020-Present
- SNI (National System of Researchers), Mexico, 2014-2020
- Accredited Evaluator of CONACyT (RCEA member), 2015-2109
- SNI, Uruguay, 2011-2013

———— Refereeing

- Referee, *Class. and Quantum Grav.*, *Phys. Rev. D*, *Universe*, *Entropy*, *Symmetry*
- 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

———— Service

- Faculty of Science Petitions Committee, York University, Jan.-Jul. 2020
- Faculty of Science Appeals Committee, York University, Jul.-Dec. 2020

———— IT Skills

- Mathematica
- Maple
- Python

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

———— Outreach, Leadership, and Other Skills

- **Astronomical observation nights:**
 - *Leader and organizer*, event for students and public, Monterrey Institute of Technology, Campus Leon, Mexico, Nov. 21, 2018
 - *Leader and organizer*, numerous events for students and public, Tehran, Iran, 1998-2005
- **Outreach talks:**
 - *Seeing the unseeable: the first photo of a black hole (Viendo lo invisible y misterioso: primera foto de un agujero negro)*, in Spanish, for bachelor students and public, Monterrey Institute of Technology, Campus Leon, Mexico, Apr. 30, 2019
 - *Black holes: wonders of the universe (Agujeros negros: maravillas del universo)*, in Spanish, for bachelor students and public, Monterrey Institute of Technology, Campus Leon, Mexico, Nov. 21, 2018
- **Workshops and classes:**
 - *Leader*, workshops on construction of four Newtonian telescopes including the main mirror, Kharazmi University, 1999-2003
 - *Instructor*, theoretical course on amateur astronomy, observation, and telescope making, Kharazmi University, 1999-2003
- **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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