

Marco A. Muñoz-Gutiérrez

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Education

- Instituto de Astronomía, Universidad Nacional Autónoma de México** **México**
Ph. D. in Astrophysics (Summa Cum Laude) *Jan. 2016*
Thesis title: *Orbital Chaotic Dynamics in the Kuiper Belt.*
Supervisors: Dr. Bárbara Pichardo & Dr. Mauricio Reyes-Ruiz
- Instituto de Astronomía, Universidad Nacional Autónoma de México** **México**
M. Sc. (Astronomy), GPA – 9.5/10 *Feb. 2012*
Supervisor: Dr. Vladimir Ávila-Reese
- Facultad de Ciencias, Universidad Nacional Autónoma de México** **México**
B. Sc. in Physics, GPA – 8.8/10 *June 2010*
Thesis title: *Computation and Dissection by Mass of the History of the Cosmic Star Formation Rate Density.*
Supervisor: Dr. Vladimir Ávila-Reese

Current Appointment

- **Postdoctoral Fellow at ASIAA** **Taiwan**
Supervisors: Dr. Shiang-Yu Wang & Dr. Matthew Lehner *Nov. 2017 - present*
Role: Independent research on the dynamics of small solar system objects and debris disks.

Previous Appointments

- **Visiting Researcher at Instituto de Astronomía, UNAM** **México**
Host: Dr. Bárbara Pichardo *May - October, 2017*
Role: Research collaboration on the dynamics of debris disks under dwarf planetary perturbations.
- **Postdoctoral Fellow at São Paulo State University (UNESP)** **Brazil**
Supervisor: Dr. Silvia Maria Giuliatti Winter *April 2016 - April 2017*
Project: Narrow Planetary Rings and Small Satellites Dynamics

Distinctions

- Member at level 1 of the Mexican National Researchers System (*Sistema Nacional de Investigadores, SNI-I, 2020 - 2022*).
- **Alfonso Caso Medal** to University Merit — *Awarded by Universidad Nacional Autónoma de México for the Ph.D. program in Astrophysics completed in 2016.*
- **Paris Pismis Prize** — *Recognition awarded by the Instituto de Astronomía, UNAM, to the best M. Sc. student in Astronomy 2012.*
- **Best B. Sc. thesis in Astronomy** — *Recognition awarded at the “Congreso Nacional de Astronomía” 2010.*

Publication Summary (see Appendix A)

- 11 Refereed Publications (9 Published, 2 Accepted).**
— 7 refereed publications as first-author (6 published, 1 accepted).
○ Additionally, 1 first-author paper submitted to MNRAS.

Presentations Summary (see Appendix B)

- 20 Invited Talks
- 11 Conference Contributed Talks
- 4 Conference Posters
- 3 Public Outreach Talks

Supervised Students

- **Pei-Hsuan Chen** - Summer student at ASIAA. *Project: Evolution of debris disks under giant and dwarf planetary perturbations.* Taipei, Taiwan, July-August 2020
- **Andrew Roberts** - Summer student at ASIAA. *Project: Origin and Evolution of Comets on Unusual Orbits in the Solar System.* Taipei, Taiwan, July-August 2019
- **Gustavo Madeira** - B. Sc. in Physics, Jury Member. *Dinâmica de partículas micrométricas no arco de anel G de Saturno (English: Dynamics of Micrometric Particles in Saturn's G Ring Arc).* UNESP, Brazil, 2016.
- **Miguel Briones Rivera** - Physics Engineering, Thesis Advisor. *Estudio dinámico de objetos cercanos a la Tierra: su posible evolución y peligrosidad (English: Near Earth Objects Dynamical Studies: Possible Evolution and Hazard).* Universidad Iberoamericana, México, 2016.

Teaching Experience

I served as teaching assistant, with approximately 25% of classroom time, at Facultad de Ciencias, UNAM, for several undergraduate elective courses of the Physics Major, namely:

- Cosmic Structure Formation and Evolution.
- Cosmological Astrophysics.
- Cosmology and Extragalactic Astrophysics.
- Dynamical Structure and Evolution of the Galaxy.

Referee Experience

International Journals

- Monthly Notice of the Royal Astronomical Society (MNRAS).
- Communications Physics (from Nature Research Publishing).

Astronomical Institutions

- James Clerk Maxwell Telescope (JCMT).

Computational Skills

- Programming: IDL, Python, Fortran, C, Bash.
- Packages: MERCURY, REBOUND (Numerical N-body simulations), L^AT_EX, Office, Gnuplot.
- Operative Systems: Linux, Mac, Windows.
- Others: Working technical experience with hardware maintenance.

Languages

Spanish: Native speaker

English: Fluent

Portuguese: Intermediate

Chinese: Basic

Appendix A: Refereed Publications

1. Chan-Kao Chang et. al, including **M. A. Muñoz-Gutiérrez** 2021, *FOSSIL: I. The Spin Rate Limit of Jupiter Trojans*, PSJ, Accepted
2. **M. A. Muñoz-Gutiérrez**, A. Peimbert, M. Lehner, & S.-Y. Wang 2021, *Long-term Dynamical Stability in the Outer Solar System I: The Regular and Chaotic Evolution of the 34 Largest Trans-Neptunian Objects*, AJ, Accepted
3. A. Roberts & **M. A. Muñoz-Gutiérrez** 2021, *Dynamics of Small Bodies in Orbits Between Jupiter and Saturn*, Icarus, 358, 114201
4. D. Gaslac Gallardo, S. Giuliatti Winter, G. Madeira, & **M. A. Muñoz-Gutiérrez** 2020, *Analysing the region of the rings and small satellites of Neptune*, Ap&SS, 365, 5
5. **M. A. Muñoz-Gutiérrez**, A. Peimbert, B. Pichardo, M. Lehner, & S.-Y. Wang 2019, *The Contribution of Dwarf Planets to the Origin of Jupiter Family Comets*, AJ, 158, 184
6. **M. A. Muñoz-Gutiérrez**, A. Peimbert, & B. Pichardo 2018, *The Contribution of Dwarf Planets to the Origin of Low-inclination Comets by the Replenishment of Mean Motion Resonances in Debris Disks*, AJ, 156, 108
7. **M. A. Muñoz-Gutiérrez** & S. Giuliatti Winter 2017, *Long-term evolution and stability of Saturnian small satellites: Aegaeon, Methone, Anthe and Pallene*, MNRAS, 470, 3750
8. **M. A. Muñoz-Gutiérrez**, B. Pichardo, & A. Peimbert 2017, *Giant Planets Can Act as Stabilizing Agents on Debris Disks*, AJ, 154, 17
9. **M. A. Muñoz-Gutiérrez**, B. Pichardo, M. Reyes-Ruiz, & A. Peimbert 2015, *Dynamical Heating Induced by Dwarf Planets on Cold Kuiper Belt-like Debris Disks*, ApJL, 811, L21
10. **M. A. Muñoz-Gutiérrez**, M. Reyes-Ruiz, & B. Pichardo 2015, *Chaotic Dynamics of Comet 1P/Halley: Lyapunov Exponent and Survival Time Expectancy*, MNRAS, 447, 3775
11. A.E. Cordero-Borboa, I. Camarillo-García, & **M. A. Muñoz-Gutiérrez** 2008, *X-ray diffraction characterization of a spatially coherent crystalline nanocomposite obtained from a melt of KCl, KBr and KI salts*, Journal Physica B: Condensed Matter, 404, 199

Publications in Refereeing

1. **M. A. Muñoz-Gutiérrez**, A. P. Granados Contreras, G. Madeira, J. A. A'Hearn, & S. Giuliatti Winter 2021, *The Long-term Dynamical Evolution of Pallene (Saturn XXXIII) and its Diffuse Dusty Ring*, MNRAS, submitted

Conference Series

1. **M. A. Muñoz-Gutiérrez** & V. Avila-Reese 2011, *The Cosmic Star Formation History*, Revista Mexicana de Astronomía y Astrofísica Conference Series, 40, 23

Appendix B: Presentations

INVITED TALKS.....

- Instituto de Radioastronomía y Astrofísica (IRyA), UNAM, 9 June 2021
- National Taiwan Normal University (NTNU), Colloquium, 30 December 2020
- Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE), Colloquium, 31 May 2019
- Instituto de Astronomía, UNAM, Colloquium, 22 May 2019
- National Central University (NCU), Colloquium, 15 March 2019
- Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), Colloquium, 4 July 2018
- Instituto de Astronomía, UNAM, Colloquium, 8 November 2017
- Instituto de Astronomía, UNAM, Theoretical Astrophysics Department Seminar, 8 August 2017
- Faculdade de Engenharia (FEG), UNESP, Colloquium, 5 May 2017
- Grupo de Dinâmica Orbital e Planetologia, FEG, UNESP, Seminar, 21 March 2017
- Grupo de Dinâmica Orbital e Planetologia, FEG, UNESP, Seminar, 7 March 2017
- Instituto de Astronomía, UNAM, Theoretical Astrophysics Department Seminar, 13 December 2016
- Faculdade de Engenharia (FEG), UNESP, Colloquium, 5 August 2016
- Grupo de Dinâmica Orbital e Planetologia, FEG, UNESP, Seminar, 15 July 2016
- Grupo de Dinâmica Orbital e Planetologia, FEG, UNESP, Seminar, 17 June 2016
- Faculdade de Engenharia (FEG), UNESP, Colloquium, 29 April 2016
- Instituto de Astronomía, UNAM, Colloquium, 9 March 2016
- Instituto de Astronomía, UNAM, Theoretical Astrophysics Department Seminar, 7 October 2015
- Universidad Autónoma Metropolitana (UAM) Seminar, 23 September 2014
- Centro de Radioastronomía y Astrofísica (CRyA), UNAM, Colloquium, 12 June 2014

CONFERENCE CONTRIBUTED TALKS.....

- *The Long-term Dynamical Evolution of the 34 Largest Trans-Neptunian Objects in the Solar System*, Astrophysical Dynamics, 7-9 July 2019, Shanghai, China.
- *The Contribution of Dwarf Planets to the Origin of Low Inclination Comets by the Replenishment of Mean Motion Resonances in Debris Disks*, 50 DPS Meeting, 21-26 October 2018, Knoxville, Tennessee, USA.
- *Long-term Evolution of Aegaeon, Methone, Anthe, and Pallene*, 48 DPS Meeting, 16-21 October 2016, Pasadena, California, USA.
- *Dynamical Heating Induced by Dwarf Planets on Cold Kuiper Belt-Like Debris Disks*, 47 DPS Meeting, 8-13 November 2015, Washington, DC, USA.
- *Dynamical Heating Induced by Dwarf Planets on Cold Kuiper-like Belts*, 2 Taller Nacional de Astrofísica Planetaria, 9-13 March 2015, Monterrey, Nuevo León, México.
- *The Effect of Dwarf Planets on the Dynamics of the Kuiper Belt*, 46 DPS Meeting, 9-14 November 2014, Tucson, Arizona, USA.
- *Chaotic Dynamics of Halley's Comet: Lyapunov Exponent and Survival Time Expectancies*, Astronomía Dinámica en Latinoamérica, ADeLA 2014, 29 Sep. - 3 Oct. 2014, Santiago de Chile, Chile.
- *Chaotic Dynamics of Halley's Comet: Lyapunov Exponent and Survival Time Expectancies*, Asteroids, Comets, Meteors 2014, 30 June - 4 July 2014, Helsinki, Finland.
- *Ordered and Chaotic Orbital Dynamics in the Solar System*, Congreso Nacional de Astronomía, 28 Oct. - 1 Nov. 2013, México City, México.
- *Comet 1P/Halley's Orbit as a Possible Restriction of the Kuiper Belt Mass*, Taller Nacional de Astrofísica Planetaria, 4-8 March 2013, Monterrey, Nuevo León, México.
- *Dissecting the Cosmic Star Formation History*, Reunión Regional Latinoamericana de la Unión Astronómica Internacional, LARIM 2010, 8-12 November 2010, Morelia, Michoacán, México.

CONFERENCE POSTER PRESENTATIONS.....

- *The Contribution of Dwarf Planets to the Origin of Jupiter Family Comets*, New Horizons in Planetary Systems, 13-17 May 2019, Victoria, British Columbia, Canada.
- *The Dynamics of Pallene, a Small Saturnian Satellite, and Its Diffuse Dusty Ring*, Asteroids, Comets, Meteors

2017, 10-14 April 2017, Montevideo, Uruguay.

- *Long-term Evolution of Pallene and Its Diffuse Ring with Solar Radiation Pressure*, XVIII Colóquio Brasileiro de Dinâmica Orbital, 28 Nov. - 2 Dec. 2016, Águas de Lindóia, São Paulo, Brazil.
- *Dissection by Mass of the Star Formation History in the Universe*, Essential Cosmology for the Next Generation: Cosmology on the Beach, 10-14 January 2011, Puerto Vallarta, Jalisco, México.

PUBLIC OUTREACH.....

- *Chaos in the Solar System*, Día del Asteroide, Instituto de Geofísica, UNAM, 30 June 2017
- *The Solar System, What Is and How It Works?*, Noche de las Estrellas, 29 November 2014
- *Is the Solar System Stable?*, 4to. Congreso de Posgrados, UNAM, 23 April 2014