# JUAN RAFAEL MARTÍNEZ GALARZA

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**CURRENT POSITION**

Staff astrophysicist at the Harvard-Smithsonian Center for Astrophysics. Deputy end-to-end scientist for the Chandra X-ray Center Data System.
Since September 2017

**RESEARCH EXPERIENCE**

Program on Statistical, Mathematical and Computational Methods for Astronomy
August 2016 - May 2017
Participant. The year-long SAMSI-ASTRO program trained a group of early-career scientist in astrostatistics and started cross-disciplinary collaborations involving astronomers, computer scientists, and statisticians, with the goal of preparing for future synoptic surveys. I led the efforts to design an LSST Data Challenge, that has now merged with the Photometric LSST Astronomical Time-Series Classification Challenge (PLAsTiCC).

Postdoctoral fellow at the Harvard-Smithsonian CfA
August 2012 - June 2017
Star formation in interacting galaxies. Combining hydrodynamical models with multi-wavelength observations and Bayesian fitting applied to the SED of galactic mergers. Physical characterization of Main Sequence of star formation in galaxies using novel physical diagnostics. Parameter estimation with stochastic optimization in a Bayesian framework. Classification of infrared sources using supervised learning.

PhD Thesis: Mid-infrared spectroscopy of starburst
Leiden Observatory, 2008 - 2012
State-of-the-art physical modelling and interpretation of the Spectral Energy Distributions (SEDs) of starburts. Comparison with Spitzer-IRS data.

PhD Thesis: Mid-Infrared Instrument (MIRI) for the James Webb Space Telescope
Rutherford Appleton Laboratory, United Kingdom, 2008-2012
Testing and data analysis of the spectrometer performance. Responsible for the wavelength calibration of the instrument.

Master Research: Filamentary Star formation in $\rho$-Ophiuchus
Leiden Observatory, 2006-2007
Radio interferometric observations of a star-forming filament in the $\rho$-Ophiuchus region. Analysis of high density gas tracers.
Supervisor: Dr. Michiel Hogerheijde

Undergrad Research: Modelling of infrared emission from $\lambda$ Bootis stars
Steward Observatory, University of Arizona, 2005
Modelling of the geometry and radiative properties of diffuse dust in the vicinity of chemically peculiar stars.
Supervisor: Dr. Kate Su, Prof. George Rieke

UNDERGRAD RESEARCH: THE NATURE OF $\lambda$ BOOTIS STARS
Space Telescope Science Institute (STScI), Baltimore, 2004-2005
Chemical abundances in the atmospheres of $\lambda$ Bootis stars, via optical spectroscopy.
Supervisor: Dr. Inga Kamp

## EDUCATION

LEIDEN UNIVERSITY
PhD in Astronomy, June 2012
Title: Infrared Spectroscopy of Starbursts: From Spitzer-IRS to JWST-MIRI
Advisor: Dr. Bernhard Brandl
Promotor: Prof. Ewine van Dishoeck

LEIDEN UNIVERSITY
Msc in Astronomy, December 2007

UNIVERSIDAD NACIONAL DE COLOMBIA
Bsc in Physics, July 2005

## TEACHING

IAU's INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS. INVITED LECTURESHIP
Topic: Astrostatistics and X-ray Astronomy. Socorro, Colombia, 2018.

SUMMER SCHOOL: LEARNING MACHINE LEARNING - ORGANIZER
Universidad del Rosario, Bogotá, 2018

SENIOR TF FOR AM207: MONTE CARLO METHODS, STOCHASTIC OPTIMIZATION
School of Engineering and Applied Science (SEAS). Harvard University. 2015-2017.

TF OF SEVERAL UNDERGRADUATE AND GRADUATE COURSES
Leiden Observatory. 2008-2011.

## SUPERVISING

MASTER THESIS: DENNIS CRAKE. Finding the Weirdest Objects in the Transient Universe.
University of Southampton, 2018-2019

HARVARD-SMITHSONIAN REU PROGRAM: JACQUELINE BLAUM. Mining Big Data Across the
Entire IR Sky: Improved Photometric Classification of YSOs, AGB and Post-AGB Stars, Mira
Variables, and Biogenic Ice Candidates through Machine Learning.
Harvard-Smithsonian Center for Astrophysics, 2018

UNDERGRADUATE THESIS: DAVID PÉREZ MILLÁN. Physical Properties of IRDCs Using a Thermal
Emission Model.
Universidad de Antioquia, Colombia, 2016.

UNDERGRADUATE THESIS: ANDRÉS RAMOS-PADILLA. Understanding the Physics of Polycyclic
Aromatic Hydrocarbos in Active Galaxies Through Infrared Observations.
Universidad Nacional de Colombia, 2015.

MASTER THESIS: JAMES KIRK. Characterising the Protostars in the Herschel Survey of Cygnus-X.
University of Southampton, 2014.

## SUCCESSFUL NASA GRANTS

**As co-investigator:**

14-ADAP14-0145 PI González Alfonso

*The Physical and Chemical Conditions in Luminous Galaxies: A Systematic IR Analysis.*

13-ADAP13-65 PI Smith

*The Evolving Physical Processes in Interacting Galaxies Traced by Their Spectral Energy Distributions.*

## SERVICE

Organizer: Summer School Learning Machine Learning.
Universidad del Rosario, 2018.

Invited speaker at NESSP Summit: Expanding NASA Opportunities for Underserved Communities.
University of Washington, Seattle, 2018.

Reviewer for proposals submitted to the National Fellowships Committee for Graduate Women in Science.
Spring 2017.

Member of the LSST science collaboration - Transients and Variable stars.
Since 2016.

Peer review panelist for proposals submitted to the Astrophysics Data Analysis Program (ADAP)
NASA, summer 2015.

Member of the core team of Science Clubs Colombia
A program that brings international researchers to teach about science and technology to high school students in Colombia.

## HONORS & AWARDS

Smithsonian Astrophysical Observatory Postdoctoral Fellowship
Harvard-Smithsonian Center for Astrophysics, 2012-2015.

James Webb Space Telescope Significant Achievement Award
European Space Agency, 2012.

Office of Astronomy for Development Grant
International Astronomical Union, 2014.

## PUBLICATIONS

Bibliometrics: 16 refereed publications, 221 citations, h-index=7
ORCID: 0000-0002-5069-0324

Unraveling the Spectral Energy Distributions of Clustered YSOs
**Martínez-Galarza, J.R.**; Protopapas, P; Smith, H. A.; Morales, E. F. E., 2018, Astrophysical Journal, 864, 71

The Photometric LSST Astronomical Time-series Classification Challenge (PLAs-TiCC): Selection of a performance metric for classification probabilities balancing diverse science goals
Malz, Alex; Hlozek, Rene; Allam, Tarek, Jr; Bahmanyar, Anita; Biswas, Rahul; Dai, Mi; Galbany, Llus; Ishida, Emille; Jha, Saurabh; Jones, David; Kessler, Rick; Lochner, Michelle; Mahabal, Ashish; Mandel, Kaisey; **Martínez-Galarza, J. R.**; McEwen, Jason; Muthukrishna, Daniel; Narayan, Gautham; Peiris, Hiranya; Peters, Christina Setzer, Christian; Astrophysical Journal, submitted

The AGN luminosity fraction in merging galaxies
Dietrich, J.; Weiner, A.; Ashby, M.; Hayward, C.; **Martínez-Galarza, J.R.**; Ramos Padilla, A.; Rosenthal, L.; Smith, H.; Willner, S.; Zezas, A., 2018, Monthly Notices of the Royal Astronomical Society, 480, 3562D.

Young Stellar Objects in the Massive Star-forming Regions W51 and W43
Saral, G.; Hora, J.L.; Audard, M.; Koenig, X.P.; **Martínez-Galarza, J.R.**; Motte, F.; Nguyen-Luong, Q.; Saygac, A.T.; Smith, 2017, Astrophysical Journal, 839, 108M.

Variations of the ISM Conditions Across the Main Sequence of Star Forming Galaxies: Observations and Simulations
**Martínez-Galarza, J.R.**; Smith, H.; Lanz., L.; Hayward, C.; Zezas, A.; Weiner, A.; Hung, C.; Rosenthal, L.; Groves, B., 2016, Astrophysical Journal, 817, 76M.

Merger Signatures in the Dynamics of Star-forming Gas
Hung, C.; Hayward, C.; Smith, H.; Ashby, Lanz., L.; M.; **Martínez-Galarza, J.R.**; Sanders, D. Zezas, A. Astrophysical Journal, 2016, 816, 99H.

A WISE Census of Young Stellar Objects in the Perseus OB2 Association
Azimlu, M.; **Martínez-Galarza, J.R.**; Muench, A., 2015, Astronomical Journal, 150, 95A.

The Schmidt Law in Six Galactic Massive Star-forming Regions
Willis, S.; Guzman, A.; Marengo, M.; Smith, H. A.,**Martínez-Galarza, J.R.**; Allen, L. 2015, Astrophysical Journal, 809, 87W.

The Mid-Infrared Instrument for the James Webb Space Telescope, VI: The Medium Resolution Spectrometer
Wells, M. et al., 2015, Publications of the Astronomical Society of the Pacific, Volume 127, issue 953, pp. 646-664.

The total infrared luminosity may significantly overestimate the star formation rate of recently quenched galaxies
Hayward, C.; Lanz, L.; Ashby, M.; Fazio, G.; Hernquist, L.; **Martínez-Galarza, J.R.**; Noeske, K.; Smith, H.; Wuyts, S.; Zezas, A., 2014, Monthly Notices of the Royal Astronomical Society, 445, 1598H

Astronomía en la Próxima Década: desde el Hubble hasta el Telescopio Espacial James Webb
**Martínez-Galarza, J.R.** en *Astronomía Para Todos: Retos Modernos de una Ciencia Milenaria*, 2014, edited by B. Calvo-Mozo, ISBN 9789587616552, 2014, Universidad Nacional de Colombia.

Ongoing Massive Star Formation in NGC 604
**Martínez-Galarza, J.R.**; Hunter, D.; Groves, B.; Brandl, B., 2012, Astrophysical Journal, 761, 3M.

The Physical Conditions in Starbursts Derived from Bayesian Fitting of Mid-IR SED Models: 30 Doradus as a Template
**Martínez-Galarza, J.R.**; Groves, B.; Brandl, B.; de Messieres, G. E.; Indebetouw, R.; Dopita, M. A., 2011, Astrophysical Journal, 738, 176M.

Infrared Emission by Dust Around λ Bootis Stars: Debris Disks or Thermally Emitting Nebulae?
**Martínez-Galarza, J.R.**; Kamp, I.; Su, K. Y. L.; G asp ar, A.; Rieke, G.; Mamajek, E. E., 2009, Astrophysical Journal, Volume 694, Issue 1, pp. 165-173.

Modeling the Infrared Bow Shock at δ Velorum: Implications for Studies of Debris Disks and λ Bootis Stars
Gáspár, A.; Su, K. Y. L.; Rieke, G. H.; Balog, Z.; Kamp, I.; **Martínez-Galarza, J.R.**; Stapelfeldt, K., 2008, Astrophysical Journal, Volume 672, Issue 2, pp. 97 4-983

## REFERENCES

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