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Dr. Karina Alexandra Rojas Olate

Postdoctoral Positions.

2018-2021 **Ecole Polytechnique Fédérale de Lausanne**, *Switzerland*, Advisor: Frédéric Courbin.

Education.

2014-2018 **Ph.D. in Astrophysics**, *Universidad de Valparaíso*, Valparaíso, Chile.
Thesis: "Strong Gravitational Lensing as a Probe of Structure from Small to Large Scales".
Advisor: Verónica Motta, Readers: Dante Minniti (UNAB) and Eric Jullo (LAM)

2012-2014 **Master in Astrophysics**, *Universidad de Valparaíso*, Valparaíso, Chile..
Thesis: "Gravitational lens Applications".
Advisor: Verónica Motta, Readers: Dante Minniti (UNAB) and Victor Cardenas (UV)

2007-2011 **Bachelor in Physics with specialization in Astronomy**, *Universidad de Valparaíso, Chile.*

Prizes and Grants

2020 **Award 100 Young Chilean Leaders**.

2017 **Grant: LSSTC Data science Fellowship Program**.

2017 **Grant: Beca CONICYT para doctorado nacional 2017**.

2014-2016 **Grant: Beca Doctoral FIB-UV**.

2015 **Grant: Beca SOCHIAS congresos en el extranjero**.

2015 **Prize: Graduate Student Prize Lecture**, XII SOCHIAS annual meeting.

2012 **Grant: Beca Maestría**, *GEMINI-CONICYT 32100020 y 32110004.*

Observing Experience

SOAR Telescope, *Cerro Pachón*, Instruments: SAMI and GOODMAN.

2015B-0615 (PI Motta): November 30th to December 2nd
2016-0107 (PI Treu): June 24th to 26th
2016A-0608 (PI Motta): June 27th to 29th
2016B-0919 (PI Motta): December 3rd to 5th
2016B-0067 (PI True): December 6th to 8th

2.2m Telescope, *La Silla*, Instrument: GROND, FEROS, WFI.

QSO monitoring program observer (PI Courbin): January 20th to 26th, 2017
QSO monitoring program observer (PI Courbin): April 10th to 12th, 2017
QSO monitoring program observer (PI Courbin): April 2nd to 9th, 2018
QSO monitoring program observer (PI Courbin): May 28th to 2nd June, 2018

Data Science Experience

Euclid Lens Finding Project.

- Convolutional Neural Network.
- Data catalog manipulation and analysis.
- Utilization of simple SQL queries.

LSSTC Data Science Fellowship, *Alumni of the 2nd cohort of the program that consists of six, one-week schools over a two year period in United States.*

- Session 4: Statistics, Seattle, September 17-22, 2017
- Session 5: Image processing, Baltimore, January 22-26, 2018
- Session 6: Time-domain analysis and interactive visualization, Pittsburgh, April 30 - May 4, 2018
- Session 7: Machine learning and software engineering, Chicago, November 5-12, 2018
- Session 8: Scalable software and data storage, New Jersey, March 25-29, 2019
- Session 9: Time series analysis, Pittsburgh, June 10-14, 2019

Teaching Experience

2020 **Co-Teaching class "Modeling of gravitational lens system"**, Postgrado en Astrofísica, Universidad de Valparaíso.

2020 **Supervisor of master project**, "Automatic modelling of gravitational lens system", student: Mark Maus, Ecole Polytechnique Fédérale de Lausanne.

2020 **Co-supervisor of master thesis**, "Searching for strong lenses in r-band DES images using a convolutional neural network", student: Camille Arruat, Ecole Polytechnique Fédérale de Lausanne.

2019 **Supervisor of practical work for master students**, "Redshift estimation for SL2S groups of galaxies", student: Aurelien Verdier, Ecole Polytechnique Fédérale de Lausanne.

2014 **Teaching assistant for advance astrophysics**, *Magister en Astrofísica, Universidad de Valparaíso.*

2012/2013 **Profesor de catedra for Physics**, *Pedagogía en Matemática, Universidad de Valparaíso.*

2009-2011 **Teaching assistant for Physics and Statistics**, *Universidad de Valparaíso.*

Presentation in conferences.

2020 **Swiss Euclid Days 2020**, *Laussane, Switzerland*, February,4-5.
Talk: Strong Lens Finding: Simulations to train Neural Networks.

2019 **Euclid Strong Lensing Working Group**, *Paris, France*, October,16-18.
Talk: Lens Finding: Simulations + CNN applied to ground base data.

2019 **Mahattan Microlens 2019**, *New York, United States*, February,14-17.
Talk: Microlensing Effect on Time Delays Measurements.

2017 **XIth Marseille Cosmology Conference: "Galaxy clusters across cosmic time"**, *Aix-En-Provence, France*, July,10-13.
Talk: New dynamical analysis for the strong lensing cluster Abell 1703.

2016 **I workshop of the southern astrophysics network**, *Santiago, Chile*, November,21-22.
Talk: Probing the stellar fraction in dark matter halos of lensing galaxies using microlensing.

2016 **XIII Annual SOCHIAS Meeting**, *Antofagasta, Chile*, March, 1-4.
Talk: Quasar accretion disks: size and temperature profile using microlensing.

2015 **Demographics and enviroment of AGN from multi-wavelength surveys**, *Chania, Grecia*, September, 21-24.
Talk: Quasar accretion disks: size and temperature profile using microlensing.

2015 **XII SOCHIAS annual meeting**, *Puerto Varas, Chile*, March, 12-15.
Talk: Strong Chromatic Microlensing in HE0047-1756 and SDSS1155+6456.

Attendance to meetings, workshops, and Schools

2019 **Euclid Consortium Annual Meeting**, Helsinki, Finland, June 4-7.

2015 **School of Statistics for Astrophysics: classification and clustering**, Les Houches, France, October, 12-16.

2014 **First VLTI School in Chile**, Valparaíso, Chile, November, 3-7.

2013 **VISTA Variable in the Vía Láctea Science Meeting**, Viña del Mar, Chile, March, 21-23.

Outreach

2013-to the date **Co-founder and Science Communicator**, *Star Tres*, www.startres.net.
Science outreach initiative in Spanish that create content in social media

2017 **Scientific Assistant**.
Science collaborator in the script of the planetarium show "Bot y Lu: El Escape del Agujero Negro", planetariochile.cl.

2016 **EXPLORA annual regional congress**.
Judge for the investigations presented in the "Engineering and Technology" section, Puerto Montt, Chile

2007-2015 **Public talks**.
presentations in schools, turistic observatories and public congress related with astronomy

2009 **Science Tunnel exposition by Max Plack Institude**.
Monitor for astronomy and physics modules

Programming & Language Knowledge

Programming Languages, Python, Wolfram Mathematica, Fortran 77 and 90.

Astronomy Softwares, IRAF, DS9, Dipso, IDL, Topcat, Aladin.

Languages, Spanish (Native), English (Fluent), French (A2).

Publications List

19.- **Revealing the Structure of the Lensed Quasar Q 0957+561, I. Accretion Disk Size**, 2020, A&A, Submitted.
C. Fian, E. Mediavilla, J. Jiménez-Vicente, V. Motta, J. A. Munoz, D. Chelouche, P. Goméz-Alvarez, **K. Rojas**, A. Hanslmeier

18.- **Measuring accretion disk sizes of lensed quasars with microlensing time delay in multi-band light curves**, 2020, A&A, Accepted..
J. H. H. Chan, **K. Rojas**, M. Millon, F. Courbin, V. Bonvin, and G. Jauffret
https://ui.adsabs.harvard.edu/abs/2020arXiv200714416C/abstract

17.- **TDCOSMO II: 6 new time delays in lensed quasars from high-cadence monitoring at the MPIA 2.2m telescope**, 2020, A&A, Volume 642, id.A193, 14 pp..
Millon, M.; Courbin, F.; Bonvin, V.; Buckley-Geer, E.; Fassnacht, C. D.; Frieman, J.; Marshall, P. J.; Suyu, S. H.; Treu, T.; Anguita, T.; Motta, V.; Agnello, A.; Chan, J. H. H.; C. -Y Chao, D.; Chijani, M.; Gilman, D.; Gilmore, K.; Lemon, C.; Lucey, J. R.; Melo, A. Paic, E.; **Rojas, K.**; Sluse, D.; Williams, P. R.; Hempel, A.; Kim, S.; Lachaume, R.; Rabus, M.
https://ui.adsabs.harvard.edu/abs/2020arXiv200610066M/abstract

16.- **HOLISMOKES – II. Identifying galaxy-scale strong gravitational lenses in Pan-STARRS using convolutional neural networks**, 2020, A&A, Accepted.
Canameras, R.; Schuldt, S.; Suyu, S. H.; Taubenberger, S.; Meinhardt, T.; Leal-Taixe, L.; Lemon, C.; **Rojas, K.**; Savary,E.
https://ui.adsabs.harvard.edu/abs/2020arXiv200413048C/abstract

15.- **Microlensing Analysis for the gravitational lens systems SDSS0924+0219, Q1355-2257, and SDSS1029+2623**, 2020, The Astrophysical Journal, 890:3 (9pp).
Rojas, K.; Motta, V.; Mediavilla, E.; Jiménez-Vicente, J.; Falco, E.; Fian,C.
https://ui.adsabs.harvard.edu/abs/2020ApJ...890....3R/abstract

14.- **COSMOGRAIL. XVIII. time delays of the quadruply lensed quasar WFI2033-4723**, 2019, A&A, Volume 629, id.A97, 13 pp.
Bonvin, V.; Millon, M.; Chan, J. H.-H.; Courbin, F.; Rusu, C. E.; Sluse, D.; Suyu, S. H.; Wong, K. C.; Fassnacht, C. D.; Marshall, P. J.; Treu, T.; Buckley-Geer, E.; Frieman, J.; Hempel, A.; Kim, S.; Lachaume, R.; Rabus, M.; Chao, D. C. -Y.; Chijani, M.; Gilman, D.; Gilmore, **K.; Rojas**, K.; Williams, P.; Anguita, T.; Kochanek, C. S.; Morgan, C.; Motta, V.; Tewes, M.; Meylan, G.,
https://ui.adsabs.harvard.edu/abs/2019A%26A...629A..97B/abstract

13.- **Quasar microlensing: Revolutionizing our understanding of quasar structure and dynamics**, 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 487; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 487.
Moustakas, Leonidas; Anguita, Timo; Chartas, George; Cornachione, Matthew; Dai, Xinyu; Fian, Carina; Jimenez-Vicente, Jorge; Labrie, Kathleen; Macleod, Chelsea; Mediavilla, Evencio; Morgan, Christopher W.; O'Dowd, Matthew; Lewis, Geraint; Motta, Veronica; Nierenberg, Anna; Pooley, David; **Rojas, Karina**; Sluse, Dominique; Vernardos, Georgios; Webster, Rachel; Yong, Suk Yee,
https://ui.adsabs.harvard.edu/abs/2019BAAS...51c.487M/abstract

12.- **Constraining the microlensing effect on time delays with a new time-delay prediction model in H_0 measurements**, 2018, Monthly Notices of the Royal Astronomical Society, Volume 481, Issue 1, p.1115-1125.
Chen, Geoff C. -F.; Chan, James H. H.; Bonvin, Vivien; Fassnacht, Christopher D.; **Rojas, Karina**; Millon, Martin; Courbin, Fred; Suyu, Sherry H.; Wong, Kenneth C.; Sluse, Dominique; Treu, Tommaso; Shajib, Anowar J.; Hsueh, Jen-Wei; Lagattuta, David J.; Koopmans, Leon V. E.; Vegetti, Simona; McKean, John P.
https://ui.adsabs.harvard.edu/abs/2018MNRAS.481.1115C/abstract

11.- **The STRong lensing Insights into the Dark Energy Survey (STRIDES) 2016 follow-up campaign - II. New quasar lenses from double component fitting**, 2018, Monthly Notices of the Royal Astronomical Society, Volume 480, Issue 4, p.5017-5028.
Anguita, T.; Schechter, P. L.; Kuropatkin, N.; Morgan, N. D.; Ostrovski, F.; Abramson, L. E.; Agnello, A.; Apostolovski, Y.; Fassnacht, C. D.; Hsueh, J. W.; Motta, V.; **Rojas, K.**; Rusu, C. E.; Treu, T.; Williams, P.; Auger, M.; Buckley-Geer, E.; Lin, H.; McMahon, R.; Abbott, T. M. C.; Allam, S.; Annis, J.; Bernstein, R. A.; Bertin, E.; Brooks, D.; Burke, D. L.; Carnero Rosell, A.; Carrasco-Kind, M.; Carretero, J.; Cunha, C. E.; D'Andrea, C. B.; De Vicente, J.; DePoy, D. L.; Desai, S.; Diehl, H. T.; Doel, P.; Flaugher, B.; GarcÃa-Bellido, J.; Gerdes, D. W.; Gruen, D.; Gruendl, R. A.; Gschwend, J.; Hartley, W. G.; Hollowood, D. L.; Honscheid, K.; James, D. J.; Kuehn, K.; Lima, M.; Maia, M. A. G.; Miquel, R.; Plazas, A. A.; Sanchez, E.; Scarpine, V.; Smith, M.; Soares-Santos, M.; Sobreira, F.; Suchyta, E.; Tarle, G.; Walker, A. R.
https://ui.adsabs.harvard.edu/abs/2018MNRAS.480.5017A/abstract

10.- **The STRong lensing Insights into the Dark Energy Survey (STRIDES) 2016 follow-up campaign - I. Overview and classification of candidates selected by two techniques**, 2018, Monthly Notices of the Royal Astronomical Society, Volume 481, Issue 1, p.1041-1054.
Treu, T.; Agnello, A.; Baumer, M. A.; Birrer, S.; Buckley-Geer, E. J.; Courbin, F.; Kim, Y. J.; Lin, H.; Marshall, P. J.; Nord, B.; Schechter, P. L.; Sivakumar, P. R.; Abramson, L. E.; Anguita, T.; Apostolovski, Y.; Auger, M. W.; Chan, J. H. H.; Chen, G. C. F.; Collett, T. E.; Fassnacht, C. D.; Hsueh, J. -W.; Lemon, C.; McMahon, R. G.; Motta, V.; Ostrovski, F.; **Rojas, K.**; Rusu, C. E.; Williams, P.; Frieman, J.; Meylan, G.; Suyu, S. H.; Abbott, T. M. C.; Abdalla, F. B.; Allam, S.; Annis, J.; Avila, S.; Banerji, M.; Brooks, D.; Carnero Rosell, A.; Carrasco Kind, M.; Carretero, J.; Castander, F. J.; D'Andrea, C. B.; da Costa, L. N.; De Vicente, J.; Doel, P.; Eifler, T. F.; Flaugher, B.; Fosalba, P.; GarcÃa-Bellido, J.; Goldstein, D. A.; Gruen, D.; Gruendl, R. A.; Gutierrez, G.; Hartley, W. G.; Hollowood, D.; Honscheid, K.; James, D. J.; Kuehn, K.; Kuropatkin, N.; Lima, M.; Maia, M. A. G.; Martini, P.; Menanteau, F.; Miquel, R.; Plazas, A. A.; Romer, A. K.; Sanchez, E.; Scarpine, V.; Schindler, R.; Schubnell, M.; Sevilla-Noarbe, I.; Smith, M.; Smith, R. C.; Soares-Santos, M.; Sobreira, F.; Suchyta, E.; Swanson, M. E. C.; Tarle, G.; Thomas, D.; Tucker, D. L.; Walker, A. R.
https://ui.adsabs.harvard.edu/abs/2018MNRAS.481.1041T/abstract

9.- **COSMOGRAIL. XVII. Time delays for the quadruply imaged quasar PG 1115+080**, 2018, Astronomy & Astrophysics, Volume 616, id.A183, 15 pp.
Bonvin, V.; Chan, J. H. H.; Millon, M.; **Rojas, K.**; Courbin, F.; Chen, G. C. -F.; Fassnacht, C. D.; Paic, E.; Tewes, M.; Chao, D. C. -Y.; Chijani, M.; Gilman, D.; Gilmore, K.; Williams, P.; Buckley-Geer, E.; Frieman, J.; Marshall, P. J.; Suyu, S. H.; Treu, T.; Hempel, A.; Kim, S.; Lachaume, R.; Rabus, M.; Anguita, T.; Meylan, G.; Motta, V.; Magain, P.
https://ui.adsabs.harvard.edu/abs/2018A&A...616A.183B/abstract

8.- **Discovery of three strongly lensed quasars in the Sloan Digital Sky Survey**, 2018, Monthly Notices of the Royal Astronomical Society: Letters, Volume 477, Issue 1, p.L70-L74.
Williams, P. R.; Agnello, A.; Treu, T.; Abramson, L. E.; Anguita, T.; Apostolovski, Y.; Chen, G. C. -F.; Fassnacht, C. D.; Hsueh, J. W.; Lemaux, B. C.; Motta, V.; Oldham, L.; **Rojas, K.**; Rusu, C. E.; Shajib, A. J.; Wang, X.
https://ui.adsabs.harvard.edu/abs/2018MNRAS.477L..70W/abstract

7.- **COSMOGRAIL: the COSmological MOnitoring of GRAvItational Lenses. XVI. Time delays for the quadruply imaged quasar DES J0408-5354 with high-cadence photometric monitoring**, 2018, Astronomy & Astrophysics, Volume 609, id.A71, 9 pp.
Courbin, F.; Bonvin, V.; Buckley-Geer, E.; Fassnacht, C. D.; Frieman, J.; Lin, H.; Marshall, P. J.; Suyu, S. H.; Treu, T.; Anguita, T.; Motta, V.; Meylan, G.; Paic, E.; Tewes, M.; Agnello, A.; Chao, D. C. -Y.; Chijani, M.; Gilman, D.; **Rojas, K.**; Williams, P.; Hempel, A.; Kim, S.; Lachaume, R.; Rabus, M.; Abbott, T. M. C.; Allam, S.; Annis, J.; Banerji, M.; Bechtol, K.; Benoit-Lévy, A.; Brooks, D.; Burke, D. L.; Carnero Rosell, A.; Carrasco Kind, M.; Carretero, J.; D'Andrea, C. B.; da Costa, L. N.; Davis, C.; DePoy, D. L.; Desai, S.; Flaugher, B.; Fosalba, P.; GarcÃa-Bellido, J.; Gaztanaga, E.; Goldstein, D. A.; Gruen, D.; Gruendl, R. A.; Gschwend, J.; et al.
https://ui.adsabs.harvard.edu/abs/2018A&A...609A..71C/abstract

6.- **Probing the Broad-Line Region and the Accretion Disk in the Lensed Quasars HE 0435-1223, WFI 2033-4723, and HE 2149-2745 Using Gravitational Microlensing**, 2017, The Astrophysical Journal, Volume 835, Issue 2, article id. 132, 13 pp.
Motta, V.; Mediavilla, E.; **Rojas, K.**; Falco, E. E.; Jiménez-Vicente, J.; Muñoz, J. A.
https://ui.adsabs.harvard.edu/abs/2017ApJ...835..132M/abstract

5.- **Determination of Pulsation Periods and Other Parameters of 2875 Stars Classified as MIRA in the All Sky Automated Survey (ASAS)**, 2016, The Astrophysical Journal Supplement Series, Volume 227, Issue 1, article id. 6, 13 pp.
Vogt, N.; Contreras-Quijada, A.; Fuentes-Morales, I.; Vogt-Geisse, S.; Arcos, C.; Abarca, C.; Agurto-Gangas, C.; Caviedes, M.; DaSilva, H.; Flores, J.; Gotta, V.; Peñaloza, F.; **Rojas, K.**; Villaseñor, J. I.
https://ui.adsabs.harvard.edu/abs/2016ApJS..227....6V/abstract

4.- **Combining strong lensing and dynamics in galaxy clusters: integrating MAMPOSSt within LENSTOOL. I. Application on SL2S J02140-0535**, 2016, Astronomy & Astrophysics, Volume 595, id.A30, 17 pp.
Verdugo, T.; Limousin, M.; Motta, V.; Mamon, G. A.; Foex, G.; Gastaldello, F.; Jullo, E.; Biviano, A.; **Rojas, K.**; Muñoz, R. P.; Cabanac, R.; Magaña, J.; Fernández-Trincado, J. G.; Adame, L.; De Leo, M. A.
https://ui.adsabs.harvard.edu/abs/2016A&A...595A..30V/abstract

3.- **VVV Survey Observations of a Microlensing Stellar Mass Black Hole Candidate in the Field of the Globular Cluster NGC 6553**, 2015, The Astrophysical Journal Letters, Volume 810, Issue 2, article id. L20, 5 pp.
Minniti, D.; Contreras Ramos, R.; Alonso-GarcÃa, J.; Anguita, T.; Catelan, M.; Gran, F.; Motta, V.; Muro, G.; **Rojas, K.**; Saito, R. K.
https://ui.adsabs.harvard.edu/abs/2015ApJ...810L..20M/abstract

2.- **Strong Chromatic Microlensing in HE0047-1756 and SDSS1155+6346**, 2015, The Astrophysical Journal, Volume 797, Issue 1, article id. 61, 7 pp.
Rojas, K.; Motta, V.; Mediavilla, E.; Falco, E.; Jiménez-Vicente, J.; Muñoz, J. A, 2014
https://ui.adsabs.harvard.edu/abs/2014ApJ...797...61R/abstract

1.- **Microlensing of Quasar Ultraviolet Iron Emission**, 2013, The Astrophysical Journal, Volume 778, Issue 2, article id. 123, 6 pp.
Guerras, E.; Mediavilla, E.; Jimenez-Vicente, J.; Kochanek, C. S.; Muñoz, J. A.; Falco, E.; Motta, V.; **Rojas, K.**
https://ui.adsabs.harvard.edu/abs/2013ApJ...778..123G/abstract