

# Fernando A. Olguin

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## WORK EXPERIENCE

2017 - to date **Postdoctoral researcher** National Tsing Hua University  
Research: data reduction and analysis of ALMA observations of high-mass star forming regions.

## EDUCATION

2013 - 2017 **PhD in Astrophysics** University of Leeds

Title: The circumstellar matter distribution of massive young stellar objects

Supervisors: Prof. Melvin Hoare and Prof. Rene Oudmaijer

Findings: Massive young stellar objects may be resolved at 70  $\mu\text{m}$  in Herschel Hi-GAL observations depending on their luminosity and distance.

The extended emission of the massive young stellar object AFGL 2591 observed at 70  $\mu\text{m}$  can be explained by dust emission from the outflow cavity walls.

A disc is needed to explain the 1.3 mm visibilities of AFGL 2591.

Methyl cyanide interferometric observations provide evidence of rotation at envelope scales ( $10^3 - 10^4$  au) of AFGL 2591 and is consistent with rotation at disc scales ( $< 10^3$  au) detected by other tracers.

The smooth density and velocity distributions given by the Ulrich (1976) model cannot explain all the observations of AFGL 2591 simultaneously.

Thesis link: <http://etheses.whiterose.ac.uk/17246/>

2010 - 2012 **MSc in Astronomy** Universidad de Chile

Title: Physical properties of dense cores using sub-mm observations

Supervisor: Prof. Diego Mardones

Findings: The density distribution of 17 dense cores was modelled as a power law with an average exponent of 1.8, consistent with other studies.

Model masses of the cores are twice as high as those derived by an isothermal approach.

Thesis link: <http://www.repositorio.uchile.cl/handle/2250/110951> (in Spanish)

2005 - 2009 **BSc in Astronomy** Universidad de Chile

## PUBLICATIONS

### Refereed first author

**Olguin, F. A.**; Sanhueza, P.; et al.

**Digging into the Interior of Hot Cores with ALMA (DIHCA). II. Exploring the Inner Binary (Multiple) System Embedded in G335 MM1 ALMA1**, in prep.

**Olguin, F. A.**; Sanhueza, P.; Guzmán, A. E.; Lu, X.; Saigo, K.; Zhang, Q.; Silva, A.; Chen, H.-R. V.; Li, S.; Ohashi, S.; Nakamura, F.; Sakai, T.; Wu, B.

**Digging into the Interior of Hot Cores with ALMA (DIHCA). I. Dissecting the High-mass Star-forming Core G335.579-0.292 MM1**, The Astrophysical Journal, 2021, Vol. 909, Issue 2, id. 199

DOI: [10.3847/1538-4357/abde3f](https://doi.org/10.3847/1538-4357/abde3f)

**Olguin, F. A.**; Hoare, M. G.; Johnston, K. G.; Motte, F.; Chen, H.-R. V.; Beuther, H.; Mottram, J. C.; Ahmadi, A.; Gieser, C.; Semenov, D.; Peters, T.; Palau, A.; Klaassen, P. D.; Kuiper, R.; Sánchez-Monge, Á.; Henning, Th.

**Multiwavelength modelling of the circumstellar environment of the massive protostar AFGL 2591 VLA 3**, Monthly Notices of the Royal Astronomical Society, 2020, Vol. 498, Issue 4, pp.4721-4744

DOI: [10.1093/mnras/staa2406](https://doi.org/10.1093/mnras/staa2406)

**Olguin, F. A.**; Hoare, M. G.; Wheelwright, H. E.; Clay, S. J.; de Wit, W.-J.; Rafiq, I.; Pezzuto, S.; Molinari, S.

**Herschel Hi-GAL imaging of massive young stellar objects**, Monthly Notices of the Royal Astronomical Society, 2015, Vol. 449, Issue 3, pp.2784-2793

DOI: [10.1093/mnras/stv401](https://doi.org/10.1093/mnras/stv401)

## Refereed collaborations

Cortes, P. C.; Sanhueza, P.; Houde, M.; Martin, S.; Hull, C. L. H.; Girart, J. M.; Zhang, Q.; Fernandez-Lopez, M.; Zapata, L. A.; Stephens, I. W.; Li, H.-b.; Wu, B.; **Olguin, F.**; Lu, X.; Guzman, Andres E.; Nakamura, F.

**Magnetic Fields in Massive Star-Forming Regions (MagMaR) II. Tomography Through Dust and Molecular Line Polarization in NGC 6334I(N)**, The Astrophysical Journal, in press.

Morii, K.; Sanhueza, P.; Nakamura, F.; Jackson, J. M.; Li, S.; Beuther, H.; Zhang, Q.; Feng, S.; Tafoya, D.; Guzmán, A. E.; Izumi, N.; Sakai, T.; Lu, X.; Tatematsu, K.; Ohashi, S.; Silva, A.; **Olguin, F. A.**; Contreras, Y.

**The ALMA Survey of 70  $\mu\text{m}$  Dark High-mass Clumps in Early Stages (ASHES). IV. Star formation signatures in G023.477**, The Astrophysical Journal, in press.

Sanhueza, P.; Girart, J. M.; Padovani, M.; Galli, D.; Hull, C. L. H.; Zhang, Q.; Cortes, P.; Stephens, I. W.; Fernández-López, M.; Jackson, J. M.; Frau, P.; Kock, P. M.; Wu, B.; Zapata, L. A.; **Olguin, F.**; Lu, X.; Silva, A.; Tang, Y.-W.; Sakai, T.; Guzmán, A. E.; Tatematsu, K.; Nakamura, F.; Chen, H.-R. V.

**Gravity-driven Magnetic Field at 1000 au Scales in High-mass Star Formation**, The Astrophysical Journal Letters, 2021, 915, L10

Chen, H.-R. V.; Zhang, Q.; Wright, M. C. H.; Busquet, G.; Lin, Y.; Liu, H. B.; **Olguin, F. A.**; Sanhueza, P.; Nakamura, F.; Palau, A.; Ohashi, S.; Tatematsu, K.; Liao, L.-W.

**Filamentary Accretion Flows in the Infrared Dark Cloud G14.225-0.506 Revealed by ALMA**, The Astrophysical Journal, 2019, 875, 24

Mendigutía, I.; Oudmaijer, R. D.; Garufi, A.; Lumsden, S. L.; Huéramo, N.; Cheetham, A.; de Wit, W. J.; Norris, B.; **Olguin, F. A.**; Tuthill, P.

**The protoplanetary system HD 100546 in  $\text{H}\alpha$  polarized light from SPHERE/ZIMPOL. A bar-like structure across the disk gap?**, Astronomy and Astrophysics, 2017, 608, A104

Eden, D. J.; Moore, T. J. T.; Plume, R.; Urquhart, J. S.; Thompson, M. A.; Parsons, H.; Dempsey, J. T.; Rigby, A. J.; Morgan, L. K.; Thomas, H. S.; Berry, D.; Buckle, J.; Brunt, C. M.; Butner, H. M.; Carretero, D.; Chrysostomou, A.; Currie, M. J.; deVilliers, H. M.; Fich, M.; Gibb, A. G.; Hoare, M. G.; Jenness, T.; Manser, G.; Mottram, J. C.; Natario, C.; **Olguin, F.**; Peretto, N.; Pestalozzi, M.; Polychroni, D.; Redman, R. O.; Salji, C.; Summers, L. J.; Tahani, K.; Traficante, A.; diFrancesco, J.; Evans, A.; Fuller, G. A.; Johnstone, D.; Joncas, G.; Longmore, S. N.; Martin, P. G.; Richer, J. S.; Weferling, B.; White, G. J.; Zhu, M.

**The JCMT Plane Survey: first complete data release - emission maps and compact source**

**catalogue**, Monthly Notices of the Royal Astronomical Society, 2017, 469, 2163

Moore, T. J. T.; Plume, R.; Thompson, M. A.; Parsons, H.; Urquhart, J. S.; Eden, D. J.; Dempsey, J. T.; Morgan, L. K.; Thomas, H. S.; Buckle, J.; Brunt, C. M.; Butner, H.; Carretero, D.; Chrysostomou, A.; deVilliers, H. M.; Fich, M.; Hoare, M. G.; Manser, G.; Mottram, J. C.; Natario, C.; **Olguin, F.**; Peretto, N.; Polychroni, D.; Redman, R. O.; Rigby, A. J.; Salji, C.; Summers, L. J.; Berry, D.; Currie, M. J.; Jenness, T.; Pestalozzi, M.; Traficante, A.; Bastien, P.; diFrancesco, J.; Davis, C. J.; Evans, A.; Friberg, P.; Fuller, G. A.; Gibb, A. G.; Gibson, S.; Hill, T.; Johnstone, D.; Joncas, G.; Longmore, S. N.; Lumsden, S. L.; Martin, P. G.; Nguyen Lu'o'ng, Q.; Pineda, J. E.; Purcell, C.; Richer, J. S.; Schieven, G. H.; Shipman, R.; Spaans, M.; Taylor, A. R.; Viti, S.; Weferling, B.; White, G. J.; Zhu, M.

**The JCMT Plane Survey: early results from the  $\ell = 30^\circ$  field**, Monthly Notices of the Royal Astronomical Society, 2015, 453, 4264

Peretto, N.; Fuller, G. A.; André, P.; Arzoumanian, D.; Rivilla, V. M.; Bardeau, S.; Duarte Puertas, S.; Guzman Fernandez, J. P.; Lenfestey, C.; Li, G.-X.; **Olguin, F. A.**; Röck, B. R.; de Villiers, H.; Williams, J.

**SDC13 infrared dark clouds: Longitudinally collapsing filaments?**, Astronomy & Astrophysics, 2014, 561, A83

## CONFERENCES AND SCHOOLS

### Conferences

- ALMA2019: Science Results and Cross-Facility Synergies, Cagliari, Italy, October 2019  
Poster title: A close-up into the massive YSO SDC335-MM1 with ALMA
- Tracing the Flow: Galactic Environments and the Formation of Massive Stars, Lake Windermere, UK, July 2018  
Presentation title: Density, temperature and kinematics of the MYSO AFGL 2591
- Magnetic Fields or Turbulence: Which is the critical factor for the formation of stars and planetary disks?, Hsinchu, Taiwan, February 2018  
Poster title: Inner envelope rotation of the massive YSO GL 2591
- Star Formation 2016, Exeter, UK, August 2016  
Poster and splinter session presentation: The physical properties of the massive YSO AFGL 2591
- Soul of high-mass star formation, Puerto Varas, Chile, March 2015  
Presentation title: The circumstellar matter distribution of the proto-typical MYSO GL 2591
- Postgraduate symposium, University of Leeds, Leeds, UK, April 2014  
Poster title: The circumstellar matter distribution of the proto-typical massive protostar AFGL 2591

### Meetings & Workshops

- ASROC Annual Meeting, Taipei, Taiwan, September, 2020  
Presentation: Looking into the high-mass star-forming core G335.579-0.272 MM1 with ALMA
- East Asia ALMA Science Workshop, Taipei, Taiwan, February, 2020  
Presentation: Dissecting the massive YSO G335-MM1: a potential multiple system?
- ASROC Annual Meeting, Taichung, Taiwan, May, 2019  
Poster: Density, temperature and kinematics of the massive proto-star GL 2591
- East Asia ALMA Science Workshop, Daejeon, Korea, November, 2017  
Presentation: The physical properties of massive young stellar objects

- Northern Star Formation Meeting, Leeds, UK, September, 2016  
Presentation: The circumstellar matter distribution of AFGL 2591
- Anglo-French Star Formation Meeting, Leeds, UK, July, 2013  
Presentation: Studying the matter distribution of MYSOs with Herschel 70  $\mu\text{m}$  imaging
- ALMA Early Science Users Workshop, Universidad de Chile, May, 2011
- Workshop on Star Formation and Galaxies with Early ALMA, Universidad de Chile, December, 2010
- Workshop on Star Formation: The Pre-ALMA Stage, Universidad de Chile, July, 2009

## Schools

- 16th Synthesis Imaging Workshop, Socorro, New Mexico, US, May 2018
- IRAM 30m summer school, Institut de Radioastronomie Millimétrique, Granada, Spain, September 2011

## RESEARCH

2017 - to date	<b>Postdoc research</b>	National Tsing Hua University
<b>DIHCA survey of high-mass cores</b> Data reduction, imaging and analysis of ALMA continuum and molecular line observations of high-mass star forming regions		
<b>ALMA-IMF large program</b> Data reduction and imaging of molecular clumps forming high-mass stars		
2013 - 2017	<b>PhD research</b>	University of Leeds
Supervisor: Prof. Melvin Hoare		
Analysis and 3-D radiative transfer modelling of multi-wavelength high-resolution continuum and molecular line data of high-mass cores		
2010 - 2012	<b>MSc research</b>	Universidad de Chile
Supervisor: Prof. Diego Mardones		
1-D radiative transfer modelling of submm continuum maps of dense cores		
2011	<b>Short internship</b>	IPAG
Supervisor: Prof. Bertrand Lefloch		
Analysis of IRAM 30m telescope CO data from jet/outflow emission		
2009	<b>Internship</b>	Universidad de Chile
Supervisors: Prof. Diego Mardones and Prof. Guido Garay		
Analysis of the (sub)mm spectral index distribution of dense cores from APEX/LABOCA and SEST/SIMBA maps		
2008	<b>Laboratory</b>	Universidad de Chile
Supervisor: Edgardo Costa		
Spectroscopic distances of nearby stars		
2007	<b>Summer internship</b>	Universidad de Chile
Supervisors: Prof. Diego Mardones and Prof. Guido Garay		
Study of the dust mass and temperature of dense cores from APEX/LABOCA maps		

## OTHER EXPERIENCE

### Observations

2014 JPS observations at JCMT  
2011 ASTE  
2011 IRAM 30m summer school  
2008 CTIO 1.5m telescope

### Teaching

2013 - 2017

University of Leeds

Undergraduate and master's students demonstrator for:

**Advanced Experimental Techniques and Analysis** (7 terms)  
**Computing 2** (2 terms)  
**Physics Laboratory for Geophysicists** (1 term)

2009-2012

Universidad de Chile

Teaching assistance work for undergraduate students:

**Introductory Astronomy** (5 terms)  
**Stellar Astrophysics** (2 terms)

### Outreach

- Monitor for the Leeds Light Night 2015
- Guide at the Observatorio Astronomico Nacional (Chile) diurnal and heritage days activities.

## IT SKILLS

**Astronomical** CASA (intermediate), AIPS (basic), CLASS (basic), IRAF (basic)

**Languages** Python (advanced), IDL (intermediate), C (intermediate), Java (basic), FORTRAN (basic)

**Radiative transfer** Hyperion, Mollie, LIME, DUSTY, RADMC-3D

**Others** BASH (intermediate), Git (intermediate)

## SCHOLARSHIPS

- CONICYT Becas Chile for PhD studies abroad, 2012
- CONICYT-CNRS Grant for attendance to the 6th IRAM 30m Summer School, 2011
- CONICYT Scholarship for Masters studies in Chile, 2011

## REFERENCES

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