

## JOHN BALLY

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### **Educational Background:**

1972 B.S. (Astronomy) University of California, Berkeley  
1977 M.S. (Physics) University of Massachusetts, Amherst  
1980 Ph.D. (Astrophysics) University of Massachusetts, Amherst

### **Professional Employment:**

2000 - present	Professor	Department of Astrophysical and Planetary Sciences, University of Colorado, Boulder, CO
1991 - 1999	Associate Professor	Department of Astrophysical and Planetary Sciences, University of Colorado, Boulder, CO
1996 - 1999	Director	Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO
1982 - 1991	Member of Technical Staff	AT&T Bell Laboratories, Holmdel, NJ
1980 - 1982	Post-Doctoral MTS	AT&T Bell Laboratories, Holmdel, NJ
1978 - 1980	Research Assistant	Five College Radio Astronomy Observatory (FCRAO) University of Massachusetts, Amherst, MA
1974 - 1974	Instructor (Physics)	California State University, Hayward, CA

### **Areas of Research:**

The astrophysics of star formation, disks and outflows associated with young stars, the formation of planetary systems, and investigations of the interstellar medium. Line and continuum observations at millimeter, sub-mm, infrared, and visual wavelengths. The hydrodynamics of shocks and ionization fronts. *Other interests:* Galaxy formation and evolution, and the search for extra-Solar planets. *Hardware/engineering experience:* Cryogenic mm-wave mixers, IF systems, and superconducting (SIS) receivers, near-infrared arrays and cameras, optics, and astronomical site characterization.

My research has focused on the formation of stars and planetary systems using observational tools throughout the spectrum from radio to X-rays, numerical computation, and theoretical analysis. I use of facilities in space such as the Hubble Space Telescope and the Chandra X-ray observatory and major observatories such as Keck, Gemini, and the National Astronomy Observatories in Arizona and Chile and the Apache Point Observatory in which CU is a partner.

My research has shown that most stars form in clusters in close proximity to massive stars whose intense radiation, winds, and supernova explosions profoundly impact the formation and architectures of planetary systems. Forming stars inject high-velocity winds, collimated jets, intense UV radiation, and explosive debris that drive the life cycles of gas, dust, and clouds that inhabit the Galaxy. Thus, star formation is a self-limiting process that controls the “ecology” of

the matter between the stars. Ultimately, star formation determines the cosmic fate of ordinary matter in the Universe through the mixture of long-lived low- and high-mass stars.

I have worked on a variety of instrumentation projects including radio-astronomy receivers, new-methods of “site-testing” the astro-climate of potential observatory sites, and infrared cameras.

I was the PI of the 1.1 mm wavelength Bolocam Galactic Plane Survey (BGPS) which traced emission produced by dense cloud cores. I was a co-I on the Herschel Space Observatory Hi-GAL survey of the entire Galactic plane which obtained the first high-resolution survey at 5 wavelengths from 70 to 500  $\mu\text{m}$ . I’m investigating the ecology of the interstellar medium and the star-formation / stellar-evolution / stellar death life-cycle.

I am a co-I on the Spitzer Space Telescope “warm mission” project, SPIRITS which monitors ~200 nearby galaxies seeking to identify new classes of transients with luminosities between novae and supernovae that are primarily visible in the infrared portion of the spectrum. I’m am the PI of a Los Cumbres Observatory Global Telescope network program which monitors these galaxies at visual wavelengths

#### **Committees:**

I have served on the Hi-GAL (Herschel Space Observatory Galactic Plane Survey) Steering Committee. I have served on the NASA’s SOFIA Users Group (SUG).

#### **Teaching:**

I teach at all levels, including introductory and advanced undergraduate, graduate courses, and I supervise students at all levels. I contributed to the development of our Observational Astronomy I and II (ASTR 3520/3520 sequence for majors, and the Extraterrestrial Life (ASTR 3300 and now listed as ASTR2040) which is our introduction to astrobiology. I give many popular lectures to astronomy groups and the public. I typically supervise between 1 and 3 graduate students at any one time who are working on PhD dissertations. I supervised several post-docs including Jon Morse, Nathan Smith, and Sean Raymond.

#### **Publications:**

Riaz, B., Bally, J. 2021.

*Accretion and outflow activity in proto-brown dwarfs.*

Monthly Notices of the Royal Astronomical Society 501, 3781–3805.

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Walker, D. L. and 18 colleagues 2021.

*Star formation in 'the Brick': ALMA reveals an active proto-cluster in the Galactic centre cloud G0.253+0.016.*

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*Star cluster formation in Orion A.*  
Publications of the Astronomical Society of Japan 73, S239–S255.  
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- Kong, S. and 15 colleagues 2021.  
*The CARMA-NRO Orion Survey: Filament Formation via Collision-induced Magnetic Reconnection—the Stick in Orion A.*  
The Astrophysical Journal 906, 80.  
doi:10.3847/1538-4357/abc687
- Magakian, T.Y., Movsessian, T.A., Andreasyan, H.R., Bally, J., Rastorguev, A.S. 2020.  
*Herbig-Haro flows around the BBWo 192E (GM 1-23) nebula.*  
Monthly Notices of the Royal Astronomical Society 498, 5109–5115.  
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- Schneider, N. and 40 colleagues 2020.  
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- Zapata, L. A. and 11 colleagues 2020.  
*Confirming the Explosive Outflow in G5.89 with ALMA.*  
The Astrophysical Journal 902, 47.  
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- Battersby, C. and 21 colleagues 2020.  
*CMZoom: Survey Overview and First Data Release.*  
The Astrophysical Journal Supplement Series 249, 35.  
doi:10.3847/1538-4365/aba18e
- Ginsburg, A. and 21 colleagues 2020.  
*The MUSTANG Galactic Plane Survey (MGPS90) Pilot.*  
The Astrophysical Journal Supplement Series 248, 24.  
doi:10.3847/1538-4365/ab8b5c
- Feddersen, J. R. and 9 colleagues 2020.  
*CARMA-NRO Orion Survey: Protostellar Outflows, Energetics, and Filamentary Alignment.*

The Astrophysical Journal 896, 11.  
doi:10.3847/1538-4357/ab86a9

Bally, J., Ginsburg, A., Forbrich, J., Vargas-Gonzalez, J. 2020.  
*The Orion Protostellar Explosion and Runaway Stars Revisited: Stellar Masses, Disk Retention, and an Outflow from the Becklin—Neugebauer Object.*  
The Astrophysical Journal 889, 178.

Wright, M., and 6 colleagues 2020.  
*Observations of the Orion Source I Disk and Outflow Interface.*  
The Astrophysical Journal 889, 155.

Hankins, M. J., and 14 colleagues 2020.  
*SOFIA/FORCAST Galactic Center Legacy Survey: Overview.*  
The Astrophysical Journal 894, 55H.  
doi:10.3847/1538-4357/ab7c5d

Tanabe, Y., and 11 colleagues 2019.  
*Nobeyama 45 m mapping observations toward Orion A. I. Molecular Outflows.*  
Publications of the Astronomical Society of Japan 71, S8.

Tinyanont, S., and 10 colleagues 2019.  
*Supernova 2014C: Ongoing Interaction with Extended Circumstellar Material with Silicate Dust.*  
The Astrophysical Journal 887, 75.

Lu, X., and 15 colleagues 2019.  
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The Astrophysical Journal Supplement Series 244, 35.

Kong, S., and 21 colleagues 2019.  
*The CARMA-NRO Orion Survey: Core Emergence and Kinematics in the Orion A Cloud.*  
The Astrophysical Journal 882, 45.

Reipurth, B., and 7 colleagues 2019.  
*The Giant Herbig-Haro Flow HH 212 and Associated Star Formation.*  
The Astronomical Journal 158, 107.

Zapata, L.A., and 8 colleagues 2019.  
*G5.89: an explosive outflow powered by a proto-stellar merger?*  
Monthly Notices of the Royal Astronomical Society 486, L15.

Barnes, A.T., and 21 colleagues 2019.  
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Monthly Notices of the Royal Astronomical Society 486, 283.

- Bally, J., Chia, Zen H. 2019.  
*A highly collimated jet from the Red Square nebula MWC 922.*  
Monthly Notices of the Royal Astronomical Society 484, 4529-4539.
- Henshaw, J.D., and 21 colleagues 2019.  
*'The Brick' is not a brick: A comprehensive study of the structure and dynamics of the Central Molecular Zone cloud G0.253+0.016.*  
Monthly Notices of the Royal Astronomical Society 485, 2457.
- Ginsburg, A., McGuire, B., Plambeck, R., Bally, J., Goddi, C., Wright, M. 2019.  
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- Karambelkar, V.R., and 12 colleagues 2019.  
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The Astrophysical Journal 877, 110.
- Jencson, J.E., and 25 colleagues 2019.  
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- Suri, S.T., and 20 colleagues 2019.  
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- Chuss, D. T., and 37 colleagues 2019.  
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- Reipurth, B., Herbig, G.H., Bally, J., Geballe, T.R., Bowler, B.P., Raga, A.C., Chiang, H.-F., Connelley, M.S., Aspin, C. 2018.  
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The Astronomical Journal 156, 25.
- Stauffer, J., and 15 colleagues 2018.  
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- Eisner, J. A., and 15 colleagues 2018.  
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- Jencson, J. E., and 44 colleagues 2018.  
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- Walker, D.L., and 16 colleagues 2018.  
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- Ginsburg, A., and 26 colleagues 2018.  
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Monthly Notices of the Royal Astronomical Society 468, 2469-2481.
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*Thermal Feedback in the High-mass Star- and Cluster-forming Region W51.*  
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The Astronomical Journal 153, 233.

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*SPIRITS 15c and SPIRITS 14buu: Two Obscured Supernovae in the Nearby Star-forming Galaxy IC 2163.*

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Bally, J., Ginsburg, A., Arce, H., Eisner, J., Youngblood, A., Zapata, L., Zinnecker, H. 2017.

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*[Fe II] jets from intermediate-mass protostars in Carina.*

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- Pon, A., Ochsendorf, B. B., Alves, J., Bally, J., Basu, S., Tielens, A. G. G. M. 2016.  
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