Carlos Badenes - CV and Publication List

Carlos Badenes, Ph.D.

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Employment

2009 - Present **Senior Research Associate**
Weizmann Institute of Science, Rehovot, Israel
and Tel-Aviv University, Tel-Aviv, Israel

2006 - 2009 **Chandra Postdoctoral Fellow**
Princeton University, Princeton, NJ (2007-2009)
Rutgers University, Piscataway, NJ (2006-2007)

2004 - 2006 **Postdoctoral Research Associate**
Rutgers University, Piscataway, NJ
Supervisor: John P. Hughes

Education

2004 **Ph.D., Astrophysics**
Universitat Politècnica de Catalunya, Barcelona, Spain
Departament de Física i Enginyeria Nuclear
Ph.D. Thesis : "Thermal X-ray Emission from Young Type Ia Supernova Remnants"
Advisor: Dr. Eduardo Bravo

1999 **M.S. and B.S., Electrical Engineering**
Universitat Politècnica de Catalunya, Barcelona, Spain
Escola Tècnica Superior d'Enginyeria de Telecomunicació de Barcelona

Research Interests

Type Ia Supernovae: explosion physics, progenitor systems, stellar populations, chemical evolution.

Supernova Remnants: X-ray emission, shock physics, multi-dimensional hydrodynamics, X-ray spectral codes.

Large Astronomical Data Bases: Data mining, short-period binaries, spectral variability.

Honors and Awards

2010 European Union IRG Fellowship
2006 *Chandra* Fellowship
2002 Award for best student-designed mission concept. European Space Agency, International Advanced School Leonardo da Vinci, 'Mission Concept and Payload Design in X- and Gamma-ray Astronomy'. Bologna, Italy
2000 Generalitat de Catalunya, FI Research Fellowship

Publication Record

23 refereed papers (**12** as first author), **560** citations (source: *NASA* ADS). *H* parameter: **12**. For more details, see attached publication list.

Professional Service

2009-present	Science Associate for the *International X-ray Observatory (IXO)*.
2009	*Chandra* Cycle 11 Time Allocation Committee.
2009	Scientific Organizing Committe, Type Ia Supernova Progenitors Workshop, Princeton, NJ.
2008	NASA *Constellation-X* Panel on Production and Distribution of the Elements.
2008	*Swift* Cycle 4 Guest Investigator Program Review.
2007	Scientific Organizing Committee, Endpoints And Interactions: A Supernova Remnant Workshop, American Astronomical Society Meeting, Hawaii.
2007-present	Member of the American Astronomical Society (AAS).
2006-present	Scientific referee for *Astronomy & Astrophysics*, *The Astrophysical Journal*, and *Science*.
2006	*Suzaku (Astro-E2)* AO-1 Time Allocation Committee.
2004	NASA *Constellation-X* Panel to Define Scientific Objectives for Supernova Remnants.
2003-present	Member of the Sociedad Española de Astronomía (SEA).

Competitively Obtained Observing Time

As PI:

2010	Mayall 4m Telescope, Kitt Peak National Observatory: Spectroscopic follow-up of the SWARMS survey. 4 nights.
2010	*Hubble Space Telescope*: WD 1257+5428. 5 orbits.
2009	*Swift* : WD 1257+5428 (ToO). 5 ks.
2009	Green Bank Telescope: WD 1257+5428. 10 hours.
2009	ARC 3.5m Telescope, Apache Point Observatory: Time Resolved Spectroscopy of Double Degenerate White Dwarfs. 8 half-nights.
2008	ARC 3.5m Telescope, Apache Point Observatory: Late-time Spectroscopy of nearby Type Ib/c and Type IIn SNe. 4 half-nights.

As Co-I:

2010	Mayall 4m Telescope at Kitt Peak National Observatory: Light Echoes from Ancient Supernovae. 8 nights. PI: A. Rest.
2010	*EVLA*: Type Ia SNe (ToO). 10 hrs. PI: A. Soderberg.
2010	ARC 3.5m Telescope at Apache Point Observatory: Time Resolved Spectroscopy of Double Degenerate White Dwarfs. 4 half-nights. PI: F. Mullaly.
2009	ARC 3.5m Telescope at Apache Point Observatory: Time Resolved Spectroscopy of Double Degenerate White Dwarfs. 4 half-nights. PI: F. Mullaly.
2009	*Chandra*: SNR G299.2-2.9. 640 ks (Large Project). PI: S. Park.
2009	*Chandra*: SNR E0519-69.0. 52 ks. PI: J.P. Hughes.
2009	*Chandra*: MACS1354+77. 33 ks. PI: D. Maoz.
2008	*Chandra*: Tycho SNR. 750 ks (Large Project). PI: J.P. Hughes.
2008	*Chandra*: SN1996cr. 500 ks (Large Project). PI: F. Bauer.
2008	*Suzaku*: Tycho SNR. 400 ks (Large Project). PI: J.P. Hughes.
2007	*Chandra/Hubble Space Telescope*: SNR 0509-67.5. 63 ks/4 Orbits. PI: J.P. Hughes.
2007	*Chandra*: Tycho SNR. 150 ks. PI: J.P. Hughes.
2006	*Chandra*: Kepler SNR. 750 ks (Large Project). PI: S. Reynolds.
2005	*Suzaku*: SNR 0509-67.5. 100 ks. Co-PIs: H. Nakajima & J.P. Hughes. (Cancelled due to the loss of XRS)
2003-2010	*INTEGRAL*: Bright Type Ia Supernova (ToO). 2000 ks. PI: J. Isern

Teaching, Student Supervision, and Outreach

Teaching Assistant at the Universitat Politècnica de Catalunya, Barcelona, Spain (2001-2002). Departament de Física i Enginyeria Nuclear, Escola Tècnica Superior d'Enginyeria Industrial de Barcelona (school of Mechanical Engineering). Subject: Electromagnetism.

PhD Student Advising: Victor García. Degree. Thesis title: 'Modeling the Population of Supernova remnants in Star-Forming Galaxies'. Expected completion in 2014. Institution: Universitat Politècnica de Catalunya. Jointly advised with Eduardo Bravo.

PhD Student Co-Advising: Laura Lopez. Co-advising on several aspects of her research (e.g., Lopez et al. 2009, Lopez et al. 2010). Institution: University of California Santa Cruz. Advisor: Enrico Ramirez-Ruiz.

Press Releases: Jun 3, 2008: *Space Forensics of a Twice-Dead Corpse*. *Suzaku* Learning Center. • Mar 20, 2008: *SNR 0509-67.5: Action Replay Of Powerful Stellar Explosion*. *Chandra* X-ray Center.

Selected Public Talks: Aug 26, 2009: Atzeneta del Maestrat, Spain. Part of the 2009 International Year of Astronomy activities in Spain • May 12, 2009: Amateur Astronomers Society of Princeton, Princeton, NJ • Jun 4, 2005: Keynote Speaker at the Jersey StarQuest 2005, Amateur Astronomers Society of Princeton.

Public Awareness of Science: Several participations in blogs, TV shows, and radio shows, including the *Chandra* blog (2009, 2008) in the USA, and TV2 (2008), Radio Nacional (2004), and Catalunya Radio (2003) in Spain.

Selected Invited Talks, Seminars and Colloquia

2010: October 28: KIPAC Astrophysics Colloquium, Stanford University, Stanford, CA • September 29: Amsterdam University, Anton Pannekoek Institute of Astronomy, Amsterdam, the Netherlands • September 28: Department of Astronomy, Radboud Universiteit Nijmegen, Nijmegen, the Netherlands • June 9: Department of Physics, Technion, Haifa, Israel • Mar 19: Groningen University, Kapteyn Institute of Astronomy, Groningen, the Netherlands • Feb 17: Princeton University, Department of Astrophysical Sciences, Princeton, NJ

2009: May 8: University of California at Santa Cruz, Department of Astronomy and Astrophysics, Santa Cruz, CA • Apr 13: Department Colloquium, University of Colorado, Department of Physics and Planetary Sciences, Boulder, CO • Mar 15: The Hebrew University of Jerusalem, Racah Institute of Physics, Jerusalem, Israel • Mar 11: Tel-Aviv University, School of Physics and Astronomy, Tel-Aviv, Israel • Mar 8: Weizmann Institute of Science, Rehovot, Israel • Jan 30: National Optical Astronomy Observatory, Tucson AZ • Jan 20: Arizona State University, School of Earth and Space Exploration, Tempe, AZ • Jan 14: Los Alamos National Laboratory, Theoretical Division, Los Alamos, NM

2008: Dec 9: American Museum of Natural History, Division of Physical Sciences, New York City, NY • Dec 5: New York University, Department of Physics, New York City, NY • Nov 20: Joint Space Science and Remote Sensing Divisions Colloquium, Naval Research Laboratory, Washington DC • Oct 22: SUNY, the State University of New York, Department of Physics and Astronomy, Stony Brook, NY • Jul 10: Observatories of the Carnegie Institution of Washington, Pasadena CA. • Jun 11: University of California Berkeley, Department of Astronomy, Berkeley CA • Apr 16: Michigan State University, Department of Physics and Astronomy, East Lansing MI • Apr 7: Harvard-Smithsonian Center for Astrophysics, Cambridge MA • Feb 6: Institute for Advanced Study, School of Natural Sciences, Princeton NJ • Jan 30: Princeton University, Department of Astrophysical Sciences, Princeton, NJ

2007: Dec 7: University of Toronto, Department of Astronomy & Astrophysics, Toronto, Canada • Oct 24: University of Pennsylvania, Department of Physics and Astronomy, Philadelphia, PA • April 26: Institute for Advanced Study, School of Natural Sciences, Princeton, NJ • Feb 8: Kavli Institute for Theoretical Physics, Santa Barbara, CA

2006: Dec 7: University of Texas at Austin, Department of Astronomy, Austin, TX • Nov 27: Princeton University, Department of Astrophysical Sciences, Princeton, NJ • Jun 28: Utrecht University, Astronomical Institute, the Netherlands • April 19: Columbia University, Department of Astronomy & Astrophysics, New York City, NY

Participation in Scientific Meetings

Invited talks and reviews:

2010: PTF Meeting, KITP, Santa Barbara, CA, October 22-23 • Type Ia Supernova Progenitor Workshop. Lorenz Center, Leiden, The Netherlands, September 20-24. • High-resolution X-ray spectroscopy: past, present, and future, Utrecht, the Netherlands, March 13-17. • April Meeting of the American Physical Society, Washington DC, February 13-17.

2009: *Chandra's* First Decade of Discovery, Boston MA, September 22-25. • A Festival of Cosmic Explosions, Caltech, Pasadena, CA, August 21-23. • 12th Marcel Grossmann Meeting, Session APT3. Paris, France, July 12-18. • Supernova Remnants and Pulsar Wind Nebulae in the Chandra Era. Boston MA, July 8-10. • Type Ia Supernova Progenitors Workshop, Princeton NJ, April 17-19.

2008 and Earlier: Supernovae & Gamma-Ray Bursts at low z & in the Era of Reionization. May 26-29 2008, Darjeeling, India. • XXIII Trobades Científiques de la Mediterrània. Supernovae: Light in the Darkness. October 3-5 2007, Maó, Menorca, Spain. • Endpoints And Interactions: A Supernova Remnant Workshop. Splinter meeting of the 210th American Astronomical Society Meeting. May 24-25, 2007, Honolulu, HI.• Paths to Exploding Stars: Accretion and Eruption. March 19-23 2007, KITP, Santa Barbara, CA. • Supernova and Gamma-Ray Burst Remnants. February 6-10 2006, KITP, Santa Barbara, CA.

Contributed talks and posters: More than 20 contributed talks and posters to international scientific meetings since 2001. My full CV includes a complete list, and can be downloaded from my web page.

Languages

Spanish and Catalan (native); English (fluent); French and German (good)

References

Prof. John P. Hughes
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Rutgers University
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jph@physics.rutgers.edu

Prof. Bruce T. Draine
Department of Astrophysical Sciences
Princeton University
Peyton Hall, Ivy Lane, Princeton NJ 08544
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Prof. Brian P. Schmidt
Research School of Astronomy and Astrophysics
Australian National University
via Cotter Rd, Weston Creek, ACT 2611, Australia
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Prof. Roger A. Chevalier
Department of Astronomy
University of Virginia
P.O. Box 400325, Charlottesville, VA 22904
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Prof. Dan Maoz
School of Physics and Astronomy
Tel-Aviv University
Tel-Aviv 69978, Israel
maoz@astro.tau.ac.il

Submitted Publications

4 K.A. Eriksen, J.P. Hughes, **C. Badenes**, R. Fesen, P. Ghavamian, D. Moffet, P.P. Plucinsky, C.E. Rakowski, E.M. Reynoso, P.O. Slane. Particle Acceleration to the Knee of the Cosmic Ray Spectrum in Tycho's Supernova Remnant. ApJ, submitted, 2010.

3 E. Bravo & **C. Badenes**. Is the metallicity of their hosts a good measure of the metallicity of Type Ia supernovae? MNRAS, submitted, 2010.

2 L.A. Lopez, E. Ramirez-Ruiz, D. Huppenkothen, **C. Badenes**, & D.A. Pooley. Using the X-ray Morphology of Young Supernova Remnants to Constrain Explosion Type, Ejecta Distribution, and Chemical Mixing. ApJ, submitted, 2010 [arXiv:1011.0073].

1 H.B. Perets, **C. Badenes**, I. Arcavi, J.D. Simon, & A. Gal-yam. An Emerging Class of Bright, Fast-evolving Supernovae with Low-mass Ejecta. ApJ, submitted, 2010 [arXiv: 1008.2754].

Refereed Publications

23 A. Rest, R.J. Foley, B. Sinnott, D.L. Welch, **C. Badenes**, A.V. Filippenko, M. Bergmann, W.A. Bhatti, S. Blondin, P. Challis, G. Damke, H. Finley, M.E. Huber, D. Kasen, R.P. Kirshner, T. Matheson, P. Mazzali, D. Minniti, R. Nakajima, G. Narayan, K. Olsen, D. Sauer, R.C. Smith, & N.B. Suntzeff. Direct Confirmation of the Asymmetry of the Cas A SN Explosion with Light Echoes. ApJ, in press, 2010. [arXiv1003.5660].

22 D. Maoz & **C. Badenes**. The supernova rate and delay time distribution in the Magellanic Clouds. MNRAS 407, 1314, 2010.

21 **C. Badenes**, D. Maoz, & B.T. Draine. On the size distribution of supernova remnants in the Magellanic Clouds. MNRAS 407, 1301, 2010.

20 **C. Badenes**. X-Ray Studies of Supernova Remnants: Opening A New Window Onto Supernova Explosions. PNAS 107, 7141, 2010.

19 E. Bravo, I. Domínguez, **C. Badenes**, L. Piersanti & O. Straniero. Metallicity as a source of dispersion in the SNIa bolometric light curve luminosity-width relationship. ApJ, 711, L66, 2010.

18 F. Mullally, **C. Badenes**, S.E. Thompson & R.H. Lupton. Twins: The Two Shortest Period Non-Interacting Double Degenerate White Dwarf Stars. ApJ, 707, L51, 2009.

17 **C. Badenes**, F. Mullally, S.E. Thompson & R.H. Lupton. First Results from the SWARMS Survey. SDSS 1257+5428: A Nearby, Massive White Dwarf Binary with a Likely Neutron Star or Black Hole Companion. ApJ, 707, 971, 2009.

16 L.A. Lopez, E. Ramirez-Ruiz, **C. Badenes**, D. Huppenkothen, T.E. Jeltema & D.A. Pooley. Typing Supernova Remnants Using X-Ray Line Emission Morphologies. ApJ 706, L106, 2009.

15 **C. Badenes**, J. Harris, D. Zaritsky & J.L. Prieto. The Stellar Ancestry of Supernovae in the Magellanic Clouds. I. The Most Recent Supernovae in the Large Magellanic Cloud. ApJ 700, 727, 2009.

14 **C. Badenes**, E. Bravo & J.P. Hughes. The End of Amnesia: A New Method for Measuring the Metallicity of Type Ia Supernova Progenitors Using Manganese Lines in Supernova Remnants. ApJ 680, L33, 2008.

13 G. Cassam-Chenai, J.P. Hughes, E. Reynoso, **C. Badenes** & D. Moffett. Morphological evidence for azimuthal variations of the cosmic ray ion acceleration at the blast wave of SN 1006. ApJ 680, 1180, 2008.

12 **C. Badenes**, J.P. Hughes, G. Cassam-Chenaï & E. Bravo. The Persistence of Memory, or How the X-ray Spectrum of SNR 0509−67.5 Reveals the Brightness of its Parent Supernova. ApJ 680, 1149, 2008.

11 S.P. Reynolds, K.J. Borkowski, U. Hwang, J.P. Hughes, **C. Badenes**, J.M. Laming & J.M. Blondin. A Deep Chandra Observation of Kepler's Supernova Remnant: A Type Ia Event with Circumstellar Interaction. ApJ 668, L135, 2007.

10 **C. Badenes**, J.P. Hughes, E. Bravo & N. Langer. Are the Models for Type Ia Supernova Progenitors Consistent with the Properties of Supernova Remnants? ApJ 662, 472, 2007.

9 C.E. Rakowski, **C. Badenes**, B.M. Gaensler, J.D. Gelfand, J.P. Hughes & P.O. Slane. Can Ejecta-Dominated Supernova Remnants be Typed from their X-ray Spectra? The Case of G337.2-0.7. ApJ 646, 982, 2006.

8 **C. Badenes**, K.J. Borkowski, J.P. Hughes, U. Hwang & E. Bravo. Constraints on the Physics of Type Ia Supernovae from the X-ray Spectrum of the Tycho Supernova Remnant. ApJ 645, 1373, 2006.

7 J.S. Warren, J.P. Hughes, **C. Badenes**, P. Ghavamian, C.F. McKee, D. Moffett, P.P. Plucinsky, C. Rakowski, E. Reynoso & P. Slane. Cosmic Ray Acceleration at the Forward Shock in Tycho's Supernova Remnant from *Chandra* X-ray Observations. ApJ 634, 376, 2005.

6 **C. Badenes**, E. Bravo & K.J. Borkowski. A Model Grid for the Spectral Analysis of X-ray Emission in Young Type Ia Supernova Remnants. Adv. Space Res. 35, 987, 2005.

5 **C. Badenes**, K.J. Borkowski & E. Bravo. Thermal X-ray Emission from Shocked Ejecta in Type Ia Supernova Remnants II: Parameters Affecting the Spectrum. ApJ 624, 198, 2005.

4 U. Hwang, J. M. Laming, **C. Badenes**, F. Berendse, J. Blondin, D. Cioffi, T. DeLaney, D. Dewey, R. Fesen, K.A. Flanagan, C.L. Fryer, P. Ghavamian, J.P. Hughes, J.A. Morse, P.P. Plucinsky, R. Petre, M. Pohl, L. Rudnick, R. Sankrit, P.O. Slane, R.K. Smith, J. Vink & J.S. Warren. A Million-Second *Chandra* View of Cassiopeia A. ApJ 615, L117, 2004.

3 H. Halloin, P. von Ballmoos, J. Evrard, G.K. Skinner, N. Abrosimov, P. Bastie, G. Di Cocco, M. George, B. Hamelin, P. Jean, J. Knödlseder, P. Laporte, **C. Badenes**, P. Laurent, A. Laurens & R.K. Smither. Performance of CLAIRE, the first ballon-borne gamma-ray lens telescope. Nuclear Instr. And Meth. In Phys. Res. Sect. A 504, 120, 2003.

2 **C. Badenes**, E. Bravo, K.J. Borkowski & I. Domínguez. Thermal X-ray Emission from Shocked Ejecta in Type Ia Supernova Remnants: Prospects for Explosion Mechanism Identification. ApJ 593, 358, 2003.

1 **C. Badenes** & E. Bravo. The Imprint of Presupernova Evolution on Supernova Remnants. ApJ 556, L41, 2001.

Other Publications

Several diverse publications, including 10 first author conference proceedings, contributions to four white papers submitted to the Astro2010 Decadal Survey Committee, and contributions to technical reports for space astrophysics missions in the USA and Europe. For a complete list of publications, see NASA ADS.