

## Leisa K. Townsley

Department of Astronomy and Astrophysics, Pennsylvania State University  
525 Davey Laboratory, University Park, PA 16802  
814-863-7946  
townsley@astro.psu.edu  
<http://www.astro.psu.edu/users/townsley/>

### CURRENT POSITION AND ACTIVITIES

**Senior Scientist** and member of the Chandra X-ray Observatory Advanced CCD Imaging Spectrometer (ACIS) Instrument Team, Department of Astronomy and Astrophysics, PSU, July 2006 – present

**Principal Investigator (PI)** for the Chandra/ACIS GO Very Large Project survey of the Great Nebula in Carina and its precursor, an observation of Carina's densest young stellar cluster Trumpler 14

**PI** for the Chandra/ACIS GO observations of the Galactic Giant HII Region NGC 3576 and the associated Spitzer Space Telescope infrared observations of the same region

**PI** of a Chandra/ACIS Large Project and Chandra archival study of NGC 3603, one of the most massive Galactic stellar clusters

**PI** for the Chandra/ACIS GO observations of the Galactic Giant HII Region G333.6-0.2

**PI** for the Chandra/ACIS GO observations of the Galactic HII Region complex NGC 6357

**PI** of the Chandra/ACIS GO Large Project observation of M17, the closest Giant HII Region

**PI** of the Chandra/ACIS GO Large Project observations of the W3 star-forming complex in the Perseus Arm and the associated XMM-Newton observations of the HB3 cavity supernova remnant

**PI** of the Chandra/ACIS GO observations of the Galactic massive star-forming region IC 1805 and the associated XMM-Newton observations of its surrounding Galactic superbubble W4

**PI** for the Chandra/ACIS GO observation of the Giant Extragalactic HII Region 30 Doradus

**PI** on two Chandra/ACIS GO projects to study the Rosette Nebula (NGC 2244) and the Rosette Molecular Cloud; **Dissertation co-Advisor** (with Eric Feigelson) to graduate student Junfeng Wang who analyzed these data as part of his PhD dissertation (degree awarded 2007)

**Lead Scientist** for the Chandra/ACIS Instrument Team GTO observations of 30 Doradus and the Galactic massive star-forming regions M17, RCW 49, W51A, NGC 6357, and Carina

**Co-PI** (with E.D. Feigelson) on an NSF project to connect international theorists with our archival study of 20 massive star-forming regions using space- and ground-based data

**Co-Investigator** on a NASA ADP project (PI Eric Feigelson), on several Chandra GTO and GO projects, and on one Spitzer GO project (Observer for the Chandra joint time awarded to study IC 1795 in W3)

**Program Sponsor** for NSF Astronomy & Astrophysics Postdoctoral Fellow Matthew Povich, who joined our group in September 2009 to integrate X-ray observations into his studies of star formation rates in Galactic HII regions

Recent **colloquium speaker** at the following institutions: University of Toronto (October 2010), SOFIA Science Center (April 2010), University of Illinois Urbana-Champaign (April 2010)

My research consists primarily of X-ray studies of massive star-forming regions, including both point source and diffuse components. Chandra/ACIS observations detect hundreds to thousands of X-ray point sources in these regions, effectively tracing the young stellar populations and enabling studies of cluster structure, mass segregation, initial mass function, circumstellar disk evolution, and many other properties of the clusters and the stars they contain. Chandra's young star census is much more complete than past X-ray missions, necessitating the development of data analysis techniques far beyond the tools provided by the Chandra X-ray Center. Our group has developed and tested these tools and provides them to the wider Chandra community with detailed manuals and recipes for their use. Chandra's high spatial resolution and sensitivity have allowed our group and others to isolate and characterize hot ( $10^6 - 10^8$ K) diffuse plasma in these star-forming regions. This hot gas is most likely caused by O-star wind collisions; its unambiguous detection with Chandra fulfills 35 years of predictions but its physical properties contradict theory. My

primary collaborators in these efforts are Patrick Broos, Eric Feigelson, and Matthew Povich.

My ACIS programmatic duties include leading the development of a Monte Carlo simulation of both front- and back-illuminated X-ray CCDs that is used as a fundamental calibration tool for the ACIS camera, leading the PSU effort to characterize and ameliorate charge transfer inefficiency in the ACIS CCDs, and developing and improving ACIS data reduction and science analysis techniques. My primary collaborator in these efforts is Software Engineer Patrick Broos. We report directly to the ACIS Principal Investigator, Professor Gordon Garmire.

## PAST POSITIONS AND ACTIVITIES

**Senior Research Associate** and member of the ACIS Instrument Team, Department of Astronomy and Astrophysics, PSU, July 2000 – June 2006

**Research Associate** and member of the ACIS Instrument Team, Department of Astronomy and Astrophysics, PSU, July 1994 – June 2000

**Colloquium speaker** at the following institutions:

University of Toronto (October 2010)

SOFIA Science Center (April 2010)

University of Illinois Urbana-Champaign (April 2010)

Lowell Observatory (December 2009)

Arizona State University (November 2009)

McMaster University (October 2008)

Cornell University (May 2008)

University of Wisconsin (January 2008)

Michigan State University (January 2008)

University of Delaware (April 2007)

University of Michigan (March 2007)

NASA Goddard Space Flight Center (December 2006)

Colby College (October 2006)

University of Virginia (September 2006)

MIT Center for Space Research (April 2006)

University of Wyoming (October 2002)

In addition to the ongoing activities noted above, my programmatic responsibilities as part of the ACIS team included leading the following PSU efforts: early diagnosis of ACIS radiation damage using celestial calibration data, PSF characterization (including off-axis and piled-up PSFs), developing subpixel spatial resolution algorithms, X-ray spatial mapping of the ACIS Optical Blocking Filters (OBFs) at the University of Wisconsin-Madison Synchrotron Radiation Center, and measuring the UV/optical rejection of the OBFs. I participated in the calibration of ACIS at the X-ray Calibration Facility, part of NASA's Marshall Space Flight Center; there I served as PSU group manager (coordinating the efforts of 10 scientists), represented the ACIS team during NASA Project Science meetings and reported to the Chandra Project Scientist, assisted in the development of the calibration plan, and performed quick-look analysis of ACIS data. I also contributed to the ACIS Calibration Report to NASA and participated in the Orbital Activation Phase of the Chandra mission at the Chandra X-ray Center. I reported to Professor John Nousek and Professor Gordon Garmire.

**Instrument Lead** of the Ultraviolet/Optical Telescope (UVOT) for the Swift Gamma-ray Burst Explorer (MIDEX selected by NASA October 1999), Feb - Oct 1999

My responsibilities included leading the Phase A Concept Study for the UVOT on Swift. This involved developing schedules, budgets, and staffing plans, defining upgrades to the XMM Optical Monitor (UVOT's precursor) to accommodate Swift/UVOT science requirements, identifying a subcontractor for a major new component and negotiating the subcontract, maintaining mass and power budgets, defining interface requirements, and establishing working arrangements with Mullard Space Science Laboratory (University College, London), NASA's foreign partner on UVOT. I wrote the UVOT section for the Swift Phase A Report and participated in several reviews and presentations at NASA's Goddard Space Flight Center, including the NASA Headquarters MIDEX Review Board site visit. I reported to Professor John Nousek, Penn State Lead for the Swift mission.

## EDUCATION

**Ph.D., Physics**, University of Wyoming, March 1994, Dissertation entitled “The Globular Cluster Systems of Nearby, Edge-on Spiral Galaxies”

Research included 300 nights of observing for several imaging projects at the Wyoming Infrared Observatory using visual and infrared CCDs, mapping the globular cluster systems of edge-on spiral galaxies, and work on an Air Force contract to perform maximum entropy image restoration and source detection on the IRAS Additional Observations of the Galactic Plane.

**B.A., Physics and Mathematical Sciences**, Rice University, May 1987

Research included measuring emission line widths to map turbulence in Galactic and extragalactic HII regions, under the supervision of Professor C.R. O’Dell.

## SERVICE

Member, **Astrophysics Subcommittee of the Science Committee of the NASA Advisory Council**, summer 2008 to present

Member, **Chandra Users’ Committee**, November 2004 to April 2008

Member of the **Science Organizing Committees** for the following conferences: “Twelve Years of Science with Chandra,” May 2011; “The Local Bubble and Beyond II,” April 2008; “Eight Years of Science with Chandra,” October 2007; “Making the Most of the Great Observatories,” May 2006; “Six Years of Science with Chandra,” November 2005; “Star Formation in the Era of Three Great Observatories,” July 2005

**Referee** of scientific papers for *The Astrophysical Journal*, *The Astrophysical Journal Supplement*, *The Astronomical Journal*, *Publications of the Astronomical Society of Japan*, and *Monthly Notices of the Royal Astronomical Society*

**Panel Chair**, Chandra Peer Review, Observing Cycle 10, June 2008

**Peer Reviewer**, Chandra Observing Cycle 8, June 2006

**Chandra X-ray Center Reviewer**, CXC’s Level 3 Data Products, February 2006

**NASA reviewer**, Swift Mission Flight Software Review, December 2002

**Peer Reviewer**, Chandra Observing Cycle 4, June 2002

**Peer Reviewer**, NSF Information Technology program, May 2001

**NASA reviewer**, Swift Ultraviolet/Optical Telescope Instrument Critical Design Review, February 2001

**NASA reviewer**, Swift X-ray Telescope Instrument Preliminary Design Review, August 2000

**NASA reviewer**, Swift Ultraviolet/Optical Telescope Instrument Preliminary Design Review, August 2000

## CONSULTING

**Lockheed-Martin Solar and Astrophysics Lab**, CCD simulations for the Solar X-ray Imager on the GOES-N Spacecraft, 1998-99

**MIT Lincoln Laboratories**, CCD simulations for back-illuminated CCD detector development, 1999

## PROFESSIONAL SOCIETIES

American Astronomical Society (AAS)

High Energy Astrophysics Division of the AAS

## AWARDS

Two NASA Group Achievement Awards for efforts to ameliorate the radiation damage to the ACIS CCDs

NASA Group Achievement Award for participation in the Swift Phase A Concept Study

## TEACHING AND PUBLIC OUTREACH

Participated in the Penn State In-Service Workshops in Astronomy for secondary school science teachers

(co-I on Chandra E/PO grants to help fund these workshops)

Participated in the Astro-Fest week-long public outreach program at Penn State

Occasionally give public talks to astronomy clubs, science classes, etc.

## PROFESSIONAL REFERENCES

**You-Hua Chu**, Professor of Astronomy and Chair, Department of Astronomy, University of Illinois at Urbana-Champaign (*Star formation science*): yhchu@astro.illinois.edu

**Eric Feigelson**, Professor of Astronomy and Astrophysics (*Star formation science*): edf@astro.psu.edu

**Gordon Garmire**, ACIS Principal Investigator and Evan Pugh Professor of Astronomy and Astrophysics (*ACIS programmatic*): garmire@astro.psu.edu

**Thierry Montmerle**, Assistant General Secretary, International Astronomical Union (*Star formation science*): montmerl@iap.fr

## REFEREED PUBLICATIONS

“An Introduction to the Chandra Carina Complex Project,” Townsley, L., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“A Catalog of Chandra X-ray Sources in the Carina Nebula,” Broos, P., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Source Contamination in X-ray Studies of Star-Forming Regions: Application to the Chandra Carina Complex Project,” Getman, K., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“A Naive Bayes Source Classifier for X-ray Sources,” Broos, P., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Carina OB Stars: X-ray Signatures of Wind Shocks and Magnetic Fields,” Gagne, M., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Candidate X-ray Emitting OB Stars in Carina Identified Via Infrared Spectral Energy Distributions,” Povich, M., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Global X-ray Properties of the O and B Stars in Carina,” Naze, Y., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“X-ray Emission from the Double-binary OB-Star System QZ Car (HD 93206),” Parkin, E., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“X-ray Star Clusters in the Carina Complex,” Feigelson, E., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Infrared Properties of the X-ray-emitting Young Stellar Objects in the Carina Nebula,” Preibisch, T., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“A Chandra ACIS Study of the Young Star Cluster Trumpler 15 in Carina and Correlation with Near-infrared Sources,” Wang, J., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Trumpler 16 as Viewed by the Chandra Carina Complex Project,” Wolk, S., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Low Mass Companions of B Stars in Trumpler 16 in the Carina Nebula,” Evans, N., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“A Pan-Carina YSO Catalog: Intermediate-Mass Young Stellar Objects in the Carina Nebula Identified Via Mid-Infrared Excess Emission,” Povich, M., et al. 2010, ApJS, accepted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“The Chandra Carina Complex Project: Deciphering the Enigma of Carinas Diffuse X-ray Emission,” Towns-

ley, L., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“The Integrated Diffuse X-ray Emission of the Carina Nebula Compared to Other Massive Star-forming Regions,” Townsley, L., et al. 2010, ApJS, submitted ([http://cochise.astro.psu.edu/Carina\\_public/special\\_issue.html](http://cochise.astro.psu.edu/Carina_public/special_issue.html))

“Innovations in the Analysis of Chandra-ACIS Observations,” Broos, P.S., Townsley, L.K., Feigelson, E.D., Getman, K.V., Bauer, F.E., & Garmire, G.P. 2010, ApJ, 714, 1582

“Methods for Estimating Fluxes and Absorptions of Faint X-ray Sources,” Getman, K.V., Feigelson, E.D., Broos, P.S., Townsley, L.K., & Garmire, G.P. 2010, ApJ, 708, 1760

“A Chandra Study of the Rosette Star-Forming Complex. II. Clusters in the Rosette Molecular Cloud,” Wang, J., Feigelson, E.D., Townsley, L.K., Román-Zúñiga, C.G., Lada, E., & Garmire, G. 2009, ApJ, 696, 47

“A Smoking Gun in the Carina Nebula,” Hamaguchi, K., et al. 2009, ApJL, 695, L4

“Low and High Mass Star Formation in the W3, W4, and W5 Regions,” Megeath, S.T., Townsley, L.K., Oey, M.S., & Tieftrunk, A.R. 2008, “Handbook of Star Forming Regions, Volume I. The Northern Sky,” Bo Reipurth (ed.), ASP Monograph Publications, Vol. 4, p. 264

“A Chandra Study of the Rosette Star-Forming Complex. I. The Stellar Population and Structure of the Young Open Cluster NGC 2244,” Wang, J., Townsley, L.K., Feigelson, E.D., Broos, P.S., Getman, K.V., Roman-Zuniga, C., & Lada, E. 2008, ApJ, 675, 464

“The Diverse Stellar Populations of the W3 Star Forming Complex,” Feigelson, E.D. & Townsley, L.K. 2008, ApJ, 673, 354

“An X-Ray Imaging Study of the Stellar Population in RCW 49,” Tsujimoto, M. et al. 2007, ApJ, 665, 719

“The Young Stellar Population in M17 Revealed by Chandra,” Broos, P.S., Feigelson, E.D., Townsley, L.K., Getman, K.V., Wang, J., Garmire, G.P., Jiang, Z., & Tsuboi, Y. 2007, ApJS, 169, 353

“An X-ray Census of Young Stars in the Massive Southern Star-forming Complex NGC 6357,” Wang, J., Townsley, L.K., Feigelson, E.D., Getman, K.V., Broos, P.S., Garmire, G.P., & Tsujimoto, M. 2007, ApJS, 168, 100

“X-ray Properties of Young Stars and Stellar Clusters,” Feigelson, E., Townsley, L., Gudel, M., & Stassun, K. 2007, Protostars and Planets V, 313

“Star Formation in the Era of the Three Great Observatories,” Wolk, S.J., et al. 2006, PASP, 118, 939

“A Chandra/ACIS Study of 30 Doradus I. Superbubbles and Supernova Remnants,” Townsley, L.K., Broos, P.S., Feigelson, E.D., Brandl, B.R., Chu, Y.-H., Garmire, G.P., & Pavlov, G.G. 2006, AJ, 131, 2140

“A Chandra/ACIS Study of 30 Doradus II. X-ray Point Sources in the Massive Star Cluster R136 and Beyond,” Townsley, L.K., Broos, P.S., Feigelson, E.D., Garmire, G.P., & Getman, K.V. 2006, AJ, 131, 2164

“Chandra Study of the Cepheus B Star Forming Region: Stellar Populations and the Initial Mass Function,” Getman, K.V., Feigelson, E.D., Townsley, L., Broos, P., Garmire, G., & Tsujimoto, M. 2006, ApJS, 163, 306

“51 Eri and GJ 3305: A 10-15 Myr Old Binary Star System at 30 Parsecs,” Feigelson, E.D., Lawson, W.A., Stark, M., Townsley, L., & Garmire, G.P. 2006, AJ, 131, 1730

“Chandra Orion Ultradeep Project: Observations and Source Lists,” Getman, K.V., et al. 2005, ApJS, 160, 319

“Membership of the Orion Nebula Population from the Chandra Orion Ultradeep Project,” Getman, K.V., Feigelson, E.D., Grosso, N., McCaughrean, M.J., Micela, G., Broos, P., Garmire, G., & Townsley, L. 2005, ApJS, 160, 353

“Global X-ray Properties of the Orion Nebula Region,” Feigelson, E.D., et al. 2005, ApJS, 160, 379

“Chandra Orion Ultradeep Project Census of X-ray Stars in the BN/KL Region and OMC-1 South,” Grosso, N., et al. 2005, ApJS, 160, 530

“Search for the Elusive Optical Counterpart of PSR J0537-6910 with the HST Advanced Camera for Sur-

veys,” Mignani, R.P., Pulone, L., Iannicola, G., Pavlov, G.G., Townsley, L., Kargaltsev, O.Y. 2005, *A&A*, 431, 659

“Diffuse X-Ray Emission in a Deep Chandra Image of the Galactic Center,” Muno, M.P., Baganoff, F.K., Bautz, M.W., Feigelson, E.D., Garmire, G.P., Morris, M.R., Park, S., Ricker, G.R., & Townsley, L.K. 2004, *ApJ*, 613, 326

“The Swift Gamma-Ray Burst Mission,” Gehrels, N., et al. 2004, *ApJ*, 611, 1005

“X-ray Spectroscopy and Variability of AGN Detected in the 2 Ms Chandra Deep Field-North Survey,” Bauer, F.E., Vignali, C., Alexander, D.M., Brandt, W.N., Garmire, G.P., Hornschemeier, A.E., Broos, P.S., Townsley, L.K., & Schneider, D.P. 2004, *AdSpR*, 34, 2555

“10 MK Gas in M17 and the Rosette Nebula: X-Ray Flows in Galactic H II Regions,” Townsley, L.K., Feigelson, E.D., Montmerle, T., Broos, P.S., Chu, Y., & Garmire, G.P. 2003, *ApJ*, 593, 874

“The Chandra Deep Field North Survey. XIII. 2 Ms Point-Source Catalogs,” Alexander, D.M., et al. 2003, *AJ*, 126, 539

“Chandra X-Ray Spectroscopic Imaging of Sagittarius A\* and the Central Parsec of the Galaxy,” Baganoff, F.K., et al. 2003, *ApJ*, 591, 891

“Diffuse X-Ray Emission from the Quiescent Superbubble M17, the Omega Nebula,” Dunne, B.C., Chu, Y.-H., Chen, C.-H.R., Lowry, J.D., Townsley, L., Gruendl, R.A., Guerrero, M.A., & Rosado, M. 2003, *ApJ*, 590, 306

“A Deep Chandra Catalog of X-Ray Point Sources toward the Galactic Center,” Muno, M.P., et al. 2003, *ApJ*, 589, 225

“Chandra Study of Young Stellar Objects in the NGC 1333 Star-forming Cloud,” Getman, K.V., Feigelson, E.D., Townsley, L., Bally, J., Lada, C.J., & Reipurth, B. 2002, *ApJ*, 575, 354

“Modeling Charge Transfer Inefficiency in the Chandra Advanced CCD Imaging Spectrometer,” Townsley, L.K., Broos, P.S., Nousek, J.A., & Garmire, G.P. 2002, *Nuclear Instruments and Methods in Physics Research A*, 486, 751

“Simulating CCDs for the Chandra Advanced CCD Imaging Spectrometer,” Townsley, L.K., Broos, P.S., Chartas, G., Moskalenko, E., Nousek, J.A., & Pavlov, G.G. 2002, *Nuclear Instruments and Methods in Physics Research A*, 486, 716

“X-Ray-emitting Young Stars in the Orion Nebula,” Feigelson, E.D., Broos, P., Gaffney, J.A., Garmire, G., Hillenbrand, L.A., Pravdo, S.H., Townsley, L., & Tsuboi, Y. 2002, *ApJ*, 574, 258

“A Chandra Study of Sagittarius A East: A Supernova Remnant Regulating the Activity of Our Galactic Center?,” Maeda, Y., et al. 2002, *ApJ*, 570, 671

“The Chandra HETGS X-Ray Grating Spectrum of Eta Carinae,” Corcoran, M.F., et al. 2001, *ApJ*, 562, 1031

“The Chandra Deep Field North Survey. V. 1 Ms Source Catalogs,” Brandt, W.N., et al. 2001, *AJ*, 122, 2810

“Rapid X-ray Flaring from the Direction of the Supermassive Black Hole at the Galactic Centre,” Baganoff, F.K., et al. 2001, *Nature*, 413, 45

“The Chandra Deep Survey of the Hubble Deep Field North Area. IV. An Ultradeep Image of the HDF-N,” Brandt, W.N., et al. 2001, *AJ*, 122, 1

“The Chandra Deep Survey of the Hubble Deep Field-North Area. II. Results from the Caltech Faint Field Galaxy Redshift Survey Area,” Hornschemeier, A.E., et al. 2001, *ApJ*, 554, 742

“Detection of Nuclear X-Ray Sources in Nearby Galaxies with Chandra,” Ho, L.C., et al. 2001, *ApJ*, 549, L51

“Hot Plasma and Black Hole Binaries in Starburst Galaxy M82,” Griffiths, R.E., Ptak, A., Feigelson, E.D., Garmire, G., Townsley, L., Brandt, W.N., Sambruna, R., & Bregman, J.N. 2000, *Science*, 290, 1325

“X-Ray Sources in the Hubble Deep Field Detected by Chandra,” Hornschemeier, A.E., et al. 2000, *ApJ*,

“Chandra X-Ray Observatory Study of the Orion Nebula Cluster and BN/KL Region,” Garmire, G., Feigelson, E.D., Broos, P., Hillenbrand, L.A., Pravdo, S.H., Townsley, L., & Tsuboi, Y. 2000, *AJ*, 120, 1426

“Mitigating Charge Transfer Inefficiency in the Chandra X-Ray Observatory Advanced CCD Imaging Spectrometer,” Townsley, L.K., Broos, P.S., Garmire, G.P., & Nousek, J.A. 2000, *ApJ*, 534, L139

“Observations of Faint, Hard-Band X-Ray Sources in the Field of CRSS J0030.5+2618 with the Chandra X-Ray Observatory and the Hobby-Eberly Telescope,” Brandt, W.N., et al. 2000, *AJ*, 119, 2349

“The Infrared Angular Diameter of Omicron Ceti Near Maximum Light,” Ridgway, S.T., Benson, J.A., Dyck, H.M., Townsley, L.K., & Hermann, R.A. 1992, *AJ*, 104, 2224

“A Very High Resolution Study of Emission Line Widths in Galactic and Extragalactic H II regions,” O’Dell, C.R. & Townsley, L.K. 1988, *A&A*, 198, 283

“Fine-scale Motion in NGC 6514 and NGC 6523,” O’Dell, C.R., Townsley, L.K., & Castaneda, H.O. 1987, *ApJ*, 317, 676

### SELECTED CONFERENCE PAPERS

“Diffuse X-ray Structures in Massive Star-forming Regions,” Townsley, L.K. 2008, Proceedings of “The Local Bubble and Beyond II,” Philadelphia, PA, 21–24 April 2008, p. 225

“An X-ray Tour of Massive Star-forming Regions with Chandra,” Townsley, L.K. 2006, Proceedings of the STScI May Symposium, “Massive Stars: From Pop III and GRBs to the Milky Way,” Baltimore, MD, 8–11 May, 2006, p. 60 (astro-ph/0608173)

“Parsec-scale X-ray Flows in High-mass Star-forming Regions,” Townsley, L.K., Broos, P.S., Feigelson, E.D., & Garmire, G.P. 2005, Proceedings of IAU Symposium 227, “Massive Star Birth - A Crossroads of Astrophysics,” Acireale, Italy, 16–20 May, 2005, p. 297 (astro-ph/0506418)

“Parsec-scale X-ray Flows in High-mass Star-forming Regions,” Townsley, L.K., et al. 2004, Proceedings of “X-Ray and Radio Connections,” Santa Fe, NM, 3–6 February, 2004 (astro-ph/0406349)

“Chandra Observations of M 17, the Omega Nebula,” Townsley, L.K., Broos, P.S., Chu, Y.-H., Feigelson, E.D., Garmire, G.P., Getman, K.V., & Montmerle, T. 2003, *Revista Mexicana de Astronomia y Astrofisica Conference Series*, 15, 190

“Joint AXAF high-resolution mirror assembly and AXAF CCD Imaging Spectrometer calibration at the MSFC X-Ray Calibration Facility,” Nousek, J.A., et al. 1998, *Proc. SPIE*, 3444, 225

“Discarding piled-up events in ACIS,” Broos, P.S., Townsley, L.K., & Nousek, J.A. 1998, *Proc. SPIE*, 3444, 30

“Metalized polyimide filters for x-ray astronomy and other applications,” Powell, F.R., et al. 1997, *Proc. SPIE*, 3113, 432

“Transmission maps of the ACIS UV/optical blocking filters,” Townsley, L.K., Powell, F.R., Mackay, J.F., Lagally, M.G., Nousek, J.A., & Garmire, G.P. 1996, *Proc. SPIE*, 2805, 134