Curriculum Vitae – **Daniel Patnaude**

Astrophysicist
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Research Interests

— Computational fluid dynamics with application to supernovae and supernova remnants
— X-ray observations of Galactic and extragalactic sources of cosmic–rays
— Compact remnants in core–collapse supernovae

Education

Ph.D, Physics and Astronomy, Dartmouth College — May 2005
Advisor: Prof. Robert Fesen
Modeling of Shocks in Young and Old Supernova Remnants

B.S., Astronomy, University of Massachusetts, Amherst — May 1995

Positions Held

Astrophysicist, Smithsonian Astrophysical Observatory	
CXO Lead Scientist for HRC Operations	2017–present
CXO Mission Planning Scientist	2007–2017
Visiting Fellow, Institute for Nuclear Theory, University of Washington	2012
Visiting Scholar, Kavli Institute for Theoretical Physics, UC Santa Barbara	2007–2009
Postdoctoral Fellow, Smithsonian Astrophysical Observatory	2005–2007
Graduate Research Assistant, Dartmouth College	1999–2005
Adjunct Faculty, Lebanon College	2003–2005
Physicist, Smithsonian Astrophysical Observatory	1995–1999

Professional Service

NuStar Cycle 6 Time Allocation Committee, Deputy Chair	2020
NASA Astrophysics Theory Program, Panelist	2019
NASA Astrophysics Data Analysis Program, Panelist	2019
Canadian National Research Council, External Reviewer	2018
NuStar Cycle 4 Time Allocation Committee, Deputy Chair	2018
NASA Postdoctoral Program, Reviewer	2016–2018
Netherlands Organization for Scientific Research, External Reviewer	2009, 2017
COSPAR Latin American Capacity Building Workshop, Lecturer	2017
Swift Cycle 13 Time Allocation Committee	2016
Chandra Cycle 16 Time Allocation Committee, Deputy Chair	2014
Fermi Time Allocation Committee	2011, 2013
Suzaku Time Allocation Committee	2011, 2012
European Research Council Advanced Studies, External Panelist	2011
International X-ray Observatory Project Science Team	2008–2010
CfA Computation Facility Scientific Advisory Committee	2008–2010
SNRs and PWNe in the Chandra Era SOC Chair	2009
Astro2010 Decadal Review Cambridge Town Hall Meeting SOC Co-Chair	2009
Referee: Astrophysical Journal, Astronomy & Astrophysics, Science, MNRAS	2005–present

HONORS AND AWARDS

NASA Space Grant Recipient	2004
Smithsonian Achievement Award for *Chandra* Ground Calibration	1997

STUDENTS AND POSTDOCTORAL FELLOWS

Kathryn Weil - Dartmouth College	2019
Taylor Jacovich - SAO Predoctoral Supervisor	2018–present
Gao-Yuan Zhang - SAO Predoctoral Committee Chair	2016–2018
Danny Milisavljevic - SAO Postdoctoral Fellow	2014–2017
Daniel Castro - SAO Predoctoral Committee Chair	2008–2010

TEACHING EXPERIENCE

Dartmouth College 2000–2005
Introductory Physics, Stellar Astrophysics, Space Plasma Physics

Lebanon College 2003–2005
Introductory Physics, Environmental Science

REFEREED PUBLICATIONS

50. "The Growth and Size Distribution of Nickel Bubbles in Supernovae" **Patnaude, D. J.**, ApJ, *in prep.* (2020)

49. "The Metallicity Dependence on Supernova Remnant Evolution" **Patnaude, D. J.**, ApJ, *submitted* (2020)

48. "Explosion and Circumstellar Asymmetries in Cassiopeia A," **Patnaude, D. J.**, et al. ApJ, *submitted* (2020)

47. "The Optical and X-ray Evolution of SN 1996cr," **Patnaude, D. J.**, et al. ApJ, *submitted* (2020)

46. "An Ejecta Kinematics Study of Kepler's Supernova Remnant with High-Resolution *Chandra* HETG Spectroscopy," Millard, M., et al. ApJ, *in press* (2020)

45. "Detection of the Red Supergiant WInd from the Progenitor of Cassiopeia A,", Weil, K., Fesen, R. A., **Patnaude, D. J.**, Raymond, J. C., Chevalier, R. A., Milisavljevic, D., & Gerardy, C., ApJ, *in press*, (2020)

44. "Diffusive nuclear burning in cooling simulations and application to new temperature data of the Cassiopeia A neutron star," Wijngaarden, M. J. P., Ho, W. C. G., Chang, P., Heinke, C. O., Page, D., Beznogov, M., & **Patnaude, D. J.**, MNRAS, 484, 974 (2019)

43. "The Expansion of the Forward Shock of 1E 0102.2–7219 in X-rays," Xi, L., Gaetz, T. J., Plucinsky, P. P., Hughes, J. P., & **Patnaude, D. J.**, ApJ, 874, 14 (2019)

42. "An Embedded X-Ray Source Shines through the Aspherical AT 2018cow: Revealing the Inner Workings of the Most Luminous Fast-evolving Optical Transients," Margutti, R. + 43 coauthors, ApJ, 872, 18 (2019)

41. "Chandrasekhar and sub-Chandrasekhar models for the X-ray emission of Type Ia supernova remnants (I): Bulk properties" Martinez-Rodriguez, H., Badenes, C., Lee, S. H., **Patnaude, D. J.**, Foster, A. R., Yamaguchi, H., Auchettl, K., Bravo, E., Slane, P. O., Piro, A. L., Park, S., & Nagataki, S., ApJ, 865, 151 (2018)

40. "Investigating the Structure of Vela X" Slane, P., Lovchinsky, I., Kolb, C., Snowden, S. L., Temim, T., Blondin, J., Bocchino, F., Miceli, M., Chevalier, R. A., Hughes, J. P., **Patnaude, D. J.**, & Gaetz, T., ApJ, 865, 86 (2018)

39. "Molecular gas toward supernova remnant Cassiopeia A" Zhou, P., Li, J. T., Zhang, Z. Y., Vink, J., Chen, Y., Arias, M., **Patnaude, D. J.**, & Bregman, J. N., ApJ, 865, 6 (2018)

38. "Evidence for a pulsar wind nebula in the Type Ib-peculiar supernova SN 2012au" Milisavljevic, D., **Patnaude, D. J.**, Chevalier, R. A., Raymond, J. C., Fesen, R. A., Margutti, R., Conner, B., & Banovetz, J., ApJ, 864, 36 (2018)

37. "The Impact of Progenitor Mass Loss on the Dynamical and Spectral Evolution of Supernova Remnants" **Patnaude, D. J.**, Lee, S. H., Slane, P. O., Badenes, C., Nagataki, S., Ellison, D. C., & Milisavljevic, D., ApJ, 849, 109 (2017)

36. "The Transition of a Type IIL Supernova into a Supernova Remnant: Late-time Observations of SN 2013by" Black, C. S., Milisavljevic, D., Margutti, R., Fesen, R. A., **Patnaude, D. J.**, & Parker, S., ApJ, 848, 5 (2017)

35. "TRES Survey of Variable Diffuse Interstellar Bands" Law, C. J., Milisavljevic, D., Crabtree, K. N., Johansen, S. L., **Patnaude, D. J.**, Margutti, R., Parrent, J. T., Drout, M. R., Sanders, N. E., Kirshner, R. P., & Latham, D. W., MNRAS, 470, 2835 (2017)

34. "iPTF15eqv: Multiwavelength Expose of a Peculiar Calcium-rich Transient" Milisavljevic, D., **Patnaude, D. J.**, Raymond, J. C., Drout, M. R., Margutti, R., Kamble, A., Chornock, R., Guillochon, J., Sanders, N. E., Parrent, J. T., Lovisari, L., Chilingarian, I. V., Challis, P., Kirshner, R. P., Penny, M. T., Itagaki, K., Eldridge, J. J., & Moriya, T. J., ApJ, 846, 50 (2017)

33. "Ejection of the Massive Hydrogen-rich Envelope Timed with the Collapse of the Stripped SN 2014C" Margutti, R., Kamble, A., Milisavljevic, D., Zapartas, E., de Mink, S. E., Drout, M., Chornock, R., Risaliti, G., Zauderer, B. A., Bietenholz, M., Cantiello, M., Chakraborti, S., Chomiuk, L., Fong, W., Grefenstette, B., Guidorzi, C., Kirshner, R. P., Parrent, J. T., **Patnaude, D. J.**, Soderberg, A. M., Gehrels, N. C., & Harrison, F., ApJ, 835, 140 (2017)

32. "Dead or Alive? Long-term Evolution of SN 2015bh (SNhunt275)" Elias-Rosa, N., + 39 coauthors, MNRAS, 463, 3894 (2016)

31. "Second Epoch Hubble Space Telescope Observations of Kepler's Supernova Remnant: The Proper Motion of Balmer Filaments" Sankrit, R., Raymond, J. C., Blair, W. P., Long, K. S., Williams, B. J., Borkowski, K. J., **Patnaude, D. J.**, & Reynolds, S. P., ApJ, 817, 36 (2016)

30. "Metamorphosis of SN 2014C: Delayed Interaction Between a Hydrogen Poor Core-Collapse Supernova and a Nearby Circumstellar Shell" Milisavljevic, D., Margutti, R., Kamble, A., **Patnaude, D. J.**, + 18 coauthors, ApJ, 815, 120 (2015)

29. "Modeling Bright γ-Ray and Radio Emission at Fast Cloud Shocks" Lee, S. H., **Patnaude, D. J.**, Raymond, J. C., Nagataki, S., Slane, P. O., & Ellison, D. C., ApJ, 806, 71 (2015)

28. "Are Models for Core-Collapse Supernova Progenitors Consistent with the Properties of Supernova Remnants?" **Patnaude, D. J.**, Lee, S. H., Slane, P. O., Badenes, C., Heger, A., Ellison, D. C., & Nagataki, S., ApJ, 803, 101 (2015)

27. "Reverse and Forward Shock Emission in an Evolutionary Model of Supernova Remnants Undergoing Efficient Diffusive Shock Acceleration" Lee, S. H., **Patnaude, D. J.**, Ellison, D. C., Nagataki, S., & Slane, P. O., ApJ, 791, 97 (2014)

26. "Correlations Between X-ray and Optical Emission in Cassiopeia A" **Patnaude, D. J.** & Fesen, R. A., ApJ, 789, 138 (2014)

25. "A CR-Hydro-NEI Model of the Stucture and Broadband Emission from Tycho's SNR" Slane, P. O., Lee, S. H., Ellison, D. C., **Patnaude, D. J.**, Hughes, J. P., Eriksen, K. A., Castro, D., & Nagataki, S., ApJ, 783, 33 (2014)

24. "New Evidence for Efficient Collisionless Heating of Electrons at the Reverse Shock of a Young Supernova Remnant" Yamaguchi, H., Eriksen, K. A., Badenes, C., Hughes, J. P., Brickhouse, N. S., Foster, A. R., **Patnaude, D. J.**, Petre, R., Slane, P. O., & Smith, R. K., ApJ, 780, 136 (2014)

23. "Measuring the Cooling of the Neutron Star in Cassiopeia A with all Chandra X-ray Observatory Detectors" Elshamouty, K. G., Heinke, C. O., Sivakoff, G. R., Ho, W. C. G., Shternin, P. S., Yakovlev, D. G., **Patnaude, D. J.**, & David, L., ApJ, 777, 22 (2013)

22. "Superluminous X-ray Emission from the Interaction of Supernova Ejecta with Dense Circumstellar Shells" Pan, T., **Patnaude, D. J.**, & Loeb, A., MNRAS, 433, 838 (2013)

21. "A CR-hydro-NEI Model of Multi-wavelength Emission from the Vela Jr. Supernova Remnant (SNR RX J0852.0–4622)" Lee, S. H., Slane, P. O., Ellison, D. C., Nagataki, S., & **Patnaude, D. J.**, ApJ, 767, 20 (2013)

20. "Fermi–LAT Observations and a Broadband Study of Supernova Remnant CTB 109" Castro, D., Slane, P. O., Ellison, D. C., & **Patnaude, D. J.**, ApJ, 756, 88 (2012)

19. "The Origin of Kepler's Supernova Remnant" **Patnaude, D. J.**, Badenes, C., Park, S., & Laming, J. M., ApJ, 756, 6 (2012)

18. "The SN 393 – RX J1713.7–3946 Connection" Fesen, R.A., Kremer, R., **Patnaude, D. J.**, & Milisavljevic, D., AJ, 143, 27 (2012) arXiv:1112.0593

17. "Core-collapse model of broadband emission from SNR RX J1713.7–3946 with thermal X-rays and Gamma-rays from escaping cosmic rays" Ellison, D. C., Slane, P. O., **Patnaude, D. J.**, & Bykov, A., ApJ, 744, 39 (2012) arXiv:1109.0874

16. "An XMM-Newton Study of the Bright, Nearby Supernova Remnant G296.1-0.5" Castro, D., Slane, P. O., Gaensler, B., Hughes, J. P., & **Patnaude, D. J.**, ApJ, 734, 86 (2011) arXiv:1104.1423

15. "The Impact of Efficient Particle Acceleration on the Evolution of Supernova Remnants in the Sedov-Taylor Phase" Castro, D., Slane, P. O., **Patnaude, D. J.**, & Ellison, D. C., ApJ, 734, 85 (2011) arXiv:1104.1179

14. "Evidence for a Possible Black Hole Remnant in the Type IIL Supernova 1979C" **Patnaude, D. J.**, Loeb, A., & Jones, C., New Astronomy, 16, 187 (2011) arXiv:0912.1571

13. "Cooling neutron star in the Cassiopeia A supernova remnant: Evidence for superfluidity in the core" Shternin, P. S., Yakovlev, D. G., Heinke, C. O., Ho, W. C., & **Patnaude, D. J.**, MNRAS Letters, 412, 108 (2011) arXiv:1012.0045

12. "A Decline in the Nonthermal X-ray Emission from Cassiopeia A" **Patnaude, D. J.**, Vink, J., Laming, J. M., & Fesen, R. A., ApJ, 729, 28 (2011) arXiv:1012.0243

11. "The Role of Diffusive Shock Acceleration on Nonequilibrium Ionization in Supernova Remnant Shocks II: Emitted Spectra" **Patnaude, D. J.**, Slane, P. O., Raymond, J. C., & Ellison, D. C., ApJ, 725, 1476 (2010) arXiv:1010.3208

10. "Efficient Cosmic Ray Acceleration, Hydrodynamics, and Self-Consistent Thermal X-Ray Emission Applied to Supernova Remnant RX J1713.7–3946" Ellison, D. C., **Patnaude, D. J.**, Slane, P. O., & Raymond, J. C., ApJ, 712, 287 (2010) arXiv:1001.1932

9. "Proper Motions and Brightness Variations of Nonthermal X-ray Filaments in the Cassiopeia A Supernova Remnant" **Patnaude, D. J.** & Fesen, R. A., ApJ, 697, 535 (2009) arXiv:0808.0692

8. "The Role of Diffusive Shock Acceleration on Nonequilibrium Ionization in SNR" **Patnaude, D. J.**, Ellison, D. C., Slane, P. O., ApJ, 696, 1956 (2009) arXiv:0902.2481

7. "The Radio Emission, X-Ray Emission, and Hydrodynamics of G328.4+0.2: A Comprehensive Analysis of a Luminous Pulsar Wind Nebula, Its Neutron Star, and the Progenitor Supernova Explosion" Gelfand, J., Gaensler, B., Slane, P. O., **Patnaude, D. J.**, Hughes, J. P., Camilo, F., ApJ, 663, 468 (2007) arXiv:0704.0219

6. "Particle Acceleration in Supernova Remnants and the Production of Thermal and Nonthermal Radiation" Ellison, D. C., **Patnaude, D. J.**, Slane, P. O., Blasi, P., Gabici, S., ApJ, 661, 879 (2007) arXiv:astro-ph/0702674

5. "Small-Scale X-Ray Variability in the Cassiopeia A Supernova Remnant" **Patnaude, D. J.** & Fesen, R. A., AJ, 133, 147 (2007) arXiv:astro-ph/0609412

4. "Model Simulations of a Shock-Cloud Interaction in the Cygnus Loop" **Patnaude, D. J.** & Fesen, R. A., ApJ, 633, 240 (2005) arXiv:astro-ph/0507330

3. “Chandra Observations of the Luminous, Oxygen-rich SNR in the Irregular Galaxy NGC 4449” **Patnaude, D. J.** & Fesen, R. A., ApJ, 587, 221 (2003) arXiv:astro-ph/0212409

2. “An Isolated, Recently Shocked ISM Cloud in the Cygnus Loop Supernova Remnant” **Patnaude, D. J.**, Fesen, R. A., Raymond, J. C., Levenson, N. A., Graham, J., & Wallace, D., AJ, 124, 2118, (2002) arXiv:astro-ph/0206492

1. “Heavy-Element Diffusion in Metal-poor Stars” Chaboyer, B., Fenton, W., Nelan, J., **Patnaude, D. J.**, & Simon, F., ApJ, 562, 521 (2001) arXiv:astro-ph/0108119

NON–REFEREED PUBLICATIONS

12. “Serendipitous Discovery of a 14-year-old Supernova at 16 Mpc” Guillochon, J., Stockler de Moraes, J., Nicholl, M., **Patnaude, D. J.**, Auchettl, K., Barth, A. J., Ho, L. C., & Li, Z. Y. RNAAS (2018)

11. “Two decades of Chandra high-resolution camera operations: lessons learned and future prospects” Kraft, R. P. et al. in Proc SPIE Vol. 10699, Space Telescopes and Instrumentation 2018: Ultraviolet to Gamma Ray, Jan-Willem A. den Herder; Shouleh Nikzad; Kazuhiro Nakazawa; Eds. (2018)

10. “Supernova Remnants as Clues to Their Progenitors” **Patnaude, D. J.** & Badenes, C. in Handbook of Supernovae, ISBN 978-3-319-21845-8. Springer International Publishing AG, p. 2233, 2233 (2017)

9. “The Extreme Physics Explorer and Large Area Microchannel Plate Optics” Garcia, M. et al. in Proc SPIE Vol. 8147, p. 55-69, Optics for EUV, X-Ray, and Gamma-Ray Astronomy V., Stephen O’Dell; Giovanni Pareschi; Eds. (2011)

8. “Impacts on the IXO Observing Efficiency” Garcia, M. et al. in Proc SPIE Vol. 7732, p. 130-139, Space Telescopes and Instrumentation 2010: Ultraviolet to Gamma Ray, Monique Arnaud; Stephen S. Murray; Tadayuki Takahashi; Eds. (2011)

7. “The Evolution of Galaxy Clusters Across Cosmic Time” Arnaud, M. et al. in “Science white paper submitted to the Astro2010 Decadal Survey” (2010)

6. “Supernovae and Their Consequences: Studies with the Generation-X Mission” Slane, P. O. et al. in “Science white paper submitted to the Astro2010 Decadal Survey” (2010)

5. “Solid State Astrophysics: Probing Interstellar Dust and Gas Properties with X-rays” Lee, J. et al. in “Science white paper submitted to the Astro2010 Decadal Survey” (2010)

4. “Formation of the Elements” Hughes, J. P. et al. in “Science white paper submitted to the Astro2010 Decadal Survey” (2010)

3. "In-flight performance and calibration of the Chandra high-resolution camera spectroscopic readout (HRC-S)" Kraft, R. P. et al. in Proc. SPIE Vol. 4012, p. 493-517, X-Ray Optics, Instruments, and Missions III, Joachim E. Truemper; Bernd Aschenbach; Eds. (2002)

2. "In-flight performance and calibration of the Chandra high-resolution camera imager (HRC-I)" Kenter, A. et al. in Proc. SPIE Vol. 4012, p. 467-492, X-Ray Optics, Instruments, and Missions III, Joachim E. Truemper; Bernd Aschenbach; Eds. (2002)

1. "Effective area of the AXAF high-resolution camera (HRC)" **Patnaude, D. J.** et al. in Proc. SPIE Vol. 3444, p. 93-105, X-Ray Optics, Instruments, and Missions, Richard B. Hoover; Arthur B. Walker; Eds. (1999)

CONFERENCE PROCEEDINGS

49. "Twenty Years of Cas A with Chandra," Patnaude, D. J., et al. AAS/High Energy Astrophysics Division, 17, 200.01 (2019)

48. "Inferring the Properties of Core Collapse Supernova Progenitors with Machine Learning," Patnaude, D. J. & Lee, H. S. AAS/High Energy Astrophysics Division, 17, 108.13 (2019)

47. "A High-Resolution X-Ray Kinematics Study of Kepler's Supernova Remnant," Millard, M. J., et al. American Astronomical Society Meeting Abstracts 233, 335.03 (2019)

46. "Classifying Supernova Remnant Spectra with Machine Learning," Patnaude, D. J., & Lee, S. H. American Astronomical Society Meeting Abstracts 233, 126.03 (2019)

45. "Testing explosion models with bulk properties of supernova remnants," Martinez-Rodriguez, H., et al. American Astronomical Society Meeting Abstracts 233, 113.06 (2019)

44. "Kinematic Study of Ejecta Knots in Kepler's SNR Using the Chandra HETGS" Millard, M. J., et al. American Astronomical Society Meeting Abstracts 231, 241.11 (2018)

43. "The Unprecedented Metamorphosis of Supernova 2014C: New Insights from New Observations by HST and Gemini" Milisavljevic, D., et al. American Astronomical Society Meeting Abstracts 229, 410.06 (2017)

42. "TRES Survey of Variable Diffuse Interstellar Bands" Law, C., et al. American Astronomical Society Meeting Abstracts 229, 151.15 (2017)

41. "X-ray observations of SNRs as probes of progenitor evolution" **Patnaude, D. J.** Supernova Remnants: An Odyssey in Space after Stellar Death, 129 (2016)

40. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. American Astronomical Society Meeting Abstracts 227, 238.07 (2016)

39. "Supernova Remnants in High Definition" Slane, P. O., et al. X-Ray Vision Workshop: Probing the Universe in Depth and Detail with the X-Ray Surveyor (X-Ray Vision Workshop), National Museum of the American Indian, Washington, DC, USA, 6-8 October 2015, article id.12, 12 (2015)

38. "N132D: Chandra and XMM-Newton X-ray Imaging and Spectral Analysis" Plucinsky, P. P., et al. Exploring the Hot and Energetic Universe: The first scientific conference dedicated to the Athena X-ray observatory, 65 (2015)

37. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. IAU General Assembly, 22, 2257837 (2015)

36. "Second Epoch Hubble Space Telescope Imaging of Kepler's Supernova Remnant" Sankrit, R., et al. American Astronomical Society Meeting Abstracts 225, 140.20 (2015)

35. "Efficient Collisionless Electron Heating at the Reverse Shocks of Young Supernova Remnants Revealed by Fe-K Emission Diagnostics" Yamaguchi, H., et al. Suzaku-MAXI 2014: Expanding the Frontiers of the X-ray Universe, 35 (2014)

34. "Efficient Collisionless Electron Heating at the Reverse Shocks of Young Supernova Remnants Revealed by Fe-K Emission Diagnostics" AAS/High Energy Astrophysics Division 14, 304.02 (2014)

33. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. The X-ray Universe 2014, 301 (2014)

32. "Spatio-temporal Spectral Variability in Cas A" Nambiar, Y., Kashyap, V., & **Patnaude, D. J.** American Astronomical Society Meeting Abstracts 223, 353.04 (2014)

31. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. American Astronomical Society Meeting Abstracts 221, 116.04 (2013)

30. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. Half a Century of X-ray Astronomy, Proceedings of the conference held 17-21 September, 2012 in Mykonos Island, Greece, 86 (2012)

29. "An Archival X-ray Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P. et al. American Astronomical Society Meeting Abstracts 220, 431.02 (2012)

28. "Hottest Superfluid and Superconductor in the Universe: Lessons from the Cooling of the Cassiopeia A Neutron Star" Ho, W., et al. New Horizons in Time Domain Astronomy, 285, 337 (2012)

27. "X-Ray Emission From SN Ia 1885A & 1986G" Packard, M., et al. APS Texas Sections Spring Meeting Abstracts, B1.011 (2012)

26. "The Origin of Kepler's Supernova Remnant" **Patnaude, D. J.**, Badenes, C., & Park, S. American Astronomical Society Meeting Abstracts 219, 418.03 (2012)

25. "X-ray Emission From Sn Ia 1885a & 1985g?" Packard, M., et al. American Astronomical Society Meeting Abstracts 219, 242.33 (2012)

24. "An Archival XMM-Newton Study of the Large Magellanic Cloud Supernova Remnant N132D" Plucinsky, P. P., et al. American Astronomical Society Meeting Abstracts 219, 239.16 (2012)

23. "Testing The Cas A Neutron Star Temperature Decline With Other Chandra Instruments" Elshamouty, K., et al. American Astronomical Society Meeting Abstracts 219, 226.07 (2012)

22. "The Extreme Physics Explorer" Garcia, M. R., et al. American Astronomical Society Meeting Abstracts 219, 140.07 (2012)

21. "The Extreme Physics Explorer and Micro-Channel Plate Optics" Garcia, M. R., et al. AAS/High Energy Astrophysics Division 12, 38.09 (2011)

20. "Constraints on the Origin of Kepler's Supernova Remnant" **Patnaude, D. J.**, Badenes, C., & Park, S. AAS/High Energy Astrophysics Division 12, 33.03 (2011)

19. "Discovery of Hottest Superfluid and Superconductor in the Universe" Ho, W., et al. Bulletin of the American Astronomical Society, 43, 320.03 (2011)

18. "X-ray and Optical Emission Correlations in the Shocked Ejecta in Cassiopeia A" **Patnaude, D. J.** & Fesen, R. A. Bulletin of the American Astronomical Society, 43, 228.09 (2011)

17. "The Origin and Evolution of the Nonthermal Emission in Cassiopeia A" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 43, 130.05 (2011)

16. "Using Thermal X-ray Emission to Constrain the Origin of GeV-TeV Gamma Rays in Galactic Supernova Remnants" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 42, 18.12 (2010)

15. "Models for the Thermal Emission from Cosmic Ray Modified Shocks with Application to Supernova Remnants" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 42, 454.01 (2010)

14. "Constraints on the origin of the GeV-TeV gamma ray emission in RX J1713.7-3946" **Patnaude, D. J.**, et al. 38th COSPAR Scientific Assembly, 38, 5 (2010)

13. "The X-ray evolution of Cassiopeia A" **Patnaude, D. J.**, et al. 38th COSPAR Scientific Assembly, 38, 5 (2010)

12. "Supernovae and Supernova Remnants in the Era of the International X-ray Observatory" Hughes, J. P., et al. Bulletin of the American Astronomical Society, 41, 488.08 (2009)

11. "The Role of Diffusive Shock Acceleration on Nonequilibrium Ionization in Supernova Remnants" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 41, 359.01 (2009)

10. "Large and Small Scale Changes Seen in 8 Years of Chandra Observations of Cassiopeia A" **Patnaude, D. J.** & Fesen, R. A. AAS/High Energy Astrophysics Division 10, 38.06 (2008)

9. "Supernova Remnants In The Sedov Phase: Impact Of Efficient Particle Acceleration On The Remnant Dynamics" Castro, D., et al. AAS/High Energy Astrophysics Division 10, 31.04 (2008)

8. "Large and small scale changes seen in Cassiopeia A" **Patnaude, D. J.** 37th COSPAR Scientific Assembly, 37, 2365 (2008)

7. "Thermal Emission from Cosmic Ray Modified Shocks" **Patnaude, D. J.** Bulletin of the American Astronomical Society, 39, 15.13 (2007)

6. "Thermal and Nonthermal Radiation in SNRs from Efficient Shock Acceleration" Ellison, D. C., et al. APS Meeting Abstracts, H11.001 (2007)

5. "Thermal and Nonthermal Emission from Cosmic Ray Modified Shocks" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 38, 243.02 (2006)

4. "Learning about the Spider from its Web: Studying the Neutron Star and Supernova Remnant in G328.4+0.2" Gelfand, J., et al. 36th COSPAR Scientific Assembly, 36, 3158 (2006)

3. "Bow Shock Phenomena in the Cas A Supernova Remnant" **Patnaude, D. J.** & Fesen, R. A. Bulletin of the American Astronomical Society, 36, 106.06 (2004)

2. "Chandra observation of the Lobe of the SNR CTB 109" Sasaki, M., et al. Bulletin of the American Astronomical Society, 36, 70.03 (2004)

1. "An Isolated, Shocked ISM Cloud in the Cygnus Loop SNR" **Patnaude, D. J.**, et al. Bulletin of the American Astronomical Society, 33, 126.11 (2001)

Recent Invited Talks

— RIKEN November 2019
"20 Years of Cas A in X-rays"

— Supernova Remnants: An Odyssey in Space after Stellar Death II June 2019
"What Do We Learn from X-ray Observations of Supernovae and Supernova Remnants"

— Symposium on Supernova and their Remnants (Kyoto University) July 2018
"Mass Loss, Metallicity, and Supernova Remnant Evolution"

— Astrophysical Big Bangs (RIKEN, Japan) November 2017
"Connections Between SNRs and Their Progenitors"

— Supernova Remnants and Their Progenitors (MPA – Garching) July 2017
"Connecting Supernova Remnants to Their Explosions and Progenitors"

— The Inner Workings of Massive Stars (KITP – UCSB) March 2017
"Connecting Supernova Remnants to Their Explosions and Progenitors"

— A Definitive Investigation of the Core-Collapse Supernova Cassiopeia A (PCTS) April 2017
"Cas A's Connections to Other Supernova Remnants"

— SNRs: An Odyssey in Space and Time (Chania, Greece) June 2018
"X-ray Studies of SNRs as Probes of Their Progenitors"

— Accelerating Cosmic Ray Comprehension (PCTS) April 2015
"Nonthermal Emission in Cassiopeia A"

— Core-Collapse Supernovae and their Remnants (INT, Univ. Washington) July 2012
"What Do X-ray Observations of Supernova Remnants Tell Us About Supernovae and Their Progenitors"
— High Energy Astrophysics Division Lunch Talk (SAO) November 2011
"Stellar Forensics: X-ray Observations of Supernova Remnants Provide Clues to How a Star Lives and Dies"
— International Astrophysics Consortium for High Energy Calibration (Rome, Italy) April 2011
"Theoretical Insights into Nonthermal and Thermal Variations in Supernova Remnants"
— Astronomy Department Seminar (Dartmouth College) February 2011
"X-ray Observations of Supernovae and Their Remnants"
— Astronomy Seminar (Weizmann Institute) November 2010
"Physical Processes in Supernova Remnants"
— Astronomy Department Seminar (NCSU) September 2010
"Physical Processes in Supernova Remnants"
— International Astrophysics Consortium for High Energy Calibration (Woods Hole) April 2010
"Diffusive Shock Acceleration and Thermal Emission in Supernova Remnant Shocks"
— Supernova Remnant Conference (ISAS/JAXA, Japan) February 2010
"What does Thermal Emission tell us about Nonthermal Processes?"
— Cosmic Ray Acceleration Workshop (KITP – UCSB), September 2009
"Diffusive Shock Acceleration and Thermal Emission in Supernova Remnant Shocks"

PRESS RELEASES

— *Chandra* Image Release: "Was Kepler's Supernova Remnant Unusually Powerful?"
— NASA/*Chandra* Press Release: "Evidence for superfluidity in the Cassiopeia A neutron star"
— NASA/*Chandra* Press Release: "Youngest Ever Nearby Black Hole Discovered"
— NASA/*Chandra* Press Release: "Cassiopeia A Comes Alive Across Space and Time"

ACCEPTED RESEARCH AND OBSERVING PROPOSALS

• Probing the Supernova Remnant Population of Nearby Galaxies 2020A
Magellan – IMACS, PI: Patnaude, 2 nights
• Discovery of New Supernova Remnants in NGC 6946, M31, and M33 2019C
MMT – Binospec, PI: Patnaude, 2 nights
• Probing the Supernova Remnant Population of Nearby Galaxies 2019B
Magellan – IMACS, PI: Patnaude, 2.5 nights
• The Extraordinary X-ray Properties of the Type Ic SN 2003gk 2019
Chandra X-ray Observatory (Director's Discretionary Time), PI: Patnaude
• Where Have All the Young Remnants Gone? 2019
Chandra X-ray Observatory Theory Program, PI: Patnaude $30K
• Probing the Supernova Remnant Population of Nearby Galaxies 2019A
Magellan – IMACS, PI: Patnaude, 3 nights
• The Compact Remnant in the Extraordinary Type Ib SN 2012au 2018
Chandra X-ray Observatory (Director's Discretionary Time), PI: Patnaude
• Investigating the Nature of Cas A's Extraordinary Bipolar Jets 2018C
MMT – Binospec, PI: Patnaude, 3 nights
• Multiwavelength Observations of Supernovae 2018C
MMT – MMIRS, PI: Patnaude, 3 nights

• Probing the Supernova Remnant Population of Nearby Galaxies 2018B
Magellan – IMACS, PI: Patnaude, 3 nights

• Magellan Extragalactic Supernova Survey 2018A
Magellan – IMACS, PI: Patnaude, 6 nights

• Zeroing in on the Mass Loss History of Supernova Progenitors 2018
Chandra X-ray Observatory (Special Call for Proposals), PI: Patnaude, $130K

• Connecting Supernovae and Their Progenitors to Supernova Remnants: End to End Dynamical and Spectral Modeling of Core Collapse Supernovae to the Remnant Phase 2017
NASA Astrophysics Theory, PI: Patnaude, $220K

• Magellan Extragalactic Supernova Survey 2017B
Magellan – IMACS, PI: Patnaude, 3 nights

• Magellan Extragalactic Supernova Survey 2017A
Magellan – IMACS, PI: Patnaude, 3 nights

• Continued Multicycle Monitoring of the Young Galactic Supernova Remnant Cassiopeia A 2016
Chandra X-ray Observatory, PI: Patnaude, $67K

• Modeling the Dynamics and X-ray Emission of Shocked Ejecta in the Remnants of Core-Collapse Supernovae 2015
Chandra X-ray Observatory, PI: Patnaude, $45K

• Continued Multicycle Monitoring of the Young Galactic Supernova Remnant Cassiopeia A 2015
Chandra X-ray Observatory, PI: Patnaude, $45K

• Understanding the Mass-Loss History of the Progenitors of Type IIn Supernovae: SN 2016bkv 2015
Chandra X-ray Observatory (Director's Discretionary Time), PI: Patnaude

• A Set of Narrowband Interference Filters for IMACS on the Magellan Baade Telescope 2015
Smithsonian Institution, PI: Patnaude, $51K

• Are Models for Core-Collapse Supernovae Consistent with the Bulk Observed Properties of Supernova Remnants? 2013
Smithsonian Institution, PI: Patnaude, $78K

• The Formation and Utilization of the Elements 2013
Smithsonian Institution, PI: Patnaude, $4K

• The Origin of the VHE Emission in the γ-Cyg SNR 2013
Chandra X-ray Observatory, PI: Patnaude, $15K

• Multicycle Monitoring of the Young Galactic Supernova Remnant Cassiopeia A 2012
Chandra X-ray Observatory, PI: Patnaude, $65K

• Multicycle Monitoring of the Young Galactic Supernova Remnant Cassiopeia A 2011
Chandra X-ray Observatory, PI: Patnaude, $43K

• Monitoring the Late Time X-ray Emission from the Type IIL SN1979C 2011
Chandra X-ray Observatory, PI: Patnaude, $46K

• IMACS Imaging and Spectra of the Young Galactic SNRs G347.3-0.5 & G350.1-0.3 2011A
Las Campanas Magellan Observatory, PI: Patnaude, 2 nights

• The Persistent X-ray Emission from the Type IIL SN 1979C 2010
Chandra X-ray Observatory, PI: Patnaude, $25K

• IMACS Imaging and Spectra of the Young Galactic SNRs G347.3-0.5 & G350.1-0.3 2010A
Las Campanas Magellan Observatory, PI: Patnaude, 2 nights

• The Origin of the VHE Emission in Cassiopeia A 2010
Fermi Gamma–Ray Space Telescope, PI: Patnaude, $50K

• The Evolution of Young Supernova Remnants 2009
Chandra X-ray Observatory Theory Program, PI: Patnaude, $60K

• Testing Shock Physics Through Flux Variability in Cas A 2009
Chandra X-ray Observatory, PI: Patnaude, $50K

• The Effects of Diffusive Shock Acceleration on Emission from Shocked Ejecta in Supernova Remnants 2008
Smithsonian Institution, PI: Patnaude, $15K

• The Effects of Diffusive Shock Acceleration on the Thermal X-ray Spectrum of Young Supernova Remnants 2007
Smithsonian Institution, PI: Patnaude, $15K

• Investigating the X-ray Variability of Cassiopeia A 2007
Chandra X-ray Observatory, PI: Patnaude, $50K

• Investigating the X-ray Variability of Cassiopeia A 2007
Hubble Space Telescope, PI: Patnaude, $100K