

Casey T. DeRoo
Curriculum Vitae as of April 9, 2019

Campus Address: Physics and Astronomy, 704 Van Allen Hall, University of Iowa
Phone: (319) 467-0370
E-mail: casey-deroo@uiowa.edu

EDUCATION AND PROFESSIONAL HISTORY

Higher Education

2016 **PhD**, Physics, University of Iowa
 Thesis: Fabrication and Testing of Off-Plane Gratings for Future X-ray Spectroscopy Missions
2011 **BA**, Physics & Classical Studies, Summa Cum Laude, Credo Honors, Concordia College
 Supporting Areas / Minor: Mathematics

Professional and Academic Positions

2017 - 2018 **Astrophysicist**, High Energy Astrophysics, Smithsonian Astrophysical Observatory
2016 - 2017 **Leon Van Speybroeck Postdoctoral Fellow in X-ray Optics**, High Energy Astrophysics, Smithsonian Astrophysical Observatory
2011 - 2016 **Presidential Graduate Fellow**, Dept. of Physics & Astronomy, University of Iowa

Memberships

2018 - Present American Astronomical Society
2018 - Present The International Society for Optics and Photonics

TEACHING

Courses Taught at the University of Iowa

Term	Course#	Title	Enrollment
Spring 2019	ASTR:1079:0023	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0025	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0027	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0029	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0041	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0043	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0045	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:1079:0047	Introductory Astronomy Laboratory	1
Spring 2019	ASTR:7991:3440	Research: Astronomy	1
Spring 2019	ASTR:1070:000A	Stars, Galaxies, and the Universe	122
Spring 2019	ASTR:1070:000B	Stars, Galaxies, and the Universe	133
Spring 2019	ASTR:1070:0023	Stars, Galaxies, and the Universe	17
Spring 2019	ASTR:1070:0025	Stars, Galaxies, and the Universe	17
Spring 2019	ASTR:1070:0027	Stars, Galaxies, and the Universe	17
Spring 2019	ASTR:1070:0029	Stars, Galaxies, and the Universe	16
Spring 2019	ASTR:1070:0041	Stars, Galaxies, and the Universe	17
Spring 2019	ASTR:1070:0043	Stars, Galaxies, and the Universe	16
Spring 2019	ASTR:1070:0045	Stars, Galaxies, and the Universe	17

Blue numbers refer to an annotation listed at the end of this document.

Spring 2019	ASTR:1070:0047	Stars, Galaxies, and the Universe	16
Fall 2018	ASTR:1079:0024	Introductory Astronomy Laboratory	1
Fall 2018	ASTR:1079:0025	Introductory Astronomy Laboratory	1
Fall 2018	ASTR:1079:0042	Introductory Astronomy Laboratory	1
Fall 2018	ASTR:1079:0043	Introductory Astronomy Laboratory	1
Fall 2018	ASTR:1079:0057	Introductory Astronomy Laboratory	2
Fall 2018	ASTR:1079:0058	Introductory Astronomy Laboratory	1
Fall 2018	ASTR:1070:000B	Stars, Galaxies, and the Universe	120
Fall 2018	ASTR:1070:000E	Stars, Galaxies, and the Universe	165
Fall 2018	ASTR:1070:0021	Stars, Galaxies, and the Universe	17
Fall 2018	ASTR:1070:0022	Stars, Galaxies, and the Universe	16
Fall 2018	ASTR:1070:0024	Stars, Galaxies, and the Universe	18
Fall 2018	ASTR:1070:0025	Stars, Galaxies, and the Universe	18
Fall 2018	ASTR:1070:0038	Stars, Galaxies, and the Universe	17
Fall 2018	ASTR:1070:0042	Stars, Galaxies, and the Universe	14
Fall 2018	ASTR:1070:0043	Stars, Galaxies, and the Universe	18
Fall 2018	ASTR:1070:0047	Stars, Galaxies, and the Universe	13
Fall 2018	ASTR:1070:0057	Stars, Galaxies, and the Universe	18
Fall 2018	ASTR:1070:0058	Stars, Galaxies, and the Universe	16

SCHOLARSHIP

Publications

CLAS * System * = Senior Author, Major Contribution, ** = Secondary Contribution *** = Equal Contribution, **** = Minor Contribution

Refereed Articles

1. * Bishop, N., Walker, J., DeRoo, C., Liu, T., Tendulkar, M., Cotroneo, V., Hertz, E. N., Kradinov, V., Schwartz, E. D., Jackson, T. N., Troler-McKinstry, S. (2019). Thickness Distribution of Sputtered Films on Curved Substrates for Adjustable X-ray Optics. *Journal of Astronomical Telescopes, Instruments, and Systems*, 5(2), 021005.
<https://www.spiedigitallibrary.org/journals/Journal-of-Astronomical-Telescopes-Instruments-and-Systems/volume-5/issue-02/021005/Thickness-distribution-of-sputtered-films-on-curved-substrates-for-adjustable/10.1117/1.JATIS.5.2.021005.full?SSO=1>
Performed figure and performance analysis, coordinated FEA analysis, wrote section [1]
2. *** Miles, D. M., McCoy, J. A., McEntaffer, R. L., Eichfeld, C. M., Lavalley, G., Labella, M., Drawl, W., Liu, B., DeRoo, C. T., Steiner, T. (2018). Fabrication and Diffraction Efficiency of a Large-format, Replicated X-Ray Reflection Grating. *The Astrophysical Journal*, 869(2), 95.
<http://dx.doi.org/10.3847/1538-4357/aaec73>
Cross-checked efficiency data using independently developed analysis technique [2]
3. * Walker, J., Liu, T., Tendulkar, M., Burrows, D. N., DeRoo, C. T., Allured, R., Hertz, E. N., Cotroneo, V., Reid, P. B., Schwartz, E. D., Jackson, T. N., Troler-McKinstry, S. (2018). Design and fabrication of prototype piezoelectric adjustable X-ray mirrors. *Optics Express*, 26(21), 27757.
<http://dx.doi.org/10.1364/oe.26.027757>
Optical metrology analysis, drafted major revisions to paper, optical performance modeling [3]
4. * DeRoo, C. T. (2018). Deterministic figure correction of piezoelectrically adjustable slumped glass optics. *Journal of Astronomical Telescopes, Instruments, and Systems*, 4(01), 1.
<http://dx.doi.org/10.1117/1.jatis.4.1.019004>
Built instrumentation/metrology system, collected all presented data, analyzed data, wrote paper [4]
5. ** Donovan, B. D., McEntaffer, R. L., Tutt, J. H., DeRoo, C. T., Allured, R., Gaskin, J. A., Kolodziejczak, J. J. (2018). X-ray verification of an optically aligned off-plane grating module. *Applied Optics*, 57(3), 454. <http://dx.doi.org/10.1364/ao.57.000454>
Collected data, supported analysis, drafted major revisions of the paper [5]
6. *** Tutt, J. H., McEntaffer, R. L., Marlowe, H., Miles, D. M., Peterson, T. J., DeRoo, C. T., Scholze, F.,

- Laubis, C. (2016). Diffraction Efficiency Testing of Sinusoidal and Blazed Off-Plane Reflection Gratings. *Journal of Astronomical Instrumentation*, 05(03), 1650009. <http://dx.doi.org/10.1142/s2251171716500094>
Assisted in data analysis interpretation/presentation [6]
7. *** Marlowe, H., McEntaffer, R. L., Allured, R., DeRoo, C. T., Donovan, B. D., Miles, D. M., Tutt, J. H., Burwitz, V., Menz, B., Hartner, G. D., Smith, R. K., Cheimets, P., Hertz, E., Bookbinder, J. A., Günther, R., Yanson, A., Vacanti, G., Ackermann, M. (2015). Performance testing of an off-plane reflection grating and silicon pore optic spectrograph at PANTER. *Journal of Astronomical Telescopes, Instruments, and Systems*, 1(4), 045004. <http://dx.doi.org/10.1117/1.jatis.1.4.045004>
Data analysis support and interpretation [7]
 8. *** Roper, Q., McEntaffer, R. L., DeRoo, C., Filipovic, M., Wong, G. F., Crawford, E. J. (2015). X-ray Spectroscopy of Potential Small Magellanic Cloud Type Ia Supernova Remnants and their Environments. *The Astrophysical Journal*, 803(2), 106. <http://dx.doi.org/10.1088/0004-637x/803/2/106>
Performed X-ray data analysis, spectral fitting for presented SNR [8]
 9. ** McEntaffer, R., DeRoo, C. T., Schultz, T., Gantner, B., Tutt, J., Holland, A., O'Dell, S., Gaskin, J., Kolodziejczak, J., Zhang, W. W., Chan, K.-W., Biskach, M., McClelland, R., Iazikov, D., Wang, X., Koecher, L. (2013). First results from a next-generation off-plane X-ray diffraction grating. *Experimental Astronomy*, 36(1-2), 389-405. <http://dx.doi.org/10.1007/s10686-013-9338-1>
Data collection and analysis support, wrote early draft of paper, copyediting [9]
 10. ** McEntaffer, R. L., Grieves, N., DeRoo, C. T., Brantseg, T. (2013). A New X-ray View of the Supernova Remnant G272.2-3.2 and its Environment. *The Astrophysical Journal*, 774(2), 120. <http://dx.doi.org/10.1088/0004-637x/774/2/120>
Performed WISE IR data analysis, radial profile modeling [10]
 11. *** Witt, A. N., Gold, B., Barnes, F. S., DeRoo, C. T., Vijh, U. P., Madsen, G. J. (2010). On the Origins of the High-Latitude H α Background. *The Astrophysical Journal*, 724(2), 1551-1560. <http://dx.doi.org/10.1088/0004-637x/724/2/1551>
Data extraction from collected observations [11]

Conference Proceeding

1. *** Cotroneo, V., Reid, P. B., DeRoo, C. T., Marquez, V., Schwartz, E. D., Schwartz, D. A., Kradinov, V., Trolier-McKinstry, S., Walker, J., Jackson, T. N., Liu, T., Tendulkar, M. (2018). Progress in development of adjustable optics for x-ray astronomy. D. Spiga & H. Mimura (Eds.), *Adaptive X-Ray Optics V*. SPIE. <http://dx.doi.org/10.1117/12.2323283>
Developed means of testing adjustable mirrors, metrology data analysis support, performance computation [12]
2. **** Civitani, M. M., Ghigo, M., Holyszko, J., Vecchi, G., Cotroneo, V., Reid, P. B., DeRoo, C. T., Basso, S., Schwartz, E. D. (2018). Progress in ion beam figuring of very thin slumped glass plates for lightweight x-ray telescope. J.-W. A. den Herder, K. Nakazawa, & S. Nikzad (Eds.), *Space Telescopes and Instrumentation 2018: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2313599>
Metrology data collection, data interpretation [13]
3. *** Brennenman, L., Foster, A., Günther, H. M., Ptak, A. F., Smith, R. K., Abraham, M., Bautz, M. W., Bookbinder, J., Bregman, J., Brickhouse, N., Burrows, D. N., Burwitz, V., Cheimets, P., Costantini, E., Dawson, S., DeRoo, C. T., Falcone, A. D., Gallo, L., Grant, C. E., Heilmann, R. K., Hertz, E. N., Hine, B., Huenemoerder, D., Kaastra, J., Kreykenbohm, I., Madsen, K., McEntaffer, R. L., Miller, E. D., Miller, J. M., Morse, E., Mushotzky, R. F., Nandra, K., Nowak, M., Paerels, F., Petre, R., Poppenhaeger, K., Reid, P. B., Sanders, J. S., Schattenburg, M. L., Schulz, N., Smale, A., Temi, P., Valencic, L., Walker, S., Willingale, R., Wilms, J., Wolk, S. (2018). Arcus: the x-ray grating spectrometer explorer (Conference Presentation). J.-W. A. den Herder, K. Nakazawa, & S. Nikzad (Eds.), *Space Telescopes and Instrumentation 2018: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2313965>
Assistance in optical design, modeling of the instrument [14]
4. * Heilmann, R. K., Schattenburg, M. L., Bruccoleri, A. R., Song, J., DeRoo, C. T., Cheimets, P., Smith, R. K., Burwitz, V., Hertz, E. N., Hartner, G., La Caria, M.-M., Pellicciari, C., Guenther, H. M., Heine, S., LaMarr, B., Marshall, H. L., Schulz, N. S., Gullikson, E. M. (2018). Blazed transmission grating technology development for the Arcus x-ray spectrometer explorer. J.-W. A. den Herder, K. Nakazawa, & S. Nikzad (Eds.), *Space Telescopes and Instrumentation 2018: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2314180>
Managed test campaign taking presented data, analyzed data presented, made figures [15]

5. *** Günther, H. M., Heilmann, R. K., Hertz, E. N., DeRoo, C. T., Smith, R. K., Wilms, J. (2018). Ray-tracing Arcus in phase A. J.-W. A. den Herder, K. Nakazawa, & S. Nikzad (Eds.), *Space Telescopes and Instrumentation 2018: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2312678>
Offered verification of optical performance modeling presented [16]
6. *** Cotroneo, V., Reid, P. B., DeRoo, C. T., Schwartz, E. D., Gurski, K. L., Allured, R., Marquez, V. (2017). Thermal forming of glass substrates for adjustable optics (Conference Presentation). G. Pareschi & S. L. O'Dell (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VIII*. SPIE. <http://dx.doi.org/10.1117/12.2275738>
Data/metrology support and analysis [17]
7. **** Civitani, M. M., Hołyszko, J., Ghigo, M., Vecchi, G., Basso, S., DeRoo, C. T., Cotroneo, V., Reid, P. B., Schwartz, E. D. (2017). Advancements in ion beam figuring of very thin glass plates (Conference Presentation). G. Pareschi & S. L. O'Dell (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VIII*. SPIE. <http://dx.doi.org/10.1117/12.2275555>
Metrology data collection and analysis support [18]
8. *** Miles, D. M., McCoy, J., McEntaffer, R. L., DeRoo, C. T. (2017). Diffraction efficiency of a replicated large-format x-ray reflection grating. G. Pareschi & S. L. O'Dell (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VIII*. SPIE. <http://dx.doi.org/10.1117/12.2272605>
Cross-checked efficiency data using independently developed analysis technique [19]
9. *** Gaskin, J. A., Allured, R., Baysinger, M. F., Capizzo, P. D., Civitani, M. M., DeRoo, C. T., DiPirro, M. J., Figueroa-Feliciano, E., Garcia, J. C., Heilmann, R. K., Hopkins, R. C., Jackson, T., Kilaru, K., Liu, T., McClelland, R. S., McEntaffer, R. L., McCarley, K. S., Mulqueen, J. A., Reid, P. B., Saha, T. T., Schattenburg, M. L., Schwartz, D. A., Solly, P. M., Suggs, R. M., Sutherlin, S. G., Trolhier-McKinstry, S., Tutt, J. H., Bandler, S. R., Basso, S., Bautz, M. W., Biskach, M. P., Boswell, T. M., Chan, K.-W., Cohen, L. M., Cotroneo, V., Davis, J. M., Dominguez, A., Fabisinski, L. L., Falcone, A. D., Gelmis, K. E., Kraft, R. P., Özel, F., Pareschi, G., Riveros, R. E., Rodriguez, M. A., Rowe, J. W., Schnell, A. R., Swartz, D. A., Vikhlinin, A., Walker, J., Yoon, W., Zhang, W. W. (2017). Lynx Mission Concept Status. O. H. Siegmund (Ed.), *UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XX*. SPIE. <http://dx.doi.org/10.1117/12.2273911>
Adjustable X-ray Optics Representative for Lynx [20]
10. *** Smith, R. K., Abraham, M. H., Allured, R., Bautz, M., Bookbinder, J., Bregman, J., Brenneman, L., Brickhouse, N. S., Burrows, D., Burwitz, V., Cheimets, P. N., Costantini, E., Dawson, S., DeRoo, C. T., Falcone, A., Foster, A. R., Gallo, L., Grant, C. E., Guenther, H. M., Miller, J., Morse, E., Mushotzky, R., Nandra, K., Nowak, M., Paerels, F., Petre, R., Poppenhaeger, K., Ptak, A., Reid, P., Sanders, J., Schattenburg, M., Schulz, N., Smale, A. P., Temi, P., Valencic, L. A., Walker, S. M., Willingale, R., Wilms, J., Wolk, S. J., Heilmann, R. K., Hertz, E., Hine, B. P., Huenemoerder, D. P., Kaastra, J. S., Kreykenbohm, I., Madsen, K. K., McEntaffer, R. L., Miller, E. (2017). Arcus: exploring the formation and evolution of clusters, galaxies, and stars. O. H. Siegmund (Ed.), *UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XX*. SPIE. <http://dx.doi.org/10.1117/12.2272818>
Optical design and modeling of the instrument [21]
11. * Walker, J., Liu, T., DeRoo, C. T., Allured, R., Hertz, E., Cotroneo, V., Reid, P. B., Schwartz, E. D., Jackson, T. N., Trolhier-McKinstry, S., Tendulkar, M., Burrows, D. (2017). Design and fabrication of adjustable x-ray optics using piezoelectric thin films. G. Pareschi & S. L. O'Dell (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VIII*. SPIE. <http://dx.doi.org/10.1117/12.2275351>
Optical metrology analysis, drafted major revisions to paper, optical performance modeling [22]
12. * Allured, R., Reid, P. B., DeRoo, C. T., Cotroneo, V., Vikhlinin, A., Hertz, E., Marquez, V., Schwartz, E. D., Trolhier-McKinstry, S., Walker, J., Jackson, T. N., Liu, T., Tendulkar, M. (2017). Deterministic figure correction of piezoelectrically adjustable slumped glass optics. G. Pareschi & S. L. O'Dell (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VIII*. SPIE. <http://dx.doi.org/10.1117/12.2275210>
Built instrumentation/metrology system, collected all presented data, analyzed data, wrote proceedings [23]
13. Cotroneo, V., Allured, R., Reid, P. B., DeRoo, C. T., Schwartz, D. A., Marquez, V., Vikhlinin, A. A., Civitani, M., Salmaso, B., Pareschi, G. (2016). Thermal forming of substrates for the X-ray Surveyor telescope. S. L. O'Dell & A. M. Khounsary (Eds.), *Adaptive X-Ray Optics IV*. SPIE. <http://dx.doi.org/10.1117/12.2239223>
Metrology data collection and analysis support [24]
14. **** Lewis, M. R., Soman, M. R., Holland, A. D., Murray, N. J., Hall, D., Weatherill, D. P., Tutt, J. H.,

- McEntaffer, R. L., DeRoo, C. T., Schultz, T. B., Holland, K. (2016). Development of the x-ray camera for the OGRE sub-orbital rocket. A. D. Holland & J. Beletic (Eds.), *High Energy, Optical, and Infrared Detectors for Astronomy VII*. SPIE. <http://dx.doi.org/10.1117/12.2232812>
Optical design for rocket instrument presented [25]
15. **** McCoy, J., McEntaffer, R., DeRoo, C. (2016). New lithographic techniques for X-ray Spectroscopy. J.-W. A. den Herder, T. Takahashi, & M. Bautz (Eds.), *Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2232072>
Fabrication techniques overview, editing paper [26]
 16. *** Smith, R. K., Abraham, M. H., Allured, R., Bautz, M., Bookbinder, J., Bregman, J. N., Brenneman, L., Brickhouse, N. S., Burrows, D. N., Burwitz, V., Carvalho, R., Cheimets, P. N., Costantini, E., Dawson, S., DeRoo, C., Falcone, A., Foster, A. R., Grant, C. E., Heilmann, R. K., Hertz, E., Hine, B., Huenemoerder, D., Kaastra, J. S., Madsen, K. K., McEntaffer, R. L., Miller, E. D., Miller, J., Morse, E., Mushotzky, R., Nandra, K., Nowak, M., Paerels, F., Petre, R., Plice, L., Poppenhaeger, K., Ptak, A., Reid, P., Sanders, J., Schattenburg, M. L., Schulz, N., Smale, A., Temi, P., Valencic, L., Walker, S., Willingale, R., Wilms, J., Wolk, S. J. (2016). Arcus: the x-ray grating spectrometer explorer. J.-W. A. den Herder, T. Takahashi, & M. Bautz (Eds.), *Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2231778>
Optical design and modeling for the grating instrument [27]
 17. *** Brenneman, L. W., Smith, R. K., Bregman, J., Kaastra, J., Brickhouse, N., Allured, R., Foster, A., Wolk, S., Wilms, J., Valencic, L., Willingale, R., Grant, C., Bautz, M., Heilmann, R., Huenemoerder, D., Miller, E., Nowak, M., Schattenburg, M., Schulz, N., Burwitz, V., Nandra, K., Sanders, J., Bookbinder, J., Petre, R., Ptak, A., Smale, A., Burrows, D., Poppenhaeger, K., Costantini, E., DeRoo, C., McEntaffer, R., Mushotzky, R., Miller, J. M., Temi, P. (2016). The evolution of structure and feedback with Arcus. J.-W. A. den Herder, T. Takahashi, & M. Bautz (Eds.), *Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray*. SPIE. <http://dx.doi.org/10.1117/12.2231193>
Optical design and modeling of grating instrument [28]
 18. * Peterson, T. J., DeRoo, C. T., Marlowe, H., McEntaffer, R. L., Miles, D. M., Tutt, J. H., Schultz, T. B. (2015). Off-plane x-ray reflection grating fabrication. S. L. O'Dell & G. Pareschi (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VII*. SPIE. <http://dx.doi.org/10.1117/12.2188302>
Experimental design, data collection support, data analysis support/interpretation [29]
 19. **** Tutt, J. H., McEntaffer, R. L., DeRoo, C., Schultz, T., Rogers, T., Murray, N., Holland, A., Weatherill, D., Holland, K., Colebrook, D., Farn, D. (2015). Technological developments of the OGRE focal plane array. O. H. Siegmund (Ed.), *UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XIX*. SPIE. <http://dx.doi.org/10.1117/12.2186630>
Optical design of rocket payload using camera [30]
 20. **** Miles, D. M., Tutt, J. H., DeRoo, C. T., Marlowe, H., Peterson, T. J., McEntaffer, R. L., Menz, B., Burwitz, V., Hartner, G., Laubis, C., Scholze, F. (2015). Diffraction efficiency of radially-profiled off-plane reflection gratings. S. L. O'Dell & G. Pareschi (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VII*. SPIE. <http://dx.doi.org/10.1117/12.2186842>
Data analysis support/interpretation [31]
 21. *** Allured, R., Donovan, B. D., DeRoo, C. T., Marlowe, H. R., McEntaffer, R. L., Tutt, J. H., Cheimets, P. N., Hertz, E., Smith, R. K., Burwitz, V., Hartner, G., Menz, B. (2015). Optical and x-ray alignment approaches for off-plane reflection gratings. S. L. O'Dell & G. Pareschi (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VII*. SPIE. <http://dx.doi.org/10.1117/12.2186412>
Optical metrology, data taking support [32]
 22. *** Marlowe, H., McEntaffer, R. L., DeRoo, C. T., Miles, D. M., Tutt, J. H., Laubis, C., Soltwisch, V. (2015). Polarization sensitivity testing of off-plane reflection gratings. S. L. O'Dell & G. Pareschi (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VII*. SPIE. <http://dx.doi.org/10.1117/12.2186344>
Modeling software calculation/programming support [33]
 23. **** Tutt, J. H., McEntaffer, R. L., DeRoo, C., Schultz, T., Miles, D. M., Zhang, W., Murray, N. J., Holland, A. D., Cash, W., Rogers, T., O'Dell, S., Gaskin, J., Kolodziejczak, J., Evagora, A. M., Holland, K., Colebrook, D. (2014). Developments in the EM-CCD camera for OGRE. A. D. Holland & J. Beletic (Eds.), *High Energy, Optical, and Infrared Detectors for Astronomy VI*. SPIE. <http://dx.doi.org/10.1117/12.2054872>
Optical design for rocket payload presented [34]
 24. * DeRoo, C., McEntaffer, R. L., Schultz, T., Zhang, W. W., Murray, N. J., O'Dell, S. L., Cash, W. (2013).

Pushing the boundaries of X-ray grating spectroscopy in a suborbital rocket. S. L. O'Dell & G. Pareschi (Eds.), *Optics for EUV, X-Ray, and Gamma-Ray Astronomy VI*. SPIE.

<http://dx.doi.org/10.1117/12.2022244>

Synthesized technical information, wrote paper [35]

Academic Dissertation

1. DeRoo, C. T. (2016). *Fabrication and testing of off-plane gratings for future X-ray spectroscopy missions*. The University of Iowa. <http://dx.doi.org/10.17077/etd.qr39wko8>
Collected, analyzed all data related to process development and testing of OPGs, wrote thesis [36]

Grants and Contracts

Funded

X-ray Diffraction Gratings on Curved Substrates 4222051C

Funded by Iowa Space Grant Consortium. Award amount: (\$7,000.00) Number of Months: 0.57. Investigator/s Casey T DeRoo (Principal Investigator).

Currently Under Review

Jan 2020 - Dec 2022 *Curved Diffractive X-ray Optics for Two Element Spectrometers*

Funded by NASA. Award amount: (\$0.00) Percent effort: 15. Investigator/s Casey DeRoo (Principal Investigator), Randall L. McEntaffer (Co-Investigator), Fabien Grise (Co-Investigator), William Zhang (Co-Investigator), Max Collon (Co-Investigator), Nicolas Barriere (Co-Investigator), Jessica Gaskin (Co-Investigator). [37]

Declined

Arcus: Exploring the Formation and Evolution of Clusters, Galaxies, and Stars NNH16ZDA0100

Funded by NASA. Award amount: (\$0.00) Number of Months: 3.35. Investigator/s Randall Smith (Principal Investigator), Casey DeRoo (Co-Investigator). [38]

Curved Diffractive X-ray Optics

Funded by NASA. Award amount: (\$0.00) Number of Months: 3.46. Investigator/s Casey T DeRoo (Principal Investigator).

Invited Lectures and Conference Presentations

Colloquium

Local

2018 Department Colloquium, *Developing X-ray Technologies for Astrophysics*, University of Iowa, Iowa City, Iowa, United States Presenters/Authors: DeRoo, Casey T. Departmental Colloquium, Graduate Student Research Interest [39]

Poster

National

2018 High Energy Astrophysics Division (HEAD), *Curved Diffractive X-ray Optics for Two Element Spectrometers*, American Astronomical Society, Monterey, California, United States Presenters/Authors: DeRoo, Casey

Seminar

Local

2018 Astronomy Seminar, *Grating Technologies for X-ray Spectroscopy*, University of Iowa, Iowa City, Iowa Presenters/Authors: DeRoo, Casey T.

SERVICE

Profession

2018 National Academies of Sciences, Engineering, and Medicine, Early Career Focus Session for the Astro2020 Decadal Survey, Attendee [40]

College

2018 Astronomy Laboratory Coordinator and Observatory Manager, Faculty Member [\[41\]](#)

Community

2019 Mt. Vernon Middle School, Guest Speaker [\[42\]](#)

Media Contributions

2018 TV, 'Good Science at Low Cost' - Benefiting from the New Space Race, Regional
Was interviewed for TV media story covering how commercial space flight opportunities are good for the University of Iowa's space-flight instrumentation programs. [\[43\]](#)

Professional Development Activities

2018 - Present Training/Development Program, Early Career Faculty Academy, University of Iowa's Center for Teaching [\[44\]](#)
2019 Workshop, Communicating Ideas Workshop, Office of the Vice President for Research [\[45\]](#)
2019 Training/Development Program, Broader Impacts 101 & 102, Research Development Office - Office of the Vice President for Research
2018 Workshop, Proposal Writing: Using NASA ROSES as a Template for Success, NASA JPL/AAS [\[46\]](#)
2018 Workshop, The AAS Chandra/CIAO Workshop, AAS / Smithsonian Astrophysical Observatory [\[47\]](#)

Annotations

- [1] Performed figure and performance analysis, coordinated FEA analysis, wrote section
- [2] Cross-checked efficiency data using independently developed analysis technique
- [3] Optical metrology analysis, drafted major revisions to paper, optical performance modeling
- [4] Built instrumentation/metrology system, collected all presented data, analyzed data, wrote paper
- [5] Collected data, supported analysis, drafted major revisions of the paper
- [6] Assisted in data analysis interpretation/presentation
- [7] Data analysis support and interpretation
- [8] Performed X-ray data analysis, spectral fitting for presented SNR
- [9] Data collection and analysis support, wrote early draft of paper, copyediting
- [10] Performed WISE IR data analysis, radial profile modeling
- [11] Data extraction from collected observations
- [12] Developed means of testing adjustable mirrors, metrology data analysis support, performance computation
- [13] Metrology data collection, data interpretation
- [14] Assistance in optical design, modeling of the instrument
- [15] Managed test campaign taking presented data, analyzed data presented, made figures
- [16] Offered verification of optical performance modeling presented
- [17] Data/metrology support and analysis
- [18] Metrology data collection and analysis support
- [19] Cross-checked efficiency data using independently developed analysis technique
- [20] Adjustable X-ray Optics Representative for Lynx
- [21] Optical design and modeling of the instrument
- [22] Optical metrology analysis, drafted major revisions to paper, optical performance modeling
- [23] Built instrumentation/metrology system, collected all presented data, analyzed data, wrote proceedings
- [24] Metrology data collection and analysis support
- [25] Optical design for rocket instrument presented
- [26] Fabrication techniques overview, editing paper
- [27] Optical design and modeling for the grating instrument
- [28] Optical design and modeling of grating instrument
- [29] Experimental design, data collection support, data analysis support/interpretation
- [30] Optical design of rocket payload using camera
- [31] Data analysis support/interpretation
- [32] Optical metrology, data taking support
- [33] Modeling software calculation/programming support

- [34] Optical design for rocket payload presented
- [35] Synthesized technical information, wrote paper
- [36] Collected, analyzed all data related to process development and testing of OPGs, wrote thesis
- [37] NASA Astrophysical Research and Analysis (APRA) proposal under the ROSES program
- [38] Arcus was competitively selected for a Phase A effort from Jan. 1, 2018 - Sept. 31, 2018 and awarded \$2M. At the end of the Phase A effort, a competitive selection process determines which of two Phase A missions proceeds to flight, and Arcus was declined at this stage.
- [39] Departmental Colloquium, Graduate Student Research Interest
- [40] Competitively selected to attend focus session of early career researchers providing input into the 2020 Decadal Survey. One of 24 early career faculty selected from national pool.
- [41] Served on three-person faculty committee hiring a lab coordinator and observatory manager for the Astronomy department. Reviewed applications, interviewed candidates over the phone and in-person, wrote communications with candidates and HR during hiring process.
- [42] Guest speaker for 100 middle school students interested in black holes and extrasolar planets
- [43] Was interviewed for TV media story covering how commercial space flight opportunities are good for the University of Iowa's space-flight instrumentation programs.
- [44] Helps early-career, tenure-track faculty members to: balance teaching with research and other obligations, employ effective and rewarding teaching pedagogies, network with other faculty members, and develop their teaching portfolios and prepare for the third-year review.
- [45] Under this program, participants will gain practical tips for crafting and honing their messages, interviewing with journalists, and presenting their research and scholarship to non-peer audiences. You'll hear from current and former members of print and broadcast media, and meet one-on-one with coaches to review and hone your talking points
- [46] The success of scientists depends upon their ability to obtain funding. One of the largest challenges is to create strong proposals. Using Research Opportunities in Space and Earth Sciences (ROSES) from NASA as a template, this workshop will focus on teaching the audience key points to writing a successful proposal.
- [47] Chandra/CIAO workshops are aimed at helping users, especially graduate students, post-doctoral fellows and early-career researcher to work with Chandra data and the Chandra Interactive Analysis of Observations (CIAO) software.