

# CURRICULUM VITAE

**TOM D. MILSTER**

2/11/2021

Wyant College of Optical Sciences and Department of Electrical and Computer Engineering  
University of Arizona  
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## **CHRONOLOGY OF EDUCATION**

Colleges and universities attended:

University of Arizona	(Optical Sciences)	1981-1987
University of Missouri-Rolla	(Electrical Engineering)	1979-1981
Southwest Mo. State University	(Math)	1977-1979
Rochester Institute of Tech.	(Photographic Science)	1976-1977

Institutions, degrees and dates awarded:

University of Arizona Ph.D.	Optical Sciences	1987
University of Missouri B.S.	Electrical Engineering	1981

Title of doctoral dissertation and name of advisor:

“Design and construction of a modular gamma camera”  
Advisor: Dr. Harrison Barrett

Major Fields:

Optical Sciences and Electrical Engineering

## **CHRONOLOGY OF EMPLOYMENT**

University of Arizona College of Optical Sciences	Professor	2007-date
University of Arizona Optical Sciences Center	Research Professor	2000-2007
University of Arizona Optical Sciences Center	Assoc. Research Professor	1995-2000
University of Arizona Optical Sciences Center	Assist. Professor	1989-1995
Lawrence Livermore National Laboratory	Optical Engineer	1989(summer)
IBM General Products Division	Staff Engineer, Optical Storage	1986-1989
University of Arizona Optical Sciences Center	Graduate Research Assoc.	1982-1986
University of Arizona Electrical Engineering	Graduate Teaching Assist.	1981
University of Missouri Electrical Engineering	Undergrad Research Assist.	1980-1981
Argonne National Laboratory	Summer Research Assist.	1980

## HONORS AND AWARDS

Paper “Multiple-order diffractive engineered surface lenses,” *Appl. Opt.* 2020, selected as *Editor’s Choice* and one of the most downloaded papers in October-December, 2020.

National Academy of Inventors (NAI) Elected Senior Member 2020

Paper “Highly efficient near-field probes,” *Appl. Opt.*, 2000, selected for Optics in 2001 as published in *Optics and Photonics News*, **12**(12), p. 38 (2001)

Society of Photo-Optical Instrumentation Engineers (SPIE) – Elected Fellow (2001)

Optical Society of America – Elected Fellow (1999)

Paper “Linear behavior of a near-field optical scanning system,” *JOSA- A*, 1995, selected by SPIE as a landmark paper in near-field optics.

Paper “Objective lens design for multiple-layer optical data storage,” *Opt. Eng.* (1997) selected by SPIE as one of 300 most influential papers in lens design (1999).

## SERVICE AND OUTREACH

### Departmental committees:

Multiple years in each position: Admissions Committee (Chair); Comprehensive Exam Committee (Chair); Graduate Curriculum Committee (Chair 2014-2016); ABET Undergraduate Academic Accreditation Committee (Chair 2014-2016); In addition, too many oral defense exams to list, including comprehensive examinations, master’s defenses, and Ph.D. defenses.

### Profession:

Co-Chair, Topical Meeting on Optical Data Storage, SPIE Optics and Photonics, Optical Engineering and Applications, Conference OP233, San Diego Convention Center, San Diego, California, 2014-2016.

Advisory Committee Member, Topical Meeting on Optical Data Storage, 2006-2018

Program Committee Member, International Symposium on Optical Memory, 2006-2020

## PUBLICATIONS

### Chapters in scholarly books:

1. T. Milster, “The Gerchberg-Saxton Phase Retrieval Algorithm and Related Variations.” In Optical Holography-Materials, Theory and Applications (Elsevier, 2020) pp. 61-72.
2. T. Milster, “Superresolution Microscopy,” in Springer Handbook of Nanotechnology (Springer, Berlin, Heidelberg 2017) pp. 845-865.
3. T. Milster and T. Tkaczyk, "Miniature and Micro Optics," Chapter 22, Handbook of Optics, 3<sup>rd</sup> Ed. Optical Society of America 2010.
4. T. Milster; J. J. Butz, T. Nakano, J. Tominaga, W. L. Bletscher, “Signal power in the angular spectrum of AgOx SuperRENS media,” in Optical Nanotechnologies: Manipulation of Surface and Local Plasmons. J. Tominaga and D. P. Tsai, eds., (Springer-Verlag, Berlin, Germany 2003) pp. 119-39 (2003).
5. E. P. Walker and T.D. Milster, “Beam Shaping for Optical Data Storage,” in Laser Beam Shaping Applications, F. M. Dickey, S. C. Holswade and D. L. Shealy, eds. (Marcel Dekker, New York,

2005, 2014 and 2017).

6. T. D. Milster, "Optical Data Storage," in The Optics Encyclopedia: Basic Foundations and Practical Applications, Volume 1 T. G. Brown, K. Creath, H. Kogelnik, M. A. Kriss, J. Schmit and M. J. Weber, eds. (Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, 2003), pp. 227-274 (2003).
7. T. D. Milster and G. T. Sincerbox, "Future of Optical Data Storage," in McGraw-Hill 2002 Yearbook of Science and Technology, pp. 252-255 (2002).
8. T. D. Milster, "Optical Data Storage," in Handbook of Laser Technology and Applications, Volume 3: Applications, C E Webb, University of Oxford, UK; J D C Jones, eds., (Institute of Physics Publishing, Bristol, UK, 2003). pp. 2391-2420 (2003).
9. T.D. Milster and G. T. Sincerbox, "Optical Data Storage," in McGraw-Hill Encyclopedia of Science and Technology, Vol 12, pp. 457-461 (2001).
10. T. D. Milster and S. B. Hamilton, "Testing," in MO Data Recording -- Materials, Subsystems, Techniques, T. McDaniel and R. Victora, eds. (Noyes Publications, Park Ridge, NJ., 1997).
11. T. D. Milster, "Miniature and Micro-optics," in Handbook of Optics, Volume 2, B. Wolfe, ed. (McGraw-Hill, New York, 1995), ch. 7 (1995).

### Peer-Reviewed Papers since 2015:

1. Milster, T. D., Wang, Z., & Kim, Y. S. (2021). Design aspects of large-aperture MODE lenses. *OSA Continuum*, 4(1), 171-181.
2. Zhang, Y., Liang, R., Spires, O. J., Yin, S., Yi, A., & Milster, T. D. (2020). Precision glass molding of diffractive optical elements with high surface quality. *Optics Letters*, 45(23), 6438-6441.
3. Milster, T. D., Kim, Y. S., Wang, Z., & Purvin, K. (2020). Multiple-order diffractive engineered surface lenses. *Applied Optics*, 59(26), 7900-7906.
4. Finan, E., & Milster, T. (2020). Phase retrieval and adaptive optics correction for systems with diffractive surfaces. *Applied Optics*, 59(22), G92-G98.
5. Eguchi, A., & Milster, T. D. (2019). Single-shot phase retrieval with complex diversity. *Optics letters*, 44(21), 5108-5111.
6. Eguchi, A., Brewer, J., & Milster, T. D. (2019). Optimization of random phase diversity for adaptive optics using an LCoS spatial light modulator. *Applied optics*, 58(25), 6834-6840.
7. Gao, W., & Milster, T. (2018). Strehl ratio for optical systems with ultrafast illumination. *Optics express*, 26(14), 18028-18042.
8. Apai, D., Milster, T. D., Kim, D. W., Bixel, A., Schneider, G., Liang, R., & Arenberg, J. (2019). A Thousand Earths: A Very Large Aperture, Ultralight Space Telescope Array for Atmospheric Biosignature Surveys. *The Astronomical Journal*, Volume 158, Issue 2, article id. 83, 21 pp. (2019).
9. Gao, W., & Milster, T. (2018). Strehl ratio for optical systems with ultrafast illumination. *Optics Express*, 26(14), 18028-18042.
10. Gao, W., Finan, E., Kim, G. H., Kim, Y., & Milster, T. D. (2018). Optical design and system characterization of an imaging microscope at 121.6 nm. *Optical Engineering*, 57(3), 035101.
11. Summitt, C., Wang, S., Namnabat, S., Johnson, L., Milster, T., & Takashima, Y. (2017). Fast fabrication of polymer out-of-plane optical coupler by gray-scale lithography. *Optics express*, 25(15), 17960-17970.

12. Eguchi, A., Lu, P., Kim, Y., & Milster, T. D. (2017). Characterization of emission from aggregated gold nanoparticles excited nonlinearly by 1560-nm femtosecond laser. *Journal of Nanophotonics*, 11(4), 046007.
13. Pacheco, S., Brand, J. F., Zaveron, M., Milster, T., & Liang, R. (2015). Sensitivity analysis and optimization method for the fabrication of one-dimensional beam-splitting phase gratings. *Optics Express*, 23(9), 11771-11782.
14. Pacheco, S., Salahieh, B., Milster, T., Rodriguez, J. J., & Liang, R. (2015). Transfer function analysis in epi-illumination Fourier ptychography. *Optics letters*, 40(22), 5343-5346.
15. Pacheco, S., Milster, T., & Liang, R. (2015). Analysis of grating doublets for achromatic beam-splitting. *Optics Express*, 23(17), 22939-22952.

**(A selected list of peer-reviewed papers published prior to 2015 is found on**

**<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/48306558/?sort=date&direction=ascending> )**

### **Selected conference publications and presentations since 2015:**

1. Milster, T. D., & Kuhn, W. P. (2020, August). Practical measurement of cell-phone camera lens focal length. In *Optical System Alignment, Tolerancing, and Verification XIII* (Vol. 11488, p. 1148807). International Society for Optics and Photonics.
2. Milster, T. D., Apai, D., Kim, D. W., Kim, Y. S., Kim, G. H., Zhang, Y., ... & Purvin, K. (2020, September). Progress toward optical design and fabrication of ultralight, large aperture transmissive lenses for space telescopes. In *Frontiers in Optics* (pp. FM1A-2). Optical Society of America.
3. Kim, Y., Wang, Z., & Milster, T. (2020, September). Optical Design and Analysis of Ultralight, Large Aperture Transmissive Lenses for Space Telescopes. In *Frontiers in Optics* (pp. JTU7A-1). Optical Society of America.
4. Dmitrovic, S., Molnar, B., Kim, Y. S., Schumann, D., Foley, J., Shelley, J. T., & Milster, T. D. (2020, September). Progress toward a VUV Raman spectrometer to detect pathogens with the samples in air. In *Laser Science* (pp. JW6B-18). Optical Society of America.
5. Kim, D. W., Walker, C. K., Apai, D., Milster, T. D., Takashima, Y., Schneider, G., ... & Gasper, A. (2020). Disruptive space telescope concepts, designs, and developments: OASIS and Nautilus-INVITED. In *EPJ Web of Conferences* (Vol. 238, p. 06001). EDP Sciences.
6. Choi, H., Esparza, M. A., Lamdan, A., Feng, Y. T., Milster, T., Apai, D., & Kim, D. W. (2020, August). In-process metrology for segmented optics UV curing control. In *Optical Manufacturing and Testing XIII* (Vol. 11487, p. 114870M). International Society for Optics and Photonics.
7. Esparza, M. A., Choi, H., & Kim, D. W. (2020, August). Alignment of Multi-Order Diffractive Engineered (MODE) lens segments using the Kinematically-Engaged Yoke System. In *Optical Manufacturing and Testing XIII* (Vol. 11487, p. 114870V). International Society for Optics and Photonics.
8. Milster, T. D., & Kuhn, W. P. (2020, August). Practical measurement of cell-phone camera lens focal length. In *Optical System Alignment, Tolerancing, and Verification XIII* (Vol. 11488, p. 1148807). International Society for Optics and Photonics.
9. Milster, T. D. (2020, March). Complex diversity for multiple-wavelength single-shot phase retrieval (Conference Presentation). In *Quantitative Phase Imaging VI* (Vol. 11249, p. 112490K).

International Society for Optics and Photonics.

10. Bendek, E., Sirbu, D., Henze, C., Belikov, R., Milster, T., Finan, E., & Pluzhnik, E. (2018, July). Sparse wavefront control: A new approach to high-contrast imaging. In *Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave* (Vol. 10698, p. 106981M). International Society for Optics and Photonics.
11. Apai, D., T. D. Milster, D. Kim, A. Bixel, G. Schneider, B. V. Rackham, R. Liang, and J. Arenberg. "Nautilus: A Biosignature Survey in a Thousand Exo-Earths." AAS (2020): 212-06.
12. Finan, E., Milster, T., & Kim, Y. (2018, September). Performance of an Adaptive Optics System in the Presence of Diffractive Grooves. In *Frontiers in Optics* (pp. FM3D-1). Optical Society of America.
13. Apai, D., Milster, T. D., Arenberg, J., Kim, D., Liang, R., Bixel, A., ... & Grunsfeld, J. (2018). Nautilus Deep Space Observatory: A Giant Segmented Space Telescope Array for a Galactic Biosignature Survey. LPI Contributions, 2063.
14. Gao, W., Finan, E., Jeong, B., Kim, G., Kim, Y., & Milster, T. (2017, July). An Imaging Microscope at 121.6 nm. In *International Optical Design Conference* (pp. JTU5A-6). Optical Society of America.
15. Scott, R. P., Jean, M., Johnson, L., Gatlin, R., Bronson, R., Milster, T., & Hart, M. (2017, September). Lithographic manufacturing of adaptive optics components. In *Astronomical Optics: Design, Manufacture, and Test of Space and Ground Systems* (Vol. 10401, p. 104011C). International Society for Optics and Photonics.
16. Knight, J. M., Brewer, J., Hamilton, R., Ward, K., Milster, T. D., & Guyon, O. (2017, September). Design, fabrication, and testing of stellar coronagraphs for exoplanet imaging. In *Techniques and Instrumentation for Detection of Exoplanets VIII* (Vol. 10400, p. 104000N). International Society for Optics and Photonics.
17. Summitt, C., Wang, S., Namnabat, S., Johnson, L., Milster, T., & Takashima, Y. (2017). Fast fabrication of polymer out-of-plane optical coupler by gray-scale lithography. *Optics express*, 25(15), 17960-17970.
18. Jean, M. A., Bronson, R., Scott, R. P., Hart, M., Johnson, L., & Milster, T. (2017, July). Multiwavelength Characterization of Multi-Order Diffractive Lenslet Arrays. In *Optical Fabrication and Testing* (pp. OW2B-4). Optical Society of America.
19. Johnson, L., Apai, D., Arenberg, J., & Milster, T. D. (2017, July). Multiple Order Diffractive Fresnel Lens (MOD-DFL) for Atmospheric Transit Surveying of Earthlike Exoplanets. In *International Optical Design Conference* (pp. IW3A-5). Optical Society of America.
20. Vorndran, S. D., Johnson, L., Milster, T., & Kostuk, R. K. (2016, June). Measurement and analysis of algorithmically-designed diffractive optic for photovoltaic spectrum splitting. In *Photovoltaic Specialists Conference (PVSC), 2016 IEEE 43rd* (pp. 3513-3517). IEEE.
21. Vorndran, S. D., Ayala, S., Wu, Y., Russo, J. M., Zaverton, M. A., Milster, T., & Kostuk, R. K. (2015, June). Freeform surface relief diffractive optic for photovoltaic spectrum splitting. In *Photovoltaic Specialist Conference (PVSC), 2015 IEEE 42nd* (pp. 1-5). IEEE.
22. Yang, J., Ge, T., Summitt, C., Wang, S., Milster, T., & Takashima, Y. (2015, August). All-polymer based fabrication process for an all-polymer flexible and parallel optical interconnect. In *Nanoengineering: Fabrication, Properties, Optics, and Devices XII* (Vol. 9556, p. 95560F). International Society for Optics and Photonics.
23. Milster, T. D., Lu, P., & Kieu, K. (2015, August). Potential of multi-photon reading and writing for optical data storage systems. In *Optical Data Storage 2015* (Vol. 9587, p. 95870B).

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