

WILLIAM S. GRAVES**Short Curriculum Vitae**

Director of CXFEL Project
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EDUCATION

Ph.D., Physics	University of Wisconsin – Madison, Madison, WI	1994
B.S., Physics	San Francisco State University, San Francisco, CA	1989

PROFESSIONAL EXPERIENCE

2022 – present	Professor, Applied Physics	Arizona State University
2019 – present	Director and PI CXFEL Project	Arizona State University
2015 – 2022	Associate Professor, Physics	Arizona State University
2007 – 2015	Principal Research Scientist	Massachusetts Institute of Technology
2002 – 2007	Research Scientist	Massachusetts Institute of Technology
1993 – 2002	Staff Physicist	National Synchrotron Light Source, Brookhaven National Lab

GOOGLE SCHOLAR PROFILE

Total citations: 2781

h-index: 24

https://scholar.google.com/citations?user=m9_e1iIAAAAJ&hl=en

SUMMARY OF FUNDING ACTIVITY

Applied for:	\$193,565,843	21 proposals in 2015-2022 including 15 as PI, 2 as co-PI
Awarded:	\$128,698,701	10 awards including 6 as PI
Declined:	\$65,117,142	11 declined including 8 as PI, 2 as co-PI

FUNDED GRANTS

10. PI, *Mid-scale RI-2 Consortium: CXFEL Project*, NSF, 2023-2027, \$90,800,000 (2023)
9. PI on ASU subaward, *AccelNet-Design: Extreme Light in Intensity, Time, & Space (XLITES)*, NSF, 2022-2023, \$250,000 (2022)
8. Senior Personnel, *NNCI: Nanotechnology Collaborative Infrastructure Southwest (NCI-SW)*, NSF, 2021-2025, \$4,300,002 (2020)

7. Senior Personnel, *MRI: Acquisition of a femtosecond laser system for time-resolved studies using Arizona State University's CXLS*, NSF, 2021-2022, \$707,419 (2020)
6. PI, *Workshop on Coherent X-ray Imaging*, Arizona Biomedical Research Center, 2020, \$5,000 total to host a workshop with 100 participants
5. PI, *Mid-Scale RI-1 (MI:DP): Compact X-ray Free-Electron Laser Project (CXFEL)*, NSF, 2019-2022, \$4,765,713 total
4. Investigator, *QLCI-CG: Institute for Chiral-Quantum Materials Interfaces (ICQMI)*, NSF, 2019-2020, \$150,000 total (this award leads to a \$25,000,000 NSF proposal in 2020).
3. PI, *Phase Contrast Imaging using a Compact Coherent X-ray Light Source*, ASU-Mayo Team Science, 2016, \$894,057 total
2. PI, *Nanopatterned Electron Beams for Coherent Radiation Emission*, NSF, 2016-2019, \$526,937 total
1. Investigator, *Center for Membrane Protein Drug Discovery (MEDD)*, NIH, 2015-2019, \$26,685,114 total

PATENTS

10. *Electron diffraction intensity from single crystal silicon in a photoinjector*, US Patent 11,915,837 (2024)
9. *Off-axis Capillary X-ray Optics*, US Patent 11,875,910 (2024)
8. *Nanopatterned Electron Beams for Temporal Coherence and Deterministic Phase Control of X-Ray Free-Electron Lasers*, US Patent 11,798,706 (2024)
7. *Method and Apparatus for Synchronizing Charged Particle Pulses with Light Pulses*, US Patent 11,715,617 (2024)
6. *Electron photoinjector*, US Patent 11,562,874
5. *Novel Low-Cost Electron Photoinjector*, US Patent 11,031,206 (2021)
4. *Coherent Electron and Radiation Production via Electron Diffraction*, US Patent 9,697,924 (2017)
2. *Compact Coherent Current and Radiation Source*, US Patent 8,787,529 (2014)
1. *Compact, High-Flux, Short-Pulse X-Ray Source*, US Patent 7,391,850 (2008)

SELECTED PUBLICATIONS (*graduate student, # undergraduate)

18. A. S. H. Shevchuk*, J. C. H. Spence, R. A. Kirian, **W. S. Graves**, and K. E. Schmidt, 'Imaging by intensity interferometry of X-ray fluorescence at a compact XFEL', *Phys. Rev. A* 104, 023514, (2021)
17. LE Malin, **WS Graves**, M Holl, JCH Spence, EA Nanni, RK Li, X Shen, S Weathersby, 'Quantitative agreement between dynamical rocking curves in ultrafast electron diffraction for x-ray lasers', *Ultramicroscopy* 223, 113211 (2021)
16. Y. Sung, B Nelson, ER Shanblatt, R Gupta, CH McCollough, **WS Graves**, 'Wave optics simulation of grating-based X-ray phase-contrast imaging using 4D Mouse Whole Body (MOBY) phantom', *Medical physics* 47 (11), 5761-5771 (2020)
15. Fromme, Petra; **Graves, William S**; and Martin-Garcia, Jose M, 'Serial Femtosecond Crystallography: A Decade at the Forefront in Structural Biology', In: eLS. John Wiley & Sons, DOI: 10.1002/9780470015902.a0028964 (May 2020)
14. E.R. Shanblatt, Y. Sung, R. Gupta, B.J. Nelson, S. Leng, **W.S. Graves**, C.H. McCollough, 'A forward model for propagation-based phase contrast x-ray imaging in parallel- and cone-beam geometry' *Optics Express* (27), pp. 4504-4521 (2019)

13. E.A. Nanni, **W.S. Graves**, and D.E. Moncton, “Nano-modulated electron beams via electron diffraction and emittance exchange for coherent x-ray generation”, *Physical Review Accelerators and Beams* 21 (1), 014401 (2018) (**selected as Editor’s Suggestion**)
12. Y. Sung, R. Gupta, B. Nelson S. Leng C.H. McCollough, and **W.S. Graves** “Phase contrast imaging with a compact x-ray light source: System design”, *Journal of Medical Imaging* 4(4), 043503 (Oct-Dec 2017)
11. E.A. Nanni and **W. S. Graves**, “Aberration Corrected Emittance Exchange”, *Phys. Rev. ST Accel. Beams* 18, 084401 (2015)
10. RG Hobbs, Y Yang, PD Keathley, ME Swanwick, LF Velásquez-García, FX Kärtner, WS Graves, and KK Berggren, ‘High-density Au nanorod optical field-emitter arrays’, *Nanotechnology* 25, 465304 (2014)
9. R. G. Hobbs, Y. Yang, A. Fallahi, P. D. Keathley, E. De Leo, F. X. Kärtner, **W. S. Graves**, and K. Berggren, ‘High-Yield, Ultrafast, Surface Plasmon-Enhanced, Au Nanorod Optical Field Electron Emitter Arrays’, *ACS Nano* 8, 11474-11482 (2014)
8. **W.S. Graves**, F.X. Kaertner, and D.E. Moncton, ‘Intense Superradiant X Rays from A Compact Source using a Nanocathode Array and Emittance Exchange’, *Phys. Rev. Lett* 108, 263904 (2012)
7. J. Kim, F.O. Ilday, F.X. Kaertner, O.d. Mucke, M.H. Perrott, **W.S. Graves**, D.E. Moncton, T. Zwart, ‘Large-Scale Timing Distribution and RF-Synchronization for FEL Facilities’, *Proceedings of 2004 FEL Conference, Trieste, IT* (2004) 339-342
6. L.H. Yu, L.DiMauro, **W.S. Graves**, E.D. Johnson, R. Heese, S. Krinsky, H. Loos, J.B. Murphy, G. Rakowsky, J. Rose, T. Shaftan, B. Sheehy, J. Skaritka, X.J. Wang, Z. Wu, First Ultraviolet High-Gain Harmonic-Generation Free Electron Laser’, *Phys. Rev. Lett.* **91** 074801 (2003)
5. **W.S. Graves**, R. Heese, E.D. Johnson, J. Rose, T. Shaftan, B. Sheehy, ‘Measurement of Thermal Emittance for a Copper Photocathode’, *Proceedings of 2001 Particle Accelerator Conference, Chicago, IL* (2001)
4. A. Doyuran*, M. Babzien, L.-H. Yu, T. Shaftan, L. F. DiMauro, I. Ben-Zvi, **W. Graves**, E. Johnson, S. Krinsky, R. Malone, I. Pogorelsky, J. Skaritka, G. Rakowsky, L. Solomon, X.J. Wang, M. Woodle, V. Yakimenko, S.G. Biedron, J.N. Galayda, E. Gluskin, J. Jagger, V. Sajaev, I. Vasserman, ‘Characterization of a High-Gain Harmonic-Generation Free-Electron Laser at Saturation’, *Phys. Rev. Lett.* **86**, 5902-5905 (2001)
3. L.-H. Yu, M. Babzien, I. Ben-Zvi, L. F. DiMauro, A. Doyuran*, **W. Graves**, E. Johnson, S. Krinsky, R. Malone, I. Pogorelsky, J. Skaritka, G. Rakowsky, L. Solomon, X.J. Wang, M. Woodle, V. Yakimenko, S.G. Biedron, J.N. Galayda, E. Gluskin, J. Jagger, V. Sajaev, I. Vasserman, ‘High-Gain Harmonic-Generation Free-Electron Laser’, *Science* **289**, 932-934 (Aug. 11, 2000)
2. **W.S. Graves**, E.D. Johnson, P.G. O’Shea, ‘A High Resolution Electron Beam Profile Monitor’, *Proceedings of the 1997 IEEE Particle Accelerator Conference, Vancouver, Canada* (1998) 1993-1995
1. **W.S. Graves**, D.H. Dowell, A. Doyuran, P. Emma, R. Heese, E.D. Johnson, J. Rose, J. Rudati, T. Shaftan, B. Sheehy, J. Skaritka, L.-H. Yu, ‘Measured Properties of the DUVFEL High Brightness, Ultrashort Electron Beam’, *Proceedings of 2001 Particle Accelerator Conference, Chicago, IL* (2001)