

Michael Zingale / Publications and Talks

Refereed Publications

72. *Simulating Lateral H/He Flame Propagation in Type I X-ray Bursts*, E. Johnson & M. Zingale 2023, submitted to Proceedings of AstroNum 2023
71. *pynucastro 2.1: an update on the development of a python library for nuclear astrophysics*, A. Smith Clark, E. T. Johnson, Z. Chen, K. Eiden, M. Zingale, B. Boyd, P. Johnson, & L. Rangel DaCosta, 2023, submitted to Proceedings of AstroNum 2023
70. *Sensitivity of 3D Convective Urca Simulations to Changes in Urca Reactions*, B. Boyd, A. Smith Clark, A. C. Calder, D. M. Townsley, & M. Zingale, 2023, submitted to Proceedings of AstroNum 2023
69. *A Framework for Exploring Nuclear Physics Sensitivity in Numerical Simulations*, Z. Chen, E. Johnson, M. Katz, A. Smith Clark, B. Boyd, & M. Zingale, 2023, accepted to Proceedings of AstroNum 2023
68. *Sensitivity of Simulations of Double Detonation Type Ia Supernova to Integration Methodology*, M. Zingale, Z. Chen, M. Rasmussen, A. Polin, M. Katz, A. Smith Clark, & E. T. Johnson, submitted to Astrophysical Journal
67. *MESA-Web: A cloud resource for stellar evolution in astronomy curriculum*, C. E. Fields, R. H. D. Townsend, A. L. Dotter, & M. Zingale, 2023, Astronomy Education Journal, 3, 1, 047ra
<https://doi.org/10.32374/AEJ.2023.3.1.047ra>
66. *Sensitivity of He Flames in X-ray Bursts to Nuclear Physics*, Z. Chen, M. Zingale, & K. Eiden, 2023, ApJ, 955, 128
65. *Comparing Early Evolution of Flames in X-ray Bursts in Two and Three Dimensions*, M. Zingale, K. Eiden, & M. Katz, 2023, ApJ, 952, 160
64. *pynucastro: A Python Library for Nuclear Astrophysics*, A. Smith Clark, E. T. Johnson, Z. Chen, K. Eiden, D. E. Willcox, B. Boyd, L. Cao, C. J. DeGrendele, & M. Zingale, 2023, ApJ, 947, 65
63. *Neural Networks for Nuclear Reactions in MAESTROeX*, D. Fan, D. E. Willcox, C. DeGrendele, M. Zingale, & A. Nonaka, 2022, ApJ, 940, 134
62. *An Improved Method for Coupling Hydrodynamics with Astrophysical Reaction Networks*, M. Zingale, M. P. Katz, A. Nonaka, & M. Rasmussen, 2022, ApJ, 936, 6
61. *Dynamics of Laterally Propagating Flames in X-ray Bursts. II. Realistic Burning & Rotation*, A. Harpole, N. M. Ford, K. Eiden, M. Zingale, A. D. Willcox, Y. Cavecchi, & M. P. Katz, 2021, ApJ, 912, 36
60. *CASTRO: A Massively Parallel Compressible Astrophysics Simulation Code*, A. Almgren, M. Barrios Sazo, J. Bell, A. Harpole, M. Katz, J. Sexton, D. Willcox, W. Zhang, & M. Zingale, 2020, Journal of Open Source Software, 5, 54, 2513

59. *Preparing Nuclear Astrophysics for the Exascale*,
M. Katz, A. Almgren, M. Barrios Sazo, K. Eiden, K. Gott, A. Harpole, J. Sexton, D. Willcox, W. Zhang, & M. Zingale, 2020, accepted to SC20
58. *Dynamics of Laterally Propagating Flames in X-ray Bursts. I. Burning Front Structure*,
K. Eiden, M. Zingale, A. Harpole, D. Willcox, Y. Cavecchi, & M. P. Katz, 2020, ApJ, 894, 6
57. *The Castro AMR Simulation Code: Current and Future Developments*,
M. Zingale, A. S. Almgren, M. Barrios Sazo, J. B. Bell, K. Eiden, A. Harpole, M. P. Katz, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2020, Journal of Physics: Conference Series, 1623, 012021, 14th Int. Conf. on Numerical Modeling of Space Plasma Flows: ASTRONUM-2019 1-5 July 2019, Paris, France
56. *Modelling low Mach number stellar hydrodynamics with MAESTROeX*
A. Harpole, D. Fan, M. P. Katz, A. J. Nonaka, D. E. Willcox, & M. Zingale, 2020, Journal of Physics: Conference Series, 1623, 012015, 14th Int. Conf. on Numerical Modeling of Space Plasma Flows: ASTRONUM-2019 1-5 July 2019, Paris, France
55. *MAESTROeX: A Massively Parallel Low Mach Number Astrophysical Solver*, D. Fan, A. Nonaka, A. S. Almgren, A. Harpole, & M. Zingale, 2019, ApJ, 887, 212
54. *Improved Coupling of Hydrodynamics and Nuclear Reactions via Spectral Deferred Corrections*, M. Zingale, M. P. Katz, J. B. Bell, M. L. Minion, A. J. Nonaka, & W. Zhang, 2019, ApJ, 886, 105
53. *MAESTROeX: A Massively Parallel Low Mach Number Astrophysical Solver*,
D. Fan, A. Nonaka, A. Almgren, D. Willcox, A. Harpole, & M. Zingale, 2019, Journal of Open Source Software, 4, 43, 1757
52. *AMReX: a framework for block-structured adaptive mesh refinement*,
W. Zhang, A. Almgren, V. Beckner, J. Bell, J. Blaschke, C. Chan, M. Day, B. Friesen, K. Gott, D. Graves, M. P. Katz, A. Myers, T. Nguyen, A. Nonaka, M. Rosso, S. Williams, & M. Zingale, 2019, Journal of Open Source Software, 4, 37, 1370
51. *Numerical Stability of Detonations in White Dwarf Simulations*,
M. P. Katz & M. Zingale, 2019, ApJ, 874, 169
50. *pyro: a framework for hydrodynamics explorations and prototyping*,
A. Harpole, M. Zingale, I. Hawke, & T. Chegini, 2019, Journal of Open Source Software, 4, 34, 1265
49. *Toward Resolved Simulations of Burning Fronts in Thermonuclear X-ray Bursts*,
M. Zingale, K. Eiden, Y. Cavecchi, A. Harpole, J. B. Bell, M. Chang, I. Hawke, M. P. Katz, C. M. Malone, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2019, Journal of Physics: Conference Series, 1225, 012005
48. *Thermonuclear (Type Ia) Supernovae and Progenitor Evolution*,
A. C. Calder, D. E. Willcox, C. J. DeGrendele, D. Shangase, M. Zingale, & D. M. Townsley, 2019, Journal of Physics: Conference Series, 1225, 012002

47. *Turbulence-driven thermal and kinetic energy in the atmospheres of hot Jupiters*,
T. Ryu, M. Zingale, & R. Perna, 2018, *Monthly Notices of the Royal Astronomical Society*,
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46. *pynucastro: an interface to nuclear reaction rates and code generator for reaction network equations*,
D. E. Willcox & M. Zingale, 2018, *Journal of Open Source Software*, 3 (23), 588; DOI: <https://doi.org/10.21105/joss.00588>
45. *Observatory science with eXTP*,
J. J. M. in 't Zand et al., 2018, *Science China Physics, Mechanics & Astronomy*, 62, 29506
44. *Meeting the Challenges of Modeling Astrophysical Thermonuclear Explosions: Castro, Maestro, and the AMReX Astrophysics Suite*,
M. Zingale, A. S. Almgren, M. G. Barrios Sazo, V. E. Beckner, J. B. Bell, B. Friesen, A. M. Jacobs, M. P. Katz, C. M. Malone, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2018, *Journal of Physics: Conference Series*, 1031, 1, 012024
43. *Best Practices in Running Collaborative GPU Hackathons: Advancing Scientific Applications with a Sustained Impact*,
S. Chandrasekaran, G. Juckeland, M. Otten, M. Lin, J. E. Stone, M. Zingale, & F. Foerterm
2018, *Computing in Science and Engineering*, 20, 4, 95–106
42. *Toward Simulating Black Widow Binaries with Castro*,
P. Karpov, M. Barrios Sazo, M. Zingale, W. Zhang, & A. C. Calder, 2017, *Journal of Computational Science Education*, 8, 25–29
41. *Review: White paper on nuclear astrophysics and low energy nuclear physics Part 1: Nuclear astrophysics*,
A. Arcones, D. Bardayan, T. Beers, L. Bernstein, J. Blackmon, M. Bronson, A. Brown, E. Brown, C. Brune, A. Champagne, A. Chieffi, A. Couture, P. Danielewicz, R. Diehl, M. El-Eid, J. Escher, B. Fields, C. Frohlich, F. Herwig, W. R. Hix, C. Iliadis, W. Lynch, G. McLaughlin, B. Meyer, A. Mezzacappa, F. Nunes, B. O'Shea, M. Prakash, B. Pritychenko, S. Reddy, E. Rehm, G. Rogachev, R. Rutledge, H. Schatz, M. Smith, I. Stairs, A. Steiner, T. Strohmayer, F. Timmes, D. Townsley, M. Wiescher, R. Zegers, & M. Zingale, 2017, *Progress in Particle and Nuclear Physics*, 94, 1
40. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs II: Bulk Properties of Simple Models*,
A. M. Jacobs, M. Zingale, A. Nonaka, A. S. Almgren, & J. B. Bell, 2016, *ApJ*, 827, 84
39. *Double White Dwarf Mergers on Adaptive Meshes I. Methodology and Code Verification*, M. P. Katz, M. Zingale, A. C. Calder, F. D. Swesty, A. S. Almgren, W. Zhang,
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38. *Comparisons of Two- and Three-Dimensional Convection in Type I X-ray Bursts*
M. Zingale, C. M. Malone, A. Nonaka, A. S. Almgren, & J. B. Bell, 2015, *ApJ*, 807, 60

37. *On the Piecewise Parabolic Method for Compressible Flow with Stellar Equations of State*,
M. Zingale & M. P. Katz, 2015, ApJS, 216, 31
36. *pyro: A teaching code for computational astrophysical hydrodynamics*,
M. Zingale, 2014, Astronomy & Computing, 6, 52
35. *Multidimensional Modeling of Type I X-ray Bursts. II. Two-Dimensional Convection in a Mixed H/He Accretor*,
C. M. Malone, M. Zingale, A. Nonaka, A. S. Almgren, & J. B. Bell, 2014, ApJ, 788, 115
34. *The Deflagration Stage of Chandrasekhar Mass Models For Type Ia Supernovae: I. Early Evolution*,
C. M. Malone, A. Nonaka, S. E. Woosley, A. S. Almgren, J. B. Bell, S. Dong, & M. Zingale, 2014, ApJ, 782, 11
33. *Low-Mach Number Modeling of Core Convection in Massive Stars*,
C. Gilet, A. S. Almgren, J. B. Bell, A. Nonaka, S. E. Woosley, & M. Zingale, 2013, ApJ, 773, 137
32. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs. I. Methodology*,
M. Zingale, A. Nonaka, A. S. Almgren, J. B. Bell, C. M. Malone, & R. J. Orvedahl, 2013, ApJ, 764, 97
31. *High-Resolution Simulations of Convection Preceding Ignition in Type Ia Supernovae Using Adaptive Mesh Refinement*,
A. Nonaka, A. J. Aspden, M. Zingale, A. S. Almgren, J. B. Bell, & S. E. Woosley, 2012, ApJ, 745, 73
30. *The Convective Phase Preceding Type Ia Supernovae*,
M. Zingale, A. Nonaka, A. S. Almgren, J. B. Bell, C. M. Malone, & S. E. Woosley, 2011, ApJ, 740, 8
29. *Multidimensional Modeling of Type I X-ray Bursts. I. Two-Dimensional Convection Prior to the Outburst of a Pure He Accretor*,
C. M. Malone, A. Nonaka, A. S. Almgren, J. B. Bell, & M. Zingale, 2011, ApJ, 728, 118
28. *CASTRO: A New Compressible Astrophysical Solver. I. Hydrodynamics and Self-Gravity*,
A. S. Almgren, V. E. Beckner, J. B. Bell, M. S. Day, L. H. Howell, C. C. Joggerst, M. J. Lijewski, A. Nonaka, M. Singer, & M. Zingale, 2010, ApJ, 715, 1221
27. *MAESTRO: An Adaptive Low Mach Number Hydrodynamics Algorithm for Stellar Flows*,
A. Nonaka, A. S. Almgren, J. B. Bell, M. J. Lijewski, C. Malone, & M. Zingale, 2010, ApJS, 188, 358
26. *Low Mach Number Modeling of Type Ia Supernovae. IV. White Dwarf Convection*,
M. Zingale, A. S. Almgren, J. B. Bell, A. Nonaka, & S. E. Woosley, 2009, ApJ, 704, 196
25. *A New Low Mach Number Approach in Astrophysics*,
A. S. Almgren, J. B. Bell, A. Nonaka, & M. Zingale, 2009, CiSE, 11, 24

24. *Turbulence-Flame Interactions in Type Ia Supernovae*,
A. J. Aspden, J. B. Bell, M. S. Day, S. E. Woosley, & M. Zingale, 2008, ApJ, 689, 1173
23. *Low Mach Number Modeling of Type Ia Supernovae. III. Reactions*,
A. S. Almgren, J. B. Bell, A. Nonaka, & M. Zingale, 2008, ApJ 684, 449
22. *Propagation of the First Flames in Type Ia Supernovae*,
M. Zingale and L. J. Dursi, 2007, ApJ, 656, 333
21. *Low Mach Number Modeling of Type Ia Supernovae. II. Energy Evolution*,
A. S. Almgren, J. B. Bell, C. A. Rendleman, & M. Zingale, 2006, ApJ, 649, 927
20. *Low Mach Number Modeling of Type Ia Supernovae. I. Hydrodynamics*,
A. S. Almgren, J. B. Bell, C. A. Rendleman, & M. Zingale, 2006, ApJ, 637, 922
19. *Three-Dimensional Numerical Simulations of Rayleigh-Taylor Unstable Flames in Type Ia Supernovae*,
M. Zingale, S. E. Woosley, C. A. Rendleman, M. S. Day, & J. B. Bell, 2005, ApJ, 632, 1021
18. *Validating an Astrophysical Simulation Codes*,
A. C. Calder, L. J. Dursi, B. Fryxell, T. Plewa, V. G. Weirs, T. Dupont, H. F. Robey, R. P. Drake, B. A. Remington, G. Dimonte, J. Hayes, J. M. Stone, P. M. Ricker, F. X. Timmes, M. Zingale, & K. Olson, 2004, CiSE, 6, 10
17. *Direct Numerical Simulations of Type Ia Supernovae Flames II: The Rayleigh-Taylor Instability*,
J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, ApJ, 608, 883
16. *Direct Numerical Simulations of Type Ia Supernovae Flames I: The Landau-Darrieus Instability*,
J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, ApJ, 606, 1029
15. *On the Nonlinear Evolution of Wind-driven Gravity Waves*,
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J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, JCP, 195, 2, 677
13. *A Comparative Study of the Turbulent Rayleigh-Taylor Instability Using High-Resolution Three-Dimensional Numerical Simulations: The Alpha-Group Collaboration*,
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12. *On Heavy Element Enrichment in Classical Novae*,
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11. *Morphology of Rising Hydrodynamic and Magneto-hydrodynamic Bubbles from Numerical Simulations*,
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10. *Parallel netCDF: A High-Performance Scientific I/O Interface*,
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9. *The Response of Astrophysical Thermonuclear Flames to Curvature and Stretch*,
L. J. Dursi, M. Zingale, A. Calder, B. Fryxell, F. X. Timmes, N. Vladimirova, R. Rosner, A. Caceres, D. Q. Lamb, K. Olson, P. M. Ricker, K. Riley, A. Siegel, & J. W. Truran, 2003, ApJ, 595, 955
8. *Mapping Initial Hydrostatic Models in Godunov Codes*,
M. Zingale, L. J. Dursi, J. ZuHone, A. C. Calder, B. Fryxell, T. Plewa, J. W. Truran, A. Caceres, K. Olson, P. M. Ricker, K. Riley, R. Rosner, A. Siegel, F. X. Timmes, & N. Vladimirova, 2002, ApJS, 143, 539
7. *On Validating an Astrophysical Simulation Code*,
A. C. Calder, B. Fryxell, T. Plewa, R. Rosner, L. J. Dursi, V. G. Weirs, T. Dupont, H. F. Robey, J. O. Kane, B. A. Remington, R. P. Drake, G. Dimonte, M. Zingale, F. X. Timmes, K. Olson, P. Ricker, P. MacNeice, & H. M. Tufo, 2002, ApJS, 142, 201
6. *A Case Study in Application I/O on Linux Clusters*,
R. Ross, D. Nurmi, A. Cheng, & M. Zingale, 2001, technical paper, SC2001
5. *Helium Detonations on Neutron Stars*,
M. Zingale, F. X. Timmes, B. Fryxell, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, P. MacNeice, & H. Tufo, 2001, ApJS, 133, 195
4. *High-Performance Reactive Fluid Flow Simulations Using Adaptive Mesh Refinement on Thousands of Processors*,
A. C. Calder, B. C. Curtis, L. J. Dursi, B. Fryxell, G. Henry, P. MacNeice, K. Olson, P. Ricker, R. Rosner, F. X. Timmes, H. M. Tufo, J. W. Truran, & M. Zingale, 2000, Gordon Bell Prize winner/Special category, technical paper, SC2000
3. *On the Cellular Structure of Carbon Detonations*,
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2. *FLASH: An Adaptive Mesh Hydrodynamics Code for Modeling Astrophysical Thermonuclear Flashes*,
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1. *Flash Code: Studying Astrophysical Thermonuclear Flashes*,
R. Rosner, A. Calder, J. Dursi, B. Fryxell, D. Q. Lamb, J. C. Niemeyer, K. Olson, P. Ricker, F. X. Timmes, J. Truran, H. Tufo, Y. Young, M. Zingale, E. Lusk, & R. Stevens, 2000, CiSE, 2, 33

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26. *A Fully Explicit Integrator for Modeling Astrophysical Reactive Flows*,
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25. *Practical Effects of Integrating Temperature with Strang Split Reactions*,
M. Zingale, M. P. Katz, D. E. Willcox, & A. Harpole, 2021, Research Notes of the AAS, 5, 4, 71
24. *The LOFT mission concept: a status update*,
M. Feroci et al., 2016, Proc. SPIE 9905, Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray, 99051R, July 25, 2016
23. *Understanding Ignition in Type Ia Supernovae*,
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22. *Low Mach Number Modeling of Stratified Flows*,
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21. *From Convection to Explosion: End-to-End Simulation of Type Ia Supernovae*,
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20. *MAESTRO, CASTRO, and SEDONA — Petascale Codes for Astrophysical Applications*,
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19. *Type Ia Supernovae: Advances in Large Scale Simulation*,
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15. *MAESTRO: A Low Mach Number Stellar Hydrodynamics Code*,
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14. *New Approaches for Modeling Type Ia Supernovae*,
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13. *Efficiency Gains from Time Refinement on AMR Meshes and Explicit Timestepping*,
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11. *Simulations of Rising Hydrodynamic and Magnetohydrodynamic Bubbles*,
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10. *Investigations of Pointwise Ignition of Helium Deflagrations on Neutron Stars*,
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9. *Onset of Convection on a Pre-Runaway White Dwarf*,
L. J. Dursi, A. C. Calder, A. Alexakis, J. W. Truran, M. Zingale, B. Fryxell, P. Ricker, F. X. Timmes, & K. Olson, 2002, Classical Nova Explosions: International Conference on Classical Nova Explosions. AIP Conference Proceedings, Vol. 637. Sitges, Spain, 20–24 May, 2002. Edited by M. Hernanz & J. Jose
8. *Mixing by Non-linear Gravity Wave Breaking on a White Dwarf Surface*,
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B. Fryxell, M. Zingale, F. X. Timmes, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, J. W. Truran, P. MacNeice, & H. Tufo, 2001, Nuclear Physics A, 688, 172.
5. *Quenching Processes in Flame-Vortex Interactions*,
M. Zingale, J. C. Niemeyer, F. X. Timmes, L. J. Dursi, A. C. Calder, B. Fryxell, D. Q. Lamb, K. Olson, P. Ricker, R. Rosner, J. W. Truran, & P. MacNeice, 2001, 20th Texas Symposium on Relativistic Astrophysics, Austin, Texas, 10–15 Dec. 2000, Melville, NY: AIP Conference Proceedings, Vol. 586. Edited by J. C. Wheeler & H. Martel, also AIP Conference Series 586, 490–492.
4. *Simulations of Astrophysical Fluid Instabilities*,
A. C. Calder, B. Fryxell, R. Rosner, L. J. Dursi, K. Olson, P. M. Ricker, F. X. Timmes, M. Zingale, P. MacNeice, & H. M. Tufo, 2001, 20th Texas Symposium on Relativistic Astrophysics, Austin, Texas, 10–15 Dec. 2000, Melville, NY: AIP Conference Proceedings, Vol. 586. Edited by J. C. Wheeler & H. Martel.
3. *Adaptive Mesh Simulations Of Astrophysical Detonations Using the ASCI Flash Code*,
B. Fryxell, A. C. Calder, L. J. Dursi, D. Q. Lamb, P. MacNeice, K. Olson, P. M. Ricker, R. Rosner, F. X. Timmes, J. W. Truran, H. M. Tufo, & M. Zingale, Proceedings of the VII International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT 2000), Fermilab, October 16–20, 2000.
2. *Large-Scale Simulations of Clusters of Galaxies*,
P. M. Ricker, A. C. Calder, L. J. Dursi, B. Fryxell, D. Q. Lamb, P. MacNeice, K. Olson, R. Rosner, F. X. Timmes, J. W. Truran, H. M. Tufo, & M. Zingale, Proceedings of the VII International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT 2000), Fermilab, October 16–20, 2000.
1. *Helium Detonations on Neutron Stars*,
B. Fryxell, M. Zingale, F. X. Timmes, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, J. W. Truran, P. MacNeice, & H. Tufo, Proceedings of the 10th Workshop on “Nuclear Astrophysics”, Ringberg Castle, Tegernsee, Germany, March 20–25 2000.

Open Books

2. *Teaching and Learning with Jupyter*,
L. A. Barba, L. J. Barker, D. S. Blank, J. Brown, A. B. Downey, T. George, L. J. Heagy, K. T. Mandli, J. K. Moore, D. Lippert, K. E. Niemeyer, R. R. Watkins, R. H. West, E. Wickes, C. Willing, & M. Zingale
<https://jupyter4edu.github.io/jupyter-edu-book/>

1. *Introduction to Computational Astrophysical Hydrodynamics*,

M. Zingale

https://github.com/Open-Astrophysics-Bookshelf/numerical_exercises

White Papers

7. Horizons: Nuclear Astrophysics in the 2020s and Beyond,
H. Schatz et al., 2022, *Journal of Physics G Nuclear Physics*, 49, 11, 110502
6. *MMA SAG: Thermonuclear Supernovae*,
M. Zingale, C. Fryer, A. Hungerford, S. Safi-Harb, R. Trappitsch, R. Fisher, A. Calder, & K. Shen, *Astro2020: Decadal Survey on Astronomy and Astrophysics*, science white papers, no. 259; *Bulletin of the American Astronomical Society*, Vol. 51, Issue 3, id. 259 (2019)
5. *Nuclear Physics Exascale Requirements Review: An Office of Science review sponsored jointly by Advanced Scientific Computing Research and Nuclear Physics*,
J. Carlson et al. 2017, US Department of Energy, Washington, DC (United States). Advanced Scientific Computing Research and Nuclear Physics
4. *The Importance of Computation in Astronomy Education*,
M. Zingale, F. X. Timmes, R. Fisher, & B. W. O'Shea, 2016, white paper submitted to the AAS Education Taskforce call
(<https://aas.org/posts/opportunity/2016/04/aas-task-force-education-begins-its-work>)
3. *White Paper on Nuclear Astrophysics*,
A. Arcones et al. 2016, Community white paper based on 2012 JINA Town Meeting in Detroit, MI, and 2014 APS Town Meeting in College Station, TX
2. *Modeling Astrophysical Explosions with Sustained Exascale Computing*,
M. Zingale, A. C. Calder, C. M. Malone, & F. X. Timmes, 2015, Response to RFI NOT-GM-15-122: *Science Drivers Requiring Capable Exascale High Performance Computing*
1. *The LOFT perspective on neutron star thermonuclear bursts*,
J. J. M. in 't Zand, D. Altamirano, D. R. Ballantyne, S. Bhattacharyya, E. F. Brown, Y. Cavecchi, D. Chakrabarty, J. Chenevez, A. Cumming, N. Degenaar, M. Falanga, D. K. Galloway, A. Heger, J. José, L. Keek, M. Méndez, S. Mahmoodifar, M. Linares, C. M. Malone, M. C. Miller, F. B. S. Paerels, J. Poutanen, A. Różańska, H. Schatz, M. Serino, V. F. Suleimanov, T. E. Strohmayer, F.-K. Thielemann, A. L. Watts, N. N. Weinberg, S. E. Woosley, W. Yu, S. Zhang, & M. Zingale, 2015, White Paper in Support of the Mission Concept of the Large Observatory For x-ray Timing

Invited Lectures / Seminars / Colloquia

- | | |
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| 11/04/2023 | Invited talk at APS-MAS, University of Delaware, <i>Engaging Students in Computational (Astro)Physics Courses and Research</i> |
| 10/23/2023 | Invited talk at the Interfaces and Mixing, Exploration Conference, 23-26 Oct 2023, Kavli Institute for Theoretical Physics, <i>Convective Mixing in Stellar Reactive Flows</i> |

- 06/28/2023 Invited talk at AstroNum 2023–15th International Conference on Numerical Modeling of Space Plasma Flows, Pasadena, CA, USA, *Coupling Hydrodynamics and Astrophysical Reaction Networks*
- 11/21/2022 Invited talk in *Astrophysical Turbulence: Current Understanding and Modeling Challenges* minisymposium at the APS/Division of Fluid Dynamics 2022 meeting, *Modeling Astrophysics Reactions in Turbulent Environments*
- 11/14/2022 Invited talk a HPC session of the Computing Working Group at the Argonne Town Meeting on Nuclear Structure, Reactions, and Astrophysics, *Blowing Up Stars Over the Next Decade*
- 07/28/2022 Universiti Malaya (Kuala Lumpur, Malaysia), Department of Physics Colloquium, *Modeling Astrophysical Thermonuclear Explosions*
- 05/20/2022 FastMath seminar, *Algorithmic Improvements for Coupling Hydrodynamics and Reactions in Astrophysical Flows*
- 05/04/2022 Invited speaker in the AMReX Breakout Session of the 2022 ECP Annual Meeting, *Castro Developments for Exascale Platforms*
- 03/16/2022 Invited Focus Session Speaker in *Extreme-Scale Computational Science Discovery in Fluid Dynamics and Related Disciplines*, APS March Meeting, *The Challenges of Modeling Astrophysical Reactive Flows*
- 11/17/2021 Invited panelist for KITP Transport in Stars workshop on convection (KITP, Santa Barbara, CA)
- 10/19/2021 Astronomy Society of Ireland Colloquium, *The Challenges of Modeling Astrophysical Reactive Flows*
- 10/18/2021 Michigan State University, Department of Computational Mathematics, Science and Engineering Colloquium, *The Challenges of Modeling Astrophysical Reactive Flows*
- 03/02/2021 Invited talk in the *Computational Methods in Explosive Nuclear Astrophysics* session at the SIAM Computational Science and Engineering 2021 meeting, *Modeling Astrophysical Reacting Flows*
- 01/30/2020 Princeton University, Department of Astrophysical Sciences Thunch talk, *Modeling Stellar Explosions*
- 01/09/2020 Invited presentation at Texas Advanced Computing Center *Workshop on Future Directions in Extreme Scale Computing for Scientific Grand Challenges on Challenges in Modeling Astrophysical Thermonuclear Explosions*
- 11/06/2019 Stony Brook University, Department of Physics and Astronomy Colloquium, *Modeling Thermonuclear X-ray Bursts*
- 07/05/2019 Invited talk at AstroNum 2019–14th International Conference on Numerical Modeling of Space Plasma Flows, Paris, France, *Improved Coupling of Hydrodynamics and Nuclear Burning in Astrophysical Flows using SDC*
- 02/26/2019 Invited talk in the *Spectral Deferred Correction Methods for Temporal Integration* session at the SIAM Computational Science and Engineering 2019 meeting, *Improved Coupling of Hydrodynamics and Nuclear Burning in Astrophysical Flows using SDC*

- 10/12/2018 Flatiron Institute Center for Computational Astrophysics Colloquium, *Algorithmic Demands for Modeling X-ray Bursts and Type Ia Supernovae*
- 08/23/2018 Talk at the TEAMS Collaboration meeting, *StarKiller Microphysics*
- 06/26/2018 Invited talk at AstroNum 2018—13th International Conference on Numerical Modeling of Space Plasma Flows, Panama City, Florida, *Modeling X-ray Bursts with the AMReX Astrophysics Suite*
- 08/10/2017 Seminar at LLNL High Energy Density Science Center, LLNL, *Modeling Stellar Explosions with the AMReX Astrophysics Suite*
- 07/27/2017 Seminar at Computational Science Initiative, BNL, *The AMReX Astrophysics Suite: Simulating the Stars at the Exascale*
- 06/30/2017 Invited talk at AstroNum 2017—12th International Conference on Numerical Modeling of Space Plasma Flows, St. Malo, France, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 06/02/2017 Invited participant / overview talk at Stellar Hydro Days, University of Victoria, *Modeling Stellar Convection and Explosions with Maestro, Castro, and the BoxLib/AMReX Astrophysics Suite*
- 04/05/2017 Astronomy Seminar at Michigan State University, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 02/23/2017 Seminar at Stony Brook Institute for Advanced Computational Science, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 06/15/2016 Case study talk at DOE Nuclear Physics / ASCR Exascale Requirements Review, Gaithersburg, MD, *Thermonuclear Transients*
- 04/29/2016 Seminar at Oak Ridge National Laboratory, *Modeling Stellar Explosions with Maestro, Castro, and the BoxLib Astrophysics Suite*
- 03/17/2016 Talk at the 18th Workshop on Nuclear Astrophysics, Ringberg Castle, Tegernsee, Germany, *Models of convection in X-ray bursts and pre-SNe Ia white dwarfs*
- 02/26/2016 Seminar at the U. S. Naval Research Laboratory, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 08/02/2015 Invited talk at the International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS), Leeds, UK, *Understanding Ignition in Type Ia Supernovae*
- 06/22/2015 Invited talk at the OLCF User's Meeting, ORNL, Oak Ridge, TN, *Computation Challenges of Modeling Astrophysical Explosions*
- 06/03/2015 Invited talk at the Fifty One Ergs meeting, NCSU, *Modeling the Early Phases of Type Ia Supernovae*
- 05/24/2015 "Setting the Stage" talk on *Stellar Hydrodynamics* at the JINA GNASH: The anomalous metal-poor stars and convective-reactive nuclear astrophysics workshop, Victoria, BC, Canada, <http://jina-cee.phys.ubc.ca/gnash-workshop/talks-and-contributions/monday/setting-the-stage>
- 04/08/2015 Seminar at U Mass Dartmouth, *Algorithmic Developments for Modeling Stellar Explosions*

- 01/15/2015 CCS-2 Seminar at Los Alamos National Laboratory, *The Challenges of Modeling Type Ia Supernovae and X-ray Bursts*
- 09/15/2014 Invited talk at the *Type Ia Supernovae: progenitors, explosions, and cosmology* conference, Chicago, IL, *Modeling the Early Phases of SNe Ia*, <https://kicp-workshops.uchicago.edu/sn2014/presentations.php>
- 04/30/2014 Invited presentation at *Large Scale Computing and Storage Requirements for Nuclear Physics (NP): Target 2017 meeting, Convection in X-ray Bursts*
- 02/28/2014 Astronomy Seminar at the Center for Cosmology and Particle Physics, New York University, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 09/27/2013 Nuclear Theory Seminar at Brookhaven National Lab, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 07/09/2013 Seminar at the Flash Center, University of Chicago, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 10/10/2012 Astro Computation working group at 2012 *Nuclear Astrophysics Town Meeting, Thermonuclear Driven Events*
- 04/04/2012 Nuclear Astrophysics Seminar at Ohio University entitled *The Challenges of Modeling Explosive Phenomena*
- 07/28/2010 Invited talk at the Lorentz Center Workshop on *X-ray Bursts and Burst Oscillations* entitled *The Algorithmic Challenges of Multidimensional Models of X-ray Bursts*, <http://www.lorentzcenter.nl/lc/web/2010/408/info.php3?wsid=408>
- 05/13/2010 Joint NRAO / UVa Dept. of Astronomy Colloquium (Charlottesville, VA) entitled *Modeling Convection and Ignition in Type Ia Supernovae*
- 03/31/2010 Center for the Study of Cosmic Evolution Seminar, Dept. of Physics and Astronomy, Michigan State University (E. Lansing, MI), entitled: *Modeling Convection and Ignition in Type Ia Supernovae*
- 05/12/2009 Astronomy Seminar at the American Museum of Natural History (New York, NY), entitled: *Modeling Convection and Ignition in Type Ia Supernovae*
- 09/30/2008 Astronomy Seminar at the Institute for Advanced Studies (Princeton, NJ), entitled: *New Methods for Modeling Type Ia Supernovae*
- 07/15/2008 Invited Poster at the *SciDAC 2008* conference (Seattle, WA), entitled: *Astrophysical Applications of the Maestro Code* (with co-authors: A. S. Almgren, J. B. Bell, C. M. Malone, & A. J. Nonaka)
- 04/06/2007 Astronomy Seminar at Rutgers University (New Brunswick, NJ), entitled: *The Challenges of Modeling Type Ia Supernova*
- 10/31/2006 Astronomy Colloquia at McGill University (Montreal, CA), entitled: *Understanding Type Ia Supernovae*
- 06/27/2006 Invited talk at the *SciDAC 2006* conference (Denver, CO), entitled: *The Challenges of Modeling Type Ia Supernovae*
- 10/03/2005 T-13 Seminar, Los Alamos National Laboratory, entitled: *Simulations of Thermonuclear Flames in Type Ia Supernovae*

- 06/26/2005 Invited poster at the SciDAC 2005 conference (San Francisco, CA), *The Physics of Thermonuclear Flames in Type Ia Supernovae*
- 03/01/2005 Astronomy Seminar at SUNY Stony Brook, *Flame Instabilities in Type Ia Supernovae*
- 02/23/2005 N Division Seminar, Lawrence Livermore National Laboratory, *Flame Instabilities in Type Ia Supernovae*
- 12/17/2003 Astrophysics Seminar, Institute for Advanced Study, Princeton, NJ, *Flame Instabilities in Type Ia Supernovae*

Popular Press Features

How Stars Explode, Forbes.com, Oct. 1, 2009

(<http://www.forbes.com/2009/09/30/supernovae-universe-science-technology-breakthroughs-stars.html>)

Unveiled: The First Full 3-D Model of a Star Going Supernova, Popular Science Online, Sept. 24, 2009

(<http://www.popsci.com/military-aviation-amp-space/article/2009-09/first-3-d-models-white-dwarf-supernova>)

Flash Upon a Neutron Star, American Scientist, Sept.–Oct. 2000, vol. 88, no. 5, p. 400.

Popular Press Mentions

Stars Go Kaboom, Spilling Cosmic Secrets, Science News, 2009, Vol. 176, #4 (Aug. 15, 2009)

(see also http://www.sciencenews.org/view/feature/id/46029/title/Stars_go_kaboom,_spilling_cosmic_secrets)

Supernova explosion simulated in exquisite detail, New Scientist Online, July 2006

(<http://www.newscientist.com/article/dn9604-supernova-explosion-simulated-in-exquisite-detail.html>)

Life-or-Death Question: How Supernovas Happen? NY Times, Nov. 9, 2004.

Physics Today cover, Feb. 2002.