

# Thomas S. Duffy

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Curriculum Vitae, 2022

## Professional History

- 2022 Chair, Department of Geosciences, Princeton University
- 1997-2022 Assistant, Associate, and Professor, Department of Geosciences, Princeton University
- 1995-1996 Staff Scientist, Consortium for Advanced Radiation Sources  
The University of Chicago
- 1992-1995 Postdoctoral Fellow, Geophysical Laboratory  
Carnegie Institution of Washington

## Education

- 1992 Ph. D., Geophysics, California Institute of Technology, Pasadena, California
- 1986 M. S., Geological Sciences, University of Illinois, Chicago, Illinois
- 1982 B. S., Physics, Boston College, Chestnut Hill, Massachusetts

## Research Interests

Physics and chemistry of minerals. Static and dynamic high-pressure research. Structure, composition, and dynamics of planetary interiors.

## Selected Recent Publications

Kim, D. R. F. Smith, I. Ocampo, F. Coppari, M.C. Marshall, M. K. Ginnane, J. K. Wicks, S. J. Tracy, M. Millot, A. Lazicki, J.R. Rygg, J. H. Eggert, T. S. Duffy, Structure and density of silicon carbide to 1.5 TPa: Implications for extrasolar planets, *Nature Communications*, 13, 2260, 2022.

Dutta, R., S. J. Tracy, F. Miozzi, K. Luo, J. Yang, R. E. Cohen, P. C. Burnley, D Smith, Y. Meng, S. Chariton, V. B. Prakapenka, and T. S. Duffy, Ultra-high pressure disordered, eight-

- fold coordinated phase of  $\text{Mg}_2\text{GeO}_4$ , Analogue for super-Earth mantles, *Proceedings of the National Academy of Sciences*, 119, e2114424119, 2022.
- Renganathan, P., T. S. Duffy, and Y. M. Gupta, Sound velocities in shock compressed soda lime glass: Melting and liquid state response, *Physical Review B*, 104, 014113, 2021.
- Coppari, F., R. F. Smith, J. Wang, M. Millot, D. Kim, S. Hamel, J. H. Eggert, and T. S. Duffy, Implications of the iron oxide phase transition on the interiors of rocky exoplanets, *Nature Geoscience*, 14, 121-126, 2021.
- Kim, D., S. J. Tracy, R. F. Smith, A. E. Gleason, C. A. Bolme, V. B. Prakapenka, K. Appel, S. Speziale, J. K. Wicks, E. J. Berryman, S. K. Han, M. Schoelmerich, H. J. Lee, B. Nagler, E. F. Cunningham, M. Akin, P. D. Asimow, J. H. Eggert, and T. S. Duffy, Femtosecond x-ray diffraction of laser-shocked forsterite, ( $\text{Mg}_2\text{SiO}_4$ ), to 122 GPa, *Journal of Geophysical Research: Solid Earth*, 126, e2020JB020337, 2021.
- Berryman, E. J., J. M. Winey, Y. M. Gupta, and T. S. Duffy, Sound velocities in shock-synthesized stishovite to 72 GPa, *Geophysical Research Letters*, 46, 13695-13703, 2019.
- Dutta, R., E. Greenberg, V. B. Prakapenka, and T. S. Duffy, High-pressure phase transitions beyond post-perovskite in  $\text{NaMgF}_3$ , *Proceedings of the National Academy of Sciences*, 116, 19324-19329, 2019.
- Berryman, E. J., D. Zhang, B. Wunder, and T. S. Duffy, Compressibility of synthetic Mg-Al tourmalines to 60 GPa, *American Mineralogist*, 104, 1005-1015 2019.
- Tracy, S. J., R. F. Smith, J. K. Wicks, D. E. Fratanduono, A. E. Gleason, C. A. Bolme, V. B. Prakapenka, S. Speziale, K. Appel, A. Fernandez-Panella, H. J. Lee, A. MacKinnon, F. Tavella, J. H. Eggert, and T. S. Duffy, *In situ* observation of a phase transition in silicon carbide under shock compression using pulsed X-ray diffraction, *Physical Review B*, 99, 214106 2019.
- Duffy, T. S. and R. F. Smith, Ultra-high pressure compression of geological materials, *Earth Science Reviews*, 7, 23, 2019.
- Duffy, T. S., Single-crystal elastic constants of minerals and related materials with cubic symmetry, *American Mineralogist*, 103, 977-988, 2018.
- Wicks, J. K., R. F. Smith, D. E. Fratanduono, F. Coppari, R. G. Kraus, M. G. Newman, J. R. Rygg, J. H. Eggert, and T. S. Duffy, Crystal structure and equation of state of Fe-Si alloys to super-Earth core conditions, *Science Advances*, 4, eaao5864, 2018.
- Smith, R. F., D. E. Fratanduono, D. G. Braun, T. S. Duffy, J. K. Wicks, P. M. Celliers, S. J. Ali, A. Fernandez Panella, R. G. Kraus, D. C. Swift, G. W. Collins, and J. H. Eggert, Equation of state of iron under core conditions of large rocky exoplanets, *Nature Astronomy*, 2, 4521-458, 2018.

Mi, Z., S. R. Shieh, A. Kavner, B. Kiefer, H.-R. Wenk, and T. S. Duffy, Strength and texture of sodium chloride to 56 GPa, *Journal of Applied Physics*, 135901, 2018.

Tracy, S. J., S. J. Turneure, and T. S. Duffy, *In situ* X-ray diffraction of shock-compressed fused silica, *Physical Review Letters*, 120, 135702, 2018.

## Honors

Mercator Fellow, DFG, German Research Foundation, 2019

Fellow, American Geophysical Union, 2013

Fellow, Mineralogical Society of America, 2010

Fellow, David and Lucile Packard Foundation, 1999

## Membership in Professional Societies

American Geophysical Union

Mineralogical Society of America

American Physical Society

## Selected Professional Affiliations, Service, and Outreach

Affiliated Faculty, Princeton Institute of Materials  
Affiliated Faculty, High Meadows Environmental Institute  
2021- Academic Freedom Alliance  
2021 Chair, Steering Committee for the “Management and operations of synchrotron-hosted analytical capabilities for Earth sciences research”  
2021- Program Committee, COMPRES Annual Meeting  
2020-2023 National Ignition Facility User Group Executive Committee  
2017-2020 Treasurer (elected), Mineralogical Society of America  
2013- Scientific Working Group, Dynamic Compression Sector, Advanced Photon Source  
2011- Visiting Scientist, Lawrence Livermore National Laboratory  
2009- Curator, Princeton University Mineral Collection