

**Opportunity Title:** Bulk Metallic Glasses for Spacecraft Applications

**Opportunity Reference Code:** 0125-NPP-NOV23-JPL-AeroEng

**Organization** National Aeronautics and Space Administration (NASA)

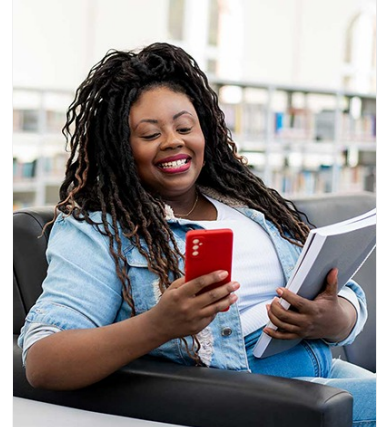
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**Application Deadline** 11/1/2023 6:00:59 PM Eastern Time Zone

**Description** The Materials Development and Manufacturing Technology Group at NASA's Jet Propulsion Laboratory, California Institute of Technology is seeking a postdoctoral scholar for basic science research related to the development of bulk metallic glasses (BMGs) and their related composites. JPL runs a premier research laboratory on BMGs, with a well-established record in the academic community and in industry. Previous research has been related to alloy development, suction casting, injection molding, development and testing of gears, infrared imaging science, rapid capacitive discharge welding, cellular structures, spacecraft debris shielding, compliant mechanisms and flexures, mirrors, inserts, and the development of ultratough composites. A postdoctoral scholar is sought who has a Ph.D. directly related to the development and mechanical properties of BMGs and could immediately make contributions to the areas listed above. The candidate is expected to rapidly integrate into the laboratory and perform independent scientific research in support of current NASA programs. The candidate is expected to vigorously lead, perform and publish peer-reviewed scientific papers and file relevant intellectual property. The candidate will have access to two arc-melters, two FLIR infrared thermal cameras, injection molding equipment, thermoplastic forming equipment, vacuum chambers, RF power supplies, metallography equipment, gear testing equipment, a load frame, microscopes, Vicker's hardness tester, machining capability and 3D polymer printers all within the primary group. The candidate will also have access, where appropriate and where funding permits, to other JPL groups and resources. The intent of the postdoctoral position is to do independent scientific research with little physical support. As such, the candidate must be able to perform all relevant experiments, fix and maintain equipment, perform all microscopy or characterization, and completely write scientific publications based on the results with limited input from others.

References related to the posting:

1. E. Homer, M. Harris, S. Zirbel, J. Kolodziejska, H. Kozachkov, B. Trease, J-P Borgonia, G. Agnes, L. Howell, D.C. Hofmann New Methods for Developing and Manufacturing Compliant Mechanisms Utilizing Bulk Metallic Glass. *Advanced Eng. Mater.* 10.1002/adem201300566 (2014)
2. L. Hamill, S. Roberts, M. Davidson, W.L. Johnson, S. Nutt, D.C. Hofmann Hypervelocity Impact Phenomenon in Bulk Metallic Glasses and Composites, *Advanced Eng. Mater.* 10.1002/adem201300252 (2013)
3. M. Davidson, S. Roberts, G. Castro, R.P. Dillon, A. Kunz, H. Kozachkov, M.D. Demetriou, W.L. Johnson, S. Nutt, D.C. Hofmann Investigating Amorphous Metal Composite Architectures as Spacecraft Shielding. *Advanced Eng. Mater.*, 15: 1-2 (2013)
4. D.C. Hofmann Shape Memory Bulk Metallic Glass Composites. *Science* 329: 1294-1295(2010)



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5. D.C. Hofmann , J-Y Suh, A. Wiest, G. Duan, M-L Lind, M.D. Demetriou, W.L. Johnson Designing Bulk Metallic Glass Matrix Composites with High Toughness and Tensile Ductility. Nature, 451: 1085, (2008)
6. D.C. Hofmann, J-Y Suh, A. Wiest, M-L Lind, M.D. Demetriou, W.L. Johnson Development of Tough, Low-Density Titanium-based Bulk Metallic Glass Matrix Composites with Tensile Ductility. Proceedings of the National Academy of Sciences, USA, 105: 20136-20140 (2008)
7. W.L. Johnson, G. Kaltenboeck, M.D. Demetriou, J.P. Schramm, X. Liu, K. Samwer, C.P. Kim, D.C. Hofmann Beating Crystallization in Glass-Forming Metals by Millisecond Heating and Processing. Science, 332: 828, (2011)
8. M.D. Demetriou, M.E. Launey, G. Garrett, J.P. Schramm, D.C. Hofmann, W.L. Johnson, R.O. Ritchie A Damage-Tolerant Glass. Nature Materials, 10: 123 (2011)
9. M.E. Launey, D.C. Hofmann, W.L. Johnson, R.O. Ritchie On the Solution to the Problem of the Poor Cyclic Fatigue Resistance of Bulk Metallic Glasses. Proceedings of the National Academy of Sciences, USA, 0900740106: 1-6 (2009)
10. D.C. Hofmann, S. Roberts. Microgravity Metals Processing: From Undercooled Liquids to Bulk Metallic Glasses. Microgravity, Inaugural Issue (2014)

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:** Aeronautics, Aeronautical or Other Engineering

**Advisors:**

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818-731-6500

**Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States.** A complete list of Designated Countries can be found at: <https://www.nasa.gov/oiiir/export-control>.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

**Eligibility** • **Degree:** Doctoral Degree.

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## **Requirements**