

# Dr. Brian W. Mulligan

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## Areas of specialization

High Performance Computing – Simulation – Parallel Processing – Developer Tools – High Performance Graphics

## Education

2018 Ph.D. in Astrophysics | University of Texas at Austin

2011 B.S. in Physics | University of Minnesota, Twin Cities

## Technical Skills

Beginner – Intermediate – Advanced – Expert

Comprehensive list available online at [https://bwmulligan.astronaos.com/BWMulligan\\_comprehensive\\_skills.tex](https://bwmulligan.astronaos.com/BWMulligan_comprehensive_skills.tex)

*Languages* c++ (A) – C (E) – FORTRAN (I) – Python (I) – XML (I) – Others (ask)  
*APIs* OpenGL (A) – Win32 (I) – POSIX sockets (I) – X11 (I) – Others (ask)  
*Software & Applications* git (I) – Microsoft Visual Studio (I) – Microsoft Project (B) – Others (ask)  
*Other skills* Project management – Team management – Machine learning – Graphics and plotting

## Relevant Experience

2016 – **Owner, Lead Developer** | [Astronaos Software](#) | Austin, TX

Video game and educational software development.

*Languages / APIs:* C/c++, OpenGL, multi-thread / parallel processing, POSIX sockets, X11, Windows

- Develop the cross-platform, multi-threaded **BWM801** game engine.
- Develop game architecture, user-interface, rules, and design.

2018 – 2011 **Research & Teaching Assistant** | [The University of Texas at Austin, Department of Astronomy](#) | Austin, TX

Research Type Ia supernovae with emphasis on interaction between the supernova and nearby gas, generating synthetic spectra, and fitting the models to observed supernovae.

*Languages / APIs:* C/c++, FORTRAN, Python, json, yaml, XML, linux, latex, multi-thread / parallel processing

- Hydrodynamic simulations using adaptive mesh refinement.
- Develop analysis software and tools in c++, using OpenMP and MPI.
- Utilize multi-node, multi-core systems (e.g. Stampede) for data processing and analysis.

2011 – 2002 **Senior Software Engineer & Technical Team Lead** | [Aerosim Technologies \(now L3\)](#) | Burnsville, MN

Develops aircraft simulation software for training of commercial pilots and maintenance crews. The AS/FI team handles simulation of most aircraft systems to the sensor level, and produces the graphics for the cockpit displays.

*Languages / APIs:* C/c++, OpenGL, Windows (Win32, GDI), Winsock, multi-threaded / parallel processing

- Design, development, and maintenance of software tools, APIs, and libraries.
- Design, development, and maintenance of simulation software and graphics.
- Software optimization.
- On-site and off-site quality assurance.
- Project management for 1 – 3 projects / year.
- Team management *Team Size:* 3 – 8.

2002 – 2001 **Senior Software Engineer** | Aerosim Technologies  
2001 – 1999 **Software Engineer** | Aerosim Technologies

## Publications

[ADS Search](#)

ORCID: [0000-0003-3347-0554](#)

### Refereed, First Author

- 2018 **Mulligan, B. W.**, & Wheeler, J. C. (2018) | A Compact Circumstellar Shell as the Source of High-Velocity Features in SN 2011fe | *Monthly Notices of the Royal Astronomical Society*, Vol 476, Iss. 1
- 2017 **Mulligan, B. W.**, & Wheeler, J. C. (2017) | High-Velocity Features in Type Ia Supernovae from a Compact Circumstellar Shell | *Monthly Notices of the Royal Astronomical Society*, Vol 467, Iss. 1

### Refereed, Other Author

- 2018 Mace, G. N., Mann, A. W., Skiff, B. A., Sneden, C., Kirkpatrick, J. D., Schneider, A. C., Kidder, B., Gosnell, N. M., Kim, H., **Mulligan, B. W.**, Prato, L., Jaffe, D., (2018) | Wolf 1130: A Nearby Triple System Containing a Cool, Ultramassive White Dwarf | *The Astrophysical Journal*, Vol 854, Issue 2
- 2015 Silverman, J. M., Vinkó, J., Marion, G. H., Wheeler, J. C., Barna, B., Szalai, T., **Mulligan, B. W.**, Filippenko, A. V., (2015) | High-velocity features of calcium and silicon in the spectra of Type Ia supernovae | *Monthly Notices of the Royal Astronomical Society*, Vol 451, Issue 2
- 2011 Daghigh, Ramin G., Green, Michael D., **Mulligan, Brian W.** (2011) | Asymptotic spectrum of Kerr black holes in the small angular momentum limit | *Physical Review D*, Vol. 83, Iss. 4

### Submitted

- 2018 **Mulligan, B. W.**, Zhang, K., & Wheeler, J. C. (2018) | The calcium abundance of high-velocity material in Type Ia supernovae

## Hobbies

volleyball | skiing | camping | backpacking | video games | home brewing | cheese making

References available upon request