



Bong Wie

Professor

Ph: 515-294-3124

Office: 2355 Howe Hall

Rm 1200 Howe Hall

bongwie@iastate.edu

<http://www.aere.iastate.edu/>

Iowa State University
537 Bissell Road
Ames, IA 50011

Education

Ph.D. Aeronautics and Astronautics, Stanford University, 1981

MS. Aeronautics and Astronautics, Stanford University, 1978

B.S. Aerospace Engineering, Seoul National University, 1975

Academic Appointments

Iowa State University (2007 - present)

Department of Aerospace Engineering

- Professor, August 2007 - present
- Director, Asteroid Deflection Research Center, August 2008 – May 2016
- Vance Coffman Endowed Faculty Chair, August 2007 – May 2016

Arizona State University (1989 - 2007)

Department of Mechanical and Aerospace Engineering

- Professor, August 1992 – May 2007
- Associate Professor, August 1989 – July 1992

University of Texas at Austin (1985 – 1989)

- Assistant Professor, August 1985 – May 1989

Awards and Honors

- Associate Fellow, AIAA
- 2006 AIAA Mechanics and Control of Flight Award for “Innovative Research on Advanced Control of Complex Spacecraft such as Solar Sails, Large Flexible Structures, and Agile Imaging Satellites Equipped with Control Moment Gyros”

Teaching

UNDERGRAD: AerE331 Flight Controls I, AerE432 Flight Controls II, AerE433 Spacecraft Dynamics, AerE351 Astrodynamics I, AerE355 Flight Dynamics and Control, AerE464 Spacecraft Systems

GRADUATE: EM 548 Advanced Engineering Dynamics, AerE531 Automatic Flight Control, AerE551 Orbital Mechanics, AerE556 Guidance and Navigation

Research

Interest Areas:

- Guidance, Control, and Dynamics of Space Vehicles; Astrodynamics and Orbital Mechanics; Asteroid Defense Mission Design; Spacecraft Attitude Dynamics and Control; Control Moment Gyros; Solar Sailing

Sponsored Grants (2007 – present): \$1.2M total from 7 grants including NASA and Iowa Space Grant Consortium (100% credit); \$1M total from industry (20% credit)

Selected Publications

(of 210 pubs. including 80 journals, 1 book chapter, 2 books, 3 patents, 170 conf. proceedings; h-index 40 (Google):

1. Wang, P, Guo, Y., Ma, G., and **Wie, B.** (2019). "New Differential Geometric Guidance Strategies for Impact Time Control Problem," *Journal of Guidance, Control, and Dynamics*, Vol. 42, No. 9, 2019, pp. 1982-1992.
2. Ahn, J., Wang, P., Guo, Y., and **Wie, B.** (2019). "Optimal Terminal-Time Determination for the ZEM/ZEV Feedback Guidance Law with Generalized Performance Index," *Astrodynamics*, Vol. 3, No. 2, pp. 127-136.
3. Lyzhoft, J. and **Wie, B.** (2019). "New Image Processing Algorithm for Terminal Guidance of Multiple Kinetic-Energy Impactors for Disrupting Hazardous Asteroids," *Astrodynamics*, Vol. 3, No. 1, pp. 45-59
4. Wang, P, Guo, Y., and **Wie, B.** (2019). "Orbital Rendezvous Performance Comparison of Differential Geometric and ZEM/ZEV Feedback Guidance Algorithms," *Astrodynamics*, Vol. 3, No. 1, 79-92
5. Zhang, Y, Guo, Y., Ma, G., and **Wie, B.** (2019). "Fixed-Time Pinpoint Mars Landing Using Two Sliding -Surfaces Autonomous Guidance," *Acta Astronautica*, 159
6. **Wie, B.**, Zimmerman, B., Lyzhoft, J., and Vardaxis, G. (2017). "Planetary Defense Mission Concepts for Disrupting or Pulverizing Hazardous Asteroids with Short Warning Time," *Astrodynamics*, Vol. 1, No. 1, pp. 3-21.
7. Zimmerman, B. and **Wie, B.** (2017). "Graphics-Processing-Unit-Accelerated Multiphase Computational Tool for Asteroid Fragmentation/Pulverization Simulation," *AIAA Journal*, Vol. 55, No. 2, pp. 599-609.
8. **Wie, B.** and Ahn, J. (2017). "On Selecting the Correct Root of Angles-Only Initial Orbit Determination Equations of Lagrange, Laplace, and Gauss," *Journal of the Astronautical Sciences*, Vol. 64, No. 1, pp. 50-71.
9. Zimmerman, B. and **Wie, B.** (2016). "GPU-Accelerated Computational Tool Development for Studying the Effectiveness of Asteroid Disruption Techniques," *Acta Astronautica*, Vol. 127, pp. 644-654.
10. Lyzhoft, J., Basart, J., and **Wie, B.** (2016). "A New Terminal Guidance Sensor System for Asteroid Intercept or Rendezvous Missions," *Acta Astronautica*, Vol. 119, pp. 147-159.
11. Vardaxis, G., Sherman, P., and **Wie, B.** (2016). "Impact Risk Assessment and Planetary Defense Mission Planning for Asteroid 2015PDC," *Acta Astronautica*, Vol. 122, pp. 307-323.
12. **Wie, B.** (2015). *Space Vehicle Guidance, Control, and Astrodynamics*, AIAA Education Series Textbook.
13. Wagner, S., **Wie, B.**, and Kaplinger, B. (2015) "Computational Solutions to Lambert's Problem on Modern Graphics Processing Units," *Journal of Guidance, Control, and Dynamics*, Vol. 38, No. 7, pp. 1305-1310.
14. Wagner, S. and **Wie, B.** (2015). "Hybrid Algorithm for Multiple Gravity-Assist and Impulsive Delta-V Maneuvers," *Journal of Guidance, Control, and Dynamics*, Vol. 38, No. 11, pp. 2096-2107
15. Vardaxis, G. and **Wie, B.** (2014). "Near-Earth Object Intercept Trajectory Design for Planetary Defense," *Acta Astronautica*, Vol. 101, pp. 1-15.
16. **Wie, B.** (2013). "Hypervelocity Nuclear Interceptors for Asteroid Disruption," *Acta Astronautica*, 90, pp. 146-155.

Thesis Advisor/Co-advisor and Postgraduate-Scholar Sponsor

Doctoral (7): J. Lyzhoft (2017), B. Zimmerman (2016), G. Vardaxis (2015), S. Wagner (2014), B. Kaplinger (2013), M. Hawkins (2013), W. Du (2010)

Masters (7): P. Premaratnes (2014), T. Winkler (2013), A. Pitz (2012), S. Wagner (2010), D. Zimmerman (2010), D. Harper (2009), J. Yang (2008)

Professional and Outreach Activities

- Editor-in-Chief, *Astrodynamics* (2018 – present)
- Associate Editor, *Journal of the Astronautical Sciences* (1993-1995)
- Associate Editor, *Journal of Guidance, Control, and Dynamics* (1986-1991)
- Member, AIAA Technical Committee on Guidance, Navigation, and Control (1988-1991)
- Technical Program Chairman, 1990 AIAA Guidance, Navigation, and Control Conference, August 1990
- Keynote Speaker, 4th IAA International Conference on Dynamics and Control of Space Systems (DYCOSS 2018), Changsha, China, May 21-23, 2018
- Keynote Speaker, 6th International ESA Conference on Guidance, Navigation and Control, Loutraki, Greece, October 17-21, 2005
- Keynote Speaker, "Solar Sailing Missions and Technology," 2005 AIAA GNC Conference, San Francisco
- Visiting Professor at Harbin Institute of Technology, University of Surrey, National Defense Academy of Japan, Seoul National University
- AIAA Two-Day Short Course at 2019 AIAA SciTech Forum, January 2019.
- AIAA Online Course "Space Vehicle Guidance, Control, and Astrodynamics," Fall 2019.