

Curriculum Vitae

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Bong Wie

Vance Coffman Endowed Chair Professor
Founding Director, Asteroid Deflection Research Center (Est. April 2008)
Department of Aerospace Engineering
Iowa State University
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Citizenship: United States

Education:

Ph.D. Aeronautics and Astronautics, Stanford University, June 1981
M.S. Aeronautics and Astronautics, Stanford University, June 1978
B.S. Aerospace Engineering, Seoul National University, Korea, February 1975

Experience:

8/07 - present: Vance Coffman Endowed Chair Professor, Iowa State University
9/92 - 8/07: Professor, Arizona State University
9/89 - 8/92: Associate Professor, Arizona State University
9/85 - 8/89: Assistant Professor, The University of Texas at Austin
7/81 - 8/85: Spacecraft Control Systems Engineer, Ford Aerospace Corporation, Palo Alto, CA
9/77 - 6/81: Research Assistant, Dept. of Aeronautics and Astronautics, Stanford University
(Research Advisor: Dr. Arthur E. Bryson, Jr.)
4/75 - 5/77: Korean Army Officer

Professional Society Activities:

Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA)
Associate Editor, AIAA Journal of Guidance, Control, and Dynamics (1986-1991)
Associate Editor, AAS Journal of the Astronautical Sciences (1993-1995)
Visiting Professor, The National Defense Academy, Japan (6/29/92 - 7/8/92)
Visiting Professor, Seoul National University, Korea (9/1/95 - 1/15/96)
Visiting Researcher, Surrey Space Center, University of Surrey, UK (2/4/03 - 4/11/03)
Visiting Professor, Surrey Space Center, University of Surrey, UK (July 2004 - present)
Member, AIAA Technical Committee on Guidance, Navigation, and Control (1988-1991)
Technical Program Chairman, 1990 AIAA GNC Conference, August 1990
Guest Investigator, NASA Control-Structure Interaction (CSI) Project (1988-1991)
Session Organizer, Special Invited Sessions on "Benchmark Problems for Robust Control Design,"
the American Control Conferences, 1990, 1991, and 1992.
Guest Editor, Special Section on "Benchmark Problems for Robust Control Design,"
Journal of Guidance, Control, and Dynamics (Sept.-Oct., 1992)
Member, NASA Solar Sail Technology Working Group (2000 - 2002)
Member, NASA New Millennium Program ST-7 Solar Sail Proposal Team (2001)
Member, Review Board for PDR of the Team Encounter Solar Sail (2/28/02 - 3/1/02)
Member, Peer Review of NASA LaRC Structural Dynamics Branch (10/8/02-10/10/02)
Member, NASA Solar Sail Technology Assessment Group (2002 - 2007)
Member, NASA New Millennium Program ST-9 Solar Sail Technology Review Board (2005 - 2006)

Session Organizer, Special Invited Sessions on “Solar Sail Trajectory Optimization and Attitude Control,” AIAA GNC Conference, San Francisco, August 2005.

Keynote Speaker, “Solar Sailing Missions and Technology,” 2005 AIAA GNC Conference, San Francisco.

Keynote Speaker, “Solar Sailing Kinetic Energy Interceptor (KEI) Mission for Impacting and Deflecting Near-Earth Asteroids,” *6th International ESA Conference on Guidance, Navigation and Control Systems*, Loutraki, Greece, October 17-21, 2005.

Co-organizer, *1st International Symposium on Solar Sailing (ISSS 2007)*, Herrsching, Germany, June 27-29, 2007.

Organizer, *Asteroid Deflection Research Symposium 2008*, Washington, D.C., October 23-24, 2008.

Steering Committee Member for the National Research Council’s Study of Near-Earth Object Surveys and Hazard Mitigation Strategies, December 2008 - February 2009.

Invited Speaker to NRC’s NEO Hazard Mitigation Panel Meeting, March 30-April 1, 2009.

A Reviewer for NRC’s final report on NEO Hazard Mitigation Study, November 2009.

Co-organizer, *2nd International Symposium on Solar Sailing*, Brooklyn, New York, July 20-22, 2010.

Invited Participant for NASA’s NEO Exploration Objectives Workshop, Washington, DC, August 10-11, 2010.

Member, The Board of Directors and Executive Committee of Korea-U.S. Science Cooperation Center, Vienna, VA, 2010 - present.

Member, Organizing Committee of IAA Planetary Defense Conference, 2009, 2011, 2013.

Invited Speaker, International Space Development Conference, San Diego, May 23-27, 2013.

Invited Speaker, NASA’s Asteroid Initiative Ideas Synthesis Workshop, Lunar and Planetary Institute, Houston, Nov. 20-22, 2013.

Principal Areas of Research Interest:

Space Vehicle Dynamics, Control, and Guidance
Computational Astrodynamics
Solar Sail Flight Control and Solar Sailing Mission Design
Singularity Escape/Avoidance Steering Logic Development for Control Moment Gyros (CMGs)
Analysis and Design of Flight Control Systems for Advanced Launch Vehicles
Mission Analysis and Design for Robotic and Human Exploration of Near-Earth Asteroids
Asteroid Deflection/Disruption Technology

Consulting:

Ford Aerospace Corporation (1985-1988); Dynacs Engineering Company (1988-1990)
Korea Electronics and Telecommunications Research Institute (November 1990)
Korea Science and Engineering Foundation (1994-1998)
Honeywell Space Systems, Glendale, AZ (1997-1999)
Surrey Space Centre, University of Surrey, UK (2003- 2005)
NASA New Millennium Program ST-9 Solar Sail Program (2005-2006)

Publications: 170 Technical Papers (including 60 Peer-Reviewed Journal Articles)

Award: 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 (CMGs).”

Book:

1. *Space Vehicle Dynamics and Control*, AIAA Education Series, 1998 (2nd Edition, 2008, 950 pages)
2. *Space Vehicle Guidance, Control, and Astrodynamics*, AIAA Education Series, to be published in late 2015.

Book Chapter: *International Handbook of Space Technology*, Edited by M. Macdonald and V. Badescu, Springer-Verlag Berlin Heidelberg, 2014. Chapter 12 Attitude and Orbit Control Systems.

Patents: 3 U.S. patents

Patent No. 6,039,290 (3/21/2000), Wie, Bailey and Heiberg, *Robust Singularity Avoidance in Satellite Control*

Patent No. 6,131,056 (10/10/2000), Heiberg, Bailey and Wie, *Continuous Attitude Control That Avoids CMG Array Singularities*

Patent No. 6,917,862 (7/12/2005), Wie, *Singularity Escape/Avoidance Logic for Control Moment Gyro Systems*

Principal Investigator (PI) of Sponsored Research Projects:

[1] Space Station Momentum/Attitude Control, NASA Johnson Space Center, \$300K, 2/1/87 - 8/31/89

[2] Nonlinear Control Synthesis for Flexible Spacecraft, NASA MSFC \$116,000, 7/1/87 - 6/30/89

[3] Control Structure Interaction Research, NASA JSC, \$50,000, 4/1/88 - 3/30/89

[4] Interactive Compensator Synthesis & Transfer Function Identification, XAJ 6146, NASA Goddard Space Flight Center, 6/1/89 - 8/30/90, \$43,000

[5] Active Structural Control Synthesis & Experiment, XAJ 6153, NASA Langley Research Center, 9/1/89 - 8/30/90, \$76,108

[6] Active Vibration Control Experiment for the ACES, XAA 0079, NASA Langley Research Center, 3/1/90 - 8/31/91, \$100,000

[7] Robust Stabilization of the Space Station, XAJ 6171, NASA Johnson Space Center, 7/1/90 - 12/31/91, \$56,363

[8] Robust Nonlinear Control of the Space Station, XAJ 6172, NASA Johnson Space Center, 7/1/90 - 12/31/91, \$90,156

[9] Parameter Margin Computation and Robust Control Synthesis, XAJ 6176, NASA Goddard Space Flight Center, 9/1/90 - 12/31/91, \$33,000

[10] Parameter Margin Computation and Robust Control Synthesis, XAJ 6214, NASA Goddard Space Flight Center, 9/1/91 - 8/30/92, \$31,300

[11] Robust Nonlinear Control of the Space Station, XAJ 6172, NASA Johnson Space Center, 1/1/92 - 8/31/93, \$90,909

[12] Robust Control Analysis and Synthesis, XAJ 6269, NASA Goddard Space Flight Center, 1/1/93 - 8/31/94, \$29,000

[13] Integrated Orbit, Attitude, and Structural Control of Space Solar Power Satellites, XAA0095, NAS1-0012, NASA Langley Research Center, 6/15/00 - 11/15/00, \$115,000

[14] Solar Sail Attitude Control System Architecture: Design, Development, and Integration, XAJ9984, Contract No. 1228156, Jet Propulsion Laboratory, 4/12/01 - 1/15/02, \$150,000

[15] Propellantless Solar Sail Attitude Control, XAJ9989, Contract No. 1232126, Jet Propulsion Laboratory, 7/24 - 1/18/02, \$10,000

[16] Development of a Low-Cost, Low-Mass, Low-Power, and Low-Volume ADCS for Solar Sails (Phase 1), XAS0019, NASA Marshall Space Flight Center, \$260K, 10/15/03 - 10/15/04.

[17] Development of a Low-Cost, Low-Mass, Low-Power, and Low-Volume ADCS for Solar Sails (Phase 2), XAS 0019, NASA Marshall Space Flight Center, \$455K, 10/15/04 - 8/15/07.

[18] Development of Integrated System Architectures and Innovative Technologies for Near-Earth Object Surveys and Threat Mitigation, NASA Iowa Space Grant Consortium, \$80K (1/1/09 - 8/31/09), \$130K (9/1/09 - 3/31/10), \$90K (5/1/10 - 4/31/11), \$50K (5/16/11 - 5/15/12),

[19] Development of Integrated System Architectures and Innovative Technologies for Near-Earth Object Surveys and Threat Mitigation, Iowa State University, \$18K (1/1/09 - 6/30/09), \$18K (7/1/09 - 6/30/10), \$18K (7/1/10 - 6/30/11)

[20] Iowa NASA EPSCoR Fellowships and Travel Grant, \$37,092, 1/1/11 - 8/31/11.

[21] Space Technology Research for Robotic and Human Exploration of NEOs, NASA Iowa Space Grant Consortium, \$110K, 5/16/11 - 5/15/14.

- [22] Robust Optimal Fragmentation and Dispersion of Near-Earth Objects, \$100K, NASA NIAC Phase 1, 9/16/11 - 9/15/12.
- [23] Kumho R&D Initiative Program at Iowa State University (Year 1), \$210K, Kumho Petrochemical Company, Korea, 8/1/11 - 7/30/12 (Co-PI: Dr. Michael Kessler).
- [24] Kumho R&D Initiative Program at Iowa State University (Year 2), \$210K, Kumho Petrochemical Company, Korea, 8/1/12 - 7/30/13 (Co-PI: Dr. Michael Kessler).
- [25] Kumho R&D Initiative Program at Iowa State University (Year 3), \$105K, Kumho Petrochemical Company, Korea, 8/1/12 - 1/31/14 (Co-PI: Dr. Michael Kessler).
- [26] An Innovative Solution to NASA's NEO Impact Threat Mitigation Grand Challenge and Its Flight Validation Mission Design, \$500K, NASA NIAC Phase 2 Study, 9/16/12 - 12/31/14.

Student Dissertations/Theses (UT Austin and Arizona State University):

- [1] Wayne Warren (M.S.), "Synthesis of a Periodic-Disturbance Accommodating Controller for Space Station Momentum Management," December 1988
- [2] Tobin Anthony (M.S.), "Pulse-Modulated Controller Synthesis for a Flexible Spacecraft," Dec. 1988
- [3] Marcello Gonzalez (M.S.), "Active Vibration Control Synthesis of Flexible Space Structures for Periodic Disturbance Rejection," December 1989
- [4] Evan Wedell (M.S.), "Computation of a Stability Robustness Margin for Structured Real-Parameter Perturbations," December 1989
- [5] Kuk-Whan Byun (Ph.D.), "Robust Control Synthesis for Uncertain Dynamical Systems," May 1990
- [6] Qiang Liu (Ph.D.), "Robust Feedforward/Feedback Control Synthesis for Uncertain Dynamical Systems," December 1992
- [7] Ravi Sinha (M.S.), "Robust Time-Optimal Control of Uncertain Flexible Structures Using Bounded Control Inputs," December 1992
- [8] Jianbo Lu (M.S.), "Robustness Analysis of Uncertain Dynamical Systems," December 1993
- [9] David Cielaszyk (M.S.), "A New Approach to a Halo Orbit Determination and Control Problem," December 1993
- [10] Frank Buntschuh (MSE), May 1996
- [11] Chris Heiberg (M.S.), "Precision Pointing Control of an Agile Spacecraft Using Single Gimbal Control Moment Gyros," May 1998
- [12] Brett Pickin (MSE), December 2000
- [13] Jose Dominguez (M.S.), "Singularity Visualization and Robust Singularity Avoidance," December 2000
- [14] Huai-Tzu You (M.S.), "Integrated Orbit, Attitude and Structural Control of a Large Sun-Pointing Spacecraft," August 2001

Graduate Students at Iowa State University (August 2007 -):

- [1] Junggyu Yang (Master of Engineering), "Singularity-Avoidance Steering Logic for Control Moment Gyros," May 2008 (graduated).
- [2] Daniel Harper (Master of Engineering), "Systems Engineering and Implementation of an Inertial Measurement Unit," May 2009 (graduated).
- [3] Sam Wagner (Master of Engineering), "Mission Design for Robotic and Human Exploration of Near-Earth Asteroids," August 2009 - December 2010.
- [4] Wei Du (Ph.D.), "Dynamic Modeling and Ascent Flight Control of Advanced Launch Vehicle," August 2007 - August 2010 (graduated).
- [5] Daniel Zimmerman (Master of Engineering) "Mission Architecture Design for Robotic and Human Asteroid Exploration," January 2010 - May 2011 (graduated).
- [6] Alan Pitz (Master of Engineering) "Conceptual Spacecraft Design for Asteroid Interceptors/Penetrators," August 2010 - May 2012 (graduated).

- [7] Brian Kaplinger (Ph.D.), “Physical Modeling and High-Performance GPU Computing for Characterization, Interception, and Disruption of Hazardous Near-Earth Objects,” August 2009 - May 2013 (graduated).
- [8] Matt Hawkins (Ph.D.) “New Near-Optimal Feedback Guidance Algorithms for Space Missions,” January 2010 - May 2013 (graduated).
- [9] Tim Winkler (Master of Science), “Fuel-Efficient Orbit Control around an Irregular Shaped Asteroid,” August 2011 - May 2013 (graduated).
- [10] Pavithra Premaratne (M.S.), “Nuclear Subsurface Explosion Modeling and Hydrodynamic Fragmentation Simulation of Hazardous Asteroids,” August 2012 - May 2014 (graduated).
- [11] Sam Wagner (Ph.D.), “Automated Trajectory Design for Impulsive and Low Thrust Interplanetary Mission Analysis,” January 2011 - December 2014 (graduated).
- [12] George Vardaxis (Ph.D.), August 2011 -
- [13] Joshu Lyzhof (Ph.D.), August 2012 -
- [14] Ben Zimmerman (Ph.D.), May 2013 -

Postdoctoral Research Associate at Iowa State University: Daero Lee, “Asteroid Deflection Research,” August 2009 - January 2010.

Undergraduate Research Projects at Iowa State University:

- [1] “Low-Cost Mission Feasibility Study for a Student-Designed Lunar Orbiter,” Nathan Willis, Samuel Wagner, Leah Benson, Daniel Harper, and Matthew Nelson, September 2007 - May 2008.
- [2] “Fundamentals of High-Energy Asteroid Deflection Method,” Brian Kaplinger, September 2007 - August 2008.
- [3] “Asteroid Exploration Mission Design,” Antonella Albuja, Aaron Neville, Alan Pitz, and Dan Zimmerman, September 2009 - December 2009.
- [4] “Iowa Space Grant Consortium Base Program at Iowa State,” Joshua Lyzfoft, August 2011 - August 2012.
- [5] “Iowa Space Grant Consortium Base Program at Iowa State,” Erik Goetz, Jake Harry, Justin Van Sambeek, August 2012 - August 2013.
- [6] “Iowa Space Grant Consortium Scholarship Program,” Christian Setzer, August 2011 - May 2013.
- [7] “Iowa Space Grant Consortium Scholarship Program,” Christian Setzer, Jake Harry, Dalton Groath, Elmer Tse, August 2013 - May 2014.
- [8] “Iowa Space Grant Consortium Base Program at Iowa State,” Ryan Hupp, Spencer Dewild, August 2013 - May 2014.
- [9] “ENGR 466: Multidisciplinary Engineering Design Course (Fall 2013),” Two projects sponsored by the ADRC.

Courses Taught at Iowa State University:

- [1] Fall 2007: AerE 551 (Orbital Mechanics)
- [2] Spring 2008: AerE 531 (Automatic Control of Aerospace Flight Vehicles)
- [3] Fall 2008: AerE 351 (Astrodynamics I), AerE 551
- [4] Spring 2009: AerE 351
- [5] Fall 2009: AerE 351, AerE 551
- [6] Spring 2010: AerE 531
- [7] Fall 2010: AerE 355 (Aircraft Flight Dynamics and Control), AerE 551
- [8] Spring 2011: AerE 464 (Spacecraft Systems)
- [9] Fall 2011: AerE 433X (Spacecraft Dynamics and Control)
- [8] Spring 2012: AerE 464, EM 548 (Advanced Engineering Dynamics)
- [9] Fall 2012: AerE 433X
- [10] Spring 2013: AerE 464, AerE 531

[11] Fall 2013: AerE 433X

Professional Short Courses:

- [1] "Synthesis of Control Logic for Spacecraft and Aircraft" A.E. Bryson and B. Wie, an AIAA Two-Day Short Course in conjunction with the AIAA Guidance, Navigation, and Control Conference, Monterey, CA, August 15-16, 1987
- [2] "Robust Control Design: Theory and Applications," B. Wie, a Two-Day Short Course, NASA Goddard Space Flight Center, November 28-29, 1990
- [3] "Robust Control Design: Theory and Applications," B. Wie, a Two-Day Short Course, NASA Johnson Space Center, August 15-16, 1991
- [4] "Control Theory and Applications," B. Wie, a Three-Day Short Course, NASA Goddard Space Flight Center, March 18-20, 1992
- [5] "Space Vehicle Dynamics and Control," B. Wie, Dept. of Aerospace Engineering, The National Defense Academy, Japan, June 29 - July 8, 1992
- [6] "Space Vehicle Dynamics and Control," B. Wie, a Two-Day Short Course, Dept. of Aerospace Engineering, Chosun University, Gwangju, Korea, May 6-7, 2003.
- [7] "Advanced Space Vehicle Control and Dynamics," B. Wie, AIAA's Two-Day Short Course in Conjunction with AIAA GNC Conference, Toronto, Canada, July 31- August 1, 2010.

Invited Seminars/Lectures/Workshops/Symposiums:

1. "Attitude Control of Flexible Spacecraft," Stanford University, October 19, 1983
2. "Control of a Liquid Upper-Stage Spacecraft," Stanford University, December 5, 1984
3. "Spacecraft Attitude Control," MIT and C.S. Draper Lab., May 6, 1986
4. "Space Station Attitude/Momentum Control," NASA Johnson Space Center, July 13-15, 1988
5. "Large Space Structure Control," MIT and C.S. Draper Lab., September 19, 1988
6. "Advanced Control Technology for the Space Station," Space Station Symposium, Dallas, Tx, 1/15 - 1/18/90
7. "Pulse Modulated Nonlinear Control of Flexible Spacecraft," NASA JSC, February 12, 1990
8. "Robust H_∞ Control Design for the Space Station," University of Colorado, Boulder, March 9, 1990
9. "Spacecraft Control Systems Analysis and Design for the KOREASAT," The Korean Institute of Communication Sciences Symposium, Seoul, Korea, July 2-3, 1990
10. "Robust Control Design for the Space Station," University of California, Irvine, October 12, 1990
11. "Control Logic Synthesis for the Space Station," The Korean Sciences and Technology Symposium, Seoul, Korea, Oct. 15-16, 1991
12. "Robust Control Design for the Space Station," Dept. of Aerospace Engineering, Korea Advanced Institute of Science & Technology, Taejon, Korea, October 17, 1991
13. "Robust Control Theory and Applications" Korean Automatic Control Conference, Seoul, Korea, October 22-24, 1991
14. "Robust Control Design for the Space Station," Dept. of Aerospace Engineering, Seoul National University, Korea, October 25, 1991
15. "Space Vehicle Dynamics and Control," The Korean Institute of Aerospace Technology, Seoul, Korea, May 26, 1992
16. "Control Logic Design for Flexible Spacecraft," Korean Aerospace Research Center, Taejon, Korea, May 28-29, 1992
17. "Robust Non-Minimum-Phase Compensation for a Class of Uncertain Dynamical Systems," Dept. of Control Engineering, Seoul National University, July 13, 1992
18. "Robust H_∞ Control Design for Benchmark Problems," Dept. of Aerospace Engineering, Konkuk University, Seoul, Korea, July 14, 1992
19. "Overview of Spacecraft Systems Engineering and Attitude Control Systems Design," Aerospace Re-

- search Center, Samsung Aerospace, Daejeon, Korea, June 16, 1993
20. "Halo Orbit Determination and Control," Dept. of Mechanical Engineering, Seoul National University, September 13, 1995
 21. "Spacecraft Systems Engineering," Hyundai Aerospace Research Center, November 16, 1995
 22. "Satellite Orbit Determination and Control," Korea Aerospace Research Institute, November 28, 1995
 23. "Halo Orbit Determination and Control," Dept. of Aerospace Engineering, Korea Advanced Institute of Science and Technology (KAIST), December 7, 1995
 24. "Halo Orbit Determination and Control," Aerospace Technology Symposium, Korea Air Force Academy, December 8, 1995
 25. "Overview of Spacecraft Systems Engineering," Korea Aerospace Research Institute, December 20, 1995
 26. "Time-Optimal Control of Agile Spacecraft," Korean Aerospace Conference, November 13-15, 1997, Seoul, Korea
 27. "Singularity Robust Steering Logic for Redundant Single-Gimbal Control Moment Gyros," the 22nd International Symposium on Space Technology and Science, Morioka, Japan, May 28 - June 4, 2000
 28. "Rapid Multi-Target Acquisition and Pointing Control of Agile Spacecraft," the 22nd International Symposium on Space Technology and Science, Morioka, Japan, May 28 - June 4, 2000
 29. "Dynamic Modeling and Attitude Control of Solar Sail Spacecraft," Astrodynamics Workshop, Surrey Space Center, University of Surrey, England, April 23-24, 2002.
 30. "Dynamics and Attitude Control of Large Solar Sail Spacecraft," Dept. of Aerospace Engineering, Seoul National University, Korea, May 12, 2003.
 31. "Dynamics and Attitude Control of Large Solar Sail Spacecraft," Korea Aerospace Research Institute, Daejeon, Korea, May 14, 2003.
 32. "Solar Sailing Missions and Technology," Keynote Speaker, *AIAA Guidance, Navigation, and Control Conference*, San Francisco, CA, August 15-18, 2005.
 33. "Solar Sailing Kinetic Energy Interceptor (KEI) Mission for Impacting and Deflecting Near-Earth Asteroids," Keynote Speaker, *6th International ESA Conference on Guidance, Navigation and Control Systems*, Loutraki, Greece, October 17-21, 2005
 34. "Solar Sailing Kinetic Energy Impactor Mission Design for Impacting and Deflecting Near-Earth Asteroids," *NASA Workshop on NEO Detection, Characterization, and Threat Mitigation*, Vail, CO, June 26-29, 2006.
 35. "Control of a Solar Sail Gravity Tractor Spacecraft for Asteroid Deflection," Surrey Space Centre, University of Surrey, U.K., September 1, 2006
 36. "AOCS Design for Solar Sails," DLR (German Aerospace Research Center), Oberpfaffenhofen, Germany, September 4, 2006.
 37. "Solar Sail Gravity Tractor Spacecraft for Asteroid Deflection," Dept. of Aerospace and Mechanical Engineering, University of Arizona, September 28, 2006.
 38. "Solar Sail Technology for Asteroid Deflection," Dept. of Aerospace Engineering, Iowa State University, Ames, IA, October 5, 2006.
 39. "Solar Sail Technology for Asteroid Deflection," Korea Aerospace Research Institute, Daejeon, January 3, 2007.
 40. "Solar Sail Gravity Tractor Concept for Asteroid Deflection," *1st International Symposium on Solar Sailing (ISSS 2007)*, Herrsching, Germany, June 27-29, 2007.
 41. "Classical vs. Adaptive Control of a Large Flexible Launch Vehicle," NASA Marshall Space Flight Center, October 11, 2007.
 42. "Asteroid Deflection Research Initiative," National Security Space Office, Washington, D.C., June 25, 2008.
 43. "Asteroid Deflection Research Initiative," NASA Headquarters, Washington, D.C., June 25, 2008.
 44. "Asteroid Deflection Research Initiative," Dept. of Aerospace Engineering, Seoul National University,

July 9, 2008.

45 “Asteroid Deflection Research Initiative,” Korea Aerospace Research Institute, July 15, 2008.

46. “Kinetic Impactors and Gravity Tractors for Asteroid Deflection,” *Asteroid Deflection Research Symposium*, Washington, D.C., October 23-24, 2008.

47. “Asteroid Deflection Research at ADRC,” 1st IAA Planetary Defense Conference, Granada, Spain, April 27-30, 2009.

48. “Asteroid Deflection Research at ADRC,” Korea Aerospace Research Institute, July 10, 2009.

49. “Astrodynamics Principles for Deflecting Hazardous Near-Earth Objects,” Invited John Breakwell Memorial Lecture, IAC-09-C1.3.1, 60th International Astronautical Congress, Daejeon, Korea, October 12-16, 2009.

50. “Nuclear Deflection Mission Analysis and Design,” NASA/DTRA/NNSA Asteroid Deflection Workshop, Washington, DC, October 20-22, 2009.

51. “Asteroid Deflection Technology Overview,” an invited lecture at Lockheed Martin’s Technical Fellow Meeting, Atlanta, GA, May 3, 2010.

52. “Earth-Impact Analysis of NEOs Fragmented and Dispersed by Nuclear Subsurface Explosions,” AAS Kyle Alfriend Astrodynamics Symposium, Monterey, CA, May 17-19, 2010.

53. “Solar Sailing Technology Overview,” an invited lecture for The Planetary Society, Pasadena, CA, June 3, 2010.

54. “Mitigation of Asteroid Impact Threats,” an invited lecture for the NASA Goddard Space Flight Center Engineering Colloquium, Greenbelt, MD, October 4, 2010.

55. “Mitigation of Asteroid Impact Threats,” an invited lecture at NASA Headquarters, October 5, 2010.

56. “Asteroid Deflection Research Overview,” Korea Aerospace Research Institute, November 25, 2010.

57. “An Overview of Asteroid Deflection/Disruption Research at Iowa State ADRC,” Raytheon Missile Systems, Tucson, AZ, May 27, 2011.

58. “Asteroid Deflection Research Overview,” Korea Aerospace Research Institute, November 22, 2011.

59. “Avoiding Asteroid Apocalypse,” an invited talk for Cafe Scientifique at the Scienc Center of Iowa, Des Moines, June 5, 2012.

60. “Avoiding Amargedon,” an invited talk at TEDxDesMoines, July 14, 2012.

61. “An Innovative Solution to NASA’s NEO Impact Threat Mitigation Grand Challenge and its Flight Validation Mission Design,” Korea Aerospace Research Institute, November 22, 2012.

62. “Conceptual Design of a Hypervelocity Asteroid Intercept Vehicle (HAIV),” Satellite Technology Research Center, KAIST, November 22, 2012.

63. “An Innovative Solution to NASA’s NEO Impact Threat Mitigation Grand Challenge and its Flight Validation Mission Design,” NASA National Space Grant Director Meeting, Washington, DC, February 28, 2013.

64. “Space Technology Overview for Planetary Defense,” International Space Development Conference, San Diego, May 23-27, 2013.

65. “ARV-based Kinetic Impactors and Gravity Tractors for Planetary Defense,” NASA’s Asteroid Initiative Ideas Synthesis Workshop, Lunar and Planetary Institute, Houston, Nov. 20-22, 2013.

Publications: 170 Technical Papers (including 60 Peer-Reviewed Journal Articles)

[1] Wie, B. and Bryson Jr., A.E., “Attitude Control of a Triangular Truss in Space,” Paper 77-2, presented at IFAC 8th World Congress, Kyoto, Japan, 1981.

[2] Wie, B. and Bryson, Jr., A.E., “Modeling and Control of Flexible Space Structures,” Proceedings of the 3rd VPI&SU/AIAA Symposium on the Dynamics and Control of Large Flexible Spacecraft, Virginia, 1981, pp. 153-174.

[3] Wie, B. and Plescia, C.T., “Attitude Stabilization of a Flexible Spacecraft During Stationkeeping Ma-

- neuers,” *Journal of Guidance, Control, and Dynamics*, Vol. 7, No. 4, 1984, pp. 430-436.
- [4] Wie, B. and Barba, P.M., “Quaternion Feedback for Spacecraft Large Angle Maneuvers,” *Journal of Guidance, Control, and Dynamics*, Vol. 8, No. 3, 1985, pp. 360-365.
- [5] Wie, B., Lehner, J.A. and Plescia, C.T., “Roll/Yaw Control of a Flexible Spacecraft Using Skewed Bias Momentum Wheels,” *Journal of Guidance, Control, and Dynamics*, Vol. 8, No. 4, 1985, pp. 447-453.
- [6] Wie, B., “Thrust Vector Control Design for a Liquid Upper Stage Spacecraft,” *Journal of Guidance, Control, and Dynamics*, Vol. 8, No. 5, 1985, pp. 566-572.
- [7] Wie, B., Furumoto, N., Banerjee, A.K. and Barba, P.M., “Modeling and Simulation of Spacecraft Solar Array Deployment,” *Journal of Guidance, Control, and Dynamics*, Vol. 9, No. 5, 1986, pp. 593-598.
- [8] Wie, B. and Bryson, A.E., “On Multivariable Control Robustness Examples: A Classical Approach,” *Journal of Guidance, Control, and Dynamics*, Vol. 10, No. 1, 1987, pp. 118-120.
- [9] Wie, B., “A New Approach to the Space-Axis Rotation,” *Journal of Guidance, Control, and Dynamics*, Vol. 10, No. 4, 1987, pp. 411-412.
- [10] Wie, B., “Active Vibration Control Synthesis for the COFS-I,” *Journal of Guidance, Control, and Dynamics*, Vol. 11, No. 3, 1988, pp. 271-276.
- [11] Wie, B., and Bryson Jr., A.E., “Pole-Zero Modeling of Flexible Space Structures,” *Journal of Guidance, Control, and Dynamics*, Vol. 11, No. 6, 1988, pp. 554-561.
- [12] Wie, B. and Byun, K.W., “New Generalized Structural Filtering Concept for Active Vibration Control Synthesis,” *Journal of Guidance, Control, and Dynamics*, Vol. 12, No. 2, 1989, pp. 147-154.
- [13] Wie, B., Weiss, H., and Arapostathis, A., “Quaternion Feedback Regulator for Spacecraft Eigenaxis Rotations,” *Journal of Guidance, Control, and Dynamics*, Vol. 12, No. 3, 1989, pp. 375-380.
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