

Brandon A. Jones

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Department of Aerospace Engineering Sciences
University of Colorado Boulder
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Education

Ph.D., Aerospace Engineering Sciences, December 2010
Thesis: *Efficient Models for the Evaluation and Estimation of the Gravity Field*
Advisor: Dr. George H. Born
University of Colorado Boulder, Boulder, CO

M.S., Aerospace Engineering Sciences, May 2006
University of Colorado Boulder, Boulder, CO

B.S., Mathematics, B.A., Physics with minor in Engineering, December 2000
The University of Texas at Austin, Austin, TX

Professional Experience

5/2013–Present University of Colorado, Boulder, CO
Assistant Research Professor, Aerospace Engineering Sciences Department

3/2011–5/2013 University of Colorado, Boulder, CO
Research Associate, Aerospace Engineering Sciences Department

5/2005–12/2010 University of Colorado, Boulder, CO
Graduate Research Assistant, Aerospace Engineering Sciences Department

1/2004–6/2004 Odyssey Space Research, Houston, TX
Engineer/Analyst

1/2001–1/2004 Titan Corporation (now L-3 Communications), Houston, TX
Engineer

Teaching Experience

Statistical Orbit Determination I (graduate), Fall 2013, 2014 - Instructor

Orbital Debris (graduate), Fall 2012 - Instructor

Statistical Orbit Determination II (graduate), Spring 2009 - Instructor

Lead Graduate Teacher, Aerospace Engineering Sciences, May 2008 - May 2009

Graduate Teaching Assistant

- Statistical Orbit Determination I (graduate, 4 semesters)
- Interplanetary Mission Design (graduate, 2 semesters)
- Orbital Mechanics/Attitude Dynamics and Control (junior, 2 semesters)
- Introduction to GNSS (graduate, 1 semester)
- Space Flight Dynamics (graduate, 1 semester)
- Introduction to Thermodynamics and Aerodynamics (sophomore, 1 semester)

Publications

Book Chapters

Born, G. H. and **B. A. Jones**, "Satellite Orbit Determination", in *Encyclopedia of Aerospace Engineering*, edited by R. Blockley and W. Shyy, John Wiley and Sons, Ltd., Chichester, UK, 2010, pp. 3085-3100.

Journal Articles

Jones, B. A., N. Parrish, and A. Doostan, "Post-Maneuver Collision Probability Estimation Using Sparse Polynomial Chaos Expansions," *Journal of Guidance, Control, and Dynamics*, Accepted for publication, 2014.

Bradley, B. K., **B. A. Jones**, G. Beylkin, K. Sandberg, and P. Axelrad, "Bandlimited Implicit Runge-Kutta Integration for Astrodynamics," *Celestial Mechanics and Dynamical Astronomy*, Vol. 119, Number 2, pp. 143-168, 2014.

Jones, B. A. and A. Doostan, "Satellite Collision Probability Estimation Using Polynomial Chaos," *Advances in Space Research*, Vol. 52, Number 11, pp. 1860-1875, 2013.

Jones, B. A., A. Doostan, and G. H. Born "Nonlinear Propagation of Orbit Uncertainty Using Non-Intrusive Polynomial Chaos," *Journal of Guidance, Control, and Dynamics*, Vol. 36, Number 2, pp. 415-425, 2013.

Jones, B. A., G. H. Born, and G. Beylkin, "Sequential Orbit Determination with the Cubed-Sphere Gravity Model," *Journal of Spacecraft and Rockets*, Vol. 49, Number 1, pp. 145-156, 2012.

Jones, B. A., G. Beylkin, G. H. Born, and R. S. Provence, "A Multiresolution Model for Small-Body Gravity Estimation," *Celestial Mechanics and Dynamical Astronomy*, Vol. 111, Number 3, pp. 309-335, 2011.

Jones, B. A., G. H. Born, and G. Beylkin, "Comparisons of the Cubed-Sphere Gravity Model with the Spherical Harmonics," *Journal of Guidance, Control, and Dynamics*, Vol. 33, Number 2, pp. 415-425, 2010.

Conference Papers

- Jones, B. A.**, B.-N. Vo, “A Labelled Multi-Bernoulli Filter for Space Object Tracking”, *AAS/AIAA Spaceflight Mechanics Meeting*, Williamsburg, VA, January 11-15, 2015.
- J. Herman, J.S. Parker, **B. A. Jones**, and G.H. Born “High-Speed, High-Fidelity Low-Thrust Trajectory Optimization Through Parallel Computing and Collocation Methods”, *AAS/AIAA Spaceflight Mechanics Meeting*, Williamsburg, VA, January 11-15, 2015.
- S. Gehly, **B. A. Jones**, P. Axelrad, “An AEGIS-CPHD Filter to Maintain Custody of GEO Space Objects with Limited Tracking Data”, *Advanced Maui Optical and Space Surveillance Technologies Conference*, Maui, HI, September 10-13, 2014.
- Jones, B. A.**, S. Gehly, P. Axelrad, “Measurement-based Birth Model for a Space Object Cardinalized Probability Hypothesis Density Filter”, *AIAA/AAS Astrodynamics Specialist Conference*, San Diego, CA, August 4-7, 2014.
- D.J. Scheeres, E.I. Asphaugh, C. Bombardelli, S. Chesly, A. Doostan, E. Herbold, **B. A. Jones**, D. Korycansky, J.W. McMahon, P. Miller, J.M. Owen, and P. Sanchez, “Comprehensive Modeling of the Effects of Hazardous Asteroid Mitigation Techniques”, *AAS/AIAA Space Flight Mechanics Meeting*, Santa Fe, NM, January 26-30, 2014.
- Jones, B. A.**, N. Parrish, M.S. Werner, and A. Doostan, “Post-Maneuver Collision Probability Estimation Using Polynomial Chaos”, *AAS/AIAA Astrodynamics Specialist Conference*, Hilton Head, SC, August 11 - 15, 2013.
- Balducci, M., **B.A. Jones**, and A. Doostan, “Orbit Uncertainty Propagation with Separated Representations”, *AAS/AIAA Astrodynamics Specialist Conference*, Hilton Head, SC, August 11 - 15, 2013.
- Herman, J., **B.A. Jones**, G.H. Born, and J.S. Parker, “A Comparison of Implicit Integration Methods for Astrodynamics”, *AAS/AIAA Astrodynamics Specialist Conference*, Hilton Head, SC, August 11 - 15, 2013.
- Gehly, S., **B.A. Jones**, and P. Axelrad, “Comparison of Multitarget Filtering Methods as Applied to Space Situational Awareness”, *AAS/AIAA Astrodynamics Specialist Conference*, Hilton Head, SC, August 11 - 15, 2013.
- Wawrzyniak, G.G., J.R. Carpenter, D.J. Mattern, T.W. Williams, N.A. Ottenstein, and **B.A. Jones**, “Conjunction Assessment Concept of Operations for the Magnetospheric Multi-Scale (MMS) Mission”, *AAS/AIAA Astrodynamics Specialist Conference*, Hilton Head, SC, August 11 - 15, 2013.
- Jones, B. A.**, A. Doostan, and G. H. Born, “Conjunction Assessment Using Polynomial Chaos Expansions” *International Symposium on Space Flight Dynamics*, Pasadena, CA, October 29 - November 2, 2012.

- Jones, B. A.**, “Orbit Propagation Using Gauss-Legendre Collocation” *AIAA/AAS Astrodynamics Specialist Conference*, Minneapolis, MN, August 13 - 16, 2012.
- Leonard, J. M., **B. A. Jones**, E. J. Villalba, and G. H. Born, “Absolute Orbit Determination and Gravity Field Recovery for 433 Eros Using Satellite-to-Satellite Tracking” *AIAA/AAS Astrodynamics Specialist Conference*, Minneapolis, MN, August 13 - 16, 2012.
- Jones, B. A.** and R. L. Anderson, “A Survey of Symplectic and Collocation Integration Methods for Orbit Propagation,” *22nd Annual AAS/AIAA Space Flight Mechanics Meeting*, Charleston, SC, January 29 - February 2 2012.
- Bradley, B. K., **B. A. Jones**, G. Beylkin, and P. Axelrad, “A New Numerical Integration Technique for Orbit Propagation,” *22nd Annual AAS/AIAA Space Flight Mechanics Meeting*, Charleston, SC, January 29 - February 2 2012.
- Gehly, S., **B. A. Jones**, P. Axelrad, and G. Born, “Minimum L_1 Norm Orbit Determination Using a Sequential Processing Algorithm” *22nd Annual AAS/AIAA Space Flight Mechanics Meeting*, Charleston, SC, January 29 - February 2 2012.
- Jones, B. A.**, et al., “Concept for a New Frontiers Mission to Ganymede: A Planetary Science Summer School Study,” *IEEE Aerospace Conference*, Big Sky, Montana, March 5-12 2011.
- Jones, B. A.**, G. Beylkin, G. H. Born, and R. S. Provence, “A New Representation for Small-Body Gravity Estimation,” *AIAA/AAS Astrodynamics Specialist Conference*, Toronto, Canada, August 2-5 2010.
- Jones, B. A.**, G. H. Born, and G. Beylkin, “Orbit Determination with the Cubed Sphere Model,” *20th Annual AAS/AIAA Space Flight Mechanics Meeting*, San Diego, California, February 14-17 2010.
- Jones, B. A.**, G. H. Born, and G. Beylkin, “A Cubed Sphere Gravity Model For Fast Orbit Propagation,” *19th Annual AAS/AIAA Space Flight Mechanics Meeting*, Savannah, Georgia, February 8-12 2009.
- Jones, B. A.**, “Surface Feature Navigation in Low Lunar Orbit,” *18th Annual AAS/AIAA Space Flight Mechanics Meeting*, Galveston, Texas, January 28 - 31 2008.
- Jones, B. A.**, G. H. Born, and D. B. Goldstein, “Expected Orbit Determination Accuracy of High altitude, Highly Inclined Satellite Orbits,” *17th Annual AAS/AIAA Space Flight Mechanics Meeting*, Sedona, Arizona, January 28 - February 1 2007.
- Axelrad, P., K. Larson, and **B. A. Jones**, “Use of the Correct Satellite Repeat Period to Characterize and Reduce Site Specific Multipath Errors,” *Institute of Navigation GNSS Conference*, Long Beach, California, September 14-16 2005.
- Wagenknecht, J., S. Fredrickson, T. R. Manning, and **B. A. Jones**, “Development and Testing of the Miniature Autonomous Extravehicular Camera (Mini-AERCam) Guid-

ance, Navigation, and Control System,” *26th Annual ASS Guidance and Control Conference*, Breckenridge, Colorado, February 5-9 2003.

Other

Jones, B. A., “International Space University Summer Session Program 2003: One Perspective,” *Space Times*, March/April, 2004, pp. 6-7.

Honors and Awards

AIAA Orville and Wilbur Wright Graduate Award, 2010
NASA Graduate Student Researchers Program (GSRP) Fellowship, 2008-2010
Best Should Teach Silver Award, 2008
CU Aerospace Engineering Sciences Departmental Fellowship, 2004
NASA ISU-SSP Scholarship, 2003
American Astronautical Society ISU-SSP Scholarship, 2003
NASA Group Achievement Award, Mini-AERCam, 2003

Society Affiliations

American Astronautical Society (AAS)
American Institute of Aeronautics and Astronautics (AIAA)
Society for Industrial and Applied Mathematics (SIAM)

Meetings/Symposium/Workshops Organized

Session chair for *Optimization Methods IV* at the AIAA/AAS Astrodynamics Specialist Conference, August, 2014

Organizer of mini-Symposium *Applications of Uncertainty Quantification in Astrodynamics* at the SIAM Conference on Uncertainty Quantification, April, 2014

Technical Committees

Covariance Realism Working Group, Astrodynamics Innovation Committee (AIC)
Transparency, Openness, and Collaboration (TOC) Assessment Working Group, Astrodynamics Innovation Committee (AIC)

Journal Reviewer/Referee

Advances in Space Research
Aerospace Science and Technology
Celestial Mechanics and Dynamical Astronomy
Journal of Guidance, Control, and Dynamics

National Aeronautics and Space Administration (proposal reviews)

January 23, 2015