Brandon A. Jones

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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

1/2016–Present	The University of Texas at Austin, Austin, TX *Assistant Professor, Aerospace Engineering and Engineering Mechanics*
5/2013–12/2015	University of Colorado, Boulder, CO *Research Assistant 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

Spacecraft Dynamics (undergraduate), Spring 2016, 44 students

Statistical Orbit Determination I (graduate), Fall 2013, 2014, and 2015 - 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 and Presentations

Bold font indicates my place in the author list and that of any students I advise or co-advise.

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

Bryant, D. S., E. D. Delande, **S. Gehly**, J. Houssineau, D. E. Clark, and **B. A. Jones**, "Spawning Models for the CPHD Filter," In press, 2016.

S. Gehly, **B. A. Jones**, and P. Axelrad "A Sensor Allocation Scheme for Tracking Geosynchronous Space Objects", *Journal of Guidance, Control, and Dynamics*, In press, 2016.

Feldhacker, J., **B. A. Jones**, A. Doostan, and J. Hampton, "Reduced Cost Mission Design Using Surrogate Models," *Advances in Space Research*, Vol. 57, Number 2, pp. 588-603, 2016.

Jones, B. A., N. Parrish, and A. Doostan, "Postmaneuver Collision Probability Estimation Using Sparse Polynomial Chaos Expansions," *Journal of Guidance, Control, and Dynamics*, Vol. 38, Number 8, pp. 1425-1437, 2015.

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.

Submitted Papers

Feldhacker, J. D.,, M. B. Syal, **B. A. Jones**, A. Doostan, J. McMahon, and D.J. Scheeres, "Shape Dependence of the Kinetic Deflection of Asteroids" Under review, 2016.

Balducci, M., **B. A. Jones**, and A. Doostan, "Orbit Uncertainty Propagation With Separated Representations", Under review, 2016.

Conference Papers

Jones, B. A., B.-T. Vo, and B.-N. Vo, "Generalized Labeled Multi-Bernoulli Space-Object Tracking with Joint Prediction and Update", *AIAA/AAS Astrodynamics Specialist Conference*, Long Beach, CA, September 13-16, 2016.

Feldhacker, J. D., J. Smith, **Jones, B. A.**, and A. Doostan, "Multi-Element Trajectory Models for Satellite Tour Missions" *AIAA/AAS Astrodynamics Specialist Conference*, Long Beach, CA, September 13-16, 2016.

Geeraert, J. L., J. W. McMahon, and **B. A. Jones**, "Orbit Determination Observability of the Dual-Satellite Geolocation System with TDOA and FDOA" *AIAA/AAS Astrodynamics Specialist Conference*, Long Beach, CA, September 13-16, 2016.

Jones, B. A., "Modeling Birth in a Space-Object CPHD Filter Using the Probabilistic Admissible Region", *International Conference on Information Fusion - Fusion 2016*, Heidelberg, Germany, July 5-8, 2016.

Feldhacker, J. D., B. A. Jones, and A. Doostan, "Trajectory Optimization Under Uncertainty for Rendezvous in the CRTBP" *AAS/AIAA Space Flight Mechanics Meeting*, Napa, CA, February 14-18, 2016.

Bryant, D. S. and **B. A. Jones**, "Fragmentation Event Tracking with the GM-CPHD Filter", *AAS/AIAA Space Flight Mechanics Meeting*, Napa, CA, February 14-18, 2016.

Balducci, M., **J. D. Feldhacker**, J. Smith, **B. A. Jones**, "Interplanetary Orbit Uncertainty Propagation Using Polynomial Surrogates", *AAS/AIAA Astrodynamics Specialist Conference*, Vail, CO, August 9-13, 2015.

Geeraert, J. L., B. A. Jones, and J. W. McMahon, "Improving Geolocation Accuracy Through Refined Satellite Ephemeris Estimation in an Ill-Conditioned System," *AAS/AIAA Astrodynamics Specialist Conference*, Vail, CO, August 9-13, 2015.

Feldhacker, J. D., B. A. Jones, A. Doostan, D. J. Scheeres, and J. W. McMahon, "Shape Dependence of Kinetic Deflection for a Survey of Real Asteroids," *AAS/AIAA Astrodynamics Specialist Conference*, Vail, CO, August 9-13, 2015.

Jones, B. A., **D. S. Bryant**, B.-T. Vo, and B.-N. Vo, "Challenges of Multi-Target Tracking for Space Situational Awareness", *International Conference on Information Fusion - Fusion 2015*, Washington D. C., July 6-9, 2015.

Feldhacker, J. D., B. A. Jones, A. Doostan, D. J. Scheeres, and J. W. McMahon, "Kinetic Deflection Uncertainties for Real Asteroid Shapes", *4th IAA Planetary Defense Conference - PDC 2015*, Frascati, Roma, Italy, April 13-17, 2015.

Scheeres, D. J., M. Bruck Syal, J. W. McMahon, **J. D. Feldhacker, B. A. Jones,** A. Doostan, M. Owen, P. Miller, E. Herbold, and E. Asphaug, "Characterizing the Effect of Asteroid Topography on Hazardous Asteroid Kinetic Impace Deflection", *4th IAA Planetary Defense Conference - PDC 2015*, Frascati, Roma, Italy, April 13-17, 2015.

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.

Herman, J., 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.

Gehly, S., **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.

Scheeres, D.J., 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) Guidance, Navigation, and Control System," *26th Annual ASS Guidance and Control Conference*, Breckenridge, Colorado, February 5-9 2003.

Invited Presentations

"Advanced Multi-Target Filtering Methods for Space Situational Awareness", Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, January 29, 2015.

Other

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

Ph.D. Students Graduated

Juliana Feldacker, Spring 2016. University of Colorado, Boulder, Area of research: Developed surrogate-based methods to enable reduced-cost spacecraft mission design.

Graduate Students Supervised

Nicholas Ravago, Summer 2016 - Present. The University of Texas at Austin, Area of research: Applying multi-Bernoulli multi-target filters to space object tracking and sensor management.

Daniel Bryant, Fall 2013 - Present. University of Colorado, Boulder, Area of research: Implementing new methods of modeling spawning events and improved probability of detection models within the context of space situational awareness and multi-target tracking using random finite sets.

Marc Balducci, Fall 2012 - Present. University of Colorado, Boulder, Area of research: Uncertainty quantification and optimization under uncertainty (OUU) for spacecraft missions in highly-dynamic environments.

Steven Gehly, Fall 2011 - Present (dual advisor with Penina Axelrad). University of Colorado, Boulder, Area of research: Studying the application of random finite set-based methods of multi-target tracking for space situational awareness.

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), Member

American Institute of Aeronautics and Astronautics (AIAA), Senior Member

Society for Industrial and Applied Mathematics (SIAM), Member

Meetings/Symposium/Workshops Organized

Co-Organizer for session *Space Object Detection, Tracking, Identification, and Classification* at the International Conference on Information Fusion, July, 2016.

Co-Organizer for session *Space Object Detection, Tracking, Identification, and Classification* at the International Conference on Information Fusion, July, 2015.

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

Technical Committees

AAS Space Surveillance Technical Committee (2016-Present)

AIAA Astrodynamics Technical Committee (2015 - Present)

Covariance Realism Working Group, Astrodynamics Innovation Committee (AIC) (2013-Present)

Transparency, Openness, and Collaboration (TOC) Assessment Working Group, Astrodynamics Innovation Committee (AIC) (2014-Present)

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)

Transactions on Microwave Theory and Techniques

October 12, 2016