

# DREW RYAN JONES

[drjones604@gmail.com](mailto:drjones604@gmail.com)

[drewryanjones.com](http://drewryanjones.com)

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## EDUCATION

**PhD** The University of Texas at Austin, Aerospace Engineering, 4.0 GPA 2013  
*A Dynamical Systems Theory Analysis of Coulomb Spacecraft Formations*  
Advisor: Dr. Cesar Ocampo

**MSE** The University of Texas at Austin, Aerospace Engineering, 3.86 GPA 2010

**BSE** Arizona State University, Aerospace Engineering, 3.47 GPA 2008

**Specialized Graduate Coursework:** Numerical Optimization, Optimal Spacecraft Trajectories, Celestial Mechanics, Optimal Control Theory, Statistical Estimation Theory, Satellite Geodesy, Design Automation and Optimization, Nonlinear Dynamical Systems, and Orbit Determination.

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## EMPLOYMENT

**Jet Propulsion Laboratory**, California Institute of Technology, Pasadena, CA  
**Member of the Technical Staff**, Mission Design and Navigation Section 2013-  
Supervisors: Tung Han Yu, Tomas Martin-Mur

- Navigation analyst for Psyche, Maven, Mars2020, and RedDragon projects
- Orbit determination lead for Parker Solar Probe project
- Mission design capture-lead for 2015 Discovery opportunity proposal
- Mission design research technologist
- Principal architect of Nova (a multi-mission navigation software framework in Python)

**Applied Physics Laboratory**, Laurel, MD  
**NASA Internship**, Supervisor: Dr. Robin Vaughan 2009-2009

- Mission design for multi-disciplinary feasibility study of a Uranus orbiter mission
- Guidance and control engineer for Radiation Storm Belt Probes project (Earth orbiter)

**Honeywell Aerospace**, Glendale, AZ  
**Subcontract Software Engineer**, Supervisor: Larry Yust 2008-2008

**Honeywell Aerospace**, Tempe, AZ  
**Test Engineer Internship**, Supervisor: Scott Martin 2005-2007

**Arizona State University / NASA**, Tempe, AZ  
**NASA Space Grant Internship**, Supervisor: Candace Jackson 2003-2007

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## RESEARCH AND TEACHING EXPERIENCE

**Research interests:** Computational astrodynamics, dynamical systems theory, optimal control of cooperative spacecraft, low-thrust trajectory optimization, mixed-integer and branching techniques applied to trajectory and space systems optimization.

<b>Arizona State University, Tempe, AZ</b>	2017
<ul style="list-style-type: none"> <li>• <b>Invited guest seminar</b></li> <li>• Topics: Computational astrodynamics, trajectory design, and celestial mechanics</li> </ul>	
<b>The University of Texas at Austin and NASA JSC, Austin, TX</b>	2009-2010
<ul style="list-style-type: none"> <li>• <b>Research Assistant</b>, Advisor: Dr. Cesar Ocampo</li> <li>• Develop methods/software for targeting anytime, fuel optimal, Moon to Earth trajectories</li> </ul>	
<b>The University of Texas at Austin, Austin, TX</b>	2008-2010
<ul style="list-style-type: none"> <li>• <b>Teaching Assistant</b>, Department of Aerospace Engineering</li> <li>• Performed lectures to 40+ students, assisted in grading, and held regular office hours</li> <li>• Courses: Statics, Flight Controls, Celestial Mechanics, and Spacecraft Dynamics</li> </ul>	

## AWARDS AND RECOGNITIONS

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<b>NASA Exceptional Achievement in Engineering: Parker Solar Probe NAV Team</b>	2019
<b>Winning team - 9<sup>th</sup> International Global Trajectory Optimisation Competition</b>	2017
<b>Winning team - 7<sup>th</sup> International Global Trajectory Optimisation Competition</b>	2014
<b>NASA RHG Exceptional Achievement in Engineering: MAVEN NAV Team</b>	2014
<b>NDSEG Graduate Research Fellowship</b>	2010-2013
National award from the Department of Defense	
<b>Cockrell School of Engineering Graduate Fellowship</b>	2008-2010
<b>Fulton Undergraduate Research Fellowship</b>	2007-2008
<b>ASU Provost Scholarship</b>	2003-2008
<b>Worth and Dot Howard Scholarship</b>	2003-2008

## PROFESSIONAL INVOLVEMENT

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### ***Society Affiliations:***

• American Institute of Aeronautics and Astronautics Member	2006-
• American Astronautical Society Member	2010-

### ***External Reviewer:***

- AIAA Journal of Guidance, Control, and Dynamics
- IEEE Transactions on Aerospace and Electronic Systems
- ASCE Journal of Aerospace Engineering

## COMPUTER SKILLS AND FLUENCIES

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**Astrodynamic Software:** MONTE and SPICE/NAIF toolkits (JPL), Copernicus, GMAT, STK/Astrogator, SOAP, SGP4 propagation, and various optimization and targeting libraries

**Programming:** Linux/Windows/MacOS, Python, Git, Subversion, C-shell, Bash, Fortran, C++, Java, Matlab, Simulink, LaTeX, and Mathematica

## PUBLICATIONS

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### ***Journal Articles:***

**D.R. Jones**, "Probability of a Spacecraft Collision at Mars," submitted to *Journal of Guidance, Control, and Dynamics*, January 2018.

**D.R. Jones**, "Trajectories for Flyby Sample Return at Icy Moons," *Journal of Spacecraft and Rockets*, Vol. 55, No. 3, 2018, pp. 529-540.

M. Jesick, S. Demcak, B. Young, **D.R. Jones**, et al. "Navigation Overview for the Mars Atmosphere and Volatile Evolution Mission," *Journal of Spacecraft and Rockets*, Vol. 54, No. 1, 2017, pp. 29-43.

**D.R. Jones** and H. Schaub, "Collinear Three-Craft Coulomb Formation Stability Analysis and Control," *Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 1, 2014, pp. 224-232.

**D.R. Jones** and H. Schaub, "Periodic Relative Orbits of Two Spacecraft Subject to Differential Gravity and Electrostatic Forcing," *Acta Astronautica*, Vol. 89, August-September 2013, pp. 21-30.

**D.R. Jones** and H. Schaub, "Optimal Reconfigurations of Two-Craft Coulomb Formations along Manifolds," *Acta Astronautica*, Vol. 83, February-March 2013, pp. 108-118.

**D.R. Jones** and C. Ocampo, "Optimization of Impulsive Trajectories between a Circular Orbit and a Hyperbolic Asymptote," *Journal of Guidance, Control, and Dynamics*, Vol. 35, No. 1, January-February 2012, pp. 234-244.

### ***Conference Papers:***

Y. Guo, P. Thompson, J. Wirzburger, N. Pinkine, S. Bushman, T. Goodson, R. Haw, J. Hudson, **D. Jones**, et al., "Execution of Parker Solar Probe's Unprecedented Flight to the Sun and Early Results," *70th International Astronautical Congress*, Washington, DC, October 21-25, 2019.

N. Bradley, J.S. Snyder, **D.R. Jones**, D. Trofimov, and D. Koh, "Navigation Models for Psyche Electric Propulsion Uncertainty," *AAS/AIAA Astrodynamics Specialists Conference*, Portland, ME, August 2019.

S. Hernandez, S. Campagnola, and **D.R. Jones**, "An Analytical Approach to the Ballistic Cycler Problem," *AAS/AIAA Spaceflight Mechanics Meeting*, Ka'anapali, HI, January 2019.

P. Valerino, P. Thompson, **D.R. Jones**, et al., "Charting a Course to the Sun: Flight Path Control for Parker Solar Probe," *AAS/AIAA Spaceflight Mechanics Meeting*, Ka'anapali, HI, January 2019.

**D.R. Jones**, S. Hernandez and M. Jesick, "Low Excess Speed Triple Cyclers of Venus, Earth, and Mars," *AAS/AIAA Astrodynamics Specialists Conference*, Stevenson, WA, August 2017.

**D.R. Jones**, P. Thompson, T. Goodson, et al., “Orbit Determination Covariance Analyses for the Parker Probe Mission,” *AAS/AIAA Astrodynamics Specialists Conference*, Stevenson, WA, August 2017.

S. Hernandez, **D.R. Jones** and M. Jesick, "One Class of Io-Europa-Ganymede Triple Cyclers," *AAS/AIAA Astrodynamics Specialists Conference*, Stevenson, WA, August 2017.

P. Thompson, **D.R. Jones**, T. Goodson, et al., “Parker Solar Probe Navigation: One Year From Launch”, *AAS/AIAA Astrodynamics Specialists Conference*, Stevenson, WA, August 2017.

P. Valerino, P. Thompson, **D.R. Jones**, et al., “Flight Path Control Analysis for Parker Solar Probe”, *AAS/AIAA Astrodynamics Specialists Conference*, Stevenson, WA, August 2017.

A. Petropoulos, D. Grebow, **D.R. Jones**, et al., “GTOC9: Methods and Results from the Jet Propulsion Laboratory Team,” *31<sup>st</sup> International Symposium on Space Technology and Science*, Matsuyama, Japan, June 2017.

J. Thangavelautham, A. Rhoden and **D.R. Jones**, “The Opportunities and Challenges of GNC on a Europa Cubesat,” *AAS Guidance and Control Conference*, Breckenridge, CO, February 2017.

**D.R. Jones**, T. Goodson, P. Thompson, P. Valerino and J. Williams, "Solar Probe Plus: Unique Navigation Modeling Challenges," *AIAA Astrodynamics Specialists Conference*, Long Beach, CA, September 2016.

**D.R. Jones**, "Trajectories for Europa Flyby Sample Return," *AIAA Astrodynamics Specialists Conference*, Long Beach, CA, September 2016.

**D.R. Jones**, "Trajectories for Flyby Sample Return at Saturn's Moons," *AIAA Astrodynamics Specialists Conference*, Long Beach, CA, September 2016.

M. Jesick, S. Demcak, B. Young, **D.R. Jones**, et al. “Maven Navigation Overview,” *AAS Space Flight Mechanics Meeting*, Napa, CA, February 2016.

**D.R. Jones**, T. Lam, N. Trawny and C. Lee, “Using MAVEN Onboard Telemetry for Orbit Determination,” *AAS Space Flight Mechanics Meeting*, Williamsburg, VA, January-February 2015.

**D.R. Jones** and H. Schaub, “Periodic Relative Orbits of Two Spacecraft Subject to Differential Gravity and Coulomb Forces,” *5<sup>th</sup> International Conference on Spacecraft Formation Flying Missions and Technologies*, Munich, Germany, May 2013.

**D.R. Jones** and H. Schaub, “Collinear Three-Craft Coulomb Formation Stability Analysis and Control,” *AIAA/AAS Astrodynamics Specialist Conference*, Minneapolis, MN, August 2012.

**D.R. Jones**, “Optimal Reconfigurations of Coulomb Formations along Invariant Manifolds,” *AAS Space Flight Mechanics Meeting*, Charleston, SC, January-February 2012.

**D.R. Jones** and C. Ocampo, “Optimal Impulsive Escape Trajectories from a Circular Orbit to a Hyperbolic Excess Velocity Vector,” *AAS/AIAA Astrodynamics Specialist Conference*, Toronto, Canada,

August 2010.

## COMMUNITY OUTREACH

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- Seminar to students and faculty of Arizona State University, Tempe, AZ** 2017  
An interactive lecture about orbital mechanics jointly with ASU's College of Engineering and College of Earth and Space Exploration.
- Subject Matter Expert for NASA Digital Learning Network, Pasadena, CA** 2014-  
Classroom 'virtual visits' to discuss science and encourage the next generation of scientific minds.
- University of Texas Women in Engineering *GLUE Program*, Austin, TX** 2012-2012  
Mentor in program to expose undergraduate women to technical research.
- NASA Space Grant, Phoenix, AZ** 2006-2007  
Self-developed project to instruct underprivileged children in the fundamentals of rocketry.