DREW RYAN JONES

drjones604@gmail.com drewryanjones.com

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.

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

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.

Arizona State University, Tempe, AZ 2017
- **Invited guest seminar**
- Topics: Computational astrodynamics, trajectory design, and celestial mechanics

The University of Texas at Austin and NASA JSC, Austin, TX 2009-2010
- **Research Assistant**, Advisor: Dr. Cesar Ocampo
- Develop methods/software for targeting anytime, fuel optimal, Moon to Earth trajectories

The University of Texas at Austin, Austin, TX 2008-2010
- **Teaching Assistant,** Department of Aerospace Engineering
- Performed lectures to 40+ students, assisted in grading, and held regular office hours
- Courses: Statics, Flight Controls, Celestial Mechanics, and Spacecraft Dynamics

AWARDS AND RECOGNITIONS

JPL Voyager award (individual navigation software contribution) 2020

JPL team award: Psyche Navigation 2020

NASA Exceptional Achievement in Engineering: Parker Solar Probe NAV Team 2019

Winning team - 9th International Global Trajectory Optimisation Competition 2017

Winning team - 7th International Global Trajectory Optimisation Competition 2014

NASA RHG Exceptional Achievement in Engineering: MAVEN NAV Team 2014

NDSEG Graduate Research Fellowship 2010-2013
National award from the Department of Defense

Cockrell School of Engineering Graduate Fellowship 2008-2010

Fulton Undergraduate Research Fellowship 2007-2008

ASU Provost Scholarship 2003-2008

Worth and Dot Howard Scholarship 2003-2008

PROFESSIONAL INVOLVEMENT

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

Astrodynamics 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

Journal Articles:

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," *Acta Astronautica*, 2020.

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," *31st 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," *5th 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

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.