PERSONAL INFORMATION:

Pedro J. Llanos, Ph.D.
Spaceflight Operations,
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College of Aviation

CONTACT DETAILS:

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PROFESSIONAL EXPERIENCE:

2014-present **Embry-Riddle Aeronautical University**

Manager for Payload Applied Technology and Operations (PATO) Lab

- Collaborated and assisted on project Magneto-Active Slosh Control System for Spacecraft and Launch Vehicle (***MASC***). Research collaboration between Carthage College and ERAU.
  - Participated in Zero-G Parabolic Flights Study (November 2019): Reduce gauging errors in spacecraft and launch vehicles and eliminate destabilizing liquid slosh during vehicle maneuvers (slosh suppression and in-space propellant gauging).
- Collaborated with ERAU/Medical University of South Carolina (*MUSC*)/University of Texas Health Science Center in San Antonio (*UTHSCSA*) research collaborative project aboard *Blue Origin's New Shepard* from West Texas Launch Site (2016-present).
  - Negotiated contracts with stakeholders (eg. Blue Origin, The Arete STEM project, PLD Space). Secured suborbital launch opportunity with PLD Space valued $550,000, and grants from Florida Space Grant Consortium (FSGC), and Faculty Innovative Research Science and Technology (FIRST) grants to fly experiments with Blue Origin.
  - Led, prepared, coordinated and integrated several STEM projects aboard various national and international suborbital platforms (eg. Blue Origin, PLD Space).
  - Designed documentation and engineering studies, reviewed protocols/reports and publications, coordinated engineering and science teams to ensure successful product.
  - Conducted feasibility studies and evaluated existing technologies to optimize functionality of product while maintained detailed documentation in all phases of research and development. Communicated with key contacts outside of own area of expertise.
  - Designed experiments, evaluated data, and provided recommendations to ensure design requirements are met.
  - Led, prepared and coordinated project Muscle characterization eXperiment In Microgravity Universal Spacelab (***McXIMUS***): In-vivo model of zebrafish embryos to analyze microgravity effects on cardiovascular system and stress responses. Blue Origin's New Shepard M11 (May 2, 2019).
  - Led, prepared and coordinated STEM project Microgravity Experiment for Spirulina as Superfood In-vitro (***MESSI***): In-vitro experiment to assess long-term effects of the suborbital flight on spirulina under different light conditions. *Blue Origin's New Shepard M11* (May 2, 2019).
  - Assisted and coordinated STEM Project Acceleration, Environment, Optics & Noise (**AEON**) in the Spaceflight Science Policy and Operations Club. *Blue Origin's New Shepard M11* (May 2, 2019).
  - Led, prepared and coordinated project Cell Research Experiment in Microgravity (***CRExIM***): In-vitro model of T Cells to analyze cell response to microgravity during suborbital flights on board of the *Blue Origin's New Shepard M7* (Dec 12 2017).
  - Provided scientific expertise and assisted researchers in the experimental design during *Visiting Researcher* at MUSC and UTHSCSA to conduct feasibility studies of science in-vitro (T-cells) and in-vivo (zebrafish embryos) experiments in preparation for prospective suborbital flights (summer 2016-present).
- *NASA's Airborne Science Program on WB-57 Aircraft* (Dec 1 2017)
  - Led, assisted and coordinated project Embry-Riddle High Altitude Science and Engineering Rig (***ERHASER***): Experiment to assess the effects of atmospheric environ-

ment at 60,000 feet on T-cells and naïve cells during a 4 hours flight.
    - Analyzed radiation effects using NASA's **LitePix** technology previously flown on the Orion's EFT-1.
    - Prepared and tested a ground-based **ADS-B** unit as a prospective technology to map the proposed ground-based ADS-B transceivers along the Gulf of Mexico, where SpaceX is planning to develop the SpaceX South Texas Launch Site.
- Current Collaboration with *European* company *PLD Space* to launch science and technology payloads aboard their *Miura 1 suborbital rocket in 2020*.
    - Leading and preparation efforts to design medical, biological and technology demonstration experiments.

Supervisor for Operations in Suborbital Space Flight Simulator (SSFS) at ERAU

- **Astronaut-Scientist Training** for the PoSSUM (Polar Suborbital Science in the Upper Mesosphere) 1502 class (October 4th-8th, 2015).
    - **Hypobaric** Chamber training at the Southeast Aero Medical Institute (SAMI)
    - Suborbital Space Flight Simulator training using the PoSSUMcam instrumentation; other instruments: Mesospheric Aerosol Sampling Spectrometer (MASS) and the Mesosphere Clear Air Turbulence (MCAT).
    - Aerobatic Flight training (October 7th, 2015).
- **Researcher** for the integration of prospective suborbital vehicles into the NAS and SESAR air spaces (2015-present).
    - Active presenter involved with the Space Traffic Management Conference.
    - Collaborate with the Next Generation ERAU Applied Research (NEAR) laboratory at Daytona Beach campus/FAA's Target Generation Facility (TGF) to integrate prospective suborbital vehicles.
    - Collaborate with the German Aerospace Center (DLR) to integrate prospective suborbital flights into the Single European Sky ATM Research (SESAR).
    - ADS-B v1.1 certification.
- **Mission Specialist** for the SSFS at ERAU (summer 2015-present).
    - Earth's atmosphere imaging and remote sensing instrumentation.
    - Simulated suborbital flights: XCOR's Lynx, SpaceShipTwo.
- Observed First PoSSUM Training Class 1501
    - Hypobaric Chamber with Pressurized Space Suit Training at Melbourne, Florida (February 7th-9th 2015).
    - Noctilucent Clouds Data Collection Training using the PoSSUM's Simulator in ERAU's Advanced Flight Facility (February 10th-11th 2015).

Inter-Institutional Research Collaboration

- Visiting Researcher, May 26-June 5, 2020, Graduate School of Biomedical Sciences Molecular Medicine, University of Texas Health Science Center in San Antonio (UTHSCSA). Dr. Michael Wargovich's Lab. Area of research: Magnetic 3D bioprinting of cells. Collaboration with Dr. Glauco Souza.
- Visiting Researcher, December 17-23, 2019, Graduate School of Biomedical Sciences Molecular Medicine, University of Texas Health Science Center in San Antonio (UTHSCSA). Dr. Michael Wargovich's Lab. Area of research: Feasibility study using microfluidic chips for cancer model.
- Visiting Researcher, August 7-15, 2019, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Feasibility study using microfluidic chips for cancer model.
- Visiting Researcher, April 29- May 7, 2019, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Preparation of Zebrafish embryos for suborbital flight.
- Visiting Researcher, March 10-18, 2019, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Feasibility

study of Zebrafish embryos for suborbital flight.

- Visiting Researcher, December 15-30, 2018, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Feasibility study of Zebrafish embryos for suborbital flight.
- Visiting Researcher, August 19-25, 2018, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Start study of Zebrafish embryos for suborbital flight.
- Visiting Researcher, December 4-12, 2017, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Preparation of T-cells for suborbital flight.
- Visiting Researcher, March 10-18, 2017, Graduate School of Biomedical Sciences Molecular Medicine, UTHSCSA. Dr. Michael Wargovich's Lab. Area of research: Feasibility study of T-cells for suborbital flight.
- Visiting Researcher, May-August 2016, Department of Surgery and Department of Drug Discovery at Medical University of Southern California. Dr. Mark Rubinstein's Lab and Dr. Sherin Chan's Lab. Area of research: Feasibility study of T-cells and zebrafish embryos for suborbital flight.

2012-2013 **GMV Aerospace and Defence, S.A. (Institut d'Estudis Espacials de Catalunya – IEEC)**

Marie Curie Postdoctoral Research Fellow, Flight Mechanics Group

- GNC for proximity operations in missions to small bodies in support to the ESA Marco Polo R mission and to the Martian moons.

Astronet-II Workshop on Advanced Aspects of Spacecraft Control and Mission Design, University of Strathclyde, June 3-7, 2013. Lectures by Prof. Gerard Gómez, Prof. Josep Masdemont, Prof. Ozan Tekinalp, Prof. Victor Becerra, Prof. Colin McInnes and Prof. Max Vasile.

Astronet-II Workshop on Astrodynamics of Natural and Artificial Satellites: from Regular and Chaotic Motions, University of Tor Vergata, January 14-17, 2013. Lectures by Dr. James Biggs, Dr. Ugo Locatelli, Prof. Daniel Scheeres, Prof. Phil Palmer and Dr. F. Biscani.

2011-2012 **California Institute of Technology**

Keck Institute for Space Studies (KISS)

- Investigated and study the feasibility of returning an entire Near Earth Asteroid to the vicinity of the Earth using technology available.
- Analyzed trajectory using invariant manifolds with dynamical systems theory.

2009-2012 **Jet Propulsion Laboratory**

Visiting Student Researcher Program (JVSRP)

- Developed trajectory design, navigation and orbit determination to the triangular points in the Sun-Earth system.
- Analyzed nonlinear dynamical systems, periodic solutions and stability using high fidelity models and N-body problem applying simple and multiple step integrators, multiple shooting and symplectic integrators.
- Designed low energy transfers using dynamical systems theory.
- Software development.

2010 **Strategic University Research Program (SURP)**

- Designed a mission to the Sun-Earth L5 Lagrange point in the Circular Restricted Three Body Problem (CTRBP) for early warning of solar storms and scientific observations of the Sun.
- Studied the dynamics of galaxies using a direct planar N-body simulation.

2007 **University of Southern California**

Information Sciences Institute, Lunar Lander Project Team

- Designed, built and tested a LEAPFROG Lunar Lander Prototype Vehicle. Hands on experience in different subsystems, such as structures and propulsion, machinery and systems integration.

2004-2005 **Physics and Astronomy Department**

Research Assistant

- Investigated the spectra of gamma ray burst afterglows analyzing the relativistic fireball shock and the cannonball models.

2001 **Physics Department at the University of Texas at Austin**

Main Injector Neutrino Oscillation Search (MINOS) Lab Assistant

- Tested the multi-anode phototubes (PMTs) by carrying out daily tasks accurately followed by strict methodologies to carry pertinent analyses to support scientific investigations.
- Maintained and operated standard laboratory equipment (eg. High Voltage Testing Capability, Oscilloscope, Voltmeter and Vacuum Drying Oven). I ensured that the lab was well-stocked and resourced, and recorded statistics and results.

TEACHING EXPERIENCE:

2014-present **Embry-Riddle Aeronautical University, College of Aviation**

(Fall 2020-present) *Associate* Professor, Applied Aviation Sciences Department
(2014-2020) *Assistant* Professor, Applied Aviation Sciences Department

- Commercial Space Operations – August 2014-present
  Courses taught:
  - CSO 390 Payloads and Integration
  - SP 300 Spacecraft and Satellite Systems
  - SP 400 Introduction to Navigation
  - CSO 330 Spaceflight and Operations Training
  - SP 110 Introduction to Space Flight
  - SP 200 Planetary and Space Exploration
  - SP 425 Selected Topics in Space and Aerospace, Part I
  - SP 215 Space Stations Systems and Operations
  - SP 210 Space Transportation Shuttle
  - SP 425 Selected Topics in Space and Aerospace, Part II
  - CSO 490 Commercial Space Ops Seminar (Co-teaching)

Adjunct Professor Applied Aviation Sciences Department, College of Aviation

- Commercial Space Operations – June 2014-August 2014 (Summer B)

2008-2012 **Teaching Assistant at University of Southern California**

- Graded homework and reporting the grades to the professor.
- Instructed and inspired students with different levels of innovative applications and creative ways of approaching one problem.
- Provided direction with background reading, problem methodology.
- Taught students how to analyze and understand their results.
- Led group discussion sessions. Blackboard system.

TA for ASTE 520, Spacecraft Mission Design Class at the Astronautical Engineering Department, Viterbi School of Engineering, University of Southern California.

- Held weekly office hours and graded homework and exams for a group of over 100 graduate students from different science and engineering backgrounds.

Fall 2007: TA for ASTE 580, Orbital Mechanics I at the Division of Astronautical Engineering and

Space Technology, Viterbi School of Engineering, University of Southern California.

- Held weekly office hours and graded homework for a group of 37 graduate students from different science and engineering backgrounds. Graded projects.

2009 **Faculty Mentor at University of California in Los Angeles Faculty Mentor at Research in Industrial Projects (RIPS) Program, Institute For Pure and Applied Mathematics (IPAM) at the University of California (UCLA).**

- Taught Astrodynamics to the RIPS JPL team.
- Oversaw the progress of my students' team developing a close working relationship at the start of the program with the student team.
- Understand the needs of individual students as well as the team as a whole, and knowing when to intervene to help the project move forward and when to let the team experiment with different approaches to a solution.
- Assisted students with developing a statement of work for their project, answered questions, and provided direction with background reading, research methodology and results analysis.
- Reviewed and critiqued students' written work and public presentation skills.
- Held weekly meeting with my mentor and the RIPS director to review the performance of individual students and understand how to propel the project forward.

2003-2006 **Teaching Assistant at University of Oklahoma**

TA for AME 2623, Circuits and Sensors at the Aerospace and Mechanical Engineering Department, University of Oklahoma at Norman.

Fall 2004: TA for PHYS 1311, General Physics Lab at the Physics and Astronomy Department, University of Oklahoma at Norman.

- Held weekly meetings with the instructor to make sure that the lab equipment was properly working before teaching the corresponding lab lecture.
- Prepared, instructed and supervised groups of students performing experiments.
- Graded laboratory reports.

Spring 2004: TA for PHYS 2524, General Physics for Engineers and Science Majors for a large number of undergraduates at the Physics and Astronomy Department, University of Oklahoma at Norman.

- Led group discussions sessions, prepared homework and solutions on a blackboard system and held office hours.

Fall 2003: TA for PHYS 5213, Nuclear and Particle Physics for a larger number of graduate students at the Physics and Astronomy Department, University of Oklahoma at Norman.

EDUCATION:

2020 **Data Science Professional Certificate, University of Harvard (edX).**

R Basics, Visualizations, Probability, Inference and Modeling, Productivity Tools, Wrangling, Linear Regression, Machine Learning, Capstone.

2012 **Ph.D. Astronautical Engineering, University of Southern California (USC).** Thesis: "Trajectory Mission Design and Navigation for a Space Weather Forecast". GPA=3.7/4.0

2008 **M.S. Astronautical Engineering**, **University of Southern California (USC).**

2005-2006 **Ph.D Aerospace and Mechanical Engineering, University of Oklahoma (OU),** (discontinued)

2005 **M.S. Astrophysics, University of Oklahoma**: "Spectra of Gamma Ray Bursts Afterglows". GPA=4.0/4.0

2003	**B.S. Physics, University of Valencia, Spain.**
Languages	**Spanish, English, French (basic)**
Relevant course work	**University of Southern California** ▪ Advanced Topics in Astrodynamics: Rendezvous, Station Keeping of GEO satellites, The Sigma Point Consider Filter, Optical Navigation by Dr. Hintz, Dr. Chao (The Aerospace Corporation), Dr. Lisano (JPL) and Dr. Owen (JPL) ▪ Low Cost Mission Design (Dr. Wertz, Microcosm) ▪ Orbital Mechanics I (Prof. Hintz, USC) ▪ Orbital Mechanics II (Dr. Kwok, JPL) ▪ Remote Sensing for Space (Dr. Freeman and Dr. MacDonald, JPL) ▪ Space Navigation and Statistical Orbit Determination (Dr. Hintz, USC) ▪ Space Environments and Spacecraft Interactions (Dr. Tobiska, Space Environment Technologies) ▪ Spacecraft Attitude Dynamics (Dr. Goodson, JPL) ▪ Spacecraft Design (Prof. Gruntman, USC) ▪ Spacecraft Propulsion (Dr. Goodfellow, Lockheed Martin) **University of Oklahoma** ▪ Advanced Particle/Nuclear Physics (Prof. Skubic, OU) ▪ Cosmology/General Relativity (Prof. Kantowski, OU) ▪ Galactic Dynamics (Prof. Henry, OU) ▪ Kalman Filtering Space Astrodynamics (Prof. Tuckness, OU) ▪ Numerical Methods (Prof. Baron, OU) ▪ Space Robotics (Prof. Miller, OU) ▪ Stellar Atmospheres (Prof. Branch, OU) **Workshop on Collaborative Biomedical Research for Earth and Space Benefit, Pre-ASGSR Meeting Workshop,** NASA and NIH **Workshop on Asteroid Return Mission Feasibility**, University of California Institute of Technology, September 27-30, 2011. Lectures by Bill A., John B., Tom J., Damon L., John L., Marco T., Brian W. and Donald Y. **Workshop on Asteroid Return Mission Feasibility II**, University of California Institute of Technology, February 7-8, 2012. Lectures by Donald Y., John L., Dan M., Brian W., John D. and Marcello C.

SPECIFIC SKILLS:

Languages	**R, MATLAB/Simulink, Mathematica, FORTRAN 77/95**
Platforms	**Windows, MacOSX, LaTeX, Unix**
Space Suit Instruments	**Zephyr BioHarness, BioRadio instrumentation for space suit operations**
Payloads	**3D printing technology, DanioVision tracking system, Fluorescent confocal microscopy**
Simulators	**Suborbital Space Flight Simulator (SSFS) and Mission Control Center (MCC)**
Biological Experiments	**Microfluidic chips, Zebrafish embryos, T-cells, spirulina growth in lab settings, gene primers design, RNA extraction, cDNA, gene expression**
Rocket Software	**RockSim, Cambridge rocketry, OpenRocket**

CONFERENCES/PUBLICATIONS:

SPACE MISSION DESIGN, NAVIGATION

1. Manikandan Vairamani, Kevin Crosby, **Pedro Llanos**, Sathya Gangadharan, Somnath Nagendra, "Design and testing of a Field Gradient System to Control a Hybrid Magneto-Active Slosh Control System", AIAA SciTech Forum, AIAA-2020-2051, Orlando, January 10 2019.
2. Manikandan Vairamani, Kevin Crosby, **Pedro Llanos**, Sathya Gangadharan, Balaji Sivasubramanian, Somnath Nagendra, "An Investigation of the Magneto-Active Slosh Control for Cylindrical Propellant Tanks Using Floating Membranes", AIAA SciTech Forum, AIAA-2019-2177, San Diego, January 8 2019.
3. **Pedro J. Llanos**, Abdiel Santos, "Commercial CubeSat Technology to Enhance Science: Communications, Space Debris Identification and Moon Surface Reconnaissance using Lagrangian Cyclers", AAS/AIAA Space Flight Mechanics Meeting, AAS 493, Napa, February 14-18, 2016.
4. **Pedro J. Llanos**, Abdiel Santos, John Ford, "Exploring New Lagrangian Cyclers to Enhance Science: Communications with CubeSat Technology", ISS R&D AAS Conference, Boston, July 7-9, 2015.
5. **Pedro J. Llanos**, Jesus D. Jordan, Gerald Hintz, Manuel S. Rivo, "Trajectory Analysis Between Quasi-Periodic Orbits and the Lagrangian Points Around Phobos", AIAA-AAS Astrodynamics Specialist Conference, San Diego, California, AIAA 2014-4349, Aug 4-7 2014.
6. James K. Miller, **Pedro J. Llanos**, Gerald R. Hintz, "A New Gravity Model For Navigation Close to Comets and Asteroids", AIAA/AAS Astrodynamics Specialist Conference, San Diego, California, AIAA 2014-4144, August 4-7, 2014.
7. **Pedro J. Llanos**, Gerald R. Hintz, Martin W. Lo, James K. Miller, "Heteroclinic and Homoclinic Connections between the Triangular Points in the Sun-Earth System and Quasi-Satellite Orbits for Solar Observations", *Journal of Earth Science and Engineering*, 3(2013), 515-526.
8. **Pedro J. Llanos**, Gerald R. Hintz, Martin W. Lo, James K. Miller, "Powered Heteroclinic and Homoclinic Connections between the Triangular Points in the Sun-Earth System and Quasi-Satellite Orbits for Solar Observations", AAS-AIAA Astrodynamics Specialist Conference, Hilton Head, South Carolina, AAS 13-786, Aug 10-15, 2013.
9. **P. Llanos**, J. Miller, G. Hintz, "L5 Mission Design Strategy", AAS/AIAA Space Flight Mechanics Conference, Kauai, Hawaii, AAS 13-223, Feb 10th-14th, 2013. *Advances in the Astronautical Sciences,* Volume 148.
10. **P. Llanos**, J. Miller, G. Hintz, "Mission and Navigation Design of Integrated Trajectories for an L4/L5 Mission in the Sun-Earth System , AIAA-AAS Astrodynamics Specialist Conference, Minneapolis, Minnesota, AIAA 2012-4668, Aug 13th-16th, 2012.
11. **Pedro J. Llanos**, James K. Miller, Gerald R. Hintz, "Navigation Analysis for an L5 Mission in the Sun-Earth system", AAS/AIAA Astrodynamics Specialist Conference, Girdwood, Alaska, AAS 11-503, August 2nd, 2011. *Advances in the Astronautical Sciences*, Volume 142.
12. Lo M., **Llanos P.**, Hintz G., "An L5 Mission To Observe the Sun and Space Weather", AAS-AIAA Space Flight Mechanics Conference, San Diego, CA, AAS 10-121, February 15 2010. *Advances in the Astronautical Sciences*, Volume 136.

SPACEFLIGHT OPERATIONS/SPACE TRAFFIC MANAGEMENT

1. Nikita Amberkar, Vijay Duraisamy, Isachi Halphen, Melisa Mastroliberti, Michelle Munasinghe, Maupin Gabriel, **Pedro Llanos**, Sathya Gangadharan, "Suborbital Payload Testing Aboard Level 3 Rocket Research Platform", AIAA SciTech Forum, AIAA-2020-0070, January 6 2020.
2. Erik Seedhouse, **Pedro Llanos**, "Science and Exploration of the Moon Enabled by Surface Telerobotics", 70th International Astronautical Congress (IAC), Washington D.C., 21-25 October 2019, IAC-19- 19.B6.3.6.
3. **Pedro Llanos** and Diane Howard, "Enhancing suborbital science through better understanding of wind effects", MS #1253, Space Traffic Management, Austin Texas, February 26, 2019.

4. Christopher Hays, Daniel Chu, and **Pedro Llanos**, "A Statistical Approach for Commercial Space Vehicle Integration into the National Airspace System", MS #1240, Space Traffic Management, Austin Texas, February 26, 2019.
5. **Pedro Llanos**, Robert Haley, Sathya Gangadharan, Vijay Duraisamy, Gabriel Maupin, Cynthia Stockton, "Educating the Space Scientists at Embry-Riddle through Design, Build and Fly Rocketry Experience", AIAA SciTech Forum, AIAA-2019-0612, San Diego, January 8 2019.
6. **Pedro Llanos**, Christopher Nguyen, David Williams, Kim O. Chambers, Erik Seedhouse, and Robert Davidson, "Space Operations in the Suborbital Space Flight Simulator and Mission Control Center: Lessons Learned with XCOR Lynx", *Journal of Aerospace/Aviation Education and Research*, Vol. 27, No. 2 (2018).
7. **Pedro Llanos**, Erik Seedhouse, Christopher Hays, "Nominal SpaceShipTwo Flights conducted by Scientist-Astronaut Candidates using the Suborbital Space Flight Simulator", Space Traffic Management Conference, Daytona Beach, January 15-19, 2018.
8. **Pedro Llanos**, Christopher Hays, "Flight Operations Quality Assurance Analysis for Contingency Scenarios of SpaceShipTwo using ERAU's Suborbital Space Flight Simulator", AIAA SPACE and Astronautics Forum and Expositions, AIAA SPACE Forum, (AIAA 2017-5111).
9. Erik Seedhouse, **Pedro Llanos**, "Integrating SpaceShipTwo into the National Airspace System", AIAA SPACE and Astronautics Forum and Expositions, AIAA SPACE Forum, (AIAA 2017-5358).
10. **Pedro J. Llanos**, Randy Triplett, "Integrating ERAU's Suborbital Space Flight Simulator ADS Data into NexGen Test Bed Simulations", Space Traffic Management Conference, November 12-13, 2015.
11. **Pedro J. Llanos**, "Commercial Uses of Space Stations in Low Earth-Orbit", ISS R&D AAS Conference, Boston, July 7-9, 2015. (Poster)

BIOASTRONAUTICS

1. **Pedro Llanos**, Diego García "Physiological Effects during Aerobatic Flights on Science Astronaut Candidates" (#20FR070185), International Conference on Medicine in Space and Extreme Environments (ICMSEE), Paris, France, July 20-21 2020, International Journal of Medical and Health Sciences, Vol: 14, No: 7, 2020. (Best paper award)
2. **Pedro Llanos**, Diego García "Physiological Effects on Science Astronaut Candidates: Hypobaric Training Assessment" (20FR070167), International Conference on Medicine in Space and Extreme Environments (ICMSEE), Paris, France, July 20-21 2020, International Journal of Medical and Health Sciences, Vol: 14, No: 7, 2020. (Best presentation award)
3. Kristina Andrijauskaite, **Pedro J. Llanos**, Sathya Gangadharan, Jay Morris, Michael J. Wargovich, "Experimental Investigation of the Behavior of Murine T Cells Cultured with IL-2 and IL-1 in Microgravity aboard Blue Origin's New Shepard Vehicle". (*in review)*
4. **Pedro Llanos**, Kristina Andrijauskaite, "Examination of Molecular Mechanisms on Vascular Formation and Stress Response in Zebrafish by Different Microgravity Environments", 70th International Astronautical Congress (IAC), Washington D.C., 21-25 October 2019, IAC-19-A2.7.14.
5. **Pedro J. Llanos**, Kristina Andrijauskaite, "Investigation of Murine T-Cells and Cancer Cells under Thermal Stressors and 2D Slow Rotating System Effects as a Testbed for Suborbital Flights", *Gravitational and Space Research*, DOI: 10.2478/gsr-2019-0006, GSR 58, 2019, 1–17.
6. **Pedro J. Llanos**, Kristina Andrijauskaite, Vijay Duraisamy, Francisco Pastrana, Mark Rubinstein, Erik Seedhouse, Sathya Gangadharan, Leonid Bunegin, Mariel Rico, "Challenges of ERAU's First Suborbital Flight Aboard Blue Origin's New Shepard M7 for the Cell Research Experiment In Microgravity (CRExIM)", *Gravitational and Space Research*, DOI: 10.2478/gsr-2019-0001, GSR 58, 2019, 1-12.
7. **Pedro Llanos**, Kristina Andrijauskaite, Mark Rubinstein, Sherine Chan (2018) "Investigation of Zebrafish Larvae Behavior as Precursor for Suborbital Flights: Feasibility Study", *Gravitational and Space Research*, Volume 6 (1): 37-57

8. **Pedro Llanos**, Ankit Rukhaiyar, Jonathon Nadeau, Nicholas Nunno, Kristina Andrijauskaite, Sathya Gangadharan, "Educational Experiences and Lessons Learned in the Multidisciplinary Design, Fabrication, Integration and Flight Testing of Embry-Riddle High Altitude Science Engineering Rig (ERHASER) Payload aboard NASA's WB-57 Aircraft", American Society for Engineering and Education Southeastern conference, ASEE-SE18, 136, March 4-8, Daytona Beach, 2018.
9. **Pedro Llanos**, Kristina Andrijauskaite, Mark Rubinstein, Sherine Chan, "Biomedical Research Analysis and Feasibility of Zebrafish for Suborbital Flights", Gravitational and Space Research Conference, Seattle, Washington, October 26th, 2017.
10. Joel Vela, Reece Lindsquist, Kristina Andrijauskaite, **Pedro Llanos**, "Operations and Testing of a Suborbital Research Payload", AIAA SPACE and Astronautics Forum and Expositions, AIAA SPACE Forum, (AIAA 2017-5135).
11. Vijay Duraisamy, Francisco Pastrana, Collin Topolski, Kristina Andrijauskaite, Sathya Gangadharan, **Pedro Llanos**, "Design, Development and Testing of a Suborbital NanoLab Research Experiment in Microgravity", AIAA SPACE and Astronautics Forum and Expositions, AIAA SPACE Forum, (AIAA 2017-5361).
12. **Pedro J. Llanos**, Victor Kitmanyen, Erik Seedhouse, Ryan Kobrick, "Suitability Testing for PoSSUM Scientist-Astronaut Candidates using the Suborbital Space Flight Simulator with an IVA Suit", International Conference on Environmental Systems, ICES-2017-100, 16-20 July 2017, Charleston, South Carolina.
13. **Pedro J. Llanos**, Erik Seedhouse, "Application of Bioinstrumentation in Developing a Pressure Suit for Suborbital Flight", Computing in Cardiology Conference, Vancouver, September 11-14, 2016.

SMALL BODIES, COMETS AND ASTEROIDS

1. James K. Miller, **Pedro J. Llanos**, Gerald R. Hintz, "A New Gravity Model for Navigation Close to Comets and Asteroids", AIAA-AAS Astrodynamics Specialist Conference, San Diego, CA, Aug 4-7 2014.
2. **Pedro J. Llanos**, James K. Miller, Gerald R. Hintz, "Orbital Evolution and Environmental Analysis Around Asteroid 2008 EV5", Space Flight Mechanics Meeting, Santa Fe, New Mexico, AAS 14-360, Jan 26-30, 2014. *Advances in the Astronautical Sciences*, Volume 152.
3. Damon Landau, John Dankanich, Nathan Strange, Jullie Bellrose, **Pedro Llanos**, Marco Tantardini, "Trajectories to Nab a NEA (Near-Earth Asteroid)", AAS/AIAA Space Flight Mechanics Conference, Kauai, Hawaii, AAS 13-409, Feb 10th-14th, 2013. *Advances in the Astronautical Sciences,* Volume 148.
4. **P. Llanos**, J. Miller, G. Hintz, "Comet Thermal Model for Navigation", AAS/AIAA Space Flight Mechanics Conference, Kauai, Hawaii, AAS 13-259, Feb 10th-14th, 2013. *Advances in the Astronautical Sciences*, Volume 148.
5. **P. J. Llanos**, M. Di Domenico, J. Gil-Fernandez, "Advanced GNC Technologies for Proximity Operations in Missions to Small Bodies", AAS/GN&C Conference, Breckenridge, Colorado, AAS 13-092, Feb 1-6, 2013. *Advances in the Astronautical Sciences*, Volume 149.
6. John Brophy, Louis Friedman, Carlton Allen, David Baughman, Julie Bellerose, Bruce Betts, Mike Brown, Michael Busch, John Casani, Marcello Coradini, Fred Culik, John Dankanich, Paul Dimokatis, Martin Elvis, Ian Garrich-Bethel, Bob Greshman, Tom Jones, Damon Landau, Chris Lewicki, John Lewis, Mark Lupisella, **Pedro Llanos**, Dan Mazanek, Prahkar Mehrotra, Joe Juth, Kevin Parkin, Nathan Strange, Guru Singh, Marco Tantardini, Rusty Schweickart, Brian Wilcox, Colin Williams, Willie Williams, and Don Yeomans, "Returning an Entire Near-Earth Asteroid in Support of Human Exploration Beyond Low-Earth Orbit", GLEX-2012.11.1.x12334, May 22-24, Washington DC.

ASTROPHYSICS, DYNAMICAL ASTRONOMY

1. James K. Miller, Gerald R. Hintz, **Pedro J. Llanos**, "A New Kinetic Theory of Particle Collisions", AAS/AIAA Space Flight Mechanics Meeting, AAS 338, Napa, February 14-18, 2016.

2. Preprint: **Pedro J. Llanos**, James K. Miller and Gerald R. Hintz, "Trajectory Dynamics of Gas Molecules and Galaxy Formation", [http//arxiv.org/pdf/1312.0166.pdf], *Galaxy Astrophysics*, (*extended version of AAS 12-863*)
3. J. Miller, **P. Llanos**, G. Hintz, "Trajectory Dynamics of Gas Molecules and Galaxy Formation", AAS-AIAA Astrodynamics Specialist Conference, Hilton Head, South Carolina, AAS 13-863, Aug 11th-15th, 2013. *Advances in the Astronautical Sciences*, Volume 150.
4. **Pedro J. Llanos**, "Morphology and Dynamics of Galaxies", AIAA Region VI Student Conference, San Diego State University, March 24-26, 2011-Honorable Mention.
5. Lo M. , **Llanos P.,** "L5 Mission Design and Galaxy Modelling", JPL Poster SURP No. 10-SU-16, 2010, R&TD, DRDF, SURP Poster Conference, JPL, 2010

Technical Reports

1. "Polar Suborbital Science in the Upper Mesosphere Training Procedures", February 17th, 2015.
2. "Trajectory Mission Design and Navigation for a Space Weather Forecast", Ph.D. Thesis, Astronautical Engineering Department, University of Southern California, May 2012
3. KISS team, "Asteroid Retrieval Feasibility", April 12, 2012
4. Pedro J. Llanos, "Morphology and Dynamics of Galaxies", AIAA Region VII Student Conference, San Diego State University, March 25, 2011 (Honorable Mention)
5. "L5 Mission Design and Galactic Dynamics", Strategic University Research Partnerships (SURP), JPL Task #1318, Nov 9, 2010
6. "Representing Invariant Manifolds to Design a Finder Planet Mission", Institute for Pure and Applied Mathematics, Aug 21, 2009
7. Pedro J. Llanos, "Spectra of Gamma Ray Burst Afterglows", M.S. Thesis, Physics and Astronomy Department, University of Oklahoma, Norman, August 1, 2005

Conference Presentations:

1. ICMSEE, 14th International Conference on Medicine in Space and Extreme Environments, Paris, France, July 20-21, 2020. (best paper award, best presentation award)
2. IAC, 70th International Astronautical Congress, Washington D.C., October 21-25, 2019.
3. STM, 5th Space Traffic Management Conference, Austin, February 26, 2019.
4. ASGSR, Gravitational Space Research Conference, Washington D.C., November 1, 2018.
5. ASEE, American Society for Engineering and Education, March 4, 2018.
6. STM, 4th Space Traffic Management Conference, Daytona Beach, January 16, 2018.
7. ASGSR, Gravitational Space Research Conference, Seattle, October 26, 2017.
8. AAS/AIAA Space Flight Mechanics Conference, Napa, February 14, 2016
9. STM, 1st Space Traffic Management Conference, Daytona Beach, November 12, 2015.
10. ISS R&D, American Astronautical Society, Boston, July 7-9, 2015
11. AIAA/AAS Astrodynamics Specialist Conference, San Diego, August 6, 2014
12. AAS/AIAA Space Flight Mechanics Conference, Santa Fe, January 28, 2014
13. AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, August 12, 2013
14. AAS/AIAA Space Flight Mechanics Conference, Kauai, February 11, 2013
15. AAS/GN&C Conference, Breckenridge, February 5, 2013
16. AIAA/AAS Astrodynamics Specialist Conference, Minneapolis, August 14, 2012
17. AAS/AIAA Astrodynamics Specialist Conference, Girdwood, August 2, 2011
18. Third Annual GPSS Poster Symposium, University of Southern California, April 6, 2011
19. AIAA Region VII Student Conference, San Diego State University, March 24-26, 2011
20. Jet Propulsion Laboratory Research Poster Conference, Pasadena, November 9, 2010
21. AAS/AIAA Space Flight Mechanics Conference, San Diego, February 15, 2010

Poster Presentations:

1. Level 3 Rocket as a Payload Research Platform (Nikita et al.), April 2019.
2. A Statistical Approach for Commercial Space Vehicle Integration into the National Airspace System (Christopher Hays, Dan Chu, Pedro Llanos), April 2019.
3. Level 3 Rocket –Discovery Day (Francisco Pastrana et al.), April 2018.
4. ERAU's First Suborbital Payload for Cell Research –Discovery Day (Collin Topolski et al.), April 2017.
5. Flight Dynamics Study with the XCOR Lynx using the SSFS/MCC –Discovery Day (Christopher Nguyen), April 2017.
6. Pedro J. Llanos, "Commercial Uses of Space Stations in Low Earth-Orbit", ISS R&D AAS Conference, Boston, July 7-9, 2015.
7. "Morphology and Dynamics of Galaxies", High Computing Capability and Modelling Section, Jet Propulsion Laboratory, May 5th, 2011
8. "Morphology and Dynamics of Galaxies", Third Annual GPSS Poster Symposium, University of Southern California, April 5th, 2011 (Finalist)

Other Presentations:

1. "The 25th Anniversary of the Hubble Space Telescope", Space Day event, Planetarium at the Museum of Arts and Sciences, Daytona Beach, May 2nd 2015.
2. "Advanced GNC Technologies for Proximity Operations In Missions to Small Bodies", University of Strathclyde, Glasgow, Scotland, June 7th, 2013
3. "Hardware in the Loop Validation of GNC for RDV/RDC Scenarios", AAS/GN&C Conference, Breckenridge, February 5, 2013

Reviewer:

1. National Space Grant College and Fellowship Program Training Grant Funding Extension - Opportunities in NASA STEM FY 2019 – 2020
2. NASA Space Technology Mission Directorate (STMD)
3. Journal of Aerospace Science and Technology
4. Acta Astronautica
5. Journal of Astronautical Sciences

Professional Affiliations:

1. American Institute of Aeronautics and Astronautics (AIAA #303497) member since 2008
2. IRC Scientific and Technical Committee & Editorial Review Board on Aerospace and Mechanical Engineering.
3. The Planetary Society (past)

Scholarships:

1. Teaching Assistantship, Astronautical Engineering Department, University of Southern California, Los Angeles, 2007-2012
2. AIAA Region VI Student Conference, San Diego State University, March, 2011
3. Strategic University Research Program (SURP), JPL, Los Angeles, summer 2010
4. Research/Teaching Assistantship, Physics and Astronomy Department, University of Oklahoma, Norman, 2003-2005
5. University of Valencia Exchange Student Program, Scholarship, Diploma 2002-2003 (Univ. of Oklahoma) and 2000-2001 (Univ. of Texas at Austin)
6. University of Valencia, Grant by Ministerio de Educación y Ciencia, 1999-2000 and 1997-1998

Grants

1. Faculty Research Development Program (*FRDP*) grant to partially support travel expenses to West Texas Launch Site for Blue Origin New Shepard suborbital payload, TX, May 2 2019. Awarded $1,340 on May 2019.
2. ERAU's Faculty Innovative Research Science and Technology (*FIRST*) grant for "Investigation of Engineering and Scientific Experiments in Microgravity aboard PLD Space's Miura 1 Suborbital Vehicle". Awarded $25,000 on April 2019.
3. Faculty Research Development Program (*FRDP*) grant to partially support travel expenses to Space Traffic Management Conference in Austin, TX, February 2019. Awarded $1,100 on February 2019.
4. Co-PI in Project MASC as part of *NASA's Flight Opportunities Program* awarded $246,750 to conduct parabolic flights by flight provider Zero Gravity Corporation (ZERO-G).
5. *NASA Florida Space Grant Consortium* (FSGC) to support AEON project for suborbital flight. Awarded $5,565 on June 2018.
6. ERAU's Faculty Innovative Research Science and Technology (*FIRST*) grant for "*Investigation of In-Vitro T-cells in Microgravity aboard Blue Origin's New Shepard Suborbital Payload*". *Awarded* $12,185 *on April 2017.*
7. *FRDP* to partially support Blue Origin's flight cost. Awarded $5,000 on January 2017.
8. *FRDP* to support instrumentation for Blue Origin suborbital flight. Awarded $2,660 on November 2016.

Awards:

1. *Award for Artistic Merit*, The American Society for Gravitational and Space Research, 2017 Combustion Art Competition, Seattle, WA.
2. McNair Faculty Mentor of the Year at ERAU, April 27th, 2016.
3. University of Oklahoma, Latino Achievement & Heritage Celebration (LAHC) award, 2005-2006 (4.0 GPA)
4. University of Oklahoma, Recognition by The Lion's Club, International Student of the Month, 2004-2005

Honors:

1. McNair Scholars Program Research Mentor (2016)
2. ERAU's Office of Undergraduate Research Mentor (2018-present)
3. Marie Curie Postdoctoral Research Fellowship, AstroNet-II-Astrodynamics Network, Madrid, Spain (2012-2013)
4. AIAA Region VI Student Conference, San Diego State University, March 24-26, 2011 (Honorable Mention for best paper in the Masters Division)
5. The National Scholars Honor Society
6. Latino Achievement & Heritage Celebration (LAHC), University of Oklahoma, May 2006
7. International Student of the Month, Lions Club, University of Oklahoma, Mar 2005

Professional Student Service:

Train, mentor students (undergraduate and graduate) on preparation, use, and analysis of data on various research projects:

1. Mentoring Frederick Missel (Spaceflight Operations undergraduate) fall 2018 - present. *PLD Space Suborbital payload.*
2. Mentoring Nikita Amberkar (Aerospace Engineering undergraduate) fall 2018 – present. Level 3 Rocket project.
3. Mentoring Julian Breen (Aerospace Engineering undergraduate) spring 2019 - present. Software *Data Analytics Tool for SSFS/MCC.*

4. Mentoring Manikandan (Ph. Candidate in Mechanical Engineering) fall 2017 - present. *PLD Space Suborbital payload.*
5. Mentored Collin Topolski for Summer Undergraduate Research Fellowship (SURF) 2018.
6. Mentored Francisco Pastrana (Aerospace Engineering undergraduate) fall 2016 – spring 2019 (*3rd prize in the Discovery Day Poster Competition, spring 2018*)
7. Mentored Christopher Hays (Aerospace Engineering undergraduate) fall 2016 - spring 2019. ERAU's *Undergraduate Student of the Year 2017*.
8. Mentored Christopher Hays for SURF 2017.
9. Mentored Vijay V. Duraisamy (Ph. Candidate in Mechanical Engineering) fall 2016 - present.
10. Mentored Daniel Chu (Aerospace Engineering undergraduate) fall 2017 - spring 2019.
11. Mentored Collin Topolski, Francisco Pastrana, Ankit Rukkaijar, Joel Vela, Reece Lindsquist, and Nicholas Cheri (*1st prize in the Discovery Day Poster Competition, spring 2017*)
12. Mentored Christopher Nguyen (Commercial Space Operations undergraduate) fall 2016 – fall 2018 (*Discovery Day Poster Competition, spring 2017).*
13. Mentored Fergie Idrovo (Commercial Space Operations undergraduate). *McNair Student of the Year, April 27th, 2016.*
14. Mentored Abdiel Santos and John Ford (*Discovery Day Poster Competition, spring 2015).*

Certifications:

1. Certified Personal Trainer (NASM-CPT), National Academy of Sports Medicine (Sep 5, 2020)
2. American Heart Association Basic Life Support (CPR and AED) Program (July 15, 2020)
3. National Association of Rocketry (NAR#105826) High-Power Rocket Cert. Level 1 (2018)
4. Suborbital PoSSUM Scientist-Astronaut Training (Certification October 7th, 2015)
5. Hypobaric Chamber training at the Southeast Aero Medical Institute (Certification October 4th, 2015)
6. ADS-B v1.1 certification (July 23rd, 2015)

Service News:

- The Pipette Gazette, November 7 2019
  "Joint Research Collaboration expedites launch of zebrafish embryos to space"
  - https://pipettegazette.uthscsa.edu/2019/11/07/joint-research-collaboration-expedites-launch-of-zebrafish-embryos-to-space/

- The Embry-Riddle Newsroom, Sep 28 2018
  "Researchers Work to Integrate Spaceflights into the National Airspace"
  - https://news.erau.edu/headlines/researchers-work-to-integrate-spaceflights-into-the-national-airspace/

- ResearchER Fall 2018, Reaching New Heights (page 3), https://online.flippingbook.com/view/556759/4/

- BLUE ORIGIN, December 21 2017
  "First Commercial Payload Onboard New Shepard"
  - https://www.blueorigin.com/news/news/first-commercial-payloads-onboard-new-shepard

- PARABOLIC ARC, December 14 2017
  "Embry-Riddle Research Payloads Flew Aboard New Shepard"
  - http://www.parabolicarc.com/2017/12/14/embryriddle-research-payloads-flew-aboard-shepard/

- ResearchER Fall 2018, Sending T-Cells into Space (page 3), https://online.flippingbook.com/view/677282/4/

- The Daytona Beach News-Journal, "Scientists get taste for space flight at Embry-Riddle", October 7th, 2015
  - http://www.news-journalonline.com/article/20151007/NEWS/151009622

- The USA Today news media interview: "Tragedy won't crush space tourism, supporters say", October 31th, 2014.
  - http://www.usatoday.com/story/money/business/2014/10/31/space-tourism-will-survive-latest-accident/18269579/

- The Now Tampa Bay ABC news media interview: "Rocket explosion leaves questions", October 29, 2014.
  - http://www.abcactionnews.com/news/science-and-technology/rocket-explosion-leaves-questions