

# IVETT A. LEYVA

## CURRICULUM VITAE

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### EDUCATION

<b>Ph.D., Aeronautics</b> California Institute of Technology (Caltech), Pasadena, CA	<i>June 1999</i>
<b>M.S., Aeronautics</b> , Caltech	<i>June 1995</i>
<b>B.S., with honors, Engineering and Applied Science</b> , Caltech	<i>June 1994</i>
<b>P.E. License in California</b> for Mechanical Engineering	<i>2005</i>
<b>Professional Military Education: Air Command and Staff College</b>	<i>2009</i>

### PROFESSIONAL EXPERIENCE

#### **College of Engineering Excellence Professor and Department Head, Aerospace Engineering, Texas A&M University**

*September 2021 – present*

- Leads a top-10 undergraduate and graduate aerospace engineering program in the US. The department is made of 50 Professors, 18 staff members and about 1000 students. Led department to pass accreditation, ABET, without shortcomings in 2022.
- We had triple the amount given in gifts in my first year as Department Head, including generous donations for discretionary funds, which are the hardest to get. Had 2nd highest revenue in the 2022 Giving Tuesday campaign in the College of Eng (CoE). After a careful study of the finances, needs and our potential pool of donors, established top 2 philanthropic priorities for the department: Building renovation and Graduate Fellowships. Renovated a whole floor, 3 student labs, and created a memorial student lounge. Obtained approval and launched a new philanthropy initiative for graduate fellowships in August 2023, which makes it more affordable for early and mid-career donors.
- In a bottoms-up approach and working regularly with the other 14 Department Heads in the CoE for months, we reached consensus on 5 main areas of research thrusts for the CoE and a new vision for the CoE after the current big drive we have on student enrollment growth. When we delivered the vision to the dean's office, they remarked such consensus had not been reached for many years.
- Through many internal and external discussions with industry and national labs, established key areas of research and growth for the department. Space is such a key area; therefore, I am working with university-level leadership, state government liaisons, two NASA centers, and alumni to secure funding for a bold initiative in space mission control.
- Part of 3 winning teams in 2 years: 1) NSF grant to create a nationwide training for academia and other research entities on how to protect fundamental research, 2) multi-national grant with Australia, UK, and other universities from the US to study shock wave-boundary layer interactions in hypersonic flows, 3) grant from the University Consortium of Applied Hypersonics to study weather effects on hypersonic canonical shapes and materials.

**Office of the Deputy Assistant Secretary of the Air Force, Science Technology and Engineering, SAF/AQR - NH-IV (Highest Tear GS-15),**

*Program Element Monitor, Hypersonics and Munitions Science and Technology (S&T), August 1st 2020 – August 14 2021*

- Primary interface among the Office of the Secretary of Defense (OSD), the Air Force Research Lab (AFRL) and Congress for S&T in Hypersonics and Munitions. Responsible for producing funding documents to Congress. Responsible for briefs to House and Senate Staffers. Responds to Congress and OSD inquiries and enacts Air Force goals in my area of responsibility.

**AFRL/Air Force Office of Scientific Research – Sr. Aerospace Engineer, DR-IV (GS-15), High Speed Aerodynamics Program Officer (PO), September 30 2014 – July 31 2020**

- Led the largest basic research (6.1) portfolio in this area in the US. Had authority and funding to establish research directions to tackle most critical yet unsolved basic science problems in aerothermodynamics for hypersonic flight. To know what the most critical problems were I continuously interacted with a diverse cadre of stakeholders ranging from the Air Force and DoD Commands in the Pacific to the Missile Defense Agency, OSD, DARPA and the Office of Naval Research. In six years, the portfolio funded 90 Principal Investigators, 37 universities and 15 other institutions around the world. Also funded were 350 students and post-docs with 523 publications, 145 awards/honors, and 4 patents. Alumni from this portfolio are now embedded in industry and Government helping the US with Hypersonics. *Through my investment decisions, my portfolio influenced the technical expertise many members of the future US workforce will have in the area of Hypersonics.*
- Created a one-of-a-kind flight experiment (BOLT) to test the US 6.1 experimental and computational capabilities to predict boundary layer transition from laminar to turbulent states over a new canonical geometry. Such predictions have been a grand challenge for decades. The team is led by Johns Hopkins University – Applied Physics Lab and it involves three universities, AFRL, NASA, industry and Australian and German partners. One of the most impactful innovations of this project is to bring academia and students as equal partners on all the critical design steps for the flight geometry. BOLT also gives students an opportunity to learn from and be mentored by professional researchers outside of academia.
- Due to the success of BOLT, OSD and AFOSR funded BOLT II, a flight experiment led by academia to study turbulence, involving 15 entities in the US and Australia. BOLT II, for the first time to our knowledge, will test the identical flight vehicle both in the ground and in flight to finally compare as faithfully as possible ground and flight results. BOLT II is also significant in that Australian partners are also testing a full-scale model in a new facility they are building. DoD leaders have praised the BOLT model as a fresh and very effective new way to do basic science at DoD.



Engineering Notebook

Decoding the boundary layer at hypersonic speeds

Aerospace America, October 2019

- Won a Multidisciplinary Univ. Research Initiative (MURI, \$7.5M in 5 years) to finally start answering a many-decades old question: “what is the atmospheric environment in near-space?”. This is the last missing link needed to give our most advanced codes realistic initial conditions so we can finally compute drag and heating to a hypersonic vehicle adequately! This MURI team is now linked to the BOLT and BOLTII flights so we can get atmosphere turbulence data concurrent with the flight.
- Won a second MURI (\$7.5M in 5 years) to study to the mathematical foundations for enabling robust optimal design of hypersonic systems. This MURI re-invigorates, at the basic science level, the study of optimization and systems engineering for hypersonic flight. This is also an example of how I responded to emerging needs from DoD at the basic science level. Co-author on a third winning MURI with ONR: Understanding Turbulence-Chemistry Interactions in Non-Equilibrium, High-Speed Flows.
- Formed a collaboration with NASA (\$6M in 3years) on simultaneous basic and applied research for diagnostics for hypersonic flight. NASA HQ and AFOSR agreed on a topic and together will fund basic and applied research on the same topic so there is a more continuous flow from basic to applied science in Hypersonics. Also significant is the partnership of academia and industry even in basic science problems and the participation of HBCU/MSI.
- Started a collaboration with Germany’s Aerospace Center (DLR) for their STORT flight which investigates the behavior of the boundary layer and shock boundary layer interactions in a rather complex geometry. This is an example of how I leveraged international efforts that aligned with the US research interests and formed partnerships.
- In 2019, for workforce development, I created a summer program that allowed 4 Ph.D. students to spend the summer in industry applying what they are learning for their dissertation. Also secured funding and coordinated another program that allowed 5 students to spend the summer working with AFRL researchers.
- Won 3 SBIR and STTR topics (\$2.7M) in Atmospheric Disturbances and Diagnostics for Hypersonic Testing and Flight. I believe small businesses and academia can be a very powerful combination to tackle technical challenges with out-of-the-box thinking in a fast-paced environment.
- Formed an NSF/AFOSR collaboration in the area of Flow-Structure Interactions with each agency co-funding proposals of mutual interest.

*Acting Program Officer for the Unsteady Aerodynamics and Turbulent Flows Portfolio*

- For about 1year I led the low-speed aerodynamics portfolio until a new PO was hired. As a result, I learned about revolutionary ideas for understanding turbulence. I saw an opportunity for the professors’ ideas to be recognized and funded at a high level. For years I campaigned and finally succeeded in having the OSD Basic Science Office consider Fluid Mechanics for their most prestigious award for mid-career Professors. There are now three active recipients of the Vannevar Bush Award (\$9M) making unprecedented strides in understanding and potentially controlling turbulent flows.

*Acting Branch Chief, November 2017 – July 2018*

- Served as acting supervisor to 17 employees including 48% of all AFOSR POs at that time. This was in addition to managing the High Speed Aerodynamics Program. I received a

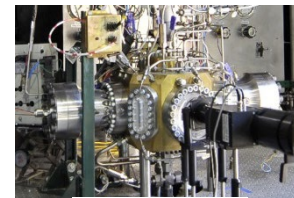
meritorious civilian service award in part for successfully doing several jobs simultaneously at AFOSR over the years. I performed all supervisor duties as needed and found solutions for a myriad of personnel issues such as remote working arrangements and alternate work locations, travel regulations enforcement, long-term family leave, and employee low performance. Was in the selection committee for several PO positions. Also, I was a key member of a pioneer team to improve business processes by creating new quality standards for proposal packages sent to contracting and travel authorizations and vouchers.

**AFRL/RQ, Edwards AFB** – Sr. Aerospace Engineer, *May 1<sup>st</sup>, 2006 – September 29, 2014*  
*Technical Advisor, Liquid Engines Branch, 08/2012-09/2014*

- Principal tech advisor for the HydroCarbon Boost (HCB) Engine Program, a multi-hundred million dollar program. Set standards for quality work products resulting in significantly improved reviews containing enough technical details to defend the presented conclusions. I also advised on the test plans for all the work related to HCB performed at RQ Edwards.
- With Space Missile Center (SMC) funding, I started a program to study scaling for combustion instability from bench tests to full scale engine tests. Lack of scaling design criteria has led to very expensive failures at full scale. This program continued to flourish even after my move to AFOSR.
- The topic I suggested to the Space Program Executive Office Staff for the quite competitive program Rapid Innovation Funds was funded at \$2.6M to work on scaling and combustion instability. I was the only AFRL reviewer for proposals. SMC chose me as the AFRL Technical Point of Contact.

*Sr. Aerospace Engineer, Aerophysics Branch, 05/2006-08/2012*

- Lead researcher for an AFOSR Star Team (designation provided to top teams sponsored by AFOSR at the other AFRL Technical Directorates). Led AFRL/RQ in-house experiments to understand injector mixing and acoustic response relevant to the next generation of upper stage engines. Created one of the most comprehensive mixing datasets in the world for one class of upper stage engine injectors, updating our understanding of how mixing happened and improving the design criteria for these injectors. I co-advised 3 Ph.D. students with UCLA and mentored 2 post-docs. Collaborated with universities in Paris and Rio de Janeiro.
- Secured funding and oversaw effort to build a multi-million dollar world-class lab to study combustion instabilities. I coordinated a wide range of efforts like meeting regulations for oxygen use (concrete finish on the floors, paint type, electrical outlets), soil testing to install liquid nitrogen tank, explosion limit calculations, etc. Also led the mechanical design of a new brand of experimental cell to do combustion tests up to 1800 psi and *demonstrated a novel way to do high pressure combustion experiments with safer ways to ignite and achieve the high pressures.*
- Conducted novel experimental studies on hypersonic boundary layer transition in collaboration with Caltech, U. of Minnesota, and Sandia Nat Labs 2006- 2014



AIAA 2014-0137

**Microcosm, Inc.** – Engine IPT Lead *January 2005 – April 2006*

- As part of DARPA's FALCON program, I was responsible for the development of ablative chambers and managing the injector development for a 20 klb liquid rocket engine. I then managed the testing campaign for that engine at AFRL/RQ Edwards. AFRL offered me a job after this test campaign.



<http://smad.com/launch/scorpius/engines/20k-engine-test-firing-video/>

### **Exponent** – Thermal Sciences Engineer

*March 2003- December 2004*

Investigated the cause, origin and prevention of fires and explosions; from residential to industrial scales. Investigated large oil rig explosion in Prudhoe Bay, Alaska.

### **General Electric Global Research Center (GE GRC)** – Mechanical Engineer –

*Pulse Detonation Engines (PDEs), August 1999 - January 2003*

- Led experimental program on advanced concepts for PDEs. I created and led a multi-function team to design and build a brand-new experimental cell to test PDEs. The team included plumbers, electricians, a safety officer, a mechanical designer, welders, tool makers, data systems engineers, and specialized technicians to do the lab build. *In about 2 years the team stood up a brand-new lab and we were able to successfully test our own version of a special type of PDE.*
- Traveled to Russia and Belarus to seek ideas for pulse detonation engines, meet the investigators and their teams in person, and to see their laboratory infrastructure. A team of us selected the most promising ideas on PDEs to collaborate on. I also interacted with the GE Legal and Contracting Departments to create new contracts with the chosen institutions.



[www.eas.caltech.edu/documents/engenious/win03/levya.pdf](http://www.eas.caltech.edu/documents/engenious/win03/levya.pdf)

### **California Institute of Technology**

*Ph.D. Thesis Research*

*September 1995- June 1999*

Conducted experimental and theoretical analysis to explain the effects of chemical and thermal non-equilibrium on the shock detachment process on cones in hypervelocity flows for different gases. This is one of the classical problems for high-enthalpy flow especially for re-entry capsules. Was the only woman to graduate from this lab in 20 years.

*Research Assistant*

*June 1994- September 1995*

- Developed a non-linear least squares fit program used to compare experimental data with the theory developed for laser-induced thermal acoustic (LITA) signals from finite beam sizes.

### **NASA Langley Research Center/ Caltech**

*June 1993-June 1994*

Simulated the performance of an expansion tube with non-constant area using supercomputers. Assessed the feasibility of increasing test time by incorporating diverging sections at different positions.

**Lunar and Planetary Institute***Summer 1992*

Modeled the response of a Martian aquifer to the propagation of an impact-induced compression wave.

**Jet Propulsion Laboratory***Summer 1991*

*Magellan Mission Design:* performed studies to optimize a technique to find the axis of rotation of spacecraft during a radio-occultation maneuver.

*Science Team:* constructed geologic map of Venus from northern Ovda Regio to southern Tellus Regio.

**HONORS AND AWARDS**

- College of Engineering Excellence Professorship, 2021 –
- AIAA Fellow, 2021
- Meritorious Civilian Service Award and Medal, 2020
- AFRL Fellow, 2019 – Given to 0.3% of the eligible technical staff
- Meritorious Civilian Service Award and Medal, 2019
- AFRL Commander Coin, 2019
- Project I created (BOLT) selected to be exhibited at the DoD Lab Day at the Pentagon, 2019
- BOLT selected as one of six AFRL projects to be exhibited at Smithsonian for Military Invention Day, attended by the Secretary of the Air Force, 2018
- Selected, due to leadership potential, for ten one-on-one executive coaching sessions, 2018
- AFOSR Team Award for Hypersonics Working Group – a group I started, 2016
- Member of steering committee for Vannevar Bush and LUCI fellowships for OSD, '16-18
- Technology Rising Star, Women of Color STEM conference, 2015
- STEM Military & Civilian Heroes – HENAAC, 2015
- W.R. Marshall Award from the Institute for Liquid Atomization and Spray Systems - Americas for best overall conference paper, 2014
- Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA), 2012
- National Associate of the National Research Council of the National Academies, 2011
- Visiting Associate at Caltech – 2009-14
- AFRL/Rocket Propulsion Division, Ross Award for best individual technical contribution, 2010
- 2007 GAFOE Committee Member
- 2006 GAFOE General Participant
- Zonta International Amelia Earhart Fellowship, 1995-1997
- Letter of recognition for outstanding achievement by Mexican President, Ernesto Zedillo, 1999
- Charles D. Babcock Award for outstanding teaching achievement, 1997

**PROFESSIONAL SERVICE**

- Member of the National Research Council's Committee on Transformative Science and Technology for the Department of Defense – 2023-
- AIAA Fellow Selection Committee – 2021-
- Member of the Aerospace Engineering Sciences Department, University of Colorado, Boulder, external Advisory Board – 2023-

- Reviewer for NDSEG Fellows, 2017-2019
- Reviewer for NASA Graduate Fellowships, several times from 2015-2019
- Participated in 2 STEM events by ASME and the Air Force. Manned science demo booths and shared with younger people what engineers can do, 2018
- Panel Member, mentoring session for younger engineers at AFRL, 2018
- Chair, Liquid Propulsion Technical Committee, AIAA, composed of 50 world leaders in propulsion, 2015-17
- One of two people representing AFOSR at AF STEM event, 2015
- Panel Member, AIAA Antelope Valley forum on preparing for college, 2014
- Invited instructor on rocket fundamentals for high school students, gave it 5 times, 2014
- Member, Aeronautics and Space Engineering Board; National Research Council (NRC) of the National Academies, '07-13
- Member, four ad-hoc NRC committees on studies commissioned by NASA and DoD, 2006-2012, see report titles under the Publications section
- Member, Selection Committee for AIAA Associate Fellows, 2013-2015
- Member, Selection Committee for AIAA Wyld Propulsion Award, 2015, 2017
- Member, Selection Committee for AIAA Propellants and Combustion Award, 2017
- Organized AIAA Joint Propulsion Conference, Liq. Prop. sessions (~100 papers), 2012
- Treasurer, AIAA Antelope Valley, CA Section, 2012-2014
- Elected to Advisory Board for AFOSR/NRC to review Propulsion proposals, 2003
- Elected to Advisory Board for ONR's MURI program on Pulse Detonation Engines, 2000-2002
- Regular reviewer for AIAA Journal, Journal of Propulsion and Power, Journal of Spacecraft and Rockets

## **TEACHING EXPERIENCE**

- AE 681 Fall 2023 – Communications for Grad Students. A very intensive course on technical and general briefing preparation and delivery.
- AE 681 Spring 2023 – Professional Development for Grad Students (proposal writing, brief preparation, arrange meetings with industry practitioners and national labs researchers)
- AE 201 Intro to Flight, Fall 2022 – 100 sophomore students, great student reviews.
- ACUE Microcredential in Designing Learner-Centered and Equitable Courses, Association of College and University Educators, 2022. This microcredential requires the implementation of evidence-based instructional approaches. The credential is co-issued by the American Council on Education and distinguishes faculty for their commitment to educational excellence and student success.
- Teaching assistant for graduate level course: Advanced Fluid Mechanics
- Teaching assistant for graduate level course: Aircraft Dynamics & Controls
- Teaching assistant for graduate level course: Experimental Methods of Fluid Mechanics
- Teaching assistant for Undergraduate course: Introductory Methods of Applied Math (2 years)
- Instructor for Fundamentals of Rocket Propulsion at the AIAA Joint Propulsion Conf., 2010, 2011

- Instructor for Fundamentals of Combustion for GE Appliances employees, circa 2002
- Instructor for Fundamentals of Rocket Propulsion for Space and Missile Defense, circa 2013
- Instructor for Fundamentals of Rocket Propulsion for CIA employees, circa 2012
- Guest lecturer for USAFA students, Hypersonic Flow Fundamentals, circa 2017
- Seminar on how to engage with Funding Agencies and write grants, U of MN, circa 2017

## BRIEFS

### Significant Briefs while at the Air Force

- Selected to give AFRL Inspire Talk (similar to TED talks), 2019
- Best presentation in my technical division at Scientific Advisory Board Review, 2019
- Special Recognition for my brief at AFOSR Annual Review, 2017
- Briefed Secretary of the Air Force on my portfolio, 2017
- Only AFOSR Program Officer selected to brief a group of AF Generals and civilian executives, 2017
- Briefed Air Force Chief Scientist on my portfolio, 2014, 2019
- Briefed Air Force Materiel Commander on my portfolio (4-star general), 2019
- Briefed DARPA Director on my portfolio, 2018
- Briefed OSD Principal Director on Hypersonics on my portfolio, 2018
- Represented AFOSR at Pentagon Day, 2015

### Invited Seminars

- Won internal Caltech's GALCIT competition to present my Ph.D. thesis results at the 12th Liepmann-Ludwig Seminar at DLR, Gottingen, Germany, 1999.
- Investigation of unsteady flow field of a 2-stage PDE resonator, I. A. Leyva, V. Tangirala, A.J. Dean, *ONR MURI Pulse Detonation Engines*, August, 2002.
- Rocket injector fluid mechanics (2007-2013)
  - One of three invited speakers (most expenses paid) at the Technical University of Munich Summer Program on space technologies. During my stay, had one-on-one meetings with students, researchers and professors and provided technical advice as needed, 2015.
  - Technical University of Munich, 2013.
  - Zonta International, Regional Meeting in Los Angeles, 2014.
  - Caltech, 2012.
  - Texas A&M University, 2012.
  - The University of Alabama, Tuscaloosa, AL, 2009, 2010.
  - Ecole Centrale de Paris, France, 2008.
  - EADS Astrium, Munich, Germany, 2008.
  - DLR, Lampoldshausen, Germany, 2007.
  - Imperial College, London, U.K, 2007.



- Hypersonic boundary layer transition (2008-2010):
  - DLR Goettingen, Germany, 2010.
  - Universität der Bundeswehr, Munich, Germany, 2008.
- High Speed Aerodynamics Portfolio (2015-2019):
  - US: Stanford, University of Minnesota, Caltech, Princeton, U of Maryland, AEDC Tunnel 9, University of Colorado, Office of Naval Research, Computational Research and Engineering Acquisition Tools and Environments (CREATE) from DoD, Doolittle Institute, Virginia Tech, Johns Hopkins University – Applied Physics Lab, Australian Embassy, Lockheed Martin Corporate in MD, Lockheed Martin in Palmdale, CA.
  - International: Four sites of DLR in Germany, Tech University of Munich, Germany, University of Queensland and University of New South Wales, Australia, two locations of JAXA, Japan, Oxford University, UK, Von Karman Institute, Belgium.
  - **Diplomacy through Science: Invited by Department of State to deliver lectures at three universities in Portugal.**
- Invited Speaker at COBEM Conference, Brazil, 2015.
- Invited Speaker at US Technology Leadership Council, 2019.
- Panel Member, Hypersonic Forum, AIAA Conference, 2019.
- Panel Member, University Hypersonic Research Partnerships, Hypersonics Capabilities Conference, NDIA, 2019.
- Invited Speaker, Basic Science Challenges In Aerodynamics For Hypersonic Flight, at Hypersonic Weapon Systems, DefenceIQ, 2020.
- Four Invited Oral Presentations at AIAA Conferences (2015-2019).
- Penn State Invited Seminar (April 28, 2022)
- University of Colorado at Boulder, Invited Seminar (May 2023)
- University of Brisbane, Australia, Invited Seminar (July 2023)
- Invited speaker for 3<sup>rd</sup> International Symposium on Hypersonics, Seoul, South Korea (August 2023)
- University of Michigan Invited Seminar (September 2023)
- Georgia Tech, Gebhardt Lecture (September 2023)
- Embry-Riddle Aeronautical University Invited Seminar (October 2023)

**PUBLICATIONS** (H-index =20, 1324 citations Google Scholar 9.13.2023)

### General Interest Publications

1. Graham V. Candler & Ivett A. Leyva (2022): Computational Fluid Dynamics Analysis of the Infrared Emission from a Generic Hypersonic Glide Vehicle, *Science & Global Security*, DOI: 10.1080/08929882.2022.2145777
2. Cover article for *Physics Today*, November 2017, “The relentless pursuit of Hypersonic Flight”, Ivett Leyva. Selected to be translated to Japanese for a special volume they produce every year or so with selected articles from *Physics Today*. Cited by the *Economist* in 2019. Got a handwritten note from the Secretary of the Air Force in recognition for writing this article.

### Co-authored NATIONAL RESEARCH COUNCIL REPORTS

- Foreign-Funded Language and Culture Institutes at U.S. Institutions of Higher Education: Practices to Assess and Mitigate Risk, 2023, <https://doi.org/10.17226/27065>
- Confucius Institutes at U.S. Institutions of Higher Education: Waiver Criteria for the Department of Defense, 2023, <https://doi.org/10.17226/26747>
- NASA Space Technology Roadmaps and Priorities, 2012, ISBN: 978-0-309-25362-8.
- A Constrained Space Exploration Technology Program, 2008, ISBN-10: 0-309-12583-9.
- Decadal Survey of Civil Aeronautics: Foundation for the Future, 2006, ISBN-10:0-309-10158-1.
- A Review of the USAF and DoD Aerospace Propulsion Needs, 2006, ISBN-10: 0-309-10247-2.

### Patents

1. US 6,877,310; Shock wave reflector and detonation chamber, Ivett Alejandra Leyva, 2005.
2. US 7,093,794; Aircraft and detonative engine incorporating pulse detonation engines, Ivett Alejandra Leyva, Anthony John Dean, 2006.
3. US 6,629,674. Method and apparatus for modulating airfoil lift, Seyed Gholamali Saddoughi, Ivett Alejandra Leyva, Anthony John Dean, Bernard Francois Robic, Lawrence Butler, 2003.
4. US 7,690,191; Fuel preconditioning for detonation combustion; Anthony John Dean, Ivett Alejandra Leyva, Chukwueloka Obiora Umeh, 2010.
5. US 6,983,586; Two-stage pulse detonation system, Venkat Eswarlu Tangirala, Anthony John Dean, Ivett Alejandra Leyva, 2006.
6. US 6,889,505; Pulse detonation system for a gas turbine engine, Lawrence Butler, Kattalaicheri Srinivasan Venkataramani, Kurt David Murrow, Ivett Alejandra Leyva, 2005.

### Book Chapters

- *Space Mission Engineering: The New SMAD* (2011) edited by J. R. Wertz, D. F., Everett, J. J., Puschell. Chapter 18 – Spacecraft Subsystems I: Propulsion, I. Leyva et al, Microcosm Press, 2011.
- *High-Pressure Flows for Propulsion Applications* (2020) edited by J. Bellan. Chapter 6 – Forced and unforced shear coaxial mixing and combustion at subcritical and supercritical pressures, D. Forliti, I. Leyva et al, Progress in Astronautics and Aeronautics Vol 260.

### Articles published about projects I started at AFOSR

Burton, K., "Decoding the boundary layer at Hypersonic Speeds", *Aerospace America*, October, 2019. – The article focused on the BOLT flight experiment and introduced the BOLT II flight.

### Papers (in reverse chronological order)

1. Forliti, D.J., Wegener, J., Min, C., and Leyva, I.A., "Quantitative analysis of forced and unforced turbulent multiphase coaxial jets," *Journal of Fluids Engineering*, V. 143, n. 1, 2021, 011406.

2. Leyva, I. A., and Cummings R.M, "Introduction to the Special Section on the Boundary Layer Transition (BOLT) Flight Experiment, " *Journal of Spacecraft and Rockets*, Vol. 58, No. 1 (2021), pp. 4-5 doi: doi/abs/10.2514/1.A34872.
3. Jewell, J., Leyva, I.A., Shepherd, J.E., "Turbulent spots in hypervelocity flow," *Experiments in Fluids*, 58, 32 (2017). <https://doi.org/10.1007/s00348-017-2317-y>.
4. Jewell, J., Parziale, N., Leyva, I, Shepherd, J., "Effects of Shock-Tube Cleanliness on Slender-Body Hypersonic Instability and Transition Studies at High-Enthalpy," *AIAA Journal*, Volume 55, Issue 1, 2016.
5. Badakhshan, A., Danczyk, S., Forliti, D., Leyva, I.A., Talley, D., "Nano-ignition Torch Applied to Cryogenic H<sub>2</sub>/O<sub>2</sub> Coaxial Jet," AIAA 2016-0184.
6. Forliti, D., Badakhshan, A., Wegener, J., Leyva, I.A., Talley, D., "The Response of Cryogenic H<sub>2</sub>/O<sub>2</sub> Coaxial Jet Flames to Acoustic Disturbances," AIAA 2015-1607.
7. Parziale, N., Jewell, J., Leyva, I, Shepherd, J., Hornung, H., "Effects of Shock-Tube Cleanliness on Slender-Body Hypersonic Instability and Transition Studies at High-Enthalpy," AIAA 2015-1786.
8. Fedorov, A., Soudakov, V., Leyva, I. A., "Stability analysis of high-speed boundary-layer flow with gas injection," AIAA 2014-2498.
9. Wegener, J., Forliti, D., Leyva, I.A., Talley, D., "Receptivity of a Cryogenic Coaxial Gas-Liquid Jet to Acoustic Disturbances," AIAA 2014, 3487.
10. Wegener, J.,Leyva, I.A., Forliti, D., Talley, D., "Development of a Facility for Combustion Stability Experiments at Supercritical Pressure," AIAA 2014-137.
11. Jewell, J., Wagnild, R., Leyva, I., Candler, G., Shepherd, J., "Transition Within a Hypervelocity Boundary Layer on a 5-Degree Half-Angle Cone in Air/CO<sub>2</sub> Mixtures," AIAA 2013-523.
12. Schmitt, T., Rodriguez, J., Leyva, I., and Candel, S., "Experiments and numerical simulation of mixing under supercritical conditions," *Physics of Fluids* 24, 055104 (2012).
13. Teshome, S., Leyva, I. A., Talley, D., Karagozian, A., "Cryogenic High-Pressure Shear-Coaxial Jets Exposed to Transverse Acoustic Forcing," AIAA 2012-1265.
14. Tian, V., McKeon, B., Leyva, I., "Split Stream Flow Past a Blunt Trailing Edge with Application to Combustion Instabilities," AIAA 2012-3807.
15. Teshome, S., Leyva, I., Talley, D., and Karagozian, A., "Geometry Effects on Steady and Acoustically Forced Shear-Coaxial Jet Sprays," 12th Triennial International Conference on Liquid Atomization and Spray Systems, Heidelberg, Germany, September 2-6, 2012.
16. Jewell, J., Parziale, N., Leyva, I, Shepherd, J., "Turbulent Spot Observations within a Hypervelocity Boundary Layer on a 5-degree Half-Angle Cone," AIAA 2012-1362.
17. Teshome, S., Leyva, I. A., Talley, D., "Proper Orthogonal Decomposition Analysis of Shear-Coaxial Injector Flows with and Without Transverse Acoustic Forcing," JANNAF Joint Subcommittee Meeting, Huntsville, AL, 5-9 Dec 2011.
18. Wagnild, R., Candler, G., Leyva, I., Jewell, J., Hornung, H., "Carbon Dioxide Injection for Hypervelocity Boundary Layer Stability," AIAA 2010-1244.
19. Schmitt, T., Rodriguez, J., Candel, S., and Leyva, I., "Mixing under Transcritical Coaxial Injection Conditions: Experiments and Simulations," 8th EuroMech Conference, Bad Reichenhall, Germany, September 2010.
20. Leyva, I., Jewell, J., Laurence, S., Hornung, H., Shepherd, J., "On the impact of injection schemes on transition in hypersonic boundary layers," AIAA 2009-720.

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