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Sr. Research Engineer (Aerospace)

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UNITED STATES CITIZEN

MAJOR FIELDS OF EXPERTISE:

High-speed, chemically reacting, multi-phase turbulent flows, hypersonic aerothermodynamics, supersonic combustion, high-pressure aerospace propulsion systems, chemical rockets, and their applications to aeronautics and astronautics.

EDUCATION:

- 2010 Ph.D. Aerospace Engineer,
University of California San Diego (UCSD), California USA.
Thesis Advisor: Prof. Forman A. Williams.
Fields of study: Theoretical Combustion Physics and Fluid Dynamics.
- 2006 M.Sc. Aerospace Engineer,
University of California San Diego (UCSD), California USA.
- 2005 B.Sc.+M.Sc. Mechanical Engineer (Ingeniero Superior, 5-years program),
Carlos III University of Madrid, Spain.

EMPLOYMENT (CIVIL AND MILITARY):

- 2020-Present Associate Director,
PSAAP-III INSIEME Center for Exascale Computing in Rocket Propulsion,
Stanford University, California, USA.
- 2011-Present Sr. Research Engineer (Aerospace),
Center for Turbulence Research (CTR),
Stanford University, California, USA.
- 2019-Present Sr. Airman (SrA), United States Air Force.
Assignments: USAF Reserves Hypersonics Team (extra assignment),
and 349th AMW, 82nd APS, Travis Air Force Base, California, USA.
- 2017-2018 Technical Consultant,
Cascade Technologies Inc., Palo Alto, California, USA.
- 2010-2011 Postdoctoral Researcher,
Combustion and Computational Fluid Dynamics Division,
European Center for Research and Advanced Training in Scientific Computations
(CERFACS) Toulouse, France.
- 2005-2010 Research Engineer,
Department of Mechanical and Aerospace Engineering,
University of California San Diego (UCSD), California, USA.

EMPLOYMENT (UNIVERSITY TEACHING):

- 2018-Present Lecturer^{1,2},
Mechanical Engineering Department. Stanford University, USA.
Course taught: *ME356 Hypersonic Aerothermodynamics* (graduate level).
- 2017 Lecturer¹,
Mechanical Engineering Department. Stanford University, USA.
Course taught: *ME451C Advanced Fluid Mechanics: Compressible Turbulence* (graduate level).
- 2016 Lecturer¹,
Mechanical Engineering Department. Stanford University, USA.
Course taught: *ME355 Compressible Flows* (graduate level).
- 2012 Lecturer¹,
Mechanical Engineering Department. Stanford University, USA.
Course taught: *ME471 Turbulent Combustion* (graduate level).
- 2009 Lecturer¹,
Department of Mechanical and Aerospace Engineering,
University of California San Diego (UCSD), USA.
Course taught: *MAE 180 Spacecraft Guidance, Navigation and Mission Analysis* (undergraduate level).
- 2014-2019 Premajor Undergraduate Advisor,
Office of the Vice Provost for Undergraduate Education,
Stanford University, USA.
(advisor to 13 freshman students)

PROFESSIONAL CERTIFICATIONS:

- 2015 Advanced Project Management Certificate,
Center for Professional Development, Stanford University.

Coursework: *Leading Effective Teams, Executing Complex Programs, Project Risk Management, Converting Strategy into Action, Financial Mastery for Projects, and Leadership for Strategic Execution* (120 hrs of instruction total).

MILITARY TRAINING:

- 2019 USAF Basic Military Training,
321st Training Squadron, Lackland Air Force Base TX.
- 2020 USAF Air Transportation Specialist Course,
345th Training Squadron, Fort Lee Army Base VA.

¹ Responsible for the instruction of the entire course.

² I introduced this course in the Stanford graduate curriculum.

SCHOLAR SERVICE TO THE SCIENTIFIC COMMUNITY:

Co-Organizer of the APS-DFD minisymposium titled “*Frontiers in Combustion Physics*” (10 speakers) at the 66th annual meeting, American Physical Society, Division of Fluid Dynamics, 2013, Pittsburgh PA.

Session Abstract Sorter (200 abstracts) and Session Organizer (21 sessions), 67th annual meeting, American Physical Society, Division of Fluid Dynamics, 2014, San Francisco CA.

Session Chair, 66th, 67th, 68th and 69th annual meetings of the American Physical Society, Division of Fluid Dynamics, 2013-2016.

CTR Steering Committee Member, 2016-Present.

Ph.D. Thesis Defense/Reading Committee Member for

- Cheryl M. Lam, Stanford University (2015); Plasma physics in Hall thrusters.
- Daniel Martínez-Ruiz, Carlos III University of Madrid (2015); Spray combustion.
- Chaitanya Ghodke, Oregon State University (2016); Turbulent flows over particle beds.
- Mario Di Renzo, Politecnico di Bari, Italy (2018); Electric-field effects on combustion.
- Curtis W. Hamman, Stanford University (2018); Rayleigh-Benard turbulent convection.
- Maxime Bassenne, Stanford University (2018); Particle-laden turbulence.
- Ronald Chan, Stanford University (2020); Turbulent breaking waves.

Reviewer of Proposals for

- National Science Foundation (NSF):
 Combustion & Fire Systems Portfolio,
 Space Technologies SBIR/STTR Portfolio.
- US Department of Energy (DoE):
 INCITE Supercomputing Program.
- US Air Force Office of Scientific Research (AFOSR):
 Hypersonic Aerothermodynamics Portfolio.
- Agence Nationale de la Recherche (ANR-France National Research Agency),
- US-Israel Bi-National Science Foundation (BNSF),
- Czech Republic Science Foundation (GACR).
- Chilean National Commission for Science and Technology (CONICYT).

Referee of Journal Papers for

- Nature Communications,
- Proceedings of the National Academy of Sciences USA (PNAS),
- Progress in Energy and Combustion Science (PECS),
- Physical Review Fluids,
- Journal of Fluid Mechanics,
- Physics of Fluids,
- Combustion and Flame,
- Proceedings of the Combustion Institute,
- Journal of Computational Physics,
- AIAA Journal,

- Journal of Propulsion and Power,
- Journal of Fluid Mechanics RAPIDS,
- Chemical Engineering Journal,
- Acta Astronautica,
- Combustion Science and Technology,
- Combustion Theory and Modeling,
- Proceedings of the Royal Society of London A,
- Physical Review E,
- Theoretical and Computational Fluid Dynamics,
- Flow, Turbulence and Combustion,
- Computers and Fluids,
- Journal of Turbulence,
- Aerospace Science and Technology,
- American Society of Mechanical Engineers (ASME) Turbo Expo,
- International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS),
- Theoretical and Applied Mechanics,
- Thermal Science,
- PLoS-ONE,
- The Aeronautical Journal / UK Royal Aeronautical Society.

Reviewer of Science & Engineering Books for

- Wiley & Sons Inc. Publishing Company,
- Elsevier Science & Technology Books.

Co-Editor (together with Parviz Moin) of 9 Volumes of 285 CTR Technical Reports:

- Proceedings of the Summer Program 2018, 2016, and 2014 (Total: 126 reports),
- Annual Research Briefs 2020, 2018, 2017, 2016, 2015, and 2014 (Total: 159 reports).

PUBLICATIONS (Research Monographs):

1. Jofre L. and Urzay J.,
"Transcritical diffuse-interface hydrodynamics of propellants in high-pressure combustors of chemical propulsion systems."
 Progress in Energy and Combustion Science 82, 100877 (2021).
2. Urzay J. and Di Renzo M.,
"Engineering aspects of hypersonic turbulent flows at suborbital enthalpies."
 Annual Research Briefs, Center for Turbulence Research, Stanford University, pp. 7-32 (2020).
3. Urzay J.,
"Supersonic combustion in air-breathing propulsion systems for hypersonic flight."
 Annual Review of Fluid Mechanics 50, 593-627 (2018).
4. Sánchez A.L., Urzay J. and Liñán A.,
"The role of separation of scales in the description of spray combustion."
 (Invited Topical Review at 35th International Symposium on Combustion)
 Proceedings of the Combustion Institute 35, 1549-1577 (2015).

PUBLICATIONS (Regular Articles):

1. Huete C., Cuadra A., Vera M. and Urzay J.,
“*Thermochemical effects on hypersonic shock waves interacting with weak turbulence.*”
Physics of Fluids 33, 086111 (2021).
2. Di Renzo M. and Urzay J.,
“*Direct numerical simulations of a hypersonic transitional boundary layer at suborbital enthalpies.*”
Journal of Fluid Mechanics 912, A29 (2021).
3. Chan W. H. R., Johnson P., Moin P. and Urzay J.,
“*The turbulent bubble break-up cascade in breaking waves. Part 2: Numerical simulations.*”
Journal of Fluid Mechanics 912, A43 (2021).
4. Fu L., Karp M., Bose S.T., Moin P. and Urzay J.,
“*Shock-induced heating and transition to turbulence in a hypersonic boundary layer.*”
Journal of Fluid Mechanics 909, A8 (2021).
5. Di Renzo M., Fu L. and Urzay J.,
“*HTR solver: An open-source exascale-oriented task-based multi-GPU high-order code for hypersonic aerothermodynamics.*”
Computer Physics Communications 255, 107262 (2020).
6. Di Renzo M., Johnson P.L., Bassenne M., Villafañe L. and Urzay J.,
“*Mitigation of turbophoresis in particle-laden turbulent channel flows by using incident electric fields.*”
Physical Review Fluids 4, 124303 (2019).
7. Chan W.H.R., Mirjalili S., Jain S.S., Urzay J., Mani A. and Moin P.,
“*Birth of microbubbles in turbulent breaking waves.*”
(paper associated with a video winner of the 2018 "APS/DFD Gallery of Fluid Motion Award")
Physical Review Fluids 4, 100508 (2019).
8. Bassenne M., Esmaily M., Livescu D., Moin P. and Urzay J.,
“*A dynamic spectrally enriched subgrid-scale model for preferential concentration in particle-laden turbulence.*”
International Journal of Multiphase Flows 116, 270-280 (2019).
9. Di Renzo M., Pascazio G. and Urzay J.,
“*The breakdown of self-similarity in electrified counterflow diffusion flames.*”
Combustion and Flame 205, 231-240 (2019).
10. Kim J., Bassenne M., Towery C.A.Z., Hamlington P.E., Poludnenko A.Y. and Urzay J.,
“*Spatially localized multi-scale transfer of energy in turbulent premixed flames.*”
Journal of Fluid Mechanics 848, 78-116 (2018).
11. Bassenne M., Moin P. and Urzay J.,
“*Wavelet multi-resolution analysis of particle-laden turbulence.*”
Physical Review Fluids 3, 084304 (2018).
12. Di Renzo M. and Urzay J.,
“*Aerodynamic generation of electric fields in turbulence laden with charged inertial particles.*”
Nature Communications 9, 1676 (2018).

13. Di Renzo M., Urzay J., di Palma P., De Tullio M.D. and Pascazio G.,
“*The effects of incident electric fields on counterflow diffusion flames.*”
Combustion and Flame 193, 177-191 (2018).
14. Yang X.I.A., Urzay J., Bose S. and Moin P.,
“*Aerodynamic heating in wall-modeled large-eddy simulations of high-speed flows.*”
AIAA Journal 56, 731-742 (2018).
15. Bassenne M., Urzay J., Schneider K. and Moin P.,
“*Extraction of coherent clusters and grid adaptation in particle-laden turbulence using wavelet filters.*”
Physical Review Fluids 2, 054301 (2017).
16. Urzay J., Doostmohammadi A. and Yeomans J.M.,
“*Multi-scale statistics of turbulence motorized by active matter.*”
Journal of Fluid Mechanics 822, 762-773 (2017).
17. O’Brien J., Towery C.A.Z., Hamlington P., Ihme M., Poludnenko A.Y. and Urzay J.,
“*The cross-scale physical-space transfer of kinetic energy in turbulent premixed flames.*”
(Distinguished Paper - Turbulent Flames Award at the 35th International Symposium on Combustion) Proceedings of the Combustion Institute 36, 1967-1975 (2017).
18. Park G.I, Bassenne M., Urzay J. and Moin P.,
“*A simple dynamic subgrid-scale model for LES of particle-laden turbulence.*”
Physical Review Fluids 2, 044301 (2017).
19. Towery C.A.Z., Poludnenko A.Y. and Urzay J., O’Brien J., Ihme M. and Hamlington P.,
“*Spectral kinetic energy transfer in turbulent premixed reacting flows.*”
Physical Review E 93, 053115 (2016).
20. Huete C., Urzay J., Sánchez A.L. and Williams F.A.,
“*Weak-shock interactions with transonic mixing layers of fuels for high-speed propulsion.*”
AIAA Journal 54, 966-979 (2016).
21. Bassenne M., Urzay J., Park G.I. and Moin P.,
“*Constant-energetics physical-space forcing methods for improved convergence to homogeneous-isotropic turbulence with application to particle-laden flows.*”
Physics of Fluids 28, 035114 (2016).
22. Huete C., Sánchez A.L., Williams F.A. and Urzay J.,
“*Diffusion-flame ignition by shock-wave impingement on supersonic mixing layers.*”
Journal of Fluid Mechanics 784, 74-108 (2015).
23. Mortazavi M., Urzay J. and Mani A.,
“*Computational hydrodynamics and optical performance of inductively-coupled plasma adaptive lenses.*”
Physics of Plasmas 22, 062122, 1-20 (2015).
24. Liñán A., Martínez-Ruiz D., Sánchez A.L. and Urzay J.,
“*Regimes of vaporization and combustion of sprays in counterflow mixing layers.*”
Combustion Science and Technology 187, 103-131 (2015).

25. Timerman D., Greene D.F., Urzay J. and Ackerman J.
"Turbulence-induced resonance vibrations cause pollen release in wind-pollinated species."
 Journal of the Royal Society Interface 11, 20140866 (2014).
26. O'Brien J., Urzay J., Ihme M., Moin P. and Saghafian A.,
"Subgrid-scale backscatter in reacting and inert supersonic hydrogen-air turbulent mixing layers."
 Journal of Fluid Mechanics 743, 554-584 (2014).
27. Urzay J., Kseib N., Davidson D.F., Iaccarino G. and Hanson, R.K.,
"Uncertainty-quantification analysis of the effects of residual impurities on hydrogen-oxygen ignition in shock tubes."
 Combustion and Flame 161, 1-15 (2014).
28. Martínez-Ruiz D., Urzay J., Sánchez A.L., Liñán A. and Williams F.A.,
"Dynamics of thermal ignition of spray flames in mixing layers."
 Journal of Fluid Mechanics 734, 387-423 (2013).
29. Urzay J., Nayagam V. and Williams F.A.,
"Theory of the propagation dynamics of spiral edges of diffusion flames in von Kármán swirling flows." Combustion and Flame 158, 255-272 (2011).
30. Urzay J.,
"Asymptotic theory of the elastohydrodynamic adhesion and gliding motion of a solid particle over soft and sticky substrates at low Reynolds numbers."
 Journal of Fluid Mechanics 653, 391-429 (2010).
31. Urzay J., Llewellyn Smith S., Thompson E., and Glover B.J:
"Wind gusts and plant aeroelasticity effects on the aerodynamics of pollen shedding: A hypothetical turbulence-initiated wind-pollination mechanism."
 Journal of Theoretical Biology 259, 785-792 (2009).
32. Urzay J., Nayagam V. and Williams F.A.,
"Diffusion-flame extinction on a rotating porous-disk burner."
 Proceedings of the Combustion Institute 32, 1219-1226 (2008).
33. Urzay J., Llewellyn Smith S. and Glover B.J.,
"The elastohydrodynamic force on a sphere near a soft wall."
 Physics of Fluids 17, 103106, 1-7 (2007).

PUBLICATIONS (Technical Reports --- Selected):

1. Jofre L. and Urzay J.,
"A characteristic length for density gradients in supercritical monocomponent flows near pseudoboiling."
 Annual Research Briefs, Center for Turbulence Research, Stanford University (2020),
 pp. 277-282.
2. Di Renzo M. and Urzay J.,
"An a priori study of the accuracy of an equilibrium wall model for dissociating air in supersonic channel flows."
 Annual Research Briefs, Center for Turbulence Research, Stanford University (2019),
 pp. 29-40.

3. Chan W.H.R., Dodd M.S., Johnson P.L., Urzay J. and Moin P.,
"Formation and dynamics of bubbles in breaking waves: Part II. The evolution of the bubble size distribution and breakup/coalescence statistics."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2018), pp. 21-34.
4. Bassenne M. and Urzay J.,
"A dynamic approximate deconvolution model for scalars in LES."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2016), pp. 105-106.
5. Kim J., Bermejo-Moreno I., Schreyer A.M. and Urzay J.,
"LES of hypersonic compression-corner flows with upstream sub-boundary layer microramp vortex generators."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2016), pp. 51-63.
6. Yang X.I.A., Urzay J. and Moin P.,
"Heat-transfer rates in equilibrium wall-modeled LES of supersonic turbulent flows."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2016), pp. 3-15.
7. Park G.I., Urzay J., Bassenne M. and Moin P.,
"A dynamic subgrid-scale model based on differential filters for LES of particle-laden turbulent flows."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2014), pp. 17-26.
8. Urzay J., Bassenne M., Park G.I. and Moin P.,
"Characteristic regimes of subgrid-scale coupling in LES of particle-laden turbulent flows."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2014), pp. 3-13.
9. O'Brien J., Urzay J., Poludnenko A.Y., Hamlington P. and Ihme M.,
"Countergradient subgrid-scale transport and energy backscatter in turbulent deflagrations."
Proceedings of the Summer Program, Center for Turbulence Research, Stanford University (2014), pp. 147-157.
10. Ghodke C.D., Apte S.V. and Urzay J.,
"Direct numerical simulations of oscillatory wall-bounded flow over a closely-packed fixed bed of spherical particles."
Proceedings of the Summer Program, Center for Turbulence Research, Stanford University (2014), pp. 47-55.
11. Urzay J., Kseib N., Costantine P.G., Davidson D.F., and Iaccarino G.,
"Uncertainty-quantifying models for chemical-kinetic rates."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2012), pp. 3-16.
12. Urzay J., Kseib N., Palacios F., Larsson J. and Iaccarino G.,
"A stochastic flamelet progress-variable approach for numerical simulations of high-speed turbulent combustion under chemical-kinetic uncertainties."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2012), pp. 17-30.
13. Urzay J.,
"A revised spray-combustion diagram of diffusion-controlled burning regimes in fuel-spray clouds."
Annual Research Briefs, Center for Turbulence Research, Stanford University (2011), pp. 193-198.

THESIS MANUSCRIPTS:

1. Urzay J.,
"Fluidodinamica de chorros laminares ligeros" (in spanish).
B.Sc./M.Sc. Thesis, Department of Thermal Engineering and Fluid Mechanics,
Carlos III University of Madrid, Spain (2005).
2. Urzay J.,
"Theoretical studies in spiral edge-flame propagation and particle hydrodynamics".
Ph.D. Thesis, Department of Mechanical and Aerospace Engineering, University of California
San Diego (2010).

CONFERENCE PRESENTATIONS AND INVITED SEMINARS:

1. Urzay J.,
"Hypersonic turbulent flows at suborbital enthalpies." Entry Systems and Technology Division
Seminar, NASA Ames Research Center, 2021.
2. Urzay J.,
*"Direct numerical simulations of a hypersonic transitional boundary layer at suborbital
enthalpies."* Space Exploration Technologies (SpaceX), Hawthorne CA, 2020.
3. Urzay J. and Jofre L.,
*"The terminal edge structure of a transcritical interface between two propellant streams at high
pressures."* 73rd annual meeting, American Physical Society, Division of Fluid Dynamics, 2020
Chicago IL.
4. Fu L., Karp M., Bose S.T., Moin P. and Urzay J.,
"Shock-induced transition and heating in hypersonic boundary layers",
72nd annual meeting, American Physical Society, Division of Fluid Dynamics, 2019 Seattle VA.
5. Chan W.H.R., Johnson P.L., Urzay J. and Moin P.,
"Cascades of bubbles in turbulent breaking waves",
72nd annual meeting, American Physical Society, Division of Fluid Dynamics, 2019 Seattle VA.
6. Jain S.S., Urzay J., Mani A. and Moin P.,
"Multiscale modeling of bubble acoustics",
72nd annual meeting, American Physical Society, Division of Fluid Dynamics, 2019 Seattle VA.
7. Urzay J.,
"On transcritical flows of propellants into high-pressure combustors." Space Exploration
Technologies (SpaceX), Hawthorne CA, 2019.
8. Chan W.H.R., Mirjalili S., Jain S., Urzay J., Mani A. and Moin P.,
"Birth of microbubbles in turbulent breaking waves"
(APS Gallery of Fluid Motion Award Winner)
71th annual meeting, American Physical Society, Division of Fluid Dynamics, 2018 Atlanta GA.
9. Bassenne M., Esmaily M., Johnson P.L., Livescu D., Moin P. and Urzay J.,
*"A dynamic spectrally-enriched subgrid-scale model for preferential concentration of inertial
particles in turbulence"*,
71th annual meeting, American Physical Society, Division of Fluid Dynamics, 2018 Atlanta GA.

10. Di Renzo M., Bassenne M., Johnson P.L., Villafaña L. and Urzay J.,
“Electrically induced suppression of turbophoresis in particle-laden turbulent channel flows”,
71th annual meeting, American Physical Society, Division of Fluid Dynamics, 2018 Atlanta GA.
11. Chan W.H.R., Dodd M., Johnson P.L., Urzay J. and Moin P.,
“Formation and dynamics of bubbles generated by turbulent breaking waves”,
71th annual meeting, American Physical Society, Division of Fluid Dynamics, 2018 Atlanta GA.
12. Fu L., Karp M., Cho M., Bose S.T., Urzay J. and Moin P.,
“Equilibrium wall-modeled LES of shock-induced aerodynamic heating in hypersonic boundary layers”,
71th annual meeting, American Physical Society, Division of Fluid Dynamics, 2018 Atlanta GA.
13. Di Renzo M., Pascazio G. and Urzay J.,
“The structure of counterflow diffusion flames subject to incident electric fields”,
12th European Fluid Mechanics Conference, 2018 Vienna (Austria).
14. Chan W.H.R., Urzay J. and Moin P.,
“Subgrid-scale modeling for microbubble generation amid colliding water surfaces”,
32nd Symposium on Naval Hydrodynamics, 2018 Hamburg (Germany).
15. Invited Tutorial (*“Hypersonic Aerodynamics & Propulsion”*) at the 17th Biennial CTR
Summer Program, Stanford University, Summer 2018.
16. Invited seminar at the Department of Mechanical and Aerospace Engineering (Fluid
Mechanics Seminar), University of California San Diego (UCSD), La Jolla CA, Spring 2018.
17. Bassenne M., Urzay J., Schneider K. and Moin P.,
“Wavelet investigation of preferential concentration in particle-laden turbulence”,
70th annual meeting, American Physical Society, Division of Fluid Dynamics, 2017 Denver CO.
18. Urzay J. and Jofre L.,
“Diffuse interfacelets in transcritical flows of propellants into high-pressure combustors”,
70th annual meeting, American Physical Society, Division of Fluid Dynamics, 2017 Denver CO.
19. Yang X.I.A., Urzay J. and Moin P.,
“Aerodynamic heating effects on wall-modelled LES of high-speed flows”,
70th annual meeting, American Physical Society, Division of Fluid Dynamics, 2017 Denver CO.
20. Di Renzo M., Di Palma P., De Tullio M.D., Pascazio G. and Urzay J.,
“The effects of incident electric fields on counterflow diffusion flames”,
70th annual meeting, American Physical Society, Division of Fluid Dynamics, 2017 Denver CO.
21. Chan W.H.R., Mirjalili S., Urzay J., Mani A. and Moin P.,
*“Formulating a subgrid-scale breakup model for microbubble generation from interfacial
collisions”*,
70th annual meeting, American Physical Society, Division of Fluid Dynamics, 2017 Denver CO.
22. Invited seminar at the Department of Mechanical Engineering (Fluid Mechanics Seminar),
Stanford University, Stanford CA, Fall 2017.
23. Jofre L. and Urzay J.,
*“Interface dynamics in the transcritical flow of hydrocarbon-fueled mixtures in high-pressure
combustors”*, AIAA Propulsion & Energy Forum, Atlanta GA, 2017.

24. Di Renzo M., Di Palma P., De Tullio M.D., Pascazio G. and Urzay J.,
"Modeling the effects of ionic winds on laminar flames subjected to electric fields",
 8th European Combustion Meeting, Dubrovnik, Croatia 2017.
25. Bassenne M., Park G.I., Urzay J. and Moin P.,
"Dynamic subgrid-scale modeling for LES of particle-laden flows",
 69th annual meeting, American Physical Society, Division of Fluid Dynamics, 2016 Portland OR.
26. Doostmohammadi A., Urzay J., Yeomans J.,
"Multi-scale analysis of active turbulence in living fluids",
 69th annual meeting, American Physical Society, Division of Fluid Dynamics, 2016 Portland OR.
27. Kim J., Bassenne M., Towery C.A.Z., Poludnenko A.Y., Hamlington P.E., Ihme M., Urzay J.,
"Wavelet multi-resolution analysis of energy transfer in turbulent premixed flames",
 69th annual meeting, American Physical Society, Division of Fluid Dynamics, 2016 Portland OR.
28. Chan W.H.R., Urzay J., Mani A. and Moin P.,
"Impact detection for characterization of complex multiphase flows",
 69th annual meeting, American Physical Society, Division of Fluid Dynamics, 2016 Portland OR.
29. Schreyer A.M., Bermejo-Moreno I., Kim J. and Urzay J.,
"Separation control in a hypersonic ramp interaction",
 69th annual meeting, American Physical Society, Division of Fluid Dynamics, 2016 Portland OR.
30. O'Brien J., Towery C.A.Z., Hamlington P., Ihme M., Poludnenko A.Y. and Urzay J.,
"The cross-scale physical-space transfer of kinetic energy in turbulent premixed flames."
 36th International Symposium on Combustion, 2016, Seoul (Korea).
31. Kim J., Bassenne M., Poludnenko A.Y., Hamlington P.E., Ihme M. and Urzay J.*,
"Wavelet multi-resolution analysis of kinetic-energy transfer in turbulent premixed flames."
 36th International Symposium on Combustion, 2016, Seoul (Korea).
32. Invited seminar at the Department of Mechanical and Aerospace Engineering, University of California at Davis, Davis CA, 2016.
33. Park G.I., Urzay J. and Moin P.,
"A novel particle SGS model based on differential filter for LES of particle-laden turbulent flows",
 68th annual meeting, American Physical Society, Division of Fluid Dynamics, 2015 Boston MA.
34. Hamlington P., Towery C.A.Z., O'Brien J., Poludnenko A., Urzay J. and Ihme M.,
"Multiscale interactions and backscatter in premixed combustion",
 68th annual meeting, American Physical Society, Division of Fluid Dynamics, 2015 Boston MA.
35. Bassenne M., Urzay J., Park G.I. and Moin P.
"A constant-energy physical-space forcing method for steadier statistics and faster convergence to homogeneous-isotropic turbulence",
 68th annual meeting, American Physical Society, Division of Fluid Dynamics, 2015 Boston MA.
36. Sánchez A.L., Huete C., Williams F.A. and Urzay J.,
"Diffusion-flame ignition by shock-wave impingement on a supersonic mixing layer",
 68th annual meeting, American Physical Society, Division of Fluid Dynamics, 2015 Boston MA.

37. Jofre L., Urzay J., Mani A. and Moin P.,
“*A single-fluid multiphase formulation for diffuse-interface modeling of high-pressure liquid-fueled transcritical mixing layers*”,
68th annual meeting, American Physical Society, Division of Fluid Dynamics, 2015 Boston MA.
38. Invited lecture at Mathematical Institute of the Serbian Academy of Arts and Sciences,
Belgrade (Serbia), 2015.
39. Urzay J.,
“*Fundamental modeling of turbulent flows in multi-physics environments*”,
Turbulence International Workshop, Department of Mechanical Engineering, University of
Belgrade, 2015, Belgrade (Serbia).
40. Sánchez A.L., Huete C., Williams F.A. and Urzay J.,
“*Diffusion-flame ignition by shock-wave impingement on a supersonic mixing layer*”,
Fall Technical Meeting, Western States of the Combustion Institute, 2015 Provo UT.
41. Huete C, Sánchez A.L., Williams F.A. and Urzay J.,
“Theory of weak-shock interactions with transonic mixing layers”, International Colloquium on
the Dynamics of Explosions and Reactive Systems (ICDERS), 2015, Leeds (UK).
42. Timerman D., Greene D.F., Urzay J., Ackerman J.D. and Barret S.H.,
“Turbulence-induced stamen vibrations mediates shifts between pollination vectors”,
Botanical Society of America, 2015, Edmonton (Canada).
43. Invited seminar at Department of Aerospace Engineering, Texas A&M University, College
Station TX, 2015.
44. Invited seminar at William E. Boeing Department of Aeronautics and Astronautics,
University of Washington at Seattle, Seattle WA, 2015.
45. Invited seminar at Department of Integrative Biology, University of California at Berkeley,
Berkeley CA, 2015.
46. Invited seminar at Mechanical Engineering Department, University of Nevada at Reno, Reno
NV, 2015.
47. Urzay J., Mortazavi M. and Mani A.,
“The aero-optics of inductively-coupled plasma adaptive lenses”,
56th annual meeting, American Physical Society, Division of Plasma Physics, 2014, New Orleans
48. Sánchez A.L., Urzay J. and Liñán A.,
“The role of separation of scales in the description of spray combustion”, (Invited Topical
Review Lecture), 35th International Symposium on Combustion, 2014, San Francisco CA.
49. Urzay J., Ott D.W. and Prakash M.,
“A spinning puzzle of the release of a giant multinucleate multiflagellate zoospore”,
Annual meeting, American Society of Cell Biology, 2014 Philadelphia PA.
50. Ghodke C., Urzay J. and Apte S.,
“Particle-resolved DNS of turbulent oscillatory flow over a layer of fixed particles”,
67th annual meeting, American Physical Society, Division of Fluid Dynamics, 2014 San
Francisco CA.

51. Urzay J., Ott D.W. and Prakash M.,
“The unique low-Re spinning hydrodynamics of release of a multinucleate multiflagellate giant zoospore”
67th annual meeting, American Physical Society, Division of Fluid Dynamics, 2014 San Francisco CA.
52. Sánchez A.L., Martínez-Ruiz D., Urzay J. and Liñán A.,
“Spray combustion: scales, regimes, and formulations.”
66th annual meeting, American Physical Society, Division of Fluid Dynamics, 2013, Pittsburgh PA.
53. Mortazavi M., Urzay J. and Mani A.,
“*Thermal convection and gyrokinetic effects in inductively-coupled plasma-assisted optics.*”
66th annual meeting, American Physical Society, Division of Fluid Dynamics, 2013, Pittsburgh PA.
54. O’Brien J., Urzay J., Ihme M. and Moin P.,
“*Subgrid-scale backscatter in supersonic hydrogen-air turbulent mixing layers.*”
66th annual meeting, American Physical Society, Division of Fluid Dynamics, 2013, Pittsburgh PA.
55. Martínez-Ruiz D., Urzay J., Sánchez A.L., Liñán A., and Williams F.A.,
“*Ignition of fuel sprays in mixing layers*”,
SIAM International Meeting in Numerical Combustion 2013, San Antonio TX.
56. Urzay J., Kseib N., D.F. Davidson, Larsson J., and Iaccarino G.,
“*Uncertainty quantification in high-speed combustion*” (Invited Minisymposium Speaker),
SIAM International Meeting on Numerical Combustion, 2013, San Antonio TX.
57. Larsson J., Emory M., Constantine P., Kseib N., Urzay J., Palacios F., Gorle C., and Iaccarino G., “*Quantification of multiple types of uncertainties in the HyShot II scramjet combustor.*”
65th annual meeting, American Physical Society, Division of Fluid Dynamics, 2012, San Diego CA.
58. Urzay J., Kseib N., Davidson D., Iaccarino G., and Hanson R.,
“*Explosions in uncertain H₂/O₂ gaseous mixtures.*”
66th annual meeting, American Physical Society, Division of Fluid Dynamics, 2012, San Diego CA.
59. Invited seminar at Mechanical and Nuclear Engineering Department, Pennsylvania State University, State College PA, 2012.
60. Timerman D., Greene D.F., Ackerman J.D., and Urzay J.,
“*The mechanics of pollination by wind: is anemophily aeroelastically optimized for reproduction?*”
65th annual meeting, American Physical Society, Division of Fluid Dynamics, 2011, Baltimore MD.
61. Kseib N., Urzay J., and Iaccarino G.,
“*Uncertainty quantification in hydrogen-air diffusion flames.*”
65th annual meeting, American Physical Society, Division of Fluid Dynamics, 2011, Baltimore MD.

62. Urzay J., Sánchez A.L., Pitsch H., and Liñán A.,
“*Theory of vaporization and combustion of fuel sprays in strained laminar mixing layers.*”
65th annual meeting, American Physical Society, Division of Fluid Dynamics, 2011, Baltimore MD.
63. Invited seminar at Aerospace Engineering Department, Carlos III University of Madrid, Spain 2010.
64. Invited seminar at Department of Fire Protection Engineering, University of Maryland, College Park MD, 2009.
65. Urzay J.,
“*Gliding over soft and sticky walls at low Reynolds numbers*”
3rd Southern California Symposium on Flow Physics, 2009, San Diego CA.
66. Urzay J.,
“*Elastohydromolecular forces on a sphere moving near a soft wall at low Reynolds numbers.*”
61st annual meeting, American Physical Society, Division of Fluid Dynamics, 2008, San Antonio TX.

MEDIA APPEARANCES:

Science documentaries:

- Seeker (2019): “*How close are we to hypersonic travel?*” ([video - 1 Million views](#));

Technical magazines and online news media:

- USAF News (2021): “*X-15 Dreams: A father's gift in Spain launches a ...*” ([link](#)).
- Popular Mechanics (2021): “*60th anniversary of Yuri Gagarin's hypersonic flight*” ([link](#)).
- Stanford News (2021): “*Team develops exascale computing for spaceflight*” ([link](#)).
- Stanford News (2019): “*Stanford engineer's work helps propel hypersonic aircraft*” ([link](#)).
- Open Mind BBVA (2019): “*Hypersonic: The Future of Aviation*” ([link](#)).
- Flight Global (2019): “*3D-Printing brings scramjet engines closer to reality*” ([link](#)).
- Bold Business (2019): “*Hypersonic transport and the future of commercial aviation*” ([link](#)).
- Stanford News (2018): “*Stanford engineers win Gallery of Fluid Motion awards*” ([link](#)).
- American Society for Engineering Education's PRISM (2017): “*Wild Blue Yonder*” ([link](#)).
- The Combustion Institute (2017): “*Distinguished Paper Awarded: Turbulent Flames*” ([link](#)).

Television and Radio:

- NBC TV Network (2020): “*Stanford rocket engineer becomes US Citizen*” ([video](#)).
- KCBS Radio (2020): “*Stanford rocket scientist sworn in today as US Citizen*” ([audio](#)).