

CURRICULUM VITA

PERSONAL INFORMATION

Ping Lu
 Professor and Chair
 Department of Aerospace Engineering
 San Diego State University
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Education

Ph.D. Aerospace Engineering, the University of Michigan
 M.S.E. Aerospace Engineering, the University of Michigan
 B. S. Beijing Institute of Aeronautics (now Beihang University)

Academic Experience

Professor and Chair, Aerospace Engineering, San Diego State University	2016-present
Professor, Aerospace Engineering, Iowa State University	2003-2016
Associate Professor, Aero. Engr. & Engr. Mech., Iowa State University	1995-2003
Assistant Professor, Aero. Engr. & Engr. Mech., Iowa State University	1990-1995
Post-doctoral Associate, Aerospace Engineering, University of Michigan (Co-advisers: Elmer Gilbert, N. X. Vinh, and Robert Howe)	1988-1989

Editor-in-Chief Position

Editor-in-Chief, *AIAA Journal of Guidance, Control, and Dynamics* (JGCD) 2013-present
 The JGCD is the premier international journal in aerospace guidance, control, and flight dynamics, and one of the top ranked research journals in the category of Aerospace Engineering by all major citation indices. JGCD is the 2nd largest journal by AIAA in terms of paper submissions and circulation. As the EIC, Prof. Lu oversees 2 Deputy Editors and 33 Associate Editors, and is responsible for the direction, quality, and operation of the JGCD.

Honors and Awards

Fellow, American Institute of Aeronautics and Astronautics (AIAA) 2016
“For outstanding contributions in theory, methodology and algorithms for advanced guidance, particularly in entry and ascent flight of space transportation systems”

NASA Johnson Space Center Director’s Innovation Group Achievement Award 2016
 For *“exceptional work in pioneering the development of a fully-numeric predictor-corrector entry guidance algorithm for the atmospheric entry of space vehicles”*. The algorithm cited was developed by Prof. Lu

Mechanics and Control of Flight (MCF) Award, AIAA 2008
“For contributions in advanced guidance algorithms for entry and ascent flight”
 The AIAA MCF Award is a prestigious award in the aerospace guidance, control, and flight mechanics community, with a long and rich history since 1967. The MFC Award is presented for an outstanding recent technical or scientific contribution by an individual in the mechanics, guidance, or control of flight in space or the atmosphere.

AIAA Sustained Service Award	2006
<i>“For exceptional sustained service to the AIAA through contributions at the publication, sector and technical service levels”</i>	
Outstanding Contribution to AIAA at the National Level	2018
AIAA San Diego Section	
Young Engineering Faculty Research Award, Iowa State University	1997

RESEARCH ACTIVITIES

A hallmark of Prof. Lu’s research program has been addressing real-world challenges encountered in advanced aerospace systems with academic rigor. In this pursuit Prof. Lu has worked extensively with NASA, DoD, and the Aerospace Industry. Prof. Lu is one of the very few university researchers who were fortunate to have involved in major NASA programs in space transportation systems such as the X-33, Space Launch Initiative/Next Generation Launch Technology, Orion Multi-Purpose Crew Vehicle, and the Evolvable Mars Campaign for human Mars missions.

Current Research

- Advanced guidance of space transportation systems
Full-spectrum space system guidance covering launch ascent, on-orbit rendezvous and proximity operations, orbital transfers, aerocapture, planetary entry, powered descent, and landing; development of theory, methodology, algorithms, and software for real-time on-board applications
- Autonomous operations of aerospace systems
Spacecraft and other autonomous vehicles; development of trajectory optimization and planning algorithms based on convex optimization and/or other methods of guaranteed convergence; applications in highly constrained missions
- Hypersonic Guidance
Guidance of hypersonic gliding flight; optimal guidance of hypersonic powered flight; hypersonic flight mechanics

Journal Articles

Trend-Setting Editorial

P. Lu, “Introducing Computational Guidance and Control”, *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 2, pp. 193, 2017.

Articles

- J1. P. Lu, “Convex-Concave Decomposition of Nonlinear Equality Constraints in Optimal Control,” published online 1 October, 2020, *Journal of Guidance, Control, and Dynamics*, doi.org/10.2514/1.G005443
- J2. P. Lu, “Theory of Fractional-Polynomial Powered Descent Guidance”, *Journal of Guidance, Control, and Dynamics*, doi:[10.2514/1.G004556](https://doi.org/10.2514/1.G004556), Vol. 43, No. 3. 2020, pp. 398-409.
- J3. P. Lu, “Augmented Apollo Powered Descent Guidance”, *Journal of Guidance, Control, and Dynamics*, Vol. 42, No. 3, 2019, pp. 447-457.
- J4. C. Wan, D. Dai, and P. Lu, “An Alternating Minimization Algorithm for Polynomial Optimal Control Problems”, *Journal of Guidance, Control, and Dynamics*, Vol. 42, No. 4, 2019, pp. 723-736

- J5. B. Pan, X. Pan, and P. Lu, "Finding Best Solution in Low-Thrust Trajectory Optimization by Two-Phase Homotopy", *Journal of Spacecraft and Rockets*, Vol. 56, No. 1, 2019, pp.283-291
- J6. P. Lu, "Propellant-Optimal Powered Descent Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 4, 2018, pp. 813-826.
- J7. R. Pinson and P. Lu, "Trajectory Design Employing Convex Optimization for Landing on Irregularly Shaped Asteroids", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 6, 2018, pp. 1243-1256.
- J8. P. Lu, C. Brunner, S. Stachowiak, G. Mendeck, M. Tigges, and C. Cerimele, "Verification of a Fully Numerical Entry Guidance Algorithm", *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 2, pp. 230-247, 2017.
- J9. X. Liu, P. Lu, and B. Pan, "Survey of Convex Optimization for Aerospace Applications", *Astrodynamics*, Vol. 1, No. 1, p. 23-40, 2017
- J10. X. Liu, Z. Shen, and P. Lu, "Closed-Loop Optimization of Guidance Gain for Constrained Impact", *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 2, pp. 453-460, 2017.
- J11. B. Pan, P. Lu, X. Pan, and Y. Ma, "Double-Homotopy Method for Solving Optimal Control Problems", *Journal of Guidance, Control, and Dynamics*, Vol. 39, No. 8, 2016
- J12. X. Liu, Z. Shen, and P. Lu, "Exact Convex Relaxation for Optimal Flight of Aerodynamically Controlled Missiles", *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 52, No. 4, 2016, p. 1881-1892,
- J13. X. Liu, Z. Shen, and P. Lu, "Entry Trajectory Optimization by Second-Order Cone Programming", *Journal of Guidance, Control, and Dynamics*, Vol. 39, No. 2, 2016, pp. 227-241
- J14. P. Lu, "Entry Guidance Using Time-Scale Separation in Gliding Dynamics", *Journal of Spacecraft and Rockets*, Vol. 52, No. 4, 2015, pp. 1253-1258
- J15. P. Lu, Cerimele, C., Tigges, M., and Matz, D., "Optimal Aerocapture Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 38, No. 4, 2015, pp. 553-565
- J16. X. Liu, Z. Shen, and P. Lu, "Solving the Maximum-Crossrange Problem via Successive Second-Order Cone Programming with Line Search", *Aerospace Science and Technology*, Vol. 47, Dec. 2015, pp. 10-20.
- J17. P. Lu, "Entry Guidance: A Unified Method", *Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 3, 2014, pp. 713—728.
- J18. X. Liu and P. Lu, "Solving Non-Convex Optimal Control Problems by Convex Optimization", *Journal of Guidance, Control, and Dynamics*, Vol. 37, No. 3, 2014, pp. 750-765
- J19. B. Pan, Z. Chen, P. Lu, and G. Bao, "Reduced Transversality Conditions in Optimal Space Trajectories", *Journal of Guidance, Control, and Dynamics*, Vol. 36, No. 5, 2013, p. 1289-1300
- J20. P. Lu and X. Liu, "Autonomous Trajectory Planning for Rendezvous and Proximity Operations by Conic Optimization", *Journal of Guidance, Control, and Dynamics*, Vol. 36, No. 2, 2013, p. 375-389.
- J21. B. Pan, P. Lu, and Z. Chen, "Three-Dimensional Closed-Form Costate Solutions in Optimal Coast", *Acta Astronautica*, Vol. 77, 2012, p. 156-166.
- J22. C. Brunner and P. Lu, "Comparison of Fully Numerical Predictor-Corrector and Apollo Skip Entry Guidance Algorithms", *The Journal of the Astronautical Sciences*, Vol. 59, No. 3, 2012, p. 517-540
- J23. M. Baldwin and P. Lu, "Optimal Deorbit Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 35, No. 1, 2012, p. 93-103.
- J24. B. Pan, P. Lu and Z. Chen, "Coast Arcs in Optimal Multiburn Orbital Transfers", *Journal of Guidance, Control and Dynamics*, Vol. 35, No. 2, 2012, p. 451-461.
- J25. S. Xue and P. Lu, "Constrained Predictor-Corrector Entry Guidance", *Journal of Guidance, Control, and Dynamics*, Vol.33, No. 4, 2010, pp. 1273-1280
- J26. P. Lu and S. Xue, "Rapid Generation of Accurate Entry Landing Footprints", *Journal of Guidance, Control, and Dynamics*, Vol. 33, No. 3, 2010, pp. 756-767
- J27. P. Lu and B. Pan, "Highly Constrained Optimal Launch Ascent Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 33, No. 2, 2010, pp. 404-414
- J28. B. Rademacher, P. Lu, A. Strahan, and C. Cerimele, "In-flight Trajectory Planning and Guidance for Autonomous Parafoils", *Journal of Guidance, Control, and Dynamics*, Vol. 32, No. 6, 2009, pp. 1697-1712
- J29. L. Zhu, P. Lu, Z. Jing and S. Hu, "A New Robust Adaptive Control Scheme for Non-Affine Nonlinear Systems Based on SHLNN Disturbance Observer", *International Journal of Innovative Computing, Information and Control*, 2009
- J30. P. Lu, B. Griffin, G. Dukeman, and F. Chavez, "Rapid Optimal Multi-Burn Ascent Planning and Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 31, No. 6, pp. 1656-1664, 2008
- J31. C. Brunner and P. Lu, "Skip Entry Trajectory Planning and Guidance", *Journal of Guidance, Control, and Dynamics*, Vol., 31, No. 5, 2008, pp. 1210-1219.

- J32. P. Lu, "Predictor-Corrector Entry Guidance for Low Lifting Vehicles", *Journal of Guidance, Control, and Dynamics*, Vol. 31, No. 4, 2008, pp. 1067-1075
- J33. L. Zhang and P. Lu, "Fixed-Point Algorithms for Optimal Trajectories of Launch Vehicles", *Engineering Optimization*, Vol. 40, No. 4, 2008, pp. 361-381
- J34. P. Lu, "Asymptotic Analysis of Quasi-Equilibrium Glide in Lifting Entry Flight", *Journal of Guidance, Control, and Dynamics*, Vol. 29, No. 3, 2006, pp. 662-670.
- J35. P. Lu, D. Doman, and J. Schierman, "Adaptive Terminal Guidance for Hypervelocity Impact in Specified Direction", *Journal of Guidance, Control, and Dynamics*, Vol. 29, No. 2, 2006, pp. 269-278
- J36. Z. Shen, and P. Lu, "On-Board Entry Trajectory Planning for Sub-Orbital Flight", *Acta Astronautica*, Vol. 56, Issue 6, 2005, pp. 573-591
- J37. Z. Shen, and P. Lu, "Dynamic Lateral Guidance Logic", (invited paper in a special section on Reusable Launch Vehicle Guidance and Control), *Journal of Guidance, Control, and Dynamics*, Vol. 27, No. 6, 2004, pp. 949-959.
- J38. P. Lu, H. Sun, and B. Tsai, "Closed-Loop Endo-Atmospheric Ascent Guidance", *Journal of Guidance, Control, and Dynamics*, Vol. 26, No. 2, 2003, pp. 283-294.
- J39. Z. Shen, and P. Lu, "On-Board Generation of Three-Dimensional Constrained Entry Trajectories", *Journal of Guidance, Control, and Dynamics*, Vol. 26, No. 1, 2003, pp. 111-121.
- J40. P. Lu, and Z. Shen, "A Unifying Treatment to Control of Nonlinear Systems with Two Time Scales", *Journal of Guidance, Control, and Dynamics*, Vol. 25, No. 5, 2002, pp 975-979.
- J41. J. Burken, P. Lu, Z. Wu, and C. Bahm, "Two Reconfigurable Flight-Control Design Methods: Servomechanism and Control Allocation", *Journal of Guidance, Control, and Dynamics*, Vol. 24, No. 3, 2001, pp. 482-493.
- J42. P. Lu, "Closed-Form Control Laws for Linear Time-Varying Systems", *IEEE Transactions on Automatic Control*, Vol. 45, No. 3, 2000, pp. 537-542.
- J43. L. Tian, P. Lu, and J. Burken, "Nonlinear Engine-Only Flight Control", *Nonlinear Problems in Aviation and Aerospace*, edited by S. Sivasundaram, Gordon and Breach Science Publishers, London, U. K., 1999.
- J44. P. Lu, "Regulation about Time-Varying Trajectories: Precision Entry Guidance Illustrated", *Journal of Guidance, Control, and Dynamics*, Vol. 22, No. 6, 1999, pp. 784-790.
- J45. P. Lu and J. Burken, "Controlling Aircraft with Engine Thrust Only: Nonlinear Challenges", *Nonlinear Analysis*, Vol. 35, 1999, pp. 21-35.
- J46. P. Lu, "Approximate Nonlinear Receding-Horizon Control Laws in Closed Form", *International Journal of Control (IJC)*, Vol. 71, No. 1, 1998, pp. 19-34.
- J47. P. Lu, and J. Hanson, "Entry Guidance for the X-33 Vehicle", *Journal of Spacecraft and Rockets*, Vol. 35, No. 3, 1998, pp.342-349.
- J48. P. Lu, "Intercept of Nonmoving Targets at Arbitrary Time-Varying Velocity", *Journal of Guidance, Control, and Dynamics*, Vol. 21, No. 1, pp. 176-178, 1998.
- J49. P. Lu, "Nonlinear Systems with Control and State Constraints", *Optimal Control Applications and Methods*, Vol. 18, 1997, pp. 313-326.
- J50. P. Lu, "Optimal Semi-Analytical Guidance for Reentry Flight", *Space Technology*, Vol. 17, No. 1, 1997, pp. 7-14.
- J51. P. Lu, "Tracking Control of Nonlinear Systems with Bounded Controls and Control Rates", *Automatica*, Vol. 22, No. 6, pp. 1199-1202, 1997.
- J52. P. Lu, "Entry Guidance and Trajectory Control for Reusable Launch Vehicle," *Journal of Guidance, Control, and Dynamics*, Vol. 20, No. 1, pp. 143-149, 1997.
- J53. P. Lu, "Constrained Tracking Control of Nonlinear Systems," *Systems and Control Letters*, Vol. 27, 1996, pp. 305-314.
- J54. P. Lu and B. L. Pierson, "Optimal Aircraft Terrain-Following with Nonlinear Engine Dynamics," *Journal of Guidance, Control, and Dynamics*, Vol. 19, No. 1, 1996, pp. 240-242.
- J55. P. Lu, "Nonlinear Trajectory Tracking Guidance with Application to a Launch Vehicle," *Journal of Guidance, Control, and Dynamics*, Vol. 19, No. 1, 1996, pp. 99-106.
- J56. P. Lu and B. L. Pierson, "Aircraft Terrain-Following Based on a Nonlinear Continuous Predictive Control Approach", *Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 4, pp. 817-823, 1995.
- J57. P. Lu, "Optimal Predictive Control of Nonlinear Continuous Systems", *International Journal of Control*, Vol. 62, No. 3, 1995, pp. 633-649.
- J58. P. Lu and B.L. Pierson, "Optimal Terrain-Following Analysis and Trajectory Generation", *Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 3, pp. 555-560, 1995.

- J59. K.C. Lin and P. Lu, "Inverse Simulation - An Error Analysis", *Simulation Journal*, Vol. 65, No. 6, 1995, p. 385-392.
- J60. N.X. Vinh, E.G. Gilbert, R.M. Howe, D. Sheu, and P. Lu, "Reachable Domain for Interception at Hyperbolic Speeds", *Acta Astronautica*, Vol. 35, No. 1, 1995, pp. 1-8.
- J61. P. Lu, "Nonlinear Predictive Controllers for Continuous Systems," *Journal of Guidance, Control and Dynamics*, Vol. 17, No. 3, 1994, pp. 553-560.
- J62. P. Lu, and M. Asif Khan, "Nonsmooth Trajectory Optimization: An Approach Using Continuous Simulated Annealing," *Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 4, 1994, pp. 685-691.
- J63. M. Asif Khan, and P. Lu, "New Technique for Nonlinear Control of Aircraft," *Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 5, 1994.
- J64. P. Lu, and K. C. Lin, "Nonlinear Control of an Autonomous Tracked Vehicle," *Transactions of the Institute of Measurement and Control*, Vol. 16, No. 5, 1994.
- J65. P. Lu, "Analytical Solution to Constrained Hypersonic Trajectories," *Journal of Guidance, Control and Dynamics*, Vol. 16, No. 5, 1993, pp. 956-960.
- J66. P. Lu, and N. X. Vinh, "On the Minimax Optimal Control Problem and Its Variations," *Optimal Control --- International Series of Numerical Mathematics*, Vol. 111, ed. by Klaus H. Well, Birkhauser Verlag, Germany, 1993, pp. 99-112.
- J67. P. Lu, "Inverse Dynamics Approach to Trajectory Optimization for an Aerospace Plane," *Journal of Guidance, Control and Dynamics*, Vol. 16, No. 4, 1993, pp. 726-732.
- J68. P. Lu, "A New Nonlinear Optimal Feedback Control Law," *Control-Theory and Advanced Technology*, Vol. 9, No. 4, 1993, pp. 947-954.
- J69. K-C Lin, and P. Lu, "State-Tracking Controller Design for A Tracked Vehicle", *Journal of Control Systems and Technology*", Vol. 1, No. 4, 1993, pp. 297-302.
- J70. P. Lu, "Use of Approximate Gradients in Trajectory Optimization," *Journal of Guidance, Control and Dynamics*, Vol. 15, No. 5, 1992, pp. 1299-1301.
- J71. P. Lu, "Optimal Feedback Control Laws Using Nonlinear Programming," *Journal of Optimization Theory and Applications (JOTA)*, Vol. 71, No. 3, 1991, pp. 599-611.
- J72. P. Lu and N. X. Vinh, "Optimal Control Problems with Maximum Functional," *Journal of Guidance, Control, and Dynamics*, Vol. 14, No. 6, 1991, pp. 1215-1223.
- J73. E. G. Gilbert, R. M. Howe, P. Lu, and N. X. Vinh, "Optimal Aeroassisted Intercept Trajectories at Hyperbolic Speeds," *Journal of Guidance, Control, and Dynamics*, Vol. 14, No. 1, 1991, pp. 1215-1223.
- J74. N. X. Vinh, P. Lu, R. M. Howe and E. G. Gilbert, "Optimal Interception with Time Constraint," *Journal of Optimization Theory and Applications*, Vol. 66, No. 3, 1990, pp. 361-390.
- J75. P. Lu and N. X. Vinh, "Minimax Optimal Control for Atmospheric Fly-Through Trajectories," *Journal of Optimization Theory and Applications*, Vol. 57, No. 1, 1988, pp. 41-58.
- J76. N. X. Vinh and P. Lu, "Chebyshev Minimax Problems for Skip Trajectories," *The Journal of the Astronautical Sciences (JAS)*, Vol. 36, No. 102, 1988, pp. 179-197.
- J77. N. X. Vinh and P. Lu, "Necessary Conditions for Maximax Problems with Application to Aeroglide of Hypervelocity Vehicles," *Acta Astronautica*, Vol. 15, No. 5-6, 1987, pp. 413-420.

Conference Articles

- C1. S. Sandoval and P. Lu, "Powered Descent Guidance for a Crewed Lunar Landing Mission", AAS 2020-044, 43rd Annual AAS Guidance and Control Conference, Jan 31–Feb 5, 2020, Breckenridge, CO
- C2. B. Johnson, R. Sostaric, and P. Lu, "Mid Lift-to-Drag Rigid Vehicle 6-DoF Performance for Human Mars Entry, Descent, and Landing: A Fractional Polynomial Powered Descent Guidance Approach", AIAA 2020-1513, AIAA Atmospheric Flight Mechanics Conference, Jan. 6-10, 2020, Orlando, FL
- C3. B. Johnson, P. Lu, B. Nikaido, Z. Hays, and S. D'Souza, "Pterodactyl: Development and Performance of Guidance Algorithms for a Mechanically Deployed Entry Vehicle", accepted by the AIAA Guidance, Navigation, and Control Conference, Jan. 6-10, 2020, Orlando, FL
- C4. S. You, C. Wan, R. Dai, P. Lu, and J. Rea, "Learning-based Optimal Control for Planetary Entry, Powered Descent and Landing Guidance", AIAA 2020-1011, AIAA Guidance, Navigation, and Control Conference, Jan. 6-10, 2020, Orlando, FL

- C5. S. You, C. Wan, R. Dai, P. Lu, and J. Rea, "Learning-based Optimal Control for Planetary Entry, Powered Descent, and Landing Guidance", AIAA 2020-0849, AIAA Guidance, Navigation, and Control Conference, Jan. 6-10, 2020, Orlando, FL
- C6. P. Lu, "The Theory of Fractional-Polynomial Powered Decent Guidance", AIAA 2020-0845, AIAA Guidance, Navigation, and Control Conference, Jan. 6-10, 2020, Orlando, FL
- C7. J. Breanna, P. Lu, and Cerimele, C, "Mid-Lift-to-Drag Ratio Rigid Vehicle 6-DoF EDL Performance Using Tunable Apollo Powered Descent Guidance," AAS Paper 19-619, AAS/AIAA Astrodynamics Specialist Conference, August 2019, Portland, ME
- C8. C. Sun, D. Ran, and P. Lu, "Multi-Phase Spacecraft Mission Optimization by Quadratically Constrained Quadratic Programming", AIAA Paper 2019-1677, AIAA Guidance, Navigation, and Control Conference, January 2019, San Diego, CA,
- C9. P. Lu, "Fuel-Optimal and Apollo Powered Descent Guidance Compared for High-Mass Mars Mission" AAS Paper 18-054, AAS Guidance & Control Conference, Breckenridge, CO, Feb. 2018
- C10. B. Johnson, E. Braden, R.Sostaric, C. Cerimele, and P. Lu, "Entry, Descent, and Landing Performance for a Mid-Lift-to-Drag Ratio Vehicle at Mars", AAS Paper 18-053, AAS Guidance & Control Conference, Breckenridge, CO, Feb. 2018
- C11. P. Lu, R. Sostaric, and G. Mendeck, "Adaptive Powered Descent Initiation and Fuel-Optimal Guidance for Mars Applications", AIAA Paper 2018-0616, AIAA Guidance, Navigation, and Control Conference, January 2018
- C12. B. Johnson, C. Cerimele, S. Stachowiak, R.Sostaric, D. Matz, and P. Lu, "Mid-Lift-to-Drag Ratio Rigid Vehicle Control System Design and Simulation for Human Mars Entry", AIAA Paper 2018-0615, AIAA Guidance, Navigation, and Control Conference, January 2018
- C13. K. Webb, P. Lu, A. D. Cinanciole, "Aerocapture Guidance for a Human Mars Mission", AIAA Paper 2017-1900, AIAA Guidance, Navigation, and Control Conference, January, 2017.
- C14. D. Matz, P. Lu, G. Mendeck, and R. Sostaric, "Application of a Fully Numerical Guidance to Mars Aerocapture", AIAA Paper 2017-1901, AIAA Guidance, Navigation, and Control Conference, January, 2017.
- C15. W. Johnson, P. Lu, S. Stachowiak, "Automated Re-entry System Using FNPEG", AIAA Paper 2017-1899, AIAA Guidance, Navigation, and Control Conference, January, 2017.
- C16. R. Pinson and P. Lu, "Generation of Fuel Optimal Powered Descent Trajectories for Irregular Shaped Asteroids", AIAA Paper 2016-5378, SPACE 2016, Long Beach, CA, Sept. 2016
- C17. P. Lu, C. Brunner, S. Stachowiak, G. Mendeck, M. Tigges, and C. Cerimele, "Verification of a Fully Numerical Entry Guidance Algorithm", AIAA Paper 2016-0377 AIAA Guidance, Navigation, and Control Conference, January, 2016.
- C18. K. Webb and P. Lu, "Entry Guidance by Onboard Trajectory Planning and Tracking", AIAA Paper 2016-0279, AIAA Guidance, Navigation, and Control Conference, January, 2016.
- C19. C. Sun, R. Dai, and P. Lu, "Solving Polynomial Optimal Control Problems via Iterative Convex Optimization", AIAA Paper 2016-0371, AIAA Guidance, Navigation, and Control Conference, January, 2016.
- C20. R. Pinson and P. Lu, "Rapid Generation of Optimal Asteroid Powered Descent Trajectories via Convex Optimization", AAS Paper 15-616, AAS/AIAA Astrodynamics Specialist Conference, Vail, CO, August 9-13, 2015
- C21. P. Lu, Cerimele, C., Tigges, M., and Matz, D., "Optimal Aerocapture Guidance", AIAA Paper, 2015-1771, AIAA Guidance, Navigation, and Control Conference, Jan. 5-9, 2015, Kissimmee, FL.
- C22. P. Lu, S. Forbes, and M. Baldwin, "Gliding Guidance of High L/D Hypersonic Vehicles", AIAA Paper 2013-4648, AIAA Guidance, Navigation, and Control Conference, Boston, MA, August, 2013
- C23. X. Liu and P. Lu, "Robust Trajectory Optimization for Highly Constrained Rendezvous and Proximity Operations", AIAA Paper 2013-4720, AIAA Guidance, Navigation, and Control Conference, Boston, MA, August, 2013
- C24. X. Liu and P. Lu, Solving Non-Convex Optimal Control Problems by Convex Optimization", AIAA Paper 2013-4725, AIAA Guidance, Navigation, and Control Conference, Boston, MA, August, 2013
- C25. P. Lu, S. Forbes, and M. Baldwin, "A Versatile Powered Guidance Algorithm", AIAA Paper 2012-4843, AIAA Guidance, Navigation, and Control Conference, Minneapolis, MN, August, 2012
- C26. P. Lu and X. Liu, "Autonomous Trajectory Planning for Rendezvous and Proximity Operations by Conic Optimization", AIAA Paper 2012-4924, AIAA Guidance, Navigation, and Control Conference, Minneapolis, MN, August, 2012

- C27. P. Lu, D. Neal, S. Su, K. Horneman, and J. Schierman, "Pitch-Over Maneuver and Guidance for Rocket-Back Boosters", AIAA Guidance, Navigation, and Control Conference, Portland, OR, August 8-11, 2011.
- C28. S. Su, D. Neal, K. Horneman, J. Schierman, and P. Lu, "Integrated Rocket-Back Guidance and a Comparative Rocket-Back Study", AIAA Guidance, Navigation, and Control Conference, Portland, OR, August 8-11, 2011.
- C29. M. Baldwin and P. Lu, "Autonomous Optimal Deorbit Guidance", AAS-Paper 11-584, AAS/AAIA Astrodynamics Specialist Conference, Girdwood, AK, July 31- August 4, 2011
- C30. B. Pan, P. Lu and Z. Chen, "Coast Arcs in Optimal Multiburn Orbital Transfers", AAS-Paper 11-557, AAS/AAIA Astrodynamics Specialist Conference, Girdwood, AK, July 31- August 4, 2011
- C31. B. Pan and P. Lu, "Improvements to Optimal Launch Ascent Guidance", AIAA Paper 2010-8174, Guidance, Navigation, and Control Conference, August 2-5, 2010, Toronto, Canada
- C32. C. Brunner and P. Lu, "Comparison of Numerical Predictor-Corrector and Apollo Skip Entry Guidance Algorithms", AIAA Paper 2010-8307, Guidance, Navigation, and Control Conference, August 2-5, 2010, Toronto, Canada
- C33. O. Murillo and P. Lu, "Fast Ascent Trajectory Optimization for Hypersonic Air-Breathing Vehicles", AIAA Paper 2010-8173, Guidance, Navigation, and Control Conference, August 2-5, 2010, Toronto, Canada
- C34. M. Baldwin, P. Lu, and B. Pan, "On Autonomous Optimal Deorbit Guidance", AIAA Paper 2009-5667, Guidance, Navigation, and Control Conference, August 10-13, 2009
- C35. S. Xue and P. Lu, "Constrained Predictor-Corrector Entry Guidance", AIAA Paper 2009-5767, Guidance, Navigation, and Control Conference, August 10-13, 2009
- C36. B. Pan and P. Lu, "Rapid Optimization of Multiburn Rocket Trajectories Revisited", AIAA Paper 2009-6105, Guidance, Navigation, and Control Conference, August 10-13, 2009
- C37. P. Lu and B. Pan, "Highly Constrained Optimal Launch Ascent Guidance", AIAA Paper 2009-5961, Guidance, Navigation, and Control Conference, August 10-13, 2009
- C38. P. Lu and S. Xue, "Rapid Generation of Accurate Entry Landing Footprint", AIAA Paper 2009-5772, Guidance, Navigation, and Control Conference, August 10-13, 2009
- C39. F. Chavez and P. Lu, "Rapid Ascent Trajectory Planning and Closed-Loop Guidance for Responsive Launch", AIAA-RS-2009-1004, the 7th Responsive Space Conference, April 27-30, 2009
- C40. P. Lu, "Entry Trajectory Optimization with Analytical Feedback Angle Law", AIAA Paper 2008-7268, Guidance, Navigation, and Control Conference, August 18-21, 2008, Honolulu, Hawaii.
- C41. B. Rademacher and P. Lu, "Trajectory Design, Guidance, and Control for Autonomous Parafoils", AIAA Paper 2008-7417, Guidance, Navigation, and Control Conference, August 18-21, 2008, Honolulu, Hawaii.
- C42. O. Murillo and P. Lu, "Comparison of Autonomous Aerial Refueling Controllers Using Reduced Order Models", AIAA Paper 2008-6790, Guidance, Navigation, and Control Conference, August 18-21, 2008, Honolulu, Hawaii.
- C43. P. Lu, "A Predictor-Corrector Entry Guidance Approach for Low Lifting Vehicles", AIAA Paper 2007-6425, AIAA Guidance, Navigation, and Control Conference, August 20-23, 2007, Hilton Head Island, SC
- C44. P. Lu, B. Griffin, G. Dukeman, and F. Chavez, "Rapid Optimal Multi-Burn Ascent Planning and Guidance", AIAA Paper 2007-6773, AIAA Guidance, Navigation, and Control Conference, August 20-23, 2007, Hilton Head Island, SC
- C45. C. Brunner and P. Lu, "Skip Entry Trajectory Planning and Guidance", AIAA Paper 2007-677, AIAA Guidance, Navigation, and Control Conference, August 20-23, 2007, Hilton Head Island, SC
- C46. B. Williams, P. Lu, T. Shih, and R. Kreeger, "Q3D-Wing for Flight Control of Aircraft with Ice Accretion", 45th AIAA Aerospace Sciences Meeting and Exhibit, Jan 8-11, 2007, Reno, Nevada
- C47. J. Schierman, M. Lichter, K. Horneman, A. McCormick, P. Lu, and M. Bolender, "Launch Vehicle Rapid Mission Planning with Adaptive Path Generation", AIAA Space 2007 Conference and Exhibition, Sept. 18-20, 2007, Long Beach, CA.
- C48. P. Lu and F. Chavez, "Nonlinear Optimal Guidance", AIAA Paper 2006-6087, presented at the AIAA Guidance, Navigation, and Control Conference, August 21-24, 2006, Keystone, CO.
- C49. P. Lu, L. Zhang, and H. Sun, "Ascent Guidance for Responsive Launch: a Fixed-Point Approach", AIAA Paper 2005-6453, AIAA Guidance, Navigation, and Control Conference, August 15-18, 2005, San Francisco, CA.
- C50. P. Lu, D. Doman, and J. Schierman, "Adaptive Terminal Guidance for Hypervelocity Impact in Specified Direction", AIAA Paper 2005-6059, AIAA Guidance, Navigation, and Control Conference, August 15-18, 2005, San Francisco, CA.
- C51. P. Lu, "Asymptotic Analysis of Quasi-Equilibrium Glide in Lifting Entry Flight", AIAA Paper 2005-6128,

- AIAA Atmospheric Flight Mechanics Conference, August 15-18, 2005, San Francisco, CA..
- C52. P. Lu, "Adaptive Proportional-Navigation Guidance", Paper CCC-062, 24th Chinese Control Conference, Guangzhou, China, July 15-18, 2005.
- C53. Z. Shen, and P. Lu, "Dynamic Lateral Guidance Logic", AIAA Paper 2004-4773, Guidance, Navigation, and Control Conference, August 16-19, 2004, Providence, RI.
- C54. P. Lu and P. Rao, "An Integrated Approach for Entry Mission Design and Flight Simulations", AIAA paper 2004-0702, The 42nd AIAA Aerospace Sciences Meeting and Exhibit, January 5—8, 2004, Reno, NV.
- C55. Z. Shen and P. Lu, "On-Board Trajectory Planning Extended to Sub-Orbital Flight", AIAA paper 2003-5736, AIAA Guidance, Navigation, and Control Conference, August 11-14, 2003, Austin, TX.
- C56. S. Kahler, P. Lu, and J. Hanson, "Optimal Interplanetary Trajectories Using an Advanced Pulsed Fusion Propulsion System", AAS paper 03-571, AAS/AIAA Astrodynamics Specialists Conference, August 3-7, 2003, Big Sky, Montana.
- C57. P. Lu, H. Sun, and B. Tsai, "Closed-Loop Endo-atmospheric Ascent Guidance", AIAA Guidance, Navigation, and Control Conference, August 5-8, 2002, Monterey, CA.
- C58. Z. Shen, and P. Lu, "On-Board Generation of Three-Dimensional Constrained Entry Trajectories", AIAA Guidance, Navigation, and Control Conference, August 5-8, 2002, Monterey, CA.
- C59. Zhu, D. Lawrence, J. Fisher, Y. Shtessel, A. Hotel, and P. Lu, "Direct Fault Tolerant RLV Attitude Control – A Singular Perturbation Approach", AIAA Guidance, Navigation, and Control Conference, August 5-8, 2002, Monterey, CA.
- C60. P. Lu, and Z. Shen, "Control of Nonlinear Systems with Two Time Scales", *Proceedings of the AIAA Guidance, Navigation, and Control Conference*, Montreal, Canada, August 6-9, 2001
- C61. P. Lu, Z. Shen, G. Dukeman, and J. Hanson, "Entry Guidance by Trajectory Regulation", the *Proceedings of the AIAA Guidance, Navigation, and Control Conference*, August 14-17, 2000, Denver, CO.
- C62. P. Lu, "Reconfigurable Control of Systems with Control Redundancy", *Proceedings of the 19th Chinese Control Conference*, Hong Kong, December 6-8, 2000.
- C63. J. Burken, P. Lu, and Z. Wu, "Reconfigurable Flight Control Designs with Application to the X-33 Vehicle", the *Proceedings of AIAA Guidance, Navigation, and Control Conference*, August 9-11, 1999, Portland, OR.
- C64. P. Lu, "Approximate Receding-Horizon Control Laws for Linear Time-Varying Systems", *Proceedings of the 14th World Congress of the International Federation of Automatic Control*, Beijing, China, July 7-11, 1999.
- C65. P. Lu, J. Hanson, G. Dukeman, and S. Bhargava, "An Alternative Entry Guidance Scheme for the X-33", *Proceedings of the AIAA Atmospheric Flight Mechanics Conference*, Boston, MA, August 10-12, 1998.
- C66. P. Lu and J. Hanson, "Entry Trajectory Design for the X-33 Vehicle", *Proceedings of AIAA Atmospheric Flight Mechanics Conference*, New Orleans, LA, August 11-13, 1997.
- C67. P. Lu, "Optimal Semi-Analytical Guidance for Re-entry Flight," *Proceedings of the 47th International Astronautical Federation Congress*, Beijing, China, October 7-11, 1996.
- C68. P. Lu, "Entry Guidance and Trajectory Control for Reusable Launch Vehicle," *AIAA Guidance, Navigation, and Control Conference*, San Diego, CA, July 29-31, 1996.
- C69. P. Lu, "Tracking Control of Nonlinear Systems with Bounded Control and Control Rates," *Proceedings of the 13th World Congress of the International Federation of Automatic Control*, San Francisco, CA, June 30-July 5, 1996.
- C70. P. Lu, and J. Burken, "Propulsion Controlled Aircraft: a Nonlinear Perspective", *Proceedings of the First International Conference on Nonlinear Problems in Aviation and Aerospace*, Daytona Beach, FL, May 9-11, 1996.
- C71. P. Lu and B.L. Pierson, "Aircraft Terrain-Following Based on a Nonlinear Continuous Predictive Control Approach", *Proceedings of AIAA Guidance, Navigation, and Control Conference*, Baltimore, MD. August 9-11, 1995.
- C72. P. Lu and B.L. Pierson, "Optimal Terrain-Following Analysis and Trajectory Generation", *Proceedings of AIAA Atmospheric Flight Mechanics Conference*, Baltimore, MD, August 9-11, 1995.
- C73. L. Vempati and P. Lu, "Neurocontroller Design for an Aircraft Penetrating Through Windshear", *Proceedings of AIAA Guidance, Navigation, and Control Conference*, Baltimore, MD., August 9-11, 1995.
- C74. S. Salehi, J. Lin, K.C. Lin, and P. Lu, "Motion Controller Design for Autonomous Vehicle", *Proceedings of AIAA Guidance, Navigation, and Control Conference*, Baltimore, MD, August 9-11, 1995.
- C75. P. Lu, "Tracking Control of General Nonlinear Systems," *Proceedings of IEEE Conference on Decision and Control*, Lake Buena Vista, FL, Dec 10-13, Vol. 4, pp 3814-3815, 1994.

- C76. P. Lu and T. Cheng, "On a Nonlinear Flight Control Law," *Proceedings of the 19th International Council Of Aeronautical Sciences Congress/AIAA Aircraft System Conference*, Anaheim, CA, Sept. 18-23, 1994.
- C77. P. Lu, "A General Nonlinear Guidance Law: Application to a Launch Vehicle," *Proceedings of AIAA Guidance, Navigation and Control Conference*, Scottsdale, AZ, August 1-3, 1994.
- C78. P. Lu and M. Asif Khan, "Nonsmooth Trajectory Optimization: An Approach Using Continuous Simulated Annealing," *Proceedings of Atmospheric Flight Mechanics Conference*, Monterey, CA, Aug. 9-11, 1993.
- C79. M. Asif Khan and P. Lu, "A New Technique for Nonlinear Control of Aircraft," *Proceedings of AIAA Guidance, Navigation and Control Conference*, Monterey, CA August 9-11, 1993.
- C80. K. C. Lin and P. Lu, "The Numerical Errors in Inverse Simulation," *Proceedings of AIAA Flight Simulation Technology Conference*, Monterey, CA, August 9-11, 1993.
- C81. P. Lu, "Nonlinear Tracking Controller Design," *Proceedings of American Control Conference*, San Francisco, CA, June 2-4, 1993.
- C82. T. Cheng and P. Lu, "A Comparison of Nonlinear Flight Control Laws," *Proceedings of Society of Computer Simulation Multi-Conference*, Washington, DC, March 29-April 2, 1993.
- C83. P. Lu, "An Inverse Dynamics Approach to Trajectory Optimization and Guidance for an Aerospace Plane," *Proceedings of AIAA Guidance, Navigation, and Control Conference*, Hilton Head, SC, August 10-12, 1992.
- C84. P. Lu, "Minimum-Energy Feedback Control of Robots," *Proceedings of American Control Conference*, Chicago, IL, June 22-24, 1992.
- C85. P. Lu and J. Samsundar, "Closed-Form Solution of Constrained Trajectories: Application in Optimal Ascent of Aerospace Planes," Fourth International Aerospace Planes Conference, Orlando, FL, Dec. 1-4, 1992.
- C86. P. Lu, "Trajectory Optimization and Guidance for an Advanced Launch System," AIAA paper 92-0732, The 30th Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 6-9, 1992.
- C87. P. Lu, "Trajectory Optimization and Guidance for a Hypersonic Vehicle," AIAA Paper 91-5068, The Third AIAA International Aerospace Planes Conference, December 3-5, 1991, Orlando, FL.
- C88. N. X. Vinh, E. G. Gilbert, R. M. Howe, and P. Lu, "Reachable Domain for Interception at Hyperbolic Speeds," AIAA paper-90-2973, *Proceedings of the AIAA Astrodynamics Conference*, August 20-22, 1990, Portland, OR.
- C89. R.M. Howe, E.G. Gilbert, P. Lu, and N. X. Vinh, "Trajectory Optimization of Earth-Launched Interceptors at Supercircular Speeds," *Proceedings of the International Society for Optical Engineering*, Vol.872, 1988.
- C90. R. M. Howe, E. G. Gilbert, P. Lu, G. Shorr and N. X. Vinh, "Computation of Optimal Trajectories Using State-of-the-art Simulation Technology," *Proceedings of the Conference on Aerospace Simulation*, No. 3, February 3-5, 1988, San Diego, CA.
- C91. R. M. Howe, E.G. Gilbert, P. Lu, and N. X. Vinh, "Trajectory Optimization of Earth-Launched Interceptors at Supercircular Speeds," *Proceedings of the International Society for Optical Engineering*, Vol.872, 1988, pp. 12-18.

Plenary and Invited Presentations in Last 4 Years

- Keynote Speaker, 2020 International Conference on Aerospace Sciences and Technology, July 13, 2020
- GALCIT Colloquium, Caltech, November 1, 2019
- Jet Propulsion Laboratory, August 12, 2109
- Institute of Aerospace Studies, University of Toronto, April 5, 2019
- School of Aeronautics and Astronautics, Purdue University, September 6, 2018
- Keynote Speaker, 2018 International Conference on Aerospace Sciences and Technology, July 31, 2018, Moscow
- School of Aerospace Engineering, Georgia Tech, October 27, 2017
- Keynote Speaker, 2017 International Conference on Aerospace Sciences and Technology, July 26, 2017, Shanghai
- NASA Engineering Safety Center, GN&C Technical Discipline Team Meeting, January 24, 2017
- Department of Aerospace Engineering, University of Kansas, September 26, 2016
- School of Aeronautics and Astronautics, Purdue University, April 6, 2015

Industry Consulting

BAE Systems
 Northrop Grumman Corporation
 Lockheed Martin Space Systems
 Barron Associates, Inc.
 Schafer Corporation

TEACHING ACTIVITIES**Courses Taught**

At San Diego State (teaching 2 courses a year, as the Department Chair)

Aerospace Guidance and Navigation	(graduate; course developer)
Optimal Control	(graduate; course developer)

At Iowa State (nominal teaching load for research-active faculty was 4 courses a year)

Flight Control Systems I	(undergraduate)
Astrodynamics I	(undergraduate)
Flight Dynamics and Stability	(undergraduate)
Flight Control Systems II	(undergraduate)
Automatic Control for Flight Vehicles	(graduate)
Space Flight Mechanics	(graduate)
Entry Dynamics	(graduate; course developer)
Guidance and Navigation of Aerospace Vehicles	(graduate; course developer)
Optimal Control	(graduate)
Special Topics in Optimization	(graduate)

PROFESSIONAL SERVICE**Editorial Positions**

Editor-in-Chief, <i>AIAA Journal of Guidance, Control and Dynamics</i>	2013- present
Associate Editor, <i>AIAA Journal of Guidance, Control and Dynamics</i>	1996-2013
Member of Editorial Board <i>Optimal Control Applications and Methods</i>	2009-present
Subject Editor (Aerospace and Mechanical Systems), <i>Optimal Control Applications and Methods</i>	2004-2008

Professional Reviews

1. Reviewer for proposals submitted to NSF, AFOSR, NASA, Canadian Natural Sciences and Engineering Research Council, and CASIS (The Center for the Advancement of Science in Space, the organization that manages research activities at the International Space Station)
2. Reviewer for: *Journal of Guidance, Control and Dynamics* and *AIAA Journal of Spacecraft and Rockets*, *Acta Astronautica*, *Automatica*, *IEEE Transactions on Automatic Control*; *International Journal of Control*; *ASME Journal of Dynamic Systems, Measurement and Control*, *ASME Journal of Engineering for Industry*; *Optimal Control: Applications and Methods*; *Journal of Optimization Theory*

and Applications, Journal of Aerospace Engineering; Journal of Vibration and Control, the Journal of Astronautical Sciences.

3. Reviewer for: American Control Conference, IEEE Conference on Decision and Control; IEEE Conference on Control Applications; AIAA Guidance, Navigation and Control Conference; AIAA Atmospheric Flight Mechanics Conference; World Congress of the International Federation of Automatic Control; ASME Design Automation Conference, European Control Conference

Professional Society Leadership Positions

- Organizer, Invited Sessions on GN&C for the Orion Crew Exploration Vehicle, AIAA Guidance, Navigation, and Control Conference, 2007
- Program Committee, 2002 American Control Conference
- Program Co-Chair, AIAA Guidance, Navigation, and Control Conference, August 14-17, 2000, Denver, CO
- AIAA Society Review Chair for American Control Conference (1997)
- AIAA Associate Director for American Automatic Control Council (1996-1998)

Evaluator for Promotion and Tenure Cases

Prof. Lu has served as an evaluator for Promotion and Tenure cases for candidates from leading research universities in the US and abroad (Caltech, Georgia Tech, Purdue, University of Colorado Boulder, Virginia Tech, University of Washington, University of Toronto, University of California, University of Texas, Naval Postgraduate School, University of Kansas, York University, University of Strathclyde, University of Missouri, Mississippi State, ...)

Institutional Service and Faculty Mentoring

Prof. Lu has served on numerous committees at the department, college, and university levels, as a member or the chair. He has been the mentor for 6 junior faculty members