

Jose Palacios

Assistant Professor
Department of Aerospace Engineering
The Pennsylvania State University, University Park, PA, 16802
jlp324@psu.edu

EDUCATION

Ph.D., Aerospace Engineering, 2008, The Pennsylvania State University
Overall GPA: 3.80 / 4.00

Master of Science, Aerospace Engineering, 2004, The Pennsylvania State University
Overall GPA: 3.75 / 4.00

Bachelors Degree in Aerospace Engineering
Minor in Engineering Mechanics, 2003, The Pennsylvania State University
Overall GPA: 3.69 / 4.00
Dean's List: Every Semester

RESEARCH EXPERIENCE AND FUNDING

Awarded proposals with secured funding exceeding \$3 million from 2008-2012

08/2013-present **Assistant Professor**
Dept. of Aerospace Engineering, The Pennsylvania State University

Ice Adhesion Testing and Surface Characterization of Hydrophilic Coatings with Hydrogen-Bondings

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Douglas Wolfe, PSU Applied Research Laboratory
Agency: NASA (Grant Agreement # NNX14AB29A)
Amount: \$79,313
Dates: 10/1/2013 – 03/1/2015

Centrifugally Powered Pneumatic De-Icing for Helicopter Rotor Blades

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Joseph Szefi, Invercon LLC
Co-PI: Douglas Wolfe, PSU Applied Research Laboratory
Agency: NASA (Grant# TBD, solicitation approved under announcement NNH11EA001N-LEARN)
Amount: \$190,000
Dates: 5/1/2013 – 5/1/2014

Experimental Measurement of Ice Crystal Dynamics

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Jason Tan, GE Global Research
Co-PI: Paul Lawson, Spec Inc.
Agency: NASA (Grant# NNX12AK16A)
Amount: \$845,000
Dates: 1/1/2013 – 1/1/2016

05/2011-08/2013 **Research Associate**
Adverse Environment Rotor Test Stand
The Vertical Lift Research Center of Excellence
Dept. of Aerospace Engineering, The Pennsylvania State University

Ice Accretion to Cascade Flow Configurations of Engine Compressors

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Agency: GE Global Research (Grant# 400088687)
Amount: \$35,600
Dates: 10/01/2010 – 06/30/2012

Wind Turbine Ice Protection Coating Performance Evaluation

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Agency: GE Global Research (Grant# 400088687)
Amount: \$75,000
Dates: 09/15/2011 – 09/14/2012

Helicopter Icing Physics, Modeling and Detection (Task of the PSU Vertical Lift Research Center of Excellence, part of a Department Joint Proposal)

Co-PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Prof. Kenneth Brentner, Dr. Jay Lindau
Agency: Army-NRTC-VLRCOE (Grant# W911W6-11-2-0011)
Amount: \$550,000
Dates: 10/01/2012 – 06/30/2017

Modeling of Rotor Blade Ultrasonic Deicing and Experimental Comparison with Electrothermal Ice Protection Systems

Co-PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
PI: Prof. Edward C. Smith
Agency: NRTC-VLC (Grant# 88745 2011-B-11-11.1-A5)
Amount: \$775,000
Dates: 03/20/2010 – 04/30/2013

Whirl Tower Evaluation of SHORAD Algorithm Using Independently-Addressable MiTEs

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Mr. Chris A. Tomashofski, Kaman Aerospace Corp.
Agency: NRTC-VLC-Kaman
Amount: \$10,000
Dates: 1/1/2013 – 1/1/2016

Principal Researcher: FBS Inc., Small Business Innovative Research (NAVAIR - SBIR, Phase I and II, 2011 - 2013), “*Optimized Ultrasonic Deicing/SHM System for Helicopter Rotor Blades*,” PI: Prof. Edward Smith

Co-Principal Investigator: Vertical Lift Consortium, 2010 – 2012, “*Pneumatic Micro-Trailing Edge Effectors for Helicopter Rotors*,” Co-PIs: Prof. Edward C. Smith, Prof. Mark Maughmer

05/2008-05/2011 Post Doctoral Researcher

The Vertical Lift Research Center of Excellence
Dept. of Aerospace Engineering, The Pennsylvania State University

Design and Fabrication of an Adverse Environment Rotor Test Stand

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University
Co-PI: Prof. Edward C. Smith
Agency: Army-NRTC-VLRCOE Grant# W911W6-06-2-0008)
Amount: \$102,000
Dates: 08/15/2008 – 08/15/2009

Designed, constructed, and calibrated 10-ft. diameter, full-chord, Adverse Environment Rotor Test Stand (AERTS). Facility purpose: blade ice protection system testing, accretion model

validation, ice-phobic coating evaluation, and centrifugal testing of active rotor systems.

Calibration of Adverse Rotor Test Stand Icing Facility and Experimental Ice Shape Data Collection to Rotating Blades

PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University

Agency: Army-NRTC-VLRCOE (Grant# W911W6-06-2-0008)

Amount: \$225,119

Dates: 09/15/2009 – 09/14/2011

Ultrasonic De-Icing for Helicopter Rotor Blades

Principal Researcher: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University

PI: Prof. Edward C. Smith, Prof. Joseph L. Rose

Agency: Army-NRTC-VLRCOE Grant# W911W6-06-2-0008)

Amount: \$225,119

Dates: 09/15/2006 – 11/15/2011

Ultrasonic Deicing for Helicopter Rotor Blades

Principal Researcher: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University

PI: Prof. Joseph L. Rose, Prof. Edward C. Smith

Agency: FBS Inc, - AATD SBIR Phase II (Grant# 108406)

Amount: \$160,000

Dates: 09/18/2008 – 09/19/2010

Ice Protective Coating Screening and Evaluation - AATD Topic 1

Researcher: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University

PI: Prof. Edward C. Smith

Agency: Boeing Co. - AATD (Grant# 2071540)

Amount: \$420,000

Dates: 08/01/2008 – 07/31/2011

Boundary Layer Control via Dynamic Roughness

Co-PI: Dr. Jose Palacios, Aerospace Eng., The Pennsylvania State University

Co-PI: Prof. Edward C. Smith, Prof. Mark Maughmer

Agency: Office of Naval Research (Grant# N00014-09-1-0971)

Amount: \$191,882

Dates: 08/01/2008 – 07/31/2011

01/2004-05/2008 Doctoral Research

The Vertical Lift Research Center of Excellence

Dept. of Aerospace Engineering, The Pennsylvania State University

Dissertation: *Ultrasonic De-Icing for Helicopter Rotor Blades*

Advisors: Prof. Edward C. Smith, Paul Morrow Prof. Joseph L. Rose

Principal researcher: FBS, Inc. Phase I SBIR, 2008 – 2010, “*Ultrasonic anti-icing for helicopter Rotor Blades,*” PI: Prof. Joseph L. Rose, Prof. Edward C. Smith

Principal researcher: Physical Sciences Inc., West Virginia University and Iowa State University on a Phase I SBIR, 2009 – 2010, “*Boundary layer control via dynamic roughness elements,*” PI: Prof. Edward C. Smith

05/2003-01/2004 Master's Research

The Vertical Lift Research Center of Excellence
Dept. of Aerospace Engineering, The Pennsylvania State University

Thesis Topic: *Dynamic Analysis and Experimental Testing of Thin Walled Structures Driven by Shear Tube Actuators*

Advisors: Prof. Edward C. Smith, Paul Morrow Prof. Joseph L. Rose

Research contributor: TRS Inc., Small Business Innovative Research Phase I, "Analysis of Single Crystal Piezoelectric Flap Actuators for Helicopter Rotor Blades." PI: Prof. Edward Smith

05/2003-01/2004 Undergraduate Research

The Vertical Lift Research Center of Excellence
Dept. of Aerospace Engineering, The Pennsylvania State University

Honors Thesis Topic: "Design and Fabrication of a Continuous Poling Machine for Piezoelectric Materials"

Advisor: Prof. Edward C. Smith

RESEARCH INTERESTS

Structural Dynamics

Mode control
Vibration mitigation
Smart structures and actuation devices
Health monitoring

Aeromechanics

Noise and vibration control for rotor blades
Design, test and evaluation of active flow control devices
Pneumatic and piezoelectric design, actuation, and control

Aircraft, Engine and Wind Turbine Icing

De-icing system design and testing
Ice accretion modeling
Ice protective material testing
Ice accretion physics

AWARDS and HONORS

Invited Keynote Speaker to the 2014 International Conference on Vibration and Vibro-Acoustics

Presentation title: "Ultrasonic Vibration for De-icing of Aircraft"

Harbin China, January 13-15, 2014

François-Xavier Bagnoud Vertical Flight Award – American Helicopter Society (AHS), Fort Worth, TX, May 2012

Given to a Society member under the age of 35 for their career-to-date outstanding contributions to vertical flight technology.

Guest Speaker to The International Technical Cooperation Program

Meeting between Australia, Canada, New Zealand and the United Kingdom
Ottawa, Canada, 2008 and Annapolis, MD, 2010

63rd American Helicopter Society Annual Forum, Best Paper Award for the Test and Evaluation Section, 05/2007

American Helicopter Society Vertical Flight Foundation Doctoral Fellowship, 05/2006

62nd American Helicopter Society Annual Forum, Nominee for "Conference Best Paper Award," 05/2006

Fundación Rafael del Pino Ph.D Scholarship, 2004 – 2007

Three-year scholarship dedicated towards Spanish students that excel academically or professionally and demonstrate extraordinary leading abilities.

Penn State Eric A. Walker Student Achievement Award, 2002 – 2003

Recognizes undergraduate student whose outstanding qualities of character, scholarship, leadership and citizenship have positively influenced fellow students and have contributed to the prestige of the University

Lion's Paw Senior Honor Society, inducted 2002

Fifteen students are selected each year to promote the welfare of the Penn State community and perpetuate the traditions of the University. Membership in Lion's Paw is the highest honor accorded to an undergraduate student

Spiritus Leoninus Honor Society for Student-Athletes excelling in Academics, Athletics, Community Service, and Leadership, inducted 2002

Parmis Nous Senior Honor and Tradition Society, Fall 2001

Recognition towards strong upper-class leaders that enforce the freshmen customs, and cooperate with the Student Tribunal in preserving Penn State traditions

Sigma Gamma Tau, Aerospace Engineering National Honor Society, Fall 2001

Sigma Gamma Tau is the honor society for Aerospace Engineering. It seeks to identify and recognize achievement and excellence in the Aerospace field

TEACHING EXPERIENCE

Aerospace Department, The Pennsylvania State University

Instructor (Spring 2013 and 2014)

AERSP 470, Senior level course: Advanced Aircraft Structures
40 Students
Fully responsible for lectures, homework and exams

Instructor (Summer '08, Fall '10, and Fall '12 and '13. Co-teaching Fall '08, Fall '09, Fall '11)

AERSP 301, Junior level core course: Introduction to Aircraft Structures
Over 100 Students
Fully responsible for lectures, homework and exams

Lead Teaching Assistant (2003 – 2006)

AERSP 406W, Structural Dynamics Laboratory
Created lectures, taught, and graded senior aerospace engineering students on the field of aerospace structure testing, laboratory experimentation, and report writing techniques

STUDENT ADVISING EXPERIENCE

Ph.D. Student Co-Advisor:

Performance Degradation Modeling of Ice Accretion
(Yiquian Han, Ph.D., expected graduation 2014)

M.S. Graduate Students Advisor

Ice Scaling and Shape Correlation on Helicopter Rotor Blades
(Yiquian Han, MS 2011)

Optimization of Ultrasonic De-Icing Bonding and Control for Helicopter Rotor Blades
(Austin Overmeyer, MS 2012)

Ultrasonic Ice Protective Erosion-Resistant Surfaces
(Jared Soltis, MS 2013)

Optimization of Ultrasonic De-icing Actuator Placement
(Nicola Diplacido, MS 2014)

Centrifugally Powered Pneumatic De-Icing System for Rotor Blades
(Matt Bailey, MS 2014)

Ice Adhesion Testing and Surface Characterization of Hydrogen-bond Hydrophilic Coatings
(Taylor Knuth, MS 2015)

M.S. Graduate Students Co-Advisor

Ice Accretion and Shedding Prediction to Rotating Blades
(Edward Brouwers, MS 2010)

Experimental Investigation of Flow Control via Dynamic Roughness
(Tenzin Choepel, MS 2010)

Undergraduate Level Projects Advisor:

- Centrifugal Testing of Pneumatic Micro Trailing Edge Flaps (Tyler Bello, 2012)
- Ice accretion testing of engine compressor cascade flow (Jason Stocker, Arnab Roy, 2012)
- Water Particle Size Sensor for PSU AERTS Facility (Jared Soltis, 2011)
- Temperature Self-monitoring Ultrasonic De-Icing Actuator (Chris Henderson, 2010)
- Wind Tunnel Actuator Performance Comparison of Trailing Edge and Micro Trailing Edge Flaps (Austin Overmeyer, 2010)
- Liquid Water Concentration Sensor Installation and Calibration for the AERTS Facility (Emily Wallis, 2010)
- Liquid Water Concentration Sensor for PSU AERTS Facility (Mike Jostes, 2009)
- Flow Control via Dynamic Roughness (Tim Yang, 2009)
- Design, Fabrication and Testing of a Fast Prototyping Impinging Ice Jet (Zack Weyant, 2009)

PUBLICATIONS

Peer-reviewed Journal Publications

Palacios, J., Smith, E., Rose, J., Royer, R., “Instantaneous De-Icing of Freezer Ice via Ultrasonic Actuation,” AIAA Journal, Volume 49, Number 6, June 2011, pp. 1158-1067.
doi: 10.2514/1.J050143

Palacios, J., Smith, E., Rose, J., Royer, R., “Ultrasonic De-Icing of Wind Tunnel Impact Icing,” Journal of Aircraft Volume 48, Number 3, June 2011, pp 1020-1027.
doi: 1020-1027, 10.2514/1.C031201.

Palacios, J., Han, Y., Brouwers, E., Smith, E., “Icing Environment Rotor Test Stand Liquid Water Content Measurement Procedures and Ice Shape Correlation,” American Helicopter Society Journal, Volume 57, Number 2, April 2012, paper number 022006.

Palacios A., **Palacios J.,** Sanchez L., “Eliciting a Human Understandable Model of Ice Adhesion Strength for Rotor Blade Leading Edge Materials from Uncertain Experimental Data,” Expert System with Applications, Volume 39, 2012, pp 10212-10225

Sanchez, L., Couso, I., Palacios, A., **Palacios, J.**, “A Methodology For Exploiting The Tolerance for Imprecision in Genetic Fuzzy Systems and Its Application to Characterization of Rotor Blade Leading Edge Materials,” *Mechanical Systems and Signal Processing*, March 2012.
doi: 10.1016/j.ymssp.2012.02.009.

Han, Y., **Palacios, J.**, Schmitz, S., “Scaled Ice Accretion Experiments on a Rotating Wind Turbine Blade,” *Journal of Wind Engineering and Industrial Aerodynamics*, Volume 109, July 2012, pp 55-67.
doi: 10.1016/j.jweia.2012.06.001.

Chen, Y., Qiu, J., **Palacios, J.**, Smith, E., “Tracking Control of Piezoelectric Stack Using Modified Prandtl-Ishlinski Model,” *Journal of Intelligent Systems and Structures*, April 2013, Vol. 24, No. 6, pp. 753-760.
doi: 10.1177/1045389X12455725

Han, Y., **Palacios, J.**, “Airfoil Performance Degradation Prediction based on Non-dimensional Icing Parameters,” *AIAA Journal*, Vol. 51, No. 11, pp. 2570-2581.
doi: 10.2514/1.J052207

Overmeyer, A., **Palacios, J.**, Smith, E., “Ultrasonic De-Icing Bondline Design and Rotor Ice Testing,” *AIAA Journal*, Volume 51, Number 12, December 2013, pp. 2965-2976. doi: 10.2514/1.J052601

Palacios, J., Kinzel, M., Overmeyer, A., Szefi, J., “Progress towards Active Gurney Flaps for Helicopter Rotor Control,” Accepted by *The Journal of Aircraft*, 12/2013

Tarquini, S., Antonini, C, Amirfazli, A., Marengo, M., **Palacios, J.**, “Investigation of Ice Shedding Properties of Superhydrophobic Coatings on Helicopter Blades,” *Cold Regions Science and Technology Journal*, 100C (2014), pp. 50-58.
doi: 10.1016/j.coldregions.2013.12.009

Conference Proceedings

Palacios, J., L., Smith, E., C., “Dynamic Analysis and Experimental Testing of Thin-Walled Structures Driven By Shear Tube Actuators,” *46th AIAA/ ASME/ ASCE/ AHS/ ASC Structures, Structural Dynamics & Materials, AIAA-2009-2112*, Austin, Texas, April 2005, p 3862-3875

Palacios, J., Zhu, Y., Smith, E., Rose, J., “Ultrasonic Shear and Lamb Wave Interface Stress for Helicopter Rotor De- Icing Purposes,” *47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials, AIAA-2006-2282*, Newport, Rhode Island, May 2006

Palacios J., Smith, E., Rose J., Gao, H., “Ultrasonic Shear Wave Anti-Icing System for Helicopter Rotor Blades,” *62nd Annual Forum Proceedings - American Helicopter Society*, Phoenix, Arizona, May 2006, p 1492-1502

Palacios, J., Smith, E., “Optimized Ultrasonic Shear Wave Anti-Icing Actuator for Helicopter Blades,” *25th Army Science Conference*, Orlando, FL, November 2006

Palacios J., Smith, E., Rose J., Zhu, Y., “Global Ultrasonic Shear Wave Anti-Icing Actuator for Helicopter Blades,” *63rd Annual Forum Proceedings - American Helicopter Society*, Virginia Beach, VA, May 2007

Palacios, J.; Smith, E.; Rose, J., “Investigation Of An Ultrasonic Ice Protection System For Helicopter Rotor Blades” *64th Annual Forum Proceedings - American Helicopter Society*, v 1, p 609-618, Montréal, Canada, 2008.

Palacios, J., Smith, E., Yang, T., “Boundary Layer Control Using Piezoelectrically Actuated Dynamic Roughness Elements,” 26th Army Science Conference, Orlando, FL, December 2008.

Palacios, J., Brouwers, E., Han, Y., Smith, E., “Adverse Environment Rotor Tests Stand Calibration and Ice Shape Correlation,” 66th Annual Forum Proceedings - American Helicopter Society, Phoenix, AZ, May, 2010.

Brouwers, E., **Palacios, J., Smith, E., Peterson, A.,** “The Experimental Investigation of a Rotor Hover Icing Model With Shedding,” 66th Annual Forum Proceedings - American Helicopter Society, Phoenix, AZ, May, 2010.

Brouwers, E., Peterson, A., **Palacios, J., Centolanza, L.,** “Ice Adhesion Strength Measurements for Rotor Blade Edge Materials,” 67th Annual Forum Proceedings - American Helicopter Society, Virginia Beach, VA, May, 2011.

Palacios, J., Kinzel, M., Overmeyer, A., Szefi, J., “A Comparison of Active Gurney Flaps and Trailing-Edge Flaps for Rotorcraft,” 67th Annual Forum Proceedings - American Helicopter Society, Virginia Beach, VA, May, 2011.

Overmeyer, A., **Palacios, J. L., Smith, E. C., Roger, R.,** “Rotating Testing of a Low-Power, Non-Thermal Ultrasonic Deicing System for Helicopter Rotor Blades,” 2011-38-0098, SAE 2011 International Conference on Aircraft and Engine Icing and Ground Deicing, June 13-17 2011, Chicago, IL.

Han, Y., **Palacios, J., & Smith, E.** “An Experimental Correlation between Rotor Test and Wind Tunnel Ice Shapes on NACA 0012 Airfoils,” 2011-38-0092, SAE 2011 International Conference on Aircraft and Engine Icing and Ground Deicing, June 13-17 2011, Chicago, IL.

Overmeyer, A., **Palacios, J., Smith, E.,** “Actuator Bonding Optimization and System Control of a Rotor Blade Ultrasonic Deicing System,” AIAA-2012-1476, 53rd AIAA Structures, Structural Dynamics and Materials Conference, Honolulu, Hawaii, Apr. 23-26, 2012.

Han, Y., **Palacios, J.,** “Analytical and Experimental Determination of Airfoil Performance Degradation Due to Ice Accretion,” AIAA-2012-2794, 4th AIAA Atmospheric and Space Environments Conference, New Orleans, Louisiana, June 25-28, 2012.

Soltis, J., **Palacios, J., Wolfe, D., Eden, T.,** “Evaluation of Ice Adhesion Strength on Erosion Resistant Materials,” AIAA-2013-1509, 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 2013, Boston, Massachusetts, April 8 – 11, 2013.

INTERNATIONAL COOPERATION

Test and Evaluation of a Piezoelectric Active Twist Rotor Blade – German Aerospace Center Member of the Helmholtz-Association, Institute of Composite Structures and Adaptive Systems (GERMANY)

Test and Evaluation of Ice-Phobic Materials – Visiting Scholar from Universita Degli Studi Di Bergamo (ITALY)

Fuzzy Math Model of Ice Accretion Performance Degradation for Rotor Blade Leading Edge Materials from Uncertain Experimental Data – Visiting Scholar from Universidad de Oviedo (SPAIN)

Tracking Control of Piezoelectric Stack Using Modified Prandtl-Ishlinski Model – Visiting Scholar from University of Aeronautics and Astronautics, Nanjing (CHINA)

PROFESSIONAL SERVICE

Session Chair of the Test and Evaluation Committee American Helicopter Society (2013)

Session Deputy Chair of the Test and Evaluation Committee American Helicopter Society (2012)

Reviewer for papers submitted to AIAA Journals (2011 -2012)

Member of the Test and Evaluation Session of the Helicopter Society Forum Papers (2010 - 2012)

Session Chair for the 2014 International Conference on Vibrations and Vibro-Acoustics, January 13-15, 2014, Harbin, China.

PROFESSIONAL MEMBERSHIPS

American Institute of Aeronautics and Astronautics (AIAA), since 2005

American Helicopter Society (AHS), since 2005

ATHLETIC HONORS

- Penn State Gymnastics Scholarship, 1998 – 2003
- Captain of the Penn State Men's Gymnastics Team, 2002 – 2003
- NCAA DIV I Gymnastics Team Champion, 2000
- Big Ten Team Champion, 2003
- Verizon Academic All-American Men's Fall-Winter At-Large, 2001
- USA Academic All-American, 1998 – 2001, Academic All Big Ten, 1998 – 2001
- Pennsylvania Senate and House of Representatives Recognition for Outstanding Gymnastics Performance
- Most Valuable Gymnast from The Penn State University Team, 2000
- Gene Wettstone Award for Outstanding Performance during PSU vs. Ohio State, 02/26/2000; PSU vs. Nebraska, 03/04/2000; PSU vs. Army, 27/01/2001; and PSU vs. Michigan 02/25/2003
- Big Ten Gymnast of the Week, 06/26/2000 and 02/27/2003
- Spanish National Gymnastics Team Member
- 4th Place in the Junior European Gymnastics Championships as a member of the Spanish Team, 1998
- 8th Place in the World University Games, as a member of the Spanish Team, 1999

OTHER

American Citizen

Computer Languages: C++, Matlab, LabView, ATILA Piezoelectric FEM, Abaqus FEM, HTML

Languages: Fluent in English, Spanish; conversational in French

Advanced Scuba Diving Certification: License Obtained: September 2005

Fixed Wing Private Pilot Student License (20 Hrs.)