

Patrick S. Wang

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EDUCATION

University of Stuttgart Bachelor's and Master's degree in Aerospace Engineering	07.2007 – 12.2013 Stuttgart, Germany
California Institute of Technology Graduate Researcher at the Graduate Aerospace Laboratories Thesis in "Experimental Analysis of Supersonic Flow on a Concave Surface"	11.2012 – 07.2013 Pasadena, USA
Rensselaer Polytechnic Institute Graduate exchange student in the GE4 Program for Engineers	08.2011 – 05.2012 Troy, USA

WORK EXPERIENCE

NASA Jet Propulsion Laboratory Technologist in Laboratory Studies and Atmospheric Observation	Since 02.2016 Wrightwood, CA
<ul style="list-style-type: none">• Maintained and operated lidar systems for atmospheric ozone and water vapor• Developed data analysis and automation software in Python• Developed dome control software to automate a 0.6m telescope• Prepared and launched radiosondes, ozonesondes, and cryogenic frost point hygrometers• Designed and built an EMI Monitoring Station• Managed IT compliance as Systems Administrator in line with NASA and NSC standards• Implemented safety standards across chemical, electrical, pressure, and laser domains• Led procurement efforts, including P-card, Purchase Orders, and chemical acquisitions• Designed and maintained the JPL webpage: https://lidar.jpl.nasa.gov/	
Mercedes Benz Technology Center Mechanical Engineer in the department of Powertrain	01.2015 – 02.2016 Ulm, Germany
<ul style="list-style-type: none">• Designed, constructed, and verified testing platforms for high-speed laser instrument• Developed software for analyses of high-speed images in internal combustion engines• Studied tribological and thermal characteristics in a rotation-"ring/liner"-tribometer• Developed software to study harmonic disturbances in a rotation-"ring/liner"-tribometer	
NASA Jet Propulsion Laboratory Graduate Fellow in the Mars Program Office	06.2014 – 10.2014 Pasadena, USA
<ul style="list-style-type: none">• Performed reliability analysis of multi-launch mission architecture for Mars sample return• Simulated shock environment for mobile Mars Ascent Vehicle survivability study• Designed spacecraft for robotic sample return from lunar distant retrograde orbits• Simulated Martian dust trajectories for planetary protection objectives	
Institute of Space Systems at the University of Stuttgart Research Assistant in the department of Astronautics	10.2010 – 08.2011 Stuttgart, Germany

- Modeled and simulated life support systems with fuel cells for manned missions to Mars
- Designed an effective linear stage system for image acquisition for ESA's Zero-G experiment
- Examined the effects of gas composition on fuel cells with a white-light interferometer
- Studied and cultivated algae in a photobioreactor for future manned missions

TWT Consulting GmbH

10.2009 – 03.2010

Intern in the department of Computational Fluid Dynamics

Neuhausen, Germany

- Constructed FE-Models of automotive and aircraft components for heat flux calculations
- Conducted CFD-simulations on automobiles with OpenFOAM and StarCCM+
- Generated and tested OpenFOAM's SnappHexMesh for thermal and mechanical analyses

THESES

Graduate Aerospace Laboratories at Caltech

11.2012 – 09.2013

Visualized a supersonic boundary layer with a novel schlieren system in a low-enthalpy wind tunnel. Designed, built and tested an infrared experiment for heat flux measurements. Developed software to acquire flow characteristics from images. The objective is to investigate the formation of supersonic Goertler vortices and post-process schlieren images for flow transition analysis and heat flux estimations.

Institute of Thermodynamics at the University of Stuttgart

05.2012 – 10.2012

Evaluated the thermal conductivity of ceramics used as protection on turbine blades. Modeled heat transfers through porous materials. The goal is to explore the thermodynamic traits that lead to a higher turbine exit temperature and increase efficiency of the gas turbine.

WORKSHOPS AND ORGANIZATIONS

Caltech Space Challenge 2013

03.2013

- Mentored students in life support technology and systems engineering

Caltech Space Challenge 2011

09.2011

- Designed a fuel cell integrated life support system for missions to near-Earth asteroids

AWARDS

NASA Group Achievement Award (2023)

JPL Voyager Award (2017)

ADDITIONAL SKILLS

Programming languages: C++, Fortran, Python, HTML/ CSS

Programs: Abaqus, GridPro, LabVIEW, Matlab, Medina, Solidworks, StarCCM+, STK

Languages: English (fluent), German (fluent), Mandarin Chinese (advanced)

PUBLICATIONS

Chouza, F., Leblanc, T., Brewer, M., Wang, P., Martucci, G., Haefele, A., Vérèmes, H., Duflot, V., Payen, G., and Keckhut, P.: The impact of aerosol fluorescence on water vapor long-term

monitoring by Raman lidar and the evaluation of a potential correction method, *Atmos. Meas. Tech. Discuss.*, <https://doi.org/10.5194/amt-2022-98>, in review, 2022.

Chouza, F., et al: The impact of Los Angeles Basin pollution and stratospheric intrusions on the surrounding San Gabriel Mountains as seen by surface measurements, lidar, and numerical models, *Atmos. Chem. Phys.*, 21, 6129–6153, <https://doi.org/10.5194/acp-21-6129-2021>, 2021

Chouza, F., Leblanc, T., Barnes, J., Brewer, M., Wang, P., and Koon, D.: Long-term (1999–2019) variability of stratospheric aerosol over Mauna Loa, Hawaii, as seen by two co-located lidars and satellite measurements, *Atmos. Chem. Phys.*, 20, 6821–6839, <https://doi.org/10.5194/acp-20-6821-2020>, 2020

F. Chouza, T. Leblanc, M. A. Brewer, P. S. Wang: Upgrade and automation of the JPL Table Mountain Facility tropospheric ozone lidar (TMTOL) for near-ground ozone profiling and satellite validation, *Atmos. Meas. Tech.*, 12, 569-583, 2019

T. Leblanc, M. A. Brewer, P. S. Wang et al.: Validation of the TOLNet lidars: the Southern California Ozone Observation Project (SCOOP), *Atmos. Meas. Tech.*, 11, 6137-6162, 2018

N. J. Parziale, B. E. Schmidt, P. S. Wang, H. G. Hornung and J. E. Shepherd: Pulsed Laser Diode for use as a Light Source for Short-Exposure, High-Frame-Rate Flow Visualization, 53rd AIAA Aerospace Science Meeting 2015, Kissimmee, Florida

P. S. Wang, M. Ono and R. E. Lock: Reliability Analysis of Multi-Launch Sample Return Missions using the Space Mission Architecture and Risk Analysis Tool (SMART), 66th International Astronautical Congress 2015, Jerusalem, Israel