

Curriculum vitae di Cinzia_Zuffada

Sottosettori ERC primari: *PE10 Earth System Science*

Eventuali sottosettori ERC secondario: *PE10_19 Planetary geology and geophysics*

Family name, First name: Zuffada, Cinzia

Birthdate: June 26 1956

Researcher unique identifier(s) (such as ORCID, Research ID, etc. ...): 0009-0003-4639-4367

URL for web site: <https://science.jpl.nasa.gov/people/zuffada/>

• **Education and key qualifications**

22/11/1979 Doctorate of Engineering
Electronic Engineering/ University of Pavia/ Italy
Prof. Giuseppe Conciauro

• **Current position(s)**

2023 - Visiting Associate
Geophysics, California Institute of Technology, USA

2023 – Senior Fellow
Scuola Superiore Studi Avanzati Sapienza, Italy

2023 - Associate
Istituto Nazionale Geofisica e Vulcanologia, Italy

2023- Interim Employee (Part-time post retirement)
NASA Jet Propulsion Laboratory, California Institute of Technology (JPL)

• **Previous position(s)**

2007 – 2023 Deputy (previously Associate) Chief Scientist
Office of the Director, JPL, USA

2007 – 2023 Manager of University Research Affairs
Office of Research and Development, JPL, USA

2016 - 2017 Task Manager of JPL contribution to NOAA Satellite Observing System Architecture
(NSOSA) study
Office of Research and Development, JPL, USA

2002 – 2006 Deputy Manager and then Manager
Earth Remote Sensing Science Section, JPL, USA

1997 - 2001 Task Manager of NASA Instrument Incubator Award
Tracking Applications Section, JPL, USA

1992 – 1997 Member Technical Staff
JPL, USA

1985- 1992 Associate Senior Engineer,
Kaman Sciences Corporation, USA

1983 – 1985 Ricercatore

- 1982 Visiting Research Fellow
 California Institute of Technology, USA
- 1980 – 1983 Assegnista di Ricerca
 Department of Electrical Communications, University of Pavia, Italy

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION

Research achievements

I am a pioneer and an internationally recognized leader in research in Global Navigation Satellite Systems Reflectometry (GNSS-R) for Earth Remote Sensing, with applications ranging from sea surface height and roughness response to soil moisture and mapping inland water bodies and inundations. Below are the major recent competitive awards, example of expertise rendered and some significant publications, followed by explanation of my role in the research output. In [1-2] I designed and guided the data analysis as per NASA ROSES NNH17ZDA001N. In [3], which first demonstrated the feasibility of the measurement over water, identified the suitable data sets and algorithm strategy. In [4] I provided key parameters to generate the simulated data. In [5] I mentored the first author postdoc in learning about and manipulating GNSS-R data in one of the first applications to soil moisture. In [6] I developed the original algorithm used for the retrieval by first author postdoc. In [7] I extended an EM scattering model to the case of rough ocean surfaces to simulate forward scattered fully polarized fields. In [8] I designed and performed one of the first sensitivity studies to understand GNSS-R signals from ocean surfaces. In [9] I developed the model of the “altimetry waveform” and performed sensitivity studies on sources of error in sea surface height retrieval. In [10] I co-developed the data analysis following data acquisition from airplane. In [11] I validated the first space-based detection of a GPS reflection with an instrument model that I developed. In [12] I co-designed the experiment and finalized data analysis. In [13] I extended a rough surface EM scattering model to include the spectrum of a wind driven ocean.

2018 – 2022 Principal Investigator: NASA ROSES NNH17ZDA001N, Dynamic Mapping of Tropical Wetlands and Inundations with CYGNSS

2017 - 2020 Principal Investigator: NASA ROSES NNH16ZDA001N, Assessing the ability of CYGNSS to provide SSH data suitable for mesoscale process studies

2021 – present Science Advisory Board Member, HydroGNSS ESA mission, part of Scout 2 Program, in final stage of development

1. B. Downs, A. Kettner, B. Chapman, G.R. Brakenridge, A. O’Brien and C. Zuffada: “Assessing the Relative Performance of GNSS-R Flood Extent Observations: Case Study in South Sudan”, *IEEE Transactions on Geoscience and Remote Sensing*, Jan 2023, DOI: 10.1109/TGRS.2023.3237461
2. Eric Loria, Andrew O’Brien, Valery Zavorotny, Brandi Downs, Cinzia Zuffada: “Analysis of Scattering Characteristics from Inland Bodies of Water Observed by CYGNSS”, *Remote Sensing of Environment*, vol. 245, p. 111 825, Aug. 2020. DOI: 10.1016/j.rse.2020.111825.
3. S.V. Nghiem, C. Zuffada and other 8 co-authors: “Wetland Monitoring with Global Navigation Satellite System Reflectometry”, *AGU Journal of Earth and Space Science*, Vol. 4(1):16-39, DOI: 10.1002/2016EA000194, January 2017
4. Z. Li, C. Zuffada, S.T. Lowe, T. Lee and V. Zlotnicki: “Analysis of GNSS-R Altimetry for Mapping Ocean Mesoscale Sea Surface Heights Using High-Resolution Model Simulations”, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 9(10):4631-4662, October 2016, DOI: 10.1109/JSTARS.2016.2581699
5. Chew, C., R. Shah, C. Zuffada, G. Hajj, D. Masters, and A. J. Mannucci (2016), Demonstrating soil moisture remote sensing with observations from the UK TechDemoSat-1 satellite mission, *Geophys. Res. Lett.*, DOI: 10.1002/2016GL068189.
6. Clarizia, M. P., C. Ruf, P. Cipollini, and C. Zuffada (2016), First spaceborne observation of sea surface height using GPS-Reflectometry, *Geophys. Res. Lett.*, 43, 767–774, doi:[10.1002/2015GL066624](https://doi.org/10.1002/2015GL066624)

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7. C. Zuffada, A. Fung, J. Parker, M. Okolicanyi, and E. Huang: "Polarization properties of the GPS signal scattered off a wind-driven ocean," *IEEE Transactions on Antennas and Propagation*, Vol. 52, No 1, pp. 172-188, Jan. 2004.
8. C. Zuffada, T. Elfouhaily and S. Lowe: "Sensitivity Analysis of Wind Vector Measurements from Ocean reflected GPS Signals," *Remote Sensing of Environment*, 88, pp. 341-350, doi:10.1016/S0034-4257(03)00175-5, 2003.
9. G. A. Hajj, C. Zuffada, " Theoretical Description of a Bistatic System for Ocean Altimetry Using the GPS Signal, " *Radio Science*, Vol. 38, No 5, 1089, doi:10.1029/2002RS002787, Oct. 2003.
10. Lowe S.T., C. Zuffada, J. LaBrecque, M. Lough, J. Lerma, Five-Cm-Precision Aircraft Ocean Altimetry Using GPS Reflections, *Geophys. Res. Lett.*, 29(10), May 2002.
11. S. T. Lowe, J.L. Labrecque, C. Zuffada, L.J. Romans, L. Young and G. A. Hajj, " First Spaceborne Observation of an Earth-Reflected GPS Signal, " *Radio Science*, Vol. 37, No.1, 1007, doi:10.1029/2000RS002539, Feb. 2002.
12. R. Treuhaft, S. Lowe, C. Zuffada, and Y. Chao: "2-Cm GPS Altimetry Over Crater Lake," *Geophys. Res. Lett.*, 28, 23, p. 4343-4346, December 2001.
13. A.K. Fung, C. Zuffada and C. Y. Hsieh, " Incoherent Bistatic Scattering from the Sea Surface at L-Band, " *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 39, no. 5, pp. 1006-1012, May 2001.

Selected Book chapters (I was responsible for writing the majority of the chapter contents):

1. H.P. Plug, Z. Altamimi, S. Bettadpur, G. Beutler, G. Beyerle, A. Cazenave, D. Crossley, A. Donnellan, R. Forsberg, R. Gross, J. Hinderer, A. Komjathy, C. Ma, A. Mannucci, C. Noll, A. Nothnagel, E.C. Pavlis, M. Pearlman, P. Poli, U. Schreiber, K. senior, P.L. Woodworth, S. Zerbini, C. Zuffada: "The goals, achievements, and tools of modern geodesy", Chapter 2 in Global Geodetic Observing Systems, DOI 10.1007/978-3-642-02687-4_2, Springer-Verlag, Berlin Heidelberg, 2009.
2. C. Zuffada, S. Lowe, Y. Chao and R. Treuhaft: "Oceanography with GPS", a chapter in Satellite Altimetry for Geodesy, Geophysics and Oceanography, C. Hwang, C. Shum and J. Li Eds, International Association of Geodesy Symposia, Volume 126, pp. 193-203, DOI: 10.1007/978-3-642-18861-9_23, Springer-Verlag 2004.

Google Scholar metrics: Citations 3488; H-index 27; i10-index 49.

Refereed journal articles:39; Conference Proceedings:118; Book Chapters: 5

Peer recognition

Awards

- 1981 Italian National Council of Research Fellowship for Research Abroad
- 1984 International Federation of University Women Fellowship
- 2002 Teresian Medal - University of Pavia, Italy (honorary member of Academic Senate)
- 2012 Communicator Award, International Academy of the Visual Arts, for "Discover JPL"
- 2014 Magellan Award for Outstanding Senior Management, JPL
- 2015 NASA Medal for Outstanding Leadership
- 2015 Knighthood of the Order of Merit of the Italian Republic
- 2019 Collegio Ghislieri, Pavia - Career Achievement Award
- 2019 Creativity Award - Italian Cultural Institute in Los Angeles, Italian Ministry of Foreign Affairs

Invited conference presentations

1. C. Zuffada, B. Downs, M. Russo, E. Loria, A. O'Brien, C. Galdi, M. Di Bisceglie, V. Zavorotny, M. Lavalley, and M. Morris, "State Of The Art In GNSS-R Capabilities Over Inland Waters", Proceedings of the IEEE IGARSS 2021, July 12-16, 2021.
2. C. Zuffada, C. Chew and S.V. Nghiem: "GNSS-R algorithms for wetlands observations", Proceedings of IEEE IGARSS, Forth Worth, TX, July 2017.
3. C. Zuffada, Z. Li, S. V. Nghiem, S. Lowe, R. Shah, M. Clarizia, E. Cardellach: "The Rise Of GNSS Reflectometry For Earth Remote Sensing", Proceedings of IEEE IGARSS, Milan, Italy, July 2015, Page(s): 5111-5114.

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4. C. Zuffada, G. Hajj, T. Mannucci, Y. Chao, C. Ao and J. Zumberge, "An Interdisciplinary Approach at Studying the Earth-Sun System with GPS/GNSS and GPS-like Signals", Proceedings of IGARSS 2005, Seoul, South Korea, July 2005.
5. V. Zavorotny and C. Zuffada: "Potentials and limitations for remote sensing of sea, land and ice using GPS reflected signals," Presented at Spring AGU, Boston, June 2001.
6. C. Zuffada, S. Lowe, G. Hajj, L. Young, Y. Chao, "GPS bistatic altimetry: a tool for studying ocean mesoscale features," Proceedings of AGU 2000 Fall Meeting, S. Francisco, CA, Dec. 2000

Invited Participation at Events

1. ATT Shannon Labs, Distinguished Speaker Series, Florham Park, NJ, September 2010
2. Colloquium on Atmospheric Remote Sensing using the Global Positioning System, NCAR, Boulder, CO, June 2004
3. International Workshop on Satellite Altimetry for Geodesy, Geophysics and Oceanography: Summer Lecture Series and Scientific Applications, Wuhan, China, September 2002
4. W. A. Heiskanen Symposium in Geodesy, Ohio State University, Oct. 2002
5. Commencement Address, University of Pavia, Italy, July 2002

2017 – 2023 Associate Editor, IEEE Transactions on Geoscience and Remote Sensing

ADDITIONAL INFORMATION

Other contributions to the research community

My role of (first Associate and later renamed) Deputy Chief Scientist of JPL was one of senior leadership at the institutional level in support of developing and integrating JPL strategic scientific goals, residing in the Office of Research and Development, part of the Director's Office. This was a full-time role so my time available for research was limited to ~20%.

Leadership – For ~15 years until May 2023 I was a key contributor to JPL's strategic science planning, formulation and management of the internal research and development program; an institutional interface with the external research and academic community, and an institutional steward of the internal research environment. Specific responsibilities included a) representing JPL within NASA Council of the Centers Chief Scientists, b) leading efforts to improve opportunities for and recognition of contributions by women researchers, c) expand the postdoctoral program and visiting students programs and d) being the point of contact for ethics in research at JPL.

Management of Institutional Programs– For ~15 years until May 2023 I oversaw the JPL Postdoctoral Programs and managed the University Research Affairs of the Office of Research and Development, comprising the Postdoc Office and the University Research Partnerships. Previously have managed a section (80 scientists) in the Science Division of JPL.

Outreach – represented JPL in a number of activities to increase its visibility with the community, like:

1. Science Fellow, US Department of State: 3-month deployment in 2019 to the US Embassy in Rome to work with the Italian science community to increase knowledge/use of NASA Earth observations satellite data
2. NASA "Women and Girls" Committee Member, representing JPL within NASA front office, 2015-2018
3. Conference for Undergraduate Women in Physics (organizer of JPL participation), 2017-2018
4. The Space Connection: Navigating the Bridge Between JPL and the Caltech Campus (Co-organizer and Panel Discussion Moderator), 2015
5. Presented at ISSNAF Annual Event at the Italian Embassy, Washington DC, November 2014
6. Science Week in Morocco, key-note address at Rabat Academy of Science, Morocco, Sept. 2009
7. FIRST Robotics LA Regional Competition Judge, 2009 – 2016
8. Keck Institute for Space Studies Symposium Co-chair of "Challenging the Paradigm: The Legacy of Galileo"

Career breaks, diverse career paths and major life events

Volunteering

Since 2020 I have been the President of the Italian Scientists and Scholars in North America Foundation (ISSNAF), a non-profit, volunteer-based organization incorporated in the US that aims to promote scientific, academic and technological cooperation between Italy and North America in all disciplines. Its mission is to **connect, empower** and **celebrate** the Italian Intellectual Diaspora in North America, and help retain a shared Italian identity and culture. Established in 2007 by 36 founding members including 4 Nobel Prize winners, under the auspices of the Embassy of Italy in USA, it counts more than 3700 members distributed across the USA and Canada. It offers its members networking events, mentoring programs and awards designed to recognize their outstanding contributions through a competitive process.

ISSNAF facilitates visiting opportunities in North America, benefitting exceptional and highly motivated students and recent graduates of partner universities in Italy, to foster networking and collaboration between research groups in Italy and North America. Currently, the Italian Ministry of University and Research is funding ISSNAF to develop a system-level access to all mobility opportunities made available by the ISSNAF network in support of the internationalization of the Italian universities.

As the President and Chief Executive Officer of our 501c (3) Corporation, I represent ISSNAF with our major partners and stakeholders, including the Italian Embassy and Italian Government representatives in Italy, universities, foundations, media and existing and potential donors. During my tenure, an experience not unlike the founding of a start-up, I have strived and been able to grow the organization and secure reasonably stable funding.