FABRIZIO SANTI

CURRICULUM VITAE

CONTACT DETAILS

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ACADEMIC EMPLOYMENT

2014 – present days

Postdoctoral Researcher with the Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome.
List of the research contracts:

Aug. 2019 – Nov. 2019
Passive radar techniques for surveillance applications based on satellite illuminators of opportunity

Aug. 2018 – July 2019
Parasitic concepts definition and analysis based on a Geo illuminator

Feb. 2018 – July 2018
Bistatic radar detection and imaging exploiting satellite illuminators

Dec. 2015 – Jan. 2016
Study and development of signal processing techniques for space-based passive radar systems

Feb. 2014 – Jan. 2018
Study and development of focusing and processing techniques for active and passive multi-dimensional radar images

EDUCATION

November 2010 – June 2014

PhD in Radar and Remote Sensing
Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome, Italy
Dissertation: Active and passive multi-sensor radar imaging techniques exploiting spatial diversity
Advisor: Dr. Debora Pastina

April 2013 – September 2013

Visiting Research Student at the Microwave and Integrated Systems Laboratory, University of Birmingham (UK), headed by Prof. Mike Cherniakov.

8 – 15 July 2011

Attendance at the 3rd International Summer School on Radar/SAR, Wachtberg, Germany, organized by the Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR.

2008 – 2010

Master's degree in Communication Engineering
Sapienza University of Rome, Italy
Final mark: 110 cum laude / 110
Dissertation: Oil spill detection using a X-band VTS radar
Advisor: Prof. Pierfrancesco Lombardo

2004 – 2007

Bachelor's degree in Communication Engineering
Sapienza University of Rome, Italy
Final mark: 108 / 110
Dissertation: Sensors based on relaxation oscillators
Advisor: Prof. Sergio Barbarossa

RESEARCH ACTIVITY

RESEARCH INTERESTS

The main research interests of Fabrizio Santi are in the field of radar systems. Current research topics include:
- Monostatic and multistatic synthetic aperture radar (SAR)/ISAR systems and techniques
- Passive radar imagery using satellite illuminators
- GNSS-based passive radar for maritime surveillance
- Parasitic systems exploiting radar illuminators

PARTICIPATION IN RESEARCH PROJECTS

June 2018 – present days
GEO-SAR – Feasibility study for the development of a geosynchronous satellite for Earth Observation. Project funded by Italian Space Agency

January 2018 – September 2019
Apollo – Passive radar based on GNSS illuminators for maritime surveillance. POR FESR Lazio 2014-2020

July 2017 – June 2018
Study and development of ship target detection techniques with a passive multistatic radar based on navigation satellites. Sapienza Research Calls 2017 - Initial research project.

January 2015 – December 2017
SpyGLASS – Galileo-based passive radar system for maritime surveillance. Horizon 2020 research programme.

November 2010 – December 2011
Study on Distributed ISAR techniques. Project funded by Leonardo S.p.a. (formerly Galileo Avionica)

PROFESSIONAL ACTIVITIES

CONFERENCES AND WORKSHOPS

Member of the Organizing Committee of the 3rd Italian Workshop on Radar and Remote Sensing, Rome, 30-31 May 2019

Session Chair ('Passive SAR / ISAR') during the 7th PCL Focus Days, Wachtberg, Germany, May 2019.

Member of the Technical Review Committee of the IEEE Radar Conference 2019 and the European Signal Processing Conference 2018

Presenting author to several national and international conferences and workshops:

26-28 June 2019	International Radar Symposium, Ulm, Germany
30-31 May 2019	3rd Italian Workshop on Radar and Remote Sensing, Rome, Italy
20-22 May 2019	IEEE GNSS+R Workshop, Benevento, Italy
7-8 May 2019	7th PCL Focus Days 2019, Wachtberg, Germany
22-26 April 2019	IEEE Radar Conference, Boston, MA (USA)
28-29 May 2018	2nd Italian Workshop on Radar and Remote Sensing, Pavia, Italy
23-27 April 2018	IEEE Radar Conference, Oklahoma City, OK (USA)
28-30 June 2017	International Radar Symposium, Prague, CZ
6-9 June 2016	European Synthetic Aperture Radar Conference, Hamburg, Germany
2-6 May 2016	IEEE Radar Conference 2016, Philadelphia, Pennsylvania (USA)
10-15 May 2015	IEEE Radar Conference 2015, Arlington, Virginia (USA)
28-29 April 2015	5th PCL Focus Days 2015, Wachtberg, Germany
13-17 Oct. 2014	IEEE International Radar Conference 2014, Lille, France
8-10 Oct. 2014	European Radar Conference, Rome, Italy
2-5 June 2014	European Synthetic Aperture Radar Conference, Berlin, Germany
4-5 June 2012	IEEE GOLD Remote Sensing Conference 2012, Rome, Italy
7-11 May 2012	IEEE Radar Conference 2012, Atlanta, Georgia (USA)
24-27 Oct. 2011	CIE International Conference on Radar 2011, Chengdu, China
23-27 May 2011	IEEE Radar Conference 2011, Kansas City, Missouri (USA)

REVIEWER   Dr. Santi frequently serves as a reviewer for a number of international technical journals in the area of radar remote sensing and signal processing, among which:

- IEEE Transactions on Aerospace and Electronic Systems
- IEEE Transactions on Geoscience and Remote Sensing
- IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
- IEEE Geoscience and Remote Sensing Letters
- IET Radar Sonar and Navigation
- AEU International Journal of Electronics and Communications
- MPDI Sensors
- MPDI Remote Sensing
- International Journal of Remote Sensing – Taylor& Francis on line

EDITORIAL ACTIVITY   October 2019 – present days

Member of the Editorial Board of the International Journal of Electronics and Communications (AEÜ, Elsevier)

AWARDS

- Co-author of the Second Best Student Paper awarded at the 2018 European Synthetic Aperture Radar Conference (Aachen, Germany, June 2018): "Ship targets feature extraction with GNSS-based passive radar via ISAR approaches: preliminary experimental study", by F. Pieralice, F. Santi, D. Pastina, M. Antoniou, M. Cherniakov.
- Best Italian Thesis on Remote Sensing Award from the IEEE Geoscience and Remote Sensing South Italy Chapter, 2010.

TEACHING EXPERIENCE

2018
Lecturer for the courses 'Communication Engineering' and 'Radar and Earth Observation' - Master in Satellite Systems and Services (Sapienza University of Rome).

2014 – present days
Co-supervisor of PhD students in Information and Communication Technologies and Visiting Phd students.
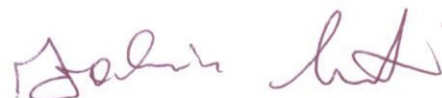
2013-present days
Co-supervisor for a number of master's thesis in Communication Engineering and Space and Astronautic Engineering

2011 – present days
Seminars and lessons in the courses: 'Radar imaging' (Communication Engineering, Electronic Engineering, Space and Astronautic Engineering - Master Degree Program), 'Radar and Remote Sensing Laboratory' (Communication Engineering – Master Degree Program) and 'Radar Systems' (Communication Engineering – Master Degree Program).

ANNEXES   Scientific publications

Rome, 15.11.2019   Fabrizio Santi

Scientific publications

Publications in international journals

[J10]   F. Santi, F. Pieralice, D. Pastina, "Joint Detection and Localization of Vessels at Sea With a GNSS-Based Multistatic Radar," IEEE Transactions on Geoscience and Remote Sensing, vol. 57, no. 8, pp. 5894-5913, Aug. 2019.

[J9]   D. Pastina, F. Santi, F. Pieralice, M. Bucciarelli, H. Ma, D. Tzagkas, M. Antoniou, M. Cherniakov, "Maritime Moving Target Long Time Integration for GNSS-Based Passive Bistatic Radar", IEEE Transactions on Aerospace and Electronic Systems, vol. 54, no. 6, pp. 3060-3083, Dec. 2018.

[J8]   H. Ma, M. Antoniou, D. Pastina, F. Santi, F. Pieralice, M. Bucciarelli, M. Cherniakov, "Maritime Moving Target Indication Using Passive GNSS-Based Bistatic Radar", IEEE Transactions on Aerospace and Electronic Systems, vol. 54, no. 1, pp. 115-130, Feb. 2018.

[J7]   Z. Li, F. Santi, D. Pastina, P. Lombardo, "Passive Radar Array with Low-Power Satellite Illuminators Based on Fractional Fourier Transform", IEEE Sensors Journal, vol. 17, no. 24, pp. 8378-8394, Dec. 2017

[J6]   F. Santi, D. Pastina, M. Bucciarelli, "Estimation of ship dynamics with a multiplatform radar imaging system," IEEE Transactions on Aerospace and Electronic Systems, vol. 53, no. 6, pp. 2769-2788, Dec. 2017.

[J5]   Z. Li, F. Santi, D. Pastina, P. Lombardo, "Multi-frame fractional Fourier transform technique for moving target detection with space-based passive radar", IET, Radar, Sonar & Navigation, vol. 11, no. 5, pp. 822-828, May 2017.

[J4]   F. Santi, M. Bucciarelli, D. Pastina, M. Antoniou, M. Cherniakov, "Spatial resolution improvement in GNSS-based SAR using multistatic acquisitions and feature extraction", IEEE Transactions on Geoscience and Remote Sensing, vol. 54, no. 10, pp. 6217-6231, Oct. 2016.

[J3]   F. Santi, D. Pastina, "A parasitic array receiver for ISAR imaging of ship targets using a coastal radar", Hindawi International Journal of Antennas and Propagation, Volume 2016 (2016), Article ID 8485305.

[J2]   F. Santi, M. Antoniou, D. Pastina, "Point Spread Function Analysis for GNSS-Based Multistatic SAR", IEEE Geoscience and Remote Sensing Letters, vol. 12, no. 2, pp. 304-308, Feb. 2015.

[J1]   D. Pastina, F. Santi, M. Bucciarelli, "MIMO Distributed Imaging of Rotating Targets for Improved 2-D Resolution", IEEE Geoscience and Remote Sensing Letters, vol. 12, no. 1, pp. 190-194, Jan. 2015.

Manuscripts under review

[Js1]   D. Pastina, F. Santi, F. Pieralice, M. Antoniou, M. Cherniakov, "MIMO Distributed Imaging of Rotating Targets for Improved 2-D Resolution", submitted to IEEE Transactions on Geoscience and Remote Sensing.

Publications in international conference proceedings

[C21]   F. Santi, F. Pieralice, D. Pastina, M. Antoniou, M. Cherniakov, "Passive radar imagery of ship targets by using navigation satellites transmitters of opportunity," International Radar Symposium IRS 2019, Ulm, Germany, 26-28 June 2019.

[C20]   F. Santi, D. Pastina, "Application of track-before-detect techniques in GNSS-bases passive radar for maritime surveillance," IEEE Radar Conference 2019, Boston, Massachusetts (USA), 22-26 April 2019.

[C19]   F. Pieralice, F. Santi, D. Pastina, M. Antoniou, M. Cherniakov, "Ship targets feature extraction with GNSS-based passive radar via ISAR approaches: preliminary experimental study", EUSAR 2018, Aachen, Germany, 4-7 June 2018.

[C18]   F. Santi, F. Pieralice, D. Pastina, "Multistatic GNSS-based passive radar for maritime surveillance with long integration times: experimental results", 2018 IEEE Radar Conference, Oklahoma City, OK, USA, 23-27 Apr. 2018.

[C17]   F. Pieralice, D. Pastina, F. Santi, M. Bucciarelli, "Multi-transmitters ship target detection with GNSS-based passive radar", Radar 2017, International Conference on Radar Systems, Belfast (UK), 23-26 Oct. 2017.

[C16]   F. Santi, D. Pastina, M. Bucciarelli, "Maritime moving target detection technique for passive bistatic radar with GNSS transmitters", IRS 2017, 18th International Radar Symposium, Prague (CZ), 28-30 June 2017.

[C15]   F. Pieralice, F. Santi, D. Pastina, M. Bucciarelli, H. Ma, M. Antoniou, M. Cherniakov, "GNSS-based passive radar for maritime surveillance: Long integration time MTI technique", 2017 IEEE Radar Conference, Seattle, WA, USA, 8-12 May 2017.

[C14]   H. Ma, M. Antoniou, M. Cherniakov, D. Pastina, F. Santi, F. Pieralice, M. Bucciarelli, "Maritime target detection using GNSS-based radar: Experimental proof of concept", 2017 IEEE Radar Conference, Seattle, WA, USA, 8-12 May 2017.

[C13]   Z. Li, F. Santi, D. Pastina, P. Lombardo, "Satellite-based PCL for moving target detection using Keystone transform and FrFT", RADAR 2016 - CIE International Conference on Radar, Guangzhou, China, 10-13 October 2016.

[C12]   F. Santi, M. Bucciarelli, D. Pastina, M. Antoniou, M. Cherniakov, "Passive multi-perspective GNSS-based SAR using CLEAN technique: an experimental study", EUSAR 2016, Hamburg, Germany, 6-9 June 2016.

[C11]   F. Santi, M. Bucciarelli, D. Pastina, M. Antoniou, M. Cherniakov, "Passive multistatic SAR with GNSS transmitters and using joint bi/multi-static CLEAN technique", 2016 IEEE Radar Conference, Philadelphia, PA, USA, 2-6 May 2016.

[C10]   F. Santi, M. Bucciarelli, D. Pastina, M. Antoniou, "CLEAN technique for passive bistatic and multistatic SAR with GNSS transmitters", RADAR 2015 - IEEE Radar Conference, Arlington, Virginia (USA), 10-15 May 2015.

[C9]   <u>F. Santi</u>, M. Bucciarelli, D. Pastina, "Multi-sensor ISAR technique for feature-based motion estimation of ship targets", RADAR'14, International Radar Conference 2014, Lille, France, 13-17 Oct. 2014.

[C8]   <u>F. Santi</u>, M. Antoniou, D. Pastina, D. Tzagkas, M. Bucciarelli, M. Cherniakov, "Passive multi-static SAR with GNSS transmitters: preliminary experimental study", EuRAD 2014, Rome, Italy, 8-10 Oct. 2014.

[C7]   <u>F. Santi</u>, M. Antoniou, D. Pastina, D. Tzagkas, M. Bucciarelli, M. Cherniakov, "Passive multi-static SAR with GNSS transmitters: first theoretical and experimental results with point targets", EUSAR 2014, Berlin, Germany, 2-5 June 2014.

[C6]   <u>F. Santi</u>, D. Pastina, P. Lombardo, "ISAR while-scan mode for coastal surveillance", RADAR 2014 - IEEE Radar Conference, Cincinnati, Ohio (USA), 19-23 May 2014.

[C5]   <u>F. Santi</u>, D. Pastina, M. Bucciarelli, "Multi-sensor ISAR techniques for motion estimation of pitching, rolling and yawing targets", RADAR 2013 - IEEE Radar Conference, Ottawa, Ontario, Canada, 29 April - 3 May 2013.

[C4]   <u>F. Santi</u>, M. Bucciarelli, D. Pastina, "Target rotation motion estimation from distributed ISAR data", RADAR 2012 - IEEE Radar Conference, Atlanta, Georgia (USA), 7-11 May 2012.

[C3]   D. Pastina, <u>F. Santi</u>, M. Bucciarelli, P. Lombardo, "2D-MIMO SAR/ISAR imaging of moving targets with reconfigurable formation of platforms", EUSAR 2012, Nuremberg, Germany, 23-26 April 2012.

[C2]   D. Pastina, <u>F. Santi</u>, M. Bucciarelli, "Multi-angle distributed ISAR with stepped-frequency waveforms for surveillance and recognition", RADAR 2011 - CIE International Conference on Radar, Chengdu, China, 24-27 October 2011.

[C1]   <u>F. Santi</u>, P. Lombardo, D. Pastina, "Oil spill detection using a coastal high-resolution radar", RADAR 2011 - IEEE Radar Conference, Kansas City, Missouri (USA), 23-27 May 2011.

Manuscripts under review

[Cs3]   <u>F. Santi</u>, I. Pisciottano, D. Cristallini, D. Pastina, "Preliminary investigations toward multi-frame DVB-S based passive ISAR", submitted to 2020 European Synthetic Aperture Radar Conference, to be held in Leipzig, Germany, June 2020.

[Cs2]   <u>F. Santi</u>, D. Pastina, M. Antoniou, M. Cherniakov, "GNSS-based multistatic passive radar imaging of ship targets," submitted to IEEE RadarConf 2020, to be held in Washington ,USA, April 2020.

[Cs1]   I. Pisciottano, D. Cristallini, D. Pastina, F. Santi, "Experimental Results of Polarimetric Passive ISAR Exploiting DVB-S2 Illumination", submitted to IEEE RadarConf 2020, to be held in Washington ,USA, April 2020.

Speeches at national and international conferences and workshops

[W7]   <u>F. Santi</u>, F. Pieralice, D. Pastina, " Detection localization and imaging of vessels at sea with a GNSS-based passive radar," 3rd Italian Radar and Remote Sensing Workshop, Rome, Italy, 30-31 May 2019.

[W6]   <u>F. Santi</u>, F. Pieralice, D. Pastina, "Passive multistatic imaging exploiting GNSS transmitters", IEEE GNSS+R 2019 Specialist Meeting on Reflectometry using GNSS and other Signals of Opportunity, Benevento, Italy, 20-22 May 2019.

[W5]   <u>F. Santi</u>, F. Pieralice, D. Pastina, " Ship target detection and localization with a GNSS-based passive radar using long integration times and multistatic acquisitions," 7th PCL Focus Day, Wachtberg (Germany), 7-8 May 2019.

[W4]   <u>F. Santi</u>, F. Pieralice, D. Pastina, "Multistatic GNSS-based passive radar for maritime surveillance", 2nd Italian Radar and Remote Sensing Workshop, Pavia, Italy, 28-29 May 2018.

[W3]   F. Pieralice, <u>F. Santi</u>, D. Pastina, M. Bucciarelli, H. Ma, M. Antoniou, M. Cherniakov, "GNSS-Based Passive Radar Detection for Maritime Surveillance", 1st Italian Radar and Remote Sensing Workshop, Naples, Italy, 25-26 May 2017.

[W2]   <u>F. Santi</u>, M. Bucciarelli, D. Pastina, M. Antoniou, D. Tzagkas, M. Cherniakov, "Passive multistatic imaging exploiting GNSS transmitters", 5th PCL Focus Day, Wachtberg (Germany), 28-29 April 2015.

[W1]   <u>F. Santi</u>, M. Bucciarelli, D. Pastina, "2D-MIMO distributed ISAR imaging of rotating targets with improved range and cross-range resolution", IEEE GOLD Remote Sensing Conference, Rome, Italy, 4-5 June 2012.

Dissertations

[D1]   <u>F. Santi</u>, "Active and passive multi-sensor radar imaging techniques exploiting spatial diversity", PhD final dissertation, June 2014.

Roma, 15.11.2019