

**CURRICULUM VITAE**

(Last update April 2017)

**Roberta Boni**, Ph.D.

Postdoctoral Research Fellow

Department of Earth and Environmental Sciences- University of Pavia

[roberta.boni01@universitadipavia.it](mailto:roberta.boni01@universitadipavia.it)**PERSONAL DETAILS AND CONTACTS**

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**Date of birth:** September 20<sup>th</sup>, 1988  
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**SUMMARY**

Roberta Boni is a Post-Doctoral Research Fellow at the Department of Earth and Environmental Sciences of the University of Pavia. Her expertise is related to the management of research projects about the interpretation of satellite interferometric radar data for different fields of the engineering geology such as land subsidence, landslides monitoring studies, estimation of hydrogeological parameters and modelling of ground motion due to groundwater level changes. Her research is performed using a multi-disciplinary approach including geological, geotechnical, hydrogeological and A-DInSAR data. SAR images acquired by various sensors such as C-Band (ERS-1/2, Envisat, RADARSAT and Sentinel-1), X-Band (Cosmo-SkyMed and TerraSAR-X) and L-Band (ALOS PALSAR) that act at different spatio-temporal resolution, were used in order to assess their performance in the ground motion investigations.

**ACADEMIC RECORD AND CAREER****2017-present** (Postdoctoral Research Fellow)

Advanced detection, interpretation and modelling of ground motion areas (A-GMA) – Area 04, SSD GEO/05 – Geologia Applicata

Place: Department of Earth and Environmental Sciences, University of Pavia, Italy.

Advisor: Prof.ssa C. Meisina

**2016** (Ph. D. in Earth and Environmental Sciences)

Ground motion identification, monitoring and modelling through multi-sensor A-DInSAR data

Place: Department of Earth and Environmental Sciences, University of Pavia, Italy.

Advisor: Prof.ssa C. Meisina

**2013** (Master degree – Geology, 110/110 cum laude)

Dissertation: Subsidence study based on Persistent Scatterer Interferometry: the case histories of Zaragoza and Lorca (Spain)

Place: Department of Earth and Environmental Sciences, University of Pavia, Italy.

Advisor: Prof.ssa C. Meisina

## SCIENTIFIC ACTIVITY

The research activity is mainly focused on the ground motion investigations headed in conjunction with a multi-disciplinary approach including geological, geotechnical, hydrogeological and A-DInSAR data. SAR images acquired by various sensors such as C-Band (ERS-1/2, Envisat, RADARSAT and Sentinel-1), X-Band (Cosmo-SkyMed and TerraSAR-X) and L-Band (ALOS PALSAR) that act at different spatio-temporal resolution, were used in order to assess their performance in the ground motion investigations. The development of the research includes the following main topics:

- **Detection of ground motion areas;** development of a methodology to analyse multi-sensor and multi-temporal A-DInSAR dataset for the geological interpretation of areas affected by ground motion (Boni *et al.*, 2016).
- **Analysis of the mechanism of ground motion;** exploitation of a multi-disciplinary approach to identify the driving mechanisms (Boni *et al.*, 2015). Combination of multi-sensors A-DInSAR data with geological, land use and other geospatial information to analyse surface and subsurface processes affecting the ground motion areas.
- **Modelling ground motion;** integration of A-DInSAR data with numerical model. Simulation of the ground motion change due to hydraulic head change by exploiting the satellite-based measurements in the phase of the calibration and the validation of the numerical model (e.g. Boni *et al.*, 2016). Estimation of hydrogeological properties of aquifer-system over wide areas of interest using A-DInSAR data.

## PROJECTS AND COORDINATION EXPERIENCES

- Principal investigator (PI) of the Proposal n°00017/8/641/1223 for the COSMO-SkyMed archive, Italian Space Agency (ASI), **2017**. Management of the research Project “Characterization of the aquifer properties using Advanced Differential SAR Interferometry technique”.
- Research proposals as member of the research team; ARPA Piemonte, **2016**. Project: “Servizio di aggiornamento del SifraP (Sistema Informativo Frane in Piemonte) finalizzato alla definizione della pericolosità da frana mediante analisi di dati d'archivio, fotointerpretazione ed analisi di dati di interferometria satellitare”.
- Principal investigator (PI) of the Proposal “GEO3016” for the TerraSAR-X archive, German Aerospace center (DLR), **2015**. Management of the research Project “Land subsidence monitoring and understanding from space: The Ravenna area (Northern Italy) case history”.
- Attendee to the international projects AQUARISK, Geohazards InSAR laboratory and Modeling Group (IGME), **2014-2017**. Estudio de riesgos geológico-geotécnicos por explotación de acuíferos mediante técnicas espaciales y terrestres. Aplicaciones a estructuras e Aplicaciones a estructuras e infraestructuras urbanas.
- Attendee to the international projects PanGeo, **2013**. PanGeo provides free access to ground instability geohazard information for many of Europe’s largest cities. Design of the PanGeo Report: Geohazard Description for Zaragoza, 2013.

## INTERNATIONAL EXPERIENCES

- **June 2015-July 2015 and September 2015** Visiting Ph.D. student at British Geological Survey (Keyworth, United Kingdom). Supervisor: Dr. F. Cigna.  
Analysis of groundwater level records from the observation borehole network of the Environment Agency and combined these with InSAR ground motion time series across the London Basin, to estimate the properties of the Chalk aquifer-system (Urban Geoscience research project; BGS Ref. NEE4586).
- **January 2015-March 2015** Erasmus Traineeship at Geohazards InSAR laboratory and Modelling Group, Geological Survey of Spain (Madrid, Spain). Supervisor: Dr. G. Herrera.  
Assistant for drilling of 300 m in depth, at Lorca city and cooperation for building the stationary Model of the Alto Guadalentin Aquifer (Spain) using MODFLOW software.

- **January 2013-March 2013** Erasmus Placement at Geohazards InSAR laboratory and Modelling Group, Geological Survey of Spain (Madrid, Spain). Supervisor: Dr. G. Herrera.  
Analysis of the sinkholes in the evaporitic karst of the Ebro Valley (Zaragoza, Spain) and study of the aquifer compaction due to ground water withdrawal in Lorca (Murcia, Spain) by the use of satellite interferometric data.

### RESEARCH INTERESTS

Engineering geology, Remote Sensing, A-DInSAR, Ground Motion, Land subsidence, Hydrogeology, Natural and Induced Hazards.

### EDITORIAL ACTIVITY

**Manuscript reviewer for:** Natural Hazards, Landslides, AUC Geographica, Journal of Geography, Environment and Earth Science International, Applied Sciences, Remote sensing.

**Invited Editor for:** Cogent Environmental Science.

### BIBLIOMETRIC RECORDS

9 Research publications in ISI journals.

H index: Scopus: 2; Web of Science:1; Google Scholar: 3.

### INVITED PRESENTATIONS

- Invited speaker for “The 3rd International Conference on Water Resource and Environment (WRE 2017)”, from June 26<sup>th</sup> to 29<sup>th</sup>, 2017 in Qingdao, China.
- Junior Co-chair session: “Remote sensing” - X Convegno dei Giovani Ricercatori di Geologia Applicata 2016, AIGA, Bologna, Italy, **18-19 February, 2016**.
- 2<sup>nd</sup> International Workshop on Coastal Subsidence. Arsenale, Tesa 102; ISMAR-CNR; Venezia, **30 May-01 June 2016**. (Boni R., Fiaschi S., Meisina C., Ibrahim A., Calcaterra D., Di Martire D., Ramondini M., Tessitore S., Borgstrom S., Siniscalchi V., Achilli V., Floris M. - *Multi-sensors Advanced DInSAR analysis of the land subsidence pattern from 1992 to 2016 in the Ravenna area (Italy)*). Invited Oral presentation.

### PUBLICATIONS IN ISI JOURNALS

1. **Boni, R.**, Meisina, C., Cigna, F., Herrera, G., Notti, D., Bricker, S., McCormack, H., Tomás, R., Béjar-Pizarro, M., Mulas, J., Ezquerro, P. (2017) Exploitation of Satellite A-DInSAR Time Series for Detection, Characterization and Modelling of Land Subsidence. *Geosciences*, 7, 25.
2. Fiaschi, S., Tessitore, S., **Boni, R.**, Di Martire, D., Achilli, V., Borgstrom S., Ibrahim, A., Floris, M., Meisina C., Ramondini, M., Calcaterra, D. (2016) From ERS-1/2 to Sentinel-1: two decades of subsidence monitored through A-DInSAR techniques in the Ravenna area (Italy). *GIScience & Remote Sensing*, 1-24.
3. **Boni, R.**, Pilla, G., Meisina, C. (2016) Methodology for Detection and Interpretation of Ground Motion Areas with the A-DInSAR Time Series Analysis. *Remote Sens.* 8, 686.
4. **Boni, R.**, Cigna, F., Bricker, S., Meisina, C., & McCormack, H. (2016). Characterisation of hydraulic head changes and aquifer properties in the London Basin using Persistent Scatterer Interferometry ground motion data. *Journal of Hydrology*.
5. **Boni R.**, Herrera G., Meisina C., Notti D., Zucca F., Bejar M., González P., Palano M., Tomás R., Fernandez J., Fernández-Merodo J., Mulas J., Aragón R., Guardiola-Albert C. and Mora O. (2015) Twenty-year advanced DInSAR analysis of severe land subsidence: the Alto Guadalentín Basin (Spain) case study. *Engineering Geology*, Available online 11 August 2015, ISSN 0013-7952.

### ISI PROCEEDINGS

1. **Boni R.**, Bordoni M., Meisina C., Colombo A., and Lanteri L. Integration of multi-sensor A-DInSAR data for landslide inventory update. (2016) 4th WLF 2017 (accepted).

2. **Bonì R.**, Cigna F., Bricker S., Meisina C. & McCormark H. (2016) Application of Persistent Scatterer Interferometry technique to estimate the Chalk aquifer properties in the London Basin. *Rendiconti Online Societa Geologica Italiana*, 40, 692.
3. Bordoni M., **Bonì R.**, Meisina C., Colombo A., Lanteri L. & Zucca F. (2016) Multi-sensor SAR data for landslide inventory updating: the case study of Piemonte Region. *Rendiconti Online Societa Geologica Italiana*, 40, 693.
4. **Bonì R.**, Meisina, C., Perotti, C., Fenaroli, F. PSI-based methodology to land subsidence mechanism recognition. (2015) *Proceedings of the International Association of Hydrological Sciences*, 372,357-360, doi:10.5194/piahs-372-357-2015.
5. **Bonì R.**, Herrera G., Meisina C., Notti D., Zucca F., Bejar M., González P., Palano M., Tomás R., Fernandez J., Fernández-Merodo J., Mulas J., Aragón R., Guardiola-Albert C. and Mora O. (2015) Application of multi-sensor advanced DInSAR analysis to severe land subsidence recognition: Alto Guadalentín Basin (Spain). *Proceedings of the International Association of Hydrological Sciences*, 372, 45-48, doi:10.5194/piahs-372-45-2015.

### CONFERENCE PROCEEDINGS

**Bonì R.** and Meisina C. Satellite based radar interferometry to mapping and monitoring swelling/shrinking clay soils. Interférométrie radar pour l'identification et le monitoring du retrait-gonflement des sols argileux. (2015) *Proceeding of the International Symposium SEC 2015 (18-19 July 2015, Marne-la-Vallee, France)*. International Symposium Shrink-swell processes in soils – Climate and constructions. Edited by IFSTTAR, ISSN: 1628-4704, pag.495-503.

### ABSTRACT FOR INTERNATIONAL CONFERENCES

**Bonì R.**, Cigna F., Bricker S., Meisina C. & McCormark H. (2016) A multidisciplinary approach based on PSI-derived ground motion, hydrogeological and lithological data to estimate the Chalk aquifer properties in the London Basin. 43rd IAH CONGRESS, 25-29 Settembre, Montpellier, France.

**Bonì R.**, Fiaschi S., Meisina C., Ibrahim A., Calcaterra D., Di Martire D., Ramondini M., Tessitore S., Borgstrom S., Siniscalchi V., Achilli V., Floris M. (2016) Multi-sensors Advanced DInSAR analysis of the land subsidence pattern from 1992 to 2016 in the Ravenna area (Italy). (2016) 2<sup>nd</sup> International Workshop on Coastal Subsidence, 2016; Arsenale, Tesa 102; ISMAR-CNR; Venice, Italy.

**Bonì R.**, Fiaschi S., Calcaterra D., Di Martire D., Ibrahim A., Meisina C., Perini L., Ramondini M., Tessitore S., and Floris M. (2015) Characterization of the multi-component driving land subsidence using Persistent Scatterer Interferometry technique: the Ravenna case of study (Italy). *Geophysical Research Abstracts Vol. 17, EGU2015-12990, 2015 EGU General Assembly 2015*.

**Bonì R.**, Herrera G., Meisina C., Notti D., Zucca F., Bejar M., González P., Palano M., Tomás R., Fernandez J., Fernández-Merodo J., Mulas J., Aragón R., and Mora O. (2014) Advanced interpretation of ground motion using Persistent Scatterer Interferometry technique: the Alto Guadalentín Basin (Spain) case of study. *Geophysical Research Abstracts Vol. 16, EGU2014-5096, 2014 EGU General Assembly 2014*.

### SCIENTIFIC REPORT

Gerardo Herrera, **Roberta Bonì**, and Margarita Sanabria (2013). PanGeo Report: Geohazard Description for Zaragoza 2013. <http://www.pangeoproject.eu/pdfs/english/zaragoza/Geohazard-Description-zaragoza.pdf>

### MEETINGS CONFERENCES, SEMINARS AND WORKSHOPS

- 2016 88° Congresso della Società Geologica Italiana, Napoli, 7-9 September 2016. (**Bonì R.**, Cigna F., Bricker S., Meisina C. & McCormark H. - *Application of Persistent Scatterer Interferometry technique to estimate the Chalk aquifer properties in the London Basin*). Oral presentation.
- 2016 88° Congresso della Società Geologica Italiana, Napoli, 7-9 September 2016. (Bordoni M., **Bonì R.**, Meisina C., Colombo A., Lanteri L. & Zucca F. - *Multi-sensor SAR data for landslide inventory updating: the case study of Piemonte Region*). Oral presentation.

- 2016 2<sup>nd</sup> International Workshop on Coastal Subsidence. Arsenale, Tesa 102; ISMAR-CNR; Venezia, May 30<sup>th</sup> – June 1<sup>st</sup> (**Bonì R.**, Fiaschi S., Meisina C., Ibrahim A., Calcaterra D., Di Martire D., Ramondini M., Sessitore S., Borgstrom S., Siniscalchi V., Achilli V., Floris M. - *Multi-sensors Advanced DInSAR analysis of the land subsidence pattern from 1992 to 2016 in the Ravenna area (Italy)*). Oral presentation.
- 2015 EGU General Assembly 2015. Vienna, 12–17 April 2015. (**Bonì R.**, Fiaschi S., Calcaterra D., Di Martire D., Ibrahim A., Meisina C., Perini L., Ramondini M., Tessitore S., and Floris M. - *Characterization of the multi-component driving land subsidence using Persistent Scatterer Interferometry technique: the Ravenna case of study (Italy)*). Poster.
- 2015 The World Multidisciplinary Earth Sciences Symposium - WMESS 2015, Prague; 09/2015. (Notti D., Herrera G., Meisina C., Monserrat O., Mateos R. M., Galve G. P., Lamas-Fernández F., Béjar-Pizarro M., **Bonì R.**, Devanthery N., Fernández-Chacón F., Zucca F., Azañón J. M. - *The key role of PSI techniques in the monitoring and study of ground oscillation related to groundwater level change*). Poster.
- 2014 Wegener 2014 Session 5. Leeds (UK) 1 – 4 September 2014. (**Bonì R.**, Herrera G., Meisina C., Notti D., Zucca F., Bejar M., González P., Palano M., Tomás R., Fernandez J., Fernández-Merodo J., Mulas J., Aragón R., and Mora O. - *Multi-sensor persistent Scatterer Interferometry land subsidence monitoring in the Alto Guadalentín Basin (Spain)*). Poster.

#### TEACHING ACTIVITIES

- Lecturer for the seminary "Rischio idrogeologico: interventi di mitigazione strutturali e non strutturali di fenomeni franosi". - L'interferometria differenziale da satellite nello studio del dissesto idrogeologico: principi, vantaggi e limiti- 24 February, 2017, Fondazione European Centre for Training and Research in Earthquake Engineering (Eucentre) e ReLUIS.
- Tutoring for Cartography course for students of first year of the degree in Earth and Environmental Sciences at the University of Pavia (a.y. 2014-2015, 2015-2016 BSc)
- Lecturer for the course "Engineering Geology for Land Planning" (a.y. 2014-2015, 2015-2016, M.Sc.)

#### SUPERVISING ACTIVITIES

Master degree student

**2016-Present** Alberto Bosino

Integration of satellite InSAR data with geological, land use and other geospatial information to analyse surface and subsurface processes and ground instability in urban environments, such as land subsidence due to groundwater abstraction for domestic and industrial use, or engineering works.