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SIMONE BARANI

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Education

January 2021 – present: B-type researcher (RTD B) at DISTAV, University of Genoa.

February 2017 – December 2020: A-type researcher (RTD A) at DISTAV, University of Genoa.

2007 – 2016: research fellow at DISTAV, University of Genoa.

March 29, 2007: Ph.D. in Geophysics (March 29, 2007), University of Genoa. Title of Ph.D. thesis: “Probabilistic Seismic Hazard Analysis (PSHA): Declustering, Logic Tree, Sensitivity, and Treatment of Uncertainties”.

October 9, 2003: Master degree with perfect score and honor in Geologic Sciences (October 9, 2003), University of Genoa. Thesis title: “Pericolosità Sismica e Fenomeni di Amplificazione Locale in Toscana: il caso della Garfagnana”.

Research Experience and Background

Dr. Barani has been working as research scientist at the University of Genoa since 2004. During his academic career, he has conducted a wide range of seismological projects. Major works in this field are:

- Probabilistic seismic hazard analysis of the Conza, Saetta, and Pertusillo dams (ongoing).
- Probabilistic seismic hazard analysis of the Piemonte Region (2018).
- Probabilistic seismic hazard analysis of the Liguria Region (2014-2015).
- Site-specific seismic hazard assessment within the framework of the DPC-INGV S2-2012 and S2-2014 projects.
- Calibration of soil amplification factors for ground motion scenarios in Italy (DPC-INGV S3 Project – 2009-2010).
- Evaluation of seismic strain rate in Northwestern Italy within the framework of the PRIN project “Dinamica del Sistema Costituito dagli Appennini Settentrionali, dalla Pianura Padana e dalle Alpi” (2008-2009) (2008-2009).
- Disaggregation of the Italian seismic hazard within the framework of the DPC-INGV S1 Project (2007) (<http://esse1.mi.ingv.it/d14.html>).

Major national and international projects he took part are:



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- DPC-INGV S2-2012 and S2-2014 projects (“Constraining OBServations into Seismic hazard (COBAS)”) (Dr. Barani covered the roles of research unit and task coordinator);
- Observatoire Européen Environnemental Educatif, Programma di cooperazione transfrontaliera Alcotra (Fondi UE 2007-2013);
- PRIN project “Dinamica del Sistema Costituito dagli Appennini Settentrionali, dalla Pianura Padana e dalle Alpi” (2008-2009);
- DPC-INGV S3-project (“ShakeMaps in Italia Nord Occidentale ed aree Interfrontaliere”) (2007-2009);
- DPC-INGV S1-project (“Completamento e gestione della mappa di pericolosità sismica prevista dall’Ordinanza PCM 3274 e progettazione di ulteriori sviluppi”) (2004-2006);
- Interreg Sismoalp Project (2005-2006).

Research Project Management

Dr. Barani was coordinator of the University of Genoa Research Unit (RU GE) within the framework of the research project S2-2014 “Constraining OBServations into Seismic hazard (COBAS)” funded by the Italian Department of Civil Protection (RU GE funding: 33.000 €). Within the framework of such project, Dr. Barani was also coordinator of Task 4 “Site-Specific Seismic Hazard Assessment”. The project followed the preceding S2-2012 project, within which Dr. Barani had covered again the roles of RU and task coordinator.

Teaching Roles and Experience

Dr. Barani has been giving lectures since his Ph.D. graduation. Currently, he is lecturer in charge of the “Seismic Hazard and Risk” course within the framework of the master degree course (Laurea Magistrale) of “Engineering for Natural Risk Management”. Moreover, he is co-lecturer of “Dinamica dei Terremoti” within the framework of the bachelor degree course (Laurea Triennale) in Geologic Sciences, and co-lecturer of “Rischio Sismico e Microzonazione” and “Sismologia Applicata” within the framework of the master degree course (Laurea Triennale) in Geologic Sciences.

In addition to the above teaching roles, on March 2018 he was appointed as lecturer of “Elementi di Probabilità e Statistica” within the framework of the “Scienze e Tecnologie per l’Ambiente e il Territorio” (Ciclo XXXII, XXXIII) Ph.D. course. Currently, he is lecturer of “Basics of applied statistics and probability: applications with R” within the framework of the “Scienze e Tecnologie per l’Ambiente e il Territorio” Ph.D. course (Ciclo XXXV, XXXVI, XXXVII).

In 2009, he was teaching assistant of Prof. Christopher H. Scholz (Columbia University, NY) during the MSc/PhD degree course “The Mechanics of Earthquakes and Faulting”, Rose School – Centre for Post Graduate Training and Research in Earthquake Engineering and Engineering Seismology (Pavia, Italy), April 20 – May 15, 2009.



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During his career, Dr. Barani was supervisor (or co-advisor) of three bachelor degree students and three master degree students. In addition, he was supervisor of one Ph.D. student.

Publications, Conferences, and Workshops

Dr. Barani is author of 38 scientific articles (19 as first author) on peer-reviewed, JCR impact factor international journals. A list of JCR publications is provided in a separate section at the end of the present document. Moreover, he published 14 articles in proceedings of international conferences.

Concerning national publications, Dr. Barani is author of 26 works published in journals, conference proceedings, or as book chapters.

Dr. Barani took part in several national and international conferences/workshops, collecting 95 abstracts (47 of which in international conferences). He organized and chaired (in collaboration with other scientists):

- Session S15 “Earthquake hazard assessment towards seismic risk mitigation in urban areas” at the “37th General Assembly of the European Seismological Commission” (Online, 19-24 September 2021);
- the “EPOS Italia online Workshop on Earthquake Hazard”, 1-3 December 2020;
- Session “Earthquake Hazards in Areas Affected by Complex Site Response: The Challenge of Understanding the Site Behavior and the Role of Thick Soil Sediments” at the 2017 American Geophysical Union fall meeting (New Orleans, December 11-15, 2017).

Research Grants

In 2016, Dr. Barani received a grant by the University of Genoa to carry out a one-month research (17 Oct. – 17 Nov. 2016) at the German Research Centre for Geosciences (GFZ), Potsdam. He received the grant within the framework of the D.R. n. 1924 concerning the funding of short research periods in foreign institutes. The research proposal submitted by Dr. Barani concerned the computation of site-specific probabilistic seismic hazard in the Abruzzo region by integration of soil amplification functions determined through the generalized inversion technique (GIT).

ASN

On November 2020, Dr. Barani was qualified as 1st-level professor (abilitazione all’esercizio di professore di prima fascia).

On April 2018, Dr. Barani was qualified as 2nd-level professor (abilitazione all’esercizio di professore di seconda fascia).



Technology Transfer and Professional Experience

Dr. Barani is co-founder and managing director of GEAmb S.r.l., a spin-off company born at the University of Genoa (October 2009) from the scientific and professional experience of Dr. Barani and other researchers.

Major projects are:

- Realizzazione di studi di Microzonazione Sismica di Livello 1, analisi della CLE, elaborazione scenari di danno, revisione dei P.E. comunali ed esecuzione di misure IOPS su edifici strategici, in applicazione dei dispositivi dell'OCDPC nr. 344/2016; attività commissionata da Regione Liguria a seguito di aggiudicazione di bando competitivo (2020 - in corso).
- Realizzazione di studi e indagini di Microzonazione Sismica di Livello 1 in applicazione dei disposti dell'OCDPC 293 del 26 Ottobre 2015; attività commissionata da Regione Liguria a seguito di aggiudicazione di bando competitivo (2019 – in corso).
- Consulenza per lo sviluppo di un modello di correlazione tra la sismicità strumentale e le strutture tettoniche attive nel settore nord-occidentale della Valle d'Aosta nell'ambito del progetto "RISVAL" – programma di cooperazione INTERREG V-A Italia-Francia Alcotra 2014-2020; committente: GDP Consultants (2019 - 2020).
- Studio sismotettonico e piano di monitoraggio della sismicità nel giacimento Selva Malvezzi (BO) (Po Valley Energy LTD) (2018 e 2021)
- Realizzazione indagini di Microzonazione Sismica, analisi della Condizione Limite dell'Emergenza dell'insediamento urbano, revisione dei Piani di Emergenza Comunale a seguito delle risultanze delle analisi delle CLE in applicazione dei disposti dell'OCDPC 171 del 19 giugno 2014; attività commissionata da Regione Liguria a seguito di aggiudicazione di bando competitivo (2017 - 2018).
- Seismic monitoring of the San Alberto gas field (Po Valley Energy LTD, Northsun Italia S.p.A., Appennine Energy s.r.l.), San Pietro in Casale (BO) (2016-2018).
- Seismic and topographic monitoring of the historical building sited in Ponte dei Mille, Genoa (period: 2016 - 2018).
- Seismic monitoring of structures during the dredging activities in the Genoa seaport (2012).

As a further professional experience, Dr. Barani collaborated with D'Appolonia S.p.A. (now RINA Consulting) on seismic hazard projects (period 2006-2008). His experience included both onshore and offshore works, from the initial phases of seismotectonic and geologic investigation through hazard analyses. Dr. Barani's earthquake and geohazard experience covered different projects for diverse industries. Major works related to geohazard assessments included:

- Evaluation of earthquake recurrence parameters for the Embalse nuclear power plant, Argentina (2008).



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- Review of seismic design criteria for the Nalpetco West Med Development (2008).
- Probabilistic seismic hazard analysis for the NEGP (Nord Stream) pipeline in the Baltic Sea (2007).
- Analysis of micro-seismicity for seismic hazard assessment of three Shell/Petronas offshore fields in South China Sea (2007).
- Fault rupture hazard analysis in the Sardinia and Tuscany regions within the framework of the seismic hazard study for the Galsi pipeline from Algeria to Italy (2006).



List of JCR Publications

Balbi E., M. Terrone, F. Faccini, D. Scafidi, S. Barani, S. Tosi, L. Crispini, L. Cianfarra, F. Poggi, G. Ferretti (2021). “Persistent scatterer interferometry and statistical analysis of time-series for landslide monitoring: Application to santo stefano d’aveto (Liguria, NW Italy)”, Remote Sensing, Vol. 13, Article No. 3348.

Mascandola C., S. Barani, M. Massa, D. Albarello (2021). “New insights into long-period (>1 s) seismic amplification effects in deep sedimentary basins: A case of the po plain basin of Northern Italy”, Bulletin of the Seismological Society of America, Vol. 111, 2071-2086.

Visini F., B. Pace, C. Meletti, W. Marzocchi, A. Akinci, R. Azzaro, S. Barani et al. (2021). “Earthquake Rupture Forecasts for the MPS19 Seismic Hazard Model of Italy”, Annals of Geophysics, Vol. 64, Article No. SE220.

Barani S., L. Cristofaro, M. Taroni, L. A. Gil-Alaña, G. Ferretti (2021). “Long memory in earthquake time series: the case study of the geysers geothermal field”, Frontiers in Earth Science, doi: 10.3389/feart.2021.563649.

Cutroneo L., G. Ferretti, S. Barani, D. Scafidi, F. De Leo, G. Besio, M. Capello (2021). “Near real-time monitoring of significant sea wave height through microseism recordings: analysis of an exceptional sea storm event”, Journal of Marine Science and Engineering, Vol. 9, 319.

Priolo E., F. Pacor, D. Spallarossa, G. Milana, G. Laurenzano, M. A. Romano, C. Felicetta, S. Hailemikael, F. Cara, G. Di Giulio, G. Ferretti, C. Barnaba, G. Lanzano, L. Luzi, M. D’Amico, R. Puglia, D. Scafidi, S. Barani, R. De Ferrari, G. Cultrera (2020). “Seismological analyses of the seismic microzonation of 138 municipalities damaged by the 2016-2017 seismic sequence in Central Italy”, Bulletin of Earthquake Engineering, Vol. 18, 5553-5593.

Scafidi D., D. Spallarossa, G. Ferretti, S. Barani, B. Castello and L. Margheriti, 2019, “A complete automatic procedure to compile reliable seismic catalogs and travel-time and strong-motion parameters datasets”, Seismological Research Letters, Vol. 90, 1308-1317.

Mascandola C., M. Massa, S. Barani, D. Albarello, S. Lovati, L. Martelli and V. Poggi, 2019, “Mapping the seismic bedrock of the Po Plain (Italy) through ambient-vibration monitoring”, Bulletin of the Seismological Society of America, Vol. 109, 164-177.

Spallarossa D., S. R. Kotha, M. Picozzi, S. Barani and D. Bindi, 2019, “On-site earthquake early warning: a partially non-ergodic perspective from the site effects point of view”, Geophysical Journal International, Vol. 216, 919-934.

Barani S., C. Mascandola, E. Riccomagno, D. Spallarossa, D. Albarello, G. Ferretti, D. Scafidi, P. Augliera and M. Massa, 2018, “Long-range dependence in earthquake-moment release and implications for earthquake occurrence probability”, Scientific Reports 8:5326.



Ferretti G., S. Barani, D. Scafidi, M. Capello, L. Cutroneo, G. Vagge and G. Besio, 2018, “Near real-time monitoring of significant sea wave height through microseism recordings: An application in the Ligurian Sea (Italy)”, Ocean & Coastal Management, Vol. 165, 185-194.

Santulin M., A. Tamaro, A. Rebez, D. Slejko, F. Sani, L. Martelli, M. Bonini, G. Corti, M. E. Poli, A. Zanferrari, A. Marchesini, M. Buseti, M. Dal Cin, D. Spallarossa, S. Barani, D. Scafidi, G. Barreca and C. Monaco, 2017, “Seismogenic zonation as a branch of the logic tree for the new Italian seismic hazard map - MPS16: a preliminary outline”, Bollettino di Geofisica Teorica e Applicata, Vol. 58, 313-342.

De Ferrari R., G. Ferretti, S. Barani, G. Pepe and A. Cevasco, 2017, “On the role of stiff soil deposits on seismic ground shaking in western Liguria, Italy: Evidences from past earthquakes and site response”, Engineering Geology, Vol. 226, 172-183.

Barani S., C. Mascandola, E. Serpelloni, G. Ferretti, M. Massa and D. Spallarossa, 2017. “Time–Space Evolution of Seismic Strain Release in the Area Shocked by the August 24–October 30 Central Italy Seismic Sequence”, Pure and Applied Geophysics, Vol. 174, 1875-1887.

Mascandola C., M. Massa, S. Barani, S. Lovati and M. Santulin, 2017, “Long-period amplification in deep alluvial basins and consequences for site-specific probabilistic seismic hazard analysis: an example from the Po Plain (northern Italy)”, Bulletin of the Seismological Society of America, Vol. 107, 770-786.

Barani S., D. Albarello, M. Massa and D. Spallarossa, 2017, “Influence of twenty years of research on ground motion prediction equations on probabilistic seismic hazard in Italy”, Bulletin of the Seismological Society of America, Vol. 107, 240-255.

Barani S., D. Albarello, D. Spallarossa and M. Massa, 2017, “Empirical scoring of ground motion prediction equations for probabilistic seismic hazard analysis in Italy including site effects”, Bulletin of Earthquake Engineering, Vol. 15, 2547-2570.

Barani S. and D. Spallarossa, 2017, “Soil amplification in probabilistic ground motion hazard analysis”, Bulletin of Earthquake Engineering, Vol. 15, 2525-2545.

Massa M., C. Mascandola, C. Ladina, S. Lovati and S. Barani, 2017, “Fieldwork on local-site seismic response in the Po Plain: examples from seismic array and single station analyses”, Bulletin of Earthquake Engineering, Vol. 15, 2349-2366.

Barani S., D. Albarello, D. Spallarossa and M. Massa, 2015, “On the influence of horizontal ground shaking definition on probabilistic seismic hazard analysis”, Bulletin of the Seismological Society of America, Vol. 105, 2704-2712.

Scafidi D., S. Barani, R. De Ferrari, G. Ferretti, M. Pasta, M. Pavan, D. Spallarossa and C. Turino, 2015, “Seismicity of northwestern Italy during the last thirty years”, Journal of Seismology, Vol. 19, 201-218.

Barani S., M. Massa, S. Lovati and D. Spallarossa, 2014, “Effects of surface topography on ground shaking prediction: implications for seismic hazard analysis



and recommendations for seismic design”, Geophysical Journal International, Vol. 197, 1551-1565.

Massa M., S. Barani and S. Lovati, 2014, “Overview of topographic effects based on experimental observations: meaning, causes and possible interpretations”, Geophysical Journal International, Vol. 197, 1537-1550.

Barani S., G. Ferretti, D. Scafidi and D. Spallarossa, 2014, “Analysis of seismicity and micro-seismicity associated with the October-November 2010 Sampeyre swarm, Southwestern Alps”, Tectonophysics, Vol. 611, pp. 130-140.

Barani S., D. Spallarossa, P. Bazzurro and F. Pelli, 2014, “The multiple facets of probabilistic seismic hazard analysis: a review of probabilistic approaches to the assessment of different hazards caused by earthquakes”, Bollettino di Geofisica Teorica e Applicata, Vol. 55, pp. 17-40.

Barani S., R. De Ferrari and G. Ferretti, 2013, “Influence of soil modeling uncertainties on site response”, Earthquake Spectra, Vol. 29, pp. 705-732.

Ferretti G., A. Zunino, D. Scafidi, S. Barani and D. Spallarossa, 2013, “On microseisms recorded near the Ligurian coast (Italy) and their relationship with sea wave height”, Geophysical Journal International, Vol. 194, pp. 524-533.

Boncio P., A. Pizzi, G. Cavuoto, M. Mancini, T. Piacentini, E. Miccadei, G.P. Cavinato, S. Piscitelli, A. Giocoli, G. Ferretti, R. De Ferrari, M.R. Gallipoli, M. Mucciarelli, V. Di Fiore, A. Franceschini, F. Pergalani, G. Naso, and Working Group MacroArea3 (B. Giaccio, M. Moscatelli, M. Spadoni, G. Romano, D. Spallarossa, M. Pasta, M. Pavan, D. Scafidi, S. Barani, C. Eva, M. Compagnoni, T. Campea, G.R. Di Bernardino, T. Mancini, A. Marino, R. Montefalcone, F. Mosca), 2011, “Geological and geophysical characterisation of the Paganica - San Gregorio area after the April 6, 2009 L’Aquila earthquake (M_w 6.3, central Italy): implications for site response”, Bollettino di Geofisica Teorica ed Applicata, Vol. 52, pp. 491-512.

Barani S. and C. Eva, 2011, “Did the April 6, 2009 L’Aquila earthquake fill a seismic gap?”, Seismological Research Letters, Vol. 82, pp. 645-653.

De Ferrari R., G. Ferretti, S. Barani and D. Spallarossa, 2010, “Investigating on the 1920 Garfagnana earthquake ($M_w = 6.5$): evidences of site effects in Villa Collemandina (Tuscany, Italy)”, Soil Dynamics and Earthquake Engineering, Vol. 30, pp. 1417-1429.

Barani S., D. Scafidi and C. Eva, 2010, “Strain rates in Northwestern Italy from spatially smoothed seismicity”, Journal of Geophysical Research, Vol. 115, B07302, doi:10.1029/2009JB006637

Barani S., D. Spallarossa and P. Bazzurro, 2009, “Disaggregation of probabilistic ground-motion hazard in Italy”, Bulletin of the Seismological Society of America, Vol. 99, pp. 2638-2661.

Barani S., R. De Ferrari, G. Ferretti and C. Eva, 2008, “Assessing the effectiveness of soil parameters for ground response characterization and soil classification”, Earthquake Spectra, Vol. 24, pp. 565-597.



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Barani S., D. Spallarossa, C. Eva and P. Bazzurro, 2007, “Sensitivity analysis of parameters for probabilistic seismic hazard assessment of Western Liguria (North-Western Italy)”, Bollettino di Geofisica Teorica e Applicata, Vol. 48, pp. 127-150.

Barani S., D. Spallarossa, P. Bazzurro and C. Eva, 2007, “Sensitivity analysis of seismic hazard for Western Liguria (North Western Italy): a first attempt towards the understanding and quantification of hazard uncertainty”, Tectonophysics, Vol. 435, pp. 13-35.

Barani S., G. Ferretti, M. Massa and D. Spallarossa, 2007, “The waveform similarity approach to identify dependent events in instrumental seismic catalogues”, Geophysical Journal International, Vol. 168, pp. 100-108.