

RADU VĂCĂREANU

Technical University of Civil Engineering
Reinforced Concrete Department & Seismic Risk
Assessment Research Centre (ccers.utcb.ro)
124 Lacul Tei Blvd., Bucharest RO-020396, Romania
Tel. – 40-21-2421163
Fax – 40-21-2420781
E-mail: radu.vacareanu@utcb.ro

<i>Nationality</i>	Romanian
<i>Age</i>	49 (born in 1966), married, two children
<i>Summary of qualifications</i>	Civil Engineer Professor of Structural Reliability and Risk Analysis at the Technical University of Civil Engineering, Bucharest
<i>Education</i>	June 1991- Graduate from Faculty of Civil Engineering of Iasi, general mark at 9.86 (on a scale from 1 to 10) September 1995 – 18 th European Regional Earthquake Engineering Seminar, <i>Ecole Centrale de Lyon</i> January 1999 – Ph. D. in Civil Engineering at <i>Technical University of Civil Engineering</i> of Bucharest; field of Ph.D.: Structural Reliability and Earthquake Engineering August 1999 – November 1999 –Post-doctoral studies in Structural Reliability, <i>Department of Engineering Mechanics, University of Innsbruck</i> ; June 2000 – International Advanced School on Wind Excited and Aeroelastic Vibrations of Structures, <i>University of Genoa</i> ; August – October 2002 – Training in Earthquake Engineering at Buildings Research Institute, Tsukuba, Japan October – December 2005 – Training in Earthquake Engineering at Buildings Research Institute, Tsukuba, Japan November 2014 – Habilitation thesis in Civil Engineering defended at <i>Technical University of Iasi</i> ; Thesis title: Probabilistic Seismic Hazard, Fragility and Risk Analyses for Romania. Developments and Insights

Key qualifications

- Seismic hazard, vulnerability and risk assessment
- Earthquake resistant design of buildings
- Seismic evaluation of existing buildings
- Structural reliability
- Wind engineering

Professional experience

- *July 1991 – April 1992: Site Engineer at the American School retrofitting site in Bucharest*
- *April 1992 – Oct. 1992: Engineer at Building Research Institute of Bucharest (INCERC), Earthquake Engineering Division*
- *Oct. 1992 – June 1997: Assistant Professor at Technical University of Civil Engineering of Bucharest*
- *June 1997 – August 2001: Lecturer at the Technical University of Civil Engineering of Bucharest*
- *July 1997 – August 1999: Consultant on infrastructure issues for World Bank Project Social Development Fund in Romania*
- *January 28, 1999: Ph.D. Thesis - Risk of exceedance of ductility supplies in reinforced concrete structures exposed to earthquakes*
- *July 2001 – August 2002: Participation in the negotiation of JICA Technical Cooperation Project for Seismic Risk Reduction for Buildings and Structures in Romania*
- *August 2001- March 2008: Assoc. Prof. at the Technical University of Civil Engineering of Bucharest - Courses and seminars in Structural Reliability and Risk Analysis*
- *October 2002 – June 2008: Director of the National Centre for Seismic Risk Reduction, implementing agency of JICA Technical Cooperation Project for Seismic Risk Reduction for Buildings and Structures in Romania*
- *April 2008 - present: Prof. at the Technical University of Civil Engineering of Bucharest - Courses and seminars in Structural Reliability and Risk Analysis and Seismic Vulnerability and Risk*
- *February 2014 - present: Director of Seismic Risk Assessment Research Centre of Technical University of Civil Engineering of Bucharest (ccers.utcb.ro)*
- *National Delegate at International Association for Earthquake Engineering*
- *Member of Earthquake Engineering Research Institute and Seismological Society of America*
- *Editorial Board Member of Earthquakes and Structures. An International Journal*

- Guest Editor of *Bulletin of the International Institute of Seismology and Earthquake Engineering*
- Reviewer for *Bulletin of the Seismological Society of America, Earthquake Spectra, Earthquakes and Structures. An International Journal* and *Earthquake Engineering and Engineering Vibration*
- Member of *National Council for Scientific Research*
- Vice-president of *National Commission for Earthquake Engineering* of Ministry of Regional Development and Public Administration
- Member of *Technical Committee 4 – Actions and Structural Safety* of Ministry of Regional Development and Public Administration
- Member of *ASRO/CT 343 Basis of Design and Structural Eurocodes*
- Evaluator of technical proposals and research projects for domestic and international bodies
- Numerous papers on seismic hazard, vulnerability and risk presented in journals, national and international conferences on earthquake engineering
- Co-author – Romanian Earthquake Resistant Design Code – *P100-1/2006 & 2013* editions
- Co-author – Romanian Seismic Evaluation and Seismic Retrofitting Code – *P100-3*
- Co-author – Romanian Code on Wind Loads *CR 1-1-4-2012*, Romanian Code on Basis of Structural Design, *CR 0-20012* and Code on Snow Load, *CR 1-1-3-20012*
- Co-worker at research/consultancy projects on earthquake engineering, structural safety and wind engineering
- Proficiency in English

Fellowships and awards

General Association of Engineers of Romania Award for the book “Constructii amplasate in zone cu miscari seismice puternice” by Aldea, A., Arion, C., Ciutina, A., Cornea, T., Dinu, F., Fulop, L., Grecea, D., Stratan, A., Văcăreanu, R. – coordinated by: Dubina, D., Lungu, D. 2003., Editura Orizonturi Universitare, Timisoara

University teaching

Structural Reliability and Risk Analysis – undergraduate level

The course provides an insight into the concepts, methods and procedures of structural reliability and risk analysis considering the presence of random uncertainties. The course is envisaged as to provide the background knowledge for the understanding and implementation of the Eurocodes and of the new generation of Romanian structural codes (calibration of earthquake, wind and snow loads; calibration of material strengths; calibration of partial safety coefficients).

Reliability of Structures Subjected to Natural Hazard Loads & Seismic Vulnerability and Risk – M.Sc. courses

These courses are envisaged to provide the background knowledge of performing reliability analysis of structures subjected to wind or earthquake loads and

vulnerability and risk analysis of structures subjected to seismic action. The courses addresses both the modelling of actions due to natural hazards as well as the modelling of the structural response induced by wind or earthquake loads.

University service

Scientific Secretary of Faculty of Buildings, Technical University of Civil Engineering Bucharest 2000-2008

Vice-Dean of Faculty of Buildings, Technical University of Civil Engineering Bucharest 2008-2012

Vice-Rector for Research of Technical University of Civil Engineering Bucharest 2012-present

Member of Faculty Council, Faculty of Buildings, Technical University of Civil Engineering Bucharest 2000-present

Member of Senate of Technical University of Civil Engineering Bucharest 2012-present

International Projects

- IPRED - International Platform for Reducing Earthquake Disaster – 2007-present
- ANDROID-Academic Network for Disaster Resilience to Optimise Educational Development – 2012 - present
- JICA Technical Cooperation Project for Seismic Risk Reduction for Buildings and Structures in Romania, financed by Japan International Cooperation Agency – Coordinator – Director of the National Centre for Seismic Risk Reduction – Project Implementing Agency – 2002-2008
- IAEA CRP-NFE Camus Benchmark - IAEA Research Contract No: 12146/RBF - Numerical Simulations and Engineering Methods for the Evaluation of Expected Seismic Performances – Researcher – 2002-2005
- RISK-UE "An advanced approach to earthquake risk scenarios with applications to different European towns", financed by European Commission, Fifth Framework, Researcher – 2001-2004
- NEMISREF “New methods of mitigation of seismic risk on existing foundations”, financed by European Commission, Fifth Framework, Researcher – 2002-2005
- Collaborative Research Centre (CRC) 461 of SFB, Germany: Strong Earthquakes: A Challenge for Geosciences and Civil Engineering” at Karlsruhe University – Researcher – 2000-2007
- COST Action C26: “Urban Habitat Constructions Under Catastrophic Events”, Working Group 2 “Earthquake Resistance”

Publications (excerpts from the past five years)

Textbooks and/or chapters in edited books

- Văcăreanu, R., Aldea, A., Lungu, D., Pavel, F., Neagu, C., Arion, C., Demetriu, S., Iancovici, M. (2016). Probabilistic Seismic Hazard Assessment for Romania. In: D'Amico, S. (Eds) Earthquakes and Their Impact on Society, Springer Natural Hazards Book Series, p. 137-169, ISBN: 978-3-319-21752-9 (Print) 978-3-319-21753-6 (Online), <http://dx.doi.org/10.1007/978-3-319-21753-6>
- Văcăreanu, R., Ionescu, C. (Eds.) (2014). Proceedings of the Fifth National Conference on Earthquake Engineering & First National Conference of Earthquake Engineering and Seismology, Editura Conspress, 426 p., ISBN 978-973-100-342-9
- Văcăreanu, R., Pavel, F., Aldea, A. (2013). Indrumator pentru evaluarea actiunii vantului asupra constructiilor conform CR 1-1-4/2012, Editura Conspress, 89p., ISBN 978-973-100-279-9
- Văcăreanu, R., Seki, M., Chesca, A.B., Lungu, D., Aldea, A., Arion, C. (2012). Seismic and wind response control of buildings with supplemental energy dissipation devices. Case studies in Bucharest. UNESCO-IPRED-PUC International Workshop Santiago de Chile, Chile, 26-28 July 2011, UNESCO, p. 99-113, Electronic version only, SC/DIS/2012/IPRED/1
- Lungu D., Arion, C., Aldea, A. Văcăreanu, R. (2011). Seismic protection and prevention of the demolition of Bucharest heritage buildings, Surveys and Activities on Post-Earthquake Disaster: UNESCO-IPRED-RIHS International Workshop, Padang, Indonesia, 6 - 8 July 2010, UNESCO, p. 190-208, SC/DR/2011/IPRED/5

Papers in Peer-Reviewed Journals

- Văcăreanu, R., Iancovici, M., Neagu, C., Pavel, F. (2015). Macroseismic intensity prediction equations for Vrancea intermediate-depth seismic source. Natural Hazards, DOI: 10.1007/s11069-015-1944-y (Online First Articles)
- Pavel, F., Văcăreanu, R., Radulian, M., Cioflan, C. (2015). Investigation on directional effects of Vrancea subcrustal earthquakes. Earthquake Engineering and Engineering Vibration, 14(3): 399-410, DOI: 10.1007/s11803-015-0032-3
- Văcăreanu, R., Radulian, M., Iancovici, M., Pavel, F., Neagu, C. (2015). Fore-arc and back-arc ground motion prediction model for Vrancea intermediate depth seismic source. Journal of Earthquake Engineering, 19(3): 535-562, DOI: 10.1080/13632469.2014.990653
- Pavel, F., Văcăreanu, R. (2015). Assessment of the ground motion levels for the Vrancea (Romania) November 1940 earthquake. Natural Hazards, 78(2): 1469-1480, DOI 10.1007/s11069-015-1767-x
- Pavel, F., Văcăreanu, R. (2015). Kappa and regional attenuation for Vrancea (Romania) earthquakes. Journal of Seismology, 19:791-799, DOI 10.1007/s10950-015-9490-3
- Popa, V., Văcăreanu, R., Oprişoreanu, V., Albotă, E., Köber, D. (2015). Suitability of Current Assessment Techniques to Retrodict the Seismic Damage of Buildings: A Case Study in Van, Turkey. The Open Civil Engineering Journal, 9: 330-343, DOI: 10.2174/1874149501509010330

- Văcăreanu, R., Iancovici, M., Pavel, F. (2014). Conditional mean spectrum for Bucharest. *Earthquakes and Structures. An International Journal*, 7(2): 141-157, DOI: 10.12989/eas.2014.7.2.141
- Pavel, F., Văcăreanu, R., Cioflan, C., Iancovici, M. (2014). Spectral Characteristics of Strong Ground Motions from Intermediate-Depth Vrancea Seismic Source. *Bulletin of the Seismological Society of America*, 104(6): 2842–2850, DOI: 10.1785/0120130334
- Pavel, F., Văcăreanu, R., Ionescu, C., Iancovici, M., Sercăianu, M. (2014). Investigation of the variability of strong ground motions from Vrancea - earthquakes. *Natural Hazards*, 74(3): 1707-1728, DOI 10.1007/s11069-014-1273-6
- Popa, V., Coțofană, D., Văcăreanu, R. (2014). Effective stiffness and displacement capacity of short reinforced concrete columns with low concrete quality. *Bulletin of Earthquake Engineering*, 12(6): 2705–2721, DOI 10.1007/s10518-014-9618-9
- Pavel, F., Văcăreanu, R., Neagu, C., Pricopie, A. (2014). Bi-normalized response spectra and seismic intensity in Bucharest for 1986 and 1990 Vrancea seismic events. *Journal of Earthquake Engineering and Engineering Vibration*, 13(1): 125-135, DOI: 10.1007/s11803-014-0217-1
- Văcăreanu, R., Demetriu, S., Lungu, D., Pavel, F., Arion, C., Iancovici, M., Aldea, A., Neagu, C. (2014). Empirical ground motion model for Vrancea intermediate-depth seismic source. *Earthquakes and Structures, An International Journal*, 6(2): 141-161, DOI: 10.12989/eas.2014.6.2.127
- F. Pavel , R. Văcăreanu & D. Lungu (2014). Bi-normalized response spectra for various frequency content ground motions. *Journal of Earthquake Engineering*, 18(2): 264-289, DOI:10.1080/13632469.2013.846283
- Pavel, F., Văcăreanu, R., Arion, C., Neagu, C. (2014). On the variability of strong ground motions recorded from Vrancea earthquakes. *Earthquakes and Structures, An International Journal*, 6(1): 1-18, DOI: 10.12989/eas.2014.6.1.001
- Văcăreanu, R., Mărmureanu, Gh., Pavel, F., Neagu, C., Cioflan, C.A., Aldea, A. (2014). Analysis of soil factor S using strong ground motions from Vrancea subcrustal seismic source. *Romanian Reports in Physics*, 66(3): 893–906
- Văcăreanu, R., Pavel, F., Aldea, A. (2013). On the selection of GMPEs for Vrancea subcrustal seismic source. *Bulletin of Earthquake Engineering*, 11(6): 1867-1884, DOI: 10.1007/s10518-013-9515-7
- Pavel, F., Văcăreanu, R., Aldea, A., Arion, C. (2013). Source Effects on the Spectral Characteristics of Strong Ground Motions Recorded in Bucharest Area During Vrancea Earthquakes of 1986 and 1990, *Journal of Earthquake Engineering*, 17(8): 1192-1211, DOI:10.1080/13632469.2013.830997
- Lungu, D. , Văcăreanu, R., Aldea, A., Arion, C. (2013). Earthquake Hazard and Risk in Romania. *Bulletin International Institute for Seismology and Earthquake Engineering*, Tsukuba, Japan, 47: 139-148, ISSN 0074-655X
- Văcăreanu R., Lungu D., Aldea A., Arion C., Neagu C., Gaman F., Petrescu F., Aldea M. (2013). Expected direct seismic losses assessment using GIS. Case study for Iași Municipality, *Technical University of Civil Engineering Bucharest - Scientific Journal – Series: Mathematical Modeling in Civil Engineering*, 3:12-18
- Radu. A. A., Angelescu, T., Curtef, V., Delia, F., Felea, D., Goia, I., Hasegan, D., Lucaschi, B., Manea, A., Popa, V., Ralit, I., Văcăreanu, R. (2012). A site evaluation campaign for a ground based atmospheric Cherenkov telescope in

- Romania, *Experimental Astronomy*, 34(1): 31-42, DOI 10.1007/s10686-012-9297-y
- R. Văcăreanu, A. Aldea, C. Arion, D. Lungu, V. Popa, E.S. Georgescu (2011). National Centre for Seismic Risk Reduction, *Bulletin of International Institute for Seismology and Earthquake Engineering*, Tsukuba, Japan, 45: 147-154
 - Neagu A., Serban L., Văcăreanu R., Aldea A. (2011). Seismic Vulnerability Analysis of Two High-code Mid-rise Reinforced Concrete Frame Structures, *Technical University of Civil Engineering Bucharest - Scientific Journal – Series: Mathematical Modeling in Civil Engineering*, 7(1-2): 224-232

Papers in Proceedings of Conferences

- Văcăreanu, R., Lungu, D., Radulian, M., Pavel, F., Iancovici, M., Arion, C. (2014). New Developments in Probabilistic Seismic Hazard Analysis for Romania. *Proceedings of the Second European Conference on Earthquake Engineering and Seismology (2ECEES)*, Istanbul, August 24-29, 2014, Paper no. 545
- Văcăreanu, R., Radulian, M., Iancovici, M., Pavel, F., Neagu, C. (2014). Fore-Arc and Back-Arc Ground Motion Prediction Model for Vrancea Intermediate-Depth Seismic Source. *Proceedings of the Second European Conference on Earthquake Engineering and Seismology (2ECEES)*, Istanbul, August 24-29, 2014, Paper no. 484
- Pavel, F., Văcăreanu, R., Cioflan, C. (2014). Directivity Effects of Strong Ground Motions from Vrancea Subcrustal Earthquakes. *Proceedings of the Second European Conference on Earthquake Engineering and Seismology (2ECEES)*, Istanbul, August 24-29, 2014, Paper no. 466
- Pavel, F., Văcăreanu, R., Aldea, A. (2014). Evaluation of GMPEs for Vrancea Intermediate-Depth Seismic Source. *Proceedings of the Second European Conference on Earthquake Engineering and Seismology (2ECEES)*, Istanbul, August 24-29, 2014, Paper no. 423
- Demetriu, S., Văcăreanu, R., Lungu, D., Pavel, F., Arion, C., Iancovici, M., Aldea, A., Neagu, C. (2014). Ground motion prediction equations for Vrancea intermediate-depth earthquakes. *Proceedings of the 9th International Conference on Structural Dynamics, EUROODYN 2014 Porto, Portugal, 30 June - 2 July 2014* A. Cunha, E. Caetano, P. Ribeiro, G. Müller (eds.) ISSN: 2311-9020; ISBN: 978-972-752-165-4, pp. 435 – 442
- Pavel F, Văcăreanu R, Neagu C, Arion C (2014) Probabilistic seismic hazard assessment for Romania. Part I: Selection of GMPEs. In: Vacareanu R, Ionescu C (eds) *Proceedings of the 5th National Conference on Earthquake Engineering & 1st National Conference on Earthquake Engineering and Seismology, CONSPRESS, Bucharest*, pp. 213-220.
- Aldea A, Văcăreanu R, Lungu D, Demetriu S, Pavel F (2014) Probabilistic seismic hazard assessment for Romania. Part II: Sensitivity analysis. *Proceedings of the 5th National Conference on Earthquake Engineering & 1st National Conference on Earthquake Engineering and Seismology, CONSPRESS, Bucharest*, pp. 221-228.
- Văcăreanu R, Lungu D, Aldea A, Demetriu S, Pavel F, Arion C, Iancovici M, Neagu C (2014) Probabilistic seismic hazard assessment for Romania. Part III:

- Seismic Hazard Maps. In: Vacareanu R, Ionescu C (eds) Proceedings of the 5th National Conference on Earthquake Engineering & 1st National Conference on Earthquake Engineering and Seismology, CONSPRESS, Bucharest, pp. 229-236.
- Văcăreanu, R., Pavel, F., Lungu, D., Iancovici, M., Demetriu, S., Aldea, A., Arion, C., Neagu, C. (2013). Uniform hazard spectra for cities in Romania. Proceedings of the International Conference on Earthquake Engineering SE-50 EEE, Skopje, Macedonia, Paper no. 164.
 - Văcăreanu, R., Lungu, D., Mărmureanu, G., Cioflan, C., Aldea, A., Arion, C., Neagu, C., Demetriu, S., Pavel, F. (2013). Statistics of seismicity for Vrancea subcrustal source. Proceedings of the International Conference on Earthquake Engineering SE-50 EEE, Skopje, Macedonia, Paper no. 138.
 - Pavel, F., Aldea, A., Văcăreanu, R. (2013). Near-field strong ground motion records from Vrancea earthquakes. Proceedings of the International Conference on Earthquake Engineering SE-50 EEE, Skopje, Macedonia, Paper no. 190.
 - Pavel, F., Văcăreanu, R., Arion, C., Neagu, C. (2013). Analysis of ground motions recorded in Bucharest during recent Vrancea earthquakes. Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics 2013 (VEESD 2013), Vienna, Austria, Paper no. 180.
 - Pavel, F., Văcăreanu, R. (2013). Some comments on the variability of strong ground motions from Vrancea earthquakes. Bauhaus Summer School in Model Validation and Simulation 2013 (MVS 2013), 5 - 16 August, Weimar, Germania. (accepted for publication)
 - Popa, V., Văcăreanu, R., Karadogan, F. (2013). Post-Earthquake Investigation and Seismic Evaluation of a Damaged RC Building in Van, Turkey. Paper no. 21-145. Proceedings, 10th International Conference on Urban Earthquake Engineering (10CUEE), Tokyo, Japan. 9 pp.
 - Demetriu, S., Văcăreanu, R., Pavel, F. (2013). Regression models for prediction of earthquake ground motion parameters. The 12th workshop of scientific communications, Department of Mathematics and Computer Science.
 - Văcăreanu, R., Lungu, D., Arion, C. (2012). Seismic fragility functions for masonry buildings in Romania, paper 1969. In 15th World Conference of Earthquake Engineering, 24-28 September 2012, Lisbon, Portugal. CD-ROM
 - Arion, C., Neagu, C., Văcăreanu, R., Calarasu, E. (2012). In Situ Investigation for Microzonation of Bucharest Surface Geology, paper 2034. In 15th World Conference of Earthquake Engineering, 24-28 September 2012, Lisbon, Portugal. CD-ROM
 - Erduran, E., Lang D., Lindholm, C., Dragos, T., Balan, S., Ionescu C., Aldea, A., Văcăreanu, R., Neagu, C. (2012). Real-Time Earthquake Damage Assessment in the Romanian-Bulgarian Border Region, paper 3945. In 15th World Conference of Earthquake Engineering, 24-28 September 2012, Lisbon, Portugal. CD-ROM
 - R. Văcăreanu, D. Lungu, A. Aldea, C. Arion, C. Neagu, F. Gaman, F. Petrescu, M. Aldea, 2011, Evaluarea pierderilor seismice directe asteptate utilizand SIG. Studiu de caz pentru municipiul Iasi. Conferinta nationala Ingineria Cladirilor, 29-30 septembrie 2011, ISBN 978-973-100-186-9, p. 155-162 (in Romanian)
 - R. Văcăreanu, Á. Szerző, 2011, Analiza probabilistică a nivelului de siguranță a unei structuri de tip cadru plan, Conferinta nationala Ingineria Cladirilor, 29-30 septembrie 2011, ISBN 978-973-100-186-9, p. 9-16 (in Romanian)
 - O. Păunescu, R. Văcăreanu, 2011, Evaluarea probabilistică a răspunsului seismic al unei structuri în cadre din beton armat cu regim mediu de înălțime, Conferinta

nationala Ingineria Cladirilor, 29-30 septembrie 2011, ISBN 978-973-100-186-9, p. 147-154 (in Romanian)

- Lungu D., Arion, C., Aldea A., Văcăreanu R., 2011. Seismic risk versus real estate risk for the Bucharest heritage buildings, TIEMS Annual Conference in Bucharest, Romania 7th - 10th June 2011, <http://www.tiems.info/tiems-events-2009/tiems-2010.html>
- Văcăreanu R., A. Aldea, C, Arion, D. Lungu, 2011. National Centre for Seismic Risk Reduction and Japan International Cooperation Agency Technical Cooperation Project in Romania. TIEMS Annual Conference in Bucharest, Romania 7th - 10th June 2011
- Aldea, D. Lungu, Văcăreanu R., C, Arion, 2011. Need for regional harmonization of Vrancea seismic hazard. TIEMS Annual Conference in Bucharest, Romania 7th - 10th June 2011

November 2015

Prof. Radu Văcăreanu, Ph.D.