Daniele Zulli - Curriculum vitae

Summary

Daniele Zulli is Associate Professor at University of L'Aquila (Italy), member of the Department of Civil, Construction-Building and Environmental Engineering (DICEAA). His scientific interests belong to the area of *Structural Mechanics*.

He teaches *Statics of Structures* for B.S. students in Civil and Environmental Engineering and *Computational Structural Mechanics* for M.S. students in Civil Engineering at University of L'Aquila.

The research activity topics are nonlinear dynamics and elastic stability of structural systems, with particular interest in geometrically-nonlinear structures. He is author of about thirty papers for International Journals, a scientific book and more than forty presentations in National and International Conferences.

General Information

- Born 28/07/1976, Atri (TE), Italy;
- Nationality: Italian;
- Gender: Male;
- Office address: DICEAA - via Giovanni Gronchi 18, 67100 L'Aquila, Italy;
- Email: `daniele.zulli@univaq.it`
- Languages: Italian (mother tongue), English (fluent), Modern Greek (basic).

Academic background and Position

2018- Associate Professor in *Structural Mechanics* at University of L'Aquila (Italy);

2017 National Academic Qualification as Associate Professor in *Structural Mechanics*;

2012-2018 Assistant Professor in *Structural Mechanics* at University of L'Aquila (Italy);

2006-2010,2011-2012 Post-doc fellow in Structural Mechanics at University of L'Aquila;

2005-2006 Term work contract in Structural Mechanics at University of L'Aquila;

2005 PhD in *Mathematical and Physical Models for Engineering* at University of L'Aquila;

2001 M.S. in Civil Engineering at University of L'Aquila cum laude.

Research areas

Nonlinear dynamics of slender structures; elastic stability; bifurcation and post-critical analysis; perturbation methods; passive control of vibrations; aero-elasticity; beams with deformable cross section; rigid-block dynamics.

Main Research topics

- *Vibration control of structures via added devices*: 1) modification and extension of classical perturbation methods to consider essentially nonlinear passive control devices like nonlinear energy sinks; 2) analysis of finite and infinite d.o.f. structures with nonlinear energy sink; 3) different internal and external resonance conditions;

- *Perturbation methods to analyze multiple bifurcations of dynamical systems*: 1) dynamical systems undergoing zero/Hopf bifurcations; 2) transition conditions to higher codimension bifurcations like double zero-Hopf bifurcation;
- *Dynamics of cables*: 1) beam-cable model formulation to fully take into account aerodynamic forces; 2) interaction of the aerodynamic forces with external and parametric excitation in stay cables; 3) classification of the nonlinear response for different resonance conditions;
- *Tall buildings under aerodynamic forces*: 1) formulation of a homogeneous beam model for a shear-type multi-story frame; 2) bifurcation analysis in different resonance conditions; 3) interaction among different sources of excitation;
- *Dynamics of beams*: 1) nonlinear model formulation and response analysis of curved beams and planar arches; 2) experimental verification and comparison with numerical models;
- *Rigid block dynamics*: 1) three-dimensional rigid block rocking on moving support; 2) classification of the dynamics and comparison with classical two-dimension models;
- *Bistable devices for energy harvesting purposes*: 1) Analysis of the slow-fast dynamics of bistable devices; 2) perturbation method to separate the slow and fast contributions of the response;
- *Beams with deformable cross section*: 1) homogeneous model formulation to take into account ovalization and warping; 2) stability analysis; 3) use of structural foam as core for pipe beams for improving the performance; 4) homogeneous models for multi-layered beams.

Conference and Mini-symposia organization

- Local Organizing Committee for *GIMC 2002, Third Joint Conference of Italian Groups of Computational Mechanics and Ibero-Latin American Association of Computational Methods in Engineering, XIV Italian Congress of Computational Mechanics*, held in Giulianova (TE), Italy, 06/2002;
- Local Organizing Committee for *IOMAC 2009, International Operational Modal Analysis Conference*, held in Portonovo (AN), Italy, 05/2008;
- Local Organizing Committee for *EVACES 2011, Experimental Vibration Analysis for Civil Engineering Structures*, held in Varenna (LC), Italy, 10/2011;
- Local Organizing Committee for *EUROMECH Colloquium 562, Stability and control of nonlinear vibrating systems*, held in Sperlonga (LT), Italy, 05/2015;
- Mini-symposium *Computational Methods for Structural Dynamics and Vibration Problems* at *CMM 2017, 22nd International Conference on Computer Methods in Mechanics*, held in Lublin (Poland), 09/2017.

Editorial Board Membership

- Issue Editor for *Continuum Mechanics and Thermodynamics* (Springer, ISSN: 0935-1175 (Print) 1432-0959 (Online)) entitled "Nonlinearities, Bifurcation and Instabilities", Volume 27, Issue 4-5, Sept. 2015;
- Editorial Board of *Journal of Civil Engineering and Architecture Research*, Ethan Publishing Company, ISSN:2333-911X (Print), ISSN:2333-9128 (Online).

Reviewer activity

- International Journals: Nonlinear Dynamics; International Journal of Non-linear Mechanics; Journal of Sound and Vibration; Journal of Vibration and Control; Meccanica; Chaos, Solitons & Fractals; Physica D: Nonlinear Phenomena; European Journal of Mechanics - A/Solids; Mechanical Systems and Signal Processing; Bridge Engineering; Applied Mathematical Modelling; Journal of Vibration and Acoustics; Mathematical Problems in Engineering; Structural Control and Health Monitoring;
- Research Projects:
  - Reviewer of Proposals submitted to FONDECYT-Chilean National Science and Technology Commission;
  - Reviewer of Proposals submitted to Polish National Science Centre (Narodowe Centrum Nauki).

Scientific Society Membership

- EUROMECH - European Mechanics Society;
- SISCo - Italian Society of Structural Mechanics;
- AIMETA - Italian Association of Theoretical and Applied Mechanics;
- Engineer Register of the Country of Teramo (Italy).

Doctoral Board Membership

2018 Member of the PhD Final Defense Evaluation Board for the XXX Course, PhD Program "Mathematics and Models" (Univ. L'Aquila);

2016- Sub-chair of the PhD Board for the *Civil and Environmental Engineering Curriculum* in the PhD Program "Civil, Construction-Building and Environmental Engineering" (Univ. L'Aquila);

2015 Member of the PhD Evaluation Board for the access to the XXXI Course, PhD Program "Civil, Construction-Building and Environmental Engineering" (Univ. L'Aquila);

2014- Member of the Scientific Board of the PhD Program "Civil, Construction-Building and Environmental Engineering" (Univ. L'Aquila).

Advanced and International Courses

- Course *Linear Dynamics (A3)* (20 hours) in Master Course in "Seismic Engineering" University of L'Aquila, 2006/07 and 2010/11;
- Lecture *One-dimensional tubular beam with possibility of ovalization: applications* in the Advanced Course "Mathematical Models of Beams and Cables", PhD Program in Civil, Chemical and Environmental Engineering at University of Genoa, February 2014;
- Lecture *Numerical Methods in Bifurcation Analysis* in the Advanced School "GADeS 2017 Summer School", organized by the Aimeta Group of Dynamics and Stability, Savona (Italy), July 2017;
- Course *Modelling of Mechanical systems - Selected Problems* (30 hours) in "International PhD study in mechanics" at Lublin University of Technology (Poland), March 2018;
- Course *Linear dynamics of Strings and Beams* (30 hours) for M.S. students in "Mechanical Engineering" at Lublin University of Technology (Poland), March 2018;

Invited Seminars and Keynotes

- Seminar *Random vibrations: some examples* for the International Master "Analysis and Control of Vibrations in Civil and Industrial Application" organized by Rome University "Sapienza", 2003;
- Seminar *Perturbation methods for weak nonlinear differential equations* for the International Master "Analysis and Control of Vibrations in Civil and Industrial Application" organized by Rome University "Sapienza", 2003 e 2004;
- Seminar *Dynamics of a 3D beam under modification of the initial curvature*, at the Department of Architecture, Constructions and Structures at Polytechnical University of Marche in Ancona (Italy), December 2005;
- Seminar *A Curved Cable-Beam model for the Analysis of Galloping* for the Starting Ceremony of the International Courses at University of L'Aquila, November 2006;
- Seminar *A Nonlinear Model of Curved Beam for the Analysis of Galloping in Suspended Cables* at ENTPE-Lyon (France), January 2009;
- Seminar *Vibration in structures* organized by the Engineer Register of the Country of Teramo, Teramo (Italy), April 2017;
- Keynote *Nonlinear dynamics of continuous and discrete models of tall buildings* at the 9th International Conference on Computational Methods (ICCM2018), Rome (Italy), August 6th - 10th, 2018.

Visiting Fellowship

Visiting researcher at "Institute of System Dynamics and Control Theory - Siberian Branch of the Russian Academy of Sciences", Irkutsk (Russia), in the framework of the European Commission granted INTAS project 2007/08 (June 2008).

Research Projects

2007-2008 International Project "Advances in Stability Theory with Mechanical Applications" involving Italy, France, Russia, granted by European Commission - INTAS - SBRAS 2006 - 06-1000013-9019 (Participant);

2005-2006, 2007-2009 National Project "FenDiS - Structural Dynamics Phenomena" granted by the Italian Ministry of University (Participant);

2010-2012 National Project "Dynamics, Stability and Control of Slender Structures" granted by the Italian Ministry of University (Participant).

Academic activity linked to the land

- Participation to the health monitoring experimental campaign organized by the Nonlinear Dynamics Laboratory of the Department of Structural, Hydraulic and Soil Engineering (DISAT) of University of L'Aquila:
  - Minerva Medica Temple in Rome (2002);
  - Bridges of property of the Teramo County (2006-07);
  - Bell tower of Duomo di Atri (TE) (2008);
  - Highway A28 bridge on the Meduna river, Pordenone, with Autovie Venete S.p.A. and University of Udine (2010);
- Participation to the scientific group for evaluation of the seismic vulnerability of the buildings of the University of L'Aquila (2017);

- Participation to the scientific group for preliminary studies for the seismic assessment of the "Palazzo delle finanze" in Rome, XX Settembre Street, 97 (2018).

Teaching activity

2013- *Statics of Structures* for B.S. in Civil and Environmental Engineering at University of L'Aquila;

2018- *Computational Mechanics of Structures* for M.S. in Civil Engineering at University of L'Aquila (in collaboration with prof. F. dell'Isola);

2002- Exercises and complements in *Dynamics of Structures* for M.S. in Civil Engineering at University of L'Aquila;

2013-2014 *Complements of Equilibrium Stability and Limit Analysis* for B.S. in Civil and Environmental Engineering at University of L'Aquila;

2014-2015 *Didactics of Structural Mechanics* in the Qualifying Period for High School Teachers (T.F.A.) at University of L'Aquila;

2009-2012 Exercises and complements in *Bifurcation Theory* for M.S. in Mathematical Engineering at University of L'Aquila;

2009-2012 Exercises and complements in *Statics of Structures* for B.S. in Civil and Environmental Engineering at University of L'Aquila;

2002-2015 Exercises and complements in *Solid Mechanics* for B.S. in Industrial Engineering and Civil and Environmental Engineering at University of L'Aquila.

Thesis supervision

2013 "A homogeneous model of shear-beam for the dynamic analysis of multi-story buildings", M.S. Thesis in Civil Engineering at University of L'Aquila, candidate L. Leonzi.

Academic Organization activity

2014- Member of the Academic Board for Orienting Activity for incoming students (Univ. L'Aquila);

2013-2015 Member of the Academic Committee for Revision of the Teaching Activities (Univ. L'Aquila);

2014-2015 Member of the Academic Committee for European Researcher's Night (Univ. L'Aquila);

2014-2016 Member of the Department Committee for the Research Activity Dossier (S.U.A. R.D., DICEAA, Univ. L'Aquila);

2014 Member of the Evaluation Board for the Qualifying Period for High School Teachers (T.F.A., Univ. L'Aquila).

L'Aquila, Italy

September 4, 2018

Daniele Zulli