

## ANDREA MICHELETTI

Assistant Professor, PhD

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### EDUCATION

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**September 2003** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
PhD in Structural Engineering - Advisor: Paolo Podio-Guidugli, Co-advisor: William O. Williams – Title of the thesis: "Tensegrity Towers"

**December 1999** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
"Laurea" Degree in Civil Engineering - Title of the Thesis: "Deployable Structures Which Find an Equilibrium Placement"

**January 1998 - June 1998** **École Nationale des Ponts et Chaussées (ENPC), Paris, France**  
Exchange student in the Civil Engineering Program

### CURRENT POSITION

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**November 2010** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Assistant Professor in Strength of Materials – Structural and Solid Mechanics

### FORMER POSITIONS

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**December 2006 - June 2008** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Research contract - Title: "Micromechanics of Materials, Models for Thin Structures".

**April 2005 - March 2006** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Collaboration contract - Topics: Tensegrity systems; design of a *tensegrity footbridge*; theoretical and experimental characterization of various cements for use with vertebroplasty; classical problems on the elastic half-space.

**March 2004 - June 2004** **Carnegie Mellon University, US – Department of Mathematical Sciences**  
Visiting Scholar – Collaboration with William O. Williams – Topic: Form-finding of tensegrity systems.

**July 2003 - January 2004** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Research contract - Title: "Statics and Dynamics of Thin Structures".

### GRANT/CONTRACT

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**2009-2011** **Civil Engineering Dept. – Univ. of Rome 'TorVergata',**  
With P.Podio-Guidugli, V. Nicotra **in collaboration with Kayser Italia srl**  
and, as a consultant, A.G. Tibert **Funded by European Space Agency (ESA)**  
Project Title: "Large aperture deployable systems" - Design concept and prototype testing for a deployable tensegrity system to unfurl a mesh reflector in space - ESA project ITT/AO-1-6037/09/F/VS (LET-SME 2009)

### TEACHING

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**2010-2011** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Teaching assignment – Course: "Strength of Materials" (One-dimensional and three-dimensional theories of linearly elastic rods)

**2008-2009, 2009-2010** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Teaching contracts – Course: "Strength of Materials" (One-dimensional and three-dimensional theories of linearly elastic rods)

**2006-2007** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Teaching contract – Course: "Strength of Materials 2" (Prestressed structures and tensegrity systems)

**2002 - 2005**  
Teaching assistant for the courses of Mechanics of Solids and Strength of Materials

**2000 - 2001**  
Teaching assistant for the course of Reinforced Concrete and Steel Design

### ADVISING

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**2010-2011** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
Currently advising two students on their MS Theses: Mattia Zanon on membrane roofs; Luca Magliozzi on origami structures.

**2010** **University of Rome 'TorVergata', Italy – Civil Engineering Department**  
MS Thesis Co-advisor – Student: Davide Cadoni – Title: "Tensegrity Roofs"

BS Thesis Co-advisor – Student: Domenico D'Apote – Title: "Bistable Prestressed Systems"

BS Thesis Co-advisor – Student: Matteo Straccamore – Title: "Prestress in Cable-Nets"

**2008** **University of Catania, Italy – Department of Architecture and Urban Design**

PhD Thesis Co-advisor – Student: Giuseppe Ruscica – Title: "Extensible Tensegrity Systems, Shapes for an Adaptive Architecture"

**2007** **University of Florence, Italy – Department of Architecture Technologies**

PhD Thesis Co-advisor – Student: Lorenzo Zoli – Title: "Innovative Lightweight Technologies Applied to Temporary Architecture: the Hypothesis of Tensegrity Structures"

**2007** **University of L'Aquila, Italy – Department of Architecture and Urban Design**

MS Thesis Co-advisor – Student: Cristina Di Pasquale – Title: "Temporary Building: Design of a First-aid Hospital Using Tensegrity Technology"

**2006** **University of Rome 'TorVergata', Italy – Civil Engineering Department**

BS Thesis Advisor – Student: Davide Cadoni – Title: "Tensegrity Systems: Design of a Conical Tower"

**2003** **University of Rome 'TorVergata', Italy – Civil Engineering Department**

MS Thesis Co-advisor – Student: Antonio Silvestrini – Title: "Dynamics of a Three-dimensional Tensegrity System"

**2002** **University of Rome 'TorVergata', Italy – Civil Engineering Department**

MS Thesis Co-advisor – Student: Livio Ponzi – Title: "A Tensegrity Footbridge in TorVergata Campus"

**2001** **University of Rome 'TorVergata', Italy – Civil Engineering Department**

MS Thesis Co-advisor – Student: Giuseppe Verri – Title: "Tensegrity Structures: Design of the Typical Node"

#### PARTICIPATION IN RESEARCH PROJECTS

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**2006-2009** **University of Rome 'TorVergata', in collaboration with other universities**

Four participations to the "Young Researchers Project", yearly funded by the National Group of Physics and Mathematics (GNFM).

2009 - Title: "Mathematical Modeling of Artificial and Natural Material Structures" - Director: Giuseppe Tomassetti

2008 - Title: "Physical-Mathematical Modeling of Electro-Active Continua" - Director: Luciano Teresi

2007 - Title: "Multifield Models for Microstructured Materials, Ferromagnets and Nematic Liquids" - Director: Giuseppe Tomassetti

2006 - Title: "Material Reorganization and Microstructures in Polymeric and Ferromagnetic Materials" - Director: Luciano Teresi

**2005** **University of Rome 'TorVergata', in collaboration with other universities**

Participation to the Italian Research Project (PRIN2005)

Title: "Mathematical Models for Material Science" - Director of the local unit: Paolo Podio-Guidugli

**2002** **University of Rome 'TorVergata', Italy**

Participation to the "University Research Project"

Title: "Analysis and Design of Tensegrity Structural Systems" - Director: Paolo Podio-Guidugli

**September 2001 - July 2002** **University of Rome 'TorVergata', Italy**

"Young Researchers 2001 Project"

Title: "Exploiting Tensegrity Systems as Deployable Structures" – Director: Andrea Micheletti

#### CONFERENCE ORGANIZATION

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**March 2007** **Brixen, Italy**

Secretary of the Symposium "Mathematical Modeling, Mechanics and Materials" – Mid-term meeting of the Italian Research Project (PRIN2005) on "Mathematical Models for Material Science", with international invited speakers.

#### MEMBERSHIP

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**2006-2010** **National Group of Mathematical Physics, Italy**  
(Area: Continuum mechanics, solids)

#### INTERNATIONAL JOURNAL REVIEWS

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- Computer and Structures
- Engineering Structures
- International Journal of Solids and Structures
- International Journal of Space Structures
- Mechanics Research Communications

#### INFORMATICS

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- Matlab programming (large displacements analysis of structures, simulation of dynamical systems, form-finding methods)
- Sap, AutoCAD, CorelDraw, Microsoft Office
- Latex

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#### REFEREED JOURNAL PAPERS

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A. Favata, A. Micheletti, P. Podio-Guidugli, "On Shear and Torsion Factors in the Theory of Linearly Elastic Rods", Journal of Elasticity, Vol. 99, no. 2, pp. 203-210, **2010**.

A. Micheletti, "Generalized Reciprocal Diagrams for Self-stressed Frameworks", International Journal of Space Structures, Vol. 23, no. 3, pp. 153-166, **2008**.

A. Micheletti, W.O. Williams, "A Marching Procedure for Form-finding for Tensegrity Structures", Journal of Mechanics of Materials and Structures, Vol. 2 no. 5, pp. 857-882, **2007**.

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#### FULL LENGTH CONFERENCE PAPERS

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G.Ruscica, A. Micheletti, A. Pizzigoni, "Tensegrity Systems: form Didactical Tasks to Innovative Marketing Proposals", Proceedings of IASS Symposium 2010, Spatial Structures – Temporary and Permanent, 8-12 November 2010, Shanghai, China, **2010**.

A. Micheletti, "Reciprocal diagrams and stress control of tensegrity systems", Proceedings of IASS-IACM 2008, 6th International Conference on Computation of Shell and Spatial Structures, Session: Advances in the Optimization and Form-finding of Tensegrity Structures, 28-31 May 2008, Ithaca, NY, US, **2008**.

A. Micheletti, "Geometrical Form-Finding of Tensegrity Modules with Orthogonal Struts", Proceedings of IASS Symposium 2007, Shell and Spatial Structures, Structural Architecture, Toward the future looking to the past, 3-6 December 2007, Venice, Italy, **2007**.

A. Micheletti, W.O. Williams, "Shape-Change of Tensegrity Systems by Controlling Edge-Lengths", Proceedings of IASS Symposium 2007, Shell and Spatial Structures, Structural Architecture, Toward the future looking to the past, 3-6 December 2007, Venice, Italy, **2007**.

S. Stucchi, A. De Laurentis, A. Micheletti, F. Santangelo, A. Totaro, "Tensegrity Units for a Movable Settlement", Proceedings of Adaptables 2006, Eindhoven, The Netherlands, vol. 2, pp. 95-99, July **2006**.

A. Micheletti, "Modular Tensegrity Structures, the TorVergata Footbridge", Proceeding of the 2nd International Conference on Footbridges, Venice, December **2005**.

A. Micheletti, "The Indeterminacy Condition for Tensegrity Towers – A Kinematic Approach", Proceedings of Colloquium Lagrangianum, Tensegrity Structures: Analysis and Design, Rome, May **2001**, published in Revue Française de Génie Civil, 7, 2003.

A. Micheletti, "Simple Analytical Models of Tensegrity Structures ", Proceedings of the First Colloquium Lagrangianum, Taormina, Italy, December **2000**, Published in: Novel Approaches in Civil Engineering, edited by M. Fremond and F. Maceri, Springer, 2004.

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#### OTHER PUBLICATIONS AND REPORTS

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A. Micheletti, G. Tomassetti, "Lectures Notes on the Theory of Elastic Plates" (in Italian), internal report, Civil Engineering Dept., University of Rome 'Tor Vergata', July **2006**.

A. Micheletti, "Tensegrity Towers", PhD Thesis (in Italian), Civil Engineering Dept., University of Rome 'TorVergata', June **2003**.

A. Micheletti, P. Podio-Guidugli, S. Stucchi, "An *Arch* for the TorVergata University in Rome" (in Italian), L'Industria delle Costruzioni, NO. 359, pp. 72-74, September **2001**.

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#### WORKING PAPERS

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D. Cadoni, A. Micheletti, "An Extended Cocoon Method for Form-Finding of Single-Layer Floating-Compression Tensegrity structures"

S. Guest, A. Micheletti, "A Bistable Tensegrity System"

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#### CONFERENCE AND SEMINAR PRESENTATIONS

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**November 2010**

**Shanghai, China**

"IASS Symposium", Spatial Structures – Temporary and Permanent

Title of the talk: "Tensegrity Systems: form Didactical Tasks to Innovative Marketing Proposals"

**September 2010**

**UNC Charlotte, NC - USA**

Seminar at MEES

Title of the talk: "Tensegrity Systems for Variable Geometry Applications"

**September 2010**

**UNC Charlotte, NC - USA**

Seminar at COAA

Title of the talk: "A Perspective on Tensegrity Systems"

**April 2009**

**University of Rome 'TorVergata', Italy**

"Archiday", Forum University-Employment"

Title of the talk: "A Tensegrity Footbridge on TorVergata Campus"

**May 2008** **Ithaca, NY, US**  
 "IASS-IACM 2008", Session: Advances in the Optimization and Form-finding of Tensegrity Structures  
 Title of the talk: "Reciprocal Diagrams and Stress Control of Tensegrity Systems"

**December 2007** **Venice - Italy**  
 "IASS Symposium", Structural Architecture, Towards the Future, Looking at the Past  
 Title of the talks: "Shape-change of Tensegrity Systems by Controlling Edge-Lengths",  
 "Geometrical Form-finding of Tensegrity Modules with Orthogonal Struts"

**November 2007** **Prague - Czech Republic**  
 Seminar of the Institute of Physics of the ASCR  
 Invited presentation: "Mechanics of Tensegrity Systems"

**July 2007** **La Vacquerie et Saint Martin de Castries - France**  
 "Tensegrity Workshop 2007"  
 Title of the talk: "Tensegrity Systems"

**June 2007** **Siracusa - Italy**  
 "6<sup>th</sup> Meeting on Unilateral Problems in Structural Analysis"  
 Title of the talk: "Stability and Form-Finding of Tensegrity Structures"

**December 2006** **Scilla (RC) - Italy**  
 "Colloquium Lagrangianum", 6<sup>th</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "On the Material Characterization of Cements for Percutaneous Vertebroplasty and Kiphoplasty"

**July 2006** **Eindhoven – The Netherlands**  
 "Adaptables 2006", International Conference on Adaptable Building Structures  
 Title of the talk: "Tensegrity Units for a Movable Settlement"

**December 2005** **Venice - Italy**  
 "Footbridge 2005", 2<sup>nd</sup> International Conference  
 Title of the talk: "The Tensegrity Footbridge at TorVergata University in Rome"

**December 2004** **Venice - Italy**  
 "Colloquium Lagrangianum", 5<sup>th</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "Dynamics of a Three-dimensional Tensegrity System"

**November 2004** **Montpellier - France**  
 "IASS2004", Theory, Design and Realizations of Shells and Spatial Structures  
 Poster Presentation: "Tensegrity Modules for Cable-Strut Systems", joint work with P. Podio-Guidugli and V. Nicotra

**November 2003** **Montpellier - France**  
 "Colloquium Lagrangianum", 4<sup>th</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "Modular Tensegrity Structures: The TorVergata Footbridge"

**November 2002** **Ravello (Na) - Italy**  
 "Colloquium Lagrangianum", 3<sup>rd</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "Analysis of Tensegrity Systems"

**May 2002** **Chia (Ca) - Italy**  
 "SIMAI 2002", 6<sup>th</sup> Congress of the Italian Society for Applied and Industrial Mathematics  
 Title of the talk: "Analysis of Tensegrity Structures"

**April 2002** **Como - Italy**  
 "3<sup>rd</sup> World Conference on Structural Control"  
 Title of the talk: "Minimal Tensegrity Towers"

**November 2001** **Mont Saint Michel - France**  
 Colloquium Lagrangianum, 2<sup>nd</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "On a Minimal Tensegrity Tower"

**May 2001** **Università degli Studi di Roma "Tor Vergata"**  
**Villa Mondragone, Monteporzio Catone (Roma) - Italy**  
 Colloquium Lagrangianum, "Tensegrity Structures: Analysis and Design" (Lagrange Laboratory – COFIN2000 – TMR1998)  
 Title of the talk: "The Indeterminacy Condition for Tensegrity Towers"

**December 2000** **Palazzo dei Duchi di S. Stefano, Taormina (CT) - Italy**  
 Colloquium Lagrangianum, 1<sup>st</sup> meeting of members from "Lagrange Laboratory"  
 Title of the talk: "Simple Analytical Models of Tensegrity Structures"

- June 2006** CISM - International Center for Mechanical Sciences, Udine - Italy  
Summer school: "Classical and Advanced Theories of Thin Structures: Mechanical and Mathematical Aspects"
- September 2003** IMATI - Applied Mathematics and Informatics Technologies Inst. - Pavia - Italy  
Summer school: "Modeling, Control and Numerical Simulation of Smart Systems"
- September 2003** Ferrara - Italy  
"Aimeta 2003", special session: "Unusual Thin Structures"
- November 2002** Paris - France  
"Footbridge 2002", 1<sup>st</sup> International Conference
- October 2002** Milan - Italy  
"7<sup>th</sup> National Conference on Wind Engineering"
- October 2001** Nagoya - Japan  
"IASS2001" - Theory, Design and Realizations of Shells and Spatial Structures
- June 2000** CISM - International Center for Mechanical Sciences, Udine - Italy  
Course on: "Smart Structures"
- July 1999** CISM - International Center for Mechanical Sciences, Udine - Italy  
Course on: "Deployable Structures"