

# NGOC-SON NGUYEN

Post-Doctoral Fellow at INRIA Grenoble

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## RESEARCH INTERESTS

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My principal research interests lie in the field of mechanics of granular materials. They include

- (1) Computational mechanics
- (2) Numerical modeling and simulation using DEM (Discrete Element Method)
- (3) Multi-scale approach and homogenization technique
- (4) Shock dynamics and nonlinear wave propagation

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## EDUCATION

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<b>Ecole Centrale de Lyon</b>	France
Ph.D. in Civil Engineering	2009
Dissertation: Multi-scale approach for granular materials	
<b>Ecole Centrale de Lyon</b>	France
Master's degree in Civil Engineering	2006
<b>Da Nang University of Technology</b>	Vietnam
<b>Hanoi National University of Civil Engineering</b>	Vietnam
Engineering degree in Civil Engineering	2005

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## HONORS and AWARDS

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<b>Post-Doctoral Fellowship</b>	2010 – present
French National Research Agency	
<b>Ph.D. Fellowship</b>	2006 – 2009
French Ministry of Higher Education and Research	
<b>Excellent Student Award</b>	2005
Hanoi National University of Civil Engineering	
<b>Undergraduate Scholarship</b>	
Da Nang University of Technology	2000 – 2002
Hanoi National University of Civil Engineering	2002 – 2005

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## RESEARCH EXPERIENCE

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<b>INRIA - National Institute for Research in Computer Science and Control</b>	Grenoble, France
Post-Doctoral Fellow with B. Brogliato and V. Acary	2010 – present
<i>Numerical modeling and simulation of shock dynamics in granular materials</i>	
<ul style="list-style-type: none"><li>• Modeling and simulating shock dynamics in granular materials, in particular, in chains of balls</li><li>• Analyzing the wave propagation in granular chains, and comparing numerical and experimental results</li><li>• Developing the Event-Driven simulation method for multi-body mechanical systems (granular systems included) with friction and shocks between bodies</li></ul>	

- Developing the SICONOS simulation software (<http://siconos.gforge.inria.fr>)

**LTDS - Laboratory of Tribology and System Dynamics** Lyon, France  
 Research Assistant with B. Cambou and H. Magoariec 2009 – 2010

- Developed a homogenization method for granular materials with a meso-scale at clusters of particles

Ph.D. Candidate with B. Cambou, H. Magoariec and A. Danescu 2006 – 2009  
*DEM numerical simulation and multi-scale approach for granular materials*

- Simulated granular materials using the PFC software (Particle Flow Code)
- Introduced a meso-scale at clusters of particles for granular assemblies
- Described the structure, and defined stress and strain fields at the meso-scale
- Analyzed the heterogeneity of the structure, and of the stress and the strain fields
- Analyzed the local behavior of granular materials at the meso-scale

Master Intern with B. Cambou June – September 2006

- Modeled the particle shape in the numerical simulation of granular materials using the PFC software

## TEACHING EXPERIENCE

**Teaching assistant at Ecole Centrale de Lyon** 2009 – 2010

Tutorials: Soil Mechanics

Lab Works: Stress measurement technique with photoelasticity, strain gauge measurement technique, hyperstatic frames, triaxial compression and shear tests on granular samples, Atterberg's limits tests for soils

## RELATED SKILLS

### Language

French: fluent

English: advanced

### Computer

DEM Softwares: PFC, SICONOS

Programming Languages: C++ , MATLAB, MAPLE, MATHEMATICA

Operating Systems: WINDOWS, LINUX

Document Preparation: MICROSOFT OFFICE, LATEX

Collaboration Software: SVN

## PUBLICATIONS and PRESENTATIONS

### Journal Articles

[1] **Nguyen N.S.**, Brogliato B.: Shock dynamics in granular chains: numerical simulations and comparison with experimental tests. *Granular Matter*, **14**(3), pp. 341–362, 2012

[2] **Nguyen N.S.**, Magoariec H., Cambou B.: Local stress analysis in granular materials at a meso-scale. *International Journal for Numerical and Analytical Methods in Geomechanics*, DOI: 10.1002/nag.1063, 2011.

[3] **Nguyen N.S.**, Magoariec H., Cambou B., Danescu A.: Analysis of structure and strain at the meso-scale in 2D granular materials. *International Journal of Solids and Structures*, **46**(17), pp. 3257–3271, 2009.

### Articles Submitted or in Preparation

- [4] **Nguyen N.S.**, Magoariec H., Cambou B.: Analysis of the local behaviour in granular materials. *Submitted in January 2012 for a book entitled "New trends in engineering mechanics" edited by Professor P.-Y. Hicher and published in American Society of Civil Engineers*
- [5] **Nguyen N.S.**, Brogliato B.: Shock dynamics in dissipative granular chains: A review of multiple impact laws. *In preparation*

### Refereed Conference Papers

- [6] **Nguyen N.S.**, Zhang H., Brogliato B.: Multiple impacts with friction in the rocking block and tapered chains. *In proceeding of 7th European Nonlinear Dynamics Conference - Enoc 2011, Rome, Italy, 24 –29 July 2011*
- [7] **Nguyen N.S.**, Magoariec H., Danescu A.: Strain - structure relationship at meso-scale for 2D granular materials. *In proceeding of Powders and Grains 2009 Conference, Golden, Colorado, USA, 13 – 17 July 2009*

### Presentations in International Conferences and Workshops

- [8] **Nguyen N.S.**, Brogliato B. : Comparison of impact laws on a simple granular chain. *Euromech colloquium 514: New trends in Contact Mechanics, Cargese, France, 27 – 31 March 2012*
- [9] **Nguyen N.S.**, Magoariec H., Cambou B.: On the definition of stress at a meso-scale in 2D granular materials. *Poster in 22th ALERT Geomaterials Workshop - Alliance of Laboratories in Europe for Research and Technology, Aussois, France, 3 – 5 October 2011*
- [10] **Nguyen N.S.**, Brogliato B.: The dynamics of tapered chains: comparisons between simulations and experimental results. *Euromech Colloquium 516: Nonsmooth contact and impact laws in mechanics, Grenoble, France, 6 – 8 July 2011*
- [11] **Nguyen N.S.**, Danescu A., Magoariec H., Cambou B.: On a physically relevant meso-scale for macroscopic modelling of granular assemblies. *Inaugural International Conference of the Engineering Mechanics Institute - EM08, Minneapolis, Minnesota, USA, 18 – 21 May 2008*

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## REFERENCES

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### **Bernard Brogliato**

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