

# Luigi E. Perotti

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## EDUCATION

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- M.S. Mechanical Engineering**                      2005-2006  
California Institute of Technology  
GPA: 4.0/4.0
- M.S. Civil Engineering**                              1998-2004  
Politecnico di Milano, Milan, Italy  
Thesis title: "Deterioration of Concrete Dams: Causes, Modeling and Parameters Identification"  
Thesis Grade: 100/100 summa cum laude  
Overall GPA: 29.4/30  
Major in Structural Engineering

## RESEARCH EXPERIENCE

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### **Graduate student**

*June 2006 - present, California Institute of Technology, Pasadena, California.*

Development of a new 3D finite element for thin plates and shells based on the diamond element approximation scheme.

Investigation of the response of fiber composite sandwich structures subjected to underwater explosions. Application of the Maximum Entropy interpolation scheme (meshless method) to the analysis of plates and shells.

Advisor: Prof. M. Ortiz - Computational Solid Mechanics group.

### **Consultant Engineer**

*January 2005 - June 2005, Milan, Italy.*

Testing and validation of the finite element code Merlin: parallel computation, implicit/explicit dynamic analysis.

P.I. and developer of the finite element code *Merlin*: Prof. V. Saouma, University of Colorado at Boulder.

### **Researcher**

*May 2004 - December 2004, Politecnico di Milano, Milan, Italy.*

3D finite element analyses of dams affected by alkali aggregate reaction (AAR) or subjected to seismic loads.

Development, validation and parameter identification of a new constitutive model to analyze dams affected by AAR.

Development of a new program for mesh generation in finite element dam analysis.

Formulation of concrete dam thermal analysis.

P.I.: Prof. V. Saouma, University of Colorado at Boulder, Visiting Professor at Politecnico di Milano.

### **M.S. Student**

*September 2003 - May 2004, Politecnico di Milano, Milan, Italy.*

Computation of the stress state in an Italian dam affected by expansion due to alkali-aggregate reaction.

Advisor: Prof. G. Maier, Politecnico di Milano.

Coadvisor: Prof. V. Saouma, University of Colorado at Boulder, Visiting Professor at Politecnico di Milano.

## TEACHING EXPERIENCE

**Teaching Assistant**, Ae105 Aerospace Engineering (Prof. P. Dimotakis, Dr. M. Watkins).  
*September 2006 - June 2007, Graduate Aeronautical Laboratories, California Institute of Technology.*  
Duties included: holding student office hours, grading homework and exams, facilitating communication between students and professors.

## PROFESSIONAL EXPERIENCE

### **Structural Engineer**

*February 2005 - July 2005, Redesco Structural Engineering, Milan, Italy.*  
Tasks: structural design of concrete-steel mixed buildings, design of bridge's shoulders in seismic zone.

## PUBLICATIONS

### **Reviewed Journals**

- ◇ V. Saouma, L. Perotti, T. Shimpo: "Stress analysis of concrete structures subjected to alkali-aggregate reactions". American Concrete Institute, Structural Journal, Vol. 104, No. 5, pp. 532-541, Sept-Oct 2007.
- ◇ V. Saouma, L. Perotti: "Constitutive model for alkali-aggregate reactions". American Concrete Institute, Materials Journal, Vol. 103, No. 3, pp. 194-202, May-June 2006.

### **Refereed Conference Proceedings**

- ◇ V. Saouma, L. Perotti: "Alkali Aggregate Reactions in Dams; Stress Analysis and Long Term Predictions". ASDSO Dam Safety Conference, New Orleans, Sept 2005.
- ◇ L. Perotti, T. El Sayed, R. Deiterding, M. Ortiz: "Response of fiber reinforced sandwich structures subjected to explosive loading". 9th International Conference on Sandwich Structures (ICSS 9), Pasadena, June 2010.

### **Thesis**

- ◇ M.S. Thesis: "Deterioration of Concrete Dams: Causes, Modeling and Parameters Identification". April 2004, Politecnico di Milano. Advisors: Prof. Giulio Maier. Coadvisor: Prof. Victor Saouma.

### **Technical Reports**

Several technical reports regarding the dynamic analysis of dams and the structural deterioration of concrete dams due to alkali-aggregate reaction have been submitted to Tokyo Electric Power Service Company, Centro Elettrotecnico Sperimentale Italiano (CESI, Italy) and the Swiss Federal Office of Geology and Water. These technical reports have been written in collaboration, among others, with professor Victor Saouma, University of Colorado at Boulder.

## HONORS AND AWARDS

### **Daniel and Florence Guggenheim Fellowship**

*Academic year 2005 - 2006, California Institute of Technology.*

### **Member, Professional Order of Italian Engineers**

*September 2005 - present.*

Selective countrywide examination is required for admission.

### **Departmental Scholarship, Structural Engineering**

*June 2004 - December 2004, Politecnico di Milano.*

### **Merit Scholarship**

*September 1998 - April 2004, Politecnico di Milano.*

## SELECTED COURSEWORK

**California Institute of Technology:** Methods of Applied Mathematics, Special Topics in Applied Mathematics, Computational Solid Mechanics, Computational Fluid Dynamics, Mechanics of Structures and Solids, Fluid Mechanics, Experimental Methods, States of Matter.

**Politecnico di Milano:** Linear Algebra and Analytical Geometry, Mathematical Analysis, Physics, Chemistry, Applied Chemistry, Rational Mechanics, Mechanics of Materials and Fracture Mechanics, Structural Mechanics, Structural Analysis and Design, Structural Analysis and Construction of Bridges.

## LANGUAGES

**Italian:** native language.

**English:** fluent, TOEFL and IELTS certificates, 2004.

**Spanish:** elementary.

**German:** basic, Z.D.a.F. certificate, 2000.

## COMPUTER SKILLS

Experienced in: MATLAB, C, C++, Mathematica, Tecplot, ParaView, LaTeX, Office, Windows, Linux.

## PERSONAL INTERESTS/HOBBIES

President of the Caltech Orienteering Club, 2007 - present.

Hiking, Floorball, Running, Scuba diving.