

# Curriculum Vitae

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## Personal information

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Born on the 28<sup>th</sup> of July 1970 in New York (USA).  
Italian and USA citizenship.  
Home address: via Balzico 1, 10137, Torino (Italy).  
Married with two children.

## Brief overview

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Marco Barla graduated as a civil engineer in 1996 and has pursued the PhD in geotechnical engineering in 1999 at the Politecnico di Torino, disserting a thesis on Tunnels in swelling ground - Simulation of 3D stress paths by triaxial laboratory testing, the principal adviser being Prof. Michele Jamiolkowski. At that time he was appointed to be the Italian delegate at the YGEC99 (Young Geotechnical Engineers Conference) held in Santorini, Greece 23-25 September 1999. After completing the PhD he was involved in the research activities at the Politecnico, serving as a Research Assistant first, then from 2003, he became Research Associate teaching Rock Mechanics to undergraduates of the I and II Faculty of Engineering. Today he teaches Numerical modelling in geotechnical engineering for Ms students of the Civil Engineering degree and Rock Mechanics for the Master in Petroleum Engineering.

From 2006 to 2012 he was the Vice Director of the DIPLAB Geomeccanica Laboratory of the Department and from 2010 to 2013 he was the commissioner for professional practice examination in Geotechnical Engineering in Torino.

He has been investigating the swelling behaviour of stiff clays with reference to tunnel excavation in the framework of tunnelling in difficult conditions, both from the experimental and theoretical point of view. This work brought to the development of a new triaxial testing procedure and a prediction method for designing tunnels in swelling ground. He has also studied the effects of clay swelling on pipe jacking. This was done in 2002, during a leave at the University of Cambridge (UK), in cooperation with the geotechnical group of Prof. Robert Mair.

The use of discontinuum numerical methods applied to geotechnical problems, such as slope stabilities and tunnel excavations, was investigated from 2006. The particle element method was used with success to predict the mechanical behaviour of partially cemented ground (e.g. Turin subsoil) both with reference to the stress strain behaviour of the Turin Metro shallow tunnels and to the applicability of trenchless technologies. In this framework, a new method was introduced, to be used at the design analysis stage to predict the jacking force, necessary to install pipelines by microtunnelling, as a function of the degree of cementation of the ground.

Recent research interests are on the rock mechanics aspects related to the development of geothermal energy as a renewable resource and on the use of the combined finite/discrete numerical method for slope stability analyses. The geothermal use of urban tunnels is also being investigated. By instrumenting the segmental lining the tunnel can become an energy geo-structure and be used to exploit heat from the ground with great economic and environmental benefits.

The latest important contribution was on the use of ground based radar interferometry for landslides monitoring. An integration procedure between GBInSAR monitoring and advanced numerical modelling has been introduced to allow for the GBInSAR to be used in emergencies and early warning systems of rock landslides. A new software was developed to interpret GBInSAR data and produce alarms based on user's defined critical thresholds.

He is responsible for research projects, contracts and consultancies at the Department and participated to a number of National Research projects (1997, 1999, 2001, 2006, 2009). He is author of a text book, of more than a hundred of scientific papers on international and national journals, on conference proceedings, as well as editor of conference proceedings. He regularly takes part to national and international conferences, also as an invited speaker or member of the Scientific Committee.

From 2001 to 2007 he served as Assistant Editor of the Rock Mechanics and Rock Engineering journal, in 2012 was Guest Editor for the ASCE International Journal of Geomechanics. He acts as a Referee for the ASCE Journal of Geotechnical and Geoenvironmental Engineering, for Rock Mechanics & Rock Engineering, for the ASCE International Journal of Geomechanics, for Geotechnique and for Tunnelling and Underground Space Technology.

He has been chair of national and international conferences, among with the 11<sup>th</sup> International Conference of Iacmag and the MIR conferences series in Torino.

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He is a member of AGI, Associazione Geotecnica Italiana, of the ISSMGE, International Society for Soil Mechanics and Geotechnical Engineering, of IACMAG, International Association for Computer Methods and Advances in Geomechanics and of EGS-A, Enhanced Geothermal System Association. From 2001 he is a member of the ISSMGE Technical Committee 209 (Underground construction in soft ground), from 2006 of the Iacmag Committee on Enhancing Membership and in 2009 entered Iacmag Board.

In 2005 he was bestowed of the Iacmag Award for the successful organisation of the 11<sup>th</sup> International Conference of Iacmag, in 2007 won the Best Paper Award in the topic "The path from characterization to modelling (T2)" at the 11<sup>th</sup> ISRM Congress with the paper "Setting up a new direct shear testing apparatus" and in 2011 won the 'IACMAG Excellent Contributions Award'.

Besides his research activity he also worked as a consultant for Geodes S.r.l. and Desa S.r.l. in Torino, and received assignments as an expert by the Turin Public Prosecutor's Office. Main professional projects were related to slope stability, tunnelling, sewage systems, foundations, monitoring of geotechnical structures and ground investigation. In 2013 he founded Resolving s.r.l., a Politecnico di Torino spin-off company which provide services in the field of tunnelling in difficult conditions and early warning monitoring of landslides, and is currently its technical coordinator.

### Education and qualification

2014	Italian qualification for Associate Professor.
1999	PhD in Geotechnical Engineering at the Politecnico di Torino. Thesis: "Tunnels in swelling ground – Simulation of 3D stress paths by triaxial laboratory testing".
1996	Qualification for engineering practice.
1996	Degree in Civil Engineering at the Politecnico di Torino. Thesis: "Scavo di una galleria in terreno sciolto: modellazione e riscontri (Shallow tunnel in loose soil: modelling and performance)".

### Awards

2011	Iacmag Excellent Contributions Award
2007	Best Paper Award in the topic "The path from characterization to modelling (T2)" at the 11 <sup>th</sup> ISRM Congress with the paper "Setting up a new direct shear testing apparatus".
2005	Iacmag Award for the organisation of the 11 <sup>th</sup> IACMAG Conference.

### Affiliations

Member of AGI, Associazione Geotecnica Italiana.  
 Member of ISSMGE, International Society for Soil Mechanics and Geotechnical Engineering.  
 Member of IACMAG, International Association for Computer Methods and Advances in Geomechanics Mechanics and Geotechnical Engineering.  
 Member of EGS-A, Italian Association for Enhanced Geothermal Systems  
 Member of the ISSMGE Technical Committee 204 (Underground construction in soft ground) from 2004.  
 Member of the Iacmag Committee on Enhancing Membership from 2006.  
 Member of the Iacmag Board from 2011.

### Teaching experience

2014-15	Regular teacher of: Numerical methods in geotechnical engineering, Civil Engineering, 8 credits in English. Lectures on Rock Mechanics for the Master in Petroleum Engineering in English. Supervisor of 10 Ms Thesis.
2013-14	Regular teacher of: Numerical methods in geotechnical engineering, Civil Engineering, 8 credits in English.

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Lectures on Rock Mechanics for the Master in Petroleum Engineering in English.  
Supervisor of 8 Ms Thesis and 1 PhD Thesis.

- 2012-13 Regular teacher of: Numerical methods in geotechnical engineering, Civil Engineering, 8 credits in English.  
Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Lectures on Rock Mechanics for the Master in Petroleum Engineering.  
Supervisor of 4 Ms Thesis and 1 PhD Thesis.
- 2011-12 Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Assistant: Rock Mechanics I and Numerical methods in geotechnical engineering, I Facoltà di Ingegneria, 5 credits (over a total of 10) in English.  
Lectures on Rock Mechanics for the Master in Petroleum Engineering.  
Supervisor of 1 Ms Thesis and 2 PhD Thesis.
- 2010-11 Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Assistant: Rock Mechanics II, I Facoltà di Ingegneria, 5 credits (over a total of 10) in English.  
Lectures on Rock Mechanics for the Master in Petroleum Engineering.  
Supervisor of 6 Ms Thesis and 2 PhD Thesis.
- 2009-10 Regular teacher of: Meccanica delle Rocce I, II Facoltà di Ingegneria, 5 credits.  
Assistant: Rock Mechanics II, I Facoltà di Ingegneria, 5 credits (over a total of 10) in English.  
Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Supervisor of 2 Ms Thesis and 2 PhD Thesis.
- 2008-09 Regular teacher of: Meccanica delle Rocce I, II Facoltà di Ingegneria, 5 credits.  
Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Supervisor of 3 Ms Thesis and 2 PhD Thesis.
- 2007-08 Regular teacher of: Meccanica delle Rocce I, II Facoltà di Ingegneria, 5 credits (student's evaluation = 3.8/4).  
Assistant: Rock Mechanics II, I Facoltà di Ingegneria, 5 credits (over a total of 10) in English.  
Lectures for the Master in Petroleum Engineering (7 hours).  
Tutor for the e-learning course (Teledidattica) Geotecnica (20 hours).  
Supervisor of 4 Ms Thesis and 2 PhD Thesis.
- 2006-07 Regular teacher of: Meccanica delle Rocce I, II Facoltà di Ingegneria, 5 credits (student's evaluation = 3.9/4).  
Assistant: Rock Mechanics II, I Facoltà di Ingegneria, 5 credits (over a total of 10) in English.  
Lectures for the Master in Petroleum Engineering (6 hours).  
Supervisor of 4 Ms Thesis and 2 PhD Thesis.
- 2005-06 Regular teacher of: Meccanica delle Rocce I, II Facoltà di Ingegneria, 5 credits (student's evaluation = 3.9/4).  
Regular teacher of: Meccanica delle Rocce II, II Facoltà di Ingegneria, 5 credits (student's evaluation = 3.9/4).  
Lectures for the Master in Petroleum Engineering (6 hours).  
Supervisor of 9 Ms Thesis.
- 2004-05 Regular teacher of: Meccanica delle Rocce II, II Facoltà di Ingegneria, 5 credits (student's evaluation = 3.8/4).  
Regular teacher of: Meccanica delle Rocce I, I Facoltà di Ingegneria (Sede di Alessandria).

Assistant: Meccanica delle Rocce, I Facoltà di Ingegneria.  
Lectures for the Master in Petroleum Engineering (6 hours).  
Supervisor of 12 Ms Thesis.

- 2003-04      Regular teacher of: Meccanica delle Rocce B, I Facoltà di Ingegneria, 5 credits.  
Assistant: Meccanica delle Rocce and Laboratorio di sintesi finale per allievi geotecnici, I Facoltà di Ingegneria.  
Lectures for the Master in Petroleum Engineering (2 hours).  
Supervisor of 8 Ms Thesis.
- 2002-03      Assistant: Meccanica delle Rocce A, Meccanica delle Rocce B and Laboratorio di sintesi finale per allievi geotecnici, I Facoltà di Ingegneria.  
Supervisor of 7 Ms Thesis.
- 2001-02      Assistant: Meccanica delle Rocce and Meccanica delle Rocce 2, I Facoltà di Ingegneria.  
Supervisor of 2 Ms Thesis.
- 2000-01      Assistant: Meccanica delle Rocce and Meccanica delle Rocce 2, I Facoltà di Ingegneria.  
Supervisor of 4 Ms Thesis.
- 1999-00      Collaborator: Meccanica delle Rocce 2, I Facoltà di Ingegneria.  
Supervisor of 2 Ms Thesis.
- 1998-99      Collaborator: Meccanica delle Rocce 2, I Facoltà di Ingegneria.  
Supervisor of 2 Ms Thesis.

### Professional and scientific activities

- 2013-to date      Founder of Resolving s.r.l., spin-off company of the Politecnico di Torino which provides services in the field of tunnelling in difficult conditions and early warning monitoring of landslides. Technical coordinator.
- 2012-to date      Member of the Academic Senate of the Politecnico di Torino.
- 2012-to date      Adjunct professor of Numerical Methods in Geotechnical Engineering
- 2006-to date      Research associate (Full position) in Geotechnical Engineering.  
Research activities on:
- *Geothermal heat from tunnel linings;*
  - *Landslides monitoring by ground based radar interferometry;*
  - *DEM numerical modelling of randomly distributed cemented ground to improve tunnel and microtunnelling design;*
  - *Tunnelling in difficult conditions (swelling and squeezing behaviours);*
  - *Deep-Seated Gravity Slope Deformation Movements;*
  - *Deep geothermal energy.*
- 2006-to date      Member of the Iacmag Committee on Enhancing Membership.
- 2006-to date      Referee for the international journals: "ASCE Journal of Geotechnical and Geoenvironmental Engineering", "Rock Mechanics & Rock Engineering", "Geotechnique", "Tunnelling and Underground Space Technology", "ASCE International Journal of Geomechanics", "Journal of pipeline engineering".

- 2004-to date      Member of the ISSMGE Technical Committee 28 (now 209): Underground Construction in Soft Ground
- 2010-2013      Responsible for Geotechnical Engineering Qualification Exams for engineering practice.
- 2012      Guest Editor of the Special Issue on Advances in Modeling Rock Engineering Problems of the ASCE International Journal of Geomechanics.
- 2006-2012      Vice Director and Responsible for the Rock Mechanics Sector of the DIPLAB Geomeccanica laboratory of the Dipartimento di Ingegneria Strutturale e Geotecnica.
- 2006      CTU (expert witness) for the accident occurred to the tunnels belonging to the Pietro Micca Museum in Torino on the 17/10/06.
- 2001-2006      Assistant Editor of the international journal Rock Mechanics & Rock Engineering edited by Springer Verlag, Wien-New York.
- 2003-2006      Research Associate (temporary position) in Geotechnical Engineering at the Dipartimento di Ingegneria Strutturale e Geotecnica, Politecnico di Torino.  
Research activities on:
- *DEM numerical modelling of randomly distributed cemented ground to improve tunnel and microtunnelling design;*
  - *Tunnelling in difficult conditions: swelling and squeezing behaviours, validation on case studies (San Donato and Caneva tunnels) and on a physical model of a new design method proposed;*
  - *Setting up of a new triaxial equipment to study hard soils and soft rocks under high confining stresses or at great depth;*
  - *Microtunnelling in fractured rock masses;*
  - *Pipe jacking in cohesive ground, studying the effect of different lubricating fluids by numerical and physical modelling;*
  - *Rock slope stability and rock fall;*
  - *Numerical modelling by FEM, FDM, BEM, DEM.*
- Responsible of the Rock Mechanics Sector of the DIPLAB Geomeccanica laboratory of the Dipartimento di Ingegneria Strutturale e Geotecnica.
- 1998-2003      Professional activity in geotechnical engineering as a private consultant at: GEODES s.r.l. – Torino and DESA s.r.l. – Torino. See Main professional projects.
- 2002      Visiting fellow at the University of Cambridge (U.K.), Department of Engineering, Geotechnical Group.  
*Cooperation with the team led by Prof. R.J. Mair on the swelling behaviour of pipe jacked tunnels in order to study the effect of different lubricating fluids by physical and numerical modelling.*
- 2000-2002      Research Assistant at the Dipartimento di Ingegneria Strutturale e Geotecnica, Politecnico di Torino.  
*Research activity on the swelling behaviour of the Caneva Clay by developing a design method for tunnels in swelling ground. Geotechnical characterisation of Clay Shales and study of their time dependence. DEM numerical modelling to the study of the stress strain behaviour of shallow tunnels excavated by EPB in loose ground characterised by randomly distributed cementation.*
- 1997-1999      PhD in Geotechnical Engineering.  
*Research activity on the swelling behaviour of the Caneva Clay with reference to tunnelling, developing a triaxial testing procedure to quantify the swelling potential. Laboratory testing at*

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*the Rock Mechanics and Soil Mechanics Laboratories of the Dipartimento di Ingegneria Strutturale e Geotecnica, Politecnico di Torino.*

- 1996-1997 Professional activity in geotechnical engineering as a private consultant at: GEODES s.r.l. – Torino. See Main professional projects.
- 1996-oggi Member of the Organizing Committee and/or Scientific Committee for a number of National and International Conferences.
- *World Tunnel Congress, 9-15 May 2014, Iguassu;*
  - *14<sup>th</sup> IACMAG conference, 22-25 September 2014, Kyoto;*
  - *13<sup>th</sup> IACMAG conference, 9-11 May 2011, Melbourne;*
  - *7<sup>th</sup> IS on Geotechnical aspects of underground construction in soft ground, 17-19 May 2011, Roma;*
  - *EUROCK '96 (ISRM International Symposium on Prediction and performance in Rock Mechanics and Rock Engineering), 2-5 september 1996, Torino;*
  - *11<sup>th</sup> IACMAG, Torino 19-24 June 2005;*
  - *IS TORINO '99 (Second International Symposium on Pre-failure deformation characteristics of geomaterials), 27-29 september 1999, Torino*
  - *MIR - Conferenze di Meccanica e Ingegneria delle Rocce series (editions 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012), Torino*

### **Main professional projects**

#### Slope stability, open pit mines:

- 2012 Buzzi Unicem. GBInSAR monitoring and assessment of the stability conditions of the Tetti di Tabanot quarry face and identification of the possible remedial measures to be adopted for risk mitigation.
- 2007 Municipality of Valenza Po (Al). Design of the stabilisation measures for the Rio Grana river bank. Stability analyses and design of retaining structures based on naturalistic engineering principles.
- 2004 Municipality of Valenza Po (Al). Preliminary design of the stabilisation measures for the provincial road Strada Citeria. Stability analyses and design of retaining structures.
- 2002 Municipality of Valenza Po (Al). Design of the stabilisation measures for the slope Bastioni di V. Rimini – zona Belvedere. Stability analyses and design of retaining structures.
- 1998 Alpetto open pit mine, Municipality of Cesana Brianza (Lc). Study of the final stabilisation of the slopes after the slide of 28–29 June 1997 and of the new exploitation areas A1 e A2. Analyses of the stability conditions. Collapse mechanism and design of the retaining wall by DEM modelling.
- 1997 Brenva glacier (Monte Bianco). DEM numerical analyses to simulate the 18<sup>th</sup> January 1997 rock fall.

#### Foundations, retaining structures, structures:

- 2014 Historic secondary school in Carmagnola (To). Structural real-time monitoring.
- 2012 Underground car park in Viale Vittorio Emanuele II n°68, Bergamo. Geotechnical consultant.
- 2001 Società Bonifiche Valle d'Aosta (Ao). Advice on the swelling behaviour of filling material (blast-furnace slug) for reinforced soil to be used on the ex-Cogne steel plant site.
- 1997 FF.SS Porta Susa (Torino) new train station. Design of shallow foundations.

#### Tunnelling and undergrounds cavities:

- 2012 Hydroelectric Tunnel Project, Kishanganga (India). Identification of the critical areas for TBM advancement and definition of guidelines to be adopted during construction.
- 2008 Microtunnelling, Caselle, Torino. Geotechnical characterisation of the subsoil conditions and design of a microtunnel installation for the upgrade of the sewer system at the “Sandro Pertini” International Airport.
- 2007 Sewer systems, San Mauro, Torino. CTU Assistant with reference to a fatal accident occurred during renewal of a pipeline by trench excavation in San Mauro Torinese.

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- 2006 Pietro Micca Tunnels, Torino. CTU with reference to an accident occurred in the historical tunnels of the Pietro Micca Museum due to works in the adjacent Porta Susa new train station construction site.
- 2002 New High Speed Railway Line Torino - Lyon, Italferr. Advice with reference to the preliminary design of the S. Didero - Settimo Torinese line (National Segment).
- 2000 Autosilo Trevipark, Padova (Pv). CTU Assistant with reference to a failure during the construction of an underground car park. Geotechnical characterisation, site investigation supervision, flow analyses.
- 2001 New High Speed Railway Line Torino - Lione, R.F.I. (Rete Ferroviaria Italiana). Advice with reference to the technical evaluation of the planned alignment S. Didero - Settimo Torinese.
- 1999-2001 Pont Ventoux Hydro electric scheme, Susa (To), AEM Torino. Advice with reference to the geotechnical aspects of the diversion tunnels and the underground power plant cavern during final design, construction and inspection.
- 2001 Linea 1, Metropolitana Automatica di Torino. Longitudinal geotechnical profile.
- 2000 New High Speed Railway Line Torino - Lione, Alpetunnel-GEIE. Geotechnical characterisation of the Carboniferous Formation of the Ambin with reference to the feasibility study of the railway base tunnel.
- 1997 Morgex (Ao) highway tunnel. FDM numerical analyses.

### Conferences and seminars

Chairman of Technical Session 3B at 13<sup>th</sup> Iacmag, Melbourne (Australia), 9-11 May 2011.

Panelist at 3<sup>rd</sup> Canada-US Rock Mechanics Symposium, 9-15<sup>th</sup> May 2009.

Selected paper presentation at 12<sup>th</sup> Iacmag, Goa (India), 1-6 October 2008. "Using particle elements to model the Torino subsoil mechanical behaviour to improve the applicability of microtunnelling technique" (18').

Chairman of Technical Session Topic 12 & 17 at 12<sup>th</sup> Iacmag, Goa (India), 1-6 October 2008.

Selected paper presentation at No Dig 2007, Rome, 10-12 September 2007. "Collection and analysis of case studies of microtunnelling installations" (15').

Invited paper at Euro:Tun 2007, Vienna, Austria, 27-29 August 2007. "Modelling the swelling behaviour in tunnels" (15').

Selected paper presentation at 11<sup>th</sup> ISRM Congress, Lisbon, 9-13 Luglio 2007. "Setting up a new direct shear testing apparatus." (15'). Best Paper Award.

Invited lecture at No Dig 2004, Hamburg, Germany, 15-17 November 2004. Session 6 (Case studies): "Analysis of Jacking Forces During Microtunneling in Limestone" (30').

Issue Paper presentation at 11<sup>th</sup> IC of Iacmag 2005, Torino, 19-24 June 2005. Session 9 (Surface and near surface geotechnical structures: foundations, pipes and tunnels): "Assessing design parameters for tunnelling in a cemented granular soil by continuum and discontinuum modelling" (30').

Italian delegate at the Young Geotechnical Engineers Conference (YGEC '99), Santorini (Greece), 23-25 September 1999.

Lectures at the Université Joseph Fourier, Grenoble (France), for the tunnelling course. January 2006 and January 2007.

Seminar at ETH, 23<sup>rd</sup> April 2013.

Participant with oral presentation to:

- 6<sup>th</sup> DEM conference, Golden, USA, 5-6<sup>th</sup> August 2013.

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- 12<sup>th</sup> ISRM International Congress on Rock Mechanics, Beijing, China, 18-21 October 2011.
- 13<sup>th</sup> Iacmag, Melbourne, Australia, 9-11 May 2011.
- Geotechnical challenges in megacities, Moscow, Russia, 7-10 June 2010.
- 3<sup>rd</sup> Canada-US Rock Mechanics Symposium, Toronto, Canada, 9-15<sup>th</sup> May 2009.
- Giornata in onore di Renato Ribacchi, Roma, 12 December 2007.
- 10<sup>th</sup> ISRM International Congress, Sandton, South Africa, 8-12 September 2003.
- IC on New Developments in Soil Mechanics and Geotechnical Engineering ZM2003, Lefkosa, Turkish Republic of Northern Cyprus, 29-31 May 2003.
- 2<sup>nd</sup> Flac symposium on Numerical Modeling in Geomechanics, Lyon (France), 29-31 October 2001.

Participant to a number of other seminars and national/international conferences, among which:

- XIII ECSMGE, Praga, 25-28 August 2003.
- XXI Convegno Nazionale di Geotecnica, L'Aquila, 11-13 September 2002.
- Euro Summerschool Tunnelling Mechanics, Innsbruck (Austria) 8-11 October 2001.
- 15<sup>th</sup> ICSMGE, Istanbul (Turchia), 27-31 August 2001
- International Conference on Response of building to excavation induced ground movements, London (U.K.), 17-18 July 2001.
- 10<sup>th</sup> IACMAG, Tucson (U.S.A.), 7-12 January 2001.
- GeoEng 2000, Melbourne (Australia), 16-24 November 2000.
- GeoBen 2000, Condizionamenti geologici e geotecnici nella conservazione del patrimonio culturale, Torino, 7-9 June 2000.
- Itasca training seminar, Lione (Francia), 26-28 April 2000.
- 9<sup>th</sup> ISRM International Congress, Parigi (Francia), 25-28 August 1999.
- 2<sup>nd</sup> International Symposium on The geotechnics of Hard Soils Soft Rocks, Napoli, 12-14 October 1998.
- IV Convegno Nazionale dei Ricercatori Universitari, Il modello geotecnico del sottosuolo nella progettazione delle opere di sostegno e degli scavi, Perugia 16 - 17 October 1997.
- "Applicazione del metodo degli elementi finiti in ingegneria geotecnica" (Ciclo di seminari), Politecnico di Milano, 2, 9 and 30 March 1998

#### **Research projects and contracts (responsible of):**

Research feasibility study "ENERTUN: Le gallerie metropolitane come fonte di energia geotermica". Polo di innovazione regionale Enemhy (12 months). Funding 39,900 €.

National research project PRIN 2009 "Monitoraggio mediante interferometria radar da terra e modellazione di grandi frane in roccia". 2011-2013 (24 months). Funding: 76,000 €.

Research contract "Hydro-mechanical behaviour of Opalinus clay specimens extracted from Mont Terri Research Laboratories in St. Ursanne, Switzerland". ETH, Switzerland. 2013-2015 (24 months). Funding: 73,000€.

Research contract "Determinazione del comportamento meccanico e dipendente dal tempo dei campioni di siltite provenienti dalla centrale idroelettrica di Rogun (Tagikistan)". Electroconsult, Italy. 2013 (12 months). Funding: 38,000€.

Research contract "Swelling pressure study on rock samples from Portillo tunnel". Hidroelectrica La Confluencia, Chile. 2014-2016 (24 months). Funding: 36,000€.

Contract "Monitoraggio del fabbricato di collegamento del complesso scolastico Liceo Majorana di via Frattini 11-15 a Torino". Provincia di Torino. 2013-2015 (24 months). Amount: 20,000€.

Research contract "Determinazione delle condizioni ottimali di condizionamento del terreno durante scavo con EPB". Global Chimica (3 months). Funding: 25,000€.

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Research contract "Specialised swelling tests on rocks from La Higuera Adit 3 tunnel". Golder Associates 2013 (12 months). Funding: 10,000 €.

Research contract "Specialised swelling tests on rocks from Portillo tunnel". Golder Associates. 2013 (12 months). Funding: 10,000 €.

Contract "Determinazione dei parametri geotecnici dei campioni di roccia prelevati presso la Galleria di finestra – Galleria di Saint-Oyen (Valle d'Aosta)". Lauro S.p.A.. 2013 (3 months). Amount: 4,800€.

Research contract "Specialised laboratory testing on swelling rocks of the La Higuera project". Golder Associates. 2012 (12 months). Funding: 12,000 €.

Contract "Determinazione della resistenza a compressione monoassiale di provini di granito dell'Isola della Maddalena". Università degli Studi di Firenze. 2012 (1 month). Amount: 1,526 €.

Contract "Determinazione della resistenza al taglio di giunti naturali e artificiali di granito proveniente dal sito della Diga di Cumbidanovu". Consorzio Bonifiche Sardegna. 2011 (2 months). Funding: 9,000€.

Contract "caratterizzazione geotecnica dei campioni di terreno provenienti da sondaggi geotecnici eseguiti nel mese di Agosto 2009, presso il sito della centrale eolica "Serra Caverio", nel co- mune di Alia (Pa)". Provincia di Torino. 2013-2009 (3 months). Amount: 7,474€.

Contract "Caratterizzazione geomeccanica dei campioni di terreno provenienti da sondaggi geotecnici eseguiti presso il sito di Versailles". VIPP Lavori S.p.A.. 2009 (3 months). Amount: 4,555 €.

Contract "Gerrards Cross – Tunnel collapse study" signed by Geo-Design Consulting Engineers Ltd and Politecnico di Torino. 15 March 2007 – 15 August 2007 (5 months). Total funding: 50,000 €.

Research projects "Studio dell'applicabilità del microtunnelling nel sottosuolo torinese (Applicability of microtunnelling to the Torino subsoil)" and "Il contributo della meccanica delle rocce per il rilancio della geotermia come fonte di energia rinnovabile (The contribution of rock mechanics for enhancing geothermal energy production)". Funding from the Department 2007: 3,000 €.

Research project "L'applicabilità del microtunnelling a Torino (Applicability of microtunnelling to the Torino subsoil)". Funding from the Department 2006: 3,500 €.

Research project "Trenchless technology for sustainable cities: reduction of jacking forces in clays", in cooperation between Politecnico di Torino and the University of Cambridge (Dr. K. Soga), funded by the British-Italian partnership programme for young researchers. 1 January 2004 - 31 December 2004 (12 months). Total funding: 12,400 €.

#### **Research projects and contracts (participant of):**

Research contract "Monimod: monitoring and modelling the Deep-Seated Gravity Slope Deformation Movement of the Beauregard dam" for the Italian Protection Agency. (12 months). Funding: 200,000 €.

Research contract "Condizioni geologico-stratigrafiche e geotecniche dei terreni e monitoraggio in corso d'opera degli scavi della metropolitana automatica di Torino - linea 1" for GTT S.p.A. (Gruppo Torinese Trasporti). 6 March 2003 - 5 March 2004 (12 months). Funding: 55,000 €.

Research contract "Tunnel maintenance" for the International Union of Railways (UIC). 15 April, 2003-14 October, 2003 (6 months). Funding: 55,000 €.

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Research project "Scavo meccanizzato di gallerie (Mechanised tunnelling)" funded by MIUR, COFIN 2001. 25 November 2001 - 24 November 2003 (24 months). Funding: 258,000 €.

Consultancy "Prestazioni di consulenza in merito alla progettazione preliminare/studio di prefattibilità della tratta S. Didero - Settimo Torinese (Tratta nazionale) del nuovo collegamento ferroviario Torino-Lione" for Italferr S.p.A.. 15 April 2002 - 15 June 2002 (2 months). Funding: 320,000 €.

Consultancy "Analisi e valutazioni del progetto di una nuova linea ferroviaria (Gronda merci e tratta di accesso al tunnel di base) che, proseguendo dalla linea AC Torino-Milano (presso Settimo Torinese) consenta, in una prima fase, il collegamento con il previsto nuovo PM (posto di movimento) di Bruzolo - S. Didero, situato al termine della tratta internazionale del nuovo collegamento ferroviario Torino - Lione" for RFI S.p.A. (Rete Ferroviaria Italiana). 15 September 2001 - 15 November 2001 (2 months). Funding: 400,000,000 LIT.

Research Project "Gallerie in condizioni difficili (Tunnelling in difficult conditions)" funded by MURST, COFIN 1999. 1999-2001.

Torino, 22<sup>nd</sup> January 2015

Marco Barla

