Professor Andrei Lyamin

Professor
School of Engineering
(Civil Engineering)

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SECTION MENU

Career Summary

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Biography

Born in 1961 in city Kaliningrad, Moscow area, former USSR. Finished high school in 1978. In 1985 graduated from Moscow Institute of Physics and Technology with a degree in Aerophysics and Space Research. In the same year was recruited to serve a military term as an officer. In 1987 graduated from Moscow Defense Academy. Resigned from military service in 1989. From 1989 till 1993 worked as a research engineer in Termotech enterprise. Migrated to Australia in 1993. In 1994 commenced PhD study in Geotechnical Group, University of Newcastle. In 2000 was awarded a PhD in Civil Engineering. Since then was employed by UoN as a Research Engineer, Research Academic, Lecturer, Senior Lecturer, Associate Professor.

Research Expertise
Played a key role in the formulation and development of powerful new methods for performing numerical stability analysis for geotechnical structures in two and three dimensions. These methods, which are based on finite elements and nonlinear programming, are the first to be able to compute rigorous bounds on the limit load in three dimensions. Moreover, for large two-dimensional problems, they are several orders of magnitude faster than an equivalent linear programming formulation and can be run on a standard desktop PC. Coupled with convenient domain discretization tools and adaptive mesh refinement, the limit analysis procedures can be applied to a wide range of problems in geotechnical engineering, and obviate the need for more approximate techniques such as limit equilibrium. Indeed, they have already been used to study the behaviour of foundations on jointed rock, square and rectangular foundations, stability of layered soil, tunnels, anchors, excavations and pavements under moving loads. My research interests have been recently extended to the fields of non-structured mesh generation and adaptivity, shakedown analysis, elastoplasticity by optimization, specialised non-linear optimisation methods such as second-order cone and semidefinite programming.

Teaching Expertise

Over the last 10 years I've been involved in marking, tutoring and lecturing a number of courses in Civil Engineering. My lecturing experience include: 2009 - GENG1002 Introduction to Engineering Computations, 370 students (1st year), 13 lectures and tutorials. 2005-2008 - CIVL2050 Engineering Computations, 100 students (2nd year), 14 lectures and tutorials. 2006-2007 - CIVL2720 Transportation Engineering, 100 students (2nd year), 28 lectures and tutorials. 2004 - CIVL3830 Stress Analysis, 100 students (3rd year), 28 lectures.

Administrative Expertise
Starting 2009 conduct the duties of a Program Convenor for Civil Engineering and Mining Transfer programs.

Collaborations
Has played a key role in the formulation and development of new methods for performing lower and upper bound limit analysis in two and three dimensions. These methods, which are based on finite elements and nonlinear programming, are the first to be able to compute rigorous bounds on the limit load in three dimensions. Moreover, for large two-dimensional problems, they are several orders of magnitude faster than equivalent linear programming formulations. Recently the upper bound method has been enhanced to deal with discontinuous velocity fields subject to general flow rule conditions and united with lower bound techniques under the static framework. The newly developed limit analysis procedures are applicable to a wide range of problems in geotechnical engineering, and obviate the need for approximate techniques such as limit equilibrium. Indeed, they have already been used to study the behaviour of foundations on jointed rock, square and rectangular foundations, tunnels, anchors and excavations. My research interests have recently been extended to the fields of non-structured mesh generation and adaptivity (completed APD, 2002), shakedown analysis, elastoplasticity by optimization (ARC grant 2006), and specialised non-linear optimisation methods such as second-order cone and semidefinite programming.

Qualifications

Doctorate, University of Newcastle

Bachelors Degree, Moscow Institute of Physics and Technology

Keywords

Adaptive Mesh Generation

Engineering Computations

Finite Elements

Limit Analysis

Optimization

Shakedown Analysis

Stress Analysis

Transportation Engineering

Languages

Russian (Fluent)

Fields of Research

Code	Description	Percentage
090599	Civil Engineering not elsewhere classified	90
091499	Resources Engineering and Extractive Metallurgy not elsewhere classified	5
091599	Interdisciplinary Engineering not elsewhere classified	5

Professional Experience

UON Appointment

Title	Organisation / Department
Professor	University of Newcastle School of Engineering Australia

Academic appointment

Dates	Title	Organisation / Department
1/11/2012 -	**Fellow ARC** ARC - Discovery - Future Fellowships	University of Newcastle School of Engineering Australia
1/03/2007 -	**Associate Professor**	University of Newcastle Engineering & Built Environment Australia
1/01/2005 - 1/02/2007	**Senior Lecturer**	University of Newcastle Engineering & Built Environment Australia
1/01/2002 - 1/12/2005	**Research Academic**	University of Newcastle Engineering & Built Environment Australia

Dates	Title	Organisation / Department
1/01/2001 - 1/12/2002	**Research Fellow**	University of Newcastle Engineering & Built Environment Australia

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Awards

Recipient

Year	Award
2002	**APD Fellowship** *ARC*

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## Research Award

Year	Award
2008	**Excellent Paper Award** *International Association for Computer Methods and Advances in Geomechanics*
2007	**Telford Premium** *Institution of Civil Engineers*
2005	**Significant Junior/Senior Paper Award** *International Association for Computer Methods and Advances in Geomechanics*

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Invitations

Participant

Year	Title / Rationale
2001	**Limit analysis using nonlinear programming** *Organisation: 1st MIT Conference on Computational Fluid and Solid Mechanics Description: Keynote paper*

Year	Title / Rationale
2000	**Stability of a plane strain circular tunnel in a cohesive-frictional soil** *Organisation: J.R.Booker Memorial Symposium Description: Invited paper*
2000	**Lower bound limit analysis using nonlinear programming** *Organisation: ECCOMAS 2000 Description: Invited paper*
2000	**Upper bound limit analysis using linear finite elements and nonlinear programming** *Organisation: 5th International Conference on Computational Structures Technology Description: Invited paper*

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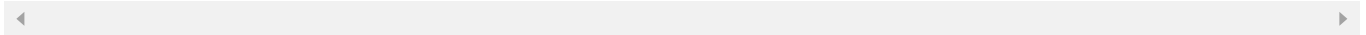
Research Networks

Priority Research Centre for Geotechnical Science and Engineering

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