U Pat RA

department of

Civil Engineering

Research Activities

University of Patras

Introduction by the Head of the Department

Dear Reader,

In this pamphlet you will find the essentials about the structure of our Department and the research activities of the faculty and its graduate students.
Civil engineering is a broad discipline that deals with the fundamental infrastructure of an organized society; hence, it has a strong interface with public agencies as well as the individual citizen. Accordingly, the research conducted in our Department explores both applied and fundamental problems, which immediately or ultimately contribute to the improvement of the various facets of the society's infrastructure.
We hope that this pamphlet will be the stimulus for getting in touch with us, so that you can learn more about our ongoing research and explore venues for cooperation.

Professor Alex C. Demetracopoulos
Head of the Department

Table of Contents

Department of Civil Engineering – An Introduction

This pamphlet gives a brief description of research groups and activities in the Department of Civil Engineering at the University of Patras (www.civil.upatras.gr). The Department is one of the most known Greek University Departments for its first-class contributions in the international research arena. It was established in 1972, consists of 35 full time faculty members and has an undergraduate student body of about 1200. The Department operates under the 5 years program of study and offers the degree of Diploma in Civil Engineering. In its new form, which is the result of a recent restructuring effort (approved by the University, Ministry of Education pending approval), the Department will consist of four Divisions, namely:

- *Structures*
- *Geotechnical Engineering*
- *Hydraulic and Environmental Engineering*
- *Transportation and Construction Management.*

The Department operates 8 Laboratories and one Study Unit for teaching and research purposes. These are the following:

Laboratories

- *Structures*
- *Structural Materials*
- *Geotechnical Engineering*
- *Hydraulic Engineering*
- *Environmental Engineering*
- *Transportation Works*
- *Architectural Technology*
- *Surveying*

Study Unit

- *Transportation and Traffic Engineering*

In addition, the Department has an *Earthquake Simulator* (Shaking Table Facility) and a *Computer Center* with a large number of personal computers, which provides adequate computing facilities primarily for undergraduate education. Additional state-of-the-art computing facilities, including super-computers, for research purposes, are attached to the Laboratories and to the various research groups.

The Department is also responsible for post-graduate education leading to the degrees of *Master of Civil Engineering* and *Doctor of Civil Engineering* through a comprehensive graduate studies program involving graduate level courses. Moreover, as member of a consortium of leading European Institutions in earthquake engineering and engineering seismology, the Department offers graduate courses within the framework of the Erasmus Mundus MEEES (*Masters in Earthquake Engineering and Engineering Seismology*) Program (www.meees.org).

ADMINISTRATION

Head of the Department
Alexandros Demetracopoulos
Professor
acdem@upatras.gr

Deputy Head of the Department
Thanasis Triantafillou
ttriant@upatras.gr

Director of Post-graduate Studies
Thanasis Triantafillou
ttriant@upatras.gr

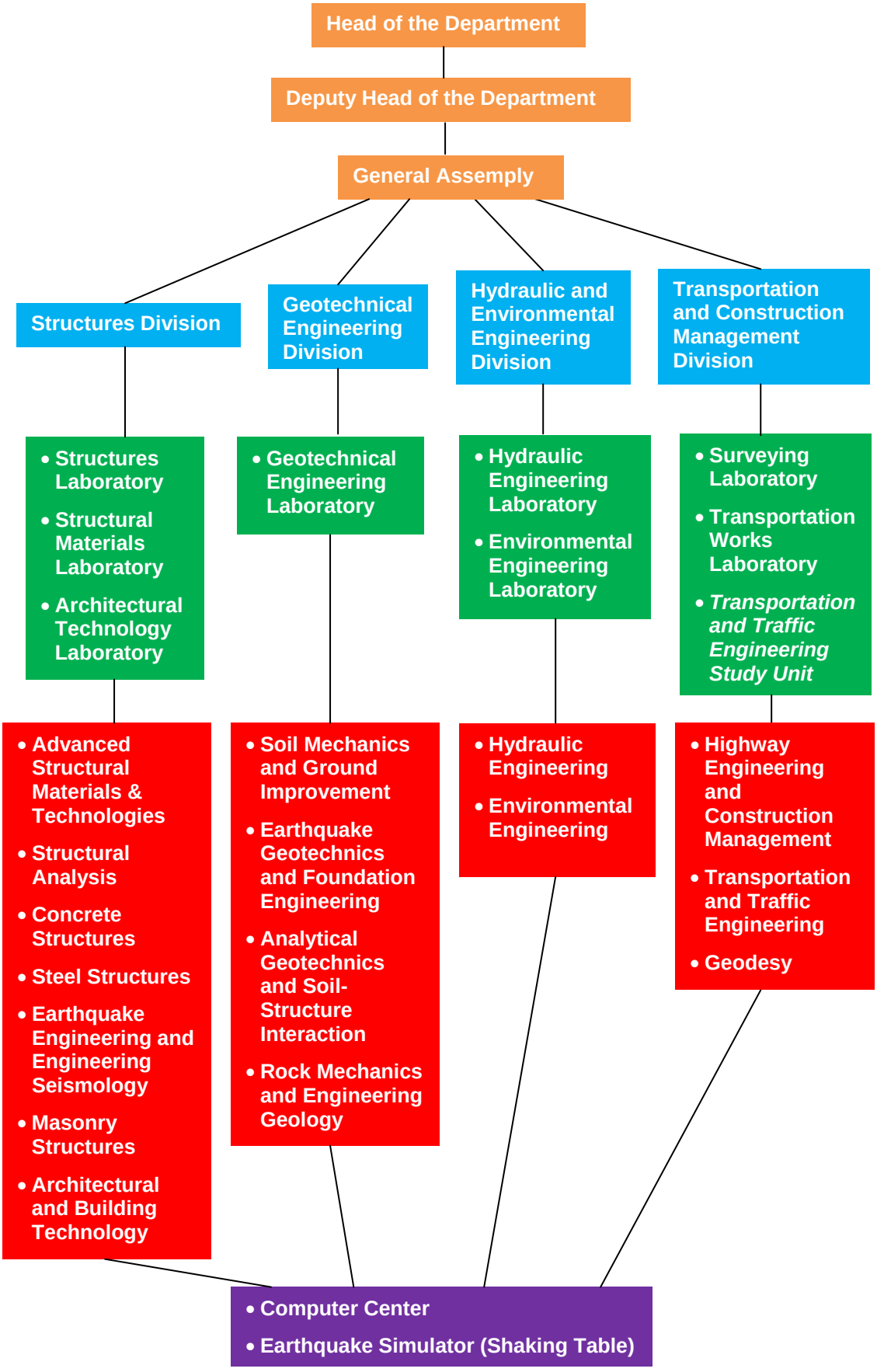
Secretariat
Anna Stamiri
stamiri@upatras.gr

Contact information
Department of Civil Engineering
University of Patras
Patras GR-26500, Greece

Tel.: +30 2610 996500-1
Fax: +30 2610 996565
email: *dept@civil.upatras.gr*

Web site:
www.civil.upatras.gr

Structure of the Department



Advanced Structural Materials and Technologies Research Group

Research Areas

- Experimental mechanics and technology of structural materials.
- Advanced repair/strengthening techniques.
- Prefabrication systems.

Selected Funded Research Projects

- *The Integrated Safe & Smart Built Concept (I-SSB).* FP6 Integrated Project, European Commission, 2007-2010.
- *Open and Fully Compatible Next Generation Strengthening System for the Rehabilitation of the Mediterranean Building Heritage (OPERHA).* FP6 Strep Project, European Commission, 2005-2008.
- *Development of Thin-walled, Prefabricated, Textile Reinforced Concrete Elements (PROTEAS).* PAVET 2005, General Secretariat for Research and Technology, 2006-2007.
- *Systematic Study of Structural Systems made of Textile Reinforced Concrete (TRC)*. C. Karatheodori Project, Research Committee, University of Patras, 2006-2008.

Selected Recent Publications

- Bournas, D. A. and Triantafillou, T. C. (2009). "Flexural Strengthening of RC Columns with NSM FRP or Stainless Steel", *ACI Structural Journal*, 106(4), 495-505.
- Bournas, D., Lontou, P., Papanicolaou, C. G. and Triantafillou, T. C. (2007). "Textile-Reinforced Mortar (TRM) versus FRP Confinement in Reinforced Concrete Columns", *ACI Structural Journal*, 104(6), 740-748.
- Papanicolaou, C. and Papantoniou, I. (2010). "Textile Reinforced Concrete (TRC) - Concrete Composite Elements*", Journal of Advanced Concrete Technology (International Journal of Japan Concrete Institute)*, in press.
- Papanicolaou, C. G., Triantafillou, T. C., Papathanasiou, M. and Karlos, K. (2008). "Textile Reinforced Mortar (TRM) versus FRP as Strengthening Material of URM Walls: Out-of-plane Cyclic Loading", *Materials and Structures, RILEM*, 41(1), 143-157.

Group Members

T. Triantafillou
Professor
ttriant@upatras.gr

C. Papanicolaou
Lecturer
kpapanic@upatras.gr

Structural Analysis Research Group

Research Areas

- Dynamics of structures.
- Seismic protection systems.
- Nonlinear analysis.

Selected Funded Research Project

- Seismic Response of Slender Structures with Foundation Uplifting on Elastic and Inelastic Soil, Greek Ministry of Education Duration, 2006-2008.
- *Development of Innovative Devices for Seismic Protection of Petrochemical Facilities (INDEPTH)*. European Commission Research Directorates Project No EVG1-CT-2002-00065, 2002 - 2005.
- *Development of a Combined Land/Sea Integrated Methodology for the Assessment of Seismic Risk of Coastal Zone Infrastructures (AMFITRITI)*. Greek Secretariat of Research and Technology (Project code DP24), 2003-2006.

Selected Recent Publications

- Makris, N., Kampas, G. And Angelopoulou, D. (2009). "The Eigenvalues of Isolated Bridges with Transverse Restraints at the End-Abutments", *Earthquake Engineering and Structural Dynamics*, 38 (published online in advance of print).
- Makris, N. and Kampas, G. (2009). "Analyticity and Causality of the Three-Parameters Rheological Models", *Rheological Acta*, 48, 815-825.
- Asimakopoulos, A. V., Karabalis, D. L. and Beskos, D. E. (2007). "Inclusion of P-Δ Effect in Displacement-based Seismic Design of Steel Moment Resisting Frames", *Earthquake Engineering and Structural Dynamics*, 36, 2171-2188.
- Drosos, G. C., Dimas, A. A. and Karabalis, D. L. (2008). "Discrete Models for Seismic Analysis of Liquid Storage Tanks of Arbitrary Shape and Fill Height", *Journal of Pressure Vessel Technology*, 130, 1-12.

Group Members

Dimitris Karabalis
Professor
karabali@upatras.gr

Nicos Makris
Professor
nmakris@upatras.gr

Manolis Sfakianakis
Assistant Professor
mgs@upatras.gr

Petros Marathias
Lecturer
pmaraths@upatras.gr

Concrete Structures Research Group

Research Areas

- Seismic design of concrete structures.
- Re-design, repair/strengthening of concrete structures.
- Experimental investigation of concrete structures.

Selected Funded Research Projects

- *Advanced Centre of Excellence in Structural and Earthquake Engineering (ACES).* FP7 Regional Potential Support Action Project, European Commission, 2008-2011.
- *Seismic Engineering Research Infrastructures for European Synergies (SERIES).* FP7 Research Infrastructures Integrating Activity, Combination of Collaborative Project and Coordination and Support Action, European Commission, 2009-2013.
- *Repair and Strengthening of Reinforced Concrete Structures*. Earthquake Planning and Protection Organisation, 2002-06.

Selected Recent Publications

- Baros, D. and Dritsos, S. (2008). "A Simplified Procedure to Select a Suitable Retrofit Strategy for Existing RC Buildings using Pushover Analysis", *Journal of Earthquake Engineering*, 12, 823-848.
- Biskinis, D. E. and Fardis, M. N. (2007). "Effect of Lap Splices on Flexural Resistance and Cyclic Deformation Capacity of RC Members", *Beton- und Stahlbetonbau*, Sonderheft Englisch, 102.
- Bousias, S. N, Biskinis, D. E., Fardis, M. N. and Spathis, L.-A. (2007). "Strength, Stiffness and Cyclic Deformation Capacity of Concrete Jacketed Columns", *ACI Structural Journal*, 104(5), 521-531.
- Bousias, S. N, Fardis, M. N., Spathis, L.-A. and Kosmopoulos, A. (2007). "Pseudodynamic Response of Torsionally Unbalanced 2-story Test Structure", *Journal of Earthquake Engineering and Structural Dynamics*, 36, 1065–1087.
- Kosmopoulos, A. and Fardis, M. N. (2008). "Simple Models for Inelastic Seismic Analysis of Asymmetric Multistory Buildings", 12(5), 704-727.
- Vandoros, K. and Dritsos S. (2008). "Concrete Jacket Construction Detail Effectiveness when Strengthening RC Columns", *Journal of Construction and Building Materials*, 22(3), 264-276.

Group Members

Michael Fardis
Professor
fardis@upatras.gr

Stephanos Dritsos
Professor
s.dritsos@upatras.gr

Stathis Bousias
Associate Professor
sbousias@upatras.gr

Steel Structures Research Group

Research Areas

- Computational mechanics of steel structures.
- Seismic design of steel structures.

Selected Funded Research Projects

- *Seismic Inelastic Response of Steel Frames with Modal Analysis and Equivalent Damping.* EPEAEK II, Pythagoras, 2005-2008.
- *New Seismic Design Method for Space Steel Structures.* Support of Basic Research - C. Karatheodori Project, Research Committee, University of Patras, 2009-2012.

Selected Recent Publications

- Bazeos, N., (2009) "Comparison of three Seismic Design Methods for Plane Steel Frames", *Soil Dynamics and Earthquake Engineering,* 29 (3), 553-562.
- Karavasilis, T. L., Bazeos, N. and Beskos, D. E. (2007). "Behaviour Factor for Performance-Based Seismic Design of Plane Steel Moment Resisting Frames", *Journal of Earthquake Engineering,* 11, 531-559.
- Karavasilis, T. L., Bazeos, N. and Beskos, D. E. (2008). "Drift and Ductility Estimates in Regular Steel MRF subjected to ordinary Ground Motions: A Design-Oriented Approach", *Earthquake Spectra,* 24(2), 431–451.
- Vasilopoulos, A. A. and Beskos, D. E. (2009). "Seismic Design of Space Steel Frames using Advanced Methods of Analysis", *Soil Dynamics and Earthquake Engineering,* 29, 194-218.

Group Members

Dimitrios Beskos
Professor
d.e.beskos@upatras.gr

Nikitas Bazeos
Associate Professor
n.bazeos@upatras.gr

Earthquake Engineering and Engineering Seismology Research Group

Research Areas

- Earthquake engineering.
- Engineering seismology.

Selected Funded Research Projects

- *Assessment, Ranking and Mitigation of the Seismic Risk of the National Telecommunications Network*. EPAN, General Secretariat for Research and Technology, 2004-2008.
- *First Phase Application of a Research Program for Pre-earthquake Rapid Assessment of the Seismic Capacity of School Buildings constructed with no Earthquake Provisions in the Prefectures of Argolis, Corfu and Lakonia*. Greek Agency for School Buildings, 2007-2008.

Selected Recent Publications

- Anagnostopoulos, S. A. and Karamaneas, Ch. (2008). "Use of Collision Shear Walls to Minimize Seismic Separation and to Protect Adjacent Buildings from Collapse due to Earthquake Induced Pounding", *Earthquake Engineering and Structural Dynamics*, 37, 1371-1388.
- Anagnostopoulos, S. A. and Moretti, M. (2008), "Post-earthquake Emergency Assessment of Building Damage, Safety and Usability - Part 1: Organization", *Soil Dynamics and Earthquake Engineering*, 28, 223-232.
- Anagnostopoulos, S., Providakis, C., Salvaneschi, P., Athanasopoulos, G. and Bonacina, G. (2008). "SEISMOCARE: An Efficient GIS Tool for Scenario-type Investigations of Seismic Risk of Existing Cities", *Soil Dynamics and Earthquake Engineering*, 28(2), 73-84.
- Mavroeidis, G., Zhang, B., Dong, G., Papageorgiou, A. S., Dutta, U. and Biswas, N. N. (2008). "Estimation of Strong Ground Motion from the Great 1964 Prince William Sound, Alaska, Earthquake (MW 9.2)", *Bulletin of the Seismological Society of America*, 98(5), 2303–2324.
- Meza Fajardo, K. C. and Papageorgiou, A. S. (2008). "A Non-Convolutional Split-Field Perfectly Matched Layer (PML) for Wave Propagation in Isotropic and Anisotropic Elastic Media – Stability Analysis", *Bulletin of the Seismological Society of America*, 98(4), 1811–1836.

Group Members

Stavros Anagnostopoulos
Professor
saa@upatras.gr

Apostolos Papageorgiou
Professor
papaga@upatras.gr

Masonry Structures Research Group

Research Areas

- Seismic strengthening techniques for masonry structures.

Group Members

Fyllitsa Karantoni
Lecturer
karmar@upatras.gr

Architectural and Building Technology Research Group

Research Areas

- Architectural and building technology.
- Restoration of monuments.
- Historical building materials.

Selected Recent Publications

- Apostolopoulos, C. and Sotiropoulos, P. (2008). "Venetian Churches of Lefkada, Greece: Construction Documentation and Seismic Behaviour - Virgin Mary of the Strangers", *Construction and Building Materials*, 22(4), 434-443.

Group Members

Dionysios Verras
Assistant Professor
dverras@upatras.gr

Panagiotis Sotiropoulos
Lecturer
psotiro@upatras.gr

Soil Mechanics and Ground Improvement Research Group

Research Areas

- Soil properties.
- Geosynthetics.
- Grouting.
- Experimental methods.
- Monitoring.

Selected Funded Research Projects

- *Development and Documentation of New Grouting Materials from Greek Ultrafine Cements for in-situ Soil Improvement – Reinforcement in Construction*. PENED 2003, #03ED 527, 2005 – 2009.
- *Expanded Polystyrene as Compressible Inclusion in Geotechnical Construction*. Basic Research Support – C. Karatheodori, Research Committee, University of Patras, 2001-2004.

Selected Recent Publications

- Chrysikos, D. A., Atmatzidis, D. K. and Missirlis, E. G. (2006). "EPS Geofoam Surface Shear Resistance", *Proceedings of the 8th International Conference on Geosynthetics*, Yokohama, Japan, 4, 1647-1650.
- Atmatzidis, D. K., Chrysikos, D. A., Blantzoukas, T. N. and Kondyli, A. T. (2008). "Long-term Protection Efficiency of Nonwoven Polypropylene Geotextiles", *Proceedings of the 4th Asian Regional Conference on Geosynthetics*, Shanghai, China, 99-104.
- Atmatzidis, D. K. and Chrysikos, D. A. (2008). "Protection Efficiency of Nonwoven Polypropylene Geotextiles", *Proceedings of the 4th European Geosynthetics Conference*, Edinburgh, Scotland, UK, Paper No. 3-58, 8 pages.
- Atmatzidis, D. K., Chrysikos, D. A. and Papaefstathiou, I. M. (2009). "Installation Damage of Nonwoven Polypropylene Geotextiles", *Proceedings of the 17th International Conference on Soil Mechanics and Geotechnical Engineering*, Alexandria, Egypt, 1, 873-876.

Group Members

Dimitrios Atmatzidis
Professor
dka@upatras.gr

Dimitrios Chrysikos
Lecturer
dac@upatras.gr

Earthquake Geotechnics and Foundation Engineering Research Group

Research Areas

- Dynamic properties of soil and geosynthetics.
- Excavations.
- Reinforced soil.
- Municipal solid waste landfills.
- Monitoring.

Selected Funded Research Projects

- *Geological and Geotechnical Investigations on Fire-Stricken Municipalities of Ileia Prefecture for the Reconnaissance and Stabilization of Slope Instabilities – Design of Countermeasures,* Western Greece Region, 2007-2008.
- *Seismic Isolation of Earth Retaining Structures by EPS Geofoam Inclusions.* Support of Basic Research - C. Karatheodori Project, Research Committee, University of Patras, 2002-2005.

Selected Recent Publications

- Bray, J. D., Zekkos, D., Kavazanjian, Jr., E., Athanasopoulos, G. A. and Riemer, M. F., (2009). "Shear Strength of Municipal Solid Waste", *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 135(6), 709-722.

Group Members

George Athanasopoulos
Professor
gaa@upatras.gr

Analytical Geotechnics and Soil-Structure Interaction Research Group

Research Areas

- Theoretical and numerical methods for static and dynamic response.
- Pile foundations.
- Earth pressures.
- Constitutive modeling.

Selected Funded Research Projects

- *Incorporation of Kinematic Pile Bending Moments into Seismic Codes,* RELUIS. European Union/Italian Government, 2006-2009.
- *Development of European Procedures for Seismic Soil-Structure Interaction.* IKYDA, 2007-2009.

Selected Recent Publications

- Mylonakis, G., Kloukinas, P., Papantonopoulos K. (2007). "An Alternative to the Mononobe-Okabe Equations for Seismic Earth Pressures", *Soil Dynamics & Earthquake Engineering,* 27(10), 957-969.
- Papargyri-Beskou, S., Thomas, K., Mylonakis, G. (2009). "Wave Dispersion in Granular Media by the Distinct Element Method", *Soil Dynamics and Earthquake Engineering*, 29(5), 888-897.

Group Members

George Mylonakis
Associate Professor
mylo@upatras.gr

Rock Mechanics and Engineering Geology Research Group

Research Areas

- Experimental and numerical methods.
- Limit analysis.
- Optimization.
- Slope stability.
- Foundations on rock.
- Tunneling.

Group Members

Konstantinos Papantonopoulos
Assistant Professor
cip@upatras.gr

Hydraulic Engineering Research Group

Research Areas

- Flow of surface, ground and sea waters.
- Coastal engineering.
- Hydrology and water resources management.
- Associated technical works.

Selected Funded Research Projects

- *Investigation of Potential Impact Especially on Sediment Transport due to Aggregate Extraction from Five Semi-Mountainous Streams.* Apion Kleos C. J. V., 2008-2009.
- *Physical Model Study of the Hydraulic Performance of the Asterios Dam Spillway.* Hellenic Ministry for the Environment, Physical Plannng and Public Works, 2007-2008.
- *Flow Measurements and Visualization in a Sea Water Intake Physical Model.* METKA A.E., 2009.
- *Numerical Prediction of Waves, Currents and Transport Environmental Parameters in the Coastal and Sea Zone of the Old and New Port of Patras.* PENED, General Secretariat for Research and Technology - Patras Port Authority, 2005-2009.
- *Submarine Groundwater Fluxes and Transport Processes from Methane-rich Coastal Sedimentary Environments (Sub-G.A.T.E.)*. European Commission, 1998-2001.

Selected Recent Publications

- Dimas, A. A. and Dimakopoulos, A. S. (2009). "Surface Roller Model for the Numerical Simulation of Spilling Wave Breaking over Constant Slope Beach", *Journal of Waterway, Port, Coastal, and Ocean Engineering (ASCE)*, 135(5), 235-244.
- Dimas, A. A., Fourniotis, N. T., Vouros, A. and Demetracopoulos, A. C. (2008). "Effect of Bed Dunes on Spatial Development of Open-Channel Flow", *Journal of Hydraulic Research (IAHR)*, 46, 802-813.
- Kaleris, V. (2006). "Submarine Groundwater Discharge: Effects of hydrogeology and of Near Shore Surface Water Bodies", *Journal of Hydrology*, 325, 96-117.
- Kaleris, V., Lagas, G., Marczinek, S. and Piotrowski, J. A. (2002). "Modelling Submarine Groundwater Discharge: An Example from the Western Baltic Sea", *Journal of Hydrology,* 265(1-4), 76-99.
- Yannopoulos P. C., Demetracopoulos, A. C. and Hadjitheodorou, C. (2008). ''Quick Method for Open - Channel Discharge Measurements Using Air Bubbles", *Journal of Hydraulic Engineering,* ASCE, 134(6), 843-846.

Group Members

Alexandros Demetracopoulos
Professor
acdem@upatras.gr
Vasilios Kaleris
Professor
kaleris@upatras.gr
Athanasios Dimas
Associate Professor
adimas@upatras.gr
George Horsch
Assistant Professor
ghorsch@upatras.gr

Environmental Engineering Research Group

Research Areas

- Experimental and theoretical aspects of contaminant transport in porous media and environmental systems.
- Wastewater treatment.
- Groundwater remediation.
- Air and water pollution – monitoring and management.

Selected Funded Research Projects

- *Investigation of Groundwater Contamination by Viruses During Infiltration of Recycled Water: Laboratory and Field Experiments*. General Secretariat for Research and Technology, 2006-2008.
- *Integrated Actions in Order to Protect Coastal Areas from Anthropogenic Pollutions and for Groundwater Restoration by Reversing the Seawater Intrusion in Coastal Aquifers*. INTERREG IIIA Greece-Italy, 2006 - 2008.
- *Development of Low-cost Methodology for Quick Prediction and Monitoring of River Pollution.* Pythagoras II Project, Ministry of National Education and Religious Affairs, 2005-2007.
- *Improved Simulation of the Flow and Mixing Fields of a Round or a Slot Buoyant Jet Discharged in a Flowing Environment of Uniform Density.* Support of Basic Research - C. Karatheodori Project, Research Committee, University of Patras, 2007-2010.

Selected Recent Publications

- Anders, R. and Chrysikopoulos, C. V. (2009). "Transport of Viruses through Saturated and Unsaturated Columns Packed with Sand", *Transport in Porous Media*, 76, 121-138, doi:10.1007/s11242-008-9239-3.
- Bloutsos, A. A. and Yannopoulos, P. C. (2009). "Round Turbulent Buoyant Jets Discharged Vertically Upwards Forming a Regular Polygon", *Journal of Hydraulic Research,* 47(2), 263-274.
- Masciopinto, C., La Mantia, R. and Chrysikopoulos, C. V. (2008). "Fate and Transport of Pathogens in a Fractured Aquifer in the Salento Area, Italy, *Water Resources Research*, 41(10), 44, W01404, doi:10.1029/ 2006WR005643.
- Yannopoulos, P. C. (2007). "Spatial Concentration Distributions of Sulfur Dioxide and Nitrogen Oxides in Patras, Greece, in a Winter Period", *Environmental Monitoring and Assessement*, 135, 163-180, DOI: http://dx.doi.org/10.1007/s10661-007-9641-2.

Group Members

Constantinos Chrysikopoulos
Professor
gios@upatras.gr
Stylianos Tsonis
Associate Professor
tsonis@upatras.gr
Panayotis Yannopoulos
Associate Professor
p.c.yannopoulos@upatras.gr
Ioannis Manariotis
Lecturer
i.d.man@upatras.gr

Highway Engineering and Construction Management Research Group

Research Areas

- Highway and pavement design.
- Transportation infrastructure management.
- Construction project management

Selected Funded Research Projects

- *A Decision Support System for Optimizing Highway Life-Cycle Operability and Performance*. General Secretariat for Research and Technology, 2006-2008.
- *Innovative Intervention Tools for Infrastructures and Environmental Impacts Management*. Creation of Regional Innovation Poles (Rip), General Secretariat for Research and Technology, 2006-2008.

Selected Recent Publications

- Chassiakos, A. P., and Sakellaropoulos, S. P. (2007). "A Web-based System for Managing Construction Information", *Advances in Engineering Software*, 39, 865-876.
- Theodorakopoulos, D. D., and Swamy, R. N. (2007). "Analytical Model to Predict Punching Shear Strength of FRP-reinforced Concrete Flat Slabs", *ACI Structural Journal,* 104(3), 257-266.

Group Members

Dimitrios Theodorakopoulos
Professor
d.d.theod@upatras.gr

Athanasios Chasiakos
Associate Professor
a.chassiakos@upatras.gr

Transportation and Traffic Engineering Research Group

Research Areas

- Advanced and smart transportation systems.
- Models and methodologies of transport systems.

Group Members

George Stefanides
Professor
yjste@upatras.gr

Evaggelos Matsoukis
Associate Professor
mats@upatras.gr

Geodesy Research Group

Research Areas

- Deformation measurements and analysis.
- Monitoring of vibrations.
- Tolerance of new geodetic instruments.
- Signal processing.

Selected Funded Research Projects

- *Real-time Satellite GPS System for Deformation Monitoring*, Greek Secretariat for Research and Technology, 2005-2009.

Selected Recent Publications

- Psimoulis, P., Pytharouli, S., Karabalis, D. and Stiros, S. (2008). "Potential of Global Positioning System (GPS) to Measure Frequencies of Oscillation of Engineering Structures", *Journal of Sound and Vibration*, 318 (3), 606-623.
- Stiros, S. (2008). "Errors in Velocities and Displacements deduced from Accelerographs: An Approach Based on the Theory of Error Propagation", *Soil Dynamics and Earthquake Engineering*, 28, 415-420.

Group Members

Efstathios Stiros
Associate Professor
stiros@upatras.gr