

**Alternative Robust Energy Technologies for Environmental Sustainability
(ARETES)**

Research proposal for the ARISTEIA grant
Principal Investigator: Demetris Koutsoyiannis
1 September 2011

Information about the principal investigator

Professor Demetris Koutsoyiannis — Curriculum Vitae

General

Nationality; birth info	Greek; born in village of Mesounta, Epirus, Greece, 27 April 1955
Professional certification	Civil Engineer (1978), Dr. Engineer (1988)
Address	Department of Water Resources and Environmental Engineering, School of Civil Engineering, National Technical University of Athens

Education

1983–1988	Doctoral studies at the National Technical University of Athens (NTUA); advisor Th. Xanthopoulos (later Rector of NTUA and Vice Minister for Public Works). Thesis: “ <i>A disaggregation model of point rainfall</i> ”.
1973–1978	NTUA, School of Civil Engineering (hydraulic engineering option). State scholarships for top performance throughout the years of university studies. Graduated top in class among more than 300 students, with 3 university and state awards for high achievements.

Academic positions

1990–today	Professor (since 2008) of Hydrology and Analysis of Hydrosystems at NTUA. (Associate professor (2003–2008), assistant professor (1995–2003), lecturer (1990–1995)).
2007–2010	Professor of hydraulics in the Hellenic Army’s Postgraduate School of Technical Education of Officers Engineers
1999–2008	Academic visitor at various institutions: Imperial College, London (1999–2000), Hydrologic Research Centre, San Diego (2005), Georgia Tech (2005–2006), University of Bologna (2006), University of Rome “Sapienza” (2008)
1979–1990	Research assistant, National Technical University of Athens, Department of Water Resources and Environmental Engineering

International positions

2003–today	Co-Editor (since 2009; Deputy Editor since 2006; Associate Editor in 2003–2006), <i>Hydrological Sciences Journal</i>
2007–today	Editor, <i>Hydrology and Earth System Sciences</i>
2007–2009	Associate Editor, <i>Water Resources Research</i>
2000–2008	Associate Editor, <i>Journal of Hydrology</i>
2006–2010	Chair, <i>Precipitation and Climate of Hydrological Sciences Division</i> in the <i>European Geosciences Union</i>

National positions

2010–today	Head of the Department of Water Resources and Environmental Engineering of NTUA
2004–2005	Senate member, NTUA (also associate member in 1993–1994 and 2002–2003)
2003–2010	Board of Directors of the Organization for the Management and Restoration of the Kephisos River and its Tributaries

Engineering experience

- 1978–today Participation in more than 60 engineering studies, 12 of which on hydrologic design of dams throughout Greece (for hydropower, water supply and irrigation)—notably two concern the Athens and the Acheloos-Thessaly hydrosystems, the most important ones in Greece.
- 1978–1985 Consultant for private constructions as well as in hydrological, structural and surveying engineering projects. Founding member of three engineering companies (Polytechnike Co., METER Ltd, BIOMETER Ltd).

Teaching experience

- 1981–today Undergraduate courses in NTUA in *Engineering hydrology*, *Stochastic methods in water resources*, *Urban hydraulic works* and *Sediment transport*, and postgraduate courses in *Hydrometeorology*, *Advanced hydrology*, *Water resource systems optimization* and *Water resource management*. Supervised 87 diploma and postgraduate theses and 9 doctoral theses.
- 2007–2010 Courses in *Hydraulics* in the Hellenic Army's Postgraduate School of Technical Education of Officers Engineers.

Research experience

- 1990–today Funded and unfunded research in the areas of *hydrological modelling*, *hydrological stochastics*, *hydroclimatology*, *analysis of hydrosystems*, *water resources engineering and management*, and *hydroinformatics*. Favourite research topics: *entropic-stochastic representation of hydrological processes*; *hydroclimatic variability and Hurst-Kolmogorov dynamics*; *extreme rainfall and flood*; *parameterization, stochastic simulation and optimization of hydrosystems*; *water resource management*; *ancient water technology and management*.
- Project leader in 17 research projects, amounting to a total budget of € 3.44 million. For example:
- Hydroscope: Creation of a National Databank for Hydrological and Meteorological Information, 1992–1993, 1.60 M€, funded by the General Secretariat of Research and Technology (GSRT) and co-funded by the EU.
 - Odysseus: Integrated Management of Hydrosystems in Conjunction with an Advanced Information System, 2003–2006, 0.81 M€, funded by GSRT and co-funded by the EU.
 - Deukalion – Assessment of flood flows in Greece under conditions of hydroclimatic variability: Development of physically-established conceptual-probabilistic framework and computational tools, 2011–2013, 0.145 M€, funded by GSRT, co-funded by the EU.
 - Evaluation of Management of the Water Resources of Sterea Hellas, Phases 1,2,3, 1990–2000, 1.18 M€, funded by the Ministry of Environment, Planning and Public Works (MEPPW).
 - Modernization of the Supervision and Management of the Water Resource System of Athens, 1999-2003, 0.71 M€, funded by the Water Supply and Sewerage Company of Athens and co-funded by the EU.
 - Support on the Compilation of the National Programme for Water Resources Management and Preservation, 2007-08, 0.05 M€, funded by MEPPW.
- Participation in 28 more projects in a role other than project leader. Some examples of international projects:
- AFORISM, A comprehensive forecasting system for flood risk mitigation and control, 1991–1994, 0.08 M€, funded by the EU (EPOCH); key investigator for the Greek team.
 - Participation in two UK projects in collaboration with the Imperial College and University College London, 1999–2001.
 - Participation in a Greek-Ethiopian expedition project.
- A detailed list of all these projects can be found at <http://itia.ntua.gr/en/pppp/2/>.

List of most important publications

My relationship with the international scientific community was built around my research publications in peer-reviewed journals. My current scientific publishing record comprises 85 publications in peer-reviewed scientific journals, in all of which except two I am the only author or a senior author. 63 of them were published in the last ten years. These fall in the following ten categories (not including a separate category related to the ethics of the scientific community and its evaluation systems, in which I have devoted a major effort and publications). In each category, I list below a sample of two recent publications (a parenthesis at the end gives the number of the citations by other authors). I also summarize the questions addressed and provide a remark on the novelty of research. This synopsis was deliberately based on journal publications, which more accurately reflect my research achievements. Due to space limitations, I am not providing details of other activities.

I. Nature of hydrological and geophysical processes

1. Koutsoyiannis, D., Uncertainty, entropy, scaling and hydrological stochastics, 1, Marginal distributional properties of hydrological processes and state scaling, *Hydrol. Sci. J.*, 50(3), 381–404, 2005. (21)
2. Koutsoyiannis, D., Hurst-Kolmogorov dynamics as a result of extremal entropy production, *Physica A: Statistical Mechanics and its Applications*, doi:10.1016/j.physa.2010.12.035 2011. (-)

Questions addressed: Why hydroclimatic and other geophysical and technological processes exhibit peculiar behaviours, such as long-term persistence, fluctuations on large scales, clustering, state and time scaling, and heavy distribution tails?

Remark: This research, highlighting entropy as a driving force of natural processes and suggesting that maximum entropy, i.e. maximum uncertainty, can explain observed large-scale behaviours, is novel, innovative and ground breaking.

II. Climate stochastics

3. Koutsoyiannis, D., Climate change, the Hurst phenomenon, and hydrological statistics, *Hydrol. Sci. J.*, 48(1), 3-24, 2003. (51)
4. Koutsoyiannis, D., A. Efstratiadis, N. Mamassis, and A. Christofides, On the credibility of climate predictions, *Hydrol. Sci. J.*, 53 (4), 671–684, 2008. (28)

Questions addressed: To which extent are future climate projections reliable and what grounds do they provide to assess impacts in hydrological processes? What is the relationship of climate with stochastics?

Remark: These works point out common misunderstandings in climate research and suggest remedies.

III. Hurst-Kolmogorov dynamics and scaling

5. Koutsoyiannis, D., The Hurst phenomenon and fractional Gaussian noise made easy, *Hydrol. Sci. J.*, 47(4), 573-595, 2002. (43)
6. Koutsoyiannis, D., Nonstationarity versus scaling in hydrology, *J. Hydrol.*, 324, 239-254, 2006. (39)

Questions addressed: What are the main characteristics and implications of the Hurst-Kolmogorov stochastic dynamics (also known as the Hurst phenomenon, Joseph effect, scaling behaviour, long-term persistence, multi-scale fluctuation, long-range dependence, long memory)?

Remark: The research suggests that the Hurst phenomenon is not a puzzle, as regarded for half a century, but a regular natural behaviour, manifesting multi-scale fluctuation.

IV. Hydrological extremes

7. Koutsoyiannis, D., Statistics of extremes and estimation of extreme rainfall, 1, Theoretical investigation, *Hydrol. Sci. J.*, 49(4), 575-590, 2004. (44)
8. Di Baldassarre, G., A. Montanari, H. F. Lins, D. Koutsoyiannis, L. Brandimarte, and G. Blöschl, Flood fatalities in Africa: from diagnosis to mitigation, *Geophys. Res. Lett.*, 37, L22402, doi:10.1029/2010GL045467, 2010. (-)

Questions addressed: How can we effectively and consistently describe the behaviour of extreme rainfall and flood? Are hydrological practices for estimation of extremes correct? Are extremes increasing?

Remark: The research shows that the prevailing hydrological methodologies and views of extremes underestimate extremes significantly, and can sometimes be misleading.

V. Deterministic vs. stochastic description of hydrological processes

9. Koutsoyiannis, D., On the quest for chaotic attractors in hydrological processes, *Hydrol. Sci. J.*, 51(6), 1065-1091, 2006. (7)
10. Koutsoyiannis, D., H. Yao & A. Georgakakos, Medium-range flow prediction for the Nile: a comparison of stochastic and deterministic methods, *Hydrol. Sci. J.*, 53(1), 142-164, 2008. (8)

Questions addressed: Do hydrological processes reveal deterministic chaos? Do they exhibit deterministic trends? Or can they be better modelled as stochastic processes?

Remark: The research examines the grounds of numerous recent studies that have detected chaotic deterministic behaviour in hydrological processes with low-dimensional attractors; it locates some shortcomings and suggests stochastic descriptions as a viable alternative for producing forecasts.

VI. Stochastic modelling of hydroclimatic processes

11. Koutsoyiannis, D., and A. Montanari, Statistical analysis of hydroclimatic time series: Uncertainty and insights, *Water Resour. Res.* 43 (5), W05429, doi:10.1029/2006WR005592, 2007. (30)

12. Koutsoyiannis, D., A random walk on water, *Hydrol. Earth Syst. Sci.*, 14, 585–601, 2010. (4)

Questions addressed: How can we build stochastic models of hydroclimatic processes effectively describing the natural behaviours and peculiarities? How can we quantify uncertainty?

Remark: The research highlights the intrinsic character of uncertainty in hydroclimatic processes and proposes novel formalism for statistical and stochastic description and simulation, which is an improvement over the common ARMA models.

VII. Scales and disaggregation

13. Koutsoyiannis, D., Coupling stochastic models of different time scales, *Water Resour. Res.*, 37(2), 379-392, 2001. (24)

14. Koutsoyiannis, D. & C. Onof, Rainfall disaggregation using adjusting procedures on a Poisson cluster model, *J. Hydrol.*, 246, 109-122, 2001. (40)

Questions addressed: How can we disaggregate hydrological data? How can we couple stochastic models of different time scales?

Remark: The research proposes a novel and theoretically consistent methodology for disaggregation of data from coarser to finer time scales, radically different from existing ones, and applies it in the most demanding problems such as rainfall disaggregation on fine time scales.

VIII. Hydrosystems modelling and management

15. Koutsoyiannis, D., & A. Economou, Evaluation of the parameterization-simulation-optimization approach for the control of reservoir systems, *Water Resour. Res.*, 39(6), 1170, 1-17, 2003. (20)

16. Koutsoyiannis, D., A. Efstratiadis, and G. Karavokiros, A decision support tool for the management of multi-reservoir systems, *J. American Water Resour. Assoc.*, 38 (4), 945–958, 2002. (15)

Questions addressed: How can we effectively model and manage large hydrosystems? Can we combine simulation and optimization techniques? How many decision variables do we need in the management of a large hydrosystem? How can we perform global optimization of hydrosystems?

Remark: The research proposes a radically novel approach for hydrosystem management, which is parsimonious in decision variables (parameterization), and combines Monte Carlo simulation and global nonlinear optimization, replacing existing oversimplifying linear or dynamic programming methods.

IX. The role of water and its relationship with energy, development and sustainability

17. Koutsoyiannis, D., C. Makropoulos, A. Langousis, S. Baki, A. Efstratiadis, A. Christofides, G. Karavokiros, and N. Mamassis, Climate, hydrology, energy, water: recognizing uncertainty and seeking sustainability, *Hydrol. Earth Syst. Sci.*, 13, 247–257, 2009. (7)

18. Koutsoyiannis, D., Scale of water resources development and sustainability: Small is beautiful, large is great, *Hydrol. Sci. J.*, 2011 (accepted with minor revisions) (-)

Questions addressed: What are the threats and challenges related to the future of water resources? How is water related to energy and climate? What is the proper scale of water resource development?

Remark: Several political and ideological agendas have obscured the causes of water related problems and point to wrong solutions. This research attempts to reveal real causes of problems and propose pragmatic solutions.

X. Ancient technologies and water management practices

19. Angelakis, A. N., D. Koutsoyiannis & G. Tchobanoglous, Urban wastewater and stormwater technologies in ancient Greece, *Water Res.*, 39(1), 210-220, 2005. (30)

20. Koutsoyiannis, D., N. Zarkadoulas, A. N. Angelakis & G. Tchobanoglous, Urban water management in Ancient Greece: Legacies and lessons, *J. Water Resour. Plan. Manag.*, 134(1), 45-54, 2008. (11)

Questions addressed: How recent are the modern technologies and management practices in water supply, wastewater, and agricultural water use?

Remark: This research shows that the most important breakthroughs in hydraulic technology, water management and sanitation have been achieved as early as 2000-4000 years ago in Ancient Greece and earlier civilizations.

Significant research achievements in the last 10 years

Publications

My publications for the last 10 years include:

- 63 peer-reviewed papers in scientific journals (total 85)
- 38 book chapters and fully evaluated conference publications (total 53)
- 99 conference publications with evaluation of abstract (total 125)

The full list, which contains a total of 573 publications (including lecture notes, university theses, research project reports, technical reports of engineering studies, and miscellaneous publications), can be found at <http://itia.ntua.gr/en/pppp/2/>. A small selection is presented in the previous chapter.

The following table provides bibliometric data for my published work retrieved by scholar databases as well as my research team's database (itia.ntua.gr); where applicable (and the information available in the databases allows), the data that concern merely the last 10 years (2002–2011) are given in parentheses.

Source	Number of registered publications	Number of cited publications	Number of citations	H-index	HI norm
Google Scholar	331	196	2073	26	20
Institute of Scientific Information (ISI Web of Science/Cited Ref. Search)	146	146	1164	20	15
Institute of Scientific Information (ISI Web of Science/Standard Search)	70 (52)	61 (34)	977 (909)	20	15
Scopus	88 (63)	76 (52)	1179 (1101)	21	16
Scopus, excluding self-citations	88 (63)	72 (48)	906 (857)	18	15
itia.ntua.gr, excluding self-citations	573 (312)	150 (93)	1404 (1332)	20	17

Awards

I was awarded the Henry Darcy Medal 2009. This medal has been established by the Division on Hydrological Sciences of the European Geosciences Union in recognition of the scientific achievements of Henry Darcy. It is reserved for individuals in recognition of their outstanding scientific contributions in water resources research and water resources engineering and management. My Henry Darcy Medal Lecture is the following:

Koutsoyiannis, D., A random walk on water (Henry Darcy Medal Lecture), European Geosciences Union General Assembly 2009, Geophysical Research Abstracts, Vol. 11, Vienna, 14033, European Geosciences Union, 2009.

More information can be found at <http://itia.ntua.gr/896>. It was also published in the official Journal of the Division on Hydrological Sciences of the European Geosciences Union (see publication 12 of the previous chapter).

A similar honour was bestowed on me by the International Union of Geodesy and Geophysics (IUGG), which selected me as a plenary lecturer of its recent XXV General Assembly (entitled Earth on the Edge: Science for a Sustainable Planet; Melbourne, Australia; 27 June - 8 July 2011; see <http://www.iugg2011.com/speakers.asp>). My plenary lecture is the following:

Koutsoyiannis, D., Hydrology and Change, *IUGG 2011*, Melbourne, International Union of Geodesy and Geophysics, 2011.

More information can be found in <http://itia.ntua.gr/1135>.

Other invited talks and seminars

Koutsoyiannis, D., Rainfall disaggregation methods: Theory and applications, *Workshop on Statistical and*

- Mathematical Methods for Hydrological Analysis*, Rome, 1–23, Università di Roma "La Sapienza", 2003 (<http://itia.ntua.gr/570>).
- Koutsoyiannis, D., On the appropriateness of the Gumbel distribution for modelling extreme rainfall, *Hydrological Risk: recent advances in peak river flow modelling, prediction and real-time forecasting. Assessment of the impacts of land-use and climate changes*, Bologna, Italy, 2004 (<http://itia.ntua.gr/590>).
- Koutsoyiannis, D., and A. Efstratiadis, Climate change certainty versus climate uncertainty and inferences in hydrological studies and water resources management, *European Geosciences Union General Assembly 2004*, Nice, 2004. (<http://itia.ntua.gr/606>).
- Koutsoyiannis, D., Simple methods to generate time series with scaling behaviour, *European Geosciences Union General Assembly 2004*, Nice, 2004 (<http://itia.ntua.gr/607>).
- Koutsoyiannis, D., Similarities and scaling of extreme rainfall worldwide, *European Geosciences Union General Assembly 2005*, Vienna, 2005 (<http://itia.ntua.gr/653>).
- Koutsoyiannis, D., The scaling properties in the distribution of hydrological variables as a result of the maximum entropy principle, *European Geosciences Union General Assembly 2005*, Vienna, 2005 (<http://itia.ntua.gr/649>).
- Koutsoyiannis, D., The management of the Athens water resource system: Methodological issues, San Diego, *Hydrologic Research Center*, 2005 (<http://itia.ntua.gr/691>).
- Koutsoyiannis, D., The management of the Athens water resource system: Methodology and implementation, Atlanta, *Georgia Water Resources Institute*, 2006 (<http://itia.ntua.gr/698>).
- Koutsoyiannis, D., A new stochastic hydrologic framework inspired by the Athens water resource system, Atlanta, *Georgia Institute of Technology*, 2006 (<http://itia.ntua.gr/699>).
- Koutsoyiannis, D., A new stochastic hydrologic framework inspired by the Athens water resource system, Durham, N. Carolina, *School of Engineering, Duke University*, 2006 (<http://itia.ntua.gr/700>).
- Koutsoyiannis, D., A new stochastic hydrological framework inspired by the Athens water resource system, Bologna, *University of Bologna*, 2006 (<http://itia.ntua.gr/715>).
- Koutsoyiannis, D., S.M. Papalexiou, and A. Montanari, Can a simple stochastic model generate a plethora of rainfall patterns?, *Rainmap Achievements and the Future in Broad-Scale Rain Modelling*, Oxford, *Engineering and Physical Sciences Research Council*, 2007 (<http://itia.ntua.gr/789>).
- Koutsoyiannis, D., Entropy as an explanatory concept and modelling tool in hydrology, Rome, *Università di Roma "La Sapienza"*, 2008 (<http://itia.ntua.gr/879>).
- Koutsoyiannis, D., and T.A. Cohn, The Hurst phenomenon and climate, *European Geosciences Union General Assembly 2008*, Vienna, 11804, 2008 (<http://itia.ntua.gr/849>).
- Koutsoyiannis, D., Older and modern considerations in the design and management of reservoirs, dams and hydropower plants, *1st Hellenic Conference on Large Dams*, Larisa, 2008 (<http://itia.ntua.gr/886>).
- Koutsoyiannis, D., Seeking parsimony in hydrology and water resources technology (solicited), *European Geosciences Union General Assembly 2009*, Vienna, 2009 (<http://itia.ntua.gr/906>).
- Koutsoyiannis, D., Why (and how) to write and publish a scientific paper in hydrology?, *European Geosciences Union General Assembly 2010*, Vienna, 2010 (<http://itia.ntua.gr/975>).
- Koutsoyiannis, D., Some problems in inference from time series of geophysical processes, *European Geosciences Union General Assembly 2010*, Vienna, 2010 (<http://itia.ntua.gr/973>).
- Koutsoyiannis, D., Memory in climate and things not to be forgotten, *11th International Meeting on Statistical Climatology*, Edinburgh, *International Meetings on Statistical Climatology*, 2010 (<http://itia.ntua.gr/991>).
- Koutsoyiannis, D., Scale of water resources development and sustainability: #Small is beautiful, large is great, *LATSIS Symposium 2010: Ecohydrology*, Lausanne, *Ecole Polytechnique Federale de Lausanne*, 2010 (<http://itia.ntua.gr/1011>).
- Montanari, A., and D. Koutsoyiannis, Uncertainty estimation in hydrology: Incorporating physical knowledge in stochastic modeling of uncertain systems, *Invited Seminar at the University of Uppsala*, Uppsala, 2011 (<http://itia.ntua.gr/1156>).
- Christofides, A., and D. Koutsoyiannis, God and the arrogant species: Contrasting nature's intrinsic uncertainty with our climate simulating supercomputers, *104th Annual Conference & Exhibition*, Orlando, Florida, *Air & Waste Management Association*, June 2011 (<http://itia.ntua.gr/1153>).
- Koutsoyiannis, D., A hymn to entropy, IUGG 2011, Melbourne, *International Union of Geodesy and Geophysics*, 2011 (<http://itia.ntua.gr/1136>).

Participation in research projects in the last 10 years

I have been continually working in research for about 30 years. Most of my research activities were funded and this allowed to create and maintain continuously for 25 years, the research team *Itia* (Greek for willow tree – not an acronym), currently comprised of 18, highly qualified, research and academic staff. Past members of the team exceed 30, not counting more than 80 students conducting their graduate and postgraduate theses. Five present or past members of Itia are now academic staff, and two other are postdoctoral researchers. Itia is an open team with collaborators from all continents and has its own *open access* digital library which contains our papers, reports, books, educational notes, software, etc., as well as project data and information (itia.ntua.gr).

Detailed information about the funded projects can be found at <http://itia.ntua.gr/en/projects/>, while the most recent ones (in the last 10 years) are listed in the table below.

Title	Budget	Funder	Role in team	Start & end date
DEUKALION – Assessment of flood flows in Greece under conditions of hydroclimatic variability: Development of physically-established conceptual-probabilistic framework and computational tools	€145 000	General Secretariat of Research and Technology	Project director	03/2011–03/2014
Integrated study for the investigation of the quantity, quality and recovery of the underwater springs of the Stoupa region in Municipality of Lefktros, Messinia	€220 000	Municipality of Lefktros, Prefectural Government of Messinia	Project director	01/2009–12/2010
Flood risk estimation and forecast using hydrological models and probabilistic methods	€15 000	National Technical University of Athens	Project director	02/2007–08/2008
Nonlinear methods in multicriteria water resource optimization problems	€33 274	Ministry of National Education	Project director	11/2002–12/2007
Support on the compilation of the national programme for water resources management and preservation	€45 000	Ministry of Environment, Planning and Public Works	Project director	02/2007–05/2007
Investigation of management scenarios for the Smokovo reservoir	€60 000	Special Directorate for the Management of Corporate Programs of Thessaly	Project director	11/2005–12/2006
Integrated Management of Hydrosystems in Conjunction with an Advanced Information System (ODYSSEUS)	€779 656	General Secretariat of Research and Technology	Project director	07/2003–06/2006
Testing of the new measuring system of the aqueduct of Mornos	€55 407	Water Supply and Sewerage Company of Athens	Project director	01/2001–12/2003
Modernisation of the supervision and management of the water resource system of Athens	€706 047	Water Supply and Sewerage Company of Athens	Project director	03/1999–12/2003

Title	Budget	Funder	Role in team	Start & end date
Completion of the classification of quantitative and qualitative parameters of water resources in water districts of Greece	€99 481	Directorate of Water and Natural Resources	Project director	11/2001–04/2003
Maintenance, upgrading and extension of the Decision Support System for the management of the Athens water resource system	€72 000	Water Supply and Sewerage Company of Athens	Principal investigator	10/2008–09/2010
Building the Future of Transnational Cooperation in Water Resources in South East Europe (EDUCATE!)	€200 000	European Union	Principal investigator	05/2006–08/2008
Investigation of scenarios for the management and protection of the quality of the Plastiras Lake	€39 618	Prefectural Government of Karditsa, Municipality of Karditsa	Principal investigator	05/2001–01/2002
EU COST Action C22: Urban Flood Management	N/A	EU-COST	Member of the Steering Committee	06/2005–12/2007
Observations, Analysis and Modeling of Lightning Activity in Thunderstorms, for Use in Short Term Forecasting of Flash Floods	N/A	EU/FP6-SUSTDEV-2005-3.II.1.2	Researcher	09/2006-09/2009
Investigation and remedy of the stability problems of the banks and bed of the Philothei Creek using mathematical models and modern environmental methods	€74 500	Municipality of Filothei	Researcher	03/2004-09/2004