Research and Development

A Periodical of the University of Thessaly

Research Committee of the University of Thessaly
Office for Technology Transfer and Research Support

Issue 01 / 2015

Thales Programme

DeMuCiV: Designing the Volos City Museum

Excellence II

BIOREMEDIATOMICS

Distinguished Researcher

Youth sport and PhysicalEducation's potential for positive youth development

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Research Committee
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Introduction Note President of Research Committee

Mamuris Zissis,
Professor,
President of Research Committee University of Thessaly & Vice-Rector University of Thessaly

In the 26 years since it was established, the University of Thessaly has acquired a distinctive character, built a strong academic identity in individual sectors and has established itself as one of Greece's most dynamic and important universities.

Teaching and research at the university are conducted in its six faculties and eighteen departments. Fully aware of its role as a new institution in Thessaly, a biodiverse region located in the heart of Greece that is rich in agricultural production and has an extensive production base and high-level biomedical services, the university has invested in research and innovation.

In Greece, which has been ravaged by the biggest economic downturn in decades and where the crisis has affected the productive sector, research and innovation are powerful weapons that can help pull the country out of the crisis. Investment in research is the only way to prevent the leakage of high-level scientists, which is one of the worst wounds inflicted by economic migration, help to curb unemployment and return the country to growth.

Our university possesses high-quality research potential, marked by its significant involvement in competitive research programmes and its expertise to undertake studies and to provide highly skilled services.

In this context, the university's Special Fund for Research Grants (ELKE) is a key driver of growth. In the current climate, it has offered essential support to the research, economic and developmental course of the entire university.

In an effort to highlight and disseminate the rich work undertaken by our academic community in research and innovation, the university's Research Committee has decided to launch, with this issue, an online magazine which will be published every two months.

THALES PROGRAMME_

DeMuCiV: Designing the Volos City Museum

Using historical research and the development of innovative interactive environments for the distribution of scientific knowledge

Part of Thalis programme, the DeMuCiV research project deals with the historical and anthropological study of urban phenomenoin Volos, the creation of databases on the later and on the modern history of the city and its inhabitants, and the production of databases and interactive applications aimed at the wide dissemination of the research findings through the creation of Volos City Museum. The research is being conducted in collaboration with the Department of Archives, Museums and Libraries of Volos Municipality. The building that will house the future city museum is located in the historic quarter of the city, called the Palia.
The research project is financed by the Ministry of Education and the European Union.

The proposed project encompasses the following:

1. A historical and anthropological research project that will highlight the city's social structure, economic and productive activities and its relationship with its surroundings within a local, regional, national, Mediterranean, European and global framework.
2. A comparative urban planning and architectural study of the city of Volos as a Mediterranean space.
3. Research on the design and realisation of models for the management and further exploitation of the material that will be gathered and of the findings of the research for educational and other related purposes.
4. Research on the exploitation of new technologies with a view to presenting and propagating the findings of the

proposed project, on a standard basis, in Volos City Museum, which hasn't finished yet.

Three research groups are collaborating in this project:

1. The Laboratory of Environmental Communication and Audiovisual Representation group of the Department of Architecture of the University of Thessaly, with V. Bourdakis as coordinator and G. Papakonstantinou, S. Papadopoulos as members
2. The "Volos in the modern and contemporary periods" group of the Department of History, Archaeology and Social Anthropology of the University of Thessaly, with Riki Van Boeschoten as coordinator and I. Laliotou, H. Agriantoni, V. Giakoumaki as members
3. The "Volos in the Network of Mediterranean cities, Transportation, Economic and Cultural Contacts" group of the School of Architecture of the Aristotle University of Thessaloniki, with V. Hastaoglou as coordinator and E. Maistrou, E. Athanasiou and C. Christodoulou as members and Cristina Pallini (Department of Architectural Design, Polytechnic University of Milan) as an external research collaborator
The research project is coordinated by G. Papakonstantinou of the Department of Architecture.
This project seeks to contribute to on-going academic debates on the use of new technologies in the representation of the past and their role in transforming the public uses and educational potential of historical knowledge.

The innovative aspect of our efforts lies in the following areas:

- Research design and methodology. The scope of this research project transgresses multiple disciplinary boundaries as every step of the investigation is dependent on the collaboration between social sciences, humanities, architecture and urban planning.
- Knowledge production and interactive digital mediation. The traditional diffusion practices of scholarly historical knowledge and ethnographic findings are confined to academia and formal educational institutions. Our research aims at providing innovative practices of producing and mediating historical and anthropological knowledge in forms that enable access by multiple publics (museum visitors, educators, students, artists, etc.) This will be partly achieved through the use of narrative and digital media that enable the audio-visualisation of historical information and by the elaboration of open-ended narrative structures that provide users with contemporaneously lived experiences of the urban past. A major goal of the proposed project is to envision and apply innovative practices of informal historical education and to provide a platform for future educational and training activities and collaborations with teachers, students, artists, cultural practitioners, administrators, etc.
- Museum conceptualisation and design. The museum is viewed as a translocal public space. This research project aims at initiating innovative practices of museum design in Greece in so far as the exhibits that we are proposing are not, as it is often the case, derived from already existing collections of items and information but on the findings from on-going interdisciplinary original research. Our research groups consider the museum as a translocal public space that is constructed by – and accommodates – empirical and applied research processes and findings. The translocality is provided by the interaction of multiple levels of knowledge production (research), presentation (exhibits) and use (museum visits, education, cultural training etc.)

BIOREMEDIATOMICS

The microbial detoxification of pesticides in the fruit-packaging industry: using omics in bioremediation

http://bioremediatomics.bio.uth.gr/

Dimitrios Karpouzas,
Associate Professor, Enviromental Microbiology & Biotechnology

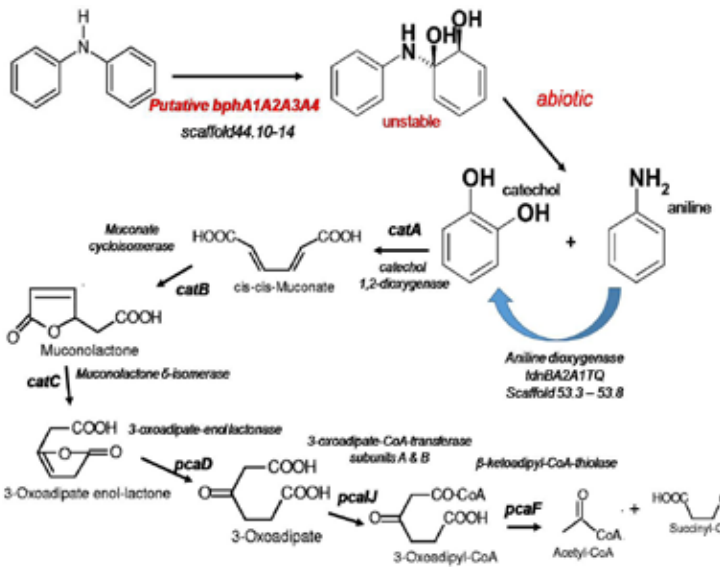
Pesticide application in fruit-packaging plants constitutes the most common method of protecting fruit during storage. Upon harvest, fruit is treated with dense aqueous solutions (0.4-2 g/L) of fungicides and antioxidants to control fungal infestations or prevent the appearance of the physiological disorder of apple scald during storage. Those pesticide application practices result in the production of high wastewater volumes which should be detoxified prior to their environmental release. Pesticides used in fruit-packaging plants are considered to be highly toxic to aquatic organisms (ortho-phenylphenol, diphenylamine, thiabendazole, imazalil) while some of them (thiabendazole, imazalil) are particularly persistent in the environment. Based on the above, the European Commission only permits the use of these pesticides by fruit-packaging plants if the wastewater produced is detoxified on site. However, no effective, simple and economic systems are available to treat wastewater produced by the fruit-packaging industry. In the absence of such systems, fruit-packaging plants tend to release their wastewater into nearby fallow fields or directly in sewage treatment plants, with both methods entailing a risk of environmental contamination. Biological methods for the detoxification of wastewater or bioremediation of contaminated disposal sites might be the way forward.

The BIOPLANET (Plant and Environmental Biotechnology) research group of the University of Thessaly has isolated soil bacteria that could rapidly degrade the pesticides used in the fruit-packaging industry (thiabendazole, orthophenyphenol, diphenylamine). In particular, the BIOPLANET inventory consists of

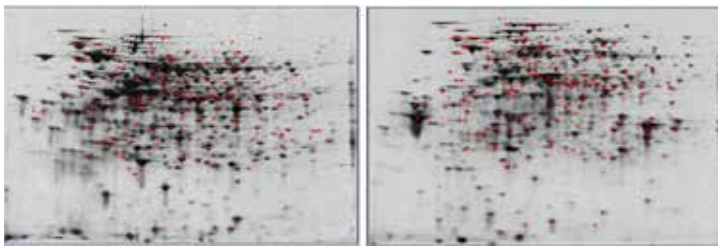
a)a *Sphingomonas haloaromaticamans* strain which is able to rapidly degrade the ortho-phenylphenol and use it as a C source,

1. A Sphingomonas haloaromaticamans strain, capable of degrading the fungicide ortho-phenylphenol, growing on an agar plate.

b) a *Pseudomonas monteilii* strain which has the capacity to utilise the antioxidant diphenylamine as a C and N source and
c) a bacterial consortium comprised of five proteobacteria which includes a *Sphingomonas* sp. which was identified, via q-PCR and stable-isotope probing techniques, as responsible for the degradation of thiabendazole while the remaining members are involved in the further transformation of the metabolic products produced. Those microorganisms could be used as microbial inocula for biological treatment systems used for the depuration of wastewater from the fruit-packaging industry or for the bioaugmentation of soils from wastewater disposal sites which have accumulated high amounts of pesticides.



3. The metabolic pathway of diphenylamine from the isolated strain Pseudomonas monteilii as it was identified via genomic analysis.



2. Proteomic analysis of the Sphingomonas haloaromaticamans strain growing on succinate or ortho-phenylphenol.

Little is known regarding the microbial degradation of those pesticides, the metabolic pathways and the genes/enzymes responsible for the detoxification of those pesticides. This information is considered necessary for their practical use in bioremediation strategies. Thus Bioremediatomics aims to explore the biological treatment of wastewater contaminated with high pesticide loads using a multidisciplinary approach including omics (genomics, proteomics, transcriptomics), classic molecular biological methods (recombineering) and advanced analytical methods.

Thus, a parallel genomic and proteomic analysis of the pesticide-degrading isolates enabled the detection of genes/enzymes responsible for the microbial metabolism of pesticides. The catabolic enzymes which are up-regulated during pesticide degradation will be identified and the expression pattern of the relevant genes will be determined via RT-q-PCR analysis. Key-enzymes in the metabolic pathway of the studied pesticides will be isolated, purified and characterised, while further efforts will concentrate on the isolation of novel catabolic enzymes directly from pesticide-polluted soils via functional metagenomic approaches. All the above activities will provide first evidence for the metabolic pathways of the pesticides which will be further verified via advanced analytical methods (HPLC-DAD, HPLC-MS/MS). Finally, the practical exploitation of those microbes for the bioaugmentation of soils from wastewater disposal sites from Cyprus will be explored.

4. The Research Group of Plant and Environmental Biotechnology of the Department of Biochemistry and Biotechnology.

Research Group

University of Thessaly, Department of Biochemistry and Biotechnology

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Miss Konstantina Rousidou, PhD student, BIOPLANET

Aristotle University of Thessaloniki

Athanasios Mollasiotis, Assistant Prof. in Pomology, School of Agriculture
Dr Georgia Tanou, Postdoc, School of Agriculture

Agricultural Research Institute of Cyprus

Dr Michalis Omirou, Researcher in Environmental and Agricultural Biotechnology

Recent and relevant publications

1. Perruchon C., Patsioura V., Vasileiadis S., **Karpouzas D.G**., (2014) Isolation and characterization of a *Sphingomonas haloaromaticamansable* to degrade the fungicide *ortho*-phenylphenol. *Pest Management Science* (minor revisions)

2. Perruchon C., Zouborlis, S., Batianis C., Vasileiadis S., **Karpouzas D.G.**, (2014) Isolation and characterization of a *Pseudomonas monteiliistrain* able to degrade the antioxidant diphenylamine used in the fruit packaging industry. *Bioresource Technology* (submitted)

3. Perruchon C., Pantoleon A., Omirou M., Menkissoglu-Spiroudi, U., Vasileiadis S., Chatzinotas A., **Karpouzas D.G.**, (2015) Isolation and characterization of two bacterial consortia able to degrade the persistent fungicide thiabendazole. *FEMS Microbiology* Ecology (to be submitted)

The Distinguished Researcher Award 2012 for the Humanities and Social Sciences was awarded to Dr. Mario Gouda.

The potential of youth sport and physical education for positive youth development

Dr Marios Goudas,
Associate Professor
Psychology of Physical Education

Despite the widespread belief that participation in sport positively affects children's and adolescents psychosomatic development, several studies have demonstrated that for a good percentage of children sport participation is related with negative experiences while participation rates drop sharply after 12-14 years of age

The respective literature focuses on specific characteristics of sport and Physical Education (PE) that facilitate children's positive development. Towards this aim, I have pursued four distinct lines of research collaborating with several colleagues from the Department of Physical Education and Sport Science of the University of Thessaly and from abroad. These lines of research delineate specific attributes of sport and PE necessary for assisting youngsters to achieve their full potential in life.

The first line of research examined factors contributing to the development of intrinsic motivation in sport and PE. Intrinsic motivation refers to one's participation motives for the pure pleasure and satisfaction emanating from participation. Intrinsic motivation is enhanced when three basic psychological needs of youngsters are satisfied: The need for competence refers to one's need to feel successful in the environment s/he acts. A focus on personal improvement rather than on surpassing others facilitates the fulfillment of this need.

The need for autonomy refers to the youngsters perceptions whether their participation and respective actions are their choice. The need for relatedness refers to one's need to be connected with others and to belong to a group. For example, a sense of security, support and acceptance form the coach and good relationships with teammates positively affect an athlete's satisfaction and enjoyment from training with a subsequent positive effect on performance.

Enhancing intrinsic motivation through the fulfillment of the three basic psychological needs requires specific teaching and coaching methods such as a focus on personal improvement, the provision of choices and positive feedback and the employment of alternative teaching styles.

The second line of research focuses on life-skills teaching through sport and PE. Life-skills are those skills that once learned can be transferred and applied in other environments to facilitate personal development. Youth sport and PE are ideal environments for teaching life-skills because challenges in sport resemble challenges in life. For example, children can be taught in PE how to set goals and think positively in relation to sport and after mastering these skills to use them in everyday life. The life-skills programs we have developed and applied have shown that life-skills can be effectively taught in conjunction with sport skills. Our results showed that youngsters are able to use these skills in other pursuits on their lives.

The third line of research has focused on teaching of self-regulatory skills through sport and PE. Self-regulation refers to processes students employ for setting learning and performance goals, for monitoring the learning process, for strategy use for for performance enhancement, for evaluating performance outcomes and for re-adjusting goals. Thus, useful skills that can be taught are self-monitoring of learning and performance, self-evaluation and self-reflection. These skills can assist youngsters to learn more effectively and to enhance their performance in sport and PE. In addition they can be valuable assets for their personal development and life-long learning.

The fourth line of research focuses on youngsters' health-related physical activity. Reduced physical activity in combination with other health-compromising behaviors (e.g. poor diet, smoking) constitutes a threat for youth health and a long-term risk factor. Sport and PE can enhance physical activity but more importantly they can contribute to the development of positive attitudes towards life-long participation in physical activities. Youngsters should be provided with positive sport experiences and learn how to exercise on their own.

In conclusion, these four lines of research constitute a heuristic framework for coaches, physical educators, youth sport clubs, and local authorities to organize youth sport and PE with the aim of positive youth development. Youth sport and PE can contribute substantially to prepare youth to face the challenges of modern societies.

Counselling in Mental Health/Psychotherapy & Counselling in Education/School Counselling

School of Humanities and Social Sciences University of Thessaly
Department of Special Education

The scope of this master's programme is the training of scientists of different specialties in counselling psychology and counselling. The MSc is a bimodular programme with two mandatory orientations:

1. Counselling in Mental Health/Psychotherapy
2. Counselling in Education/School Counselling

A two years' intensive programme worth 150 ECTS, the course is essentially based on the integrative approach to counselling/psychotherapy with a strong existential and cultural/multicultural orientation. This approach incorporates aspects of theory and practice from five main therapeutic traditions: existential-humanistic, cultural-multicultural, systemic, cognitive-behavioural and psychodynamic. Students are encouraged to explore psychological processes and experiences from these different perspectives. Integrative theory and practice are at the forefront of counselling and psychotherapy theory, practice and research. Increasingly, integrative approaches are seen as offering the greater flexibility required to meet the wide range of needs and client groups presenting for counselling/psychotherapy. At its best, integration necessitates greater critical reflection on interventions and understandings than traditional single model training/practice.

The purpose of the programme is the provision of specialised knowledge and the development of appropriate skills in counselling/psychotherapy with regards to:

- Regular and special education
- Mental health, psychological well-being and work settings

- People with disabilities
- Cultural and multicultural dimension of counselling for minorities

Achieving the aforementioned objectives is a difficult, multilateral and complicated procedure and, for that reason, students' education and training include:

a) Personal development work: Forty (40) hours a year (1 hour/week) of individual counselling for each student and sixty (60) hours a year (1.5 hours/week) of group counselling

b) Theoretical modules: Ten (10) theoretical courses in the area of counselling

c) Experiential skills workshops: Three (3) workshops in counselling intervention techniques and a series of intensive, specialised seminars in counselling of applied-practical character

d) Research: Two (2) courses in quantitative and qualitative research methods and a thesis

e) Work placement: One thousand one hundred (1,100) hours on an internship, with one hundred and twenty-two (122) of individual and group supervision

SPECIAL EDUCATION

School of Humanities and Social Sciences University of Thessaly
Department of Special Education

The aim of this master's programme, run by the Department of Special Education of the University of Thessaly, is to provide professionals from different scientific fields with an expertise in Special Education.

The programme provides the theoretical and practical background necessary for identifying and understanding the characteristics of students with special educational needs as well as for designing, implementing and evaluating the appropriate educational interventions. It also aims at developing support systems for students with special educational needs while at the same time using the existing knowledge in the field of special education.

Within this framework, this programme may lead to three (3) specialisation fields:

A. Education of Students with Special Needs
B. Learning Difficulties
C. Language Development, Language Pathology and Educational Intervention

Programme graduates will be able to:

- Identify and understand the characteristics of children with special educational needs
- Design appropriate educational interventions and teaching approaches
- Implement and evaluate the relevant educational interventions
- Suggest ways of using empirically based data within the field of education

Graduates of universities or technological education institutes in Greece or equivalent academic institutions may apply for this programme through an open call process. Applicants who have submitted all the relevant documents are required to sit a written examination, organised especially by the Department of Foreign Languages of the University of Thessaly, to evaluate their English-language proficiency. Applicants who pass this test will then sit written exams in the following three subjects:

A. Special Education
B. Research Methods in Education
C. Theories of Learning

Automation in irrigation, in agricultural structures and in agricultural mechanisation

Department of Agriculture, Crop Production and Rural Environment of the University of Thessaly.

This new master's programme is organised by the Department of Agriculture, Crop Production and Rural Environment of the University of Thessaly.
The programme aims to provide postgraduate education and specialisation to agronomists and automation engineers in the field of automation in irrigation, in agricultural structures and in agricultural mechanisation. Multidisciplinary in approach, it combines the most modern scientific and technological developments in the fields of both automation and agriculture.

The main characteristic of the programme is the originality of its concept. It is the first postgraduate programme of its kind is Greece that deals with an area that is so critical for the Greek as well as European economy. The programme promotes scientific knowledge and the advancement of research in the area of automation in agriculture, with emphasis on irrigation, agricultural structures and agricultural mechanisation.

Thus, it will succeed in educating specialised scientists capable of filling responsible positions in the civil service or in private enterprises in the above fields, in this way contributing to the production of high quality, competitive products.
The postgraduate programme, which leads to a master's degree, is addressed to graduates of agricultural departments from Greek or foreign universities as well as automation departments from Greek technological education institutes or similar institutions in other countries. The selection of candidates will be conducted by the selection committee for MSc students, without applicants having to take written exams.

The curriculum of the programme consists in two (2) semesters, during which postgraduate students will attend seven (7) postgraduate courses and complete a MSc thesis.
Programme graduates will be suited for employment in all agricultural areas where automation is used: agricultural production units, agricultural industries, industries producing agricultural machinery, irrigation companies, green houses, cooperatives, technical companies involved in agricultural machinery and automation, etc.

Moreover, the graduates will be equipped with all the necessary skills for engagement in additional application areas, such as in industrial automation applications as well as in the use of agricultural informatics.

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