

# PHD THEME ANNOUNCEMENT

## DOCTORAL SCHOOL OF Plant and Horticultural Sciences

**Title:**

Development of a detailed soil map with digital soil mapping methods for the watershed of Lake Balaton

**Supervisors:****Internal:**

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**General field of study:** Agricultural Sciences

**Study area:** Plant production, soil fertility and environmental effects of soil use

**Place of study:** University of Pannonia, Georgikon Faculty  
Department of Plant Production and Soil Science  
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**Description:**

Several authors pointed out lately the rapidly increasing need for detailed soil information. This demand has brought into existence the term and the research field of „digital soil mapping”. Digital soil mapping covers development of methods that integrate existing soil information (such as legacy soil maps or databases) and auxiliary soil information that usually have higher spatial resolution (geological and land use maps, spatial and aerial photos, multispectral images, digital elevation models) and develops methods that evaluate usefulness and accuracy of the resulting maps for different purposes.

Hungary is rich in legacy soil information. We have the Kreybig soil maps (1:25,000 1931-1951), Géczy soil maps (1:25,000 1958-1961), database of the land evaluation reference sites (1980'ies) and the agrochemical database (1978-1990). All of these have relatively high spatial resolution and nationwide coverage. Further we have 1:10,000 soil maps (1960-1990) for some 50 % of the country and a continuously growing active agri-environmental database on soils. The integration of these soil data with the above mentioned auxiliary data allow us now to develop a multi-purpose soil information system to support decision making in agri-environmental policy (Water Framework Directive) and agricultural development (National Irrigation Program).

The quality of most of the European water bodies should reach the „good” status by 2015 according to the Water Framework Directive. Lake Balaton is, unfortunately, far from that. Even for the last few years some deterioration of the water quality has been observed despite of the successful prevention of point source loads. Any further improvement can be achieved by the prevention of non-point source loads and regulation or watershed processes. Hence, this requires detailed soil information.

The PhD has the objective to develop a comprehensive soil information system that will be able to provide detailed information on the most crucial soil properties affecting diffuse nutrient load (infiltration, hydraulic conductivity, erodibility). The work will be conducted in Transdanubian study areas with special emphasis on watershed of Lake Balaton. To achieve objectives, data evaluation methods will be used such as cluster analysis, discriminant analysis, principal component analysis, variogram tests as well as kriging and other spatial estimation methods.

Data and test watershed background will be provided by University of Pannonia while theoretical background for spatial data analysis will be provided by the Eötvös Lóránd University.

**Research background at the department:**

National Research Project: Management alternatives for reducing diffuse phosphorus load from the watershed of Lake Balaton, 2001-2004 ([http://w3.georgikon.hu/nkfp/NKFP\\_English%20ESRI.pdf](http://w3.georgikon.hu/nkfp/NKFP_English%20ESRI.pdf)); EU FP5 project: An Environmental Soil Test to Determine the Potential for Sediment and Phosphorus Transfer in Run-off from Agricultural Land, 2000-2004; GVOP-3.1.1.2004-05-0383/3.0 Development of an automated erosion model for the watershed of Lake Balaton accessible via the Internet and its adaptation for other areas. 2005-2006; COST 634 action On- and Off-site Environmental Impacts of Runoff and Erosion; 2004-2008; COST 869 Mitigation options for Nutrient Reduction in Surface Water and Groundwaters 2007-2011 (<http://www.georgikon.hu/cost869final/index.htm>); TÁMOP -4.2.2.A-11/1/KONV-2012-0064. Weather extremities due to climate change, their regional effects and the possibilities of damage amelioration 2012-2014

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**Important facts for the recent announcement:**

**Deadline:** 1st June 2013

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**Interview of the applicants:** June 2013 (date and place to be announced later)

**General information:** <http://phd.georgikon.hu/>

**Official topic announcement:** <http://phd.georgikon.hu/nktdi/doktori-temak-2013-2014>

**Georgikon Mapserver:** <http://map.georgikon.hu/en/>