INTERNATIONAL SOCIETY OF GEOSPATIAL HEALTH NEWSLETTER

MESSAGE FROM THE PRESIDENT

Dear GnosisGIS members and friends,

We are very happy to present the first newsletter of 2024, to update you on our recent activities and present the plans we have for this year.

Looking back at 2023, we can safely say that it has again been a very productive year both for our society and for our journal *Geospatial Health*. We have welcomed a good number of new members from diverse scientific backgrounds and from across the globe, and look back at the well-attended 16th International Symposium of Geospatial Health which was hosted by the Faculty of Geo-Information Science and Earth Observation (ITC) in the Netherlands. Our journal *Geospatial Health* is also going strong. A broad array of high-quality academic research was published, resulting in an increased impact factor for the journal, thanks to the continued leadership of Dr. Robert Bergquist, our Editor in Chief.

For 2024 our aim is to further strengthen GnosisGIS and the journal. This year we will organize our annual symposium in conjunction with the 14th European Multi-colloquium of Parasitology (EMOP), which will take place in Wroclaw, Poland, August 26-30, 2024 (more details provided below).

Best wishes, stay healthy and keep safe,
Sherif

GNOSISGIS 2024 - Wroclaw, POLAND

We are happy to announce that GnosisGIS will actively contribute to the **14th European Multi-colloquium of Parasitology, which will take place in Wrocław, Poland, August 26-30, 2024**. EMOP-XIV is hosted by the University of Wroclaw.

GnosisGIS will contribute via a dedicated symposium (https://emop2024wroclaw.eu/programme) titled "Artificial Intelligence and Digital Health: Multidisciplinary Examination of Potential Applications in Geospatial Analysis". Further details will follow soon, so keep an eye on our website (www.gnosisgis.org).

It would be great if we can all meet again in beautiful Wroclaw!

NEWS ITEMS

HANDOVER OF GNOSISGIS SECRETARIATE

After many years of dedicated work for GnosisGIS, **Jen McCarroll** handed over the secretariat and treasurer tasks during the 2023 GnosisGIS symposium. The Faculty of Geoinformation Science and Earth Observation (ITC), of the University of Twente, the Netherlands takes over this role for the coming years.

Jen has - in a superb manner - taken care of financial matters, provided extensive support when organizing the annual GnosisGIS symposium, and has been the liaison and information source for the members of our society ever since the early stages of the International Society of Geospatial Health.

We thank Jen dearly for her hard work, dedication, and the essential support she provided for our society.

NEW MEMBER GNOSISGIS EXECUTIVE COMMITTEE & ASSOCIATE EDITOR OF GEOSPATIAL HEALTH

Dr. Behzad Kiani earned his PhD from Mashhad Medical School, Iran, in 2017, marking the initiation of his illustrious academic journey. Behzad served as an Assistant Professor at the same Department from 2018 to 2022, where he contributed significantly to the field through his teaching and research endeavors. He then broadened his horizons as a Postdoctoral Researcher working on urban health at the University of Montreal, Canada, from 2022 to 2023, delving deeper into the intricacies of spatial epidemiology.

Currently, Behzad holds the position of Research Fellow of Infectious Diseases Spatial Epidemiology at the University of Queensland Centre for Clinical Research, Australia, where he continues to make ground-breaking contributions to the field. His research interests encompass geoinformatics and spatial epidemiology, with a focus on digital health and

methodological excellence in spatial epidemiology.
Behzad does not consider himself a subject expert, despite his experience working across various domains such as cancer research, urban health, infectious diseases, and social epidemiology. However, he may be considered an experienced researcher in utilizing spatial epidemiology and digital health for his studies. Behzad's home page.

GNOSISGIS 2023 – ENSCHEDE, THE NETHERLANDS

The 16th International Symposium on Geospatial Health was hosted by the University of Twente, the Netherlands.

The leading title of GnosisGIS 2023 was '*Interdisciplinary Geospatial Research for Planetary Health*' and explored subjects such as new data sources, emerging technologies, data-driven approaches, spatio-temporal methods, and impacts of climate change, human activities, and animal interaction on human and veterinary health.

The 2023 symposium was well attended with close to 40 F2F participants, and around 10 remote contributions. GnosisGIS 2023 presented an interactive symposium format, combining pre-symposium technical workshops on Spatial Statistics and Agent-Based Modelling, a keynote presentation, a panel discussion on the future of Geospatial Health as a scientific domain, scientific sessions, poster presentations, and a visit to ITC's advanced Geo-Science Laboratories.

A match-making session for joint proposal writing, and a discussion session on developing an ontology for Geospatial Health were also part of the program. We expect 10-15 peer-reviewed symposium contributions to feature in a special issue of Geospatial Health. A complete overview of the program including all abstracts can be found here.

We thank all participants and look forward to meeting you again in beautiful Wroclaw in August 2024.

GNOSISGIS 2023 – BEST PRESENTATION AWARDS

The scientific committee of GnosisGIS 2023 assessed all F2F and online presentations and unanimously concluded that not one, not two, but three contributions qualified as best presentation. The award consists of a free publication in Geospatial Health.

The authors of the best presentations were **Martina Nocerino & Nicola Lattero** (Department of Veterinary Medicine and Animal Production, University of Naples Federico II, Italy), **Sarsenbay Abdrakhmanov & Yersin Mukhanbetkaliyev** (S. Seifullin Kazakh Agro Technical Research University, Kazakhstan), and **Bart Roelofs** (Faculty of Spatial Sciences, University of Groningen, the Netherlands).

AWARD WINNER 1: NEW SUSTAINABLE TOOLS AND INNOVATIVE ACTIONS TO CONTROL CYSTIC ECHINOCOCCOSIS (NOCERINO & LATTERO)

Cystic echinococcosis (CE), caused by the larval stage of *Echinococcus granulosus*, is one of the most severe parasitic zoonosis worldwide distributed, especially in the Mediterranean area. The lifecycle of *E. granulosus* involves canids as definitive hosts and usually sheep and other herbivore species as intermediate hosts. Free-roaming dogs (owned and unowned) are the major source of echinococcosis and the most challenging category in dog population management for the control of CE. New sustainable tools are needed to implement the efficiency of CE control programmes, especially for definitive hosts. In this study, conducted in a highly endemic area of southern Italy, it was explored the combined use of Geographical Information Systems (GIS) and innovative devices (e.g., GPS collars, drone, camera trap) to identify the spatiotemporal patterns of the free-roaming owned dogs and to design new anthelmintic treatment strategies for wild canids gravitating near the CE positive sheep farms.

Read more on the innovative procedures and tools developed and exploited during the CE control programme in southern Italy (Campania region) to date: https://doi.org/10.1016/j.vetpar.2021.109347

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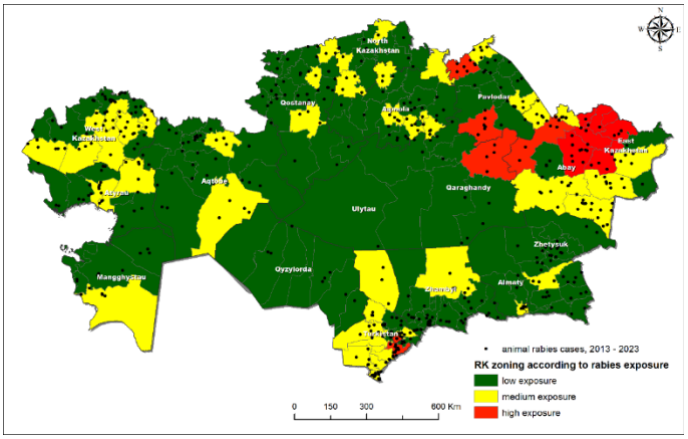
Award Winner 2: On the implementation of geospatial technologies to improve veterinary preventive measures and assess risks of infectious livestock diseases spread in the Republic of Kazakhstan (Abdrakhmanov & Mukhanbetkaliyev)

Currently, several research projects aimed at developing and improving a system for the prevention, surveillance, and risk assessment of infectious diseases of farm animals are being implemented in S. Seifullin Kazakh Agrotechnical Research University.

The main directions of these projects are: 1) testing methods for geospatial analysis of the epidemic situation for dangerous livestock diseases to develop approaches to risk-based surveillance; 2) creation of a database of epidemically significant veterinary facilities to support activities for surveillance and monitoring of infectious animal diseases, including zoonotic ones.

A spatiotemporal analysis and modeling were carried out to identify and forecast the patterns of rabies emergence among different animal species as a part of activities to support progressive rabies control in the country within the framework of the informal association MEEREB (Middle East, Eastern Europe, and Central Asia countries) (Kabzhanova et al., 2023). Modeling and assessment of the risks of introduction and spread of Peste des Petits Ruminants into the country has been performed (Abdrakhmanov et al., 2022; Yessenbayev et al., 2023).

A georeferenced database of objects that are potential points of contact between susceptible and healthy populations, as well as between animals and humans (livestock farms, slaughterhouses, livestock markets, etc.) was compiled. GIS symbols were developed to visualize these objects. Using remote sensing data, locations are identified, and maps are drawn up of potential contact of grazing herds with hazardous natural objects, anthrax burial sites, proximity to meat processing plants and other epidemically significant objects.



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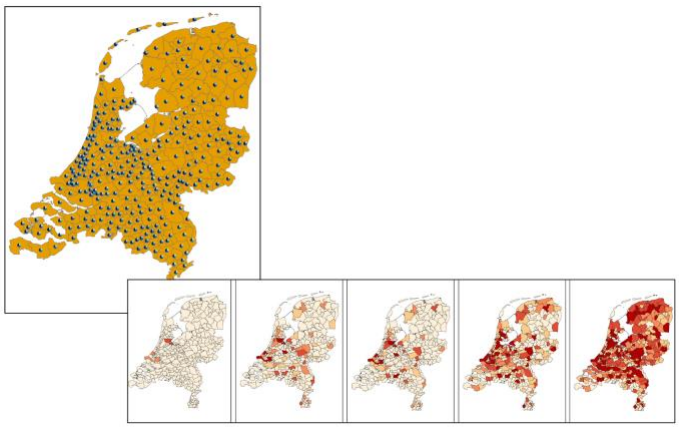
Award Winner 3: Mapping the space & time of disease data (Roelofs)

As geospatial experts, we know how to create good maps. We know what colors to pick in specific situations, and we think about the classification of our data. Creating a map of infection rates of a disease does not appear to be rocket science. But what if we want to map the progress of disease over a longer period? Do we create a map for each day of the outbreak? Are we going to aggregate the data? Perhaps make use of a certain type of symbology? Visualizing both spatial and temporal trends on a map is difficult, especially in the field of infectious disease, as all disease outbreaks occur within a unique spatio-temporal context.

In my presentation at the GeoHealth symposium at ITC, I've shared my thoughts on how I think we can structure the field of spatio-temporal visualization. By deconstructing the various ways you can map the space-time of disease, using the Generalized Space Time Cube framework [1], we are left with different operations which we can apply on data. With these operations as tools, we can approach the large variety of infectious disease datasets and create different combinations of mapping operations, each tailored to the spatio-temporal context of the specific disease outbreak.

Figures: The same disease dataset, displayed in two different types of disease maps.



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GNOSISGIS 2023 – PANEL DISCUSSION

The theme of the 2023 GnosisGIS panel discussion "**Geo-Information science and Earth Observation in human and veterinary public health: reflecting on successes, identifying challenges and future perspectives**" focused on the past, present and future of geospatial health research.

Panellists Laura Rinaldi (Department of Veterinary Medicine and Animal Production, University of Naples Federico II, Italy), Marc van den Homberg, Raúl Zurita-Milla, Justine Blanford (Faculty of Geo-Information Science and Earth Observation, University of Twente, the Netherlands), and Thomas van Rompay (Department of Communication Science, University of Twente, the Netherlands) each brought a unique perspective including veterinary science, disaster preparedness, methodology and technology, geography, teaching, and psychology.

In a lively discussion led by moderators Carmen Anthonj and Nils Tjaden (Faculty of Geo-Information Science and Earth Observation, University of Twente, the Netherlands), panellists discussed major achievements, current trends, and challenges as well as future perspectives in the Geospatial Health domain, also with regards to its relationship with adjoining scientific disciplines and professional stakeholders.

Outcomes of the panel discussion will be compiled into an article and published in the upcoming special issue of Geospatial Health.

GNOSISGIS 2023 – TOWARDS A BODY OF KNOWLEDGE FOR GEOSPATIAL HEALTH

Another interesting component of the 2023 GnosisGIS symposium, was the workshop on developing a Body of Knowledge for Geospatial Health (BoK-GH). Although this session took place on the last day of the symposium, we still had a good group of enthusiastic participants. The starting point of this workshop was the editorial published in Geospatial Health in 2022 under the title: "Does the Geohealth domain require a body of knowledge?".

We concluded that there is sufficient interest to start the development of the BoK-GH:
To give this project a kick-start, we need to:

- Get several GnosisGIS members interested in participating in this project. Most people attending the workshop volunteered to participate, and we are very grateful for this.
- Investigate if ITC is willing to host the BoK-GH, and GnosisGIS if it can publish it via their website.
- Search for seed funding to develop a prototype.

Several actions are being undertaken to see if seed funding can be acquired. **Dr. Ellen-Wien Augustijn** is in contact with some Dutch funding sources, and we will keep you updated on progress made.
In case you wish to participate in establishing the BoK-GH and/or see possible funding opportunities, please contact (p.w.m.augustijn@utwente.nl).

JOURNAL OF GEOSPATIAL HEALTH - EDITORIAL

From Snow's map of cholera transmission to dynamic catchment boundary delineation: current front lines in spatial analysis

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Abstract
The history of mapping infectious diseases dates to the 19th century when Dr John Snow utilized spatial analysis to pinpoint the source of the 1854 cholera outbreak in London, a ground-breaking work that laid the foundation for modern epidemiology and disease mapping (Newsom, 2006). As technology advanced, so did mapping techniques. In the late 20th century, geographic information systems (GIS) revolutionized disease mapping by enabling researchers to overlay diverse datasets to visualize and analyze complex spatial patterns (Bergquist & Manda 2019;

Hashtarkhani *et al.*, 2021). The COVID-19 pandemic showed that disease mapping is particularly valuable for optimizing prevention and control strategies of infectious diseases by prioritizing geographical targeting interventions and containment strategies (Mohammadi *et al.*, 2021).

Today, with the aid of high-resolution satellite imagery, geo-referenced electronic data collection systems, real-time data feeds, and sophisticated modelling algorithms, disease mapping has become a feasible and accessible tool for public health officials in tracking, managing, and mitigating the spread of infectious diseases at global, regional, and local scales (Hay *et al.*, 2013). [...]

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Read the full editorial here.