INTERNATIONAL SOCIETY OF GEOSPATIAL HEALTH NEWSLETTER

MESSAGE FROM THE PRESIDENT

Dear GnosisGIS members and friends,

Although these are times of continued uncertainty, we hope that you and your family are in good health and doing well. In spite of the pandemic, 2021 has been a productive year for our society. We have welcomed a good number of new members, were able to conduct an inspiring 14th International Symposium of Geospatial Health, and have published a broad array of high-quality academic research in our journal *Geospatial Health*.

The year 2022 will be special as we will - and hopefully in person - celebrate the 15th anniversary of our annual International GnosisGIS Symposium which will be organized in beautiful Naples, Italy on 28-29 June.

In case you have ideas, suggestions, and/or want to become more actively engaged in GnosisGIS, please drop me a line (s.amer@utwente.nl).

Wishing you and family happiness and success in 2022 !

Stay healthy & keep safe,

Sherif

UPCOMING GNOSISGIS SYMPOSIUM

THE 15TH INTERNATIONAL SYMPOSIUM OF GEOSPATIAL HEALTH – NAPLES 28 – 29 JUNE 2022

Save the date!: The 15th International Symposium of Geospatial Health will be held in Naples, Italy on 28 – 29 June 2022. Venue is the beautiful Centro Congressi Federico II. Further details will soon follow. Please keep an eye on our website www.gnosisgis.org. **Save the date!**

NEWS ITEMS

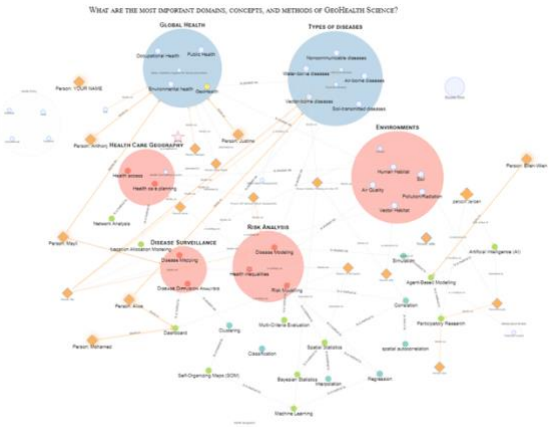
THE 14TH INTERNATIONAL SYMPOSIUM OF GEOSPATIAL HEALTH: A VERY SUCCESSFUL EVENT

The 14th International Symposium on Geospatial Health - organized by **Laura Rinaldi** and **Robert Bergquist** - took place in Belgrade, Serbia in October 2021 as part of the EMOP2021 conference *Changing Climate Changing Parasites* (https://emop2020.org). The symposium was set up in a hybrid manner and consisted of 10+ excellent presentations covering a diversity of subjects, study areas and methodological approaches. Topics ranged from COVID-19 monitoring, parasitic diseases, social sciences, to access to health care, and included contributions both from human and animal health.

Geographically, contributions came from Africa, Asia, Australia, Russia, Italy, Denmark, Sweden and The Netherlands, which illustrates that our society is truly international. The fact that this already was the 14th annual symposium also shows that our society is persistently fulfilling a scientific need. GnosisGIS might not be large but it remains an active society thanks to the efforts of its members who remain motivated to promote and scientifically advance the field of Geospatial Health.

AN ONTOLOGY FOR GEOHEALTH – CALL FOR COLLABORATION

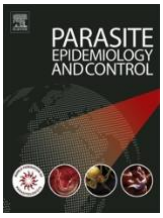
During the GeoHealth seminar in October 2021 at ITC, we announced the kickoff of a project to create an ontology for the GeoHealth domain. For those less familiar with the term, an ontology is a graphical representations of a scientific domain, consisting of concepts that belong to this domain, including the relationships between these concepts. Ontologies are particularly useful to stimulate reasoning but can also be used for course and curriculum development. An ontology of the GI-Science domain (for details see) and General Medical Science (for details see) already exist.



There are different ways to create an ontology, but we aim to create this ontology via discussion with domain experts, including the GnosisGIS community. We have selected the Living Textbook software for this implementation. In this software, we can store a digital concept map (Figure 1) as well as the description of each concept. In this way the ontology, once completed, can also be used as a textbook. Over time, we would like to create links with other existing ontologies such as the GIS&T Body of Knowledge. During the GeoHealth seminar, we created an initial version of the ontology with the participants (Figure 1). In the coming months, we intend to improve and extend this ontology via discussion with experts active

in geospatial health. Eventually, we would also like to establish an editorial board for this ontology to maintain it over time. In case you are interested in contributing to this project please contact **Dr. Ellen-Wien Augustijn** (p.w.m.augustijn@utwente.nl).

PROFESSOR UWEM FRIDAY EKPO APPOINTED AS JOINT EDITOR OF PARASITE EPIDEMIOLOGY AND CONTROL



On behalf of the GnosisGIS society, we congratulate **Uwem Friday Ekpo**, Professor of Parasitology and Epidemiology, Department of Pure and Applied Zoology, Federal University of Agriculture, Nigeria with this appointment.

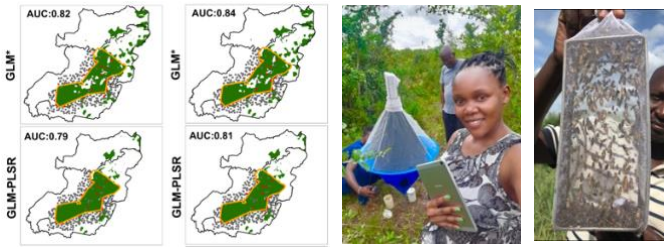
RESEARCH DOMAIN WATER SECURITY, WASH AND GLOBAL HEALTH AT THE FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION (ITC)

A great number of diseases are attributable to, or linked with, inadequate drinking water, sanitation and hygiene (WASH). At ITC, the research on water security, WASH and global health considers mainly topics that are connected with the United Nations Sustainable Development Goal #6: access to water and sanitation for all, how WASH infrastructure and behaviors can promote human health and how they can impair human health.

Multiple research projects are ongoing that look at how WASH can prevent water-related infectious diseases, how the WASH situation differs in different regions and among different populations in low-, middle- and high-income countries. Besides, research is ongoing that investigates the impact that water has on the functionality of WASH and the accessibility of health services, e.g. in times of flooding. Moreover in the context of water and health, local knowledge, health risk perceptions and impact on behavior are researched, and data is used to inform decision-making. More information on the research domain water security, WASH and global health, as well as various research stories and descriptions of projects lead by **Dr. Carmen Anthonj** via this link.

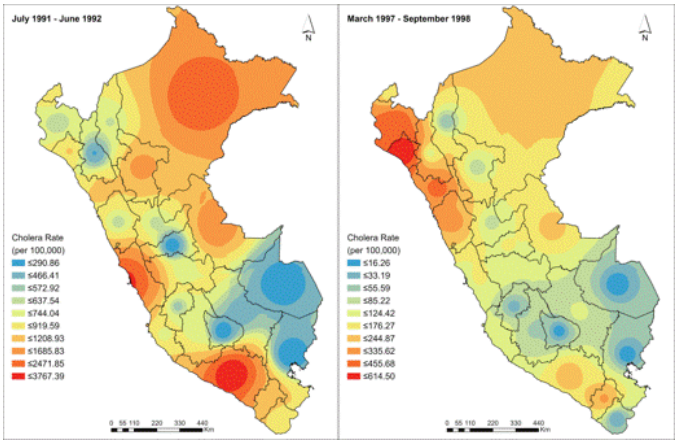
SATELLITE-BASED MODELLING OF POTENTIAL TSETSE (*GLOSSINA PALLIDIPES*) BREEDING AND FORAGING SITES USING TENERAL AND NON-TENERAL FLY OCCURRENCE DATA

Kwale County, Kenya - **Stella Gachoki**, who works at ICIPE (Kenya) and performs her PhD at the Natural Resources Department of the Faculty ITC predicted suitable habitats for tsetse flies (the most important vector for trypanosomiasis) to breed in and around Shimba Hills National reserve using occurrence data of newly emerged tsetse and environmental variables derived from time series of optical satellite data (Sentinel-2 and Landsat 8 OLI). A large fraction (63%) of the predicted suitable sites for teneral flies were within the Shimba Hills National Reserve, but also around other woodland areas their presence was predicted and confirmed. The findings of the study were published in the journal Parasites and Vectors. Read the full article here.



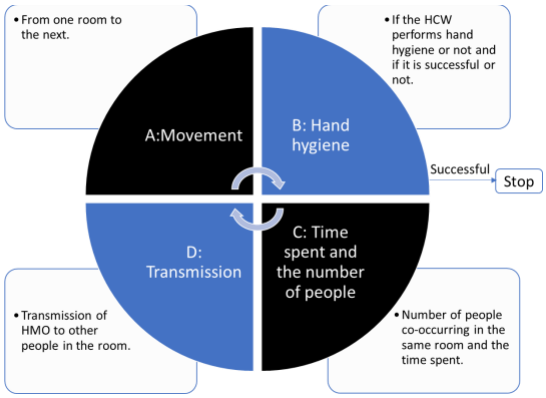
DECONSTRUCTING THE SPATIAL EFFECTS OF EL NIÑO AND VULNERABILITY ON CHOLERA RATES IN PERU: WAVELET AND GIS ANALYSES.

A recent study by **Ivan Ramírez** and **Jieun Lee,** University of Colorado, presents new insights about epidemic cholera during the 1990s in Latin America, which first emerged in Peru, and was linked to the air-sea phenomenon, El Niño. Using Wavelet and GIS analyses, the spatial relationships between sea surface temperatures and department-level cholera rates were estimated across regions in Peru. In addition, we generated social and disaster data indices to assess spatial vulnerability patterns during the extreme 1998 El Niño. The findings show that climate-cholera patterns varied across time and space: stronger connections in 1997-98, greater risk in northern coastal Peru; less clear connections in 1991-93, greater risk in central and southern coastal Peru. Overall, the study suggests that El Niño's impacts exacerbated cholera vulnerability following the emergence in 1991, rather than triggered the epidemic. Read the full article here.



A SPATIOTEMPORAL SIMULATION STUDY ON THE TRANSMISSION OF HARMFUL MICROORGANISMS THROUGH CONNECTED HEALTHCARE WORKERS IN A HOSPITAL WARD SETTING

Recently, a study was published by ITC PhD candidate **Magnus van Niekerk et al**, on the transmission of harmful microorganisms in hospital wards. The results are based on a four-part agent-based model (see figure below) informed by empirical healthcare worker tracking data collected using RFID sensors and various levels of hand hygiene compliance and transmission probabilities.



They showed that nurses are potential super-spreaders as they were responsible for 70.68% of all contacts with other healthcare workers and patients, which is more than five times that of doctors (10.44%). In addition, it was found that nurses are more likely to transmit harmful microorganism transmission during weeknights (5 pm – 7 am) and weekends than weekdays (7 am – 5 pm).

These insights can be used to evaluate spatiotemporal safety behaviours and develop more effective infection prevention and control strategies. Read the full article here.

JOURNAL OF GEOSPATIAL HEALTH

The changing risk of vector-borne diseases: Global satellite remote sensing and geospatial surveillance at the forefront

Robert Bergquist,[1] Jeffrey C. Luvall,[2] John B. Malone[3]

[1]Ingerod, Brastad, Sweden; [2]National Aeronautics Space Administration (NASA), Huntsville, AL, USA; [3]Department of Pathobiological Sciences, Louisiana State University, Baton Rouge, LA, USA

Introduction

The threat of climate change has already translated into early signs of a changing distribution of vector-borne diseases; where will they go next? The global, average temperature, regularly recorded since 1880, has passed 1°C above the mean of the period monitored. In addition, the higher the latitude, the more pronounced the temperature change.

On 6 August 2021, the United Nations Inter-governmental Panel on Climate Change (IPCC) released the report by its working group on the Physical Basis of Climate Change (IPCC, 2021). There are two other working groups: one on Impacts, Adaptation and Vulnerability, the other on Mitigation of Climate Change; together with the first group they will jointly issue IPCC's Sixth Assessment Report (AR6) next year. The already available working group report is the most elaborate attempt so far to understand the climate system and it warns that an average global warming by 1.5°C can only be avoided if massive and immediate cuts in greenhouse gas emissions are made. Thus, we are dangerously near a tipping point that could lead to irreversible climate changes. Read the full editorial here

GEOSPATIAL HEALTH – SPECIAL ISSUE COVID-19

The invitation to publish in a special issue of *Geospatial Health* on Covid-19 has resulted in a large number of submitted manuscripts.

However, since it is of interest to also include research results of the new Omicron wave of infections, the original deadline of 31 December 2021 has been **extended to 30 January 2022**. It is now planned to finalize the issue within the month of February 2022. Further information on the journal is here.