DEEP DIVE INTO THE SYSTEM-WIDE IMPLICATIONS OF THE CORONA OUTBREAK

HARITH ALANI AND TINA COMES ABOUT THE HEROS PROJECT

Our 4TU RE Scientific Vice Director **Tina Comes** and Resilience Fellow **Harith Alani** have been awarded with a European project on the outbreak of the corona virus. During this 3-year HERoS project, they will dive deeper into the system-wide implications of this corona virus. In this double interview they tell us about this project. If you are interested or would like to collaborate, please do get in touch with them!

Tina Comes | **Who are you?**
I am Associate Professor at the Faculty Technology, Policy and Management at the TU Delft. Since my PhD, I have been determined to better understand decision-making of individuals and groups in the context of risk, disasters and resilience. My work therefore combines decision-theory and operations research with behavioural and cognitive aspects of decisions. In the 4TU RE centre, I serve as the Scientific Vice Director. I am passionate about multi-disciplinary collaborations, as these provide great opportunities to learn, stimulate creativity and generate new scientific ideas and insights. This is especially important in a complex domain such as resilience, which requires us to bring together engineering and social sciences.

What is the HERoS project about and how are you involved in this project?
The HERoS project is an H2020 project funded in response to the Covid-2019 outbreak. HERoS stands for Health Emergency Response in Interconnected Systems. We want to understand the Covid-2019 outbreak by understanding and orchestrating the many direct and indirect feedbacks between local systems, interventions and global impact across international supply chains. Therefore, HERoS takes an integrated perspective that aims at understanding the impact of these measures from the bottom up and orchestrates the response across hierarchical levels, sectors and countries. Within the project, I lead the work package on behavioural modelling and decision-making.

What is your research focus within this HERoS project?
Epidemics, such as Covid-2019, essentially spread through contact networks and human interaction. To consider the impact of local population structures and behaviour, we will develop an agent-based model at the level of cities. This model will be combined and coupled with a network model based on system dynamics to model the spread across globalised networks. To reflect on the tremendous uncertainties, we will use exploratory modelling to identify robust policies.

What will we learn from this research?
This research will allow us to understand the impact of policy interventions locally at global level, and vice versa. At the same time, we will also aim to understand the balancing act of recovery and resilience: what is the implication of re-opening our cities and countries? How to avoid that the most vulnerable populations are specifically exposed? Which control mechanisms can be put in place to prevent another wave of the disease as we re-open our societies? And what is the role of local behaviour and culture? We also saw that many countries initiated serious restrictions only after the disease already had infected thousands of people. Therefore, another important question is: what are appropriate thresholds to initiate the protective measures (again) given the exponential spread of a disease?

What is your main challenge within this project?
The main challenge is to be sufficiently rapid to inform the response. This project explicitly has the ambition to inform the response, yet research takes time – from collecting high-quality data, to conceptualizing models, running analysis and interpreting data. For us, this will be a balancing act of upholding academic rigour while being as quick as possible.

Are we going to notice this research project as ordinary citizens?
We will be working with users such as the Italian Red Cross and Project HOPE to ensure that our research actually will inform the response to Covid-2019. Moreover, we are in frequent calls with the European Commission, coordinating all Covid-2019 research and inform organizations such as ECDC.

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Where is the HERoS project in 3 years?
After three years, I hope that we have generated important insights that helped navigate the Covid-2019 pandemic and contribute to avoid future epidemics from turning into pandemics. The World Economic Forum estimated last year that in the coming decades, epidemics will cause average annual economic losses of 0.7% of the global GDP. This puts the scale of loss associated to epidemics at the same level as the losses estimated for climate change. Understanding how to prevent future epidemics spread, understanding resilience, governance, supply chain management and information is therefore of the essence if we would like to avoid future pandemics.

Harith Alani | **Who are you?**
I am a Professor of Web Science and leader of the Social Data Science Group at the Knowledge Media Institute, The Open University in the UK. I'm also a Fellow at the 4TU Centre for Resilience Engineering. My research is mainly focused on applying computational social science methods and social media analytics to better model, understand and track various social phenomena on the web, such as radicalisation, misogyny, crisis resilience and misinformation.

What is the HERoS project about and how are you involved in this project?
HERoS addresses the immediate need for developing better models and reaching a deeper understanding of the dynamics of the COVID-19 crisis. This will be done by bringing together multiple impactful parameters, such as social behaviour, supply chain disruptions, and the spread of reliable and unreliable information. I will act as the HERoS Principal Investigator at The Open University, which is one of the partners in this project.

What is your research focus within this HERoS project?
I will be leading one of the research work packages in this project, to pursue two main strands of work. The first is focused on studying the spread of misinformation about COVID-19 on social media. We want to better understand the socio-dynamics of that spread and the impact of fact-checking initiatives and assessments on that spread. The second is to develop tools to capture and categorise COVID-19 related content posted on social media by citizens. We want to support humanitarian organisations and policy makers by more rapidly establishing what are the needs of their citizens during this crisis at any given time.

What will we learn from this research?
Currently, even though there are many authoritative organisations (e.g., WHO, governments, legitimate fact-checking groups) who are continuously and relentlessly debunking myths and correcting misinformation about the virus. It is unclear what impact this has had on how these myths are spreading, by whom and where. I'm hoping that by measuring the spread of misinformation and corrective information together, we would get a bit closer to understanding what strategy is working better than others, and how to intervene more effectively in the future.

What is your main challenge within this project?
Access to the right amount and quality of data is always a challenge for us as computer scientists. Some social media platforms where misinformation spreads wildly, such as WhatsApp, are private and therefore we will not be able to access that data with our research computer programs. The other challenge is that new rumours and myths about COVID-19 are emerging on daily basis, and therefore we would need to regularly update our databases and refresh our analysis to keep up to date.

> ❝ Hopefully, by the end of HERoS, we would have succeeded in understanding and measuring approximately the impact of misinformation on this pandemic… ❞

Are we going to notice this research project as ordinary citizens?
That's yet to be determined, but we hope to create better methods for pushing out corrective information on social media more efficiently. Therefore some citizens might come across this part of the work when it's fully developed later in the project. We also aim to publish short reports on the proliferation of COVID-19 misinformation on some social media platforms. Ordinary citizens will be one of the main target audiences for such reports.

Where is the HERoS project in 3 years?
Hopefully, by the end of HERoS, we would have succeeded in understanding and measuring approximately the impact of misinformation on this pandemic, and in establishing more efficient methods and techniques for battling misinformation related to health crises.