SCIENTIFIC NEWSLETTER ILEANET

The ILEAnet scientific newsletter provides scientific news in the security research area. Published every two months, it is intended to highlight and promote the scientific work in the field of technology, human and social sciences. The scientific coordination within the ILEAnet project is led by Professor Patrick Laclémence. In this issue, you will find:

NEWS: ILEANET STUDY ON INFORMATION SHARING MECHANISMS	**PORTRAIT OF SECURITY RESEARCHERS**
Find out more about the first ILEAnet study	Discover active profiles in university research
BIBLIOGRAPHY	**RESEARCHER'S TOOLBOX**
Find here a recent bibliographical selection of scientific and technical resources related to the main themes of the ILEAnet project	Learn more about tools and tips for researchers to support their scientific production and monitoring missions

CHERYL BAKER
ILEAnet Work Package Leader and Director of the Centre for Cybersecurity and Cybercrime Investigation at University College Dublin

Our centre was established with a mission to assist law enforcement in the fight against cybercrime. Fourteen years later, that mission is still relevant. Cybercrime is an ongoing challenge affecting all levels of society, yet cybercrime is not a new crime phenomenon. Cybercriminals are utilising well established crime methods, but with innovation in the tools and strategies. The ransomware attack against the Irish Health Service demonstrates that. Ransomware is a common and well-known attack vector, yet it is currently being deployed to devastating effect, with critical hospital systems forced offline [on May 13th a cyberattack badly damaged the Irish Health Service, forcing to shut down all of its IT systems – further information in the bibliography below]. The tools used are sophisticated and complex, and so law enforcement must have up-to-date knowledge at their fingertips. Thus, cyber research should be applied and targeted, as knowledge transfer needs to be timely.

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Furthermore, criminals cooperate effectively, sharing information with no concern for jurisdiction, privacy, or ethics. This does not apply in the lawful world, where respect for boundaries, whether physical or societal, is crucial to a functioning society. Cybercrime research does not just sit in the technical domain, but also has legal, social, and ethical dimensions. Technologies, such as AI, could greatly benefit investigations, but there are human rights questions that must be addressed. Therefore, research in this domain needs to consider a broad set of issues. Thus, in addition to being applied and targeted, research in cyber should be multidisciplinary. Embedding practitioners into the research process can ensure that the above factors are considered, and the ILEAnet project can provide supports to researchers wishing to achieve this goal.

NEWS: ILEANET STUDY ON INFORMATION SHARING MECHANISMS

ILEAnet's mission is to stimulate LEA's capacities to influence, develop and take up research, development and innovation (RDI) in order to help them tackle their daily challenges. Therefore, the implication of research, academia and industry is crucial to fostering and developing innovative solutions. ILEAnet represents a unique community, bridging very different worlds, building up a portfolio of RDI results and concepts, and destined to generate recommendations for future policies at the European level.

ILEAnet developed an analysis of LEA's challenges and needs, which highlighted a clear cross-cutting issue raised across ILEAnet's four priority areas (Migration, Cybercrime, Terrorism, and Organised Crime): the need for common processes and frameworks to share information and data, as well as a reinforced cooperation and collaboration among LEAs.

As a result, ILEAnet's Consortium agreed on the necessity of a state-of-the-art investigation on the practitioners' needs for more effective information sharing processes. It would allow the research world to share its more recent and innovative solutions, with the purpose of finding a concrete solution to LEA's needs.

After a call for tenders at the European level, the first ILEAnet study began on April 12th, 2021. The selected contractor (CEIS) is in charge of reviewing the existing tools and channels of information, identifying the challenges and recommending solutions to ensure an effective sharing of information and data between LEAs. The recommendations should consist in best solutions/practices that can be easily adaptable in LEAs' daily work, as well as nurture the European Commission's future projects, strategies and possible efforts for standardisation.

The first task consisting on reviewing the existing and emerging mechanisms of information sharing is ongoing. A broad survey shared with more than 500 stakeholders has asked LEAs, research, academia and industry for their feedback in the matter.

 ➲ You can access to the online survey here (password: #ILEAnet2021!).
We need your inputs!
Note: the scientific world is under represented so far, so it is up to you to change that!

 ➲ The results will be presented during workshops.

Should you have any question regarding the survey or the workshops, please contact us: ensp-ileanet@interieur.gouv.fr

PORTRAIT OF RESEARCHERS

NOELIA FELIPE MONTIEL & ROBIN VAN ECHELPOEL

PhD Candidates in BorderSens (H2020 Project)

Research work on Electrochemical sensors, Illicit drug sensors, Pattern recognition algorithms, Sensor software development

AXES Research group, University of Antwerp, Belgium

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The ILEAnet scientific coordination team met two PhD candidates working in the field of electrochemistry for drug detection: Noelia Felipe Montiel and Robin van Echelpoel. Both work at the University of Antwerp, which coordinates BorderSens. Bordersens is an EU funded project running from 2019 to 2023, aiming at developing a device that detects a wide range of drugs. Several end user countries are involved in the project.

What is your current research focus?

Robin: Our lab develops low-cost devices to detect drugs. I work on the development of a methodology to detect MDMA (the drug in ecstasy), while Noelia is working on the detection of heroin, synthetic opioids and amphetamines. I also worked on the software framework.

There is already a huge knowledge in our lab because another colleague did a thesis on the development of the cocaine sensors and we are able to rapidly develop systems for other drugs. Currently, we have nearly finished working on single-drug detection and we have started working on a multi-drug detection system.

The detection methodology is simple: we record a voltammogram for each drug [a graph drawn after an electrochemical experiment – drugs have specific peaks in that graph]. To bring this technology to law enforcement, we help them looking at the right peaks. So the software interprets peaks and gives a clear output to end users.

What is the role of LEAs in your project?

Both: We are at a point in the project in which we need to define LEAs' needs. Two scenarios are possible and will steer the future development. In the first scenario, LEAs already have a good idea of what drug is in the sample and need a sensor to confirm the presence of this drug. In the second scenario, LEAs don't know if the sample contains drugs and need a system to identify the type of drugs present in the sample, without prior knowledge. As needs differ from one LEA to another, we will define and agree on the detection system fitting with the consortium's needs. We recently travelled to start discussing with the LEAs from the consortium on that topic.

Robin: The project is also collaborating with LEAs on the final shape of the product. Ideally, the final result will be displayed on a compact, light and portable device to perform on-site measurements.

Noelia: Furthermore, on-site tests are performed in end users' facilities to test street samples that LEAs collected. Composition of drugs changes a lot from one country to another so we need to know if there are substances that will interfere with the detection.

Robin: Those on-site tests are also a way to showcase our work and discuss with end users.

Noelia: It is easy to make contact with LEAs because they are part of the project. In fact if we had to contact end users outside of the consortium, it would be more difficult for us. Having an intermediate to get a broader opinion would be an added value because for now, we only know requirements of end users participating in the project and not those of practitioners outside the project.

What is planned for the adoption or uptake of the technology?

Noelia: The question has been asked recently during one of the project's meetings. As we are still at the beginning of the project, we did not agree with all partners if a company (such as a start-up) will commercialize the device or if something else will be imagined. It is hard to answer the question today.

As the drug landscape keeps changing, do you monitor the evolution drug trafficking?

Robin: Obviously we maintain constant monitoring of the changes in drug trafficking. For instance, we attend seminars, such as the Winter School of European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) where there were many talks about the change in drug users due to Covid-19. We monitor the changes in the market, in the composition of the drugs and we adjust our research accordingly. The best sensor we have at this point, with the most knowledge, is for cocaine samples, but we work on adapting it to other types of drugs.

Why did you choose to join BorderSens research team?

Robin: It was an opportunity and I really liked the security area because you work on something meaningful, it is not a "just science for science" project. It is a project for real applications, valuable and useful for society.

"Needs of LEAs will influence the final shape of the drug detection system"

How do you perceive your own role as a researcher?

Noelia: I think researchers have a huge responsibility (and pressure!). We bring to society devices that will be used for LEAs and that will impact security through the prevention of drug trafficking. Our work will enhance people's health as well.

How do you communicate your research results?

Both: We participate not only in conferences (Noelia participated in the XL Meeting of the specialized group of electrochemistry of the Royal Spanish Society of Chemistry and XX Iberian Meeting of Electrochemistry) but also in Seminars and we are happy to communicate about our research to non-expert audiences. Our Department of Bioscience engineering and the AXES Research group disseminate scientific knowledge to a wide population. Besides, BorderSens is also doing a great job through newsletters, social media or mass media.

What is the future of your research strand?

Noelia: The electrochemistry will not focus only on drug detection but will expand to other types of targets such as explosives and pharmaceutical products. Explosives are an important issue for LEAs.

What are your future professional experiences?

Noelia: I'll see what opportunities are available to me because, I'm Spanish and I know that continuing searching in the security area if you are not a police officer is very difficult in Spain. You need to be first a police officer and then you can become a researcher.

Robin: It will be easier for me to join the forensics environment but for now, I'd like to keep my future as open as possible. I enjoy my work and I will see in 2-3 years what kind of challenging opportunities I will find!

Thank you very much Noelia and Robin for your time and for this very interesting exchange!

ILEAnet members can connect with Noelia and Robin through the ILEAnet Online Platform and find out more about their work with the following links:

https://www.researchgate.net/profile/Noelia-Felipe-Montiel

https://www.uantwerpen.be/nl/personeel/robin-vanechelpoel/publicaties/

BIBLIOGRAPHY

The ILEAnet scientific coordination team suggests a recent bibliographical selection of scientific and technical resources related to the main themes of the ILEAnet project: cybersecurity, terrorism, organised crime and migration. Resources can be found in the ILEAnet Knowledge Library. If you want to share a publication, please contact us at ensp-ileanet@interieur.gouv.fr

ILEAnet is collecting the most recent or relevant publications in the following areas, but does not necessarily endorse their contents.

Cybersecurity

Ly Bora, Ly Romny. **Cybersecurity in unmanned aerial vehicles (UAVs).** Journal of Cyber Security Technology 2021 ; 5(2): 120-137. doi : https://doi.org/10.1080/23742917.2020.1846307

This research is a comprehensive literature review investigating which cyber-attacks are most frequent and what consequences they cause in civilian UAV attacks.

NCSC Alert. Ransomware attack on health sector, National Cyber Security Centre. 2021. 7 pages.

Terrorism

Lee Hannarae, Choi Kyung-Shick. Interrelationship between **Bitcoin, Ransomware, and Terrorist Activities: Criminal Opportunity Assessment via Cyber-Routine Activities Theoretical Framework**. Victims & Offenders. An international Journal of Evience-based Research 2021; 16(3): 363-384. doi : https://www.tandfonline.com/doi/full/10.1080/15564886.2020.1835764

The current study explores the dynamic properties of ransomware attacks, Bitcoin prices, and terrorist activities by connecting two opportunity-based theory frameworks: The Routine Activity Theory (RAT) and Cyber-Routine Activity Theory (Cyber-RAT).

Organised crime

Hounmanou Charles, O'Grady Caitlin. **Private Investigators' Experiences in Human Trafficking Investigations**. Journal of Human Trafficking. Published online: 16 May 2021. doi : https://www.tandfonline.com/doi/full/10.1080/23322705.2021.1925819

This paper argues that private investigators have the potential to supplement law enforcement's efforts to investigate human trafficking cases.

Migration

Europol, European Migrant Smugling Centre (EMSC). European Migrant Smuggling Centre 5th Annual Report 2021, Europol. 2021. 30 pages.

In its 5th annual report for the European Migrant Smuggling Centre, Europol provides an overview of recent activities and looks ahead at expected challenges.

You may also be interested in the following reports:

Shoval Shraga, Sharma Abhinav, Pandey Jitendra Kumar. **Path Planning for Multiple Targets Interception by the Swarm of UAVs based on Swarm Intelligence Algorithms: A Review**. IETE Technical Review. Published online: 11 Mar 2021. doi: https://doi.org/10.1080/02564602.2021.1894250

This paper focuses on the problem of path planning for intercepting multiple aerial targets by a swarm of UAVs.

Commission presents guidance to strengthen the Code of Practice on Disinformation European Commission. 26 May 2021.

The Commission publishes its guidance on how the Code of Practice on Disinformation, the first of its kind worldwide, should be strengthened to become a more effective tool for countering disinformation.

Europe fit for the Digital Age: Commission proposes new rules and actions for excellence and trust in Artificial Intelligence European Commission. 21 April 2021.

The Commission proposes new rules and actions aiming to turn Europe into the global hub for trustworthy Artificial Intelligence (AI).

Europe's global approach to cooperation in research and innovation: strategic, open, and reciprocal European Commission. 18 May 2021.

RESEARCHER'S TOOLBOX: « THE IMPORTANCE OF STANDARDS IN THE RESEARCH AND INNOVATION AREA »

Standards as a solution to dock Research & Innovation (R&I) outputs in the real world

Research outputs must meet the needs of the society and the markets. By connecting innovation and research to the real world, "standards help to ensure that innovations effectively solve the problems they set out to, by outlining the frameworks they need to function within". Standards also have a positive impact on the time to market and creates opportunity for eventual public procurement.

Why standards are so important in the security research area?

Threats to security are increasing and becoming more complex. Risks are increased by climate change, globalization, the development of malicious actions, social instability, etc. Crisis management requires a partnership response involving numerous and interdependent actors. Thus standards are necessary to make the States, their governments and territorial organisations collaborate and respond to crises.

The security research community should definitively consider standards as necessary in the development of cross-border solutions and to guarantee the interoperability of systems.

How to connect researchers with standardisation activities?

There are more and more attempts to embed standardisation in the R&I cycle and to better involve key stakeholders in the definition of standards. Research programs, such as Horizon Europe, are good opportunities to strengthen the link between R&I projects and standardisation activities, to involve standardisation stakeholders in innovative fields and to ensure the timely inclusion of research and innovation results into standardisation activities. The interweaving of standardisation and R&I communities in research projects facilitates the uptake of projects results into standardisation activities as well.

Projects funded by the European Commission address standardisation in different ways (contribution to existing standards, development of new standards, etc.).

How can standards help researchers?

Developing standards can help researchers with:

Complying with regulations and certifications	Finding new partners	Keeping abreast with leading technologies and policy changes	Facilitating the uptake of research outputs	Getting professional recognition

What is the conclusion?

Standardisation is not a chore but an investment for researchers.

ILEAnet invites all security stakeholders (researchers, practitioners, industrials, etc.) to its Public Workshop to learn more about the benefits of standardisation in security research and reflect on ways to facilitate the involvement of LEAs in standardisation activities and in R&I.

The event will be held online on June 9-10-11. To register, please contact us (ensp-ileanet@interieur.gouv.fr). Feel free to circulate the information around!

To go further on the standardisation topic, here are some suggested materials:

- About CEN and CENELEC
- The role of standardisation in Horizon Europe - the European Commission's newly proposed Framework Programme for Research and Innovation, 2018
- Horizon Europe: opportunities for the standardisation system, 2020
- https://www.standardsplusinnovation.eu/
- CEN-CENELEC Guide, Research Consortium Bridge-Addressing Research and Innovation in European Standardisation, 2020
- CoU Brief - Standardisation Governance, 2018

NEXT NEWSLETTER

The next issue will be published after the summer break.

We wish you all a happy summer!

CONTACT

You wish to publish? You are a researcher and would like to share your profile? You would like to have information about the ILEAnet project and the scientific coordination? Do not hesitate to contact us!

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