Christiaan Huygens

Wiskunde
Informatica
Studievereniging

SOLVING CRIME IN NO TIME

SYMPOSIUM
PROGRAM BOOKLET

Table of contents

Introduction

SYMPOSIUM COMMITTEE 2021-2022

SCOTT JOCHEMS

CHAIRMAN

While advanced technology opens the door to many more criminal activities, it has also had great benefits for the exact opposite. Nowadays, criminal investigation is heavily influenced by computer science and mathematics.

During this symposium, we aim to dive deep into the many different sides of the world of criminal investigation and the modern technology that they use to solve crimes. We will feature multiple experts that work to use their computer science and mathematical knowledge to apprehend criminals. They are very excited to share their knowledge with you and give you a peek into the world of criminal investigation. At the end of the day you will be able to get hands-on experience during the workshops provided by a variety of companies.

We are proud to welcome you all to our symposium: “Solving Crime in No Time – the Strength of Digital Forensics”, organized by the study association W. I. S. V. ‘Christiaan Huygens’.

On behalf of the Symposium Committee,
Scott Jochems

Program

10:30-11:00	REGISTRATION	
11:00-11:10	OPENING GABRIELLA ADÈR	@ AUDITORIUM
11:15-12:00	THE ATTRIBUTION OF ATTACKERS IN CYBERSPACE RONALD PRINS	@ AUDITORIUM
12:00-12:15	COFFEE BREAK	
12:15-13:00	INTERPRETATION OF DNA MIXTURES KLAAS SLOOTEN	@ SENTAATSZAAL
	THE PRIVACY CHALLENGE OF HUMAN TRAFFICKING DATA PAUL FOCKENS & MARY ADAMS	@ AUDITORIUM
13:00-14:00	LUNCH	
14:00-14:45	EVIDENCE BASED ON DIGITAL DATA ZENO GERADTS	@ SENAATSZAAL
	DETECTION OF FINANCIAL CRIME STEFANIE VONK	@ AUDITORIUM
14:45-15:00	COFFEE BREAK	
15:00-16:30	WORKSHOPS	
16:30-17:30	DRINKS	

Chair of the day

OPENING

GABRIELLA ADÈR

11:00-11:15 @ AUDITORIUM

I am very honored and thrilled to be presenting the symposium on the 18th of October. It is an intriguing - and today maybe the most important - field of forensics but it is hard to grasp as an outsider. Therefore I believe this symposium will shine a brighter light on digital forensics, and that can also serve me in my work.

Why my work? As a podcast – and documentary maker, my work has always revolved around topics regarding crime and justice. I am currently working for NRC Media, based in the Netherlands. I also host their daily podcast Vandaag.

Forensics always play a significant role in my stories. I realize, while writing this, that the Villamurder in The Netherlands in the 1998's, that I researched, might have had a different outcome if digital forensics had been as developed as it is now. Or how the parents of a murderer, whom I followed for a year in an audio documentary, would have had more peace with the verdict with better digital forensic proof.

I am very eager to explore the field of digital forensics, since I have very little knowledge of this topic. I hope this knowledge will serve me in my reporting on crime, and will give inspiration for new (audio)documentaries.

THE ATTRIBUTION OF ATTACKERS IN CYBERSPACE

RONALD PRINS

@ AUDITORIUM 11:15-12:00

Abstract

Cyberspace is more and more becoming the playfield of nation states. Most attacks in cyberspace are alse flag attacks: an act committed with the intent of disguising the actual source of responsibility. Therefore, the main question regarding cyber attacks is: how can it be determined which country was responsible for the attack? The answer to this question and more will be provided during the talk of Ronald Prins.

Biography

Ronald Prins studied Applied Mathematics at TU Delft and is an expert in cybersecurity. As a student, he was always fascinated by the then up and coming internet. He often listened to police radios with his own scanner. After graduation he worked for NFI before founding the company Fox-IT, a cybersecurity company that worked with different governments and secret services such as the FBI.

Speakers

INTERPRETATION OF DNA MIXTURES

KLAAS SLOOTEN

12:15-13:00 @ SENAATSZAAL

Abstract

Klaas Slooten will talk about the interpretation of DNA mixtures, traces to which several people have contributed, found at crime scenes. He will explain the mathematical models used to calculate the likelihood of a certain person being present at the scene of the crime. Furthermore, he will talk about the communication between the forensic department and the judicial system.

Biography

Klaas Slooten focuses on the application of mathematics and statistics in DNA investigation, with family relations tests as the point of departure. These tests are used in criminal investigations (familial searching) and in identification procedures in, for example, major disasters. In cooperation with VU Amsterdam, Klaas Slooten focuses on maximising search strategies in forensic DNA databases, including on establishing the most efficient method for familial searching. He also gives lectures on ‘The use of statistics in legal court cases’ for the VU Honours programme.

Speakers

THE PRIVACY CHALLENCE OF HUMAN TRAFFICKING DATA

PAUL FOCKENS & MARY ADAMS

@ AUDITORIUM 12:15-13:00

Abstract

Although the profits from human trafficking are estimated at over $150B per year, it remains an invisible crime because of the flexibility of the traffickers' business models. However, traffickers, facilitators, and victims unintentionally leave behind a trail of digital breadcrumbs that can be reconstructed and assembled to provide evidence of illicit activities. Our use cases examine how digital breadcrumbs can provide insights into criminal networks using a safe, secure, and legal methodology.

Paul and Mary will demonstrate use cases that show how privacy-enhancing technology, natural language processing, knowledge graphs, machine learning, entity resolution, big data and artificial intelligence can be integrated for intervention and prevention in human trafficking. The role of the data scientist as part of the forensic team is becoming a vital link to freedom from modern slavery.

Biography

During his entire life, Paul Fockens' passion has been using technology for the improvement of business results. Now he is focused on using technology to eradicate human trafficking from our planet. Paul is committed to make the invisible crime of human trafficking visible using all human intelligence available.

Mary Adams is originally from Texas, United States. After 25 years of working in management consulting with Capgemini, one charitable human rights event opened her eyes and acted as a catalyst for a career change. As Founder and Director of Sustainable Rescue Foundation, she is now using her consulting skills, business knowledge, thought leadership, and determination to help organizations disrupt the human trafficking business model.

EVIDENCE BASED ON DIGITAL DATA

ZENO GERADTS

14:00-14:45 @ SENAATSZAAL

Abstract

In Geradts' talk titled 'Evidence based on digital data' he will talk about digital trails found at a crime scene. Think about the texts sent from phones or data from smartwatches. This data could for instance contain heart beat rates, languages and voice memos from which many conclusions can be drawn. Geradts and his team research what statements can be made based on data from phones and smartwatches and also on deep fakes. In his talk he will introduce you to their research and give real-life examples.

Biography

Zeno Geradts is a senior forensic scientist at the Dutch Forensic Institute (NFI) of the Ministry of Security and Justice at the Forensic Digital Biometrics Traces departement. He is an expert witness in the area of forensic (video) image processing and biometrics such as manipulation detection on deepfakes. Within the team Forensic Big Data Analysis he works in research on artificial intelligence on text, images and video. He is one of the founders of the new ICAI lab AI4Forensics that is being established with UvA and NFI.

Speakers

DETECTION OF FINANCIAL CRIME

STEFANIE VONK

@ AUDITORIUM 14:00-14:45

Abstract

Financial crime has increasingly become of concern over the past years to governments throughout the world. In the Netherlands alone, an estimated 16 billion euros is laundered annually, tied to predicate offences ranging from human trafficking, and narcotics trafficking to terrorist financing. Financial institutions are committed to detecting these money flows, as part of their 'gatekeeper' role to protect the integrity of the financial system. This fight against money laundering involves a huge amount of data crunching and the application of more advanced analytics in detection. Stefanie Vonk helps financial institutions in the detection of money laundering. She will explain what a complete case study looks like and gives some examples of how to use advanced analytics to keep the financial infrastructure safe.

Biography

Stefanie Vonk is manager Forensic and Financial Crime Analytics at Deloitte. After graduating Applied Mathematics at the TU Delft in 2016, she looked for a place where she could apply her skills for a good cause. She said the following about this: 'an important threat that we experience is criminals trying to influence our society in all possible ways. One key method is the abuse of our financial system by criminals, to hide ('launder') money earned with illegal activities such as drug trafficking. In the detection of this kind of abuse, the application of advanced technologies like outlier detection and network analytics has proven to be very successful.' It was therefore an easy choice for her to start working in the field of detecting Financial Crime. The best of both worlds.

Fun fact about Stefanie Vonk: she took part in Board 57 of CH!

ING BANK

WORKSHOP 1: DETECTING CRIMINALS IN BANKING DATA: A LABOUR EXPLOITATION CASE

15:00-16:30 @ FRANS VAN HASSELTZAAL

How do you catch a criminal? Through their victims! ING Bank invites you to join them down the rabbit hole of a large-scale labor exploitation investigation.

Banks invest substantial effort in detecting criminal behavior in their accounts. Can you find criminal deeds in transaction data? Can you identify a victim based on their client profile? In this workshop, we will take you on a journey through an investigation that has spanned a year, included several hundred possible victims, heaps of cash, some proper bad guys, smelly mattresses, and a box of chocolates, to name a few. We will brainstorm together about next steps and you will get the chance to spot the red flags yourself, in the data we will provide for you.

Turn on your inner Sherlock and jump into the world of Financial Economic Crime!

Scan this QR code to sign up for the workshop by ING!

THALES

WORKSHOP 2

@ COMMISSIEKAMER 2 15:00-16:30

Time to get some action! During this workshop, led by two experienced Red Teamers from Thales you will learn the basics of penetration testing.

During the workshop you will learn how to enumerate and exploit four different machines. However exploitation is not everything, as a red teamer we need to cover our tracks and stay under the radar. Therefore we will discuss on high level what marks are left behind when attacking the machines. Hope you are not afraid of using some kali linux and hope to see you with a laptop!

Scan this QR code to sign up for the workshop by Thales!

ABN AMRO

ABN·AMRO

WORKSHOP 3

15:00-16:30 @ COMMISSIEKAMER 3

Annually, hundreds of billions of euros are laundered worldwide, of which an estimated 16 billion in the Netherlands. A major challenge is posed by the fact that criminals often use successive transactions through multiple banks. Each bank therefore sees just one piece of the puzzle and has to investigate and report on suspicion of money laundering activities to financial investigation services on the basis of incomplete information.

For money laundering detection purposes, it is interesting to follow risky flows of money, such as cash deposits. Via different bank accounts risky money flows to its intended destination, often obfuscated by complex constructs and transaction patterns.

During this case study students are challenged to think of possible solutions that can support financial institutions in identifying risks within financial networks, across multiple organizations, while respecting basic privacy and competition challenges. Successful solutions may include aspects of multiparty risk computations, data sharing and encryption methods.

Scan this QR code to sign up for the workshop by ABN AMRO!

RISKQUEST

WORKSHOP 4

RISKQUEST

@ SENAATSZAAL 15:00-16:30

Today you're about to discover how a typical day looks like within the Data Science team at RiskQuest. You're tasked with helping a credit card company with identifying potential fraudsters. To this end, your team will combine all their analytical and programming skills to build a machine-learning model.

The company has provided you with access to their historical transaction data (i.e. features), as well as the outcome of the manual review performed by their compliance department (i.e. the target variables). To give you a head-start, we have already structured the below notebooks in various parts, ranging from exploratory data analysis to hyper-parameter tuning. We look forward to seeing your results, and of course there will be a prize for the best performing team!

Scan this QR code to sign up for the workshop by RiskQuest!

Board of Advice

For acquiring contacts with several parties, we have turned to the long experience and wisdom of professors from the TU Delft for support and tips. These people form the board of advice. Our board of advice consists of:

PROF. DR. IR. G. JONGBLOED

PROFESSOR OF STATISTICS

PROF. DR. C. WITTEVEEN

PROFESSOR IN ALGORITHMICS

DR. R. J. FOKKINK

ASSISTENT PROFESSOR IN APPLIED MATHEMATICS

DR. C. C. S. LIEM

ASSOCIATE PROFESSOR IN MULTIMEDIA COMPUTING

Board of Recommendation

For the organization of our symposium, several companies and universities were contacted. By their participation in our board of recommendation, the following people, speaking for their respectable institutions, acknowledge the importance and competence of the symposium and recommend supporting the organization.

TU Delft	PROF DR. IR. T. H. J. J. VAN DER HAGEN RECTOR MAGNIFICUS AT TU DELFT
TU Delft	PROF. DR. IR. L. J. VAN VLIET DEAN OF THE FACULTY OF ELECTRICAL ENGINEERING, MATHEMATICS & COMPUTER SCIENCE (EEMCS) AT TU DELFT
Erasmus	PROF. DR. A. BREDENOORD RECTOR MAGNIFICUS AT ERASMUS UNIVERSITY
Delft	M. VAN BIJSTERVELDT MAYOR OF DELFT
Brunel	DRS. J. T. ANDRINGA CHIEF EXECUTIVE OFFICER AT BRUNEL
TNO	IR. M. G. L. H. TOSSINGS CHIEF OPERATIONAL OFFICER AT TNO
Shell	M. VAN LOON CHIEF EXECUTIVE OFFICER AT SHELL NETHERLANDS
Van Oord Marine ingenuity	P. VAN OORD CHIEF EXECUTIVE OFFICER AT VAN OORD

Committee

This symposium is organized by the Symposium Committee 2021-2022 of Mathematics and Computer Science Study Association W. I. S. V. ‘Christiaan Huygens’.

From left to right: Merel, Darwin, Thomas, Scott, Waded, Marjolein, Jolijn

Scott Jochems	**Chairman**
Waded Oudhuis	**Secretary**
Thomas Kamminga	**Treasurer**
Marjolein van den Berghe	**Commissioner of Logistics**
Darwin Liu	**Commissioner of Speakers**
Jolijn van Delft	**Commissioner of Promotion**
Merel Steenbergen	**Supervisor**
Amanda Krudde	**Supervisor**

Our partners

Christiaan Huygens

TU Delft

Harvest

RISKQUEST

THALES

ABN·AMRO

do your thing

Deloitte.

W. I. S. V. ‘Christiaan Huygens’

Mekelweg 4

2628CD Delft

Telephone: +31 15 27 82 532

Email: bestuur@ch.tudelft.nl

Website: ch.tudelft.nl

Editorial Staff

Scott Jochems

Waded Oudhuis

Thomas Kamminga

Marjolein van den Berghe

Darwin Liu

Jolijn van Delft

Merel Steenbergen

Amanda Krudde