DOD 24

International Workshop on Dynamics of Disasters: Hybrid Threats

PROGRAM GUIDE

July 30 until Aug. 01, 2024

Vienna, Austria

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Welcome Messages

Welcome Message from the DOD 2024 Chairs

We would like to welcome you to the seventh edition of the Dynamics of Disasters conference series, which is held as the **International Workshop on Dynamics of Disasters: Hybrid Threats DOD 2024.** https://www.ares-conference.eu/dod2024

DOD 2024 takes place from 30 July 2024 to 01 August 2024 in Vienna, Austria, co-located with the 19th International Conference on Availability, Reliability and Security (ARES 2024). After the successful editions of DOD in Athens (Greece; 2006), Kalamata (Greece; 2015, 2017 and 2019), virtual in 2021 and Piraeus (Greece; 2023), we are very pleased to see DOD taking place again physically in 2024.

Disasters occur when hazards - both natural as well as man-made - and their corresponding risks can no longer be properly contained, leading to serious detrimental consequences in terms of loss of life, financial repercussions or devastation to infrastructure and the environment. In recent years, the rising number of disasters occurring all over the world, even affecting or threatening regions where in the past certain hazards were not so prominent, have painfully revealed that disaster preparedness as well as disaster management are not always up to par to the challenges posed by various kinds of disasters. The COVID-19 pandemic has been an especially hard test by reality for many aspects of disaster preparedness as well as operational disaster management policies, and it still impacts our lives today and will continue to do so for some time in the future. From the perspective of today, the world-wide spread and the multitude of resulting different (local and global) implications during the COVID-19 pandemic highlight the importance to consider the dynamic evolvement of a disaster, which is exactly what the DOD conference series has been focused on in the past and is also focused on in its edition in 2024.

Moreover, DOD 2024 will broaden its scope and put forward the specialized theme of hybrid threats, thereby paying particular attention to new and emerging threats due to the ever growing integration as well as increasing coupling between the cyber- and physical domain. Such new and emerging threats reach farther than cyber-physical systems, which – so far – have been the prime examples for targets of novel attacks and their consequences, which can arise from both

the cyber- as well as the physical domain. The impact of hybrid threats on our modern societies is profound and only increases the challenges pertaining to disaster risk, disaster management organizations and first responders.

This year, we have received high quality submissions addressing many different topics in disaster research. Looking at the titles of accepted submissions to DOD 2024, words such as disasters, digital and hazard stand out, but the eye also catches terms like hybrid, technology and resilience.

On behalf of all organizers of DOD 2024, we sincerely thank all authors for their valuable contributions, our plenary speaker Distinguished Professor Panos Pardalos (University of Florida) and our invited speaker Professor Georg Pflug (University of Vienna, IIASA) as well as the Program Committee of DOD 2024. Without the efforts and dedication shown by the DOD community, events like DOD 2024 would not be possible and we are very grateful for this steadfast support! We are looking forward to an excellent DOD 2024, the presentations as well as discussions among participants and we profoundly hope that you will enjoy DOD 2024 in Vienna!

We have the honor to remain,
With highest consideration,
Your most humble PC co-Chairs,

Stefan Pickl
University of the Bundeswehr
Munich, Germany
stefan.pickl@unibw.de

Bernhard Garn
SBA Research, Austria
bgarn@sba-research.org

Program Overview

Tuesday | 30th July

Time (UTC +2)	SR 03	SR 04	SR 05	SR 07	SR 08	SR 06	HS 02
09:30 18:30	Organizers available						
09:30 10:30	Coffee available						
10:30 12:00	EPESec I		PCSCI			Sec-Industry I	
12:00 13:00	Lunch Beak						
13:00 14:30	EPESec II	STAM I		ENS I	SP2I I	Sec-Industry II	
14:30 15:00	Coffee Break						
15:00 16:30	ETACS I	STAM II	Cyber-hunt I	ENS II	SP2I II	Sec-Industry III	DOD I
16:30 17:00	Coffee Break						
17:00 18:30	ETACS II	STAM III	Cyber-hunt II	ENS III	SP2I III		DOD II
18:30 19:00	Opening - HS 01						
19:00 21:30	Welcome Reception						

Wednesday | 31st July

Time (UTC +2)	HS 01	SR 03	SR 04	SR 05	SR 07	SR08	HS 02
08:30 17:30	Organizers available						
08:45 10:15	ARES I	TRUST-BUS I	IWAPS I	COSH & WSDF I	EDId I	CUING I	
10:15 10:45	Coffee Break						
10:45 12:15	ARES II	TRUST-BUS II	IWAPS II	COSH & WSDF II	EDId II	CUING II	DOD III
12:15 13:15	Lunch Break						
13:15 14:45	ARES III	TRUST-BUS III	IWAPS III	COSH & WSDF III	FARES I	CUING III	DOD IV
14:45 15:15	Coffee Break						
15:15 16:45	ARES IV	TRUST-BUS IV	IWAPS IV	COSH & WSDF IV	FARES II	IMTrust-Sec	DOD V
16:45 17:00	short Coffee Break						
17:00 18:15	ARES Keynote - HS 01						
18:15 22:00	Suprise Evening Prater Vienna						

Thursday | 1st August

Time (UTC +2)	HS 01	SR 03	SR 04	SR 05	HS 02	SR 07
08:15 17:30	Organizers available					
08:45 10:15	ARES V	ARES SoK	CSA I	GRASEC I		ICS-CSR I
10:15 10:45	Coffee Break					
10:45 12:15	ARES VI	ARES Short	CSA II	GRASEC II	DOD VI	ICS-CSR II
12:15 13:15	Lunch Break					
13:15 14:15	ARES - Best Paper Session - HS 01				DOD VII	ICS-CSR III
14:15 14:45	Coffee Break					
14:45 16:15	ARES VII	ARES VIII	CSA III	IWSECC & SecHealth	DOD VIII	ICS-CSR IV
16:15 16:30	Short Coffee Break					
16:30 18:00	ARES Keynote & Best Paper Award - HS 01					
18:00 22:00	Traditional Viennese Dinner					

Social Events

Welcome Reception

18:30
TUE
30th July.

Join us for an evening of networking at the ARES Conference Welcome Reception! Kick off the conference with great conversations, delicious refreshments, and a vibrant atmosphere. Connect with attendees, speakers, and industry professionals in a relaxed setting, fostering collaborations. Don't miss this opportunity to unwind, make connections, and set the tone for a memorable ARES experience

Meeting point:
Währinger Straße 29, 1090 Vienna

SCAN ME

Address: Währinger Straße 29, 1090 Vienna

Scan the QR Code and
find the directions to the location.

Surprising Evening

19:00
WED
31st July.

Join us for a magical night at the Prater, the world's oldest amusement park, where surprises await! Your ticket includes a voucher for a delightful drink and transportation. Embrace the mystery, enjoy the enchantment, and let the adventure unfold. See you there!

Meeting point:
Faculty Entrance – 18:15
Start: 19:00

SCAN ME

Address: Riesenradplatz, 1020 Vienna

Scan the QR Code and
find the directions to the location.

Conference Dinner

19:00
THUR
1st Aug.

Join us for an unforgettable experience at our Conference Dinner, where we'll embark on a journey to the historic "10er Marie". This renowned wine tavern, dating back to 1740, is nestled in Vienna's 16th district of Ottakring, boasting the title of the oldest documented "Heuriger" in the city. Prepare to be enchanted by the rustic charm and rich history of "10er Marie" as we gather to savor traditional Viennese cuisine and indulge in exquisite local wines. This iconic establishment holds a special place in Vienna's culinary landscape.

Meeting point:
Faculty Entrance – 18:00

SCAN ME

Address: Ottakringer Straße 222-224, 1160 Vienna

Scan the QR Code and
find the directions to the location.

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HS 01
31st July
17:00

Yuval Shavitt

Tel Aviv University, Israel

Machine Learning Solutions for detection of attacks on Internet Routing

Attacks on Internet routing have a long history. Early on, attacks used simple IP hijacking, but now they also include routing deflection using manipulations at the BGP level or even at the data plane.

However, defenses against such attacks are falling behind. RPKI is a standard that is (too) slowly deployed in order to protect against IP hijack attacks, when reaching a critical point, it will make such attacks almost impossible. However, RPKI only protects against falsified first hop in the BGP path attribute, while manipulation of other hops has no solution with RPKI. Even the detection of route manipulations is not trivial.

In this talk I will present a Machine Learning approach, BGP2Vec, to detect such attacks with high accuracy and low false alarm rate. BGP2Vec is based on embedding of the ASNs in a latent space in a way that captures the role of an ASN in the routing. This allows us to cluster ASNs and identify a manipulation of a route if an ASN is replaced with one from a different cluster. I will also discuss embedding of Address Prefixes (AP) in the same space and its advantages for deflection attacks. Finally, I will show how to combine the route geography with ML to detect deflection attacks.

HS 01
1st Aug.
16:30

Jan Baumbach

University of Hamburg, Germany

To share or not to share? Privacy-preserving AI in medicine

European Health Data Spaces, national digital health records archives and similar initiatives aim to provide a mixture of legal and technical frameworks to make privacy-sensitive medical data available for data mining. The goal is to access the yet behind legal barriers hidden healthcare data treasure in order to train prognostic models for personalized medicine – from disease management to individualized drug repurposing prediction. The biggest roadblocks are the GDPR and cyber security.

In the talk, we will discuss federated learning technology that – coupled to other privacy-enhancing technologies – allows for a secure multi-center data mining collaboration. Specifically, we will demonstrate that it does provide as accurate results as centralized solutions. We will discuss concrete applications for multi-centric genome-wide association studies, for meta-genomics, transcriptomics and proteomics analysis including batch effect correction, and for survival time analysis. One application involved >1,000 hospitals in North America, another one involves >100,000 European screening participants. Finally, we discuss remaining cyber security aspects, limitations and prospects of federated learning in healthcare data mining.

HS 02
31st July
10:45

Panos M. Pardalos

Emeritus Distinguished Professor, University of Florida

Dynamics of Disasters

Extreme global disasters are a subject of scientific intrigue, and a huge amount of research has been devoted to them. Much work is devoted to studying them across the fields of science, ethics, and policy issues of catastrophic risk.

Humans experience a wide array of disasters that generally fall into two categories: natural disasters such as hurricanes, earthquakes, tsunamis, volcanic eruptions, pandemics, etc.; and unnatural, or man-made, disasters such as wars, explosions, wildfires, chemical spills, etc.

Such disasters wreak havoc and provoke extensive and large-scale devastation, and carry extremely serious financial repercussions for nations, organizations, and individuals. In this lecture, we are going to address some of the issues regarding the dynamics of disasters and address some of the latest developments. We hope to stimulate and promote awareness and discussions.

SR 05
1st Aug.
10:45

Georg Pflug
Emeritus Professor, University of Vienna

Modeling and analyzing statistical dependence of catastrophic events

In recent years, the research about "multi-hazard" and "multi-risk" catastrophic events has gained special interest. In contrast to sectoral studies for earthquakes, floods, droughts etc. one looks now at the total hazard and risk a country or region is facing. It has been observed that a sequence of events of different types can be much devastating for a country or a region. Only by looking at global picture about risks threatening a region (e.g. Europe) allows to design the "optimal" risk management strategy.

While many publications about multi-hazards are of anecdotical character, we are interested in obtaining statistically sound results on probabilistic relationships.

Data on past catastrophic events contain information about the questions:
- what happened? (type of event),
- when? (timing),
- where? (location) and
- how big? (severity).

The usual independence assumption is not justified for some of these quantities, and it can be often rejected. Here are the types of statistical dependencies, which are subject of our studies at the IIASA (International Institute of Applied System Analysis).

The co-occurrence of flood events in different regions in Europe can be observed and modeled using copulas. The relations of severities of events happening in different locations at similar times can be described by copulas depending on the geographical distance as we demonstrate.
There are typically dependencies between the timing and the severity of earthquake events: the longer is the interval between two subsequent events, the more severe is the second event.
Recently we started to investigate the dependency of events of a cer-

tain type on the occurrence of an event of another type: Traditionally, catastrophic event types such as floods, landslides, heat waves, forest fires and so on, are considered separately and studied independently of each other for frequency, severity and trends. The dependencies can be classified into 3 groups:

triggering (an event of type 1 (e.g. a flash flood) triggers the occurrence of another event (e.g. a landslide). This is the relationship of the timings of two event sequences of different types.

amplifying (an event of type 1 (e.g. drought) makes the next event of type 2 (e.g. forest fire) more severe. This is the relationship between the timing of one event type and the severity of another event type.

compounding (the co-occurrence of two events (e.g. heat wave and drought) increases the total damage in a non-additive manner. There is a relation between the severity of an event and the caused damage. The compounding effect means that two events happening in close moments in time may result a total damage, which is much larger than the independent sum of the damages attributable to the two events.

We explain in detail the triggering model, where an event of one type increases the intensity of a different type and present numerical results for some of these dependencies in the Danube region. Moreover, we link these models to systemic risk models. Systemic risk in the banking sector means that the bankruptcy of one bank increases the bankruptcy risk of other banks by influencing their “residual lifetime”. Freund-type copula models may quantify this relationship.

Accepted Talks Overview

Ethics in Technology Challenges: The Edward Snowden's Case and Privacy Perspectives
Mohamed Salem (Nile university, Egypt), Marianne Azer (National Telecommunication Institute, Egypt)

Hybrid Warfare, the Escalation Paradox, and Manmade Disasters in the Anthropocene
Larry Goodson (US Army War College, United States), Abram Trosky (US Army War College, United States), Marzena Żakowska (War Studies University, Poland)

A Framework for Hybrid Risk Analysis
Maryna Zharikova (UniBw Munich, Germany), Rudy Milani (UniBw Munich, Germany), Stefan Pickl (UniBw Munich, Germany)

On Track for Resilience: Assessing and Enhancing Railway Security in the Digital Age
Teresa Franziska Loreth (Universität der Bundeswehr München, Germany), Stefan Wolfgang Pickl (Universität der Bundeswehr München, Germany)

Role of inventory amid crisis
Lydia Novoszel (WU (Vienna University of Economics and Business), Austria), Harald Oberhofer (WU (Vienna University of Economics and Business), Austria), Tina Wakolbinger (WU (Vienna University of Economics and Business), Austria)

Combining perspectives of SCM and IB to address the literature´s void of ad-hoc strategic change in times of disruptions
Lydia Novoszel (WU (Vienna University of Economics and Business), Austria), Björn Schmeisser (NHH, Norway), Tina Wakolbinger (WU (Vienna University of Economics and Business), Austria), Jan Fisch (WU (Vienna University of Economics and Business), Austria)

Building Incident-Centric Knowledge Graphs: Enhancing Crisis Management with Data-Driven Insights
Amin Anjomshoaa (Vienna University of Economics and Business, United States), Hannah Schuster (Complexity Science Hub, Vienna university of economics and business, Austria), Axel Polleres (Vienna University of Economics and Business - WU Wien, Austria)

An optimization-simulation approach to scheduling firefighting vehicles
Emerson J. Paiva (Federal University of Itajubá / GEQProd, Brazil), Marina A. Matos (Algoritmi Research Centre / LASI, University of Minho, 4710-057, Braga, Portugal, Portugal), Ana Maria A. C. Rocha (Algoritmi Research Centre / LASI, University of Minho, 4710-057, Braga, Portugal, Portugal)

Exploring Constraint-Based Approaches for Disaster Scenario Generation
Antonis Troumpoukis (National Centre for Scientific Research "Demokritos", Greece), Bernhard Garn (SBA Research, Austria), Klaus Kieseberg (SBA Research, Austria), Dimitris Simos (SBA Research, Austria), Iraklis Klampanos (National Centre for Scientific Research "Demokritos", Greece)

Feasibility of School Building in Banda Aceh City 19 Years After Tsunami
Rifqi Irvansyah (University College London, United Kingdom), Abdullah (Department of Civil Engineering, Faculty of Engineering, Universitas Syiah Kuala, Indonesia), Yunita Idris (Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala (USK), Indonesia), Bunga Raihanda (Department of Civil Engineering, Faculty of Engineering, Universitas Syiah Kuala, Indonesia)

Piloting effects of cyber-physical attacks and their cascading effects using community based digital ecosystems for disaster resilience utilising smart city digital twin (SCDT) technology
Benjamin Schuster (Johanniter Österreich Ausbildung und Forschung gemeinnützige GmbH, Austria), Daniela Weismeier-Sammer (Johanniter Österreich Ausbildung und Forschung gemeinnützige GmbH, Austria)

Evaluation of the regional situation under volcanic eruption and corresponding decisions
Fuad Aleskerov (National Research University Higher School of Economics, Institute of Control Sciences of Russian Academy of Sciences, Russia), Pavel Hachikyan (National Research University Higher School of Economics, Russia), Dmitriy Kobets (Space Research Institute of the Russian Academy of Sciences, National Research University Higher School of Economics, Russia), Viacheslav Yakuba (National Research University Higher School of Economics, Institute of Control Sciences of Russian Academy of Sciences, Russia)

Anticipating Disasters through a Security Twin
Fabrizio Baiardi (dipartimento di informatica, Italy), Salvatore Ruggieri (Università di Pisa, Italy), Vincenzo Sammartino (Università di Pisa, Italy)

The UNDRR/ISC Hazard Information Profiles – Standardized hazard definition and information to support hazard understanding and data analytics
Virginia Murray (United Kingdom Health Security Agency, United Kingdom), Helene Jacot Des Combes (International Science Council, France)

Conference Venue

DOD 2024 will be held at the University of Vienna, Austria. Lecture halls are located at the Faculty for Computer Science.

Address of DOD 2024 Conference
Faculty of Computer Science
University of Vienna
Währinger Straße 29, 1090 Vienna, Austria

SCAN ME

Public transportation: Tram: 37, 38, 40, 41, 42
Stop: Sensengasse or Spitalgasse

Directions from the tram station to the venue just a quick scan away!

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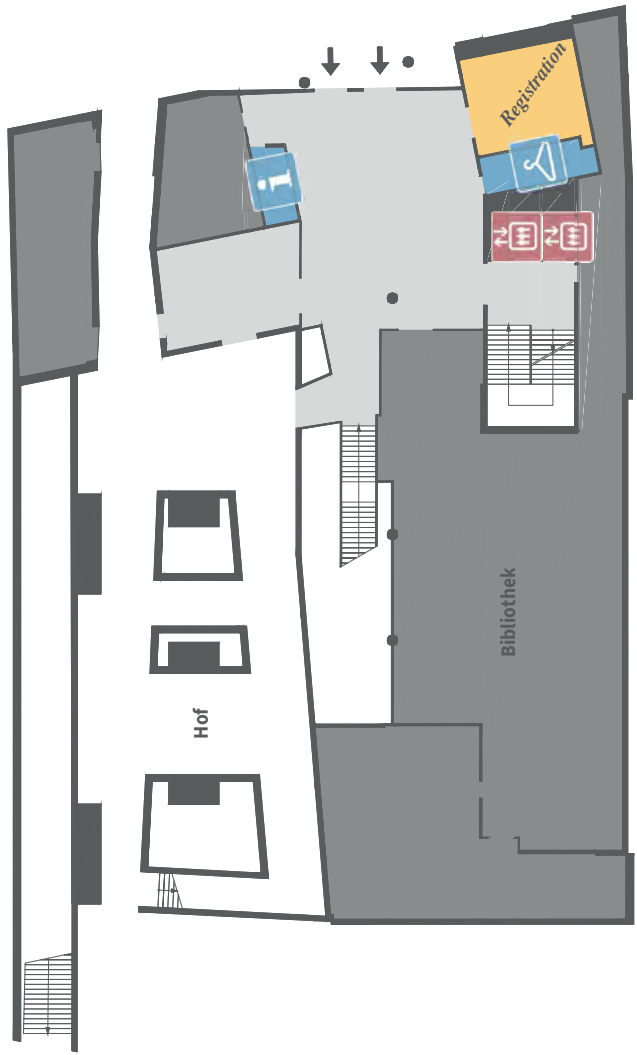
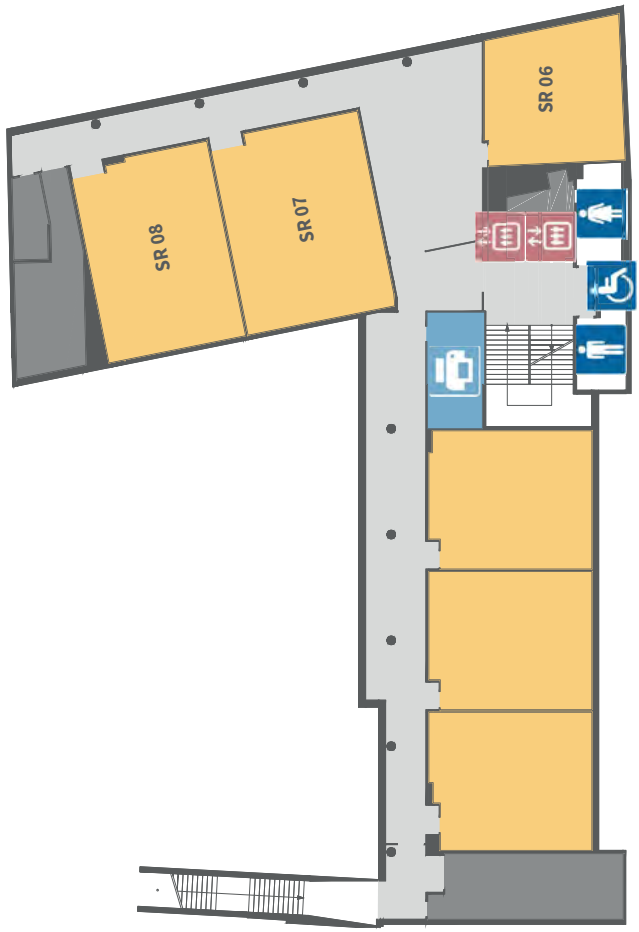
Basement

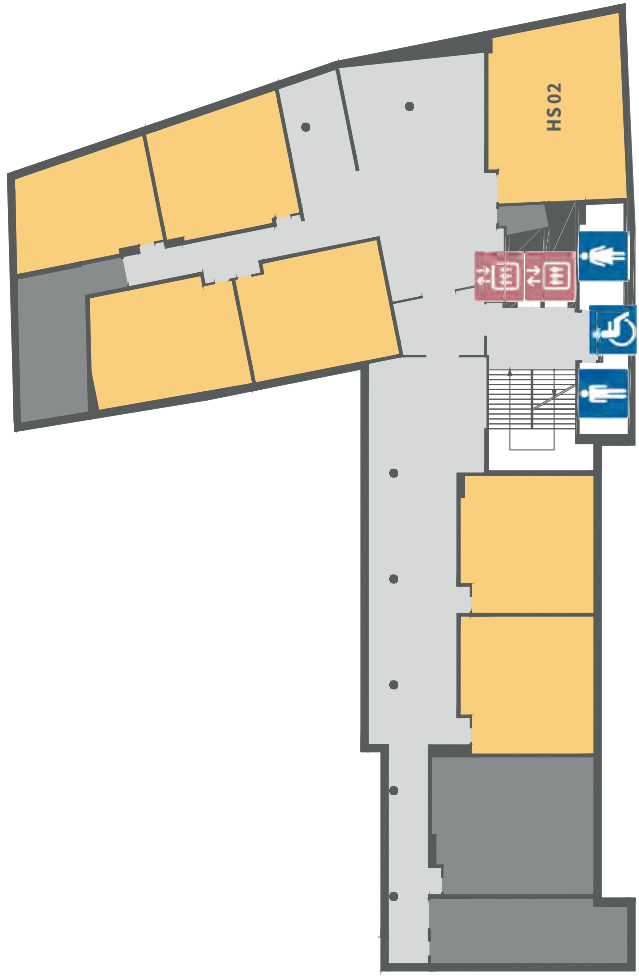
Ground Floor



First Floor



Second Floor



Useful Information

WIFI At ARES

You can access with your Eduroam at the University of Vienna or will be supplied with a unique WIFI login at the Conference Office/Registration.

Emergency Numbers

112	European emergency number
122	Fire Brigarde
133	Poilce
144	Ambulance service

ⓘ **Info:**
The emergency numbers can be called free of charge from any phone in Austria.

Conference Office

Our dedicated team at the Conference Office is here to ensure that your conference experience is nothing short of exceptional.

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SBA Research

Founded in 2006, SBA Research is a COMET Competence Center for Excellent Technologies located in Vienna, Austria. Our approx. 120 employees – researchers and practitioners – are specialized in Information Security. In cooperation with, among others, the Vienna University of Technology and the University of Vienna as well as other national and international institutions, we follow a dual approach of scientific research and practical implementation. SBA offers a unique portfolio of services, ranging from research cooperation to penetration testing to covering security aspects of future key areas such as Artifical Intelligence, IoT/Industry 4.0, Secure Software Development and security in digitalization. This is complemented by numerous training courses.

University of Vienna / Security & Privacy (SEC) group

Duke Rudolph IV founded the University of Vienna in 1365 as the Alma Mater Rudolphina Vindobonensis, one of the oldest and largest universities in Europe. The Security & Privacy (SEC) group was established in 2020 as part of the Faculty of Computer Science. Information Security and Privacy have always been areas where a multidisciplinary approach is indispensable. With the increased interconnectivity and ubiquitous data access, new services and threats have emerged. Two domains are critical and challenging areas of research that the SEC group currently works in: Distributed Ledger Technology (aka Blockchains) in cooperation with SBA Research; Development Lifecycle of IT in Production Environments with the CD-Lab SQI. In both areas, technical and formal research is best combined with usability research to create solutions incorporating fundamental research results and having a significant and lasting impact.

Notes

DOD 2024

Conference Office Contact

Bettina Jaber
Mobile: +43 664 254 03 14
E-Mail: ares@sba-research.org

Clara Kubesch
Mobile: +43 664 88 00 11 61
E-Mail: ares@sba-research.org