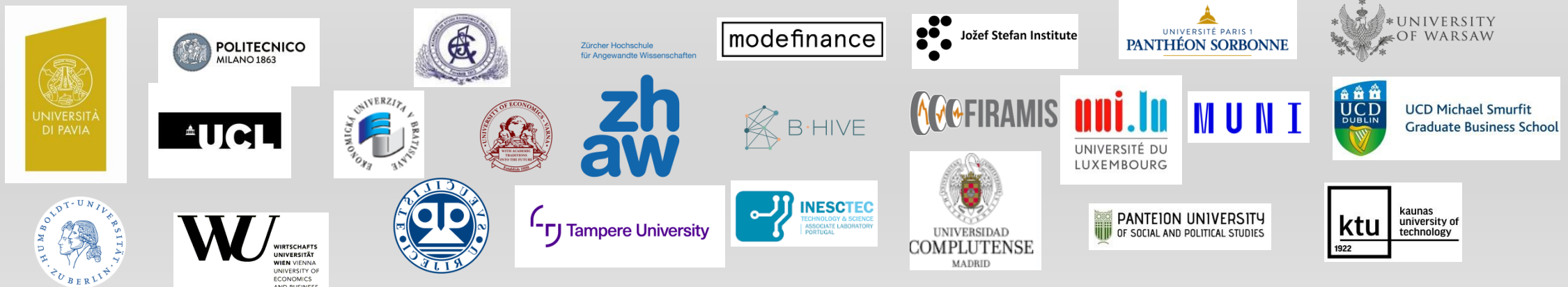




# A FINancial supervision and TECHnology compliance training programme

RegTech Workshop II: Big Data Analytics, P2P Lending and Credit Risk



- Financial Technology (Fintech) is transforming the business models of financial service providers.
- Meanwhile, incumbent banks and insurance companies are increasing investment in technological innovation by:
  - establishing horizontal units within their organisations;
  - partnering with third parties offering specialised services;
  - acquiring FinTech Startups.
- For those who are involved in FinTech it holds that:

Adequate risk management frameworks and processes need to be in place.

**Motivation.** Financial Technologies bring opportunities (competitive prices, improved user experience, wider inclusion) but also risks (credit risks, market risks, cyber risks), amplified by the interconnectedness of FinTech platforms (systemic risks).

**Aim.** The Horizon2020 FIN-TECH project aims at building a Fintech risk management platform, which measures risks to make Fintech innovations sustainable, for both RegTech and SupTech purposes.

**Method.** The aims will be achieved creating a knowledge exchange hub, which will eventually lead to a research sandbox laboratory.

**Participants.** i) Project partners, who research and develop Fintech risk management models; ii) National supervisors of 29 European countries, who give feedback in SupTech workshops; iii) European FinTechs, banks and insurance companies, who give feedback in RegTech workshops; v) international Regulators and Advisors, who supervise and evaluate the developed models.

## About this EU project

# What do we do?

- Our goal: the FIN-TECH-ho2020 project, under the EU's Horizon2020 funding scheme, aims to create a European knowledge exchange programme, aimed at providing shared risk management solutions that **automatize compliance of Fintech companies (RegTech)** and at the same time, **increases the efficiency of supervisory activities (SupTech)**.
- Our model: knowledge exchange (SupTech and RegTech) sessions, connecting universities with supervisors and universities with fintechs, discussing the application of emerging technologies in finance (**big data analytics, artificial intelligence and blockchain**), the risks that are associated with their application (on issues related with investor or customer protection) and the state-of-art risk management tools that can address those risk and help build uniform data-driven risk management solutions.
- Our network: **24 research partners**, interacting with supervisors and FinTechs from **all European Union countries plus Switzerland**.

# Challenges and Scope

## □ Specific Challenge

- increase the role Europe play in Fintech so that EU startups can better scale-up across Europe and at global level.
- interactions between innovators, supervisors and regulators
- Promote the ordered and safe development of innovative and more efficient financial markets

## □ Scope

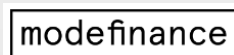
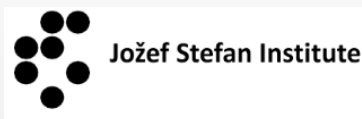
- Bring together a group of regulators/supervisors to investigate new approaches for piloting innovative Fintech solutions
- Build capacity and expertise for regulators/supervisors, common understanding and interpretation of data-related policies and rules.
- Support the cross-border networking of ecosystems, hubs and accelerators focusing on Fintech, in particular to help startups
- engage with other stakeholders like established financial or insurance firms and to identify opportunities for innovation procurements in Fintech. -> Innovation hubs and regulatory sandboxes
- Envisage possible actions and technical solutions to evaluate the impact of regulation.

# Expected Impact

## □ Expected Impact

- Reinforce the position of Europe amongst leaders in Fintech, encouraging cross border collaboration and practical approaches for Fintech experimentation frameworks; enabling Fintech firms to grow and scale-up across Europe.
  - Develop common understanding, interpretation and expertise regarding technology evolution and Fintech-related regulations and policies, in particular those concerning data.
  - Put Europe in the lead for innovating in regulation, appraising the impact of regulation and facilitating regulatory compliance.
- 
- Promote the ordered and safe development of innovative and more efficient financial markets
  - Innovation hubs and regulatory sandboxes can be effective tools to create opportunities for exchanging ideas and foster dialogue between the various stakeholders

# Who are we?






Participant organisation name	Lead	Country
University of Pavia	Prof. Paolo Giudici	Italy
Humboldt University Berlin	Prof. Wolfgang K. Härdle	Germany
ZHAW Applied Sciences	Prof. Jörg Osterrieder	Switzerland
University College London	Prof. Tomaso Aste	UK
Bucharest University	Prof. Vasile Strat	Romania
WU Vienna	Prof. Ronald Hochreiter	Austria
Panteion University	Prof. Veni Arakelian	Greece
INESC-TEC	Prof. Paola Brito	Portugal
University of Paris 1	Prof. Christophe Henot	France
Politecnico of Milan	Prof. Emilio Barucci	Italy
University College Dublin	Prof. Valerio Poti	Ireland
University of Luxembourg	Prof. Radu State	Luxembourg
Jozef Stefan Institute	Prof. Marko Grobelnik	Slovenia
University of Warsaw	Prof. Piotr Wojcik	Poland
University of Rijeka	Prof. Saša Žiković	Croatia
Universidad Complutense de Madrid	Prof. Javier Arroyo	Spain
University of Economics in Bratislava	Prof. Jana Peliova	Slovakia
Kaunas University of Technology	Prof. Audrius Kabasinkas	Lithuania
Masaryk University Brno	Prof. Oleg Deev	Czech Republic
Varna University of Economics	Prof. Stefan Vachkov	Bulgaria
University of Tampere	Prof. Lasse Koskinen	Finland
B-Hive	Dave Remue	Belgium
Modefinance	Dr. Valentino Pediroda	Italy
Firamis	Dr. Jochen Papenbrock	Germany

# Network

## The project network includes:

- 24 research universities and centres
- 16 European fintech companies and fintech hubs
- The national supervisors of all 28 EU countries
- The international regulators (BIS, IMF, OECD, EC, EBA, ESMA, EIOPA, ECB)
- International advisory board members

UNIVERSITIES and RESEARCH CENTRES	FINTECH HUBS and ASSOCIATIONS	REGULATORS and SUPERVISORS
		



## FinTech-ho2020: The Model

- Bridge the gap between fintechs and regulators concerning the risks that emerge from the fast adoption of emerging technologies in (support of) the provision of financial services, i.e.:
  - Big Data Analytics
  - Artificial Intelligence
  - Blockchain
- Introducing fintech risk management tools that can address the identified risks.



**RESEARCH FRAMEWORK:  
6 RESEARCH WORKSHOPS**

**3 HORIZONTAL WORKSHOPS,**  
TO DEVELOP USE-CASES BASED  
ON REGULATORS' PRIORITIES  
**3 VERTICAL WORKSHOPS,**  
TO VALIDATE THE DEVELOPED  
USE CASES



**SUPTECH FRAMEWORK:  
3 X 29 SUPTECH WORKSHOPS**

EACH WORKSHOP CONSISTS OF  
**16 HOURS OF TRAINING** FOR  
THE CORRESPONDING  
NATIONAL SUPERVISOR, BASED  
ON THE **USE-CASES**  
DEVELOPED BY THE PROJECT



**REGTECH FRAMEWORK:  
6 REGTECH WORKSHOPS**

EACH WORKSHOP CONSISTS  
OF **6 HOURS OF PRACTICAL  
TRAINING**, WHERE FINTECHS  
AND BANKS CAN REPLICATE  
THE PROJECT'S **USE CASES**  
THROUGH CODING SESSIONS



**EVALUATION FRAMEWORK:**

**ALL PROJECT'S WORKSHOP  
FEEDBACKS** ARE ELABORATED  
INTO AN INTERMEDIATE AND A  
FINAL EVALUATION REPORT.  
**ALL PROJECT'S DELIVERABLES**  
ARE EVALUATED BY A PANEL  
OF ADVISORS WHO  
ELABORATE AN OVERALL  
EVALUATION REPORT



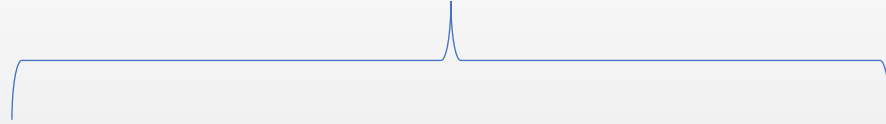
**COMMUNICATION FRAMEWORK:**

**A DEDICATED PLATFORM**  
INTEGRATES ALL PROJECT  
DELIVERABLES (RESEARCH PAPERS,  
USE CASES AND TRAINING SLIDES)  
THE WEBSITE IS LINKED WITH  
**SOCIAL NETWORK CHANNELS**, TO  
ENGAGE ALL STAKEHOLDERS.

# Building blocks



## Research Framework



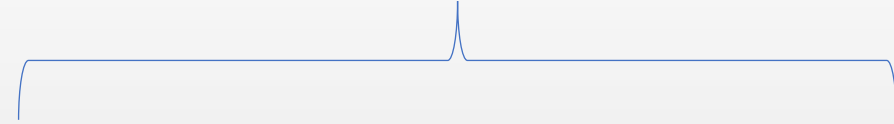
### Collection of Use Cases



- ☐ Identify main applications
- ☐ Identify main risks [customer/investor protection, financial stability]
- ☐ Develop fintech risk management tools that address the identified risks



## Knowledge Exchange Framework



### Dissemination



- ☐ SupTech Trainings
- ☐ RegTech Workshops
- ☐ International Research Workshops

# Knowledge Exchange Platform: Individual Formats



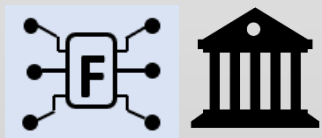
FinTechs

- Collection of use cases (business models/applications/regulatory concerns)
- RegTech Workshops (practical implementation of solutions that help address specific risk or regulatory concerns)



Regulators

SupTech Workshops (overview of emerging technologies, **presentation of use cases (business models/applications/regulatory concerns, risk concerns, state-of-art risk management tools)**)



- Research Workshops [on Big Data Analytics, AI and Blockchain]
- Joint Platform

# RegTech WP— six European Workshops



## Credit Risk in P2P Lending - I

- Organizer: **modeFinance**, Milan, Italy
- March 29<sup>th</sup> 2019



## Credit Risk in P2P Lending - II

- Organizer: **Firamis**, Frankfurt, Germany
- June 28<sup>th</sup> 2019
- [FLYER](#)
- [AGENDA](#)

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## AI-based solutions in Finance I

- Organizer: **ZHAW**, Winterthur, Switzerland
- September 4<sup>th</sup> 2019



## AI-based solutions in Finance II

- Organizer: **Vienna University of Economics**, Vienna, Austria
- February 26<sup>th</sup>, 2020



## Operational Risks in Blockchain - I

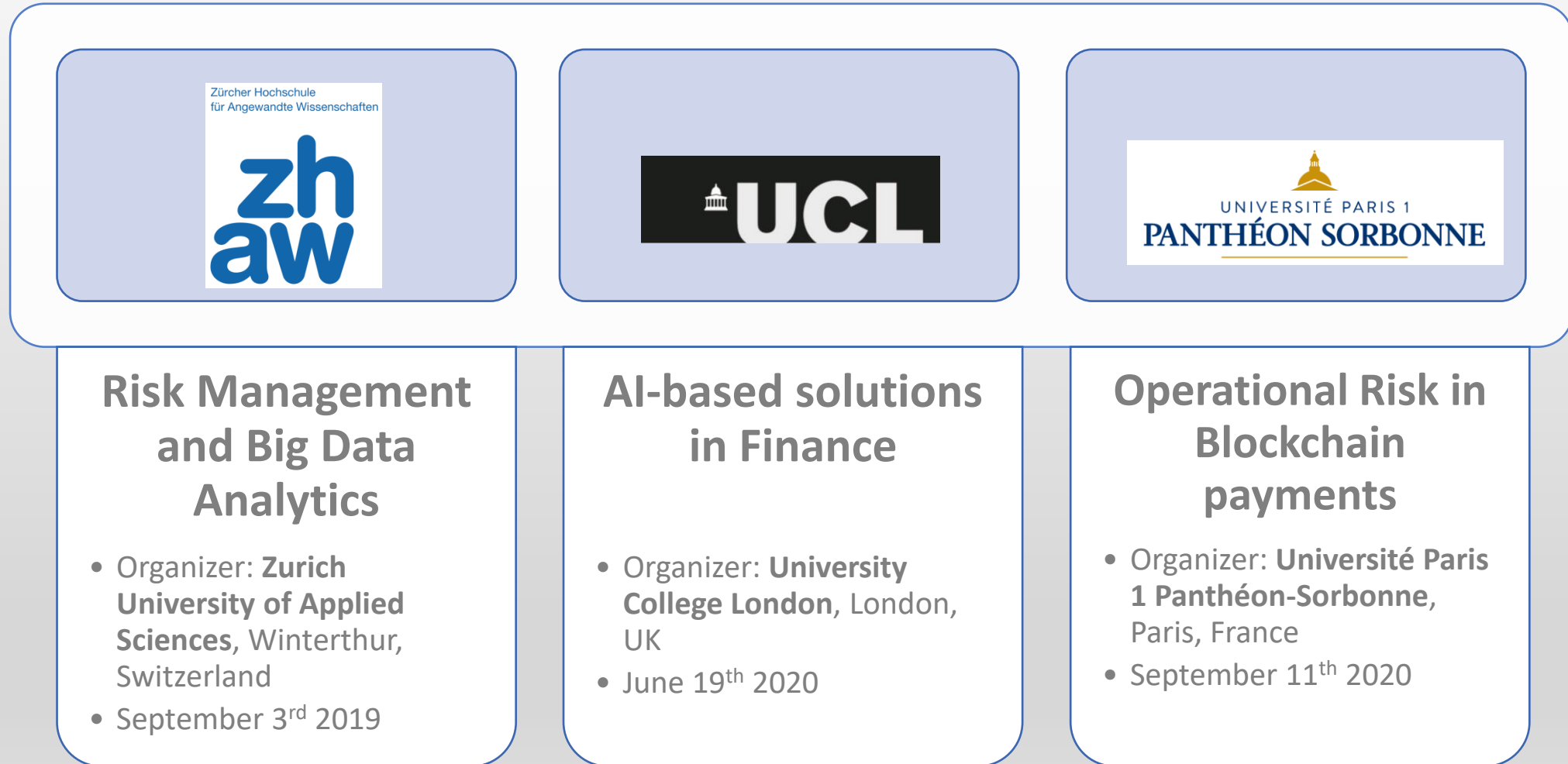
- Organizer: **Universidad Complutense de Madrid**, Madrid, Spain
- June 19<sup>th</sup> 2020



## Operational Risks in Blockchain - II

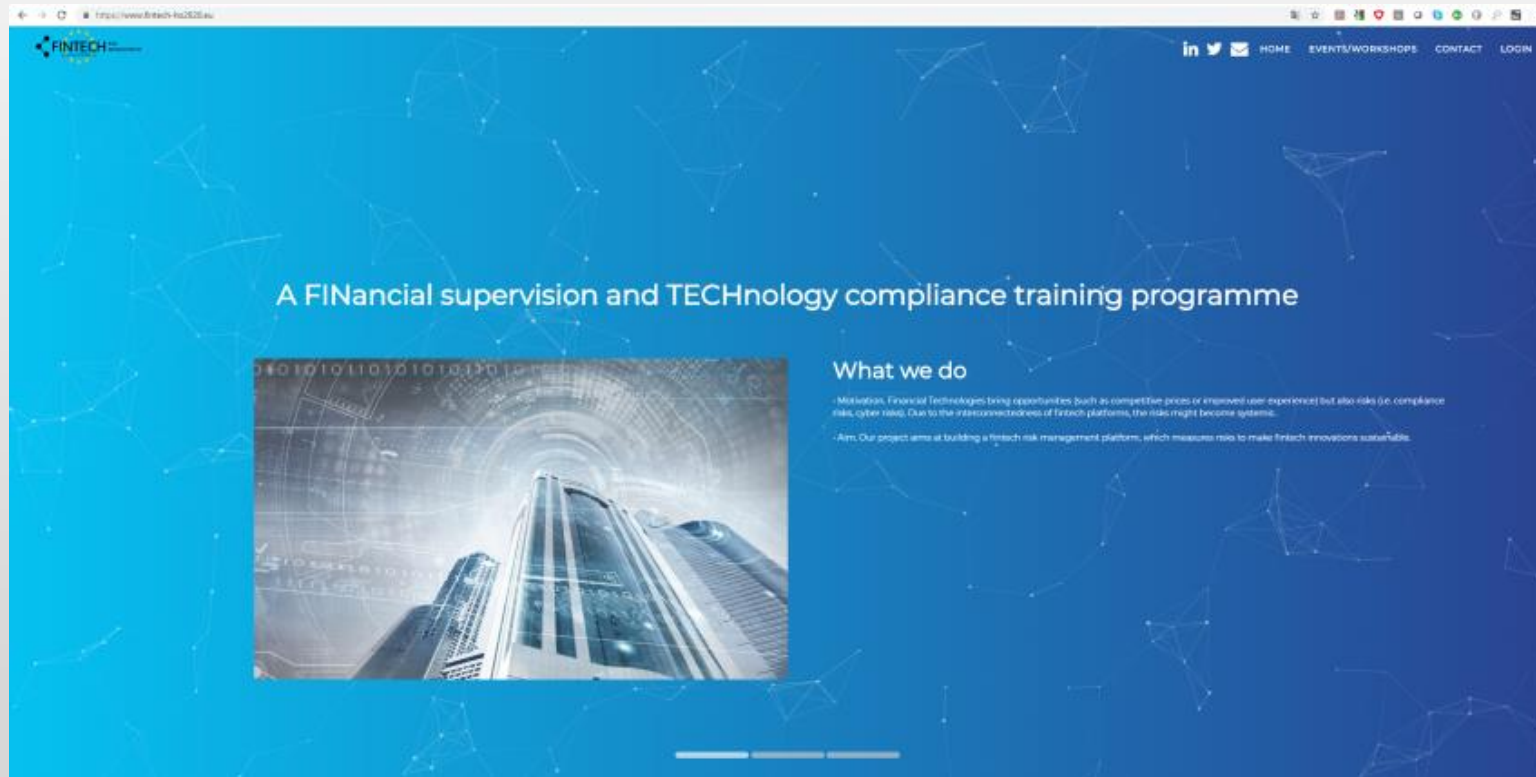
- Organizer: **Université Paris 1 Panthéon-Sorbonne**, Paris, France
- September 11<sup>th</sup> 2020

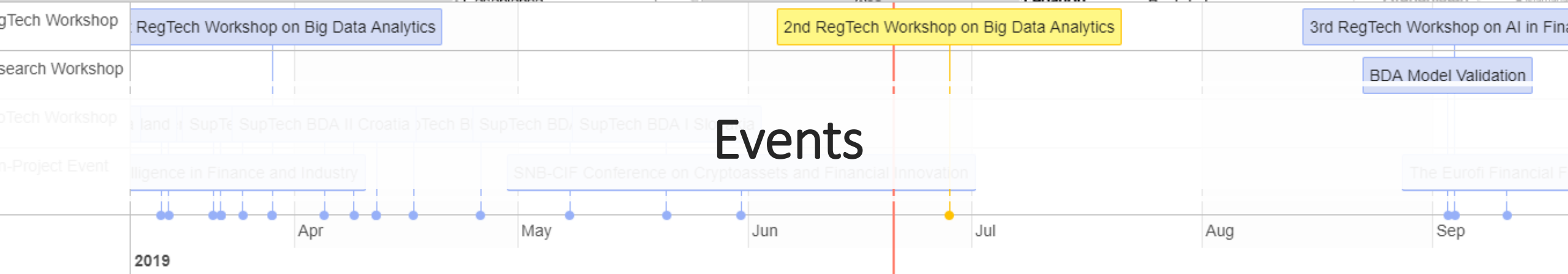
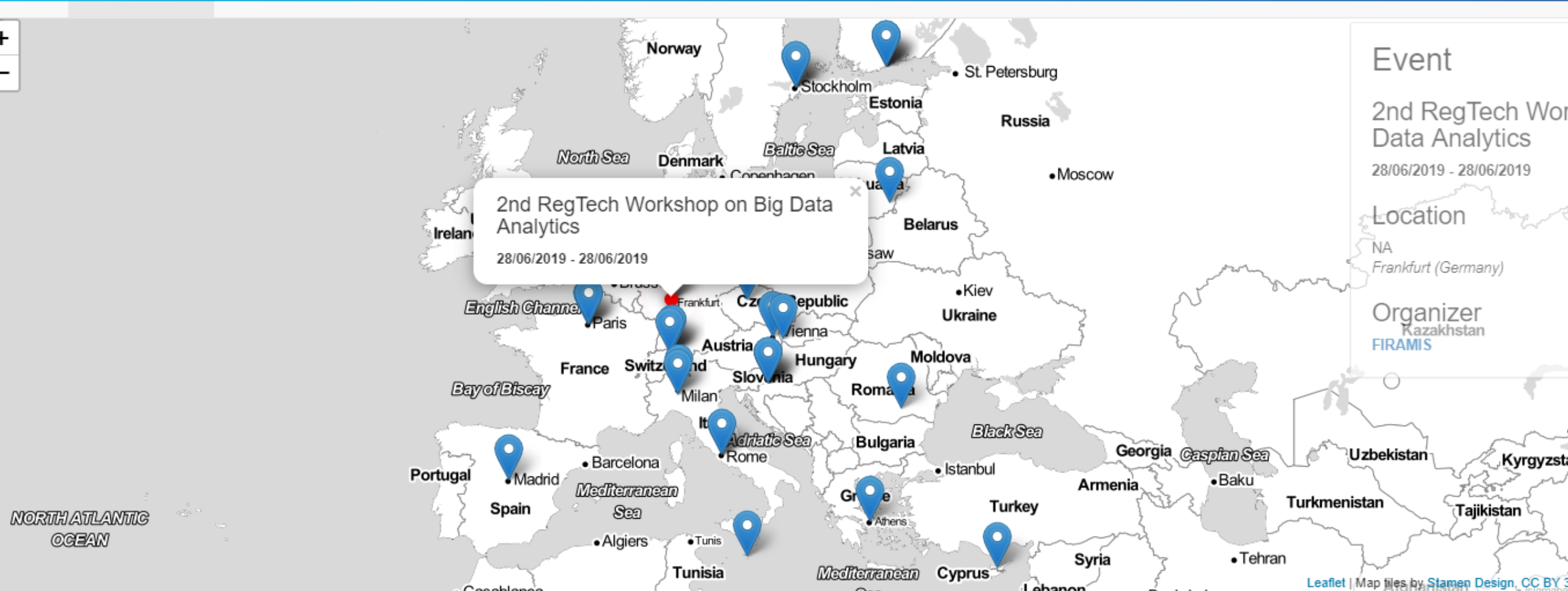
## Research WPs – Vertical Workshops



# Joint Platform

[www.fintech-ho2020.eu](http://www.fintech-ho2020.eu)

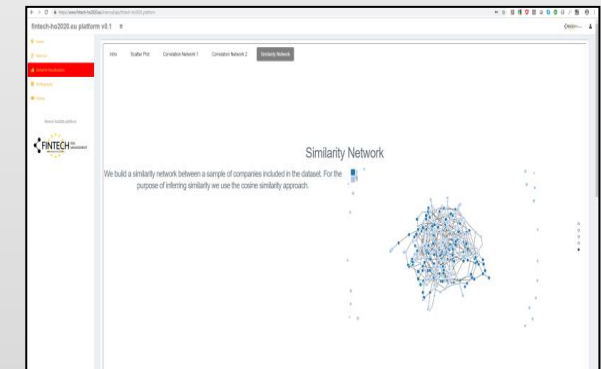
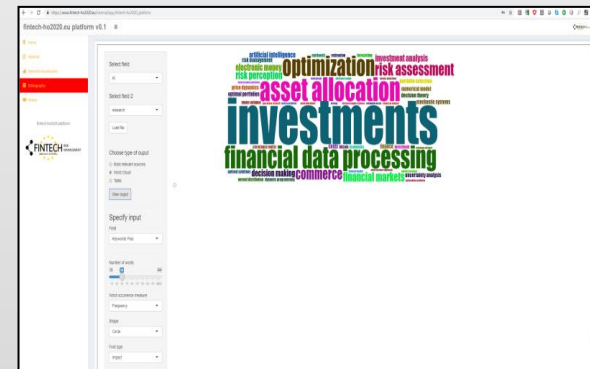
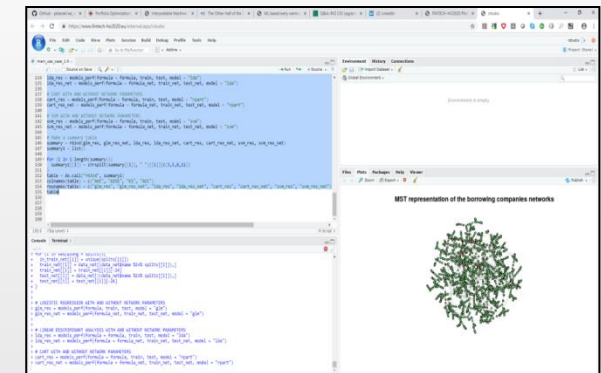
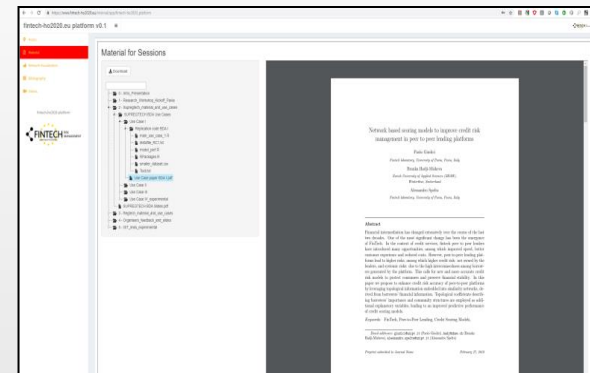






<https://www.fintech-ho2020.eu/internal/login>

- Workshop presentations
- Links and articles
- Paper repositories
- Model demonstrations and coding use cases
- Workshop videos
- Event maps
- Digital learning tools
- Complex data visualisations



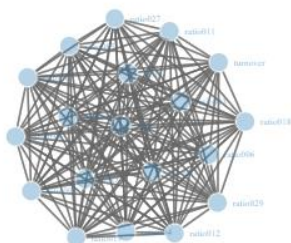
Knowledge and Coding Platform

# Knowledge Exchange

Online platform accessible to all stakeholders

Shared with all / Dropbox\_Fintech / Suptech / SUPTECH BDA Use Cases / Use Case I

	Name ▲
	Replication code BDA I
	Replication code BDA I.zip
	Use Case paper BDA I.pdf



Market structure discovery with clique forests  
(Massara G., Aste T.)

## Material for Sessions

Download Open in RStudio

- 0 - Intro\_Presentation
- 1 - Research\_Workshop\_Kickoff\_Pavia
- 2 - Supregtech\_material\_and\_use\_cases
  - SUPREGTECH BDA Use Cases
  - SUPREGTECH BDA Slides.pdf
- 3 - Regtech\_material\_and\_use\_cases
  - Code\_for\_use\_cases
    - data\_final\_stand.csv
    - DescriptionAndrea.html
    - DescriptionAndrea.Rmd
    - final\_dataset\_mfi\_test.csv
    - final\_dataset\_mfi.csv
    - final\_dataset\_smes\_and.csv
    - final\_dataset\_smes.csv
    - Logit\_model\_test.html
    - Logit\_model\_test.Rmd
    - RandomForest\_test.html
    - RandomForest\_test.Rmd
    - Training\_and\_testing\_models.Rmd
    - Training\_and\_testing\_models\_mfi.html
    - Training\_and\_testing\_models\_mfi.Rmd
    - Training\_and\_testing\_models.html
    - Training\_and\_testing\_models.Rmd
- 4 - Organisers\_feedback\_and\_slides
- 5 - GIT\_links\_experimental

```
...geom_histogram(aes(y = stat(count/nrow(data))),colour="black",binwidth = 10)+ xlim(-10, 180)

#Size dependency of ratios
Let us see if there is different behaviour of other ratios depending on size
```{r plots, echo=FALSE}
multiplot <- function(..., plotlist=NULL, file, cols=1, layout=NULL) {
  require(grid)

  # Make a list from the ... arguments and plotlist
  plots <- c(list(...), plotlist)

  numPlots = length(plots)

  # If layout is NULL, then use 'cols' to determine layout
  if (is.null(layout)) {
    layout <- matrix(seq(1, cols * ceiling(numPlots/cols)),
                      ncol = cols, nrow = ceiling(numPlots/cols))
  }

  if (numPlots==1) {
    print(plots[[1]])
  } else {
    # Set up the page
    grid.newpage()
    pushViewport(viewport(layout = grid.layout(nrow(layout), ncol(layout))))

    # Make each plot, in the correct location
    for (i in 1:numPlots) {
      # Get the i,j matrix positions of the regions that contain this subplot
      matchidx <- as.data.frame(which(layout == i, arr.ind = TRUE))

      print(plots[[i]], vp = viewport(layout.pos.row = matchidx$row,
                                      layout.pos.col = matchidx$col))
    }
  }
}

x <- c(.05,.10, .25, .50, .75, .90)
dat <- data.frame(
  quantiles = x,
  q_lev_2 = quantile(data2$leverage, x),
  q_flev_2 = quantile(data2$fin_leverage, x),
  q_qr_2 = quantile(data2$quick_ratio, x),
  q_cr_2 = quantile(data2$current_ratio, x),
  q_roi_2 = quantile(data2$ROI, x),
  q_roe_2 = quantile(data2$ROE, x),
  q_lev_2 = quantile(data2$leverage, x)
)
```

AI-based  
solutions in  
Finance

Improving  
Scoring Model

# Questionnaire for Fintechs

- Dialogue between regulators and fintechs
- Express opinions, viewpoints
- shed light on the areas of improvement and the criticalities in the relation with regulators and supervisors

[https://www.fintech-ho2020.eu/free/app/survey\\_impact\\_regulation](https://www.fintech-ho2020.eu/free/app/survey_impact_regulation)

Obstacles to fintech scaling →



## FinTech-Questionnaire

### We need your voice!

To enable the dialogue between regulators and operators please answer the following questions to share your profile as a fintech company:

#### 1. How would you describe your main domain of activity?

- ☐ FinTech
- ☐ Traditional financial services
- ☐ Tech
- ☐ Other

'FinTech' describes an activity, service or product related to financial services that includes a technological feature.

'Tech' describes an activity, service or product related to the technological application that can - among others - also have applications in the financial services and markets.

#### 2. How many years has your company been active in its main domain?

- ☐ < 1
- ☐ 1 - 3
- ☐ 3 - 5
- ☐ 5 - 10
- ☐ 10+

#### 3. Which FinTech area characterises best your main domain?

- ☐ Big data
- ☐ Artificial intelligence
- ☐ Blockchain
- ☐ Cybersecurity
- ☐ Lending



A FINancial supervision and TECHnology compliance training programme

## REGTECH WORKSHOP II Big Data Analytics , Frankfurt, June 28th 2019 , TechQuartier Evaluation Form

Role \*

Consortium partner

Please evaluate the contents of the workshop with comments on specific parts and suggestions for future events.

Please indicate which use case was best (if there was more than one) \*

☐ 1

☐ 2

☐ 3

☒ no use case covered

Please evaluate the use cases' explainability on a 1-5 scale (1=low; 5=high) \*

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☒ no use case covered

Please evaluate the use cases' predictive accuracy on a 1-5 scale (1=low; 5=high) \*

☐ 1

# Evaluations



## Explainable AI can help!

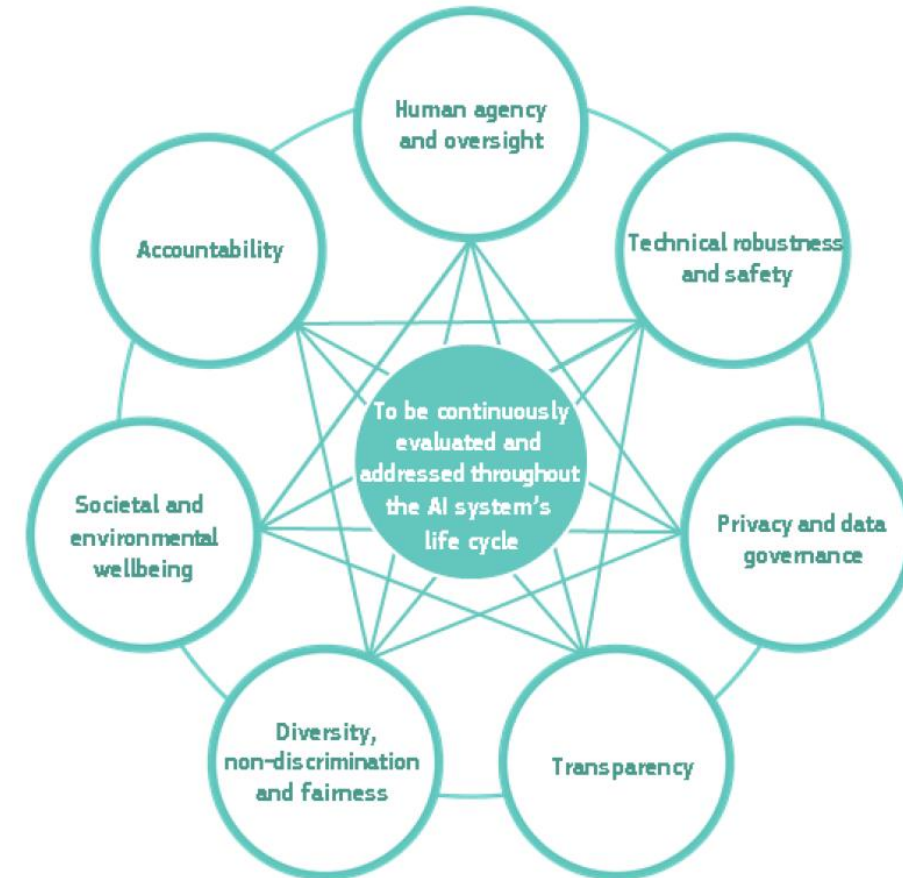
Explainable AI (XAI):

businesses must justify how their models arrive at their decisions. To build trust with users and stakeholders, application leaders must make these models more interpretable and explainable.

- common level of model understanding of all stakeholder
- model validation
- benchmarking

Black box models will not be accepted.

## Black Boxes and XAI



## Firamis team involved



Alexander Deierling



Dr. Alla Petukhina



Niklas Bussmann



Dr. Dimitri Marinelli

## The role of Firamis in this EU project

- member of the executive committee
- work package leader for dissemination, evaluation, coding infrastructure and model implementation
- event and workshop organisation: the 6 RegTech workshops, financial industry workshops, SupTech workshops
- enhance the project network and co-represent the project

## The role of Firamis in this project

[www.fintech-ho2020.eu](http://www.fintech-ho2020.eu)

LinkedIn: <https://www.linkedin.com/company/fintech-ho2020-eu>

Twitter: @fintech\_ho2020

[info@fintech-ho2020.eu](mailto:info@fintech-ho2020.eu)

## Contact and Social Media

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08.30 – 09.00

Registration and welcome FIN-TECH coffee

09.00 – 09.45

Opening and introduction into the EU project  
'Fintech Risk Management'

Dr. Jochen Papenbrock, Firamis GmbH

Branka Hadji Misheva, ZHAW Zurich University



**BRANKA HADJI MISHEVA** is a Scientific Assistant at ZHAW (Zurich University of Applied Sciences) at the School of Engineering and a PhD fellow in Data Science at the University of Pavia. Currently she works on developing and introducing a network-based credit scoring model for Peer-to-Peer lending platforms. She is research author on several papers in the field of financial incentives, network models, predictive performance of scoring models and lead behavior in crypto markets.

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**Dr. JOCHEN PAPENBROCK** is a German Fintech-Entrepreneur and Financial Data Scientist. He has a diploma and doctorate at Karlsruhe Institute of Technology in "financial technology engineering". He worked as a Quantitative Modeler and Risk Management Consultant in the Financial Industry. He is Founder and CEO of the B2B Fintech startup FIRAMIS. Besides that he is editor, speaker and ecosystem shaper for Financial Data Science and AI.



## Agenda

09.45 – 10.30

**Perspective of a European regulator / supervisor on modern Big Data and AI approaches**

Gilles Bouvier, ECB

10.30 – 10.45

**FIN-TECH coffee**



**GILLES BOUVIER** is an experienced Supervisor at the ECB's SSM Fintech team, and is actively involved in ECB's work in the area of Fintech/Regtech. He has an economic background and professional experience both in the private banking sector and in public institutions such as the National Bank of Belgium and the ECB. Gilles was one of the first colleagues to join the work on the ECB Fintech Licensing Guide which was published in March 2018. He is an enthusiast communicator in the languages English, Dutch, French and German.

## Agenda

10.30 – 10.45	FIN-TECH coffee
10.45 – 11.30	<b>Credit risk in banking</b> Dr. Jan-Alexander Posth, ZHAW Zurich University



**Dr. JAN-ALEXANDER POSTH** is a senior lecturer at the Institute for Wealth and Asset Management at the ZHAW School of Management and Law. He has more than 12 years' of professional track record in the financial industry, where he gained extensive expertise as a risk manager, quant and portfolio manager. Jan-Alexander holds a PhD in theoretical physics.



## Agenda

11.30 – 12.45

**Overview P2P lending industry and Coding Session:**

- **Use case I - Network-based Credit Scoring models**
- **Use case II - Clustered scoring models**
- **Use case III - Spatial regression scoring models**

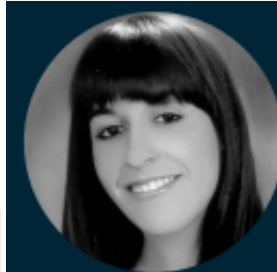
Branka Hadji Misheva, ZHAW Zurich University

Thomas Leach, University of Pavia, Italy

Prof. Daniel Felix Ahelegbey, University of Pavia, Italy

12.45 – 13.45

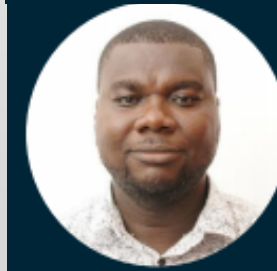
**FIN-TECH lunch**



**BRANKA HADJI MISHEVA** is a Scientific Assistant at ZHAW (Zurich University of Applied Sciences) at the School of Engineering and a PhD fellow in Data Science at the University of Pavia. Currently she works on developing and introducing a network-based credit scoring model for Peer-to-Peer lending platforms. She is research author on several papers in the field of financial incentives, network models, predictive performance of scoring models and lead behavior in crypto markets.



**THOMAS LEACH** is currently a PhD student in the FinTech SandLab at the University of Pavia. He has previously worked at the European Central Bank's FinTech Lab and at blockchain software firm, R3.



**Dr. DANIEL FELIX AHELEGBEY** is an Assistant Professor of Financial Mathematics at the University of Pavia, Department of Economics and Management. He was a faculty member of Boston University as a Postdoctoral Associate (2015-2017). His areas of research include network models for macroeconomic modeling and forecasting, financial markets and risk analytics, and advancing data-driven techniques to solve analytical problems. His current research interest also involves application of network-based segmentation models for Peer-to-Peer credit risk management.

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# Agenda

13.45 – 14.30

**Explainable AI /  
Smart Governance for Fintech Solutions and Data driven  
Management**

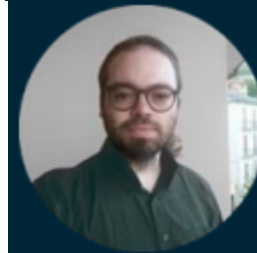
Alexandra Yaroslavtseva, TME AG

Dr. Jochen Papenbrock, FIRAMIS

Dr. Dimitri Marinelli, FIRAMIS

14.30 – 14.45

**FIN-TECH coffee**



**Dr. DIMITRI MARINELLI** is a postdoc researcher at FIRAMIS with research focus on Machine Learning and Finance. He is an expert in applying advanced mathematical methods in quantitative systems, nowadays focusing on Portfolio Risk analysis. His current position at FIRAMIS is sponsored by the Marie Skłodowska-Curie Action through an Individual Fellowship within the EU HO2020 program.



**Dr. JOCHEN PAPENBROCK** is a German Fintech-Entrepreneur and Financial Data Scientist. He has a diploma and doctorate at Karlsruhe Institute of Technology in "financial technology engineering". He worked as a Quantitative Modeler and Risk Management Consultant in the Financial Industry. He is Founder and CEO of the B2B Fintech startup FIRAMIS. Besides that he is editor, speaker and ecosystem shaper for Financial Data Science and AI.



# Agenda

**14.45 – 16.30**

**Panel: Fintech**

Gilles Bouvier, ECB

Julian Arevalo, EIOPA

Dr. Michael Jünemann, Bird & Bird

Carsten Zecher, KPMG

Thorsten Seeger, P2P industry expert

Moderators:

Branka Hadji Misheva, ZHAW Zurich University

Dr. Jochen Papenbrock, Firamis GmbH

**16.30 – 17.00**

**Discussion and Feedbacks**

# Agenda



# Panel discussion with...



**Thorsten Seeger**

*Experienced  
financial services  
professional*



**Julian Arevalo**

*Senior Expert on  
Financial  
Innovation at  
EIOPA.  
Involved in  
FinTech/Insur-  
Tech and Big Data  
Analytics.*



**Gilles Bouvier**

*Supervisor at the  
ECB's SSM Fintech  
team*



**Dr. Michael Jünemann**

*Heads the German  
Banking & Finance  
practice of Bird & Bird  
LLP,  
advises on all aspects  
of banking regulatory  
and finance law.*



**Carsten Zecher**

*Senior Manager  
at KPMG,  
he focuses on  
Non-Financial  
Risk Management  
in Financial  
Services.*



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