

**EU Supervisory
Digital Finance
Academy**



Artificial Intelligence and Machine Learning for SupTech

2nd Advanced Training Week

Florence

13 - 16 Mar. 2023

It is hard to name a sector that will not be dramatically affected by machine learning or even artificial intelligence. Many excellent courses teach you the mechanics behind these innovations, helping you to develop an engineering skill set. This course takes a different approach. It is aimed at people who want to deploy these tools in business or policy, whether through start-ups or within larger organisations. While this requires some knowledge of how these tools work, it is only a tiny part of the equation — just as knowing how an engine works is a small part of understanding how to drive. What is needed is an understanding of what these tools do well and what they do poorly. This course focuses on giving you a functional, rather than mechanical, understanding. By the end, you should be an expert at identifying ideal use-cases and be well-equipped to improve analysis and policy using machine learning.

This course thus aims to give an overview and a grasp of popular Machine Learning (ML) techniques. Within this, you will be provided with an understanding of the opportunities and limitations of said techniques and a chance to interact with the experts. In practical terms, you will work hands-on with ML/AI methods in Python and demystify the black boxes to continue learning by yourself. Furthermore, the course will also present and discuss current policy and industry practice at European and international levels.

PROGRAMME

Day 1 - Monday, 13 March 2023

13.30 - 14.00 **Welcome remarks and EU-SDFA presentation, followed by a tour de table**

- **Nicola Bilotta** | European University Institute
- **Nico Lauridsen** | European University Institute
- **Piotr Nowak** | DG Reform, European Commission

Part one

- **Iman Van Lelyveld** | Vrije Universiteit Amsterdam and De Nederlandsche Bank
- **Michiel Nijhuis** | De Nederlandsche Bank

14.00 - 14.45 **Lecture 1: Course overview**

- Why is this course relevant?
- What can you expect?
- What we will cover

14.45 - 15.45 **Tutorial 1: How to read data and use sklearn?**

- Getting started with Python and data manipulation.
- How is this different from Excel?
- Read the data and get to know it.
- Introduction to sklearn: where to find the buttons

15.45 - 16.15 *Coffee break*

16.15 - 17.00 **Lecture 2: Introduction to Machine Learning (ML)**

- What is ML? What is ML applied to?
- Linear regression from the ML lens.
- The outlines of the ML approach
 - o Supervised vs. unsupervised learning
 - o Hyperparameters and how to select them
 - o Gradient descent and grid search

17.00 - 18.00 **Tutorial 2: Regressions versus Classifiers**

- Logit as a statistical model vs ML model
- How to find the optimal (hyper)parameters
- A different classifier: Support vector machines
 - o Different types of kernels
 - o First glimpse: Dangers of overfitting
 - o Evaluating performance

18.00 - 19.00 *Cocktail*

19.00 *Shuttle bus from Villa Schifanoia to Hotel San Gallo Palace*

8.45 Shuttle bus from Hotel San Gallo Palace to Villa Schifanoia

9.15 - 10.00 **Lecture 3: Machine Learning – the basics**

- Importance of pre-processing your data
- Building up to the workhorse classifier: the logit model
- When is a classifier doing a “good” job?
- Confusion matrix, Receiver Operator Characteristic (ROC)
- What are overfitting, bias and variance?

10.00 - 11.00 **Tutorial 3: Data pre-processing and assessing model performance**

- How to pre-process: standardize your data
- Pros and cons of standardization
- Working with the confusion matrix
 - What if costs are not symmetric?
 - The trade-off between precision and recall

11.00 - 11.30 *Coffee break*

11.30 - 12.15 **Lecture 4: Fighting the curse of dimensionality**

- How to reduce dimensionality?
 - K-Nearest Neighbours (KNN)
 - Principal Components Analysis (PCA)
- Feature selection and regularization
 - How to select the most important features?
 - Examples: RIDGE, LASSO, Elastic net
- Is a “good” model always good? What is external validity?
- Cross-validation and holdouts

12.15 - 13.15 **Tutorial 4: Cross-validation applied to LASSO variable selection**

- Looking closer at cross-validation (CV) and holdouts
- K-fold, Leave-one-out, stratified CV
- Splitting your data into training and testing samples
- How to use CV to tune a LASSO model

13.15 - 14.25 *Lunch break*

14.25 - 14.30 *Group picture*

14.30 - 15.15 **Lecture 5: Improving weak learning**

- How to grow a decision tree? How to split?
 - Purity measures
- Can Ensemble Classifiers improve weak learners?
 - Bagging and boosting
 - Examples: AdaBoost, XGBoost

15.15 - 16.15 **Tutorial 5: Decision trees and random forests**

- Growing your own decision tree
- How deep? How many splits? How big are the leaves?
- From trees to random forests
- Comparing performance with the confusion matrix

16.15 - 16.45	<i>Coffee break</i>
16.45 - 17.30	Lecture 6: Unsupervised learning and clustering <ul style="list-style-type: none"> • Supervised versus unsupervised learning • What can we do with unsupervised learners? • K-means, t-SNE, DBSCAN, Gaussian mixtures
17.30 - 18.30	Tutorial 6: Finding clusters and neighbours <ul style="list-style-type: none"> • Implementing K-means and DBSCAN • Hierarchical clustering: Bottom-up or Top-down? • Visual inspection of results
18.30	<i>Shuttle bus from Villa Schifanoia to Hotel San Gallo Palace</i>
19.00 - 20.30	<i>Guided tour on the history of banking and finance in Florence (Meeting point at Hotel San Gallo)</i>

Day 3 - Wednesday, 15 March 2023

8.45	<i>Shuttle bus from Hotel San Gallo to Villa Schifanoia</i>
9.15 - 10.00	Lecture 7: Natural Language Processing (NLP) <ul style="list-style-type: none"> • What are the main approaches in textual analysis? • Going beyond simple word counts • How to extract market sentiment?
10.00 - 11.00	Tutorial 7: NLTK and sentiment analysis <ul style="list-style-type: none"> • Constructing a bag of words • Classifying sentiments (positive/negative) • Example with financial news data
11.00 - 11.30	<i>Coffee break</i>
11.30 - 12.15	Lecture 8: Explainability <ul style="list-style-type: none"> • How can we open the black box • Explain it like I'm a 5 year old (ELI5) and Shapley values
12.15 - 13.15	From practice to policy: AI ACT supervisor implication <ul style="list-style-type: none"> • Discuss some things that can go wrong <ul style="list-style-type: none"> ◦ Survivorship bias, input errors and deceit ◦ Fairness and discrimination • What is the reaction of authorities?
13.15 - 14.30	<i>Lunch break</i>

Part Two

14.30 - 16.00	Session 1: NCAs use case of Suptech applications <ul style="list-style-type: none"> • Michiel Nijhuis De Nederlandsche Bank • Hans Gmasz ECB • Oliver Giudice Banca d'Italia
16.00 - 16.30	<i>Coffee break</i>

16.30 - 18.00	Session 2: Future trends, challenges, and collaborations in Suptech: ESAs prospective <ul style="list-style-type: none"> • Miguel Caballero EIOPA • Vaidotas Tamulenas EBA • Giulio Bagattini ESMA
18.30 - 19.00	<i>Cocktail</i>
19.00 - 19.45	Keynote Speech by Jermy Prenio BIS
19.45 - 21.00	<i>Dinner</i>
21.00	<i>Shuttle bus from Villa Schifanoia to Hotel San Gallo Palace</i>

Day 4 - Thursday, 16 March 2023

8.45	<i>Shuttle bus from Hotel San Gallo Palace to Badia Fiesolana</i>
9.15 - 10.45	Session 3: Technology application design and prototyping Robert Binder Regnology <ul style="list-style-type: none"> • Agile prototyping and applications development • Lifecycle management application • Lean procurement
10.45 - 11.15	<i>Coffee break</i>
11.15 - 12.45	Session 4: Industry dialogue: future market development <ul style="list-style-type: none"> • Mathias Strand Anch.AI • Robert Binder Regnology • Lubos Pernis FNA
12.45 - 13.00	Closing Remarks
13.00	<i>Light lunch</i>

INSTRUCTORS



Giulio Bagattini *European Securities and Markets Authority*

Giulio Bagattini works in the Economics, Financial Stability and Risk department at ESMA, where he monitors market developments and assesses risks to consumers, orderly markets and financial stability. To this end, he seeks to optimally leverage different sources of information via econometric analysis and data science. Prior to joining ESMA in 2021, he conducted empirical banking research and data-driven supervision at the ECB. Giulio studied mathematics, finance and banking.

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Nicola Bilotta *Florence School of Banking and Finance, European University Institute*

Nicola Bilotta is the project coordinator of the EU-SDFA at the FBF. Previously, he worked as a Senior Fellow at the International Affairs Institute (IAI) - where he led the research on digitalization and global finance -, as a Senior Research Analyst at The Banker Research Team (Financial Times) and as a Visiting Fellow at the CSIS. He is currently an Adjunct Professor at the LUMSA University and an Associate Fellow at IAI.



Robert Binder *Regnology Germany GmbH*

Robert Binder currently works in the SupTech product management team of Regnology, shaping the vision and roadmap of Regnology's SupTech solutions since 2020. Previously, Robert studied chemistry at the Goethe University Frankfurt. Thereafter, he worked as a research associate in the field of quantum dynamics for a total of seven years, first as a PhD student and, then, after graduation as a postdoctoral researcher, (co-)authoring more than a dozen peer-reviewed scientific articles.

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Miguel Caballero *European Insurance and Occupational Pensions Authority (EIOPA)*

Miguel Caballero works as senior expert on supervisory convergence and FinTech at the European Insurance and Occupational Pensions Authority (EIOPA) since 2019. He has worked on several projects promoting the harmonisation of supervisory practices among insurance supervisors as well as coordinating EIOPA's work on SupTech. Previously he worked in the Spanish Insurance Supervisory Authority (DGSFP) as head of the actuarial and financial department and before as off-site analyst.

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Oliver Giudice *Banca D'Italia*

Oliver Giudice received his Ph.D. in Maths and Computer Science in 2017 at University of Catania, defending a thesis entitled "Digital Forensics Ballistics: Reconstructing the source of an evidence exploiting multimedia data". From 2011 to 2014 he was involved in various research projects at University of Catania in collaboration with the Civil and Environmental Engineering department and the National Sanitary System. He was leader of the R&D team of University of Catania for project Farm.PRO (PO/FESR Misura 4.1.1.1) from 2012 to 2014. In 2014 he started his job as a researcher at the IT Department of Banca d'Italia dealing with text classification and crypto-currencies analysis. For various years since 2011 he collaborated with the IPLab (<http://iplab.dmi.unict.it>) working on Multimedia Forensics topics and being involved in various forensics cases as Digital Forensics Expert. His research interests include machine learning, computer vision, image coding, urban security, crypto-currencies and multimedia forensics.

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**Hans Gmasz** *European Central Bank*

Hans Gmasz works in banking supervision at the European Central Bank. He is a senior expert in internal models used for the calculation of capital requirements and has been working on different aspects in the supervision of these models in the past (leading on-site inspections, drafting decisions, policy making, trainings). In recent years his main focus was the development of a tool to support on-site supervisors in internal model investigations, employing state of the art natural language processing techniques. He holds a PhD in mathematics from the university of Vienna.

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**Nico Lauridsen** *Florence School of Banking and Finance, European University Institute*

Nico Lauridsen is a Research Associate of the Florence School of Banking and Finance at the European University Institute. At the same time, he is also a Ph.D. candidate at the University of Bologna. He has been a visiting researcher at the Judge Business School and a Research Associate for the Cambridge Centre for Alternative Finance. Before his academic career, he had worked for several Fintech startups.

**Piotr Nowak** *European Commission DG REFORM*

Piotr is an established official of the European Union. He is currently working in the European Commission, DG REFORM, where he is responsible for projects related to financial sector and access to finance. His focus is on digitalisation and the application of new technologies in supervisory practices and capital market development. Piotr joined the European Commission in 2008 and has worked in several policy areas. He has been involved in establishing three European Union agencies, namely, the European Institute of Innovation and Technology, the Single Resolution Board (SRB), and the European Labour Authority. During his assignment at the SRB, he was responsible for setting up the contributions collection to the Single Resolution Fund. When working in the Commission, he was also involved in the implementation of the Capital Markets Union Action Plan of the Commission, specifically actions related to performance of investment products and retail investors agenda. Piotr began his career in finance in Poland, where he worked as a stockbroker and private banker. He graduated from the Warsaw School of Economics, where he studied "Management and Marketing".

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**Michiel Nijhuis** *De Nederlandsche Bank (DNB)*

Michiel Nijhuis works as data scientist at the Data Science Hub at De Nederlandsche Bank (DNB), where he performs data science related project for both the central bank as well as the supervision side. Michiel enjoys applying data science to solve a large variety of problems and use new techniques. His background is in electrical engineering, he holds a PhD on data driven methods to the planning of low voltage networks. His main interest is in using data to gain new insights by using modern statistical approaches.

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**Lubos Pernis** *FNA*

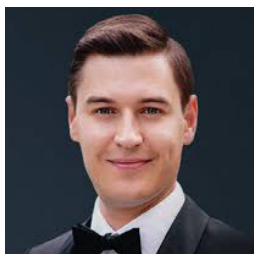
Luboš Pernis is the Lead Data Scientist for EMEA at FNA taking care of the delivery of network analytics and simulation solutions for central banks, financial market infrastructures and other financial institutions. He joined FNA in February 2019 as a Data Scientist after working in the Data and Statistics Department at the Bank of England. His training is in Economics and Data Science and he is currently a Master in Public Administration candidate at the Institute for Innovation and Public Purpose at UCL. He is based in London, UK.

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**Jermy Prenio** *Bank for International Settlements*

Jermy Prenio joined the Financial Stability Institute of the BIS in 2016. He is involved in managing the FSI's outreach programme for financial supervisors. He contributes to the FSI's published work, mainly on technology-related topics such as fintech, suptech and cyber security, and develops other policy-related material for FSI Connect. He also manages the activities of the Informal Suptech Network and coordinates the FSI's work related to financial inclusion. Previously, he was Deputy Director for Regulatory Affairs at the Institute of International Finance in Washington DC, where he led the formulation of the global banking industry's views on international regulatory issues. He also worked as a regulator in the Philippines, where he headed the Task Force on Basel II Implementation.

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Vaidotas Tamulenas *European Banking Authority*

Vaidotas Tamulenas is a Bank Expert in Digital Finance Unit at the European Banking Authority (EBA). He currently leads the EBA work on innovation monitoring, SupTech and innovation facilitators. Prior to that he focused on ICT security, operational resilience and recovery and resolution planning topics. Before joining the EBA, Vaidotas worked in crisis management division at the ECB/SSM and in financial stability unit at the Bank of Lithuania. He holds Master's degree in Financial Economics and Bachelor's degree in Economics from ISM University of Management and Economics in Lithuania.

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Iman Van Lelyveld *VU Amsterdam*

Iman van Lelyveld heads the Data Science Hub at DNB and is Professor of Banking and Financial Markets at the Finance Group of the VU Amsterdam. He has been involved in many regulatory policy issues and the BCBS Research Task Force – chairing several groups. He has published widely on international banking and financial networks and has worked for Deutsche Bank, the Bank of England, and the International Data Hub at the Bank for International Settlements (BIS). At the BIS he helped to setup analysis of the exposure network of the largest banks in the world. In the last few years he has been busy with setting up a Data Science Hub (DSH) at De Nederlandsche Bank, the Dutch central bank and prudential supervisor.

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PARTICIPANTS



Angela Avagliano *European Banking Authority*

Angela Avagliano is currently working as Statistician at the European Banking Authority with a special focus on data visualization and data analytics. Previously she worked for 3 years at the European Central Bank on Banking Supervisory Data and Internal Models topics. In the meantime, she pursued a remote postgraduate program for professionals in Data Science, ML and AI organized by the Massachusetts Institute of Technology. She graduated at the University of Bologna in Economic Statistics with a master thesis research project in geo-spatial macro-econometric modelling.

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Mario Bambulovic *Croatian financial services supervisory agency*

Mario Bambulovic works as a head of Systemic risk department at Croatian Financial Services Supervisory Agency that regulates non-banking financial institutions in Croatia. Mario holds a degree in mathematics at the University of Zagreb and eight years of experience in field of financial stability and macroprudential regulation.

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Georgios Banavas *Hellenic Capital Market Commission*

Georgios Banavas is a senior national representative at Data Standing Committee - ESMA addressing issues on regulatory requirements for reporting of derivative contracts under EMIR, transactions in financial instruments, order data record keeping, clock synchronisation, positions limits, double volume cap and transparency data reporting under MiFIR/MiFID II, securities financing transactions under SFTR, reference data under MiFIR and MAR, reporting obligations under 24 of AIFMD, approved prospectuses, supplements and associated meta data under PR, reporting requirements under MMFR. He is responsible for 5 HCMC staff members of the 3 TFs (Market and Issuers, Repositories, Funds) under DSC. Member of the Hellenic Delegates team for the EU Digital Operational Resilience Act -DORA at European Council. (Sep 2020 - Sep 2022) Member of the Joint ESAs DORA committee on policy development of the Regulation (EU) 2022/2554 on Digital Operational Resilience (since Nov 2022). Member of the Cyber Security Network at ESMA. (Jul 2019 - Dec 2022). Data Reporting and Supervision Coordinator (HCMC): Regulatory and market data reporting across pieces of EU capital markets legislation - Responsible for ad hoc designated teams of 2-3 HCMC staff per Regulation/ Competent Directorate.



Kurt Mario Bonello *Malta Financial Services Authority (MFSA)*

Kurt Mario Bonello is an experienced data solutions specialist with a passion for driving insights and building impactful solutions. Making the world more efficient through analytics, mathematics, economics, engineering and business.



Maja Curkovic Ilic *Croatian National Bank*

Maja Curkovic Ilic holds a university specialist degree in Financial analysis. She has been working for Croatian national bank for 9 years - 6 years in Statistics department and past 3 years in Risk modelling department.

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**Anna Curridori** *Commission for the Supervision of the Financial Sector (CSSF)*

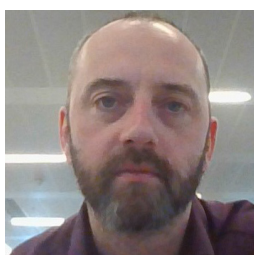
Anna Curridori is a member of the Innovation Hub of the CSSF (Commission de Surveillance du Secteur Financier). Previously she was member of IT supervision department at CSSF. Before arriving at CSSF, she worked as Information Security Manager for an insurance company and as IT auditor and IT risk consultant in a Big Four.

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**Tiago Dias** *Comissão do Mercado de Valores Mobiliários (CMVM)*

Tiago Dias is an economist / data analyst at CMVM, in Portugal. He has been dedicated to the development and implementation of BI solutions for the supervision / surveillance of investment funds for the past 3 years (performance and compliance of UCITS and AIFs). He graduated in 2020 from NOVA School of Business and Economics (NOVA SBE) with a Master's in Management, specialising in Data and Business Analytics. Currently pursuing a PhD in Mathematics, in the area of Operations Research, at the NOVA School of Science and Technology (NOVA SST).

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**Edward Flood** *Central Bank of Ireland*

Edward Flood manages a team of analytics professionals in the Central bank of Ireland and oversees the application of data driven supervision of funds and investment firms across a number of regulatory regimes.

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**Gheorghe Cazacu** *The Financial Supervisory Authority*

Gheorghe Cazacu during his career had the opportunity to cover a wide area of expertise, starting by working on developing drivers to development and approaching design and development of big data solutions for social media and financial institution using technologies from J2EE, microservices and ML.

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**Javier Eduardo Hernández Sánchez** *Banco de España*

Javier Eduardo Hernández Sánchez is a supervisor at the Banco de España. He was born in Bogotá (Colombia) where he spent most of his childhood and adolescence. In 2000 he moved with his family to Madrid after they were threatened by guerrillas. He holds a master's degree in computer vision and a PhD in the same field from Rey Juan Carlos University. In 2021 he was awarded a second master's degree in data science. Javier started working in R&D in the fields of parallel computing and computer vision and then taught at university until the burst of the real estate bubble and financial crisis. After that, he did a spell in consulting on business analytics in banking and finance. His career in central banking started in 2014, when he moved to the Banco de España – first in the IT department and then in Supervision as an IT Auditor. In 2020 He was offered a position for the European Central Bank in the SupTech team where he worked with network-graph technologies. Now he is back in Banco de España working in the Horizontal Analysis and Suptech group.

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**Olga Janczyszyn** *The Polish Financial Supervision Authority*

Olga Janczyszyn works at the Polish Financial Supervision Authority, dealing with the licensing of loan crowdfunding platforms. In addition, she is interested in new technologies and financial solutions (FinTech, AI). She completed postgraduate studies in Cybersecurity management, Technology, the right application of artificial intelligence (AI), Postgraduate management studies - Fintech, Postgraduate Studies in Modern Promotion. Education helps her to have a wide view of the financial innovation market and additional supervisory tools.

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**Alexandros Kaliontzoglou** *Bank of Greece*

Alexandros Kaliontzoglou holds a Diploma in Electrical and Computer Engineering and a Ph.D. in information systems security. He joined the Bank of Greece in 2009 and has worked in Payment Systems Oversight for 10 years, with significant contribution in payment instrument related policy development. He is currently working in Macprudential Policy focusing on cyber security and digital finance risks. He is the deputy head of the Macprudential Policy Section, the head of the Bank of Greece Innovation Hub and a member of the Regulatory Sandbox Operations Team.

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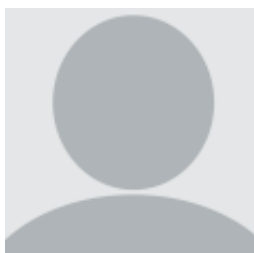
**Kadri Kaljaste** *Finantsinspeksioon*

Kadri Kaljaste works as a financial auditor in the Financial Supervision Authority in the Risk and analysis department. She is responsible for tasks related to credit risk. During supervision she has to assess the bank's internal models, both from the point of view of capital regulation and the automated models used in the creditworthiness assessments. Kadri holds a master's degree in math.

Sebastian Kimmer *BaFin*

Sebastian Kimmer is an economist at the German financial supervisory authority BaFin and concerned with secondary markets topics. Prior to joining the secondary markets team, he performed data analysis and was responsible for data management at the resolution unit of BaFin. Before that, he investigated market manipulation cases and dealt with policy issues regarding market integrity.

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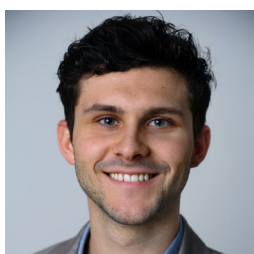
**Erkko Korgema** *Estonian Financial Supervision and Resolution Authority (EFSA)*

Erkko Korgema worked for several years in the Financial Supervision Authority in various positions. He currently is the Head of IT department. In his previous positions, he was closely involved with project management, data processing and data security. Educational background: Bachelor's degree in Informatics and Master's degree in IT Management.

**Mathias Lien Oskarsson** *Finansinspektionen (S-FSA)*

Mathias Lien Oskarsson is an analyst at the Market Analysis and Policy division at the Swedish FSA. Primarily working with wide-range market analysis, AI policy as well as researching retail investor behavior and ESG-motivated investments in the mutual fund space. His educational background is a M.Sc. in Statistics and a M.Sc. in Finance.

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**Matthias Mantler** *FMA (Austria)*

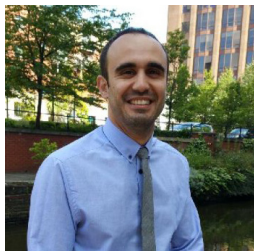
Matthias Mantler is Economist Banking Resolution at Financial Market Authority (Vienna, Austria). Previously he worked as Credit Risk Analyst at Raiffeisen Landesbank NÖ/Wien (Vienna, Austria). He holds a Bachelor of Science Economics and Social Sciences from the Vienna University of Economics and Business (Vienna, Austria)

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**Cristina Palomo Regidor DGSFP**

Cristina Palomo studied Telecommunication Engineer and she has been working in the private sector until 2021 where she started working for the public sector. Since last august she is working for DGSFP organism from Economy Ministry. Cristina likes reading, music, going to cinema, theater and museums.

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**Andreas Papayiannis CySEC**

Andreas Papayiannis is an officer at the Risk Management and Statistics department of CySEC, bringing wide experience in data science and risk analytics. Andreas is involved in the operation of the RBS-F, CySEC's holistic risk-based methodology to supervision, while leading the data analytics activities of the department and participating at ESMA committees. Prior to CySEC, Andreas has worked in data science related senior roles in the Academia, e-Commerce, Financial Services and Banking sectors.

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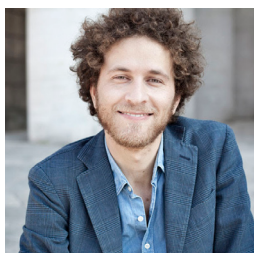
**Sebastiano Russo EIOPA**

Sebastiano Russo is very interested in Risk Management, especially in the Insurance context. He is increasing his quantitative skills within the Actuarial function; he is also very interested in Big Data analysis and Data Mining techniques.

**Jose Luis Sanchez Comisión Nacional del Mercado de Valores (CNMV)**

Jose Luis Sanchez is a senior supervision officer (CCP Profile) at Comisión Nacional del Mercado de Valores. He is a quantitative and data analyst and he holds a Msc. Civil Engineer.

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**Francesco Scalese CONSOB**

Francesco Scalese has a background in statistics. He joined Consob in 2005 working for Markets Division carrying out inquiries and activities to counteract market abuse (insider trading and market manipulation). Since 2012 he has been working for research department where he manages the supervisory databases, ensuring the quality of the data available, and managing the information flows from the supervised subjects, other Institutions and the supervisory authorities. In addition he carries out research and analysis in the economic and financial fields, promoting CONSOB participation in the scientific debate.

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**Karel Scheib Czech National Bank (CNB)**

Karel Scheib is a Data Warehouse Engineer at the Czech National Bank. He is responsible for development/operations of analytical data use cases based upon largest regulatory SME loan/subject register in Czech Republic (AnaCredit/RIAD). He also works on replacement of CRÚ by AnaCredit.

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**Valerio Signore** *Bank of Italy*

Valerio Signore is an expert in the field of customer protection working at Bank of Italy since December 2018. BNL BNP Paribas Analyst from August 2013 to December 2018. Intern at MSCI - ISS Corporate Governance from February 2013 to May 2013.

**Jakub Sip** *National Bank of Slovakia*

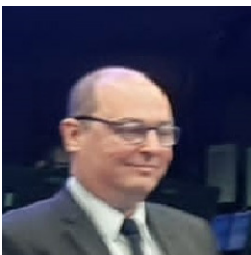
Jakub Sip works for the National Bank of Slovakia as python programmer (especially working with django). He is a tech enthusiast and he is looking forward to gain some new skills.

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**Bas Verschoor** *AFM*

Bas Verschoor is a senior data analyst and team lead of development and operations team for the AFM retail supervision departments. Development of data driven solutions for 9 supervisory teams, ranging from - for example - building BI tools supporting general market insights, to implementing machine learning models to detect non-compliance with legal norms, to developing new generic technical solutions for receiving and processing data. Extensive experience in previous roles in policy and international supervisory cooperation in the field of capital markets and financial stability supervision.

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**Andrej Vrabic** *Banka Slovenije*

Andrej Vrabic started his professional career as a stockbroker and later continued as an asset manager, mainly in asset management companies and private funds in Slovenia. For a short period he was head of market operations on the Ljubljana Stock Exchange. He continued his work as a product owner at a small crypto exchange Blocktrade, where he worked closely with the developers to obtain an MTF license for the exchange. During the Slovenian Presidency to the Council of the EU, he was chairing the digital finance dossiers MiCA, DORA and DLT - pilot regime. He is currently working at the Banka Slovenije as an AML/CFT supervisor, focusing on crypto asset service providers. Andrej is an economist and electrical engineer by training.

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**Juho Westerlund** *Finnish Financial Supervisory Authority*

Juho Westerlund is a FIN-FSA senior market supervisor with over ten years of experience in the financial industry. He has spent the majority of his time working on market structure, risk management, and regulatory reporting issues. Because of his technical education, data analysis has been his bread and butter, along with some work with regulatory texts. Currently, he oversees data quality and analyses data produced under various reporting regimes.

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Thorsten Beck *Florence School of Banking and Finance, European University Institute*

Thorsten Beck is Director of the Florence School of Banking and Finance and Professor of Financial Stability at the European University Institute. He is a research fellow of the Centre for Economic Policy Research (CEPR) and the CESifo. He was professor of banking and finance at Bayes Business School (formerly Cass) in London between 2013 and 2021 and professor of economics from 2008 to 2014 and the founding chair of the European Banking Center from 2008 to 2013 at Tilburg University.



Kasongo Chiwele *Florence School of Banking and Finance, European University Institute*

Kasongo Chiwele is an economist with over 6 years of work experience in Credit Insurance, Corporate Banking and Compliance. She is a Research Associate at the FBF specialising in a vast range of topics in Supervisory Digital Finance within the EU. Prior to joining FBF, Kasongo worked as an Anti-Money Laundering and Countering the Financing of Terrorism (AML/CFT) analyst at Stanbic bank Zambia, a member of Standard Bank Group where she ensured that the bank complied with its outside regulatory and legal requirements as well as internal policies and standards.



Leonardo Giani *Florence School of Banking and Finance*

Leonardo Giani is Research Fellow of the Florence School of Banking and Finance at the European University Institute. Leonardo worked at the European Central Bank for an overall period of fifteen months since 2007 to 2009, he practiced as an attorney at law since 2009 to 2015 (where compatible with academic activities), he worked as a legal and compliance expert in an investment bank from 2015 to 2019. Afterwards (2019-2022), he worked as a senior legal expert at the Italian Investment Management Association (Assogestioni).



Samir Kiuhan Vásquez *Florence School of Banking and Finance, European University Institute*

Samir Kiuhan-Vásquez is an economist with more than 10 years of experience in academic, public, private, and multilateral organisations. Samir specializes in financial regulation, development economics, and digital finance. Currently, he is a Research Associate at the Florence School of Banking and Finance, and previously, he was Deputy Director of Research & Development at the Colombian Financial Authority (SFC). He holds an MPA from Cornell University and a PhD from Bocconi University.



Gabriele Macchi *Florence School of Banking and Finance, European University Institute*

Gabriele Macchi is a PhD candidate at the EUI Economics Department. He combines theoretical models and the analysis of administrative dataset to study questions related to firm dynamics, wage inequality within and across firms, and the role of technological change in affecting the gender pay gap. He joined the FBF in February 2023 as a part-time research associate and looks forward to apply his analytical skills to the fields of banking and finance.

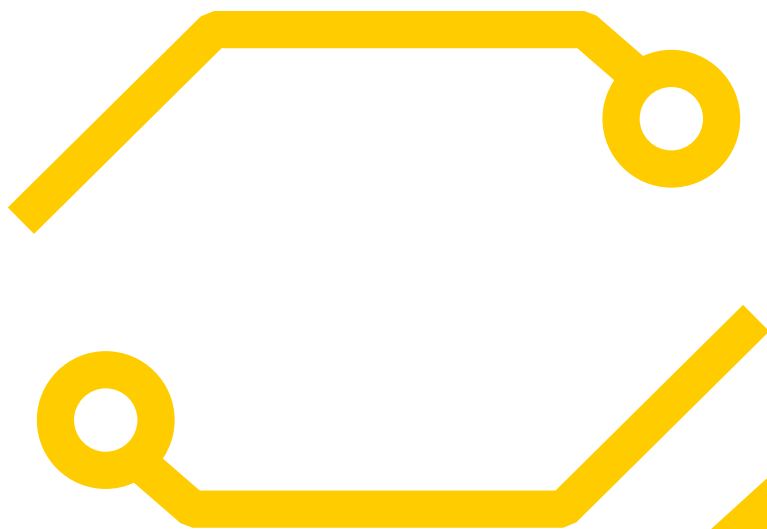


Pierre Schlosser *Florence School of Banking and Finance, European University Institute*

Pierre Schlosser is the Deputy Director of the Florence School of Banking and Finance, an executive education and policy debate programme for financial stability professionals which forms part of the Robert Schuman Centre at the European University Institute. Pierre holds a Ph.D in political and social sciences (European University Institute, Florence, 2016), a postgraduate master degree in EU economic studies (College of Europe, Bruges, 2008) and a master's degree in economic governance (Sciences Po Paris, 2007).

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