

Marco Schreyer

Auditor, Swiss Federal Audit Office | Lecturer, University of St. Gallen

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Research Interests

In my research, I aim to advance the intersection of artificial intelligence and auditing, focusing on:

- **Agentic Audit Workforce:** autonomous AI systems that co-pilot and scale human auditors.
- **Auditing of AI Systems:** methodologies for auditing the reliability, robustness, and governance of AI.
- **Diffusion Models in Auditing:** synthesizing financial tabular data for audit sampling and anomaly detection.

Underlying all three pillars is a sustained effort to bridge research and practice in auditing.

Education

Ph.D. in Computer Science

02/2019 – 10/2023

University of St. Gallen, St. Gallen, Switzerland

Dissertation: *Representation Learning in Financial Auditing using Deep Neural Networks*

M.Sc. (equiv.) Business Administration & Computer Science

10/2002 – 11/2008

University of Mannheim, Mannheim, Germany

Majors: Artificial Intelligence, Software Engineering, and Financial Accounting

Academic Experience

Postdoctoral Researcher

01/2024 – 07/2024

UC Berkeley — International Computer Science Institute, Berkeley, USA

Advisors: John Wu, Ph.D. & Alexander Sim, Ph.D.

Visiting Researcher

07/2022 – 03/2023

Rutgers University — Accounting Research Center, Newark, USA

Advisor: Prof. Miklos Vasarhelyi, Ph.D.

Doctoral Researcher

10/2018 – 12/2023

University of St. Gallen — AI:ML Research Group, St. Gallen, Switzerland

Advisor: Prof. Dr. Damian Borth

Visiting Researcher

04/2017 – 10/2018

German Research Center for Artificial Intelligence (DFKI), Kaiserslautern, Germany

Advisor: Prof. Dr. Andreas Dengel

Professional Experience

Auditor (Artificial Intelligence), Competence Center IT-Audits

08/2024 – present

Swiss Federal Audit Office, Bern, Switzerland

Senior Manager & Manager, Forensic and Deals Data Analytics

10/2013 – 03/2017

PricewaterhouseCoopers AG WPG, Munich, Germany

Publications

1,069 citations ■ h-index 17 ■ i10-index 22 ■ [Google Scholar](#)

Journal Articles

1. 2026 **Deep Learning Meets Risk-Based Auditing: A Holistic Framework for Leveraging Foundation and Task-Specific Models in Audit Procedures.** Föhr, T.L., Schreyer, M., Moffitt, K., & Marten, K.U. *International Journal of Accounting Information Systems (IJ AIS)*.
2. 2026 **Connecting the Dots: Graph Neural Networks for Auditing Accounting Journal Entries.** Huang, Q., Schreyer, M., Michiles Jr., N.R., & Vasarhelyi, M.A. *Auditing: A Journal of Practice & Theory*.
3. 2024 **Artificial Intelligence Co-Piloted Auditing.** Gu, H., Schreyer, M., Moffitt, K., & Vasarhelyi, M.A. *International Journal of Accounting Information Systems (IJ AIS)*.

Conference Proceedings

1. 2025 **Diffusion-Scheduled Denoising Autoencoders for Anomaly Detection in Tabular Data.** Sattarov, T., Schreyer, M., & Borth, D. *31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*.
2. 2025 **Federated Diffusion Modeling with Differential Privacy for Tabular Data Synthesis.** Sattarov, T., Schreyer, M., & Borth, D. *3rd International Conference on Federated Learning Technologies (FLTA)*.
3. 2024 **Imb-FinDiff: Conditional Diffusion Models for Class Imbalance Synthesis of Financial Tabular Data.** Schreyer, M., Sattarov, T., Sim, A., & Wu, K. *5th ACM International Conference on AI in Finance (ICAIF)*.
4. 2023 **FinDiff: Diffusion Models for Financial Tabular Data Generation.** Sattarov, T., Schreyer, M., & Borth, D. *Proceedings of the 4th ACM International Conference on AI in Finance (ICAIF)*.
5. 2022 **RESHAPE: Explaining Accounting Anomalies in Financial Statement Audits by Enhancing SHapley Additive exPlanations.** Müller, R., Schreyer, M., Sattarov, T., & Borth, D. *3rd ACM International Conference on AI in Finance (ICAIF)*.
6. 2022 **Federated and Privacy-Preserving Learning of Accounting Data in Financial Statement Audits.** Schreyer, M., Sattarov, T., & Borth, D. *3rd ACM International Conference on AI in Finance (ICAIF)*.
7. 2021 **Multi-view Contrastive Self-Supervised Learning of Accounting Data Representations for Downstream Audit Tasks.** Schreyer, M., Sattarov, T., & Borth, D. *2nd ACM International Conference on Artificial Intelligence (ICAIF)*.
8. 2020 **Learning Sampling in Financial Statement Audits using Vector Quantised Variational Autoencoder Neural Networks.** Schreyer, M., Sattarov, T., Gierbl, A.S., Reimer, B., & Borth, D. *1st ACM International Conference on Artificial Intelligence (ICAI)*.

Four earlier papers on printing-technique forensics and document examination (2008–2010), published in venues including IFIP Digital Forensics and SPIE Media Forensics and Security.

Workshop Papers

1. 2024 **FedTabDiff: Federated Learning of Diffusion Probabilistic Models for Synthetic Mixed-Type Tabular Data Generation.** Sattarov, T., Schreyer, M., & Borth, D. *AAAI 2024 Workshop on Artificial Intelligence in Finance for Social Impact*.
2. 2022 **Federated Continual Learning to Detect Accounting Anomalies in Financial Auditing.** Schreyer, M., Hemati, H., Borth, D., & Vasarhelyi, M.A. *FL-NeurIPS'22: International Workshop on Federated Learning, NeurIPS*.
3. 2021 **Continual Learning for Unsupervised Anomaly Detection in Continuous Auditing of Financial Accounting Data.** Hemati, H., Schreyer, M., & Borth, D. *AAAI 2022 Workshop on Knowledge Discovery from Unstructured Data in Financial Services*.
4. 2020 **Leaking Sensitive Financial Accounting Data in Plain Sight using Deep Autoencoder Neural Networks.** Schreyer, M., Schulze, C., & Borth, D. *AAAI 2021 Workshop on Knowledge Discovery from Unstructured Data in Financial Services*.

5. 2019 **Detection of Accounting Anomalies in the Latent Space using Adversarial Autoencoder Neural Networks.** Schreyer, M., Sattarov, T., Schulze, C., Reimer, B., & Borth, D. *KDD 2019 Workshop on Anomaly Detection in Finance*.
6. 2019 **Adversarial Learning of Deepfakes in Accounting.** Schreyer, M., Sattarov, T., Reimer, B., & Borth, D. *NeurIPS 2019 Workshop on Robust AI in Financial Services*.
7. 2014 **Visual Exploration of Journal Entries to Detect Accounting Irregularities and Fraud.** Tatu, A., Schreyer, M., Hagelauer, J., & Wang, J. *IEEE VIS Business Workshop*.

Working Papers & Preprints

1. 2024 **Artificial Intelligence Agentic Auditing.** Schreyer, M., Gu, H., Moffitt, K., & Vasarhelyi, M.A. *Working paper, SSRN 4909147*.
2. 2024 **GraphGuard: Contrastive Self-Supervised Learning for Credit-Card Fraud Detection in Multi-Relational Dynamic Graphs.** Reynisson, K., Schreyer, M., & Borth, D. *arXiv preprint*.
3. 2024 **Differentially Private Federated Learning of Diffusion Models for Synthetic Tabular Data Generation.** Sattarov, T., Schreyer, M., & Borth, D. *arXiv preprint*.

Technical Reports

1. 2025 **Overcoming Data-Sharing Challenges in Central Banking: Federated Learning of Diffusion Models for Synthetic Mixed-Type Tabular Data Generation.** Sattarov, T., & Schreyer, M. *IFC Bulletin, Bank for International Settlements (BIS)*.
2. 2023 **Assuring Sustainable Futures: Auditing Sustainability Reports using AI Foundation Models.** Föhr, T.L., Schreyer, M., Juppe, T.A., & Marten, K.U. *Working paper, SSRN 4502549*.
3. 2017 **Detection of Anomalies in Large Scale Accounting Data using Deep Autoencoder Networks.** Schreyer, M., Sattarov, T., Borth, D., Dengel, A., & Reimer, B. *arXiv preprint arXiv:1709.05254, NVIDIA GPU Technology Conference (GTC) 2017..*

Practitioner Publications (English)

1. 2026 **Agentic Authority and the Future of Organisational Leadership.** Weiser, Y., Schreyer, M., & Ruud, T.F. *Magma, Vol. 29(3)*.
2. 2026 **Governing the Future Digital Workforce: The Three Lines Model in the Age of Agentic Artificial Intelligence.** Ruud, T.F., Schreyer, M., & Weiser, Y. *Magma, Vol. 29(1)*.
3. 2026 **Building a Future Digital Audit Workforce: Equipping Artificial Intelligence (AI) Agents with Computer-Aided Audit Tools (CAATs).** Willig, O., & Schreyer, M. *EXPERTsuisse, Expert Focus 04*.
4. 2025 **A Novel Digital Audit Workforce: Embedding Agentic Artificial Intelligence in Internal Auditing.** Schreyer, M., Mäder, T., & Ruud, T.F. *EXPERTsuisse, Expert Focus*.
5. 2024 **A Sum Greater Than Its Parts: Collective Artificial Intelligence in Auditing — Advancing Audit Models through Federated Learning Without Sharing Proprietary Data.** Schreyer, M., Borth, D., Ruud, T.F., & Vasarhelyi, M.A. *EXPERTsuisse, Expert Focus 04*.
6. 2024 **A Graph Says More Than A Thousand Journal Entries: Harnessing Graph Autoencoder Networks in Auditing.** Huang, Q., Schreyer, M., Michiles Jr., N.R., & Vasarhelyi, M.A. *EXPERTsuisse, Expert Focus 12*.
7. 2022 **Artificial Intelligence Enabled Audit Sampling: Learning to Draw Representative and Interpretable Audit Samples from Large-Scale Journal Entry Data.** Schreyer, M., Gierbl, A.S., Ruud, T.F., & Borth, D. *EXPERTsuisse, Expert Focus 04*.
8. 2022 **Artificial Intelligence in Internal Audit as a Contribution to Effective Governance: Deep-Learning Enabled Detection of Anomalies in Financial Accounting Data.** Schreyer, M., Baumgartner, M., Ruud, T.F., & Borth, D. *EXPERTsuisse, Expert Focus 01*.

Practitioner Publications (German)

1. 2025 **Agentische Künstliche Intelligenz in der Wirtschaftsprüfung.** Kopp, C., Schreyer, M., & Birk, M. *WPg — Die Wirtschaftsprüfung 17*.
2. 2022 **Stichprobenauswahl durch die Anwendung von Künstlicher Intelligenz: Lernen repräsentativer Stichproben aus Journalbuchungen in der Prüfungspraxis.** Schreyer, M., Gierbl, A.S., Ruud, T.F., & Borth, D.

3. 2022 **Künstliche Intelligenz im Internal Audit als Beitrag zur Effektiven Governance: Deep-Learning basierte Detektion von Buchungsanomalien in der Revisionspraxis.** Schreyer, M., Baumgartner, M., Ruud, T.F., & Borth, D. *EXPERTsuisse, Expert Focus 01.*
4. 2020 **Künstliche Intelligenz in der Prüfungspraxis: Eine Bestandsaufnahme aktueller Einsatzmöglichkeiten und Herausforderungen.** Gierbl, A.S., Schreyer, M., Leibfried, P., & Borth, D. *EXPERTsuisse, Expert Focus 09.*
5. 2018 **Künstliche Intelligenz in der Wirtschaftsprüfung: Identifikation ungewöhnlicher Buchungen in der Finanzbuchhaltung.** Schreyer, M., Sattarov, T., Borth, D., Dengel, A., & Reimer, B. *WPg — Die Wirtschaftsprüfung 72.*

Grants, Fellowships, and Awards

Best Paper Award , AAAI Workshop on AI in Finance and Social Impact	02/2024
DAAD IFI Fellowship , German Academic Exchange Service, EUR 32,500	10/2023
Best Paper Award , SET Section of the American Accounting Association	08/2023
Mobility Doc Fellowship , University of St. Gallen, CHF 37,500	12/2021
Mindscape Innovation Award , PwC Europe Innovation Board	07/2016
High Potential Program , PwC Europe Forensic Services	10/2015
Next Level Innovation Funding , PwC Germany, EUR 68,000	09/2015
Federal Innovation Award , Federal Ministry for Economics	04/2009

Teaching Experience

Lecturer, Deep Learning Fundamentals & Applications <i>University of St. Gallen (GSERM Summer Schools), St. Gallen, Switzerland</i>	06/2021 – present
Lecturer, Competence Center Governance and Audit <i>Frankfurt School of Finance and Management, Frankfurt, Germany</i>	08/2013 – present
Lecturer, School of Management and Law <i>Zurich University of Applied Sciences, Zurich, Switzerland</i>	08/2025 – present
Lecturer, Internal Audit & Computer Science <i>University of St. Gallen, St. Gallen, Switzerland</i>	01/2020 – 01/2023
Lecturer & Teaching Assistant, Training Centre for Investment Professionals <i>Swiss Financial Analysts Association, Zurich, Switzerland</i>	03/2019 – 05/2021
Lecturer, Department of Computer Science <i>RheinMain University of Applied Sciences, Wiesbaden, Germany</i>	09/2018 – 03/2019

Professional & Editorial Service

Program Committee Member , ACM International Conference on AI in Finance	2020–2024
Reviewer , <i>Intelligent Systems in Accounting, Finance and Management</i> (Wiley), <i>International Journal of Accounting Information Systems</i> (Elsevier), <i>Journal of Financial Innovation</i> (Springer)	

Professional Development

EU Winter School on Foundation AI Models (FoMo) , University of Amsterdam, The Netherlands	03/2024
Oxford Machine Learning Summer School (OxML) , University of Oxford, UK	07/2022

Global School on Empirical Research Methods (GSERM), *University of St. Gallen, Switzerland*
International Summer School on Deep Learning (DeepLearn), *University of Deusto, Spain*
Lisbon Machine Learning Summer School (LxMLS), *Instituto Superior Técnico, Portugal*

06/2019

07/2017

06/2017

Skills & Languages

Machine Learning: PyTorch, TensorFlow

Scientific Computing: Pandas, NumPy, Scikit-learn, R (CRAN)

Programming: Java, PL/SQL, C++

Audit Tools: SAP (FI, MM, SD, IS-U), Audit Command Language (ACL)

Languages: English (proficient), German (native)