Edouard Fouché, PhD, MBA

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Find me on: (@edouardfouche)
LinkedIn
Google Scholar
GitHub
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EXPERTISE

Data Science / Data Mining
Machine Learning
Algorithms
Visualization

PROGRAMMING

Python (~7 years)
Scala (~4 years)
R (~3 years)
Also: Java, SQL, Bash, C, Web…

SOFTWARE

Git, Linux, MacOS, Databases, LaTeX, Adobe, MS Office

SOFT SKILLS

Research, **Teaching**
Leadership
Agile Development
Cultural Awareness
Dedication, Commitment

LANGUAGES

French (Native)
English (Fluent, C2)
German (Fluent, C2)

PERSONAL INTERESTS

Photography (Analog/Digital), Hiking, Travelling, Cooking, Blogging, Roller Derby

Research Scientist

Summary

I am a researcher in data science at the Karlsruhe Institute of Technology (KIT), where I lead my own team with currently four PhD candidates and several graduate and undergraduate students. I have 7+ years experience developing scientific software for data analysis. I am particularly skilled at developing systematic evaluation and visualization pipelines for data science techniques. I like to invent new and scalable algorithms. My preferred programming languages are Python and Scala. I have advised 15+ students for their Master/Bachelor's theses and conducted multiple projects with major industry actors (such as Daimler, BMW, IBM, ...).

Experience

2020-now **Senior Researcher & Lecturer, Karlsruhe Institute of Technology (KIT)**.
- Conducting independent research, collaborations and student theses.
- Co-supervision of 4+ doctoral students. Responsible for Data Science lectures.
- Organizer for chair-wide meetings, coaching and mentoring.
- Elected member of faculty council and KHYS steering committee member.

2016-2020 **Researcher & Ph.D. Candidate in Data Science, KIT**.
- Published 8 peer-reviewed research papers and a doctoral thesis.
- Advised 10+ student theses (Master/Bachelor level).
- Worked with 2 research labs (international) and 5 industry partners.

2015-2016 **Working student, IBM R&D GmbH, Böblingen.**
- Created ibmdbpy, an open-source interface between Python and DB2.
- Writing my Master's thesis in collaboration between KIT and IBM.
- Co-supervision of two fellow interns. Python coaching.

Education

2020-2021 **MBA, Quantic School of Business and Technology.** (fka "Smartly")
- Online, 7% admission rate. Graduated with Honors (top 10% of cohort).
- Accounting, Economics, Data & Decisions, Leading Organizations, Marketing, Finance, Supply Chain & Operations, Strategy, Entrepreneurship.

2016-2020 **Ph.D. (Dr.-Ing.) in Data Science, KIT.**
- Thesis: Estimating Dependency, Monitoring and Knowledge Discovery in High-Dimensional Data Streams. (Advisor: Prof. Klemens Böhm)
- Summa Cum Laude. Helmholtz Doctoral Prize. German GPA: 1.0

2015-2016 **M.Sc. Computer Science, KIT.**
- Thesis: Fast In-Database Feature Selection. (Advisor: Prof. Emmanuel Müller)
- German GPA: 1.4 (Very Good)

2010-2015 **Diplôme d'Ingénieur (Dipl.-Ing.), ESIEE Paris, France.**
- Major: Computer Science. Final internship at IBM R&D (6 months).
- "Félicitations du Jury" and "Parcours d'Excellence" award.

Awards

2021 **Elite Program for Postdocs, Baden-Württemberg Stiftung.**
The program supports outstanding researchers on their path to becoming a professor. It includes research funding of 150K€ for up to 3 years and trainings.

2020 **Helmholtz Doctoral Prize.** 5.000€ cash prize + travel scholarship
The Helmholtz Association is the largest german scientific organisation.

2019 **SSDBM Best Paper Award.** Paper: Monte Carlo Dependency Estimation

2017 **Software Campus Member:** 100K€ research grant, training, mentoring.

2015 **Parcours d'Excellence ESIEE Paris.** Top 1% of the cohort.

Research Statement

I am currently interested in problems involving **automated decision making**, in particular concerning dynamic, non-stationary settings. I study new methods, based on bandit algorithms or reinforcement learning, to tackle important real-world challenges. I am also interested in tasks like outlier detection, clustering, correlation analysis, and generally, learning from high-dimensional data streams.

List of Publications

See my Google Scholar profile: https://scholar.google.com/citations?user=UUTBItQAAAAJ

International Mobility

- **Sept-Dec 2019. University of Illinois at Urbana-Champagin (Prof. Jiawei Han). IL, USA.**
  - 3-month research collaboration in the group of Prof. Jiawei Han, well-known pioneer of the field of Data Mining. This has led to the publication of "Mining Text Outliers in Document Directories" at ICDM'20.
- **June 2019. RIKEN AIP (Asst. Prof. Junpei Komiyama). Tokyo, Japan.**
  - 1-month research collaboration at RIKEN AIP. Following up on the work with Junpei Komiyama ("Scaling Multi-Armed Bandit Algorithms", KDD19). This led to the recent preprint "Finite-time Analysis of Globally Nonstationary Multi-Armed Bandits": https://arxiv.org/abs/2107.11419.
- **Before 2014: Growing up and studying in Paris, France.**

Service

- **Program Committee (PC) member / Reviewer:**
  - ACM SIGKDD 2021, 2022 (ACM Special Interest Group on Knowledge Discovery and Data Mining)
  - IJCAI 2021, 2022 (International Joint Conference on Artificial Intelligence)
  - IEEE ICDM 2021, 2022 (IEEE International Conference on Data Mining)
  - SIAM SDM 2022 (SIAM International Conference on Data Mining)
  - ECML PKDD 2022 (European Conference on Machine Learning)
- **April 2021 – now: Steering Committee Member: Karlsruhe House of Young Scientists (KHYS) at KIT**
- **October 2021 – now: Elected at the council of the KIT-Faculty of Computer Science ("Fakultätsrat")**
- **2019 – 2021: Roller Derby Coach for new skaters at Roller Derby Karlsruhe**

Teaching

While my preferred language for research and teaching is English, I am also able to communicate and conduct examinations in German or French without any difficulty. I recently took over the responsibility for the lectures "Data Science 1" and "Data Science 2" at KIT and substantially improved the content of the course. I can deliver those courses both as an online or on-site/hybrid format. I can provide the courses' evaluation on request.

Ongoing PhD Supervision

- Florian Kalinke. Current topic: Kernel methods for Outlier and Change Detection from Data Streams.
- Daniel Betsche. Current topic: Surrogate Modeling and Superresolution for Materials Science
- Daniel Ebi. Current topic: Orchestration of Multiple Active Learning Oracles
- Bela Böhnke. Current topic: Data Efficient Dependency Estimation and Surrogate Modeling
- Marco Heyden (together with Vadim Arzamasov). Current topic: Change Detection from Large Data Streams

Advised Master/Bachelor Theses

15. Canonical Monte Carlo Dependency Estimation. Jan22 – Jun22. Master's thesis. Tobias Hombücher.
14. Generalized Monte Carlo Dependency Estimation. Nov21 – Feb22. Bachelor's Thesis. Li Mingyi.
13. Outlier Analysis in Live Systems from Application Logs. May21 – Oct21. Master's thesis. Wenrui Zhou.
12. Change Detection in High-Dimensional Data Streams. Mar21 – Sep21. Master's thesis. Tanja Fenn.
11. Visualization of Semantics from Document Directories. Mar21 – Jul21. Bachelor's Thesis. Klevia Ulqinaku.
10. Subspace Search in Data Streams. May19 – Oct19. Master's thesis. Florian Kalinke.
9. Anytime Tradeoff Strategies for Multiple Targets. May19 – Nov19. Master's thesis. Marco Heyden.
8. Visualization of Correlations in High-Dimensional Streams. Mar19 – Jun19. Bachelor's thesis. Yimin Zhang.
7. Generation of Data Streams with Complex Dependencies. Jun18 – Nov18. Bachelor's thesis. Alexander Poth.
6. Adaptive Variational Autoencoders for Outlier Detection. Sep18 – Feb18. Master's thesis. Florian Pieper.
5. Interpretable Anomaly Detection via Neural Networks. Apr18 – Sep18. Master's thesis. Marco Sturm.
4. Energy Time Series Reduction. Jan18 – Apr18. Bachelor's thesis. Lucas Krauß.
3. Relevance-Driven Feature Engineering. Jul17 – Dec17. Master's thesis. Rosina Kazakova. With BMW AG.
2. High-Dimensional Neural-Based Outlier Detection. Apr17 – Sep17. Master's thesis. Daniel Popovic.
1. Quality of Subspace Search under Missing Values. Feb17 – Apr17. Bachelor's thesis. Jonathan Bechtle.

Lectures/Labs/Seminars

8. Lecturer & Examiner: Data Science 2. KIT, IPD Böhm. Summer 2022. 3 ECTS.
7. Lecturer & Examiner: Data Science 1. KIT, IPD Böhm. Winter 2021. 5 ECTS.
6. Lecturer & Examiner: Big Data Analytics II. KIT, IPD Böhm. Summer 2021. 3 ECTS
5. Teaching Assistant: Big Data Analytics Lab. KIT, IPD Böhm. Summer 2018.
4. Teaching Assistant: Machine Learning Seminar. KIT, IPD Böhm. Summer 2017.
3. Teaching Assistant: Big Data Analytics Lab. KIT, IPD Böhm. Summer 2017.
2. Teaching Assistant: Big Data Analytics Lab. KIT, IPD Böhm. Summer 2016.
1. Teaching Assistant: Customer Relation Management. KIT, IISM. Winter 2015.