

Aleksandr Shemendyuk

PHD IN ACTUARIAL SCIENCE

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About Me

PhD in Actuarial Science with expertise in mathematical modeling, health data analytics, and AI applications. Currently a Lecturer at HEC Lausanne (UNIL), teaching data science and AI-driven business automation. My research combines actuarial methods, statistical analysis, and machine learning to address challenges in long-term care and health economics. Published in top-tier journals including *Insurance: Mathematics and Economics*, *Annals of Actuarial Science*, and *Applied Mathematical Modelling*. Experienced mentor who has guided 30+ student projects and supervised 10+ industry collaborations. Skilled AI practitioner developing innovative applications for business and research.

Education

PhD in Actuarial Science

Lausanne, Switzerland

University of Lausanne, Department of Actuarial Science

2019 - 2024

- Thesis: Three Essays on Modeling Long-Term Care of Institutionalized Elderly in Switzerland
- Supervisor: Prof. Joël Wagner
- Key Concepts: Data Analysis; Longitudinal Data; Long-Term Care; Accelerated Failure Time Models; Beta Regression; Survival Analysis; Spectral Clustering; Gradient Boosting; Random Forests; Multi-State Models;

Master of Science in Statistical Modelling and Actuarial Science

Moscow, Russia

HSE University, Faculty of Economic Sciences

2017 - 2019

- GPA: 8.69/10.0
- Thesis: Optimal Medical Insurance in Connected SIR Centres during Epidemic Outbreak
- Supervisor: Prof. Mark Y. Kelbert
- Key Courses: High Dimensional Statistics, Random Processes and Modelling, Life and Non-life Insurance Mathematics

Bachelor of Science in Applied Mathematics and Information Science

Moscow, Russia

HSE University, Faculty of Computer Science

2013 - 2017

- GPA: 8.27/10.0
- Thesis: Boundary Conditions, which Simulate the Cauchy Problem (Transparent Boundary Conditions) for Finite-Difference Approximations of Basic Mathematical Physics Equations
- Supervisor: Prof. Vladimir A. Gordin
- Key Courses: Calculus, Linear Algebra, Differential Equations, Probability Theory and Statistics, Data Science, Numerical Methods, System Analysis

Experience

Lecturer

Lausanne, Switzerland

HEC Lausanne, UNIL

Aug 2024 - Present

- Teaching 'Data Science in Business Analytics' to 100 master's students
- Mentoring students on data science projects and research
- Developed and taught novel course 'AI Tools for Business Innovation: Projects in Creation and Design' (Spring 2025)
- Project-based learning approach with students creating functional AI services, websites, and automated systems

Master Thesis Supervisor

Lausanne, Switzerland

HEC Lausanne, UNIL

Jan 2025 - Present

- Supervising master's research projects for 2nd year HEC students in Management
- Elwin Freudiger: 'Kolmogorov-Arnold Networks for Precipitation Forecasting in Switzerland'
- Herald Nakpil: 'Designing a Smart Training App for Cyclists: An AI-Driven Approach to Personalized Training Recommendation'

- Zoé Dardare: 'Quantitative Analysis of Social Media Impact on Festival Industry Growth: A Case Study of Paleo Festival Nyon'
- Maria Fernanda Cladera Melgar: 'Statistical Analysis of Stock Market Correlations and Sector Classifications in Latin American Economies'

Graduate Assistant

HEC Lausanne, UNIL

Lausanne, Switzerland

Feb 2019 - Jul 2024

- Provided teaching assistance for various courses:
- Asset and Liability Management for Actuaries
- Data Science in Business Analytics
- Machine Learning in Business Analytics
- Quantitative Methods for Management
- Programming Tools for Data Science
- Algorithms for Business Intelligence and Digital Marketing

Seminarist

HSE University, Online

Moscow, Russia

Sep 2021 - Jun 2023

- Conducted seminars for undergraduate courses:
- Mathematical Models and Differential Equations
- Additional Chapters in Mathematical Analysis

Assistant

HSE University

Moscow, Russia

Sep 2015 - Jun 2019

- Conducted practice sessions for undergraduate courses:
- Calculus 1- 2, Linear Algebra, Probability Theory
- Mathematical Models and Differential Equations
- Additional Chapters in Mathematical Analysis
- Mathematics and Computer, Forecasts and Optimisation

AI Consultant

Premium Center LTD

Edinburgh, United Kingdom

2024 - Present

- NumoMagic Project: Developed a Telegram bot for personalized daily recommendations
- Implemented AI-driven recommendation algorithms and cloud server deployment
- Analyzed user activity patterns using Python and R to optimize engagement

AI Automation Consultant

HEC Lausanne, UNIL

Lausanne, Switzerland

2023 - 2024

- Conceptualized and developed an AI system to automatically provide feedback for textual answers
- Built a Python solution using OpenAI API to validate responses against predefined criteria

Private Tutoring

Independent

Online

Sep 2013 - Present

- Middle and High-School Mathematics, Probability Theory and Statistics, Calculus, and Linear Algebra
- Programming in Python
- Interaction with AI chats, including ChatGPT and DeepSeek, and use of GitHub Copilot

Skills

Programming Languages

Python, R, Matlab, LaTeX, Markdown, Quarto, Rust (Beginner)

Software

Microsoft Office Suite (Word, Excel, Teams), Adobe Creative Suite (Premiere Pro, Photoshop, After Effects), CapCut, RStudio, VS Code, Cursor, PyCharm, RustRover

AI Tools

AI Prompting, GitHub Copilot, ChatGPT, Claude, GPT Assistants, Midjourney, Runway.ml, ElevenLabs.io, Bolt.new

AI Automation & Development

Make.com, Voiceflow.com, n8n.io, GitHub, Telegram API, OpenAI API, Perplexity AI API, Termius, Supabase, Netlify

Languages

Russian (Native); English (Fluent); French (Limited working proficiency); Latvian (Working proficiency); German (Elementary proficiency)

Research Interests

Mathematical Modeling

Mathematical modeling and numerical methods

- Computational methods
- Statistical modeling
- Numerical analysis

Actuarial Science

Long-term care insurance and actuarial applications

- Institutional Long-Term Care
- Statistical methods for actuarial analysis
- Health factors and care needs modeling

Other Interests

Interdisciplinary research areas

- Pedagogical approaches to data science education
- Computational methods for climate and environmental modeling
- AI tool development for business applications
- Machine learning for robust prediction models and uncertainty quantification
- AI-assisted education systems for learning programming languages and technical concepts

Publications

2025

Compact scheme for rod transverse vibrations equation: approximation of the boundary conditions matters

Gordin, V.A., & Shemendyuk, A.

In progress

2025

Two-dimensional Parisian ruin problem and computation of corresponding Pickands constants

Jasnovidov, G. A., & Shemendyuk, A. A.

Teoriya Veroyatnostei i ee Primeneniya, 70(1), 45-72

2025

- DOI: 10.4213/tvp5617

On the Role of Equity and Pension Savings in the Financing of Homeownership in Switzerland

Huggenberger, Y., Shemendyuk, A., Wagner, J., & Wanzenried, G.

Journal of European Real Estate Research, 17(1), 50-72

2025

- DOI: 10.1108/JERER-06-2024-0045

2024

Evolution of Institutional Long-Term Care Costs Based on Health Factors

Shemendyuk, A., & Wagner, J.

Insurance: Mathematics and Economics, 120, 107-130

2024

- DOI: 10.1016/j.insmatheco.2024.11.007

On the factors determining the health profiles and care needs of institutionalized elders

Shemendyuk, A., & Wagner, J.

- DOI: 10.1016/j.insmatheco.2023.12.003

Insurance: Mathematics and Economics, 114, 223-241
2024

Three Essays on Modeling Long-Term Care of Institutionalized Elderly in Switzerland

PhD thesis by Shemendyuk, A.; Supervisor: Prof. Joël Wagner

- https://serval.unil.ch/en/notice/serval:BIB_E46095CB9086

University of Lausanne, Department of Actuarial Science
2024

2023

Modeling the burden of long-term care for institutionalized elderly based on care duration and intensity

Bladt, M., Fuino, M., Shemendyuk, A., & Wagner, J.

- DOI: 10.1017/S1748499522000136

Annals of Actuarial Science, 17(1), 83-117
2023

2021

Fair insurance premium rate in a connected SEIR model under epidemic outbreak

Chernov, A., Shemendyuk, A., & Kelbert, M.

- DOI: 10.1051/mmnp/2021028

Mathematical Modelling of Natural Phenomena, 16(34)
2021

2020

Discrete transparent boundary conditions for the equation of rod transverse vibrations

Gordin, V.A., & Shemendyuk, A.A.

- DOI: 10.1016/j.apm.2020.06.050

Applied Mathematical Modelling, 88, 550-572
2020

2019

Optimal vaccine allocation during mumps outbreak in two SIR centres

Chernov, A., Kelbert, M., & Shemendyuk, A.

- DOI: 10.1093/imammb/dqz012

Mathematical Medicine and Biology: A Journal of the IMA, 37(3), 303-312
2019

Conferences

26th International Congress on Insurance: Mathematics and Economics (IME 2023)

Evolution of Elderly in Institutionalised Long-Term Care Based on Multiple Health Factors

Edinburgh, Scotland
July 4-6, 2023

6th Conference of the Swiss Society of Health Economics

On the factors Determining the Health Profiles and Care Needs of Institutionalized Elderly

Bern, Switzerland
June 8, 2023

Research Centre for Longevity Risk Conference

Amsterdam, Netherlands

Health profiles and long-term care burden of institutionalized elderly derived from multiple health factors

May 25-26, 2023

European Actuarial Journal Conference 2022

Tartu, Estonia

Two talks on the topic of long-term care of institutionalized elderly

August 22-24, 2022

- Study of institutionalized elderly profiles derived from multiple health factors
- Determinants of institutional long-term care of dependent elderly in Switzerland

Annual Interuniversity Scientific Conference (E.V. Armensky)

Moscow, Russia

Compact Approximations for the Shear Equation of a Member with Constant Coefficients

April 5-13, 2022

24th International Congress on IME (Virtual)

(Online)

Determinants of Institutional Long-Term Care of Dependent Elderly in Switzerland

July 9, 2021

International Conference on Computer Simulation in Physics and Beyond

(Online)

Discrete Transparent Boundary Conditions for the Equation of Rod Transverse Vibrations

October 12-16, 2020

Annual Interuniversity Scientific Conference (E.V. Armensky)

Moscow, Russia

Boundary Conditions that Imitate Cauchy Problem for the Equation of Rod Transverse Vibrations

February 18-28, 2019

Annual Interuniversity Scientific Conference (E.V. Armensky)

Moscow, Russia

Boundary Conditions that Imitate Cauchy Problem for Finite-Difference Equations in Problems of Mathematical Physics

February-March 2018

International Conference on Computer Simulations in Physics

Moscow, Russia

Boundary Conditions that Imitate Cauchy Problem for Finite-Difference Approximations of Basic Mathematical Physics Equations

October 9-12, 2017

Hobbies and Interests

Physical & Mental Activities

Regular physical and mental activities

- Regular gym training and fitness
- Chess (strategic gameplay and analysis)
- Hiking in the Swiss mountains
- Playing fingerstyle guitar

Technology Exploration

Exploring emerging technologies

- Experimenting with emerging AI tools and applications
- Implementing innovative AI solutions for everyday tasks
- Following developments in automation technology

Additional Pursuits

Other personal interests

- Providing math tutoring and educational guidance
- Content creation and social media management