Christian Furrer *Curriculum Vitae*

Vognmandsmarken 29, 2. th., DK-2100 Copenhagen Ø.
Born May 12, 1994 in Svendborg, Denmark. Single, no children.
E-mail: christian@furrer.dk Phone: +45 30 24 18 15 Homepage: https://furrer.dk/christian.

Education

University of Copenhagen — Copenhagen, Denmark

PhD in Actuarial Mathematics (Industrial PhD) — *2017 – 2020*

Multi-state modeling in the mathematics of life insurance: meditations and applications.
Industrial collaboration with PFA Pension co-funded by the Innovation Fund Denmark.
Main supervisors: Mogens Steffensen and Kristian Buchardt.

University of Copenhagen — Copenhagen, Denmark

BSc's and MSc's in Actuarial Mathematics, cand. act. — *2012 – 2017*

Experience

University of Copenhagen — Copenhagen, Denmark

TT Asst. Prof. at the Dept. of Mathematical Sciences — *Oct '20 – present*

Member of 'Kontaktudvalget' (Oct '20 – present), the 'MATH 1½-årsteam' (Apr '21 – present), and the Diversity Committee (May '22 – present) and past member of the Library Committee (Oct '20 – May '22).
Organizer of the Seminar in Insurance and Economics (Jun '22 – present).
Member of the Steering Committee for the project frame InterAct (Jan '22 – present).

PFA Pension — Copenhagen, Denmark

Industrial PhD student at Innovation & Models — *Sep '17 – Aug '20*

University of Copenhagen — Copenhagen, Denmark

Teaching assistant at the Dept. of Mathematical Sciences — *Sep '14 – Jan '17*

Publications

1. *Transaction time models in multi-state life insurance*, with Buchardt and Sandqvist, Scandinavian Actuarial Journal, advance online publication, 2023
2. *Extension of as-if-Markov modeling to scaled payments*, with Christiansen, Insurance: Mathematics and Economics 107, pp. 288–306, 2022 [Corrigendum]
3. *Scaled insurance cash flows: representation and computation via change of measure techniques*, Finance and Stochastics 26(2), pp. 359–382, 2022
4. *Computation of bonus in multi-state life insurance*, with Ahmad and Buchardt, ASTIN Bulletin 52, pp. 291–331, 2022
5. *Dynamics of state-wise prospective reserves in the presence of non-monotone information*, with Christiansen, Insurance: Mathematics and Economics 97, pp. 81–98, 2021
6. *Tax- and expense-modified risk-minimization for insurance payment processes*, with Buchardt and Møller, Scandinavian Actuarial Journal 2020(10), pp. 934–961, 2020
7. *Forward transition rates*, with Buchardt and Steffensen, Finance and Stochastics 23(4), pp. 975–999, 2019

8. *Experience rating in the classic Markov chain life insurance setting: An empirical Bayes and multivariate frailty approach*, European Actuarial Journal 9, pp. 31–58, 2019,

2019 Gauss Prize / EAJ Best Paper Award.

Manuscripts

- *Conditional Aalen–Johansen estimation*, with Bladt, 2023 [R package on CRAN: AalenJohansen]
- *Aggregate Markov models in life insurance: properties and valuation*, with Ahmad and Bladt, 2022
- *Expert Kaplan–Meier estimation*, with Bladt, 2022.

Other works

- *Matematikken bag bedre forsikringer til en mere fair pris*, with Bladt, Hiabu, and Steffensen, Aktuel Naturvidenskab 2023, pp. 27–29, 2023
- *Introduction to actuarial mathematics*, lecture notes for *Insurance and law*, 2023
- *Multi-state modeling in the mathematics of life insurance: meditations and applications*, PhD thesis, 2020.

Professional and Honors

- 2017 – present: Member of the Danish Society of Actuaries
  - Qualifying Actuary (Apr '19 – present)
  - Member of 'Kommunikationsudvalget' (Mar '22 – present)
  - Chairperson of 'Udvalg om implementing af Core Syllabus bestemmelse' (Feb '21 – Jan '22)
  - Member of 'Kontaktudvalget' (Dec '18 – Sep '20), 'Efteruddannelsesudvalget' (Oct '20 – Jan '22), and 'Udvalg om den fremtidige strategi for Aktuarforeningen' (Feb '21 – Dec '21).
  - Continuing education: 'Etik og professionalisme i aktuarfaget' (May '18), 'Kommunikation for aktuarer' (Mar '19), and 'Dataetik for aktuarer' (Nov '22)
- Chairperson of the Education Committee of the Danish Society of Actuaries (Dec '21 – present)
- Member of the Education Committee of the Actuarial Association of Europe and the Education Committee of the International Actuarial Association (Jan '21 – present)
  - Member of the Data Science Syllabus Task Force (Jun '22 – present)
- 2020 – present: Member of the German Society for Insurance and Financial Mathematics
- Selected to participate in the 10th edition of the Global Young Scientists Summit, 2022
- 2019 Gauss Prize by the German Society for Insurance and Financial Mathematics and the German Association of Actuaries
- Conferences and workshops:
  - Member of the European Actuarial Day 2023 Program Committee
- Management and leadership training:
  - Leading Research (Feb '23 – Jun '23)
- Pedagogical training:

  - Introduction to University Pedagogy (Nov ‘17)
  - ‘Universitetspædagogikum’ (Aug ‘21 – Aug ‘22)
  - ‘Kursus for førsteårsundervisere’ (23 Nov ‘21)

- Referee for Scandinavian Actuarial Journal, Stochastic Models, and ASTIN Bulletin
- Media appearences: 12 May ‘21 in B.T. and 21 Sep ‘22 on videnskab.dk.

Funding

- 2017 – 2020: Industrial PhD project titled *Biometriske risici i livsforsikring* in collaboration with the University of Copenhagen and PFA Pension and co-funded by the Innovation Fund Denmark; the Industrial PhD candidate was myself
- 2022 – 2033: Member of the project frame InterAct managed by Mogens Steffensen and co-funded by partners from the Danish insurance and pensions industry
- 2022 – 2025: Industrial PhD project titled *Tab af erhvervsevne: forsikring og forebyggelse* in collaboration with Mogens Steffensen and PFA Pension and co-funded by the Innovation Fund Denmark; the Industrial PhD candidate is Oliver Lunding Sandqvist
- 2022 – 2023: Co-investigator of *FAIR: Forsikringsmatematisk modellering Adapteret til Individets Retsstilling* supported by Fynske Købstæders Fond
- 2022: Travel grant by Dr.phil. Ragna Rask-Nielsens Grundforskningsfond
- 2022: Travel grant by Verein zur Förderung der Versicherungs- und Finanzmathematik – Universität Oldenburg e.V.
- 2023 – 2024: Co-investigator of *WorkFair: Wokshop og konference om fairness* supported by Fynske Købstæders Fond
- 2023 – 2024: Principal investigator of *MISS: Modeling and learning Insurance risks Subject to Systematic changes in information* supported by the Hanse-Wissenschaftskolleg.

Read more about the Innovation Fund Denmark’s Industrial PhD programme via this link.

Longer visits

- Visitor at *Institut für Mathematik, Carl von Ossietzky Universität Oldenburg*, Germany, 2018
- Visitor at *Département de sciences actuarielles, Université de Lausanne*, Switzerland, 2022
- Junior Fellow at *Hanse-Wissenschaftskolleg*, Delmenhorst, Germany, 2023 (planned).

Presentations

○ *Credibility for Markov chains.* The 21st International Congress on Insurance: Mathematics and Economics, Vienna, Austria, Jul ‘17

○ *Empirical Bayes Credibility for the Classic Markov Chain Life Insurance Setting.* The 31st International Congress of Actuaries, Berlin, Germany, Jun ‘18

○ *An empirical Bayes approach to group heterogeneity in the classic Markov chain life insurance setting.* The 4th European Actuarial Journal Conference, Leuven, Belgium, Sep ‘18

◇ *Forward transition rates.* Oberseminar Stochastik/Statistik, University of Oldenburg, Germany, Oct ‘18

- ○ *Forward transition rates.* Actuarial and Financial Mathematics Conference, Brussels, Belgium, Feb '19
- ○ *Simple shrinkage estimation in multi-state models.* Perspectives on Actuarial Risks in Talks of Young Researchers, Sibiu, Romania, Apr '19
- ○ *Tax- and expense-modified risk-minimization for life insurance payment processes.* The 23rd International Congress on Insurance: Mathematics and Economics, Munich, Germany, Jul '19
- ◇ *Change-of-measure techniques for efficient computation of expected cash flows.* Oberseminar Stochastik/Statistik, University of Oldenburg, Germany, Jul '19
- ◇ *Predictive modeling of disability insurance: background, pitfalls, and open questions.* Workshop on Time to Event Data and Machine Learning with focus on pension insurance problems, Copenhagen, Denmark, Nov '19
- ◇ *On forward transition rates and representation of some non-classic payment processes via change-of-measure techniques.* Talks in Financial and Insurance Mathematics, ETH Zurich, Switzerland, Dec '19
- ○ *Tax- and expense-modified risk-minimization for insurance payment processes.* Actuarial and Financial Mathematics Conference, Brussels, Belgium, Feb '20
- ⋆ *Experience rating in the classic Markov chain life insurance setting.* e-Jahrestagung von DAV & DGVFM, online, Apr '20
- ◇ *Multi-state modeling in the mathematics of life insurance: meditations and applications.* PhD Defense, University of Copenhagen, Denmark, Nov '20
- ◇ *Multi-state modeling in the mathematics of life insurance: meditations and applications.* Danish Society of Actuaries, online, Dec '20
- ⋆ *Change of measure techniques for scaled insurance cash flows.* European Actuarial Days, online, Jun '21
- ○ *Beyond Markov chain modeling.* United as One: 24th International Congress on Insurance: Mathematics and Economics, online, Jul '21
- ◇ *Change of measure techniques for scaled insurance cash flows.* Joint Risk & Stochastics and Financial Mathematics Seminar, London School of Economics and Political Science, United Kingdom, online, Dec '21
- ◇ *Multi-state modeling in the mathematics of life insurance.* Actuarial Science Seminar, HEC Lausanne, Switzerland, Feb '22
- ◇ *Change of measure techniques for scaled insurance cash flows.* One World Actuarial Research Seminar, online, Apr '22
- ○ *Extension of as-if-Markov modeling to scaled payments.* The 5th European Actuarial Journal Conference, Tartu, Estonia, Aug '22
- ⋆ *Experience rating in the classic Markov chain life insurance setting.* 1st Convention A, online, Sep '22
- ◇ *Bewertung von Lebensversicherungsverbindlichkeiten – Entwicklungen in Dänemark.* Verein zur Förderung der Versicherungs- und Finanzmathematik – Universität Oldenburg e.V., Oldenburg, Germany, Sep '22
- ◇ *Change of measure techniques for scaled insurance cash flows.* Seminars in Mathematical Statistics, KTH Royal Institute of Technology, Stockholm, Sweden, Dec '22

◇ *Expert Kaplan–Meier estimation.* Seminars in Mathematical Statistics, Stockholm University, Sweden, Dec '22

○ *Conditional Aalen–Johansen estimation.* Perspectives on Actuarial Risks in Talks of Young Researchers, Valencia, Spain, Jan '23

◇ *Conditional Aalen–Johansen estimation.* Riskcenter, University of Barcelona, Spain, Feb '23.

Contributed talks: ○ Invited talks: ⋆ Seminars & miscellaneous: ◇

Teaching and supervision

Doctoral students

Oliver Lunding Sandqvist *Feb '22 – present*

Industrial PhD project titled *Tab af erhvervsevne: forsikring og forebyggelse.*
Supervised jointly with Lars Frederik Brandt Henriksen and Niklas Lindholm (previously Kristian Buchardt) from PFA Pension as well as Mogens Steffensen.

BSc and MSc Programmes in Actuarial Mathematics at the Dept. of Mathematical Sciences, University of Copenhagen

Inference, Market Consistent Valuation and Pricing in Life Insurance *Spring '18*

With Buchardt and Møller. Co-lecturer.
Evaluated as an 'A-course' by the Teaching Committee.

Beyond the Classic Markov Chain Life Insurance Setting *Winter '18/19*

Course responsible and sole lecturer.
Evaluated as an 'A-course' by the Teaching Committee.

Advanced Topics in Modern Life Insurance *Spring '20*

With Buchardt and Falden. Course responsible and main lecturer.
Evaluated as an 'A-course' by the Teaching Committee.

Projects in the Mathematics of Life Insurance *Spring '23*

With Sandqvist. Course responsible and main lecturer.

Insurance and Law *Spring '21, '22, '23*

With Andreasen. Course responsible and main lecturer.
Evaluated as an 'A-course' by the Teaching Committee '22.

Supervision of master's theses

- Lars Christian Geisler, *ongoing*
- Thea Hovmand Larsen, *ongoing*
- Frederik Skjødt (with Buchardt and Ott), *Design and computation of bonus in the presence of risk charge*, Jan '23
- Louise Beck Dinesen, *Real Estate as a Pension Device: The Case of Reverse Mortgage Insurance*, Jan '23
- Christian Sabroe Simonsen (with Lollike), *State Space Reduction Methods for Life Insurance*, Jun '22
- Sophie Elisabeth Gasser (with Ahmad), *Stochastic behavioral rates*, Jun '22
- Christiane Annodine Duus-Holm, *Comparative study on small population mortality modeling*, Jan '22
- Philipp Carsten Hornung, *Dynamics of the prospective reserve*, Sep '21
- Hamid Yar Mohammad (with Hessler), *Doubly stochastic Markov chains with application to life insurance*, Jun '21
- Oliver Lunding Sandqvist (with Buchardt), *Transaction time models in life insurance*, Jun '21
- Liu Li, *Risk-minimization of unit-linked life insurance contracts in the presence of taxes and expenses*, Jun '21

- Oliver Prehn Mikkelsen, *Stochastic retirement*, Jun ‘21
- Jacob Juhl Sørensen (with Steffensen), *Experience Rating in the Setup of Multivariate Correlated Frailties Using a Class of Conjugate Hierarchical Priors*, Dec ‘19
- Jamaal Ahmad (with Steffensen and Buchardt), *Elimination of Path Dependencies for Projection of Cash Flows in Multi-State Life Insurance*, Sep ‘19
- Mikkel Anker Lilja (with Pedersen), *Valuation of Payment Processes in the Presence of Realistically Asymmetric Taxes on Investment Returns*, Jun ‘19
- Morten Berg Jacobsen (with Pedersen), *A Case Study on Modelling Taxation on Investment Returns and Methods of Performance Assessment*, Jun ‘19.

Further activities at the Dept. of Mathematical Sciences, University of Copenhagen

Coordinator of the bachelor’s projects in actuarial mathematics *Sep ‘22 – present*

Supervision of bachelor’s theses

- Savannah Willert, *Beregning af bonus*, Jun ‘22.

Miscellaneous

Courses for the Danish Society of Actuaries:

- 4 Apr ‘22: *Fremregning for gennemsnitsrente: tilstandsvist og tilstandsfrit* (with Ahmad and Buchardt), 20 participants.

Miscellaneous

Languages: Danish *(mother tongue)*, German *(fluent)*, and English *(fluent)*.

Chess: Former Danish scholastic chess champion (2013); currently on hiatus.

Other interests include: Art (modern and contemporary, especially *Jugendstil*), European politics, literature (Tolkien, Murakami, Houellebecq), music (Cohen, Marie Key, Fleetwood Mac), philosophy (Lakatos, Nietzsche).
