

**Georgiana Caltais**  
(version of May 15, 2021)

**Contact Information**

University of Konstanz  
Chair for Software & Systems Engineering  
P.O. Box 67, D-78457 Konstanz, Germany  
Office: PZ913

Phone -office: +49 (0) 7531 88 4762  
Phone -mobile: +41 (0) 78 405 6194  
Email: gcaltais@gmail.com  
Url: <https://www.georgianacaltais.com>

**Personal Information**

Born: April 1984, Suceava, Romania  
Nationality: Romanian  
Languages: Romanian (native), English (proficient), French & Italian (intermediate), German (basic)

**EDUCATION**

- Ph.D. in Computer Science **August 2010 to August 2013**  
Degree awarded by Reykjavík University, Iceland and Radboud University, the Netherlands  
Thesis: *Coalgebraic Tools for Bisimilarity and Decorated Trace Semantics*  
Promotors: Jan Rutten, Anna Ingólfssdóttir  
Co-promotors: Luca Aceto, Marcello Bonsangue, Alexandra Silva
- M.Sc. in Computer Science **October 2007 to July 2009**  
Al. I. Cuza University, Iași, Romania  
Thesis: *CIRC: A Behavioural Verification Tool Based on Circular Coinduction – extensions –*
- B.Sc. in Computer Science **October 2003 to July 2007**  
Al. I. Cuza University, Iași, Romania  
Thesis: *The implementation of a Programming Language in Maude, using Denotational Semantics*

**EMPLOYMENT**

- Postdoctoral Researcher / Independent Junior Scientist  
University of Konstanz – Chair for Software & Systems Engineering, Germany  
**July 2015 to present**
- Postdoctoral Researcher  
ETH Zürich – Chair of Software Engineering, Switzerland  
**November 2013 to June 2015**
- Research Assistant  
Reykjavík University – School of Computer Science, Iceland  
**August 2010 to August 2013**
- Tenured as Teaching & Research Assistant  
Al. I. Cuza University – Department of Computer Science, Iași, Romania  
**October 2008 to September 2010**
- Research Assistant  
Al. I. Cuza University – Department of Computer Science, Iași, Romania  
**October 2007 to September 2008**

## GRANTS & AWARDS

1. Deutsche Forschungsgemeinschaft (DFG) - Research Grant **July 2018 to January 2022**
  - Causal Reasoning in NetKAT. PI: Georgiana Caltais  
≈ 500.000 EUR, to finance my salary for three years and one Ph.D. student
2. University of Konstanz - Independent Research Start-up Grants **2015, 2016 and 2017**
  - Total of 9.000 EUR, to finance student assistants and research visits
3. Centrum Wiskunde & Informatica (CWI), The Netherlands - Research Internship **September – December 2011**
4. Reykjavík University, Graduate Studies Council - Tuition Waivers **2010, 2011, 2012 and 2013**
5. Participated in writing the project proposal DAK–“An Executable Semantic Framework for Rigorous Design, Analysis and Testing of Systems”
  - ≈ 1.000.000 EUR, awarded by the National Authority for Scientific Research (ANCS), Romania funding period 2010 – 2013
6. Marktoberdorf Summer School 2008 – Participation Grant
7. ETAPS 2008 – Participation Grant

## UNIVERSITY ACTIVITIES

### Teaching - Directed Studies Courses & Exercise Sessions, University of Konstanz

- In charge of designing the courses (approx. 10-15 students), conducting the associated lectures, exercise classes and final examinations:
  1. Kick Start to the Technical Interview (B.Sc./M.Sc.), Spring Semester 2021
  2. Software Defined Networks (B.Sc./M.Sc.), Fall Semester 2020
  3. Satisfiability Modulo Theories (M.Sc.), Fall Semester 2017
  4. Formal Specification and Verification of Cyber-Physical Systems (M.Sc./B.Sc.), Spring Semester 2017
  5. Requirements Engineering (B.Sc./M.Sc.), Spring Semester 2016
  6. Software Testing (B.Sc./M.Sc.), Fall Semester 2015, Spring Semester 2018

### Teaching - Courses & Exercise Sessions

1. Software Engineering (B.Sc.), University of Konstanz, Fall Semester 2016
  - Provided an updated version of the course slides, conducted the lectures (approx. 60 students), exercise classes (group of 20 students) and final examinations
2. Software Engineering (B.Sc.), University of Konstanz, Fall Semester 2015
  - Conducted exercise classes (group of 20 students)
3. Introduction to Programming (B.Sc.), ETH Zürich, Fall Semester 2014
  - Head assistant: coordinated the course, interviewed potential teaching assistants, prepared and moderated weekly assistant meetings, set up the exercise groups (for a total of 360 students)
  - Conducted exercise classes (group of 20 students)
4. Concepts of Concurrent Computation (M.Sc./Ph.D.), ETH Zürich, Spring Semester 2014
  - Conducted exercise classes (approx. 20 students)

### **Teaching - Seminars, University of Konstanz**

- In charge of selecting the topics and conducting the seminar sessions:
  1. Advanced Topics in Software Engineering (B.Sc.), Fall Semester 2017
  2. Process Algebras (M.Sc.), Fall Semester 2016
  3. Model-Based Testing (B.Sc./M.Sc.), Spring Semester 2016

### **Teaching - Laboratories, Al. I. Cuza University, October 2008 to September 2010**

1. Functional Programming – Haskell (B.Sc.)
  - Conducted the exercise sessions (groups of approx. 20 students)
2. Algorithms and Programming – C/C++ (B.Sc.)
  - Conducted the exercise sessions (groups of approx. 20 students)

### **Student / Projects & Theses Supervision, University of Konstanz (2015-2021)**

Involved into the supervision of

- student assistants: Mihaela Coman, Sophie Gütlein, Mariam Mahmoud, Dang Mai, Natascha Siirak, Hargurbir Singh, Mathew Smith, Michael Stark, Hünkar Can Tunç, Jannis Weiser
- B.Sc./M.Sc. projects and theses: Andreas Bäuerle, Sophie Gütlein, Stefan Brütch, Sebastian Haufe, Roland Metko, Ivo Schüepp, Hargurbir Singh, Mathew Smith, Timo Suk, Hünkar Can Tunç, Moritz Wagner, Ying Wang, Jannis Weiser
- Ph.D. students (fellowship supervision at the University of Konstanz, 2020-2021): Hui Feng - enrolled at Leiden University, the Netherlands, and Zahra Moezkarimi - enrolled at the University of Tehran, Iran

### **Hiring**

1. Member of the appointment committee for a W3 professorship on “Cyber-Physical Systems”, at the University of Konstanz (2021).
2. Member of the appointment committee 2019-044 “Image Analysis and Computer Vision”, at the University of Konstanz (2019).
3. Interviewed and hired students for various teaching and research assistant jobs at ETH Zürich and University of Konstanz (2013 – 2021).

## **PROFESSIONAL ACTIVITIES AND SERVICE**

### **Research Visits / Meetings**

1. University of Konstanz, March 2020. Workshop on concurrency-based approaches for modelling and reasoning about dynamic and stateful software defined network behaviours. (Organizer)
2. Leiden University, December 2019. Research on “repairs” of regular programs, based on causal explanations of failures.
3. Gebze Technical University, December 2019. Workshop on providing a concurrent, operational semantics of an extension of the NetKAT programming language for networks; explaining failures in NetKAT programs. (Organizer)
4. EPFL Lausanne, November 2019. Research on small step semantics of software defined networks.
5. Al. I. Cuza University & Polytechnic University Bucharest, August 2019. Research on faults, failures and causality in software defined networks.
6. Shonan Seminar No. 139 “Causal Reasoning in Systems”, Japan June 24-27, 2019.

7. UCL London, March 2019. Kick-off workshop on causality checking for software defined networks - NetKAT. (Organizer)
8. University of Konstanz, January 2019. Workshop on Causality and Timed Systems. (Organizer)
9. Reykjavik University, May & October 2018. Research on (monitoring) causality for labeled transition systems.
10. Reykjavik University, March 2016, May 2017. Research on compositionality of causality for labeled transition systems.
11. UCL London, April 2017. Research on causality checking for software defined networks - NetKAT.
12. Airbus Defence & Space, March 2017. Meeting on applying the QuantUM methodology in industrial settings, organised at University of Konstanz.
13. Halmstad University, October 2015, December 2015, September 2016. Research on counterfactual reasoning and causality for labelled transition systems and Hennessy-Milner logic.
14. Knorr-Bremse München, September 2015. Meeting on applying the QuantUM methodology in industrial settings.
15. Radboud University, Nijmegen, October – December 2012. Study on decorated trace semantics for non-deterministic finite automata and generative probabilistic systems: coalgebraic modelling, equivalence-checking algorithms and case studies.
16. CWI, Amsterdam, March 2012. Study on the coalgebraic modelling of Basic Parallel Processes.
17. CWI, Amsterdam, October – December 2011. Study on the coalgebraic modelling of decorated trace semantics.
18. CWI, Amsterdam, July 19 – August 2, 2009. Study on coalgebra and implementation of a Maude meta-application for automated reasoning on the equality of regular expressions for polynomial functors.

#### Conference & Journal Referee

1. IEEE Conference on Network Function Virtualization and Software Defined Networks (IEEE NFV-SDN) 2020.
2. International Conference on Concurrency Theory (CONCUR) 2013, 2020.
3. International Colloquium on Theoretical Aspects of Computing (ICTAC) 2017, 2020.
4. International Conference on Engineering of Complex Computer Systems (ICECCS) 2020.
5. International Conference on Advancements in Computational Sciences (ICACS) 2020.
6. International Symposium on Model Checking of Software (SPIN) 2016, 2017, 2018, 2019.
7. International Colloquium on Automata, Languages and Programming (ICALP) 2014.
8. International Conference on Foundations of Software Science and Computation Structures (FoSSaCS) 2014.
9. Symposium On Applied Computing (SAC) 2017, 2018, 2020.
10. Symposium On Theoretical Aspects of Software Engineering (TASE) 2009.
11. Workshop on Formal Reasoning about Causation, Responsibility, & Explanations in Science & Technology (CREST) 2016, 2017, 2019.
12. Reviewer of Journal of Logical and Algebraic Methods in Programming (JLAMP), Elsevier.

#### Committees

1. Demo co-chair of the IEEE Conference on Network Function Virtualization and Software Defined Networks 2021 (IEEE NFV-SDN 2021).
2. OC member of IEEE NFV-SDN 2021.

3. Co-chair of the 1st Workshop on Formal Foundations of Software Defined Networks 2020; held in conjunction with IEEE NFV-SDN 2020.
4. PC member of the International Conference on Advancements in Computational Science (ICACS) 2020.
5. Co-chair of the International Workshop on Causal Reasoning for Embedded and Safety-critical Systems Technologies (CREST) 2019; held in conjunction with ETAPS 2019.
6. PC member of the International Workshop on Causal Reasoning for Embedded and Safety-critical Systems Technologies (CREST) 2017, 2020; held in conjunction with ETAPS 2017, 2020.

## Events

1. Organised the 1st edition of the Workshop on Formal Foundations of Software Defined Networks (FoFoSDN 2020), held in conjunction with IEEE NFV-SDN 2020.
2. Organised the 4th Workshop on Formal Reasoning about Causation, Responsibility, & Explanations in Science & Technology (CREST 2019), held in conjunction with ETAPS 2019.
3. Participated in organizing LASER Summer School in 2013, 2014.
4. Participated in organizing the ICE-TCS Workshop on Structural Operational Semantics and the Equational Logic of Processes 2011.
5. Co-chaired Niklaus Wirth Birthday Symposium (ETH Zürich).
6. Contributed in training and coordinating the ETH Zürich team participating in the contest Prix du Jeune Entrepreneur 2014.
7. Organized an apéro for students interested in doing Master or Bachelor theses within the research topics of the Chair of Software Engineering at ETH Zürich.

## Trainings

1. Graduated the modules on Educational Psychology, Pedagogy and Teaching Traineeship within the Teaching Training Department at Al. I. Cuza University.
2. Project Management for Researchers, 28-29 May 2020, University of Konstanz.
3. LASER Summer School 2013, 2014. Leading-Edge Software Engineering.
4. Marktoberdorf Summer School 2008. Engineering Methods and Tools for Software Safety and Security.
5. Sinaia School on Formal Verification of Software Systems 3–10 March 2008.
6. Agile IT Project Management Training 13–14 November 2008, Al. I. Cuza University.

## Presentations

1. Correctness of an ATL Model Transformation from SysML State Machine Diagrams to Promela. MOD-ELSWARD 2020.
2. Explaining Safety Failures in NetKAT. Talk at Leiden University and Gebze Technical University (December 2019).
3. Causal Reasoning in SDNs (NetKAT). Shonan Seminar No. 139 “Causal Reasoning in Systems”, Japan June 24-27, 2019.
4. Correctness of an ATL Model Transformation from SysML to Promela. Invited talk at Reykjavik University (April 2019).
5. Causal Reasoning for Safety. Invited talk at OPCT 2019.
6. Counterfactual causal reasoning for concurrency - one possible approach. Invited talk at Reykjavik University (October 2018).
7. Encoding Causality via Modal Formulae. FROM 2018.

8. Causality for General LTL-definable Properties. CREST 2018.
9. Causality Checking to Support Functional Safety in Cyber-Physical Systems – The QuantUM Approach. Invited talk at Reykjavik University (May 2017).
10. (Co-)Algebraic Approaches to the Modelling and Verification of Reactive Systems. Invited talk at the Logic Colloquium - University of Konstanz (January 2017).
11. (De-)composing Causality for Labelled Transition Systems. Invited talk at OPCT'17 - IST Austria (June 2017), Reykjavik University (March 2016), CREST 2016 and Department's Summer School - Gaschurn, Austria (September 2016).
12. Causality Checking to Support Functional Safety in Cyber-Physical Systems. Invited talk at CERES - Halmstad University (October 2015).
13. Causality Checking for Critical Systems - the QuantUM Approach (Part II). Talk within the Department's Summer School - Gaschurn, Austria (September 2015).
14. Coalgebra. Invited talk within the course on Concepts of Concurrent Computation, Chair of Software Engineering, ETH Zürich (May 2015).
15. Exploiting alias information. CME internal workshop, Chair of Software Engineering, ETH Zürich (November 2014).
16. On the design and analysis of a concurrency model. ICE-TCS seminars, Reykjavik University (November 2014).
17. Expression-based aliasing for OO-languages. FTSCS 2014.
18. Coffman deadlocks in SCOOP. NWPT 2014.
19. An Executable Semantic Framework for the Design and Analysis of SCOOP. Chair of Software Engineering, ETH Zürich (May 2014).
20. Coalgebraic Tools for Bisimilarity and Decorated Trace Semantics. Ph.D. defense, Radboud University, Nijmegen, the Netherlands (December 2013).
21. Alais analysis – a possible approach? -. CME internal workshop, Chair of Software Engineering, ETH Zürich (November 2013).
22. (Co)algebra & SOS for Concurrency – from theory to practice. Chair of Software Engineering, ETH Zürich (May 2013).
23. Checking the must-testing preorder with bisimulations up-to. ICE-TCS seminars, Reykjavik University (February 2013).
24. Final Semantics for Decorated Traces. COIN: Coalgebra in the Netherlands, CWI Amsterdam (March 2012) and MFPS 2012.
25. Formal methods for concurrency: (Co)algebra and SOS. ICE-TCS seminars, Reykjavik University (January 2012).
26. Axiomatizing GSOS with Predicates. ICE-TCS Workshop on Structural Operational Semantics and the Equational Logic of Processes, Reykjavik University (April 2011).
27. Algebra meets Coalgebra – A Decision Procedure for Bisimilarity of Generalized Regular Expressions. ICE-TCS seminars, Reykjavik University (August 2010).
28. Behavioural Specification of Polynomial Functors.
  - Scientific Day of the University, Iași (October 2009).
  - ARCO meeting, Eindhoven (November 2009).
29. Simplification and Generalization in CIRC. SYNASC 2009.
30. Automata-based Behavioural Specification of Regular Expressions. ARCO meeting, Iași (May 2009).
31. A Rewrite Stack Machine for ROC!. SYNASC 2008.
32. Patterns for Maude Metalanguage Applications. WRLA 2008.

33. K: a Rewrite-based Framework for Modular Language Design, Semantics, Analysis and Implementation. Formal Methods group sessions at Al. I. Cuza University, Iași.

## PUBLICATIONS

- [1] G. Caltais, H. Hojjat, M. R. Mousavi, and H. C. Tunc. DyNetKAT: An algebra of dynamic networks. *CoRR*, abs/2102.10035, 2021.
- [2] G. Caltais and H. C. Tunc. Explaining safety failures in NetKAT. *CoRR*, abs/2102.12448, 2021. (To appear in J. Log. Algebraic Methods Program.).
- [3] G. Caltais, S. Leue, and H. Singh. Correctness of an ATL model transformation from SysML state machine diagrams to Promela. In S. Hammoudi, L. F. Pires, and B. Selic, editors, *Proceedings of the 8th International Conference on Model-Driven Engineering and Software Development, MODELSWARD 2020, Valletta, Malta, February 25-27, 2020*, pages 360–372. SCITEPRESS, 2020.
- [4] G. Caltais, M. R. Mousavi, and H. Singh. Causal reasoning for safety in Hennessy Milner logic. *Fundam. Informaticae*, 173(2-3):217–251, 2020.
- [5] G. Caltais. Explaining SDN failures via axiomatisations. In M. Marin and A. Craciun, editors, *Proceedings Third Symposium on Working Formal Methods, FROM 2019, Timișoara, Romania, 3-5 September 2019*, volume 303 of *EPTCS*, pages 48–60, 2019.
- [6] G. Caltais and J. Krivine, editors. *Proceedings of the 4th Workshop on Formal Reasoning about Causation, Responsibility, and Explanations in Science and Technology, CREST@ETAPS 2019, Prague, Czech Republic, 7th April 2019*, volume 308 of *EPTCS*, 2019.
- [7] G. Caltais, S. L. Guetlein, and S. Leue. Causality for general LTL-definable properties. In B. Finkbeiner and S. Kleinberg, editors, *Proceedings 3rd Workshop on formal reasoning about Causation, Responsibility, and Explanations in Science and Technology, CREST@ETAPS 2018, Thessaloniki, Greece, 21st April 2018*, volume 286 of *EPTCS*, pages 1–15, 2018.
- [8] G. Caltais and B. Meyer. On the verification of SCOOP programs. *Sci. Comput. Program.*, 133:194–215, 2017.
- [9] F. Bonchi, M. M. Bonsangue, G. Caltais, J. Rutten, and A. Silva. A coalgebraic view on decorated traces. *Math. Struct. Comput. Sci.*, 26(7):1234–1268, 2016.
- [10] G. Caltais, F. Leitner-Fischer, S. Leue, and J. Weiser. SysML to NuSMV model transformation via object-orientation. In C. Berger, M. R. Mousavi, and R. Wisniewski, editors, *Cyber Physical Systems. Design, Modeling, and Evaluation - 6th International Workshop, CyPhy 2016, Pittsburgh, PA, USA, October 6, 2016, Revised Selected Papers*, volume 10107 of *Lecture Notes in Computer Science*, pages 31–45. Springer, 2016.
- [11] G. Caltais, S. Leue, and M. R. Mousavi. (De-)composing causality in labeled transition systems. In G. Göbller and O. Sokolsky, editors, *Proceedings First Workshop on Causal Reasoning for Embedded and safety-critical Systems Technologies, CREST@ETAPS 2016, Eindhoven, The Netherlands, 8th April 2016*, volume 224 of *EPTCS*, pages 10–24, 2016.
- [12] G. Caltais. Coalgebraic tools for bisimilarity and decorated trace semantics. *CoRR*, abs/1502.02910, 2015. (PhD thesis).
- [13] G. Caltais. Expression-based aliasing for OO-languages. In C. Artho and P. C. Ölveczky, editors, *Formal Techniques for Safety-Critical Systems - Third International Workshop, FTSCS 2014, Luxembourg, November 6-7, 2014. Revised Selected Papers*, volume 476 of *Communications in Computer and Information Science*, pages 47–61. Springer, 2014.
- [14] G. Caltais and B. Meyer. Coffman deadlocks in SCOOP. *CoRR*, abs/1409.7514, 2014.
- [15] F. Bonchi, G. Caltais, D. Pous, and A. Silva. Brzozowski’s and up-to algorithms for must testing. In C. Shan, editor, *Programming Languages and Systems - 11th Asian Symposium, APLAS 2013, Melbourne, VIC, Australia, December 9-11, 2013. Proceedings*, volume 8301 of *Lecture Notes in Computer Science*, pages 1–16. Springer, 2013.

- [16] M. M. Bonsangue, G. Caltais, E. Goriac, D. Lucanu, J. J. M. M. Rutten, and A. Silva. Automatic equivalence proofs for non-deterministic coalgebras. *Sci. Comput. Program.*, 78(9):1324–1345, 2013.
- [17] F. Bonchi, M. M. Bonsangue, G. Caltais, J. J. M. M. Rutten, and A. Silva. Final semantics for decorated traces. In U. Berger and M. W. Mislove, editors, *Proceedings of the 28th Conference on the Mathematical Foundations of Programming Semantics, MFPS 2012, Bath, UK, June 6-9, 2012*, volume 286 of *Electronic Notes in Theoretical Computer Science*, pages 73–86. Elsevier, 2012.
- [18] L. Aceto, G. Caltais, E. Goriac, and A. Ingólfssdóttir. Axiomatizing GSOS with predicates. In M. A. Reniers and P. Sobocinski, editors, *Proceedings Eight Workshop on Structural Operational Semantics 2011, SOS 2011, Aachen, Germany, 5th September 2011*, volume 62 of *EPTCS*, pages 1–15, 2011.
- [19] L. Aceto, G. Caltais, E. Goriac, and A. Ingólfssdóttir. PREG axiomatizer - A ground bisimilarity checker for GSOS with predicates. In A. Corradini, B. Klin, and C. Cirstea, editors, *Algebra and Coalgebra in Computer Science - 4th International Conference, CALCO 2011, Winchester, UK, August 30 - September 2, 2011. Proceedings*, volume 6859 of *Lecture Notes in Computer Science*, pages 378–385. Springer, 2011.
- [20] M. M. Bonsangue, G. Caltais, E. Goriac, D. Lucanu, J. J. M. M. Rutten, and A. Silva. A decision procedure for bisimilarity of generalized regular expressions. In J. Davies, L. Silva, and A. da Silva Simão, editors, *Formal Methods: Foundations and Applications - 13th Brazilian Symposium on Formal Methods, SBMF 2010, Natal, Brazil, November 8-11, 2010, Revised Selected Papers*, volume 6527 of *Lecture Notes in Computer Science*, pages 226–241. Springer, 2010.
- [21] E. Goriac, G. Caltais, and D. Lucanu. Simplification and generalization in CIRC. In S. M. Watt, V. Negru, T. Ida, T. Jebelean, D. Petcu, and D. Zaharie, editors, *11th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, SYNASC 2009, Timisoara, Romania, September 26-29, 2009*, pages 85–92. IEEE Computer Society, 2009.
- [22] G. Grigoras, D. Lucanu, G. Caltais, and E. Goriac. Automated proving of the behavioral attributes. In P. Kefalas, D. Stamatis, and C. Douligeris, editors, *2009 Fourth Balkan Conference in Informatics, BCI 2009, Thessaloniki, Greece, 17-19 September 2009*, pages 33–38. IEEE Computer Society, 2009.
- [23] D. Lucanu, E. Goriac, G. Caltais, and G. Rosu. CIRC: A behavioral verification tool based on circular coinduction. In A. Kurz, M. Lenisa, and A. Tarlecki, editors, *Algebra and Coalgebra in Computer Science, Third International Conference, CALCO 2009, Udine, Italy, September 7-10, 2009. Proceedings*, volume 5728 of *Lecture Notes in Computer Science*, pages 433–442. Springer, 2009.
- [24] G. Caltais, E. Goriac, D. Lucanu, and G. Grigoras. A rewrite stack machine for ROC! In V. Negru, T. Jebelean, D. Petcu, and D. Zaharie, editors, *SYNASC 2008, 10th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, Timisoara, Romania, 26-29 September 2008*, pages 85–91. IEEE Computer Society, 2008.
- [25] E. Goriac, G. Caltais, D. Lucanu, O. Andrei, and G. Grigoras. Patterns for Maude metalanguage applications. In G. Rosu, editor, *Proceedings of the Seventh International Workshop on Rewriting Logic and its Applications, WRLA 2008, Budapest, Hungary, March 29-30, 2008*, volume 238 of *Electronic Notes in Theoretical Computer Science*, pages 121–138. Elsevier, 2008.