Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

Curriculum Vitae

Karl Palmskog

Research Interests

I am interested in development of techniques and tools based on proof assistants for construction of functionally correct and secure software systems. I also take a broad interest in programming languages, software engineering, and verification.

Education

Feb 2009 - Nov 2014	**Ph.D., Computer Science**, 240 ECTS credits, KTH Royal Institute of Technology, Stockholm, Sweden. Research on distributed systems and programming languages. School Ph.D. student council chairman in 2013.
Aug 2001 - Apr 2007	**M.Sc., Computer Science and Engineering**, 270 ECTS credits, KTH Royal Institute of Technology, Stockholm, Sweden. Master's project at Ericsson AB.
Mar 2002 - Jan 2003	Military service/training in the Swedish Armed Forces.

Employment

Oct 2019 -	**Researcher**, KTH Royal Institute of Technology, Stockholm, Sweden. Research on program verification.
Jan 2018 - Aug 2019	**Research Fellow**, The University of Texas at Austin, TX, USA. Research on proof engineering.
Sep 2017 - Jan 2018	**Visiting Scholar**, University of Illinois at Urbana-Champaign, IL, USA. Research on program verification.
Jan 2015 - Aug 2017	**Postdoctoral Research Associate**, University of Illinois at Urbana-Champaign, IL, USA. Research on programming languages.
Nov 2014 - Dec 2014	**Researcher**, KTH Royal Institute of Technology, Stockholm, Sweden. Research on programming languages and distributed systems.
Feb 2014 - Sep 2014	**Research Engineer**, KTH Royal Institute of Technology, Stockholm, Sweden. Research on programming languages and distributed systems.
Feb 2009 - Jan 2014	**Doctoral Student**, KTH Royal Institute of Technology, Stockholm, Sweden. Lecturer, teaching assistant, and lab assistant in several computer science courses.
Feb 2007 - Jan 2009	**Developer**, Jaycut AB, Stockholm, Sweden. Company co-founder and backend developer of a platform for online video editing. Company sold in 2011 to Research in Motion (now Blackberry).

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

Professional Service

CPP 2021	Program Committee Member
FMBC 2020	Program Committee Member
Coq Workshop 2020	Program Committee Member
CACM	Reviewer 2020
CPP 2020	External Reviewer
COLA	Reviewer 2019
FMBC 2019	Program Committee Member
CAV 2019	External Reviewer
ISSTA 2019	External Reviewer
SCICO	Reviewer 2019
FASE 2019	External Reviewer
ICSE 2019	External Reviewer
POPL 2019	Artifact Eval. Committee Member
ASE 2018	External Reviewer
FM 2018	External Reviewer
TOMACS	Reviewer 2018
QEST 2017	External Reviewer
COORDINATION 2017	External Reviewer
PDP 2017	External Reviewer
QEST 2016	Proceedings Chair
CONCUR 2016	External Reviewer
COORDINATION 2016	External Reviewer
FORTE 2016	External Reviewer
iFM 2016	External Reviewer
SRDS 2015	External Reviewer
COORDINATION 2015	External Reviewer
CPP 2013	External Reviewer

External Funding

"ReCoqtion: Meta-Certified Continuous Program Verification", Research Award from Facebook, joint with Zachary Tatlock, University of Washington (50k USD).

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

Contributions to Software

Suggesting Coq lemma names	https://github.com/EngineeringSoftware/roosterize
Mutation analysis for Coq	https://github.com/EngineeringSoftware/mcoq
Algorand formalization	https://github.com/runtimeverification/algorand-verification
Blockchain formalization	https://github.com/certichain/toychain
Verdi verification framework	https://github.com/uwplse/verdi
Verdi Raft consensus protocol	https://github.com/uwplse/verdi-raft
Cheerios serialization library	https://github.com/uwplse/cheerios
iCoq proof selection tool	https://cozy.ece.utexas.edu/icoq/
Ott tool for defining calculi	https://github.com/ott-lang/ott
Distributed separation logic	https://github.com/DistributedComponents/disel
SerAPI Coq library	https://github.com/ejgallego/coq-serapi

GitHub profile: https://github.com/palmskog

Accepted Publications

[Jai+20] Kush Jain, Karl Palmskog, Ahmet Celik, Emilio Jesús Gallego Arias, and Milos Gligoric. "mCoq: Mutation Analysis for Coq Verification Projects". Accepted to appear in International Conference on Software Engineering, Tool Demonstrations Track. 2020.

Peer-Reviewed Publications

[Alt+20] Musab A. Alturki, Jing Chen, Victor Luchangco, Brandon Moore, Karl Palmskog, Lucas Peña, and Grigore Roşu. "Towards a Verified Model of the Algorand Consensus Protocol in Coq". In: *Formal Methods 2019 International Workshops*. Aug. 2020, pp. 362–367. DOI: 10.1007/978-3-030-54994-7_27.

[Nie+20a] Pengyu Nie, Karl Palmskog, Junyi Jessy Li, and Milos Gligoric. "Deep Generation of Coq Lemma Names Using Elaborated Terms". In: *International Joint Conference on Automated Reasoning*. July 2020, pp. 97–118. DOI: 10.1007/978-3-030-51054-1_6.

[Nie+20c] Pengyu Nie, Karl Palmskog, Junyi Jessy Li, and Milos Gligoric. "Learning to Format Coq Code Using Language Models". In: *The Coq Workshop*. July 2020. URL: https://coq-workshop.gitlab.io/2020/abstracts/Coq2020_02-03-formatting.pdf.

[PCG20] Karl Palmskog, Ahmet Celik, and Milos Gligoric. "Practical Machine-Checked Formalization of Change Impact Analysis". In: *International Conference on Tools and Algorithms for the Construction and Analysis of Systems*. Apr. 2020, pp. 137–157. DOI: 10.1007/978-3-030-45237-7_9.

[Cel+19] Ahmet Celik, Karl Palmskog, Marinela Parovic, Emilio Jesús Gallego Arias, and Milos Gligoric. "Mutation Analysis for Coq". In: *International Conference on Automated Software Engineering*. Nov. 2019, pp. 539–551. DOI: 10.1109/ASE.2019.00057.

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

[CPA19] Minas Charalambides, Karl Palmskog, and Gul Agha. "Types for Progress in Actor Programs". In: *Models, Languages, and Tools for Concurrent and Distributed Programming: Essays Dedicated to Rocco De Nicola on the Occasion of His 65th Birthday*. July 2019, pp. 315–339. DOI: 10.1007/978-3-030-21485-2_18.

[Kal+19] Faria Kalim, Karl Palmskog, Jayasi Mehar, Adithya Murali, P. Madhusudan, and Indranil Gupta. "Kaizen: Building a Performant Blockchain System Verified for Consensus and Integrity". In: *International Conference on Formal Methods in Computer-Aided Design*. Oct. 2019, pp. 96–104. DOI: 10.23919/FMCAD.2019.8894248.

[Pal+19] Karl Palmskog, Milos Gligoric, Lucas Peña, and Grigore Roşu. "Verifying Finality for Blockchain Systems". In: *International Workshop on Coq for Programming Languages*. Jan. 2019. URL: https://popl19.sigplan.org/event/coqpl-2019-verifying-finality-for-blockchain-systems.

[Rin+19] Talia Ringer, Karl Palmskog, Ilya Sergey, Milos Gligoric, and Zachary Tatlock. "QED at Large: A Survey of Engineering of Formally Verified Software". In: *Foundations and Trends in Programming Languages* 5.2-3 (Sept. 2019), pp. 102–281. DOI: 10.1561/2500000045.

[AP18a] Gul Agha and Karl Palmskog. "A Survey of Statistical Model Checking". In: *ACM Trans. Model. Comput. Simul.* 28.1 (Jan. 2018), 6:1–6:39. DOI: 10.1145/3158668.

[AP18b] Gul Agha and Karl Palmskog. "Transforming Threads into Actors: Learning Concurrency Structure from Execution Traces". In: *Principles of Modeling: Essays Dedicated to Edward A. Lee on the Occasion of his 60th Birthday*. July 2018, pp. 16–37. DOI: 10.1007/978-3-319-95246-8_2.

[CPG18] Ahmet Celik, Karl Palmskog, and Milos Gligoric. "A Regression Proof Selection Tool for Coq". In: *International Conference on Software Engineering, Demo*. June 2018, pp. 117–120. DOI: 10.1145/3183440.3183493.

[PCG18] Karl Palmskog, Ahmet Celik, and Milos Gligoric. "piCoq: Parallel Regression Proving for Large-scale Verification Projects". In: *International Symposium on Software Testing and Analysis*. July 2018, pp. 344–355. DOI: 10.1145/3213846.3213877.

[CPG17] Ahmet Celik, Karl Palmskog, and Milos Gligoric. "iCoq: Regression Proof Selection for Large-Scale Verification Projects". In: *International Conference on Automated Software Engineering*. Nov. 2017, pp. 171–182. DOI: 10.1109/ASE.2017.8115630.

[Doe+17] Ryan Doenges, James R. Wilcox, Doug Woos, Zachary Tatlock, and Karl Palmskog. "Verifying Implementations of Churn-Tolerant Distributed Systems". In: *International Workshop on Coq for Programming Languages*. Jan. 2017. URL: https://popl17.sigplan.org/event/main-verification-of-implementations-of-distributed-systems-under-churn.

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

[DP15] Mads Dam and Karl Palmskog. "Location-independent routing in process network overlays". In: *Service Oriented Computing and Applications* 9.3 (Sept. 2015), pp. 285–309. DOI: 10.1007/s11761-014-0173-7.

[PHM15] Karl Palmskog, Farah Hariri, and Darko Marinov. "A Case Study on Executing Instrumented Code in Java PathFinder". In: *SIGSOFT Softw. Eng. Notes* 40.6 (Nov. 2015), pp. 1–5. DOI: 10.1145/2830719.2830730.

[DP14] Mads Dam and Karl Palmskog. "Location Independent Routing in Process Network Overlays". In: *International Conference on Parallel, Distributed and Network-Based Processing*. Feb. 2014, pp. 715–724. DOI: 10.1109/PDP.2014.30.

[DP13] Mads Dam and Karl Palmskog. "Efficient and Fully Abstract Routing of Futures in Object Network Overlays". In: *Workshop on Programming Based on Actors, Agents, and Decentralized Control*. 2013, pp. 49–60. DOI: 10.1145/2541329.2541340.

[Pal+13] Karl Palmskog, Mads Dam, Andreas Lundblad, and Ali Jafari. "ABS-NET: Fully Decentralized Runtime Adaptation for Distributed Objects". In: *Interaction and Concurrency Experience*. Vol. 131. EPTCS. 2013, pp. 85–100. DOI: 10.4204/EPTCS.131.8.

[JPV12] Kristján Valur Jónsson, Karl Palmskog, and Ymir Vigfússon. "Secure Distributed Top-k Aggregation". In: *International Conference on Communications*. June 2012, pp. 804–809. DOI: 10.1109/ICC.2012.6364049.

[Pal+10] Karl Palmskog, Alberto Gonzalez Prieto, Catalin Meirosu, Rolf Stadler, and Mads Dam. "Scalable Metadata-Directed Search in a Network of Information". In: *Future Network & Mobile Summit*. June 2010, pp. 1–8. URL: https://ieeexplore.ieee.org/document/5722376.

[Ism+07] Yuri Ismailov, Karl Palmskog, Micael Widell, Petter Arvidsson, and YaoShuang Wang. "Session Layer Resurgence: Towards Mobile, Disconnection- and Delay-Tolerant Communication". In: *European Conference on Universal Multiservice Networks*. Feb. 2007, pp. 337–345. DOI: 10.1109/ECUMN.2007.47.

Theses

[Pal14] Karl Palmskog. "Towards Correct and Efficient Program Execution in Decentralized Networks: Programming Languages, Semantics, and Resource Management". Ph.D. thesis. School of Computer Science and Communication, KTH Royal Institute of Technology, Nov. 2014. URL: http://kth.diva-portal.org/smash/record.jsf?pid=diva2%3A749552.

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

[Pal06] Karl Palmskog. "Verification of the Session Management Protocol". M.Sc. thesis. School of Computer Science and Communication, KTH Royal Institute of Technology, Nov. 2006. URL: http://kiosk.nada.kth.se/utbildning/grukth/exjobb/rapportlistor/2006/rapporter06/palmskog_karl_06149.pdf.

Book Chapters

[Agh+18] Gul Agha, Minas Charalambides, Kirill Mechitov, Karl Palmskog, Atul Sandur, and Reza Shiftehfar. "Theoretical Considerations: Inferring and Enforcing Use Patterns for Mobile Cloud Assurance". In: *Assured Cloud Computing*. John Wiley & Sons, Ltd, July 2018. Chap. 7, pp. 237–276. DOI: 10.1002/9781119428497.ch7.

Technical Reports and Preprints

[Nie+20b] Pengyu Nie, Karl Palmskog, Junyi Jessy Li, and Milos Gligoric. "Deep Generation of Coq Lemma Names Using Elaborated Terms". In: *CoRR* abs/2004.07761 (2020). arXiv: 2004.07761.

[Nie+20d] Pengyu Nie, Karl Palmskog, Junyi Jessy Li, and Milos Gligoric. "Learning to Format Coq Code Using Language Models". In: *CoRR* abs/2006.16743 (2020). arXiv: 2006.16743.

[Rin+20] Talia Ringer, Karl Palmskog, Ilya Sergey, Milos Gligoric, and Zachary Tatlock. "QED at Large: A Survey of Engineering of Formally Verified Software". In: *CoRR* abs/2003.06458 (2020). arXiv: 2003.06458.

[Alt+19] Musab A. Alturki, Jing Chen, Victor Luchangco, Brandon Moore, Karl Palmskog, Lucas Peña, and Grigore Rosu. "Towards a Verified Model of the Algorand Consensus Protocol in Coq". In: *CoRR* abs/1907.05523 (2019). arXiv: 1907.05523.

[Pal+18] Karl Palmskog, Milos Gligoric, Lucas Peña, Brandon Moore, and Grigore Roşu. *Verification of Casper in the Coq Proof Assistant*. Tech. rep. 2018. URL: http://hdl.handle.net/2142/102075.

[Pek+17] Edgar Pek, Pranav Garg, Muntasir Raihan Rahman, Karl Palmskog, Indranil Gupta, and P. Madhusudan. "Inferring Formal Properties of Production Key-Value Stores". In: *CoRR* abs/1712.10056 (2017). arXiv: 1712.10056.

Publication Profiles

Google Scholar: https://scholar.google.com/citations?user=myVdnacAAAAJ

DBLP: https://dblp.org/pers/hd/p/Palmskog:Karl

Publons: https://publons.com/researcher/3578494/karl-palmskog/

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

Recent Presentations

2019-10-24	Kaizen: Building a Performant Blockchain System Verified for Consensus and Integrity. Presentation at the International Conference on Formal Methods in Computer-Aided Design (FMCAD).
2019-10-11	Towards a Verified Model of the Algorand Consensus Protocol in Coq. Presentation at the Workshop on Formal Methods for Blockchains (FMBC).
2019-03-08	Regression Proving in Deductive Program Verification: Theory and Practice. UT Austin colloquium presentation.
2019-01-28	Regression Proving with Proof Assistants: Theory and Practice. Invited presentation at Uppsala University.
2019-01-19	Verifying Finality for Blockchain Systems. Presentation at the CoqPL Workshop.
2019-01-09	Regression proving with Dependent Types: Theory and Practice. Presentation at the Lean Together workshop.
2018-09-05	Guest lecturer, UT EE328V, Continuous Development and Build Systems.
2018-07-18	piCoq: Parallel Regression Proving for Large-Scale Verification Projects. Presentation at the International Symposium on Software Testing and Analysis (ISSTA).
2018-06-13	An Introduction to Verification of Software Systems. Invited presentation at Klarna AB.
2018-06-12	Regression Proving in Large-Scale Verification Projects: Theory and Practice. Invited presentation at KTH Royal Institute of Technology.
2018-05-31	A Regression Proof Selection Tool For Coq. Demonstration at the International Conference on Software Engineering (ICSE).
2018-02-07	Guest lecturer, UIUC CS477, Verification of Imperative Programs using Dafny.
2017-10-31	iCoq: Regression Proof Selection for Large-Scale Verification Projects. Presentation at International Conference on Automated Software Engineering (ASE).
2017-10-30	Guest lecturer, UIUC CS524, The π-Calculus.
2017-10-25	Guest lecturer, UIUC CS524, Concurrent Processes and Bisimulation.
2017-10-23	Guest lecturer, UIUC CS524, Proofs by Induction.
2017-03-14	Guest lecturer, UIUC CS598, Stochastic Computing.
2017-01-23	iCoq: Regression Proof Selection for Large-Scale Coq Projects. Invited presentation at University of Washington Proof Assistant User Group.
2016-09-29	Guest lecturer, UIUC CS173, Intro to Discrete Structures: Graph Colorings.
2016-08-25	Guest lecturer, UIUC CS173, Intro to Discrete Structures: Graph Problems.
2016-08-23	Guest lecturer, UIUC CS173, Intro to Discrete Structures: Course Overview.
2015-11-09	A Case Study on Executing Instrumented Code in Java PathFinder. Presentation at Java PathFinder workshop.
2015-10-30	Guest lecturer, UIUC CS477, Temporal Logic.
2015-10-27	Hybrid Inference of Semantics for Software Adaptation. Invited presentation at the Workshop on Software Engineering for Parallel Systems (SEPS).
2015-05-05	Guest lecturer, UIUC CS421, Logic Programming.
2015-05-01	Automatic Conversion of Shared-Memory Programs to the Message-Passing Model Using Dynamic Probabilistic Inference. Invited presentation at BBN Technologies.
2015-04-29	Network-Oblivious Programmers, Network-Aware Program Execution. Invited presentations at MIT.

Karl Palmskog
KTH Royal Institute of Technology
School of Electrical Engineering and Computer Science
Lindstedtsvägen 3, 100 44, Stockholm, Sweden
Email: palmskog@kth.se

Teaching Experience

Interactive Theorem Proving and Program Verification	KTH	DD3023	Course development and lectures.
Graduate student advising	UT		Co-advising of 2 junior PhD students.
Software Evolution	UT	EE328V	Guest lecturer.
Student supervision	UIUC		Co-supervision of 5 undergraduate students and junior PhD students.
Concurrent Programming Languages	UIUC	CS524	Guest lecturer. Development of exercises and exams.
Programming Languages for Next Generation Applications	UIUC	CS598	Guest lecturer.
Discrete Structures	UIUC	CS173	Guest lecturer.
Formal Software Development Methods	UIUC	CS477	Guest lecturer.
Logic for Computer Science	KTH	DD1350	Held recitation classes. Gave lab assistance to students. Corrected written assignments and exams. Developed course material.
Program System Construction Using C++	KTH	DD2387	Held recitation classes. Gave lab assistance to students. Corrected exams. Developed course material.
Software Engineering	KTH	DD2385	Held recitation classes. Gave lab assistance to students. Developed course material.
Network Security	KTH	DD2495	Guest lecturer. Gave lab assistance to students. Developed course material.
Advanced Algorithms	KTH	DD2440	Corrected written assignments. Conducted oral exams.
Algorithms, Data Structures and Complexity	KTH	DD1352	Gave lab assistance to students. Conducted oral exams.
Compiler Construction	KTH	DD2488	Conducted oral exams.
Numerical Methods	KTH	DN1240	Gave lab assistance to students.