

# Curriculum Vitae

Antti Valmari

December 14, 2017

## 1 Full name and date

**surname:** Valmari  
**given names:** Antti Arvi  
**gender:** male  
**date of writing the CV:** 2017-12-14



## 2 Date and place of birth, nationality, current residence

**date and place of birth:** 1961-10-16, Vaala  
**citizenship:** Finnish  
**current residence:** Tampere  
**work phone:** +358 40 849 0384 (TUT, will go down)  
**private phone:** +358 40 723 0256  
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## 3 Education and degrees awarded

**Doctor of Technology** Tampere University of Technology, software technology, 1988-12-29, supervisor: Prof. Reino Kurki-Suonio  
**Diplomi-insinööri** Helsinki University of Technology, computer technology, 1985-11-12 (the degree is roughly equivalent to *M.Sc.*) oivallisesti (= with distinction)  
**title of docent** computer science, University of Helsinki, June 1991  
**title of docent** computer science, University of Oulu, 1990 or 1991 or 1992

## 4 Other education and training, qualifications and skills

I have extensive experience on writing reliable efficient software that performs complicated tasks.

As a student, I designed and programmed the sports result information processing software that was used for the Conseil International du Sport Militaire (CISM) Ski Week 1982 that was held in Rovaniemi. Afterwards it was assessed as “ja ATK pelasi” (“and the information system worked well”).

Publication [94] Fast Brief Practical DFA Minimization contains, in addition to the theory, a compilable well-working C++ implementation, all in 5 pages. This paper is number six in “The ryg blog, Papers

I like”. The review ends: “The algorithm itself is rather pretty too, working by alternatingly refining a partition on the states and the transitions of the input DFA in a pleasantly symmetric way. The data structures are simple but clever. It’s taken an extra 41 years, but I think we can actually consider this problem truly solved now.”

Recently I have implemented highly non-trivial software for giving students feedback on their solutions of various kinds, please see “Merits in teaching and pedagogical competence”.

I have passed some project management and leadership courses.

## 5 Linguistic skills

**Finnish:** mother tongue

**English:** “laudatur” in matriculation examination, in heavy use since then

**Swedish:** “laudatur” in matriculation examination, not used since then

**Russian, 3 years:** “laudatur” in matriculation examination, not used since then

## 6 Current position

**next position:** Professor, University of Jyväskylä, 2018-01-01–

**current position:** Professor

- Professor (new position) July 1999–
- Associate professor (tenure) Febr. 1993–June 1999 (title changed to “Professor” Sept. 1998)
- Acting associate professor Jan. 1993
- Acting professor Aug.–Dec. 1992

**employer and place of work:** Tampere University of Technology

- Computing and Electrical Engineering Sept. 2017–
- Department of Mathematics Jan. 2013–Aug. 2017
- Department of Software Systems Aug. 1992–Dec. 2012

**research sabbatical:** Aug. 1998–July 1999 “Varttunut tutkija” (Academy of Finland)

## 7 Previous work experience

**Technical Research Centre of Finland (VTT)** development of verification theory and software

- Senior research scientist, April 1990–July 1992
- Research scientist, Dec. 1985–March 1990
- Research trainee, Feb. 1985–Nov. 1985

**Telecom Australia Research Laboratories** Dec. 1988–Oct. 1989 funded both by VTT and Telecom Australia, development of verification theory and software

short periods as a programmer, research assistant, and trainee with Agricultural Research Centre of Finland and Finnish Air Forces during 1979–1981.

### side positions

- Docent (professor-level part-time teacher) in Computer Science, University of Helsinki since June 1991
- Part-time teacher and then docent, University of Oulu, Jan. 1990–Nov. 1993
- Part-time senior research scientist, VTT, Jan. 1993–June 1995
- Free-lance programmer, Oy Canon Ab, Jan. 1981–Feb. 1984

## 8 Research funding as well as leadership and supervision

### Research funding

- Technology Development Centre of Finland (TEKES): SASOKE 2002–2005, RATE 1998–2001, AATOS 1992–1995 (joint with VTT), ARA 1990?–1992?, RIMST (1984)–1988 (joint with Hels. Univ. Tech.)
- Academy of Finland: Compositional Verification Algorithms 2002–2004, UVER 1999–2001 (joint with Åbo Akademi), “Varttunut tutkija” (= research sabbatical) Aug. 1998 – July 1999, Specification and Verification of Distributed Systems with Synchronous Actions 1998–2000 (joint with the DisCo group), REFORM 1995–1997 (joint with the DisCo group)
- Emil Aaltonen foundation 2003–2005
- Nokia Research Center 2000–2001
- Telecom Australia: research exchange 1988–1989
- some funding from industry 1985–1995, 1998; Tekes 1996–1997

### Supervised Doctoral theses

- Timo Kellomäki: *Large-Scale Water Simulation in Games*, Dr. Tech., Tampere University of Technology, 2015-12-04 (co-supervised with Timo Saari)
- Antti Kervinen: *Towards Practical Model-Based Testing*, Dr. Tech., Tampere University of Technology, 2008-12-05 (co-supervised with Mika Katara)
- Henri Hansen: *Alternatives to Büchi Automata*, Dr. Tech., Tampere University of Technology, 2007-10-05
- Jaco Geldenhuys: *Improvements in State Space Representation and Model Checking Algorithms*, Dr. Tech., Tampere University of Technology, 2006-04-05
- Antti Puhakka: *Weakest Congruences, Fairness and Compositional Process-Algebraic Verification*, Dr. Tech., Tampere University of Technology, 2004-05-27 (winner of the City of Tampere annual PhD thesis award)
- Konsta Karsisto: *A New Parallel Composition Operator for Verification Tools*, Dr. Tech., Tampere University of Technology, 2003-05-16
- Ilkka Kokkarinen: *A Verification-Oriented Theory of Data in Labelled Transition Systems*, Dr. Tech., Tampere University of Technology, 1998-06-29
- (second supervisor of Antti Siirtola: *Algorithmic multiparameterised verification of safety properties, Process algebraic approach* Dr. Phil., University of Oulu, 2010-10-08)
- (unofficial second supervisor of Sari Leppänen: *Rigorous Service-Oriented Development of Communicating Distributed Systems*, Dr. Tech., Tampere University of Technology, 2008-02-19)

### Supervised licentiate theses

- Ilkka Kokkarinen: *Symbolic Data in Labelled Transition Systems*, Lic. Tech., Tampere University of Technology, 1997
- Reijo Savola: *State Space Generation Tool for LOTOS Specifications*, Lic.Tech., Tampere University of Technology, 1995

## 9 Merits in teaching and pedagogical competence

I have taught various computer science topics, including data structures and algorithms, object-oriented programming, principles of programming languages, software mathematics, program verification, theoretical computer science, concurrency theory, Petri nets, and model checking. I have mostly implemented the courses myself. Sometimes, but not always, I have received very good student feedback, almost and even above 4 in the scale from 1 to 5.

Before my university career I taught many courses for INSKO, please see publications in Finnish. According to unofficial information I once received the best participant feedback of the year.

Please see “Positions of Trust in Tampere University of Technology” for my experience in curriculum planning and related topics.

Recently I have implemented highly non-trivial software for giving students feedback on their solutions of various kinds, please see <http://math.tut.fi/mathcheck/>. For an earlier version, please see publication [115]. In an experiment conducted by Terhi Kaarakka in autumn 2016 with first-year students, students were told to solve ten problems. 56 students were told to use the earlier version of MathCheck for help and 50 students were told to use Wolfram Alpha for help. Then they had an examination where the maximum number of points was 16. They also reported how long they had used the program. 19 students used Wolfram Alpha less than an hour and got 7.2 points on the average. 31 students used Wolfram Alpha at least an hour and got 8.2 points on the average. 26 students used MathCheck less than an hour and got 7.1 points on the average. 30 students used MathCheck at least an hour and got 9.7 points on the average.

I have some publications on teaching in English [67, 76, 77, 115] (including an invited talk in a minor event), and some mostly light publications on teaching and related topics in Finnish [11, 13, 14, 17, 21, 25, 26].

## 10 Awards, prizes and honours

### Computer-Aided Verification Award 2014

- together with Patrice Godefroid (Microsoft Research), Doron Peled (Bar Ilan University), and Pierre Wolper (Université de Liège)
- “For the development of partial-order reduction algorithms for efficient state-space exploration of concurrent systems.”
- <http://i-cav.org/cav-award>
- From the announcement during Vienna Summer of Logic 2014: “Partial-order reduction is one of the major contributions to the field of automated verification in the last two decades. Its development contributed in a crucial way to make model checking successful and practically applicable to concurrent systems.” <http://vsl2014.at/2014/07/2014-cav-award/>

### **Finnish Academy of Science and Letters**

- member since 2008
- vice chair of the Mathematics and Computer Science division 2014–2018

**Outstanding Paper Award** 33rd International Conference on Application and Theory of Petri Nets and Concurrency, June 27–29, 2012, Hamburg, Germany (with Henri Hansen)

**Outstanding Paper Award** 31st International Conference on Application and Theory of Petri Nets and Other Models of Concurrency, June 21–25, 2010, Braga, Portugal (with Henri Hansen)

**Best Paper Award** International Conference on Application of Concurrency to System Design, March 23–26, 1998, Aizu-Wakamatsu, Fukushima, Japan (with Ilkka Kokkarinen)

**Annual best computer science Ph.D. thesis in Finland award** 1989

**XXI International Mathematical Olympiad** [of high school students], London, UK, a third prize, 1979

**XX International Mathematical Olympiad** [of high school students], Bucharest, Romania, a third prize, 1978

## **11 Other academic merits**

### **Service as an opponent or committee member**

- Satu Eloranta: *Dynamic Aspects of Knowledge Bases*, Dr. Phil., University of Helsinki, Finland, June 27, 2013
- outside Finland, details withheld because I suggested rejection, 2008
- Dragan Bosnacki: *Enhancing State Space Reduction Techniques for Model Checking*, Dr. Phil., Technische Universiteit Eindhoven, the Netherlands, Nov. 7, 2001
- Timo Karvi: *Partially Defined Lotos Specifications and Their Refinement Relations*, Dr. Phil., University of Helsinki, Finland, Dec. 9, 2000
- PhD Thesis examiner of Ranko Lazic, *A Semantic Study of Data Independence with Applications to Model Checking*, University of Oxford, UK, Sept. 17, 1999
- Virpi Kasurinen: *Informal and Formal Requirements Specification*, Dr. Phil., University of Kuopio, Finland, April 10, 1999
- Patrice Godefroid: *Partial-Order Methods for the Verification of Concurrent Systems, An Approach to the State Explosion Problem*, PhD, Université de Liège, Belgium, Nov. 22, 1994 (later published as Lecture Notes in Computer Science 1032, Springer-Verlag 1996, 143 p.)
- Jaana Eloranta: *Minimal Transition Systems with Respect to Divergence-Preserving Behavioural Equivalences*, Dr. Phil., University of Helsinki, Finland, Jan. 29, 1994
- Linda Christoff: *Specification and Verification Methods for Probabilistic Processes*, PhD, University of Uppsala, Sweden, March 1, 1993

### **Service as a thesis pre-examiner or reviewer**

- Matti Luukkainen: *A Process Algebraic Reduction Strategy for Automata Theoretic Verification of Untimed and Timed Concurrent Systems*, Dr. Phil., University of Helsinki, 2003
- Karsten Schmidt: *Explicit State Space Verification*, habilitation thesis, Humboldt-Universität zu

Berlin, 2002

- Matti Luukkainen: *Timed Semantics of Concurrent Systems*, Lic. Phil., University of Helsinki, 2000
- Kimmo Varpaaniemi: *On the Stubborn Set Method in Reduced State Space Generation*, Dr. Tech., Helsinki University of Technology, 1998
- Roope Kaivola: *Equivalences, Preorders and Compositional Verification for Linear Time Temporal Logic and Concurrent Systems*, Ph.D., University of Helsinki, 1996
- Jari Arkko: *Conformance Test Generation from Non-deterministic Specifications*, Lic.Tech., Helsinki University of Technology, 1995

#### **Service as expert on filling a professor position**

- University of Vaasa (committee member) 2014
- University of Vaasa (committee member) 2012
- Details withheld because I have not got permission to reveal them, summer 2010
- University of Joensuu, May 2004
- Åbo Akademi, July 2000

#### **Service as expert on filling a lecturer position**

- Oxford, October 2006
- Oxford, Sussex, Bristol, Warwick, March–August 2000 (reference for an applicant who eventually got a position in Warwick)

#### **Service as expert on a title of docent**

- Åbo Akademi, December 2012
- Åbo Akademi, August 2011
- Helsinki University of Technology, September 2009
- Helsinki University of Technology, November 2005
- Helsinki University of Technology, June 2003
- Helsinki University of Technology, July 2000

#### **Research funding application reviews for**

- *Swiss National Science Foundation* 2016 and 2009
- *Israel Science Foundation* 2010 and 2017
- *L'Agence nationale de la recherche*, France 2008
- *Wiener Wissenschafts-, Forschungs- und Technologiefonds (WWTF)*, Austria, 2008
- *Rannsóknamiðstöð Íslands* 2007
- *National Science Foundation*, USA (long ago)
- *Academy of Finland* (twice, long ago)
- *Tekniikan Edistämmissäätiö* (7 times, long ago)
- member of selection committee for funding of postgraduate studies, *University of Tampere, School of Information Sciences* 2015

**Evaluator** of European Union Esprit LTR project 23498 VIRES, June 1999 and June 2000

**Finnish member** in European Union *Esprit III* Basic Research Action REACT (6021): “Building Correct Reactive Systems” project group 1992–1995

**Member of steering committee of**

- *Petri net* conferences and other activities since Nov. 2008
- *Application of Concurrency to System Design* conferences since (about) 2002
- *SPIN Workshop on Model Checking of Software* 2007–2008

**Member in Editorial Board** of the journal *Formal Methods in System Design* (Kluwer Academic Publishers) 1997–Sept. 2005

**Programme Committee chair of**

- *Petri Nets 2015, 36th International Conference on Application and Theory of Petri Nets and Concurrency* (Brussels, Belgium, with Raymond Devillers)
- *13th International SPIN Workshop on Model Checking of Software (SPIN 2006)* (Vienna, Austria)
- *International Conference on Application of Concurrency to System Design 2001* (Newcastle Upon Tyne, UK, with Alex Yakovlev)

**Member of programme committee of**

- *25th SPIN Workshop on Model Checking of Software (SPIN 2018)* Malaga, Spain
- *18th International Conference on Application of Concurrency to System Design (ACSD 2018)* Bratislava, Slovakia
- *29th Nordic Workshop on Programming Theory (NWPT' 17)* Turku, Finland
- *17th International Conference on Application of Concurrency to System Design (ACSD 2017)* Zaragoza, Spain
- *28th Nordic Workshop on Programming Theory (NWPT' 16)* Rold Storkro, Denmark
- *16th ACSD 2016* Toruń, Poland
- *23th SPIN Workshop on Model Checking of Software (SPIN 2016)* Eindhoven, The Netherlands
- *37th International Conference on Application and Theory of Petri Nets and Concurrency (Petri Nets 2016)* Toruń, Poland
- *14th Symposium on Programming Languages and Software Tools (SPLST' 15)* Tampere, Finland
- *15th ACSD 2015* Brussels, Belgium
- *14th ACSD 2014* Tunis, Tunisia
- *35th Petri Nets 2014* Tunis, Tunisia
- *13th ACSD 2013* Barcelona, Spain
- *34th Petri Nets 2013* Milano, Italy
- *12th ACSD 2012* Hamburg, Germany
- *33rd Petri Nets 2012* Hamburg, Germany
- *11th ACSD 2011* Newcastle upon Tyne, UK (relocated from Kanazawa, Japan due to Tōhoku earthquake and tsunami)
- *32nd Petri Nets 2011* Newcastle upon Tyne, UK (relocated from Kanazawa, Japan)
- *International Joint Conference Security and Intelligent Information Systems (S&IIS'2011)* Warsaw, Poland
- *10th ACSD 2010* Braga, Portugal
- *31st Petri Nets 2010* Braga, Portugal
- *Intelligent Information Systems 2010 (IIS'2010)* Siedlce, Poland
- *9th ACSD 2009* Augsburg, Germany
- *30th Petri Nets 2009* Paris, France

- *2nd Workshop on Teaching Concurrency* (TeaConc 2007) Siedlce, Poland
- *14th SPIN* 2007 Berlin, Germany
- *1st TeaConc* 2006 Turku, Finland
- *5th ACSD* 2005 St Malo, France
- *Fifteenth International Conference on Concurrency Theory* (CONCUR 2004) London, UK
- *11th SPIN* 2004 Barcelona, Spain
- *Tenth International Conference on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS 2004) Barcelona, Spain
- *3rd International Workshop on Formal Approaches to Testing of Software* (FATES 2003) Montreal, Canada
- *Eighth International Workshop on Formal Methods for Industrial Critical Systems* (FMICS 2003) Trondheim, Norway
- *3rd ACSD* 2003 Guimarães, Portugal
- *2nd FATES* 2002 Brno, Czech Republic
- *7th FMICS* 2002 Málaga, Spain
- *1st FATES* 2001 Aalborg, Denmark
- *22nd Petri Nets* 2001 Newcastle upon Tyne, UK
- *21st Petri Nets* 2000 Aarhus, Denmark
- *11th Computer Aided Verification* (CAV 1999) Trento, Italy
- *1st ACSD* 1998 Fukushima, Japan
- *9th CAV* 1997 Haifa, Israel
- *Structures in Concurrency Theory* (STRICT 1995) Berlin, Germany
- *13th Protocol Specification, Testing and Verification* (PSTV 1993) Liège, Belgium
- *4th Formal Description Techniques for Distributed Systems and Communications Protocols* (FORTE 1991) Sydney, Australia
- *12th Petri Nets* 1991 Aarhus, Denmark
- *3rd Euromicro Real-Time Systems* (ECRTS 1991) Paris-Orsay, France
- *11th Petri Nets* 1990 Paris, France

**A total of 53 paper reviews for journals**

- *ACM Transactions on Programming Languages and Systems* (2)
- *Acta Informatica* (1)
- *Algorithmica* (1)
- *Distributed Computing* (2)
- *Formal Aspects of Computing* (1)
- *Formal Methods in System Design* (4)
- *Frontiers of Computer Science (in China)* (1)
- *Fundamenta Informaticae* (3)
- *IEEE Transactions on Parallel and Distributed Systems* (3)
- *IEEE Transactions on Computers* (1)
- *IEEE Transactions on Software Engineering* (8)
- *Information and Computation* (1)
- *Information Processing Letters* (1)
- *Journal of Computer and System Sciences* (1)



- *Journal of Systems and Software* (1)
- *Journal of Universal Computer Science* (1)
- *Microprocessors and Microsystems* (1)
- *Nordic Journal of Computing* (3)
- *Science of Computer Programming* (1)
- *Software and Systems Modeling* (1)
- *Software Testing, Verification and Reliability* (1)
- *Software Tools for Technology Transfer* (4)
- *The Computer Journal* (2)
- *Theoretical Computer Science* (8)

#### **Paper reviews for 34 conferences and 4 books**

**Review for** Zentralblatt MATH 2012, 2013, 2014 and AMS Mathematical Reviews 2013, 2014

#### **Positions of Trust in Tampere University of Technology**

- Member of the Academic Board of Tampere University of Technology 2014–2017
- Member of the Education Council of Tampere University of Technology 2011–2016 (deputy chair 2011–2013)
- Deputy member of the board of the Faculty of Natural Sciences 2017
- Vice dean of the Faculty of Natural Sciences 2014–2016
- Deputy member of the board of the Faculty of Natural Sciences 2013
- Head of the undergraduate degree programmes in the Faculty of Natural Sciences 2013–2016
- Head of the Degree Programme in Information Technology 2008–2012
- Member of the board of the Library 2002–2007, deputy chair 2005–2007
- Chairman of the board of Researcher School in Software Systems and Telecommunication Protocols, Oct. 1998–2003
- Deputy member of the board of the Faculty of Computing and Electrical Engineering 2008–2012
- Member of the board of the Department of Information Technology 1996–1998
- Deputy member of the board of the Department of Information Technology Aug. 1993–Dec. 1995
- Member of the committee that produced the information technology strategy of Tampere University of Technology for the years 2002–2004, and one of its sub-committees
- Member in a committee (chair: vice principal Markku Mattila) that re-wrote the postgraduate students' guide of Tampere University of Technology, 1996-10-4–1997-09-30

#### **Other Positions of Trust in Finland**

- The Finnish Society for Computer Science (Tietojenkäsittelytieteen Seura ry): chair 2001–2003; vice chair 2000; member of the board 1998–1999; editor-in-chief of its journal Tietojenkäsittelytiede 2002–2008; editor 2009–2015
- Chairman, organising committee of Tietojenkäsittelytieteen päivät, May 20–21, 1999, annual symposium of The Finnish Society for Computer Science
- Member of the board of Tampere Graduate School in Information Science and Engineering (TISE), Jan. 1996–2007

#### **Published invited lectures and papers**

- list of publications numbers **117**, 109, 79, 76, **75**, **54**, 42, **39**, 31

- [97] is based on 180 min of lectures at *5th Advanced Course on Petri Nets*, Rostock, Germany, Sept. 2010.
- [55] is based on *Modeling and Verification of Parallel Processes, 4th Summer School*, Nantes, France, June 2000.
- [46] is based on 4 lectures at *3rd Advanced Course on Petri Nets*, Schloss Dagstuhl, Germany, Oct. 1996]

#### **Other important invited lectures**

- *Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science (MEMICS) 2010*, Mikulov, Czechia, one of 4 invited speakers
- *UK Model Checking Days 2005* York, UK, keynote address
- *16th Petri Nets 1998* Lisbon, Portugal, invited tutorial
- A 5-lecture mini-course in Århus, Denmark, October 1997
- 1 out of 13 lectures in a workshop held in honour of the Turing Award winner Amir Pnueli, when he received Honorary Doctorate from Uppsala University, May 1997
- 1 out of 23 invited lectures in *Oxford Workshop on Automated Formal Methods 1996*
- *15th Petri Nets* Zaragoza, Spain, 1994, invited tutorial
- about 20 other non-published lectures in international context

#### **Host to meetings and visiting ( $\geq 1$ week) researchers**

- Wojciech Penczek, Warsaw, Poland, Oct. 10–18, 2001 (our funding)
- Ranko Lazic, Oxford, UK, March 20–29, 2000 (joint funding)
- Lars M. Kristensen, Århus, Denmark, Jan.–May 1997 (Danish funding)
- Doron Peled, Lucent Bell Labs, USA, Nov. 22 – Dec. 3, 1996 (our funding)
- Jens B. Jørgensen, Århus, Denmark, January 1995 (Danish funding)
- general meeting of the ESPRIT III BRA project REACT, Tampere, Finland, Febr. 22.–24., 1995

## **12 Scientific and societal impact of research**

#### **Total number of publications**

- in English: 122
- in Finnish: 34

#### **Ten most cited, Microsoft Academic Research 2017-02-11**

- [25] A stubborn attack on state explosion 761
- [15] Stubborn sets for reduced state space generation 608
- [46] The state explosion problem 575
- [28] On-the-Fly Verification with Stubborn Sets 156
- [11] Stubborn sets for reduced state generation 124
- [17] A Stubborn Attack On State Explosion 121
- [26] Compositional State Space Generation 118
- [4] Error detection by reduced reachability graph generation 107
- [42] Stubborn set methods for process algebras 96
- [34] Compositional failure-based semantic models for basic LOTOS 94

### Ten that I appreciate most

- [17] A Stubborn Attack On State Explosion  
(an influential early stubborn set publication, contributed towards the CAV Award)
- [94] Fast brief practical DFA minimization  
(after 40 years, makes a significant improvement to a classical problem)
- [99] All Linear-Time Congruences for Familiar Operators  
(proves that there only are so many “reasonable” linear-time semantic models)
- [33] Failure-based Equivalences Are Faster Than Many Believe  
(sorted out a misconception on the cost of automatic verification)
- [37] Visual Verification of Safety and Liveness  
(helped me and may help others to understand linear-time concurrency, fairness, etc.)
- [54] A Chaos-Free Failures Divergences Semantics with Applications to Verification  
(in a very prestigious event, summarizes the CFFD semantics)
- [75] What the small Rubik’s cube taught me about data structures, information theory, and randomisation (puts versatile theory into practice in an interesting way, invited talk in a leading conference)
- [48] Unbounded Verification Results by Finite-State Compositional Techniques:  $10^{\text{any}}$  States and Beyond (contributes to demonstrating the power of compositionality, contains original tricks)
- [61] Alphabet-Based Synchronisation is Exponentially Cheaper  
( $L_1 \parallel \dots \parallel L_n \leq \text{Spec}$  is **PSPACE**-complete;  $\parallel_A, \text{CCS}$  |, and so on make it **EXPSPACE**-complete)
- [89] Can Stubborn Sets Be Optimal?  
(A model-theoretic proof that with the usual stubborn set interface, we cannot do better)

## 13 Positions of trust in society and other societal merits

Some 80 % of the population belongs to the Evangelical Lutheran Church of Finland. I was a candidate in its elections in 1994, 1998, 2002, 2006, and 2010. I was elected in 1998–2010 on parish and/or Tampere level, and was in various duties. Among other things, for 2005–2010 (6 years) I was the chair of the non-political coalition in the church council of the Evangelical Lutheran Church of Tampere.