Curriculum Vitae

1 Personal Data

Name:	Akshay SUNDARARAMAN
Address:	IRISA, Campus de Beaulieu, Rennes 35000, France.
E-mail:	akshay@irisa.fr
Date of Birth:	August 14^{th} 1984
Place of Birth:	Pondicherry, India
Nationality:	Indian
Current Position	Post-Doctoral Fellow in the Distribcom Team at IRISA, ENS Cachan Bretagne, Rennes, France since Nov 2011.

2 Academic qualifications and experience

Work experience:	(2012)	On-going post-doctoral fellowship at IRISA(Institut de recherche en informatique et systèmes aléatoires), ENS Cachan Bretagne, Rennes, France.
	(2011)	One year post-doctoral fellowship at the National University of Singapore (NUS), Singapore with Prof. P. S. Thiagarajan of NUS.
Doctorate: (2010)	Institute:	Ecole Normale Superieure de Cachan (ENS-Cachan)
	PhD title:	*Specification and Verification for Distributed and Timed Systems*
	Advisors:	Prof. Paul Gastin of ENS-Cachan, France and Prof. Madhavan Mukund of Chennai Mathematical Institute (CMI), Chennai, India.
Masters:	First year:	Institute of Mathematical Sciences, Chennai (2005)
	Second year:	ENS-Cachan, France (2006)
Undergraduate:		Chennai Mathematical Institute (2004)

3 List of Publications

3.1 Refereed Proceedings

- Robustness of time Petri nets under architectural constraints.
  S. Akshay, L. Héloüet, C. Jard, D. Lime, O. H. Roux. *Appeared in the proceedings of the 10th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2012), September 18-20, 2012, London, United Kingdom. Springer LNCS 7595, pp. 11-26.*

- Robustness of time Petri nets under guard enlargement.
  S. Akshay, L. Héloüet, C. Jard, P.-A. Reynier. *Appeared in the proceedings of the 6th International Workshop on Reachability Problems (RP 2012), September 17-19, 2012, Bordeaux, France. Springer LNCS 7550, pp. 92-106.*

- Symbolically bounding the drift in time-constrained MSC graphs.
  S. Akshay, B. Genest, L. Héloüet, S. Yang. *Appeared in the proceedings of the 9th International Colloquium on Theoretical Aspects of Computing (ICTAC 2012), September 23-27, 2012, Bangalore, India. Springer LNCS 7521, pp. 1-15.*

- Approximate verification of the symbolic dynamics of Markov chains.
  M. Agrawal, S. Akshay, B. Genest, P. S. Thiagarajan. *Appeared in the proceedings of the 27th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2012) June 25-28, 2012, Dubrovnik, Croatia. IEEE Computer Society Press, pp. 55-64. ISBN 978-0-7695-4769-5.*

- A hybrid factored frontier algorithm for dynamic Bayesian network models of biopathways. S. K. Palaniappan, S. Akshay, B. Genest, P. S. Thiagarajan. *Appeared in the proceedings of the 9th International Conference on Computational Methods in Systems Biology (CMSB 2011), Paris, France. ACM 2011, pp.35-44. ISBN 978-1-4503-0817-5.*

- Model checking time-constrained scenario-based specifications.
  S. Akshay, P. Gastin, M. Mukund and K. Narayan Kumar. *Appeared in the proceedings of the 30th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2010), December, 2010, Chennai, India. Leibniz International Proceedings in Informatics, LiPIcs, Dagstuhl, vol. 8, pp. 204-215.*

- Distributed timed automata with independently evolving clocks.
  S. Akshay, B. Bollig, P. Gastin, M. Mukund, and K. Narayan Kumar. *Appeared in the proceedings of the 19th International Conference on Concurrency Theory (CONCUR 2008) August, 2008, Toronto, Canada. Springer LNCS 5201, pp. 82-97.*

- Automata and logics for timed message sequence charts.
  S. Akshay, B. Bollig, P. Gastin. *Appeared in the proceedings of the 27th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2007) December, 2007, New Delhi, India. Springer LNCS 4855, pp. 290-302.*

- Checking coverage for infinite collections of timed scenarios.
  S. Akshay, M. Mukund, K. Narayan Kumar. *Appeared in the proceedings of the 18th International Conference on Concurrency Theory (CONCUR 2007), September, 2007, Lisbon, Portugal. Springer LNCS 4703, pp. 181-196.*

3.2 Journal Articles

- A hybrid factored frontier algorithm for dynamic Bayesian networks with a biopathway application. S. K. Palaniappan, S. Akshay, B. Liu, B. Genest, P. S. Thiagarajan. *Appeared in IEEE/ACM Transactions on Computational Biology and Bioinformatics. IEEE Computer Society Press, Volume 9, Number 5, Sept-Oct 2012, Pages 1352-1365.*

- Regular sets of representatives for time-constrained MSC graphs.
  S. Akshay, B. Genest, L. Helouet. S. Yang. *Appeared in Information Processing Letters, Elsevier, Volume 112, Issues 14-15, 15 August 2012, Pages 592-598.*

- **(Under submission)** Event-clock message passing automata: A logical characterization and an emptiness checking algorithm. S. Akshay, B. Bollig, P. Gastin.

- **(Under submission)** Distributed timed automata with independently evolving clocks. S. Akshay, B. Bollig, P. Gastin, M. Mukund, K. Narayan Kumar.

4 Research and Academic Background

- **Ongoing post-doctoral fellowship at IRISA, ENS Cachan Bretagne.**

  Working on the ANR IMPRO project on imprecision and robustness in timed systems. We focus on examining different notions of robustness for timed and distributed systems. We consider the model of time Petri nets (TPNs) and look at two notions of robustness. The first is preserving behaviors of a given TPN under the constraints imposed by an external architecture. The second is robustness in TPNs with respect to guard enlargements, i.e., preserving properties of TPNs in the presence of infinitesimally small enlargements in the constraints guarding the transitions in a TPN.

- **Post-doctoral fellowship at National University of Singapore (2010 - 11)**

  Worked with Prof P. S. Thiagarajan of the National University of Singapore (NUS) and Dr. Blaise Genest of IPAL/CNRS (Image & Pervasive Access Lab/Centre National de la Recherche Scientifique, France) on developing efficient computational methods for addressing questions on Large Biological Signalling Pathway Systems modeled as Dynamic Bayesian Networks (DBNs). As DBNs are compact representations of Markov chains, these approximate methods can be used to develop new techniques for probabilistic verification of very large Markov chains. This also led us to consider a symbolic dynamics for Markov chains which allows to model imprecisions in data. We considered the problem of model checking here and developed approximate verification techniques.

- **Doctorate from Ecole Normale Superieure de Cachan, France (ENS-Cachan) (2006 - 10)**

  Obtained the degree of doctorate in computer science from ENS-Cachan on 02 July 2010 for the PhD thesis titled *Specification and Verification of Distributed and Timed Systems* with distinction. (The classification of "distinction" is the highest awarded by ENS-Cachan.) My PhD was co-advised by Prof. Paul Gastin of LSV, ENS-Cachan and Prof. Madhavan Mukund of CMI. As a result, I made several academic visits to CMI during my doctoral studies.

  In my thesis, I looked at notions of global and local time in distributed automata. In the global time setting, we considered message sequence charts with timing as behaviours and proved a variety of equivalence and model checking results for appropriate specifications and implementations. In the local time setting, we introduced a new model of distributed timed automata with independently evolving clocks and addressed the question of model checking them against regular specifications.

- **Masters in Theoretical Computer Science (2004 - 06)**

  - Joined the **Institute of Mathematical Sciences (IMSc), Chennai, India** on a junior research fellowship in theoretical computer science and successfully completed my first year of Masters. (Sept '04 - Aug '05)
  - Went on a one-year scholarship to continue my second year of Masters at **Ecole Normale Supérieure de Cachan (ENS-Cachan), France**. As part of this, joined the Master Parisien de Recherche en Informatique (MPRI) program in September 2005 and completed my course requirements in Feb 2005. Obtained a cumulative grade of 16.5/20 and 15th rank among the 66 students enrolled.

    Completed Masters project at Laboratoire Specification et Verification (LSV), ENS-Cachan under the guidance of Prof. Paul Gastin and Dr. Benedikt Bollig on *Timed Communicating Systems* and obtained Masters degree with the citation *tres bien* (Very Good).

- **Undergraduate Studies at CMI (2001 - 04)**

  Obtained my Bachelor of Science (Honors) degree in Mathematics from the Chennai Mathetical Institute (CMI), Chennai, India with a cumulative grade point average of 8.19/10 (8.89/10 in computer science courses).

- **Higher Secondary Examinations (Baccalaureate) (Completed in 2001)**

  Studied at Kendriya Vidyalaya, No.1, Pondicherry, India and obtained an overall average of 94.8% in the Higher Secondary Exams conducted by the Central Board for Secondary Education in India (CBSE).

5 Other Academic Activities

- Served a reviewer in 2012 for several conferences in theoretical computer science including **CAV'12, FSTTCS'12, CONCUR'12, MFCS'12, QEST'12 and FM'12**. In the previous years have served as a reviewer for conferences and journals including **Algorithmica and FSTTCS**.

- Presented a paper on *Approximate verification of the symbolic dynamics of Markov chains* at the conference **LICS**, at Dubrovnik, Croatia in June, 2012.

- **Academic visit** to University of Saarland, Saarbrucken in June 2012 for research collaboration with Prof. Holger Hermanns and Prof. Verena Wolf. Also gave a presentation on *Approximate verification of symbolic dynamics of Markov chains with a view towards biopathway applications.*

- Gave a talk on *Studying robustness of time Petri nets under a control architecture* at the annual plenary meeting of Project ImPro at IRCCyN, Nantes in March 2012.

- **Academic visit** in February 2012 to Laboratoire d'Informatique Fondamentale (LIF) at Marseilles, France for research collaboration with Dr. P.-A. Reynier. Also gave a seminar *On the emptiness problem for time-constrained message sequence graphs.*

- **Academic visit** to University of Saarland, Saarbrucken in September 2011 where I gave two talks on *Distributed timed automata with independently evolving clocks* and *Approximate inferencing in DBN models of biopathways.*

- **Academic visit** for a week to IIT Bombay in August 2011, where I gave two seminars on *Model checking time-constrained scenario-based specifications* and *Approximate inference methods for DBN models of biopathways.*

- **Academic visit** to the Institute of Science and Technology at Austria (IST, Austria) in June 2011 for research collaboration, where I also gave a talk on *Approximate inference methods for DBN models of biopathways.*

- Gave a talk at the **Automata, Concurrency and Timed Systems-III Workshop (ACTS)** in Chennai Mathematical Institute in January 2011 on *Approximate methods for probabilistic inference in dynamic Bayesian networks.*

- Presented a paper on *Model checking time-constrained scenario-based specifications* at the **FSTTCS** conference at Chennai, India in December 2010.

- Gave a presentation at the **Cross-Knowledge Seminar Series at IPAL** (Image and Pervasive Access Lab) in November 2010 on *Approximate methods for DBN models of bio-pathway systems.* IPAL is a French-Singaporean International joint research laboratory based in Singapore.

- Presented a paper on *Automata and logics for timed message sequence charts* at the **FSTTCS** conference at New Delhi, India in December 2007.
- Presented a paper on *Checking coverage for infinite collections of timed scenarios* at the **CONCUR** conference at Lisbon, Portugal in September 2007.
- In the summer of 2004, worked on Cell-probe complexity and related data structure problems with Prof. Venkatesh Raman of IMSc. Also did a reading course on communication complexity and worked on approximation algorithms with Prof. Meena Mahajan of IMSc in the summer of 2005.
- In the summer of 2003, I was one of nine students selected for the Visiting Students Research Programme (VSRP) in Computer Science at the Tata Institute of Fundamental Research (TIFR), Bombay. Under the guidance of Prof. Jaikumar Radhakrishnan of TIFR, I focused on studying the space complexity of undirected graph connectivity.
- In the summer of 2002, I did a reading course with Prof. Ramanujam of Institute of Mathematical Sciences (IMSc) on Mathematical ideas in Biology.

6 References

Available upon request.