Dr. Frank Stephan
Departments of Computer Science and Mathematics
National University of Singapore
3 Science Drive 2
Singapore 117543

November 20th, 2004

Search
Department of Mathematics
University of Illinois at Urbana-Champaign
1409 West Green Street
Urbana IL 61801, USA

Dear Madam, Dear Sir,

Enclosed I want to apply for the tenure track position 0AA#9411 in the Department of Mathematics of the University of Illinois at Urbana-Champaign, commencing on August 16, 2005. Prof. Steffen Lempp pointed out to me that the University of Illinois at Urbana-Champaign might consider after the retirement of Prof. Carl Jockusch to hire a recursion-theorist again, provided that he has some links to computer science.

Below you find the overview of my professional qualifications. My current position is that of a visiting senior fellow. It is for two years and can be extended to a permanent position afterwards. It is a joint employment by the Departments of Mathemaitcs and Computer Science. Currently I am teaching set theory, the upcoming semester I will teach recursion theory and a general education module which gives an introduction to computing.

I had been visiting Prof. Carl Jockusch at the University of Illinois at Urbana-Champaign from February 4th through February 15th, 2002, and presented the talk "On the Structures Inside Truth-Table Degrees" in the logic seminar. I enjoyed staying in Urbana and would look forward to work there in the case that you accept my application.

Enclosed you receive an overwiew on my professional qualifications and my certificates. I have asked my colleagues Klaus Ambos-Spies, Steffen Lempp, Sanjay Jain, Eric Martin and Thomas Zeugmann to send you a letter of reference on my behalf; the letters go directly to your address.

Yours sincerely,

(Frank Stephan)

Professional Qualifications Dr. Frank Stephan

Address

Dr. Frank Stephan
Departments of Computer Science and Mathematics
National University of Singapore
3 Science Drive 2
Singapore 117543
Republic of Singapore

Telephone: +65/6874-7354, Facsimile: +65/6779-4580
Email: fstephan@comp.nus.edu.sg

105 Clementi Road, Block B, #04-04
Kent Vale, Singapore 129789, Republic of Singapore
Telephone: +65/6778-9044

Education and Employment History

7.4.1964 Born in Bonn, Germany.
Parents: Hans-Ulrich Stephan and Christiane Stephan.
Three Brothers: Klaus Stephan (1961), Ralf Stephan (1966), Dietmar Stephan (1973).

August 1970 – July 1974 Elementary School (Grade 1 – 4) in Wuppertal.

August 1974 – July 1983 Secondary School (Grade 5 – 13) in Wuppertal; average mark 1.3 (out of 1.0, very good – 4.0, satisfactory) in final exams ("allgemeine Hochschulreife").

October 1983 – July 1985 Undergraduate studies in computer science at the University of Karlsruhe; intermediate exam (Diplom-Vorprüfung) at the end of this period.

August 1985 – November 1986 Zivildienst (alternative service in place of obligatory military service).

October 1986 – July 1989 Graduate studies in computer science at the University of Karlsruhe; final exam (Diplom-Prüfung): mark "sehr gut" (very good).

August 1989 – June 1990 Doctor in natural sciences at the Department of Mathematics of the University of Karlsruhe; thesis title: "X-Spaces as a Generalization of Topological Spaces" [C1] mark "sehr gut" (very good).

April 1990 – September 1995 Scientific employee at the University of Karlsruhe at the Institute for Operating and Dialogue Systems and the Institute

of Logic, Complexity and Deductive Systems. From January 1992 until September 1995 funded by the DFG project "Query Complexity in Recursion Theory".

October 1995 – March 2000 Scientific employee at the University of Heidelberg at the Mathematical Institute. From October 1995 to March 2000 funded by the DFG Project "Recursion Theoretic Problems in Inductive Inference."

Since September 1996 Regular annual visitor of the University of New South Wales, School of Computer Science and Engineering.

February 1999 Habilitation degree in mathematics at the University of Heidelberg. This degree permits to work as a professor in German universities. The title of submitted thesis is "Degrees of Computing and Learning" [C2] and the title of the exam talk is "DNA-Computing."

April 2000 – July 2003 Privatdozent (= senior lecturer) at the University of Heidelberg. From May 2000 until April 2003 supported by a Heisenberg grant of the DFG.

September 2001 – February 2002 Research visit to several American universities supported by the DFG through above mentioned Heisenberg grant.

August 2003 – June 2004 Senior Researcher (Level C) at the National ICT Australia Ltd, Sydney Research Laboratory at Kensington.

Since July 2004 Visiting Senior Fellow at the National University of Singapore; Departments of Computer Science and Mathematics.

Research Statement

Stephan's research areas are at the borderline of pure mathematics and theoretical computer science. Stephan works on

- Learning Theory, in particular Inductive Inference,
- Recursion Theory,
- Complexity Theory,
- Formal Languages,
- Topology.

Stephan's PhD thesis was in pure mathematics and offered a generalization of the notion of topological space [C1]. Taking a position at the Department of Computer Science, Stephan started working in mathematical logic and theoretical computer science, but some of his work [A36, B48, B51] deal with the connections between recursion and learning theory on the one hand and topology on

the other hand.

A major topic of Stephan's research is *inductive inference* which aims to understand learning in a recursion theoretic framework. The general model is that a recursive learner reads a sequence of data and has to identify the source of this data which is either a recursive function or an r.e. set from some infinite class of these objects. The learner can use any knowledge of the class available, although this knowledge might be incomplete for classes which do not have a uniformly recursive representation. The main questions are: which classes are learnable, how good is the quality of the learning process and of the final hypothesis, how can one construct a learner from some parameters in the case of parameterized learning tasks.

Stephan investigated the power of relativized learners [A4, A10]. He worked on the complexity of the learning process measured in terms of long-term memory usage and quantity of mind changes [A9, A42, A41, B51]. Baliga, Case, Merkle and Stephan [B34] solved an open problem from 1986 in inductive inference by showing that there is a class of recursively enumerable sets which can be Ex-learned from positive data, but which does not have a decisive Ex-learner — where a learner is decisive iff it never returns to a once abandoned hypothesis.

Stephan also opened new directions within this field. He created a popular new model to incorporate noise into inductive inference [A12]. The novel idea of this model compared to others in inductive inference is that the data-presentation contains correct data infinitely often and incorrect only finitely often, thus every data-presentation still uniquely determines the object to be learned. Together with Ventsov [A28] and Harizanov [B47] he started ongoing research on the learnability of concrete mathematical structures like the class of ideals in a given ring or r.e. subspaces of a given vector space.

The basic idea behind the concept of *robust learning* is that for natural classes learnability is invariant with respect to the application of recursive operators. Stephan's major contributions to joint work with Case, Jain and Wiehagen [B37] are the following: there is a robustly Ex-learnable class which is not uniformly robustly BC-learnable; every uniformly robust Ex-learnable class has a further Ex-learner which satisfies the original notion of consistency introduced by Bārzdins 1974.

Mathematical truth is discovered by a combination of deduction from axioms and induction from related results found in the literature. More strikingly is the necessity of observed data from experiments and other sources in natural sciences like astronomy, chemistry and physics. A major joint project of Martin, Sharma and Stephan is aimed to create *a unified theory for deduction and induction*, called *parametric logic* [B41, B48, B51]. Based on this theory, Martin supervised several students to implement the extension RichProlog of Prolog which combines the purely deductive approach of Prolog with the inductive approach of learning theory. Martin successfully applied for an Australian Research Council grant to hire a specialist in a specialist in the design and implementation of logic programming systems to improve the current RichProlog implementation. The common work of Martin, Nguyen, Sharma and Stephan on RichProlog and its

foundations was presented at ALT 2002 [B43], Nguyen received the University Medal (of UNSW) for his thesis on RichProlog.

Menzel and Stephan [C4] investigated the relation between inductive and statistical learning models. In particular they characterized those classes of functions for which there is a learner on the one hand identifying the functions in the class and on the other hand outputting with high probability only approximable correct intermediate hypotheses. Permitting that the number of examples before each hypothesis depends on the distribution, one could even obtain that the learner approximates every function. A recent project of Case, Jain, Reischuk, Stephan and Zeugmann [B52] is the construction of a polynomial time learning algorithm for the class of c-regular patterns.

Stephan solved several long standing open problems in *recursion theory*. He showed that there is a non-high cohesive set [A2]. Furthermore, Stephan [A26] studied the structures inside non-recursive truth-table degrees. He showed that these degrees consist of infinitely many bounded truth-table degrees; the previous lower bound was 2 and given by Dëgtev in 1978. Since there are infinite chains and antichains of such degrees, the result gives an affirmative answer to Jockusch's question from 1969, whether every truth-table degree contains an infinite antichain of many-one degrees. Jockusch showed in 1969 that every non-recursive truth-table degree contains at least 3 positive degrees. Stephan constructed some truth-table degrees where this bound is indeed optimal; other truth-table degrees consist of 19 or 219 positive degrees. It is still open whether for every odd natural number $n \geq 3$ there is a truth-table degree consisting of n positive degrees. Stephan showed that every non-recursive truth-table degree consists of infinitely many btt-degrees but some non-recursive truth-table degrees consist of 3 positive degrees [A26]. Stephan also worked with Jockusch's student Ho on the question, which natural classes of r.e. many-one degrees have a non-trivial upper bound and if so, what properties this bound can have [A32].

A current active research topic is *algorithmic randomness*. Stephan recently showed that every Martin-Löf random set is either Turing hard for the halting problem or does not compute any complete extension of Peano Arithmetic [B72]. Furthermore, he joined ongoing research on the enumeration complexity of the Kolmogorov function and contributed among other things the main result which says that for any constant k any k-enumerator of the Kolmogorov function is computationally as hard as the halting problem [A48]. Stephan supervised the diploma thesis of Piotr Grabowski on this research topic.

Based on Ebert's surprising result that the random sets are infinitely often autoreducible, Beigel, Fortnow and Stephan investigated the version of this notion for *complexity theory*. They showed that some exponential time computable sets are not infinitely often autoreducible and that one can separate the major variants of autoreducibility notions by exponential time computable sets. Schaefer and Stephan [B49] studied the question, how notions of exponential time immunity and hardness for several polynomial time reducibilities can be combined.

Khoussainov, Rubin and Stephan [B50, B54] obtained some fundamental results in the recent field of *automatic structures* where not only the domain but

also all relations and graphs of operations must be regular, that is, recognizable by a finite automaton with respect to a default encoding. The motivation of this research is that – unlike in many other fields of complexity theory – the recursive and resource-bounded models of mathematical structures are often very similar. One can get the complexity-theoretic versions from the recursive ones just by padding. Thus only the severe restrictions of finite automata for modelling mathematical structures give a real difference compared to the recursion theoretic approach. Khoussainov received a Marsden grant in New Zealand in order to extend the collaboration on this subject.

Conference Presentations

Since 1993, Stephan is regularly visiting the leading learning-theory conferences ALT (on Algorithmic Learning Theory), COLT (on Computational Learning Theory) and EuroCOLT (European version of COLT funded for several years by the European Union). On these conferences, Stephan presented the papers [B2, B5, B6, B9, B10, B12, B15, B19, B27, B28, B30, B32, B33, B34, B37, B38, B39, B46, B52].

Stephan presented further accepted talks at the refereed conferences Structure in Complexity Theory [B4], Mathematical Foundations of Computer Science [B11], the International Colloquium on Automata, Languages and Programming [B34] and the Symposium on Theoretical Aspects of Computer Science [B49].

Stephan gave an invited plenary talk at the conference Computability and Models 2002 in Almaty. Stephan gave invited scientific talks at the Recursion Theory Weeks in Oberwolfach 1996 and 2001, Conferences in Theoretical Computer Science in Dagstuhl 2002 and 2003, the Joint AMS-DMV Recursion Theory Conference 1993 and the conference VIC 2004 at the Victoria University of Wellington. Stephan is invited to give a plenary talk on the Logic Colloquium 2004 in Torino.

Program Committees and Refereeing

Stephan was member of the program committees of the conferences

1. EuroCOLT 1997, 2001;
2. ALT 1997, 2000, 2003, 2005;
3. COLT 1999, 2001;

where the committee of the last EuroCOLT 2001 was identical with the COLT 2001 committee since these two conferences series were in the process of merging. Stephan was subreferee for conferences from the series ALT, CATS, CCC, COLT, EuroCOLT, FCT, ICALP, MFCS, STACS and Structure. Stephan refereed articles submitted to the journals

1. Annals of Mathematics and Artificial Intelligence;

2. Annals of Pure and Applied Logic;

3. Archive for Mathematical Logic;

4. Data Mining and Knowledge Discovery;

5. IEEE Transactions on Knowledge and Data Engineering;

6. Information and Computation;

7. Journal of Computer and System Sciences;

8. Theoretical Computer Science;

9. The Journal of Symbolic Logic.

Furthermore, Stephan wrote a referee-report for a book submitted to Birkhäuser. Stephan writes regular reviews for the Zentralblatt für Mathematik which is the leading abstracting and reviewing service in pure and applied mathematics.

Teaching

Although most of Stephan's positions were research positions, Stephan has been teaching courses on Inductive Inference (Einführung in die Lerntheorie), Computational Complexity (Komplexitätstheorie) and Kolmogorov Complexity (Beschreibungskomplexität und Algorithmische Zufälligkeit). Stephan supervised the tutorial sessions for the lecture Computer Science III in Karlsruhe and was tutor for two special lectures in Karlsruhe. Stephan also organized several seminars and is co-organizer of the graduate seminar (Oberseminar) in Heidelberg from 1999 to 2003. During the Recursion Theory Year 2002/2003, researchers and PhD students from all over the world visited Heidelberg; in that year, Stephan taught his learning theory course in English.

Title (translated)	Place	Year
Tutorial for Computer Science III	Karlsruhe	1990/1991
Technical Tutorial Neural Nets	Karlsruhe	1990/1991
Tutorial for Curves and Surfaces in CAD	Karlsruhe	1991
Tutorial for Recursion Theory	Karlsruhe	1992
Seminar Random Sequences and Applications	Karlsruhe	1994
Lecture on Inductive Inference	Heidelberg	$4 * 1996$–2003
Graduate Seminar on Mathematical Logic	Heidelberg	1999–2003
Lecture on Computational Complexity	Heidelberg	2000, 2001
Seminar on Theoretical Computer Science	Heidelberg	2000, 2001
Lecture on Kolmogorov Complexity	Heidelberg	2002
Lecture on Computational Complexity	Sydney	2004
Lecture on Set Theory	Singapore	2004

In Sydney, Stephan taught an informal course on computational complexity and Kolmogorov complexity. Stephan is teaching Set Theory in Singapore from September to August 2004.

Stephan has been first or second referee for the diploma theses (= master theses) of Paolo Di Muccio, Nenad Mihailovič, Amaranta Melchor del Río and Peter Knapp. Furthermore, Stephan advised (as first referee) the diploma thesis of Piotr Grabowski about the enumeration complexity of the Kolmogorov function [A48]. Stephan was second referee of the PhD theses of Levke Bentzien (Heidelberg) and Maren Hinrichs (Jena).

Scientific Collaboration

Stephan has published many joint papers with collaborators in Australia, Austria, Germany, Latvia, New Zealand, Singapore and USA. The collaborators are

1. Klaus Ambos-Spies, University of Heidelberg, Germany, EU.
2. Ganesh R. Baliga, Rowan University, New Jersey, USA.
3. Richard Beigel, Temple University, New Jersey, USA.
4. Levke Bentzien, formerly University of Heidelberg, Germany, EU.
5. Bernd Borchert, formerly University of Tübingen, Germany, EU.
6. Heinz Braun, formerly University of Karlsruhe, Germany, EU.
7. Harry Buhrman, University of Amsterdam, The Netherlands, EU.
8. Lorenzo Carlucci, University of Siena, Italy, EU.
9. John Case, University of Delaware, Delaware, USA.
10. Rod Downey, Victoria University of Wellington, New Zealand.
11. Peter Fejer, University of Massachusetts at Boston, Massachusetts, USA.
12. Henning Fernau, University of Tübingen, Germany, EU.
13. Lance Fortnow, NEC Laboratories America, New Jersey, USA.
14. Rūsiņš Freivalds, University of Latvia, Latvia.
15. William I. Gasarch, University of Maryland, Maryland, USA.
16. Piotr Grabowski, University of Heidelberg, Germany, EU.
17. Valentina Harizanov, The George Washington University, Washington, D.C., USA.
18. Denis Hirschfeldt, University of Chicago, Illinois, USA.

19. Kejia Joyce Ho, formerly Wheaton College, Illinois, USA.
20. Sanjay Jain, National University of Singapore, Singapore.
21. Carl Jockusch, University of Illinois at Urbana-Champaign, Illinois, USA.
22. Susanne Kaufmann, Provadis School of International Management and Technology, Germany, EU.
23. Efim Kinber, Sacred Heart University, Connecticut, USA.
24. Bakhadyr Khoussainov, The University of Auckland, New Zealand.
25. Martin Kummer, formerly University of Karlsruhe, Germany, EU.
26. Stuart A. Kurtz, formerly University of Chicago, Illinois, USA.
27. Dietrich Kuske, Technical University of Dresden, Germany, EU.
28. Klaus-Jörn Lange, University of Tübingen, Germany, EU.
29. Luc Longpré, University of Texas, Texas, USA.
30. Eric Martin, The University of New South Wales, Australia.
31. Georgia Martin, formerly University of Maryland, Maryland, USA.
32. Timothy McNicholl, University of Dallas, Texas, USA.
33. Wolfram Menzel, University of Karlsruhe, Germany, EU.
34. Wolfgang Merkle, University of Heidelberg, Germany, EU.
35. Andrew Mitchel, The University of New South Wales, Australia.
36. Andrej A. Muchnik, Institute of New Technologies, Moscow, Russia.
37. André Nies, The University of Auckland, New Zealand.
38. Matthias Ott, formerly University of Karlsruhe, Germany, EU.
39. Mark Pleszkoch, formerly University of Maryland, Maryland, USA.
40. Desh Ranjan, New Mexico State University, New Mexico, USA.
41. Jan Reimann, University of Heidelberg, Germany, EU.
42. Rüdiger Reischuk, University at Lübeck, Germany, EU.
43. Sasha Rubin, The University of Auckland, New Zealand.
44. Marcus Schaefer, DePaul University, Illinois, USA.

45. Tobias Scheffer, University of Magdeburg, Germany, EU.

46. Arun Sharma, Queensland University of Technology, Australia.

47. Theodore A. Slaman, The University of California at Berkeley, California, USA.

48. Carl Smith, University of Maryland, Maryland, USA.

49. Robert Solovay, The University of California at Berkeley, California, USA.

50. Denis Therien, McGill University, Quebec, Canada.

51. Sebastiaan Terwijn, Technical University of Vienna, Austria, EU.

52. Pascal Tesson, McGill University, Quebec, Canada.

53. Leen Torenvliet, University of Amsterdam, The Netherlands, EU.

54. Mahendran Velauthapillai, Georgetown University, Washington, D.C., USA.

55. Yuri Ventsov, Technical University of Sydney, Australia.

56. Rolf Wiehagen, University of Kaiserslautern, Germany, EU.

57. Thomas Zeugmann, Hokkaido University, Japan.

Journal Articles

[A1] M. Kummer, F. Stephan. Weakly semirecursive sets and r.e. orderings. *Annals of Pure and Applied Logic* 60:133–150, 1993.

[A2] C. Jockusch, F. Stephan. A cohesive set which is not high. *Mathematical Logic Quarterly*, 39:515–530, 1993. Correction – not changing main result – *Mathematical Logic Quarterly*, 43:569, 1997.

[A3] H. Braun, F. Stephan. On optimizing diameter and average distance of directed interconnected networks. *IEEE Transactions on Computers*, 42:353–358, 1993.

[A4] L. Fortnow, W. Gasarch, S. Jain, E. Kinber, M. Kummer, S. Kurtz, M. Pleszkoch, T. Slaman, R. Solovay, F. Stephan. Extremes in the degrees of inferability. *Annals of Pure and Applied Logic*, 66:231–276, 1994.

[A5] M. Kummer, F. Stephan. Effective search problems. *Mathematical Logic Quarterly*, 40:224–236, 1994.

[A6] R. Beigel, M. Kummer, F. Stephan. Quantifying the amount of verboseness. *Information and Computation* 118, 1995, 73–90. Conference version-see [B1].

[A7] M. Kummer, F. Stephan. Recursion theoretic properties of frequency computation and bounded queries. *Information and Computation*, 120:59–77, 1995. Conference version see [B3].

[A8] R. Beigel, M. Kummer, F. Stephan. Approximable sets. *Information and Computation*, 120:304–314, 1995. Conference version see [B4].

[A9] E. Kinber, F. Stephan. Language learning from texts: mind changes, limited memory and monotonicity. *Information and Computation*, 123:224–241, 1995. Conference version see [B6].

[A10] M. Kummer, F. Stephan. On the structure of degrees of inferability. *Journal of Computer and System Sciences* (Special Issue COLT 1993), 52:214–238, 1996. Conference version see [B2].

[A11] M. Kummer, F. Stephan. Inclusion problems in parallel learning and games. *Journal of Computer and System Sciences* (Special Issue COLT 1994), 52:403–420, 1996. Conference version see [B5].

[A12] F. Stephan. Noisy inference and oracles. *Theoretical Computer Science* 185:129–157, 1997. Conference version see [B9].

[A13] L. Fortnow, R. Freivalds, W. Gasarch, M. Kummer, S. Kurtz, C. Smith, F. Stephan. On the relative sizes of learnable sets. *Theoretical Computer Science*, 197:139–156, 1998. Conference version see [B7].

[A14] B. Borchert, D. Ranjan, F. Stephan. On the computational complexity of some classical equivalence relations on Boolean functions. *Theory of Computing Systems*, 31:679–693, 1998.

[A15] F. Stephan. Learning via queries and oracles. *Annals of Pure and Applied Logic*, 94:273–296, 1998. Conference version see [B10].

[A16] W. Gasarch, M. Pleszkoch, F. Stephan, M. Velauthapillai. Classification using information. *Annals of Mathematics and Artificial Intelligence. Selected papers from ALT 1994 and AII 1994*, 23:147–168, 1998.

[A17] F. Stephan, S. A. Terwijn. The complexity of universal text-learners. *Information and Computation*, 154:149–166, 1999. Conference version see [B20].

[A18] H. Fernau, F. Stephan. Characterizations of recursively enumerable languages by programmed grammars with unconditional transfer. *Journal of Automata, Languages and Combinatorics*, 4:117–142, 1999. Conference version see [B21].

[A19] B. Borchert, D. Kuske, F. Stephan. On existentially first-order definable languages and their relation to NP. *RAIRO Informatique Théorique et Applications* (Theoretical Informatics and Applications), 33:259–270, 1999. Conference version see [B25].

[A20] R. Beigel, W. Gasarch, M. Kummer, G. Martin, T. McNicholl, F. Stephan. The complexity of Odd_n^A. *The Journal of Symbolic Logic*, 65:1–18, 2000. Conference version see [B11].

[A21] J. Case, S. Jain, M. Ott, A. Sharma, F. Stephan. Robust learning aided by context. *Journal of Computer and System Sciences* (Special Issue COLT 1998), 60:234–257, 2000. Conference version see [B24].

[A22] J. Case, S. Jain, F. Stephan. Vacillatory and BC learning on noisy data. *Theoretical Computer Science – Series A*, 241:115–141, 2000. Conference version see [B13].

[A23] M. Ott, F. Stephan. Structural measures for games and process control in the branch learning model. *Theoretical Computer Science – Series A*, 244:135–165, 2000. Conference version see [B14].

[A24] B. Borchert, F. Stephan. Looking for an analogue of Rice's theorem in complexity theory. *Mathematical Logic Quarterly*, 46:489–504, 2000. Conference version see [B17].

[A25] S. Kaufmann, F. Stephan. Robust learning with infinite additional information. *Theoretical Computer Science – Series A*, 259:427–454, 2001. Conference version see [B15].

[A26] F. Stephan. On the structures inside truth-table degrees. *The Journal of Symbolic Logic*, 66:731–770, 2001.

[A27] J. Case, S. Jain, S. Kaufmann, A. Sharma, F. Stephan, Predictive learning models for concept drift. *Theoretical Computer Science – Series A* (Special Issue ALT 1998), 268:323–349, 2001. Conference version see [B27].

[A28] F. Stephan, Y. Ventsov. Learning algebraic structures from text. *Theoretical Computer Science – Series A* (Special Issue ALT 1998), 268:221-273, 2001. Conference version see [B28].

[A29] F. Stephan. On one-sided versus two-sided classification. *Archive for Mathematical Logic*, 40:489–513, 2001.

[A30] J. Case, M. Ott, A. Sharma, F. Stephan. Learning to win process-control games watching game-masters. *Information and Computation*, 174:1–19, 2002. Conference version see [B26].

[A31] M. Ott, F. Stephan. Avoiding coding tricks by hyperrobust learning. *Theoretical Computer Science – Series A* (Special Issue EuroCOLT 1999), 284:161–180, 2002. Conference version see [B30].

[A32] K. Ho, F. Stephan. Simple sets and strong reducibilities. *Annals of Pure and Applied Logic*, 116:273–295, 2002.

[A33] F. Stephan, T. Zeugmann. Learning classes of approximations to non-recursive functions. *Theoretical Computer Science – Series A* (Special Issue ALT 1999), 288:309–341, 2002. Conference version see [B32].

[A34] W. Merkle, F. Stephan. Refuting learning revisited. *Theoretical Computer Science – Series A*, 298:145–177, 2003. Conference version see [B40].

[A35] E. Martin, A. Sharma, F. Stephan. Learning power and language expressiveness. *Theoretical Computer Science – Series A*, 298:365–383, 2003.

[A36] W. Menzel, F. Stephan. Topological aspects of numberings. *Mathematical Logic Quarterly*, 49:129-149, 2003.

[A37] S. Jain, F. Stephan. Learning by switching type of information. *Information and Computation*, 185:90–105, 2003. Conference version see [B38].

[A38] W. Merkle, F. Stephan. Trees and learning. *Journal of Computer and System Sciences*, 68:134–156, 2004. Conference version see [B12].

[A39] S. Jain, F. Stephan. Learning how to separate. *Theoretical Computer Science* (Special Issue ALT 2001), 313:209–228, 2004.

[A40] S. Jain, F. Stephan, S. Terwijn. Counting extensional differences in BC-learning. *Information and Computation*, 188:127–142, 2004. Conference version see [B35].

[A41] A. Sharma, F. Stephan, Yu. Ventsov. Generalized notions of mind change complexity. *Information and Computation*, 189:235–262, 2004. Conference version see [B18].

[A42] J. Case, E. Kinber, A. Sharma, F. Stephan. On the classifaction of recursive languages. *Information and Computation*, 192:15-40, 2004. Conference version see [B16].

[A43] J. Case, S. Jain, F. Stephan, R. Wiehagen. Robust learning – rich and poor. *Journal of Computer and System Sciences*, 69:123–165, 2004. Conference version see [B37]

[A44] S. Jain, W. Menzel, F. Stephan Classes with easily learnable subclasses. *Information and Computation*, 190:81–99, 2004. Conference version see [B46]

[A45] B. Borchert, K.-J. Lange, F. Stephan, P. Tesson, D. Thérien. The dot-depth and the polynomial hierarchy correspond on the delta levels. *International Journal of Foundations of Computer Science* 16:625–644, 2005. Conference version see [B58]

[A46] A. Nies, F. Stephan and S. A. Terwijn. Randomness, relativization and Turing degrees. *The Journal of Symbolic Logic* 70:515–535, 2005.

[A47] W. Merkle, J. Miller, A. Nies, J. Reimann, F. Stephan. *Annals of Pure and Applied Logic*, 138:183–210, 2006. Conference version see [B59].

[A48] R. Beigel, H. Buhrman, P. Fejer, L. Fortnow, P. Grabowski, L. Longpre, A. Muchnik, F. Stephan, L. Torenvliet. Enumerations of the Kolmogorov function. *The Journal of Symbolic Logic* 71:501–528, 2006.

[A49] J. Case, S. Jain, E. Martin, A. Sharma, F. Stephan. Identifying clusters from positive data. *SIAM Journal on Computing* 36:28–55, 2006. Conference version see [B57].

[A50] B. Kjos-Hanssen, A. Nies, F. Stephan. Lowness for the class of Schnorr random reals. *SIAM Journal on Computing* 35:647–657, 2006.

[A51] L. Carlucci, S. Jain, E. Kinber, F. Stephan. Variations on U-Shaped Learning. *Information and Computation*, 204:1264-1294, 2006. Conference version see [B61].

[A52] R. Beigel, L. Fortnow, F. Stephan. Infinitely-often autoreducible sets. *SIAM Journal on Computing*, 36:595–608, 2006. Conference version see [B53]

[A53] S. Figueira, F. Stephan, G. Wu. Randomness and universal machines. *Journal of Complexity*, 22:738–751, 2006. Conference version see [B63].

[A54] J. Case, S. Jain, R. Reischuk, F. Stephan, T. Zeugmann. Learning a subclass of regular patterns in polynomial time. *Theoretical Computer Science*, 364:115–131, 2006. Conference version see [B52].

[A55] V. Harizanov, F. Stephan. On the learnability of vector spaces. *Journal of Computer and System Sciences*, 73:109–122, 2007. Conference version see [B47].

[A56] E. Martin, A. Sharma, F. Stephan. On the Data Consumption Benefits of Accepting Increased Uncertainty. *Theoretical Computer Science*, 382:170–182, 2007. Conference version see [B56].

[A57] S. Jain, J. Nessel, F. Stephan. Invertible Classes. *Theoretical Computer Science*, 384:49–65, 2007. Conference version see [B69].

[A58] L. Carlucci, J. Case, S. Jain, F. Stephan. Results on memory-limited U-shaped learning. *Information and Computation*, 205:1551–1573, 2007. Conference version see [B71].

[A59] B. Khoussainov, P. Semukhin, F. Stephan. Applications of Kolmogorov complexity to computable model theory. *The Journal of Symbolic Logic*, 72:1041–1054, 2007.

Conference Articles

[B1] R. Beigel, M. Kummer, F. Stephan. Quantifying the amount of verboseness. *Proceedings of the Second International Symposium on Logical Foundations of Computer Science* – Logic at Tver 1992, Springer LNCS 620, 21–32, 1992. Journal version see [A6].

[B2] M. Kummer, F. Stephan. On the structure of degrees of inferability. *Proceedings of the Sixth Annual ACM Conference on Computational Learning Theory* – COLT 1993, 117–126, ACM-Press, New York, 1993. Journal version see [A10].

[B3] M. Kummer, F. Stephan. Recursion theoretic properties of frequency computation and bounded queries. *Proceedings of the Third Kurt-Gödel-Colloquium*, Springer LNCS 713, 243–254, 1993. Journal version see [A7].

[B4] R. Beigel, M. Kummer, F. Stephan. Approximable sets. *Proceedings Structure in Complexity Theory, Ninth Annual Conference*, IEEE Press, 12–23, 1994. Journal version see [A8].

[B5] M. Kummer, F. Stephan. Inclusion problems in parallel learning and games. *Proceedings of the Seventh Annual ACM Conference on Computational Learning Theory* – COLT 1994, 287–298, ACM-Press, New York, 1994. Journal version see [A11].

[B6] E. Kinber, F. Stephan. Language learning from texts: mind changes, limited memory and monotonicity. *Proceedings of the Eighth Annual ACM Conference on Computational Learning Theory* – COLT 1995, ACM-Press, 182–189, 1995. Journal version see [A9].

[B7] L. Fortnow, R. Freivalds, W. Gasarch, M. Kummer, S. Kurtz, C. Smith, F. Stephan. Measure, category and learning theory. *Proceedings of the 22nd International Colloquium on Automata, Languages and Programming* – ICALP 1995, Springer LNCS 944, 558–569, 1995. Journal version see [A13].

[B8] M. Kummer, F. Stephan. The power of frequency computation. *Proceedings of the Tenth International Conference on Fundamentals of Computation Theory* – FCT 1995, Springer LNCS 969, 323–332, 1995.

[B9] F. Stephan. Noisy inference and oracles. *Proceedings of the Sixth International Workshop on Algorithmic Learning Theory* – ALT 1995, Springer LNCS 997, 185–200, 1995. Journal version see [A12].

[B10] F. Stephan. Learning via queries and oracles. *Proceedings of the Eighth Annual ACM Conference on Computational Learning Theory* – COLT 1995, ACM-Press, New York, 162–169, 1995. Journal version see [A15].

[B11] R. Beigel, W. Gasarch, M. Kummer, G. Martin, T. McNicholl, F. Stephan. On the query complexity of sets. *Proceedings of the Twenty-First International Symposium on Mathematical Foundations of Computer Science* – MFCS 1996, Springer LNCS 1113, 206–217, 1996. Journal version see [A20].

[B12] W. Merkle, F. Stephan. Trees and learning. *Proceedings of the Ninth Annual ACM Conference on Computational Learning Theory* – COLT 1996, ACM-Press, 270–279, 1996. Journal version see [A38].

[B13] J. Case, S. Jain, F. Stephan. Vacillatory and BC learning on noisy data. *Proceedings of the Seventh Annual Workshop on Algorithmic Learning Theory* – ALT 1996, Springer LNCS 1160, 285–298, 1996. Journal version see [A22].

[B14] M. Ott, F. Stephan. Structural measures for games and process control in the branch learning model. *Proceedings of the Third European Conference on Computational Learning Theory* – EuroCOLT 1997, Springer LNCS 1208, 94-108, 1997. Journal version see [A23].

[B15] S. Kaufmann, F. Stephan. Robust learning with infinite additional information. *Proceedings of the Third European Conference on Computational Learning Theory* – EuroCOLT 1997, Springer LNCS 1208, 316-330, 1997. Journal version see [A25].

[B16] J. Case, E. Kinber, A. Sharma, F. Stephan. On the classifaction of computable languages. *Proceedings of the Symposium on Theoretical Aspects of Computer Science* – STACS 1997, Springer LNCS 1200, 225–236, 1997. Journal version see [B16].

[B17] B. Borchert, F. Stephan. Looking for an analogue of Rice's theorem in complexity theory. *Proceedings of the Fifth Kurt-Gödel-Colloquium* – KGS 1997, Springer LNCS 1289, 114–127, 1997. Journal version see [A24].

[B18] A. Sharma, F. Stephan, Y. Ventsov. Generalized notions of mind change complexity. *Proceedings of the Tenth Annual ACM Conference on Computational Learning Theory* – COLT 1997, Nashville, 96–108, 1997. Journal version see [A41].

[B19] S. Kaufmann, F. Stephan. Resource bounded next value and explanatory identification: learning automata, patterns and polynomials on-line. *Proceedings of the Tenth Annual ACM Conference on Computational Learning Theory* – COLT 1997, Nashville, 263–274, 1997.

[B20] F. Stephan, S. A. Terwijn. The complexity of universal text-learners. *Proceedings of the Eleventh International Symposium on Fundamentals of Computation Theory* – FCT 1997, Springer LNCS 1279, 441–451, 1997. Journal version see [A17].

[B21] H. Fernau, F. Stephan. How powerful is unconditional transfer? – When UT meets AC. – *Proceedings of the Conference Developments in Language Theory* – DLT 1997 (S. Bozapalidis, ed.), 249–260, Aristotle University of Thessaloniki, Thessaloniki, 1997. Journal version see [A18].

[B22] M. Ott, F. Stephan. The complexity of learning branches and strategies from queries. *Proceedings of the Eighth Annual International Symposium on Algorithms and Computation* – ISAAC 1997, Springer LNCS 1350, 283–292, 1997.

[B23] W. Gasarch, F. Stephan. A techniques-oriented survey of bounded queries. *Models and Computability* (*invited papers from Logic Colloquium 1997*). London Mathematical Society Lecture Note Series 259, 117–156, 1999.

[B24] J. Case, S. Jain, M. Ott, A. Sharma, F. Stephan. Robust learning aided by context. *Proceedings of the Eleventh Annual ACM Conference on Computational Learning Theory* – COLT 1998, ACM-Press, 44–55, 1998. Journal version see [A21].

[B25] B. Borchert, D. Kuske, F. Stephan. On existentially first-order definable languages and their relation to NP. *Proceedings of the 25th International Colloquium on Automata, Languages and Programming* – ICALP 1998, Springer LNCS 1443, 17–28, 1998. Journal version see [A19].

[B26] J. Case, M. Ott, A. Sharma, F. Stephan. Learning to win process-control games watching game-masters. *Proceedings of the Ninth Annual Workshop on Algorithmic Learning Theory* – ALT 1998, Springer LNCS 1501, 31–45, 1998. Journal version see [A30].

[B27] J. Case, S. Jain, S. Kaufmann, A. Sharma, F. Stephan, Predictive learning models for concept drift. *Proceedings of the Ninth Annual Workshop on Algorithmic Learning Theory* – ALT 1998, Springer LNCS 1501, 276–290, 1998. Journal version see [A27].

[B28] F. Stephan, Y. Ventsov. Learning Algebraic Structures from Text using Semantical Knowledge. *Proceedings of the Ninth Annual Workshop on Algorithmic Learning Theory* – ALT 1998, Springer LNCS 1501, 321–335, 1998. Journal version see [A28].

[B29] K. Ambos-Spies, L. Bentzien, P. Fejer, W. Merkle, F. Stephan. Collapsing polynomial-time degrees. Logic Colloquium 1998 — Proceedings of the Annual European Summer Meeting of the Association for Symbolic Logic, held in Prague, Czech Republic, ASL Lecture Notes in Logic 13, 1–24, 2000.

[B30] M. Ott, F. Stephan. Avoiding coding tricks by hyperrobust learning. *Proceedings of the Fourth European Conference on Computational Learning*

Theory – EuroCOLT 1999, Springer LNCS 1572, 183–197, 1999. Journal version see [A31].

[B31] A. Mitchell, T. Scheffer, A. Sharma, F. Stephan. The VC-dimension of subclasses of pattern languages. *Proceedings of the Tenth International Conference on Algorithmic Learning Theory* – ALT 1999, Springer LNCS 1720, 93–105, 1999.

[B32] F. Stephan, T. Zeugmann. On the uniform learnability of approximations to non-recursive functions. *Proceedings of the Tenth International Conference on Algorithmic Learning Theory* – ALT 1999, Springer LNCS 1720, 276–290, 1999. Journal version see [A33].

[B33] F. Stephan, T. Zeugmann. Average-case complexity of learning polynomials. *Proceedings of the Conference on Computational Learning Theory* – COLT 2000, Morgan Kaufmann, 59–68, 2000.

[B34] G. Baliga, J. Case, W. Merkle, F. Stephan. Unlearning helps. *Proceedings of the 27th International Colloquium on Automata, Languages and Programming* – ICALP 2000, Springer LNCS 1853, 844–855, 2000.

[B35] F. Stephan, S. A. Terwijn. Counting extensional differences in BC-learning. *Proceedings of the Fifth International Colloquium on Grammatical Inference* – ICGI 2000, Springer LNAI 1891:256–269, 2000. Journal version see [A40].

[B36] K. Ambos-Spies, W. Merkle, J. Reimann, F. Stephan. Hausdorff dimension in exponential time. *Proceedings of the Sixteenth Annual IEEE Conference on Computational Complexity* (*formerly Structure in Complexity Theory*), IEEE Computer Society, 210–217, 2001.

[B37] J. Case, S. Jain, F. Stephan, R. Wiehagen. Robust learning – rich and poor. *Proceedings of the Fourteenth Annual Conference on Computational Learning Theory and the Fifth European Conference on Computational Learning Theory* – COLT 2001 and EuroCOLT 2001, Springer LNAI 2111:143–159, 2001. Journal version see [A43]

[B38] S. Jain, F. Stephan. Learning by switching type of information. *Proceedings of the Twelfth International Conference on Algorithmic Learning Theory* – ALT 2001, Springer LNAI 2225:205–218, 2001. Journal version see [A37].

[B39] S. Jain, F. Stephan. Learning how to separate. *Proceedings of the Twelfth International Conference on Algorithmic Learning Theory* – ALT 2001, Springer LNAI 2225:219–234, 2001. Journal version see [A39].

[B40] W. Merkle, F. Stephan. Refuting learning revisited. *Proceedings of the Twelfth International Conference on Algorithmic Learning Theory* – ALT 2001, Springer LNAI 2225:299-314, 2001. Journal version see [A34].

[B41] E. Martin, A. Sharma, F. Stephan. A general theory of deduction, induction and learning. *Proceedings of the Fourth International Conference on Discovery Science* – DS 2001, Springer LNAI 2226:228–242, 2001.

[B42] R. Downey, D. Hirschfeldt, A. Nies, F. Stephan. Trivial Reals. *Proceedings of the 7th and 8th Asian Logic Conferences* (7th Conference: Hsi-Tou, Taiwan 6 – 10 June 1999, 8th Conference: Chongqing, China 29 August – 2 September 2002), World Scientific, 103–131, 2003.

[B43] E. Martin, P. Nguyen, A. Sharma, F. Stephan. Learning in logic with RichProlog. *Proceedings of the International Conference on Logic Programming* – ICLP 2002, Springer LNCS 2401:239–254, 2002.

[B44] J. Reimann, F. Stephan. Effective Hausdorff dimension. *Logic Colloquium 2001, Proceedings of the Annual European Summer Meeting of the Association for Symbolic Logic, held in Vienna, Austria, August 1–6, 2001*, ASL Lecture Notes in Logic 20:369–385, 2001.

[B45] S. Jain, F. Stephan. A Tour of Robust Learning. *Computability and Models: Perspectives East and West*. edited by S. B. Cooper, S. S. Goncharov. Kluwer Academic / Plenum Publishers, pages 215–245, 2003.

[B46] S. Jain, W. Menzel, F. Stephan. Classes with easily learnable subclasses. *Algorithmic Learning Theory. 13th International Conference*, ALT 2002, Lübeck, Germany, November 2002, Proceedings, Springer LNCS 2533:218–232, 2002. Journal version see [A44].

[B47] V. Harizanov, F. Stephan. On the learnability of vector spaces. *Algorithmic Learning Theory. 13th International Conference*, ALT 2002, Lübeck, Germany, November 2002, Proceedings, Springer LNCS 2533:233–247, 2002. Journal version see [A55].

[B48] E. Martin, A. Sharma, F. Stephan. Learning, logic and topology in a common framework. *Algorithmic Learning Theory. 13th International Conference*, ALT 2002, Lübeck, Germany, November 2002, Proceedings, Springer LNCS 2533:248–262, 2002.

[B49] M. Schaefer, F. Stephan. Strong reductions and immunity for exponential time. *Twentieth International Symposium on Theoretical Aspects of Computer Science*, STACS 2003, Berlin, Germany, February/March 2003, Proceedings; Springer LNCS 2607:559–570, 2003.

[B50] B. Khoussainov, S. Rubin, F. Stephan. On automatic partial orders. *Eighteenth Annual IEEE Symposium on Logic in Computer Science*, LICS 2003, 168–177, 2003.

[B51] E. Martin, A. Sharma, F. Stephan. On ordinal VC-dimension and some notions of complexity. *Algorithmic Learning Theory*, Fourteenth International Conference, ALT 2003, Sapporo, Japan, October 2003, Proceedings; Springer LNAI 2842:54–68, 2003.

[B52] J. Case, S. Jain, R. Reischuk, F. Stephan, T. Zeugmann. Learning a subclass of regular patterns in polynomial time. *Algorithmic Learning Theory*, Fourteenth International Conference, ALT 2003, Sapporo, Japan, October 2003, Proceedings; Springer LNAI 2842:234–246, 2003. Journal version see [A54].

[B53] R. Beigel, L. Fortnow, F. Stephan. Infinitely-often autoreducible sets. *Algorithms and Computation*, 14th International Symposium, ISAAC 2003, Kyoto, Japan, December 15-17, 2003, Proceedings; Springer LNAI 2906:98–107, 2003. Journal version see [A52].

[B54] B. Khoussainov, S. Rubin, F. Stephan. Definability and Regularity in Automatic Structures. STACS 2004, Twenty-First Annual Symposium on Theoretical Aspects of Computer Science, Montpellier, France, March 25-27, 2004, Proceedings; Springer LNCS 2996:440-451, 2004.

[B55] B. Khoussainov, A. Nies, S. Rubin, F. Stephan. Automatic Structures: Richness and Limitations. *19th IEEE Symposium on Logic in Computer Science* (LICS 2004), 14-17 July 2004, Turku, Finland, Proceedings; IEEE Computer Society, pages 44-53, 2004.

[B56] E. Martin, A. Sharma, F. Stephan. On the data consumption benefits of accepting increased uncertainty. *Algorithmic Learning Theory*: 15th International Conference, ALT 2004, Padova, Italy, October 2-5, 2004. Proceedings; Springer LNCS 3244:83-98, 2004. Journal version see [A56].

[B57] J. Case, S. Jain, E. Martin, A. Sharma, F. Stephan. Identifying clusters from positive data. *Grammatical Inference: Algorithms and Applications* – 7th International Colloquium, ICGI 2004, Athens, Greece, October 11-13, 2004, Proceedings; Springer LNCS 3264, 103–114, 2004. Journal version see [A49].

[B58] B. Borchert, K.-J. Lange, F. Stephan, P. Tesson, D. Thérien. The dot-depth and the polynomial hierarchy correspond on the delta levels. *Developments in Language Theory*: 8th International Conference, DLT 2004. Auckland, New Zealand, December 13-17. Proceedings; Springer LNCS 3340:89–101, 2004. Journal version see [A45].

[B59] W. Merkle, J. Miller, A. Nies, J. Reimann, F. Stephan. Kolmogorov-Loveland Randomness and Stochasticity. STACS 2005 – *Twenty-Second Annual Symposium on Theoretical Aspects of Computer Science*, Stuttgart, Germany, February 24-26, 2005, Proceedings. Springer LNCS 3404:422–433, 2005. Journal version see [A47].

[B60] F. Stephan, G. Wu. Presentations of K-Trivial Reals and Kolmogorov Complexity. *New Computational Paradigms: First Conference on Computability in Europe*, CiE 2005, Amsterdam, The Netherlands, June 8-12, 2005. Proceedings. Springer LNCS 3526:461–469, 2005.

[B61] L. Carlucci, S. Jain, E. Kinber, F. Stephan. Variations on U-Shaped Learning. *Learning Theory: Eightteenth Annual Conference on Learning Theory*, COLT 2005, Bertinoro, Italy, June 27-30, 2005. Proceedings. Springer LNCS 3559:382–397, 2005. Journal version see [A51].

[B62] S. Figueira, A. Nies, F. Stephan. Lowness properties and approximations of the jump. *Twelfth Workshop of Logic, Language, Information and Computation*, WoLLIC 2005. Florianópolis, Santa Catarina, Brazil, 19-22 July 2005. Proceedings, pages 47–58.

[B63] S. Figueira, F. Stephan, G. Wu. Randomness and universal machines. *Second International Conference on Computability and Complexity in Analysis*, CCA 2005. Fernuniversität in Hagen, Informatik Bereichte 326:103–116, 2005. Journal version see [A53].

[B64] L. Carlucci, J. Case, S. Jain, F. Stephan. Non U-Shaped Vacillatory and Team Learning. *Algorithmic Learning Theory: Sixteenth International Conference*, ALT 2005, Singapore, October 2005. Proceedings. Springer LNAI 3734:241–255, 2005.

[B65] S. Jain, E. Martin, F. Stephan. Absolute Versus Probabilistic Classification in a Logical Setting. *Algorithmic Learning Theory: Sixteenth International Conference*, ALT 2005, Singapore, October 2005. Proceedings. Springer LNAI 3734:327–342, 2005.

[B66] M. Agrawal, F. Stephan, P.S. Thiagarajan, Sh. Yang. Behavioural Approximations for Restricted Linear Differential Hybrid Automata. *Hybrid Systems: Computation and Control: Ninth International Workshop*, HSCC 2006, Santa Barbara, CA, USA, March 29-31, 2006. Proceedings. Springer LNCS 3927:4–18, 2006.

[B67] B. Kjos-Hanssen, W. Merkle, F. Stephan. Kolmogorov Complexity and the Recursion Theorem. STACS 2006: *Twenty-Third Annual Symposium on Theoretical Aspects of Computer Science*, Marseille, France, February 23-25, 2006. Proceedings. Springer LNCS 3884:149–161, 2006.

[B68] S. Jain, F. Stephan. Some Recent Results in U-Shaped Learning. *Theory and Applications of Models of Computation*: Third International Conference, TAMC 2006, Beijing, China, May 15-20, 2006. Proceedings. Springer LNCS, 3959:421–431, 2006.

[B69] S. Jain, J. Nessel, F. Stephan. Invertible Classes. *Theory and Applications of Models of Computation*: Third International Conference, TAMC 2006,

Beijing, China, May 15-20, 2006. Proceedings. Springer LNCS, 3959:707–720, 2006. Journal version see [A57].

[B70] F. Stephan, L. Yu. Lowness for Weakly 1-generic and Kurtz-Random. *Theory and Applications of Models of Computation*: Third International Conference, TAMC 2006, Beijing, China, May 15-20, 2006. Proceedings. Springer LNCS, 3959:756–764, 2006.

[B71] L. Carlucci, J. Case, S. Jain, F. Stephan. Memory-limited U-shaped learning. *Computational Learning Theory*: Nineteenth Annual Conference, COLT 2006, Carnegie Mellon University, Pittsburgh, Pennsylvania, June 22-25, 2006. Proceedings. Springer LNAI 4005:259–273, 2006. Journal version see **??**.

[B72] F. Stephan. Martin-Löf Random and PA-complete Sets. *Logic Colloquium 2002*. ASL Lecture Notes in Logic, 27:342–348, 2006.

[B73] R. Reimann, F. Stephan. Hierarchies of randomness tests. *Mathematical Logic in Asia.* Proceedings of the Ninth Asian Logic Conference, Novosibirsk, Russia 16 - 19 August 2005, pages 215–232, 2006.

[B74] W. Merkle, F. Stephan. On C-Degrees, H-Degrees and T-Degrees. *Twenty-Second Annual IEEE Conference on Computational Complexity* (CCC 2007), San Diego, USA, 12 - 16 June 2007, pages 60–69, 2007.

[B75] S. Jain, F. Stephan. Mitotic Classes. *Computational Learning Theory, 20th Annual Conference on Computational Learning Theory, COLT 2007, San Diego, CA, USA, June 13-15, 2007, Proceedings.* Springer LNCS 4539:218–232, 2007.

[B76] L. Bienvenu, D. Doty, F. Stephan. Extractors and constructive dimensions of weak truth-table degrees. *Computation and Logic in the Real World, Third Conference on Computability in Europe, CiE 2007, Siena, Italy, Proceedings.* Springer LNCS 4497:63–72, 2007.

[B77] S. Jain, E. Martin, F. Stephan. Input-dependence in function-learning. *Computation and Logic in the Real World, Third Conference on Computability in Europe, CiE 2007, Siena, Italy, Proceedings.* Springer LNCS 4497:378–388, 2007.

Exam Texts, Book Chapters and Technical Reports

[C1] F. Stephan. *X-Räume als Verallgemeinerung topologischer Räume.* Dissertation, Karlsruhe, 1990.

[C2] F. Stephan. *Degrees of Computing and Learning*. Habilitation, Heidelberg, 1999. The habilitation contains the publications [A12, A15, A17, A25, A26, A29].

[C3] M. Kummer, F. Stephan. Some aspects of frequency computation. Interner Bericht Nr. 21 / 1991, Fakultät für Informatik, Universität Karlsruhe (T.H.), Karlsruhe, 1991.

[C4] W. Menzel, F. Stephan. Inductive versus approximative learning. *Perspectives on Adaptivity and Learning*, edited by Reimer Kühn, Randolf Menzel, Wolfram Menzel, Ulrich Ratsch, Michael M. Richter, Ion-Olimpiu Stamatescu. Springer, pages 187–209, 2003.

[C5] A. Nies, F. Stephan, S. Terwijn. *Randomness, relativization and Turing degrees.* Research Report 234, Department of Computer Science, University of Auckland, February 2004.

[C6] F. Stephan. Hausdorff-dimension and weak truth-table reducibility. Technical Report TR52/05, School of Computing, National University of Singapore, 2005.

[C7] C. Mummert, F. Stephan. Topological aspects of poset spaces. Technical Report TRC6/06, School of Computing, National University of Singapore, 2006.

[C8] F. Stephan. The complexity of the set of nonrandom numbers. *Randomness and Complexity, from Leibnitz to Chaitin*, edited by Cristian S. Calude. World Scientific, pages 217–230, 2007.

Recommendation Letters

Below a list of academic teachers and collaborators who would be willing to write a recommendation letter about Stephan on request.

Professor Klaus Ambos-Spies
Institut für Informatik
Universität Heidelberg
Im Neuenheimer Feld 294
69120 Heidelberg
Germany, EU
Telephone: +49/6221/548203, Facsimile: +49/6221/544465
Email: ambos@math.uni-heidelberg.de

Professor Sanjay Jain
School of Computing
National University of Singapore
3 Science Drive 2
Singapore 117543
Republic of Singapore
Telephone: +65/6874-7842, Facsimile: +65/6779-4580
Email: sanjay@comp.nus.edu.sg

Professor Steffen Lempp
Department of Mathematics
University of Wisconsin
480 Lincoln Drive
Madison, Wisconsin 53706-1388, USA
Telephone: +1/608/263-1975, Facsimile: +1/608/263-8891
Email: lempp@math.wisc.edu

Dr. Eric Martin
School of Computer Science and Engineering
The University of New South Wales
UNSW Sydney NSW 2005
Australia
Telephone: +61/2/9385-6936, Facsimile: +61/2/9385-4936
Email: emartin@cse.unsw.edu.au

Professor Arun Sharma
Queensland University of Technology
Division of Research and Commercialization
GPO Box 2434, Brisbane QLD 4001, Australia
Telephone: +61/7/3864-2132, Facsimile: +61/7/3864-4097
Email: arun.sharma@qut.edu.au

Professor Rolf Wiehagen
Universität Kaiserslautern
AG Algorithmisches Lernen
Postfach 3049
67653 Kaiserslautern
Germany, EU
Telephone: +49/631/205-3353, Facsimile: +49/631/205-3348
Email: wiehagen@informatik.uni-kl.de

Professor Thomas Zeugmann
Division of Computer Science
Graduate School of
Information Science and Technology
Hokkaido University
N-14, W-9
Sapporo 060-0814, Japan
Telephone and Facsimile: +81/11/706-7684
Email: thomas@ist.hokudai.ac.jp