Curriculum Vitae of Stanislav Živný

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Research Interests

- Artificial Intelligence: graphical models and submodular functions.
- Constraint Satisfaction: computational complexity and efficient algorithms.
- SAT Solvers: resolution and proof complexity.

Current Position

- University College, University of Oxford, Oxford, UK.
  Stipendiary Junior Research Fellow in Mathematical and Physical Sciences, 10/2009–09/2012.
- Balliol College, University of Oxford, Oxford, UK.
  Stipendiary Lecturer in Computing, 10/2010–06/2012.

Education

- Department of Computer Science, University of Oxford, Oxford, UK.
  D.Phil. (Ph.D. equivalent) in Computer Science, 10/2006–06/2009.
  Thesis title: *The complexity and expressive power of valued constraints.*
  ACP (Association for Constraint Programming) Doctoral Research Award 2011.
  Examiners: Stephan Kreutzer (TU Berlin) and Peter Jonsson (Linköping, Sweden).
  Supervisor: Peter Jeavons.
- VU University, Amsterdam, Netherlands.
  M.Sc. in Computer Science, cum laude, 08/2004–08/2005.
  Thesis title: *Properties of oracle classes that collapse or separate complexity classes.*
  Supervisors: Václav Koubek and Femke van Raamsdonk.
- Charles University, Prague, Czech republic.
  Mgr. (B.c. + M.Sc. equivalent) in Computer Science, summa cum laude, 09/1999–05/2005.
  RNDr. (Rerum Naturalium Doctor, M.Phil. equivalent) in Computer Science, 09/2005–09/2006.
  On leave to the Department of Mathematics, Turku University, Finland, 01/2006–06/2006.
  Thesis title: *Relation between accepting languages and complexity of questions on oracle.*
  Supervisor: Václav Koubek.

Research Visits

- KTH (Jakob Nordström), Stockholm, Sweden, 05/2011 (funded by KTH).
- University of Toulouse III (Martin Cooper), France, 04/2011 (funded by the Royal Society).
- Constraint Reasoning Group, Microsoft Research, Cambridge, UK, 06–09/2010 (funded by MSR).
- Constraint Reasoning Group, Microsoft Research, Cambridge, UK, 04/2010 (funded by MSR).
- University of Toulouse III (Martin Cooper), France, 03/2010 (funded by EPSRC).

Awards & Fellowships

- ACP (Association for Constraint Programming) Doctoral Research Award 2011.
- Royal Society International Travel Grant, 2011.
- Stipendiary Junior Research Fellowship, University College, University of Oxford, UK, 2009–2012.
- EPSRC PhD+ Fellowship (top ∼10-15% EPSRC-funded PhDs), University of Oxford, UK, 2009-2010.
- Research Studentship, EPSRC Grant *The Complexity of Valued Constraints*, UK, 2007–2010.
- Academic Travel Award, Keble College, University of Oxford, UK, 2007–2009.
- Department of Computer Science Stipend, University of Oxford, UK, 2006–2009 (declined from 2007).
- EPSRC DTA Studentship, University of Oxford, UK, 2006–2009 (declined from 2007).
- Charles Simonyi Fellowship, Grand Challenges of Informatics, Hungary, 2006.
- Erasmus Scholarship, Turku University, Finland, 2006.
- Doctoral Grant *Collegium Informaticum*, Charles University, Czech republic, 2005–2006.
- Student Fellowship, VU University, Netherlands, 2004–2005.
- Merit Scholarship, Charles University, Czech republic, 2001–2003, 2005–2006.

Publications (in reverse chronological order)

The authors of most of my publications are listed in alphabetical order, following the standard convention in mathematics and theoretical computer science. However, some of my early publications from my student years followed the AI community rule of making the student who has done most of the work (both results and writing) the first author. Hence, in pubications C2, C3, C4, J4, J5 below I am the first author.

Preprints

[P2] The complexity of conservative valued CSPs
(with V. Kolmogorov), submitted for journal publication, 2011.

[P1] On nested and convex valued constraints
(with M. Cooper), submitted for journal publication, 2011.

Book Chapters

[B1] Tractable valued constraints
(with P. Jeavons), to appear in *Advances in Tractability*, Cambridge University Press, 2012.

Refereed Journals

[J6] Hybrid tractability of valued constraint problems
(with M. Cooper), *Artificial Intelligence* (**AIJ**), 175(9-10), pp. 1555–1569, 2011.

[J5] Classes of submodular constraints expressible by graph cuts
(with P. Jeavons), *Constraints*, 15(3), pp. 430-452, 2010.

[J4] The expressive power of binary submodular functions
(with D. Cohen and P. Jeavons), *Discrete Applied Mathematics* (**DAM**) 157(15), pp. 3347–3358, 2009.

[J3] Structural properties of oracle classes
(single author), *Information Processing Letters* (**IPL**) 109(19), pp. 1131-1135, 2009.

[J2] A note on some collapse results of valued constraints
(with B. Zanuttini), *Information Processing Letters* (**IPL**) 109(11), pp. 534–538, 2009.

[J1] The expressive power of valued constraints: Hierarchies and collapses
(with D. Cohen and P. Jeavons), *Theoretical Computer Science* (**TCS**) 409(1), pp. 137–153, 2008.

Refereed Conference Proceedings

[C11] The complexity of conservative valued CSPs
(with V. Kolmogorov), to appear in the Proceedings of the 23^{rd} Annual ACM-SIAM Symposium on Discrete Algorithms (**SODA'12**), 2012. Preprint

[C10] On minimal weighted clones
(with P. Creed), *Proceedings of the* 17^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'11**), LNCS 6876, pp. 210–224, 2011.

[C9] Tractable triangles
(with M. Cooper), *Proceedings of the* 17^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'11**), LNCS 6876, pp. 195–209, 2011.

[C8] Hierarchically nested convex VCSP
(with M. Cooper), *Proceedings of the* 17^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'11**), LNCS 6876, pp. 187–194, 2011.

[C7] An algebraic theory of complexity for valued constraints: Establishing a Galois connection
(with D. Cohen, P. Creed, and P. Jeavons), *Proceedings of the* 36^{th} *International Symposium on Mathematical Foundations of Computer Science* (**MFCS'11**), LNCS 6907, pp. 231–242, 2011.

[C6] A new hybrid tractable class of soft constraint problems
(with M. Cooper), *Proceedings of the* 16^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'10**), LNCS 6308, pp. 152–166, 2010.

[C5] Same-relation constraints
(with C. Jefferson, S. Kadioglu, K. Petrie, and M. Sellmann), *Proceedings of the* 15^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'09**), LNCS 5732, pp. 470–485, 2009.

[C4] The complexity of valued constraint models
(with P. Jeavons), *Proceedings of the* 15^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'09**), LNCS 5732, pp. 833–841, 2009.

[C3] The expressive power of binary submodular functions
(with D. Cohen and P. Jeavons), *Proceedings of the* 34^{th} *International Symposium on Mathematical Foundations of Computer Science* (**MFCS'09**), LNCS 5734, pp. 744–757, 2009.

[C2] Classes of submodular constraints expressible by graph cuts
(with P. Jeavons), *Proceedings of the* 14^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'08**), LNCS 5202, pp. 112–127, 2008.

[C1] The expressive power of valued constraints: Hierarchies and collapses
(with D. Cohen and P. Jeavons), *Proceedings of the* 13^{th} *International Conference on Principles and Practice of Constraint Programming* (**CP'07**), LNCS 4741, pp. 798–805, 2007.

Theses

[T3] The complexity and expressive power of valued constraints
Doctoral thesis, Department of Computer Science, University of Oxford, 2009.

[T2] Properties of oracle classes that collapse or separate complexity classes
Master's thesis, VU University in Amsterdam, 2005.

[T1] Relation between accepting languages and complexity of questions on oracle
Master's thesis, Charles University in Prague, 2005.

Teaching

I teach core subjects in Computer Science, and Mathematics and Computer Science. Moreover, I prepare and mark collection papers, and undertake undergraduate admission interviews.

- Stipendiary Lecturer in Computing, Balliol College, University of Oxford, 2010–2012.
- Non-Stipendiary Lecturer in Computing, Hertford College, University of Oxford, 2008–2009.

Tutorials

I have given 1-hour tutorials (usually 4 tutorials per course) for a group of 2-3 students at various Oxford colleges for the following courses: *Linear Algebra* (Balliol College, MT 2010, HT 2011, MT 2011), *Discrete Mathematics* (Balliol College, MT 2010, MT 2011), *Logic and Proof* (Hertford College, HT 2009; Balliol College, HT 2011), *Models of Computation* (Hertford College, TT 2009; Lincoln College, TT 2009; Balliol College, MT 2010, MT 2011), *Design and Analysis of Algorithms* (Lincoln College, HT 2009; University College, HT 2010; Balliol College, HT 2011), *Advanced Data Structures and Algorithms* (University College, HT 2010), *Imperative Programming 1* (Balliol College, HT 2011), *Imperative Programming 2* (Balliol College, TT 2011), *Digital Systems* (Balliol College, HT 2011), *Object Oriented Programming* (Hertford College, MT 2008), *Concurrency* (Hertford College, MT 2008).

Classes

I have given (on average) 7 1-hour classes (marking and presenting model answers to a class of up to 10 students) at the Department of Computer Science at Oxford for the following courses: *Probability and Computing* (MT 2010), *Computational Complexity* (MT 2007, MT 2008, HT 2010), *Advanced Data Structures and Algorithms* (HT 2009), *Theory of Data and Knowledge Bases* (HT 2009), *Randomised Algorithms* (MT 2008), *Data Structures and Algorithms* (HT 2007), *Functional Programming* (MT 2006), *Introduction to Programming* (Charles University, 2005).

Talks

Invited Talks

- *The complexity and expressive power of valued constraints*
ACP Doctoral Research Award 2011, Perugia, Italy, 09/2011.
- *The complexity of conservative valued CSPs*
STTI'11, ITI, Charles University, Prague, Czech republic, 06/2011.
- *Hybrid tractability of soft constraint problems*
Theoretical and applied problems of structural recognition, Kiev, Ukraine, 10/2010.

- *Submodularity and valued constraint satisfaction problems*
  Microsoft Research, Cambridge, UK, 04/2010.
- *Decomposition of submodular polynomials*
  STTI'09, ITI, Charles University, Prague, Czech republic, 06/2009.
- *Sudoku and other problems: complexity of constraint satisfaction problems*
  Keble College, 05/2009.

Conferences, Workshops & Seminars

- *Soft Constraints and Optimisation*
  - ACiD Seminar, Durham, UK, 02/2012.
  - Workshop on Configurations, Oxford, UK, 01/2012.
- *The complexity of conservative valued CSPs*
  - Combinatorics Seminar, Dept. of Mathematics, Queen Mary, University of London, UK, 12/2011.
  - Constraints Group, Department of Computer Science, University of Oxford, UK, 05/2011.
  - TCS Seminar, KTH, Stockholm, Sweden, 05/2011.
- *Tractable triangles*
  - CP, Perugia, Italy, 09/2011.
  - Constraints Group, Department of Computer Science, University of Oxford, UK, 05/2011.
- *Hierarchically nested convex VCSP*
  - CP, Perugia, Italy, 09/2011.
  - Constraints Group, Department of Computer Science, University of Oxford, UK, 05/2011.
- *An algebraic theory of complexity for valued constraints: Establishing a Galois connection*
  - MFCS, Warsaw, Poland, 08/2011.
- *Hybrid tractability of soft constraint problems*
  - Structural Recognition Workshop, Kiev, Ukraine, 10/2010.
  - Microsoft Research, Cambridge, UK, 09/2010.
  - ACiD, Durham, UK, 09/2010.
  - CP, St Andrews, UK, 09/2010.
- *The expressive power of binary submodular functions*
  - IRIT, University of Toulouse, Toulouse, France, 03/2010.
  - MFCS, Nový Smokovec, Slovakia, 08/2009.
  - BAD, Bristol, UK, 05/2009.
  - BCTCS, Warwick, UK, 04/2009.
  - DIMAP Workshop on Algorithmic Graph Theory, Warwick, UK, 03/2009.
  - DIMACS-RUTCOR Workshop on Boolean Functions, Rutgers University, NJ, USA, 01/2009.
  - Cakes Seminar, Department of Computer Science, University of Oxford, UK, 10/2008.

- *The complexity of valued constraint models*
  - CP, Lisbon, Portugal, 09/2009.
  - BCTCS, Durham, UK, 04/2008.
- *Submodular valued constraints*
  - INFORMS, Washington D.C., USA, 10/2008.
  - University of Leeds, UK, 10/2008.
  - CMP, Czech Technical University, Prague, Czech republic, 08/2008.
  - Oxford Brookes University, Oxford, UK, 04/2008.
- *Classes of submodular constraints expressible by graph cuts*
  - CP, Sydney, AU, 09/2008.
  - The University of Melbourne, Melbourne, AU, 09/2008.
- *The expressive power of valued constraints: hierarchies and collapses*
  - Noon Seminar, Charles University, Prague, Czech republic, 12/2007.
  - CIRCA Seminar, University of St Andrews, Scotland, UK, 12/2007.
  - Cakes Seminar, Department of Computer Science, University of Oxford, UK, 11/2007.
- *Expressibility of valued constraints*
  - Doctoral Programme of CP, Providence, RI, USA, 09/2007.

Professional Activities

- Programme Committee Member:
  - Doctoral Programme of CP'09, Doctoral Programme of CP'11.
  - AAAI'10, CP'10, AAAI'11, CP'11, IJCAI'11, AAAI'12, CP'12, SOFSEM'12.
- Programme Co-Chair:
  - Doctoral Programme of CP'10, Doctoral Programme of CP'12.
  - Department of Computer Science Student Conference, University of Oxford, 2008.
- Referee for AAAI, CP, CSL, ECAI, ECCV, ICALP, IJCAI, MFCS, STACS.
- Referee for *Annals of Mathematics and Artificial Intelligence*, *Constraints*, and *Discrete Applied Mathematics*.
- Admissions Interviewer, Hertford College 2008, University College 2009, Balliol College 2010-2011.
- Admissions Interviews, St Anne's College, University of Oxford, 2006, 2008.