Hong Xu

Curriculum Vitæ

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Education

2012– **Doctor of Philosophy (PhD) in Physics expected**, *University of Southern California (USC)*, Los Angeles, California, United States.
Advised by Dr. Satish Kumar Thittamaranahalli (T. K. Satish Kumar) and Dr. Sven Koenig.

2015–2016 **Master of Science (MSc) in Computer Science**, *University of Southern California (USC)*, Los Angeles, California, United States.

2008–2012 **Bachelor of Science (BSc) in Physics**, *University of Science and Technology of China (USTC)*, Hefei, Anhui, P. R. China.
Thesis: Research on the IRX-β relation of galaxies. Advised by Dr. Xu Kong.

Research Interests

Algorithms and Phase Transition for Combinatorial Problems, Hybrid Quantum-Classical Algorithms, and other interdisciplinary areas between Computer Science and Physics in general.

Peer-Reviewed Publications

Stars (*) next to names in the author lists indicate equal contribution.

Conference Papers

2018 [18] **Hong Xu**, Kexuan Sun, Sven Koenig, and T. K. Satish Kumar. 2018. "A Warning Propagation-Based Linear-Time-and-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs". In: *Proceedings of the 15th International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR)*. Also in Proceedings of the 15th International Symposium on Artificial Intelligence and Mathematics (ISAIM-2018).

[17] T. K. Satish Kumar, **Hong Xu**, Zheng Tang, Anoop Kumar, Craig Milo Rogers, and Craig A. Knoblock. 2018. "Alert Generation in Execution Monitoring Using Resource Envelopes". In: *Proceedings of the 31st International FLAIRS Conference (FLAIRS)*.

2017 [16] T. K. Satish Kumar, **Hong Xu**, Zheng Tang, Anoop Kumar, Craig Milo Rogers, and Craig A. Knoblock. 2017. "A Distributed Logical Filter for Connected Row Convex Constraints". In: *Proceedings of the 29th IEEE International Conference on Tools with Artificial Intelligence (ICTAI)*, pp. 96–101. DOI: 10.1109/ICTAI.2017.00026.

[15] **Hong Xu**, Sven Koenig, and T. K. Satish Kumar. 2017. "A Constraint Composite Graph-Based ILP Encoding of the Boolean Weighted CSP". In: *Proceedings of the 23rd International Conference on Principles and Practice of Constraint Programming (CP)*, pp. 630–638. DOI: 10.1007/978-3-319-66158-2_40.

[14] Wolfgang Hönig, T. K. Satish Kumar, Liron Cohen, Hang Ma, **Hong Xu**, Nora Ayanian, and Sven Koenig. 2017. "Summary: Multi-Agent Path Finding with Kinematic Constraints". In: *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, pp. 4869–4873. DOI: 10.24963/ijcai.2017/684. Sister Conference Best Paper Track.

[13] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017a. "Min-Max Message Passing and Local Consistency in Constraint Networks". In: *Proceedings of the 30th Australasian Joint Conference on Artificial Intelligence (AI)*, pp. 340–352. DOI: 10.1007/978-3-319-63004-5_27.

[12] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017c. "The Nemhauser-Trotter Reduction and Lifted Message Passing for the Weighted CSP". In: *Proceedings of the 14th International Conference on Integration of Artificial Intelligence and Operations Research Techniques in Constraint Programming (CPAIOR)*, pp. 387–402. DOI: 10.1007/978-3-319-59776-8_31.

2016

[11] **Hong Xu**, T. K. Satish Kumar, Dylan Johnke, Nora Ayanian, and Sven Koenig. 2016. "SAGL: A New Heuristic for Multi-Robot Routing with Complex Tasks". In: *Proceedings of the 28th IEEE International Conference on Tools with Artificial Intelligence (ICTAI)*, pp. 530–535. DOI: 10.1109/ICTAI.2016.0087.

[10] Liron Cohen, Tansel Uras, T. K. Satish Kumar, **Hong Xu**, Nora Ayanian, and Sven Koenig. 2016. "Improved Solvers for Bounded-Suboptimal Multi-Agent Path Finding". In: *Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI)*, pp. 3067–3074. URL: http://www.ijcai.org/Abstract/16/435.

[9] Wolfgang Hönig, T. K. Satish Kumar, Liron Cohen, Hang Ma, **Hong Xu**, Nora Ayanian, and Sven Koenig. 2016. "Multi-Agent Path Finding with Kinematic Contraints". In: *Proceedings of the 26th International Conference on Automated Planning and Scheduling (ICAPS)*, pp. 477–485. URL: https://www.aaai.org/ocs/index.php/ICAPS/ICAPS16/paper/view/13183/12711. Outstanding paper award in the robotics track.

[8] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2016. "A New Solver for the Minimum Weighted Vertex Cover Problem". In: *Proceedings of the 13th International Conference on Integration of Artificial Intelligence and Operations Research Techniques in Constraint Programming (CPAIOR)*, pp. 392–405. DOI: 10.1007/978-3-319-33954-2_28.

Journal Papers

2017

[7] Hang Ma, Wolfgang Hönig, Liron Cohen, Tansel Uras, **Hong Xu**, T. K. Satish Kumar, Nora Ayanian, and Sven Koenig. 2017. "Overview: A Hierarchical Framework for Plan Generation and Execution in Multi-Robot Systems". In: *IEEE Intelligent Systems* 32.6, pp. 6–12. DOI: 10.1109/MIS.2017.4531217.

Symposium Papers

2018

[6] Masaru Nakajima*, Hong Xu*, Sven Koenig, and T. K. Satish Kumar. 2018. "Towards Understanding the Min-Sum Message Passing Algorithm for the Minimum Weighted Vertex Cover Problem: An Analytical Approach". In: *Proceedings of the 15th International Symposium on Artificial Intelligence and Mathematics (ISAIM)*. URL: http://isaim2018.cs.virginia.edu/papers/ISAIM2018_Nakajima_etal.pdf.

[5] Ferdinando Fioretto, **Hong Xu**, Sven Koenig, and T. K. Satish Kumar. 2018. "Constraint Composite Graph-Based Lifted Message Passing for Distributed Constraint Optimization Problems". In: *Proceedings of the 15th International Symposium on Artificial Intelligence and Mathematics (ISAIM)*. URL: `http://isaim2018.cs.virginia.edu/papers/ISAIM2018_Fioretto_etal.pdf`.

[4] **Hong Xu**, Xin-Zeng Wu, Cheng Cheng, Sven Koenig, and T. K. Satish Kumar. 2018. "The Buss Reduction for the k-Weighted Vertex Cover Problem". In: *Proceedings of the 15th International Symposium on Artificial Intelligence and Mathematics (ISAIM)*. URL: `http://isaim2018.cs.virginia.edu/papers/ISAIM2018_Xu_etal.pdf`.

2017 [3] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017b. "A Linear-Time and Linear-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs". In: *Proceedings of the 10th International Symposium on Combinatorial Search (SoCS)*, pp. 173–174. URL: `https://aaai.org/ocs/index.php/SOCS/SOCS17/paper/viewFile/15789/15080`.

Workshop Papers

2017 [2] Therese Anders, **Hong Xu**, Cheng Cheng, and T. K. Satish Kumar. 2017. "Measuring Territorial Control in Civil Wars Using Hidden Markov Models: A Data Informatics-Based Approach". In: *Proceedings of the NIPS 2017 Workshop on Machine Learning for the Developing World*. arXiv: `1711.06786 [stat.AP]`.

2016 [1] Hang Ma, Sven Koenig, Nora Ayanian, Liron Cohen, Wolfgang Hoenig, T.K. Satish Kumar, Tansel Uras, **Hong Xu**, Craig Tovey, and Guni Sharon. 2016. "Overview: Generalizations of Multi-Agent Path Finding to Real-World Scenarios". In: *Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI) Workshop on Multi-Agent Path Finding*. URL: `https://www.andrew.cmu.edu/user/gswagner/workshop/IJCAI_2016_WOMPF_paper_6.pdf`.

Advised Students

Spring 2018 – Present: Ka Wa Yip (Doctoral student in Physics at the University of Southern California, advised as a senior PhD student)

Summer 2017 – Present: Masaru Nakajima (Doctoral student in Physics at the University of Southern California, advised as a senior PhD student)

Summer 2017 – Present: Kexuan Sun (Master student in Computer Science at the University of Southern California)

Summer/Fall 2017: Cheng Cheng (Undergraduate student in Computer Science/Economics at the University of Southern California)

Summer 2017: Zhi Wang (Undergraduate student in Computer Science at the University of Southern California)

Summer 2015: Dylan Johnke (Undergraduate student in Mathematics at Cornell University, Viterbi Summer Undergraduate Research Experience (SURE) Program)

Talks and Presentations

Conference Presentations

If a presentation is coupled with a publication, then its entry starts with a reference to the corresponding entry. If such a presentation has no venue explicitly specified, then it took place at where the paper was published.

2018-01-05 [4] "The Buss Reduction for the k-Weighted Vertex Cover Problem".

2018-01-05 [5] "Constraint Composite Graph-Based Lifted Message Passing for Distributed Constraint Optimization Problems".

2018-01-03 [18] "A Warning Propagation-Based Linear-Time-and-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs".

2017-11-06 [16] "A Distributed Logical Filter for Connected Row Convex Constraints".

2017-08-29 [15] "A Constraint Composite Graph-Based ILP Encoding of the Boolean Weighted CSP".

2017-06-16 [4] "The Buss Reduction for the k-Weighted Vertex Cover Problem". International Symposium of Combinatorial Search (SoCS).

2017-06-16 [3] "A Linear-Time and Linear-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs".

2016-11-08 "Topic Model Based Multi-Label Classification". IEEE International Conference on Tools with Artificial Intelligence (ICTAI).

2016-11-07 [11] "SAGL: A New Heuristic for Multi-Robot Routing with Complex Tasks".

Conference Review

2018 International Conference on Fuzzy Systems and Data Mining (FSDM)

2018 AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES)

Teaching

Below is a list of courses that I have taught as a teaching assistant at the University of Southern California. The letter "L" in the course reference number indicates that there is a laboratory part in this course.

Spring 2018 INF 552: Machine Learning for Data Informatics

Fall 2017 INF 552: Machine Learning for Data Informatics

Spring 2017 INF 552: Machine Learning for Data Informatics

Spring 2017 PHYS 163L: Advanced Principles of Physics III (lecture only)

Spring 2017 PHYS 153L: Fundamentals of Physics III: Optics and Modern Physics (lab only)

Fall 2016 INF 552: Machine Learning for Data Informatics

Fall 2016 PHYS 135aLg: Physics for the Life Sciences (both lecture and lab)

Fall 2015 PHYS 135aLg: Physics for the Life Sciences (both lecture and lab)

Fall 2014 PHYS 153L: Fundamentals of Physics III: Optics and Modern Physics (both lecture and lab)

Summer 2014 PHYS 135aLg: Physics for the Life Sciences (both lecture and lab)

Spring 2014 PHYS 153L: Fundamentals of Physics III: Optics and Modern Physics (both lecture and lab)

Fall 2013 PHYS 518: Thermodynamics and Statistical Mechanics

Fall 2013 PHYS 153L: Fundamentals of Physics III: Optics and Modern Physics (lab only)

Summer 2013 Physics demo lab for various courses (In-class experiment demo)

Spring 2013 PHYS 153L: Fundamentals of Physics III: Optics and Modern Physics (both lecture and lab)

Fall 2012 PHYS 304: Mechanics

Honors, Awards & Scholarships

2016 ICAPS-2016 outstanding paper award in the robotics track (publication [9]).

2012 USC college merit fellowship.

2012 USTC best bachelor thesis award.

2011 USTC outstanding undergraduate student scholarship.

2011 Honorable winner of mathematical contest in modeling.

2011 Honorable winner of research-oriented physics experiment competition.

2009 USTC outstanding undergraduate student scholarship.

2008 USTC outstanding freshman scholarship.

Applied Skills

Programming Proficient in C/C++, Python and Java. Familiar with many other programming languages, such as Ruby, Lisp, Bash, FORTRAN, MATLAB, etc.

Operating Systems Proficient in GNU/Linux, MacOS and Microsoft Windows. Limited Experiences with FreeBSD and NetBSD.

Languages Proficient in English. Native in Mandarin Chinese (國語,普通話).