

Hong Xu

Curriculum Vitæ

✉ hongx@usc.edu
🌐 www.hong.me

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

Constraint programming, machine learning, and the integration between them. Multiagent systems, parallel algorithms, knowledge representation, applications in artificial intelligence (AI), and other areas in AI.

PUBLICATIONS

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

Preprints

- preprint** [22] Shudan Zhong* and Hong Xu*. preprint. “Learning Embeddings of Directed Networks with Text-Associated Nodes—with Applications in Software Package Dependency Networks”. In: arXiv: 1809.02270.

Conference Papers

- 2018** [21] **Hong Xu**, Sven Koenig, and T. K. Satish Kumar. 2018. “Towards Effective Deep Learning for Constraint Satisfaction Problems”. In: *Proceedings of the 24th International Conference on Principles and Practice of Constraint Programming (CP)*, pp. 588–597. DOI: 10.1007/978-3-319-98334-9_38.
- [20] **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)*, pp. 567–584. DOI: 10.1007/978-3-319-93031-2_41.
- [19] Ferdinando Fioretto, **Hong Xu**, Sven Koenig, and T. K. Satish Kumar. 2018a. “Solving Multiagent Constraint Optimization Problems on the Constraint Composite Graph”. In: *Proceedings of the 21st International Conference on Principles and Practice of Multi-Agent Systems (PRIMA)*.

- [18] 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 Florida Artificial Intelligence Research Society Conference (FLAIRS)*, pp. 38–43. URL: <https://aaai.org/ocs/index.php/FLAIRS/FLAIRS18/paper/view/17615/16853>.
- 2017**
- [17] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017a. “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.
- [16] **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.
- [15] 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.
- [14] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017b. “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.
- [13] Wolfgang Hönl, 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.
- 2016**
- [12] **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.
- [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 Hönl, T. K. Satish Kumar, Liron Cohen, Hang Ma, **Hong Xu**, Nora Ayanian, and Sven Koenig. 2016. “Multi-Agent Path Finding with Kinematic Constraints”. 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.

Journal Papers

- 2017 [8] 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 [7] **Hong Xu**, Cheng Cheng, Sven Koenig, and T. K. Satish Kumar. 2018. “Message Passing Algorithms for Semiring-Based and Valued Constraint Satisfaction Problems”. In: *Proceedings of the 11th International Symposium on Combinatorial Search (SoCS)*, pp. 115–123. URL: <https://aaai.org/ocs/index.php/SOCS/SOCS18/paper/viewFile/17969/17107.pdf>.
- [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. 2018b. “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.

Workshop Papers

- 2017 [3] 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 [2] 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.

Extended Abstract

- 2017 [1] **Hong Xu**, T. K. Satish Kumar, and Sven Koenig. 2017c. “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>.

ADVISED STUDENTS

- Summer 2017 – Spring 2018 Kexuan Sun <<http://www.kianasun.com>>: Master student in Computer Science at the University of Southern California, achieved USC Viterbi School of Engineering Department of Computer Science best research award in April 2018, joined the University of Southern California as a PhD student in Fall 2018.
- Summer 2017 – Spring 2018 Masaru Nakajima: Doctoral student in Physics at the University of Southern California, advised as a senior PhD student.
- Spring 2018 Ka Wa Yip: Doctoral student in Physics at the University of Southern California, advised as a senior PhD student.
- Summer/Fall 2017 Cheng Cheng: Undergraduate student in Computer Science/Economics at the University of Southern California, achieved USC Viterbi School of Engineering computer science award for outstanding research in May 2018, joined Carnegie Mellon University as a PhD student in Fall 2018.
- Summer 2017 Zhi Wang <<http://www.zwang.org>>: Undergraduate student in Computer Science at the University of Southern California, joined the University of California, San Diego as a PhD student in Fall 2018.
- 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.

- 2018-07-15 [7] “Message Passing Algorithms for Semiring-Based and Valued Constraint Satisfaction Problems”.
- 2018-06-28 “Towards Effective Deep Learning for Constraint Satisfaction Problems”. International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR).
- 2018-06-27 [20] “A Warning Propagation-Based Linear-Time-and-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs”.
- 2018-05-21 [18] “Alert Generation in Execution Monitoring Using Resource Envelopes”.
- 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 “A Warning Propagation-Based Linear-Time-and-Space Algorithm for the Minimum Vertex Cover Problem on Giant Graphs”. International Symposium on Artificial Intelligence and Mathematics (ISAIM).
- 2017-11-06 [15] “A Distributed Logical Filter for Connected Row Convex Constraints”.
- 2017-08-29 [16] “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 [1] “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”.

PROFESSIONAL SERVICE

Conference Reviewer

- 2019 The 33rd AAAI Conference on Artificial Intelligence (AAAI)
- 2018 The 24th International Conference on Principles and Practice of Constraint Programming (CP)
- 2018 The 9th International Conference on Decision and Game Theory for Security (GameSec)
- 2018 The 1st AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES)
- 2018 The 4th International Conference on Fuzzy Systems and Data Mining (FSDM)

Symposium Reviewer

- 2018 The 11th International Symposium on Combinatorial Search (SoCS)

Workshop Reviewer

- 2018 The 9th International Workshop on Optimization in Multiagent Systems (OptMAS)

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.

- Fall 2018 ASTR 100Lxg: The Universe (grading only)
- 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).

REFERENCES

T. K. Satish Kumar (Satish Kumar Thittamaranahalli)

Research Assistant Professor / Computer Scientist
Information Sciences Institute
University of Southern California
Marina del Rey, CA 90292, USA
✉ tkskwork@gmail.com

Sven Koenig

Professor
Department of Computer Science
University of Southern California
Los Angeles, CA 90089, USA
✉ skoenig@usc.edu

Ferdinando Fioretto

Research Fellow
Department of Industrial and Operations Engineering
University of Michigan
Ann Arbor, MI 48109, USA
✉ fioretto@umich.edu

Itay Hen

Research Assistant Professor / Computer Scientist
Information Sciences Institute
University of Southern California
Marina del Rey, CA 90292, USA
✉ itayhen@isi.edu