Amulya Yadav

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RESEARCH INTERESTS

Artificial Intelligence, Machine Learning, Social Network Analysis, Computational Game Theory, Mechanism Design, Multiagent Systems and Applications, Large-scale and Robust Optimization.

APPOINTMENTS

Assistant Professor **2018 – Present**
College of Information Sciences and Technology
Penn State University

Graduate Research Assistant **2013 – 2018**
Department of Computer Science
University of Southern California (USC)

Software Development Engineer **2012– 2013**
Amazon Inc.

EDUCATION

Ph.D., Computer Science **2013 – 2018**
University of Southern California (USC)
Advisor: Prof. Milind Tambe
Dissertation: AI for Low-Resource Communities: Influence Maximization in an Uncertain World

B.Tech., Computer Science & Engineering **2008 – 2012**
Indian Institute of Technology (IIT), Patna
Ranked 2nd out of 120 students

SELECT HONORS & AWARDS (BY YEAR)

2017

1. **AAMAS 2017 Best Paper Nomination** My AAMAS 2017 paper "*Influence Maximization in the Field: The Arduous Journey from Emerging to Deployed Application*" won the Best Paper Nomination (*out of 288 papers*).

2. **AAAI 2017 Best Video & Best Student Video** My AAAI 2017 video submission "*HEALER: Using AI to Raise HIV Awareness among Homeless Youth*" was awarded the Best Video and Best Student Video Award (*out of 34 videos*).

3. **USC Best Research Assistant 2017** Won the Best Research Assistant Award in USC's Computer Science Department for the academic year 2016-2017 (*out of 245 students*).

2016

4. **AAMAS 2016 Best Student Paper Award** My AAMAS 2016 paper "*Using Social Networks to Aid Homeless Shelters: Dynamic Influence Maximization under Uncertainty*" was awarded the Best Student Paper Award (*out of 348 papers*).

5. **IDEAS Visionary Paper Award** My IDEAS 2016 paper "*POMDPs for Assisting Homeless Shelters: Computational and Deployment Challenges*" was awarded the Most Visionary Paper Award (*out of 14 papers*).

2015

6. **Incredible Innovations for Social Good 2015** My IAAI 2015 work on influence maximization and POMDPs was highlighted by Mashable.com as one of 26 incredible innovations that improved the world in 2015.

7. **AAAI 2015 Press Conference** My IAAI 2015 paper was one of four papers that was highlighted in the AAAI 2015 press conference (*out of 640 papers*).

RESEARCH INTERNSHIPS

Microsoft Research **Oct 2017 – Jan 2018**
Technology for Emerging Markets (TEM) Group
Mentors: Bill Thies, Amit Sharma

University of Southern California **May 2011 – Jul 2011**
Autonomous Networks Research Group (ANRG)
Mentors: Prof. Bhaskar Krishnamachari

University of Houston **Jun 2010 – Aug 2010**
Department of Computer Science
Mentors: Prof. Rakesh Verma

LIST OF PUBLICATIONS

Refereed Journal & Conference Publications

17. Eric Rice, Robin Petering, Amanda Yoshioka-Maxwell, Jaih Craddock, Darlene Woo, Nicole Wilson, Laura Onasch-Vera, Bryan Wilder, **Amulya Yadav** and Milind Tambe. Piloting the Use of Artificial Intelligence to Enhance HIV Prevention Interventions for Youth Experiencing Homelessness. In *Journal of the Society for Social Work and Research (forthcoming).*

16. **Amulya Yadav**, Ritesh Noothigattu, Eric Rice, Laura Onasch-Vera, Leandro Marcolino, Milind Tambe. Please be an Influencer? Contigency-Aware Influence Maximization. In *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2018*.

15. **Amulya Yadav**, Bryan Wilder, Eric Rice, Robin Petering, Jaih Craddock, Amanda Yoshioka-Maxwell, Mary Hemler, Laura Onasch-Vera, Milind Tambe and Darlene Woo. Bridging the Gap Between Theory and Practice in Influence Maximization: Raising Awareness about HIV among Homeless Youth. In *Proceedings of the 27th International Joint Conference in Artificial Intelligence (IJCAI) Best Paper Track, 2017.*

14. Lily Hu, Bryan Wilder, **Amulya Yadav**, Eric Rice, Milind Tambe. Activating the "Breakfast Club": Modeling Influence Spread in Natural World Social Networks. In *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2018.*

13. **Amulya Yadav**, Hau Chan, Albert Jiang, Haifeng Xu, Eric Rice, Milind Tambe. Maximizing Awareness about HIV in Social Networks of Homeless Youth with Limited Information. In *Proceedings of the 26th International Joint Conference in Artificial Intelligence (IJCAI) Best Paper Track, 2017.*

12. **Amulya Yadav**, Bryan Wilder, Eric Rice, Robin Petering, Jaih Craddock, Amanda Yoshioka-Maxwell, Mary Hemler, Laura Onasch-Vera, Milind Tambe, Darlene Woo. Influence Maximization in the Field: The Arduous Journey from Emerging to Deployed Application. In *Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2017.* **Best Paper Nomination at AAMAS-17**

11. Bryan Wilder, **Amulya Yadav**, Nicole Immorlica, Eric Rice and Milind Tambe. Uncharted but not Uninfluenced: Influence Maximization with an Uncertain Network. In *Proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2017.*

10. **Amulya Yadav**, Hau Chan, Albert Jiang, Haifeng Xu, Eric Rice, Milind Tambe. Using Social Networks to Raise HIV Awareness Among Homeless Youth In *IBM Journal of Research and Development, Vol. 61, Issue 6(4), pp. 1-10, 2017.*

9. Leandro Marcolino, Aravind S. Lakshminarayanan, **Amulya Yadav**, Milind Tambe. Simultaneous Influencing and Mapping Social Networks. In *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems (AAMAS) (Short Paper), 2016.*

8. **Amulya Yadav**, Hau Chan, Albert Jiang, Haifeng Xu, Eric Rice, Milind Tambe. Using Social Networks to Aid Homeless Shelters: Dynamic Influence Maximization under Uncertainty. In *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2016.* **Best Student Paper Award at AAMAS-16**

7. Benjamin Ford, Matthew Brown, **Amulya Yadav**, Amandeep Singh, Arunesh Sinha, Biplav Srivastava, Christopher Kiekintveld, and Milind Tambe. Protecting the NECTAR of the Ganga River through Game-Theoretic Factory Inspections. In *Proceedings of the 14th International Conference on Practical Applications of Agents and Multi-Agent Systems (PAAMS), 2016.*

6. Eric Shieh, Albert Xin Jiang, **Amulya Yadav**, Pradeep Varakantham, Milind Tambe. An Extended Study on Addressing Defender Teamwork while Accounting for Uncertainty in Attacker Defender Games using Iterative Dec-MDPs. In *Multiagent and Grid Systems - 1 (2015) 1-38*

5. Thanh H. Nguyen, Francesco M. Delle Fave, Debarun Kar, Aravind S. Lakshminarayanan, **Amulya Yadav**, Milind Tambe, Noa Agmon, Andrew J. Plumptre, Margaret Driciru, Fred Wanyama, Aggrey Rwetsiba. Making the most of Our Regrets: Regret-based Solutions to Handle Payoff Uncertainty and Elicitation in Green Security Games. In *Proceedings of the 6th Conference on Decision and Game Theory for Security (GameSec), 2015.*

4. **Amulya Yadav**, Leandro Marcolino, Eric Rice, Robin Petering, Hailey Winetrobe, Harmony Rhoades, Milind Tambe, Heather Carmichael. Preventing HIV Spread in Homeless Populations using PSINET. In *Proceedings of the 27th Annual Conference on Innovative Applications of Artificial Intelligence (IAAI), 2015.*

3. Eric Shieh, Albert Xin Jiang, **Amulya Yadav**, Pradeep Varakantham, Milind Tambe. Unleashing Dec-MDPs in Security Games: Enabling Effective Defender Teamwork. In *Proceedings of the 21st European Conference on Artificial Intelligence (ECAI), 2014.*

2. Thanh Hong Nguyen, **Amulya Yadav**, Bo An, Milind Tambe, Craig Boutilier. Regret-based Optimization and Preference Elicitation for Stackelberg Security Games with Uncertainty. In *Proceedings of the 26th National Conference on Artificial Intelligence (AAAI), 2014.*

1. Sriparna Saha, Ashok Singh Sairam, **Amulya Yadav**, Asif Ekbal. Genetic algorithm combined with support vector machine for building an intrusion detection system. In *Proceedings of the International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2012.*

Refereed Magazine Articles

1. **Amulya Yadav**, Leandro Marcolino, Eric Rice, Robin Petering, Hailey Winetrobe, Harmony Rhoades, Milind Tambe, Heather Carmichael. PSINET: Assisting HIV Prevention Amongst Homeless Youth by Planning Ahead. In *AI Magazine, Vol. 32, No. 2, pg 47-62, 2016.*

Book Chapters

3. **Amulya Yadav**, Bryan Wilder, Eric Rice, Robin Petering, Jaih Craddock, Amanda Yoshioka-Maxwell, Mary Hemler, Laura Onasch-Vera, Milind Tambe, Darlene Woo. Deployment of Influence Maximization Algorithms in the Real World: A Case Study In *Artificial Intelligence for Social Welfare, Cambridge University Press, 2017.*

2. **Amulya Yadav**, Bryan Wilder, Hau Chan, Albert Xin Jiang, Eric Rice, Milind Tambe. Using Social Networks to Raise HIV Awareness Among Homeless Youth. In *Artificial Intelligence for Social Welfare, Cambridge University Press, 2017.*

1. **Amulya Yadav**, Hau Chan, Albert Xin Jiang, Eric Rice, Ece Kamar, Barbara Grosz, Milind Tambe. POMDPs for Assisting Homeless Shelters: Computational and Deployment Challenges. In *Autonomous Agents and Multiagent Systems, Visionary Papers, Lecture Notes in AI, 2016.*

Workshop & Symposium Papers

9. **Amulya Yadav**, Aida Rahmattalabi, Ece Kamar, Phebe Vayanos, Milind Tambe and Venil Loyd Noronha. Explanation Systems for Influence Maximization Algorithms. In *IJCAI 2017 International Workshop on Social Influence Analysis , 2017.*

8. Bryan Wilder, **Amulya Yadav**, Nicole Immorlica, Eric Rice and Milind Tambe. Uncharted but not Uninfluenced: Influence Maximization with an Uncertain Network. In *AAMAS 2017 International Workshop on Optimization in Multi-Agent Systems, 2017.*

7. **Amulya Yadav**, Hau Chan, Albert Xin Jiang, Eric Rice, Ece Kamar, Barbara Grosz, Milind Tambe. POMDPs for Assisting Homeless Shelters: Computational and Deployment Challenges. In *AAMAS 2016 Workshop on Issues with Deployment of Emerging Agent-based Systems, 2016.* **Most Visionary Paper Award**

6. Leandro Marcolino, Aravind S. Lakshminarayanan, **Amulya Yadav**, Milind Tambe. Simultaneous Influencing and Mapping Social Networks. In *AAAI 2016 Workshop on Expanding the Boundaries of Health Informatics using AI, 2016.*

5. **Amulya Yadav**, Leandro Marcolino, Eric Rice, Robin Petering, Hailey Winetrobe, Harmony Rhoades, Milind Tambe, Heather Carmichael. Forming Teams of Homeless Youth To Combat HIV Spread. In *AAAI 2016 Spring Symposium on Intelligent systems for distributed human teamwork, 2016.*

4. **Amulya Yadav**, Thanh Nguyen, Francesco Delle Fave, Milind Tambe, Noa Agmon, Manish Jain, Widodo Ramono, Timbul Batubara. Handling Payoff Uncertainty with Adversary Bounded Rationality in Green Security Domains. In *IJCAI-15 Workshop on Algorithmic Game Theory, 2015.*

3. **Amulya Yadav**, Thanh Nguyen, Francesco Delle Fave, Milind Tambe, Noa Agmon, Manish Jain, Widodo Ramono, Timbul Batubara. Handling Payoff Uncertainty in Green Security Domains with Adversary Bounded Rationality. In *IJCAI-15 Workshop on Behavioral, Economic and Computational Intelligence for Security, 2015.*

2. **Amulya Yadav**, Leandro Marcolino, Eric Rice, Robin Petering, Hailey Winetrobe, Harmony Rhoades, Milind Tambe, Heather Carmichael. PSINET - An Online POMDP Solver for HIV Prevention in Homeless Populations. In *AAAI 2015 Workshop on Planning, Search and Optimization, 2015.*

1. Lila Ghemri, Siddhartha Dalal, Irfan Ul-Haq, Rakesh Verma, **Amulya Yadav**. Identifying Relevant Literature on Chemical Terrorism using Machine Learning. In *Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA)-Research Retreat, 2010.*

Video

1. **Amulya Yadav**, Eric Rice, Robin Petering, Jaih Craddock, Bryan Wilder, Milind Tambe. HEALER: Using AI to Raise HIV Awareness among Homeless Youth In *AAAI 2017 Video Competition, Jan 2017.* **Best Video & Best Student Video Award at AAAI-17**

Demos

1. **Amulya Yadav**, Ece Kamar, Barbara Grosz, Milind Tambe. HEALER: POMDP Planning for Scheduling Interventions among Homeless Youth In *Proceedings of the International Conference on Autonomous Agents and Multiagent Systems, May 2016.*

FIELDED & DEPLOYED RESEARCH

- **HEALER System for Awareness about HIV**
  This work focuses on developing models and algorithms for influence maximization in social networks under different kinds of real-world uncertainties and constraints. The work has been deployed in the field for raising awareness about HIV and other STDs among homeless youth in Los Angeles.
- **PAWS (Protection Assistant for Wildlife Security)**
  This work focuses on learning poacher behavior, predicting poaching activities, and generating randomized patrols to combat poaching. The work has been tested or deployed in the field for protecting wildlife Uganda, Malaysia, China and South Africa.

INVITED TALKS

- CS Colloquium Talk, Computer Science Department, March 2018, **Notre Dame University**
- CS Colloquium Talk, College of Information Sciences and Technology, March 2018, **Penn State University**
- CS Colloquium Talk, Computer Science Department, March 2018, **University of Central Florida**
- CS Colloquium Talk, Computer Science Department, February 2018, **Oregon State University**

- AI for Social Good Workshop, March 2017, **Indian Institute of Science (IISc)**
- CS Advisory Board, April 2017, **University of Southern California**

GRANT PROPOSAL ASSISTANCE

Accepted

- *Peers and Social Media to Promote HIV Testing and Treatment for Homeless Youth*. Submission to California HIV/AIDS Research Program (CHRP) *Grant award: 1,000,000 USD*.

Submitted

- *Optimization of biosensor arrays using POMDP*. Submission to National Science Foundation.
- *END-HIV/AIDS: Using Artificial Intelligence to Enhance HIV Prevention for YMSM Homeless Youth*. Submission to Children's Hospital Los Angeles (CHLA) Adolescent Trials Network (ATN).

PROFESSIONAL SERVICE

Co-Chair

- **AAAI 2017 Spring Symposium** on AI for Social Good (AISOC-17)

Conference Program Committee

- AAAI (2019)
- IJCAI (2017)

Conference Reviewing Activity

- AAAI (2018, 2017)
- AAMAS (2018, 2017, 2016, 2015)
- IJCAI (2018, 2016)

STUDENTS MENTORED

- **Ritesh Noothigattu**. (Ph.D., Carnegie Mellon University). Summer 2016.
- **Venil Loyd Noronha**. (M.S., University of Southern California). Fall 2016 - Fall 2018.
- **Donnabell Rachel Lucas Dmello**. (M.S., University of Southern California). Fall 2016 - Fall 2018.
- **Anirudhh Bharadwaj**. (B.S., University of Southern California). Fall 2015 - Fall 2019.

POPULAR MEDIA COVERAGE OF MY RESEARCH

- How AI Could Slow the Spread of HIV, **CityLab**, October 2017
- Spreading Awareness about HIV among Homeless Youth using Artificial Intelligence, **CCC Great Innovative Idea**, May 2017
- Modelling How Information Spreads By Word Of Mouth Is Helping Stop HIV, **FastCompany**, March 2015
- Artificial Intelligence Could Help Reduce HIV Among Homeless Youths, **Motherboard News**, February 2015
- Can an Algorithm Help Prevent HIV From Spreading Among Homeless Young People?, **NextCity**, February 2015
- How an Algorithm Can Help Spread HIV Information Among Homeless Teens, **Mashable**, February 2015
- To Prevent the Spread of HIV Among the Homeless, Researchers Turn to Math, **USC News**, February 2015