Jakub Černý

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Research Interests

Decision making, game theory, bounded rationality, behavioral models, human-machine interactions, cooperation, coordination, persuasion, uncertainty, robustness, optimization.

Education

Doctor of Philosophy in Computer Science — **Nanyang Technological University**
School of Computer Science and Engineering — *2019 – 2023*
Thesis: Commitment and Coordination in Boundedly Rational Interactions
Funding: A*STAR SINGA Award

Master of Science in Discrete Models and Algorithms — **Charles University**
Department of Applied Mathematics, Faculty of Mathematics and Physics — *2014 – 2017*
Thesis: Computational Bounded Rationality

Master of Science in Artificial Intelligence — **Czech Technical University in Prague**
Department of Computer Science, Faculty of Electrical Engineering — *2014 – 2016*
Minor: Robotics
Thesis: Stackelberg Extensive-Form Correlated Equilibrium with Multiple Followers

Bachelor of Science in Computer Science — **Czech Technical University in Prague**
Department of Cybernetics, Faculty of Electrical Engineering — *2011 – 2014*
Minor: Mathematics
Thesis: Playing General Imperfect-Information Games Using Game-Theoretic Algorithms

Appointments

Postdoctoral Research Scientist — **Columbia University**
Department of Industrial Engineering and Operations Research — *08 / 2023 – now*
Funding: United States Department of the Navy, Office of Naval Research

Research Associate — **Nanyang Technological University**
Laboratory of Agent Mediated Intelligence — *10–12 / 2018, 01–06 / 2023*
Funding: Singapore NRF/Industry Alignment Fund Pre-Positioning Programme

Research Assistant — **Czech Technical University**
Collaborative Research Alliance: CMU/UTEP/CTU — *07 / 2016 – 09 / 2018*
Funding: United States Army Research Laboratory

Awards and Honors

A*STAR SINGA Award and Merit Award Laureate — *2018*
PhD scholarship and monthly allowance for pursuing studies in Singapore
First laureate of the Merit Award in the history of >900 scholarship awardees.

Cisco Outstanding Thesis Award Laureate — *2016*
Award for best master thesis related to security

ACM Spy Award Nominee — *2016*
Master thesis shortlisted among top 10 CTU theses

CTU FEE Dean's Awards Laureate — *2016/2014*
MSc/BSc studies finished summa cum laude – among top 6%/2% of students (faculty-wide)

CTU Merit Scholarship Recipient — *2012 – 2015*
Scholarship for excellent study results by Czech Technical University

Research Visits and Internships

Visiting Research Scholar **University of Chicago**
Sigma Laboratory, hosted by Prof. Xu *09 – 12 / 2022*
Project: Persuading short-sighted Bayesian actors in partially observable sequential interactions.

Research Intern **Gen Digital (NortonLifeLock + Avast Software)**
AI Research Laboratory, hosted by Dr. Somol *02 – 06 / 2021*
Project: Discovering human-centered explainable attack strategies in computer attacks behavioral data.

Visiting Researcher **US Army Research Laboratory**
Adelphi Laboratory Center, hosted by Dr. Colbert and Dr. Ben-Asher *06 / 2018*
Project: Computing defender strategies against behavioral learning models of attackers in computer networks.

Visiting Researcher **Carnegie Mellon University**
Dynamic Decision Making Laboratory, hosted by Prof. Gonzalez *06 / 2017*
Project: Modeling cyber security honeypot scenarios via game theory.

Visiting Researcher **University of Texas at El Paso**
Intelligent Agents and Strategic Reasoning Laboratory, hosted by Prof. Kiekintveld *06 / 2017*
Project: Modeling cyber security honeypot scenarios via game theory.

Publications

Preprints

*Unified Perspective on Deep Equilibrium Finding (X. Wang, **J. Černý**, S. Li, Z. Yin, H. Chan and B. An).*

*Offline Equilibrium Finding (S. Li, X. Wang, **J. Černý**, Y. Zhang, H. Chan and B. An).*

*Critical Good Distribution Systems (**J. Černý**, A. Jedličková, M. Loebl and D. Sychrovský).*

Journal papers

*The Dark Triad and Strategic Resource Control in a Competitive Computer Game (S. Curtis, A. Basak, J. Carre, B. Bošanský, **J. Černý**, N. Ben-Asher, M. Gutierrez, D. Jones and C. Kiekintveld).* In Personality and Individual Differences. Elsevier, 2020.

Conference papers

*Generalist Pursuer for Pursuit-Evasion Problems (P. Li, S. Li, X. Wang, **J. Černý**, Y. Zhang, S. McAleer, H. Chan, B. An).* In Proceedings of 23rd International Conference on Autonomous Agents and Multiagent Systems. IFAAMAS, 2024.

*Reducing Optimism Bias in Incomplete Cooperative Games (F. Úradník, D. Sychrovský, **J. Černý**, M. Černý).* In Proceedings of 23rd International Conference on Autonomous Agents and Multiagent Systems. IFAAMAS, 2024.

*Price of Anarchy in a Double-Sided Critical Goods Distribution System (D. Sychrovský, **J. Černý**, S. Lichau and M. Loebl).* In Proceedings of 22nd International Conference on Autonomous Agents and Multiagent Systems. IFAAMAS, 2023.

*Solving Pursuit-Evasion Games Using Pre-Trained Strategies (S. Li, X. Wang, Y. Zhang, H. Chan, **J. Černý** and B. An).* In Proceedings of 37th AAAI Conference on Artificial Intelligence. AAAI Press, 2023.

*Quantal Correlated Equilibrium in Normal Form Games (**J. Černý**, B. An and A. N. Zhang).* In Proceedings of the 2022 ACM Conference on Economics and Computation. ACM, 2022.

*Computing Quantal Stackelberg Equilibrium in Extensive-Form Games (**J. Černý**, V. Lisý, B. Bošanský and B. An).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

*Computing Ex Ante Coordinated Team-Maxmin Equilibria in Zero-Sum Multiplayer Extensive-Form Games (Y. Zhang, B. An and **J. Černý**).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

*Complexity and Algorithms for Exploiting Quantal Opponents in Large Two-Player Games (D. Milec, **J. Černý**, V. Lisý and B. An).* In Proceedings of 35th AAAI Conference on Artificial Intelligence. AAAI Press, 2021.

*Dinkelbach-Type Algorithm for Computing Quantal Stackelberg Equilibrium (**J. Černý**, V. Lisý, B. Bošanský and B. An).* In Proceedings of the 29th International Joint Conference on Artificial Intelligence. AAAI, 2020.

*Finite State Machines Play Extensive-Form Games (**J. Černý**, B. Bošanský and B. An).* In Proceedings of the 2020 ACM Conference on Economics and Computation. ACM, 2020.

*Evaluating Models of Human Behavior in an Adversarial Multi-Armed Bandit Problem (M. Gutierrez, **J. Černý**, N. Ben-Asher, E. Aharonov-Majar, A. Basak, B. Bošanský, C. Kiekintveld and C. Gonzalez)*. In Proceedings of the 41th Annual Meeting of the Cognitive Science Society, 2019.

*Incremental Strategy Generation for Stackelberg Equilibria in Extensive Form Games (**J. Černý**, B. Bošanský and C. Kiekintveld)*. In Proceedings of the 2018 ACM Conference on Economics and Computation. ACM, 2018.

*An Initial Study of Targeted Personality Models in the FlipIt Game (A. Basak, **J. Černý**, M. Gutierrez, S. Curtis, C.Kamhoua, D. Jones, B. Bošanský and C. Kiekintveld)*. In Proceedings of the 2018 Conference on Decision and Game Theory for Security, 2018.

Externally Funded Research Projects

United States Department of the Navy, Office of Naval Research **PIs: C. Kroer, G. Iyengar**
Red Team/Blue Team Games with Contingency Planning and Adversarial Team Games
Total funding: $1,226,862.00
Role: Contractor / Postdoctoral Research Scientist at Columbia University

United States Army, Army Research Laboratory **PIs: C. Kiekintveld, D. Jones, B. Bošanský, N. Cristin**
Defeating the Dark Triad in Cyber-security Using Game Theory
Total funding: $1,350,000.00
Role: Contractor / Research Assistant at Czech Technical University

Teaching Experience

CTU: Parallel and Distributed Computing
Teaching assistant *02 – 05 / 2018*
Co-designed the tutorials for an entirely new course from scratch, including assignments and automatic evaluation.

Related Skills

Programming: Python; C++; Java; TEX

Modeling: Formal cognitive modeling of rationality; process modeling using one-shot and sequential games

Problem-Solving: Formalizing optimal decisions as equilibria; linear, convex and non-convex optimization with CPLEX and Gurobi; grid computing on supercomputers using PBSPro, Slurm

Refereeing: AAMAS (+GAIW/OptLearnMAS); AAAI; DAI; EC; ICLR*; ICML; IJCAI; NeurIPS; WINE

* Outstanding reviewer award in 2022

Languages

Czech: Native proficiency

English: Prof. working proficiency

French: Elementary proficiency

Japanese: Elementary proficiency

References

Prof. Garud Iyengar **garud@ieor.columbia.edu**
Department of Industrial Engineering and Operations Research, Columbia University *Tel. +1 (212) 854 4594*

Prof. Christian Kroer **christian.kroer@columbia.edu**
Department of Industrial Engineering and Operations Research, Columbia University *Tel. +1 (412) 667 0870*

Prof. Bo An **boan@ntu.edu.sg**
School of Computer Science and Engineering, Nanyang Technological University *Tel. +65 6790 5389*

Prof. Haifeng Xu **haifengxu@uchicago.edu**
Department of Computer Science, University of Chicago

Prof. Martin Loebl **loebl@kam.mff.cuni.cz**
Department of Applied Mathematics, FMP, Charles University *Tel. +420 22191 4233*