

# Jakub Černý

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## Research Interests

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Artificial intelligence, multi-agent systems, computational game theory, decision making, bounded rationality, uncertainty, robustness, security, optimization, coordination.

## Education

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<b>Nanyang Technological University</b> <i>PhD., Complex Systems</i> Thesis: Commitment and Correlation in Boundedly Rational Interactions	<b>School of Computer Science and Engineering</b> 2019 – 2023
<b>Charles University</b> <i>Mgr. (MSc.), Applied Mathematics – Discrete Models and Algorithms</i> Thesis: Computational Bounded Rationality	<b>Faculty of Mathematics and Physics</b> 2014 – 2017
<b>Czech Technical University in Prague</b> <i>Ing. (MSc.), Artificial Intelligence, minor: Robotics</i> Thesis: Stackelberg Extensive-Form Correlated Equilibrium with Multiple Followers	<b>Faculty of Electrical Engineering</b> 2014 – 2016
<b>Czech Technical University in Prague</b> <i>Bc. (BSc.), Computer Science, minor: Mathematics</i> Thesis: Playing General Imperfect-Information Games Using Game-Theoretic Algorithms	<b>Faculty of Electrical Engineering</b> 2011 – 2014

## Research Experience

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<b>Agent Mediated Intelligence Research Group at NTU</b> <i>Research Associate</i> Research project: Solving Large-Scale General-Sum Dynamic Games.	10/2018 – 01/2019
<b>Artificial Intelligence Center at CTU</b> <i>Research Assistant, coop. with CMU and UTEP</i> Research project: Defeating the Dark Triad in Cyber Security Using Game Theory.	<b>US Army Research Lab Research Alliance</b> 07/2016 – 09/2018
<b>Agent Technology Center at CTU</b> <i>Research Assistant</i> Research project: General Game Description Language for Computational Game Theory.	01 – 12/2015

## Research Visits and Internships

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<b>NortonLifeLock / Avast Software (Dr. Somol)</b> <i>Research internship</i>	02 – 06/2021
<b>US Army Research Laboratory at Adelphi (Dr. Colbert, Dr. Ben-Asher)</b> <i>Research internship</i> Computing defender strategies against behavioral learning models of attackers in computer networks.	06/2018
<b>CMU: CyLab (Prof. Christin) and DDM Lab (Prof. Gonzalez); UTEP (Prof. Kiekintveld)</b> <i>Research Alliance visit</i> Modeling cyber security scenarios via game theory.	06/2017
<b>Agent Technology Center at CTU (Prof. Bošanský)</b> <i>Research internship</i> Developing double-oracle game-theoretic algorithms based on reverse game tree traversal.	08 – 09/2014

## Publications

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### Working papers.....

*Discrete-Time Stochastic Multi-Player Stopping Games with Affine Payoffs* (G. Bouveret, **J. Černý** and A. Neufeld).

*Double-Sided Market Mechanism for Critical Goods Redistribution*. (D. Sychrovský, M. Loeb, **J. Černý** and J. Fink).

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

### 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.....

*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. Kamboua, D. Jones, B. Bošanský and C. Kiekintveld). In *Proceedings of the 2018 Conference on Decision and Game Theory for Security*, 2018.

### Workshop papers and posters.....

**AAMAS 2019**: International Workshop on Optimization in Multiagent Systems (OptMAS)

**EC 2019**: Workshop on Machine Learning in the Presence of Strategic Behavior

**ICALP 2017**: Game Solving: Theory and Practice Workshop

**US ARL Bootcamp 2017, 2018**: Cyber Security Collaborative Research Alliance Poster Sessions

## Awards and Honors

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### A\*STAR SINGA Award and Merit Award Laureate

*PhD scholarship and monthly allowance for pursuing studies in Singapore* 2018

### Cisco Outstanding Thesis Award Laureate

*Award for best master thesis related to security* 2016

### ACM Spy Award Nominee

*Master thesis shortlisted among top 10 CTU theses* 2016

### CTU FEE Dean's Awards Laureate

*MSc/BSc studies finished summa cum laude – among top 6%/2% of students (faculty-wide)* 2016/2014

### CTU Merit Scholarship Recipient

*Scholarship for excellent study results by Czech Technical University* 2012 – 2015

## Teaching Experience

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### CTU: Parallel and Distributed Computing

*Teaching assistant* 02 – 05 / 2018

Co-created the tutorials for a new course from scratch, including homeworks and automatic evaluation.

## Related Skills

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**Programming:** C++; Python; Java; Matlab; Prolog; Scheme; Haskell; T<sub>E</sub>X

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

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

**Refereeing:** AAMAS/GAIW 2018 – 2021; AAAI 2021; DAI 2020; EC 2019 – 2022; ICLR 2022\*; ICML 2021; IJCAI 2019, 2020; NeurIPS 2020, 2021; WINE 2020

\* Outstanding reviewer award

### Languages

**Czech:** Native proficiency

**French:** Elementary proficiency

**English:** Prof. working proficiency

**Japanese:** Elementary proficiency

### Certificates

**GRE:** Quantitative: 164/170, Verbal: 158/170

**TOEFL:** Total: 111/120; Reading: 30/30, Listening: 30/30, Speaking: 26/30, Writing: 25/30

## References

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### Prof. Bo An

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### Prof. Martin Loeb

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### Prof. Branislav Bošanský

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### Prof. Christopher D. Kiekintveld

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