

Terrence W.K. Mak (麥偉強)

Postdoctoral Fellow

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A Postdoctoral Fellow working on intersections between Artificial Intelligence (AI), Operations Research (OR), and Energy Systems (EE) looking for a junior faculty position in research-based University. Applicant has published more than 17 peer-reviewed papers in various academic domains, including Machine Learning (ML), Operations Research (OR), and Electrical Systems (EE), and have collaborated with researchers and students from all around the world. Currently, the applicant is focusing on Machine Learning Applications in Energy domains.

Education

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|-----------------------|--|---|
| Oct 2014 – July 2018: | Australian National University | PhD (Computer Science) |
| Mar 2013 – Oct 2014: | University of Melbourne | PhD Candidate (transferred with supervisor) |
| Sept 2009 – Aug 2011: | The Chinese University of Hong Kong | MPhil (Computer Science and Engineering) |
| Sep 2006 – Jul 2009: | The Chinese University of Hong Kong | BSc (1 st Hon in Computer Science) |

Professional Employment

Sept 2018 - now: **Georgia Tech** Postdoctoral Fellow (School of Industrial and Systems Engineering)

- **Advanced Research Projects Agency-Energy: Risk-Aware Market Clearing (RAMC)**
 - Designing risk-aware marking clearing mechanism with Midcontinent Independent System Operator
- **Advanced Research Projects Agency-Energy: High Fidelity, Large-Scale, Realistic Dataset Development**
 - Power system dataset research and development for ARPA-E challenge to improve industry practice
- **Advanced Research Projects Agency-Energy: Grid Research for Good project**
 - Differential Privacy & Machine Learning applications, Power System Optimization analysis

Feb 2017 – Aug 2018: **University of Michigan** Research Associate (Industrial and Operations Engineering)

Nov 2015 – Sept 2016: **University of Michigan** Visiting Research Scholar (Industrial and Operations Engineering)

- **Advanced Research Projects Agency-Energy: Grid Research for Good project**
 - Develop new power system format & research software
 - Benchmark analysis collaborating with RTE, a French Transmission Operator

Aug 2011 – Jan 2013: **Chinese University of Hong Kong** Junior Research and Teaching Assistant

- Constraint programming research with distributed algorithms
- Class taught: Introduction to Java programming and object-oriented programming

Research Publication

Working Paper:

- Terrence W.K. Mak, Ferdinando Fioretto, and Pascal Van Hentenryck. Dimension Reduction for Learning AC-OPF: Load Encoding Scheme with Penalty Methods.
- Terrence W.K. Mak, Lyndon Shi, and Pascal Van Hentenryck. Phase Transitions for Optimality Gaps in Optimal Power Flows.

Journal/Transaction Publication:

- Minas Chatzos, Ferdinando Fioretto, Terrence W.K. Mak, and Pascal Van Hentenryck. High-Fidelity Machine Learning Approximations of Large-Scale Optimal Power Flow, *IEEE Trans on Power Systems*, **submitted**, July, 2020.
- Terrence W.K. Mak, Ferdinando Fioretto, Pascal Van Hentenryck. Bilevel Optimization for Differentially Private Optimization in Energy Systems, *Artificial Intelligence*, **submitted**, July, 2020.
- Terrence W.K. Mak, Ferdinando Fioretto, Lyndon Shi, and Pascal Van Hentenryck. Privacy-Preserving Power System Obfuscation: A Bilevel Optimization Approach, *IEEE Trans on Power Systems*, Vol 35, No 2, 1627-1637, 2020.
- Ferdinando Fioretto, Terrence W.K. Mak, and Pascal Van Hentenryck. Differential Privacy for Power Grid Obfuscation, *IEEE Trans on Smart Grid*, Vol 11, No 2, 1356-1366, 2020.
- Terrence W.K. Mak, Pascal Van Hentenryck, Anatoly Zlotnik, and Russell Bent. Dynamic Compressor Optimization in Natural Gas Transmission Systems, *INFORMS Journal on Computing*, Vol 31, No 1, 40-65, 2019.
- Arnaud Lallouet, Jimmy H.M. Lee, Terrence W.K. Mak, Justin Yip. Ultra-Weak Solutions and Consistency Enforcement in Minimax Weighted Constraint Satisfaction, *Constraints*, Vol 20, Issue 2, 109-154, April, 2015.

Conference Publication:

- Ferdinando Fioretto, Pascal Van Hentenryck, Terrence W.K. Mak, Cuong Tran, Federico Baldo, Michele Lombardi. Lagrangian Duality for Constrained Deep Learning, *ECML PKDD'20*, **accepted**, Ghent, Belgium, Sept, 2020.
- Terrence W.K. Mak, Ferdinando Fioretto, and Pascal Van Hentenryck. Privacy-Preserving Obfuscation for Distributed Power Systems, *PSCC'20*, Porto, Portugal, June, 2020.
- Ferdinando Fioretto, Terrence W.K. Mak, Pascal Van Hentenryck. Predicting AC Optimal Power Flows: Combining Deep Learning and Lagrangian Dual Methods, *AAAI'20*, 630-637, New York, USA, February, 2020.
- Ferdinando Fioretto, Terrence W.K. Mak, Pascal Van Hentenryck. Privacy-Preserving Obfuscation of Critical Infrastructure Networks, *IJCAI'19*, 1086-1092, Macau, China, August, 2019
- Terrence W.K. Mak, Lyndon Shi, Pascal Van Hentenryck. Phase Transitions for Optimality Gaps in Optimal Power Flows: A Study on the French Transmission Network, arXiv preprint, July, 2018.
- Terrence W.K. Mak, Pascal Van Hentenryck, Ian A. Hiskens. A Nonlinear Optimization Model for Transient Stable Line Switching, *IEEE American Control Conference 2017*, 2085-2092, Seattle, WA, U.S., May, 2017.

- Terrence W.K. Mak, Pascal Van Hentenryck, Anatoly Zlotnik, Hassan Hijazi, and Russell Bent. Efficient Dynamic Compressor Optimization in Natural Gas Transmission Systems, *IEEE American Control Conference 2016*, 7484-7491, Boston, MA, U.S., July, 2016.
- Hassan Hijazi, Terrence W.K. Mak, Pascal Van Hentenryck. Power System Restoration With Transient Stability, *AAAI'15*, 658-664, Austin, Texas, U.S., January, 2015
- Terrence W.K. Mak, Carleton Coffrin, Pascal Van Hentenryck, Ian A. Hiskens, and David Hill. Power System Restoration Planning with Standing Phase Angle and Voltage Difference Constraints, *PSCC'14*, Wroclaw, Poland, August, 2014
- Jimmy H.M. Lee, Terrence W.K. Mak, and Yuxiang Shi. A General Privacy Loss Aggregation Framework for Distributed Constraint Reasoning, *ICTAI'13*, 979-986, Washington DC, USA, November, 2013
- Patricia Gutierrez, Jimmy H.M. Lee, Ka Man Lei, Terrence W.K. Mak, and Pedro Meseguer. Maintaining Soft Arc Consistencies in BnB-ADOPT+ During Search, *CP'13*, 365-380, Uppsala, Sweden, September, 2013
- Jimmy H.M. Lee, and Terrence W.K. Mak. A Value Ordering Heuristic for Solving Ultra-Weak Solutions in Minimax Weighted CSPs, *ICTAI'12*, pages 17-24, Athens, Greece, November, 2012
- Arnaud Lallouet, Jimmy H.M. Lee, and Terrence W.K. Mak. Consistencies for Ultra-Weak Solutions in Minimax Weighted CSPs Using the Duality Principle, *CP'12*, pages 373-389, Québec City, Canada, October, 2012
- Jimmy H.M. Lee, Terrence W.K. Mak, and Justin Yip. Weighted Constraint Satisfaction Problems with Min-Max Quantifiers, *ICTAI'11*, pages 769-776, Florida, USA, November, 2011

Research Collaboration Experience:

Los Alamos National Lab (CNLS) RTE (French Transmission Operator) MISO (U.S. Transmission Operator)

Class Teaching Experience:

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| Fall'09 | Combinatorial Search and Optimization with Constraints | Teaching Assistant |
| Spring'10, Fall'10, Spring'11 | Principles of Programming Languages. | Teaching Assistant |
| | Best Teaching Assistant Award (2010-2011) | |
| Summer '18 –'20 | Seth Bonder Summer Camp | Lab Instructor |

Optimization Experience

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|-------------------------------|-------------------------------------|--|
| Linear Programming | Gurobi/CPLEX | Nonlinear Programming Ipopt / Bonmin / Knitro |
| Constraint Programming | CP Optimizer / Minizinc / Toulbar 2 | |

Programming Language Experience C/C++, Java, Python, Julia, PHP

Communication Languages

| | | |
|---------|-------------------|---------------------------------|
| English | Cantonese Chinese | Mandarin Chinese (Intermediate) |
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Academic Journal Review Experience

INFORMS Journal on Computing

IEEE Transactions on Power Systems

IEEE Transactions on Control of Network Systems

Artificial Intelligence Review

IEEE Transactions on Smart Grid

IEEE Power Engineering Letters

Academic Conference Review Experience

AAAI Conference on Artificial Intelligence (AAAI)

International Joint Conferences on Artificial Intelligence (IJCAI)

Power Systems Computation Conference (PSCC)

Principles and Practice of Constraint Programming (CP)

American Control Conference (ACC)