

Terrence W.K. Mak

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Postdoctoral Fellow

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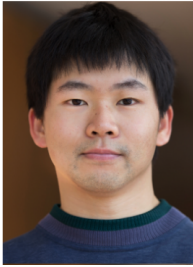
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An interdisciplinary Postdoctoral Fellow funded by ARPA-E (U.S. Department of Energy), with a strong focus on applying **Machine Learning & Optimization** (AI-OPT) to the **Energy Grid / Market targeting Green Renewable Technologies**. Applicant has a broad span and experience over multiple optimization & learning paradigms, with more than 19 peer-reviewed papers, over *400 citations*, and recently a *best transaction paper award on Bilevel programming & Differential Privacy*. See: <https://scholar.google.com/citations?user=IBXyE1EAAA&hl=en>

Education

2014 – 2018:	Australian National University (ANU)	PhD	(Computer Science)
2013 – 2014:	University of Melbourne (UMelb)	PhD-transfer	(Computer Science)
2009 – 2011:	Chinese University of Hong Kong (CUHK)	MPhil	(Computer Science & Eng)
2006 – 2009:	Chinese University of Hong Kong (CUHK)	BSc, 1 st Hon	(Computer Science)

Employment

2018 - now: **Georgia Institute of Technology (GT)** Postdoctoral Fellow

- **Advanced Research Projects Agency-Energy: High Fidelity, Large-Scale, Realistic Dataset Development**
 - Organizing government competitions for energy market optimization <https://gocompetition.energy.gov/>
 - Role: Federal funded supporter Task: Manage dataset/solution format specification. Create hard dataset.
- **Advanced Research Projects Agency-Energy: Risk-Aware Market Clearing (RAMC)**
 - Designing risk-aware marking clearing mechanism with Midcontinent Independent System Operator
 - Role: Advising role Task: Provides advisory/guidance on power system aspects
- **Advanced Research Projects Agency-Energy: Grid Research for Good project (former)**
 - Power systems research & development based on real data from RTE (Transmission Operator in France)
 - Role: Research role Task: Research and development on optimization & differential privacy

2015 - 2018: **University of Michigan (UMich)** Visiting Research Scholar / Research Associate

- **Advanced Research Projects Agency-Energy: Grid Research for Good project (former)**
 - Power systems research & development based on real data from RTE (Transmission Operator in France)
 - Role: Research role Task: Develop new power system software & data format

2011 – 2013: **Chinese University of Hong Kong (CUHK)** Junior Research Assistant

- **Constraint Programming Research**
 - Constraint programming research on weighted constraint satisfaction and distributed constraint satisfaction
 - Role: Research & advising role Task: Continue Master thesis research & advising incoming lab students

Research Publication

Machine Learning & Optimization - Power & Energy:

- **Learning Regionally Distributed AC Optimal Power Flows with ADMM.** Terrence W.K. Mak, Minas Chatzos, Mathieu Tanneau, and Pascal Van Hentenryck, *IEEE Trans on Smart Grid*, working draft.
- **Load Encoding for Predicting AC Optimal Power Flow in Electrical Transmission Systems.** Terrence W.K. Mak, Ferdinando Fioretto, and Pascal Van Hentenryck, KDD'22, submitted.
- **Spatial Network Decomposition for Fast and Scalable AC-OPF Learning.** Minas Chatzos, Terrence W.K. Mak, and Pascal Van Hentenryck, *IEEE Trans on Power Systems*, publishing, Nov 2021.
- **Lagrangian Duality for Constrained Deep Learning.** Ferdinando Fioretto, Pascal Van Hentenryck, Terrence W.K. Mak, Cuong Tran, Federico Baldo, Michele Lombardi, *ECML PKDD'20*, Ghent, Belgium, Sept, 2020.
- **High-Fidelity Machine Learning Approximations of Large-Scale Optimal Power Flow.** Minas Chatzos, Ferdinando Fioretto, Terrence W.K. Mak, and Pascal Van Hentenryck. ArXiv:2006.16356, June, 2020.
- **Predicting AC Optimal Power Flows: Combining Deep Learning and Lagrangian Dual Methods.** Ferdinando Fioretto, Terrence W.K. Mak, Pascal Van Hentenryck, *AAAI'20*, 630-637, New York, USA, February, 2020.

Differential Privacy & Optimization - Power & Energy:

- **Bilevel Optimization for Differentially Private Optimization in Energy Systems. (Working)** Terrence W.K. Mak, Ferdinando Fioretto, Pascal Van Hentenryck., ArXiv 2001.09508, Jan, 2021.
- **Privacy-Preserving Obfuscation for Distributed Power Systems.** Terrence W.K. Mak, Ferdinando Fioretto, and Pascal Van Hentenryck. *Electric Power Systems Research*, Vol 189, Dec 2020, 106718 .
- **Privacy-Preserving Power System Obfuscation: A Bilevel Optimization Approach. (2020 TPWRS Best Paper Award).** Terrence W.K. Mak, Ferdinando Fioretto, Lyndon Shi, and Pascal Van Hentenryck., *IEEE Trans on Power Systems*, Vol 35, No 2, 1627-1637, 2020.
- **Differential Privacy for Power Grid Obfuscation.** Ferdinando Fioretto, Terrence W.K. Mak, and Pascal Van Hentenryck., *IEEE Trans on Smart Grid*, Vol 11, No 2, 1356-1366, 2020.
- **Privacy-Preserving Obfuscation for Distributed Power Systems.** Terrence W.K. Mak, Ferdinando Fioretto, and Pascal Van Hentenryck., *PSCC'20*, Porto, Portugal, June, 2020.
- **Privacy-Preserving Obfuscation of Critical Infrastructure Networks.** Ferdinando Fioretto, Terrence W.K. Mak, Pascal Van Hentenryck., *IJCAI'19*, 1086-1092, Macau, China, August, 2019.

Control/Planning & Optimization - Power & Energy:

- **Dynamic Compressor Optimization in Natural Gas Transmission Systems. (Runner-Up - 2016 INFORMS Computing Society Student Paper Prize.)** Terrence W.K. Mak, Pascal Van Hentenryck, Anatoly Zlotnik, and Russell Bent., *INFORMS Journal on Computing*, Vol 31, No 1, 40-65, 2019.
- **Phase Transitions for Optimality Gaps in Optimal Power Flows: A Study on the French Transmission Network.** Terrence W.K. Mak, Lyndon Shi, Pascal Van Hentenryck., ArXiv :1807.05460, July, 2018.
- **A Nonlinear Optimization Model for Transient Stable Line Switching.** Terrence W.K. Mak, Pascal Van Hentenryck, Ian A. Hiskens. *IEEE American Control Conference 2017*, 2085-2092, Seattle, WA, U.S., May, 2017.

- **Efficient Dynamic Compressor Optimization in Natural Gas Transmission Systems.** [Terrence W.K. Mak](#), Pascal Van Hentenryck, Anatoly Zlotnik, Hassan Hijazi, and Russell Bent., *IEEE American Control Conference 2016*, 7484-7491, Boston, MA, U.S., July, 2016.
- **Power System Restoration With Transient Stability.** Hassan Hijazi, [Terrence W.K. Mak](#), Pascal Van Hentenryck., *AAAI'15*, 658-664, Austin, Texas, U.S., January, 2015
- **Power System Restoration Planning with Standing Phase Angle and Voltage Difference Constraints.** [Terrence W.K. Mak](#), Carleton Coffrin, Pascal Van Hentenryck, Ian A. Hiskens, and David Hill., *PSCC'14*, Wroclaw, Poland, August, 2014

Constraint Programming & Theory [Authors are sorted in alphabetical order w.r.t. to domain standard]

- **Ultra-Weak Solutions and Consistency Enforcement in Minimax Weighted Constraint Satisfaction.** Arnaud Lallouet, Jimmy H.M. Lee, [Terrence W.K. Mak](#), Justin Yip. *Constraints*, Vol 20, Issue 2, 109-154, April, 2015.
- **A General Privacy Loss Aggregation Framework for Distributed Constraint Reasoning.** Jimmy H.M. Lee, [Terrence W.K. Mak](#), and Yuxiang Shi., *ICTAI'13*, 979-986, Washington DC, USA, November, 2013.
- **Maintaining Soft Arc Consistencies in BnB-ADOPT+ During Search.** Patricia Gutierrez, Jimmy H.M. Lee, Ka Man Lei, [Terrence W.K. Mak](#), and Pedro Meseguer. *CP'13*, 365-380, Uppsala, Sweden, September, 2013.
- **A Value Ordering Heuristic for Solving Ultra-Weak Solutions in Minimax Weighted CSPs.** Jimmy H.M. Lee, and [Terrence W.K. Mak](#), *ICTAI'12*, pages 17-24, Athens, Greece, November, 2012.
- **Consistencies for Ultra-Weak Solutions in Minimax Weighted CSPs Using the Duality Principle.** Arnaud Lallouet, Jimmy H.M. Lee, and [Terrence W.K. Mak](#), *CP'12*, pages 373-389, Québec City, Canada, October, 2012.
- **Weighted Constraint Satisfaction Problems with Min-Max Quantifiers.** Jimmy H.M. Lee, [Terrence W.K. Mak](#), and Justin Yip., *ICTAI'11*, pages 769-776, Florida, USA, November, 2011.

Student Mentoring / Advising Experience:

Yuxiang Shi	Master student	CS	former	Chinese University of Hong Kong
Lyndon Shi	undergraduate student	ECE	former	Univeristy of Michigan
Michael Klamkin	undergraduate student	ISYE	current	Georgia Tech
Lasya Akshara	undergraduate student	ISYE	current	Georgia Tech
Minas Chatzos	PhD student	ISYE	current	Georgia Tech
Wenbo Chen	PhD student	CS/ISYE	current	Georgia Tech

National Laboratory Affiliation – Team Working Experience

2015 – 2018:	Data61 of CSIRO (Australia)	PhD sponsored student
2013 – 2015:	NICTA (Australia)	PhD sponsored student

Industry & National Laboratory – External Collaboration Experience:

Energy/Power Transmission Operator: RTE (France), MISO (U.S.)

National Labs: Los Alamos National Lab, Pacific Northwest National Lab, National Renewable Energy Lab

Teaching – Classes/Camps:

Summer '18 –'21	Seth Bonder Summer Camp	Lab Instructor
Spring'10, Fall'10, Spring'11	Principles of Programming Languages. Best Teaching Assistant Award (2010-2011)	Teaching Assistant
Fall'09	Combinatorial Search and Optimization with Constraints	Teaching Assistant

Latest Academic Service

Program Committee	2021 - 2022	International Joint Conferences on Artificial Intelligence (IJCAI)
Workshop Committee	2021 - 2022	Privacy-Preserving Artificial Intelligence (in AAAI)

Optimization Software Experience

Mixed Integer Linear Program	Gurobi/CPLEX
Nonlinear Program	Ipopt / Bonmin / Knitro
Constraint Programming	CP Optimizer / Minizinc / Toulbar 2

Programming Language Experience

C/C++, Java, Python, Julia, PHP

Languages

English	Cantonese Chinese	Mandarin Chinese
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Reviewer

Academic Journal

IJOC	INFORMS Journal on Computing
TPS/TPWRS	IEEE Transactions on Power Systems
TSG	IEEE Transactions on Smart Grid
TCNS	IEEE Transactions on Control of Network Systems
EPSR	Electric Power Systems Research
AIR	Artificial Intelligence Review
PEL	IEEE Power Engineering Letters

Academic Conference

AAAI	AAAI Conference on Artificial Intelligence
IJCAI	International Joint Conferences on Artificial Intelligence
PSCC	Power Systems Computation Conference
CP	Principles and Practice of Constraint Programming
ACC	American Control Conference

Academic / Job Reference

[PhD & Post-doc supervisor]

Prof. Pascal Van Hentenryck

Associate Chair for Innovation and Entrepreneurship

A. Russell Chandler III Chair and Professor

Georgia Institute of Technology

pascal.vanhentenryck@isye.gatech.edu

[Post-doc colleague]

Prof. Ferdinando Fioretti

Assistant Professor

Syracuse University

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[PhD advisor & Collaborator]

Carleton Coffrin

Staff Scientist

Los Alamos National Laboratory

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[PhD advisor]

Hassan Hijazi

Staff Scientist

Los Alamos National Laboratory

hlh@lanl.gov

[Bachelor & M.Phil supervisor]

Jimmy Ho Man Lee

Professor

Chinese University of Hong Kong

jlee@cse.cuhk.edu.hk

Other activities / sports / hobby

Kendo

Georgia Kendo Association (USA)

1 Kyu

F-class rifle

Canberra Rifle Club (Australia)

Student

Violin

ABRSM (Hong Kong)

Grade 3

Trumpet

ABRSM (Hong Kong)

Grade 3