

## Richard T.B. Ma

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### Research Interests

Distributed Systems, Wireless Networks and P2P Networks  
Economics of the Internet and Cloud Computing  
Algorithmic Game Theory and Mechanism Design  
Stochastic Modeling and Analysis

### Education

**Columbia University** **New York, NY**  
*Doctor of Philosophy*, Electrical Engineering Expected 2010  

- Thesis: “Internet Economics and ISP Business Settlements.” One of the first to use advancements in economics and game theory to model and analyze ISPs’ strategic behaviors in routing and interconnecting. Designed a negotiation mechanism to encourage cooperations among ISPs and maximize network utilizations.

*Master of Philosophy*, Electrical Engineering 2008

**The Chinese University of Hong Kong** **Hong Kong**  
*Master of Philosophy*, Computer Science and Engineering 2004  
*Bachelor of Science (First Class Honors)*, Computer Science 2002

### Experience

**Distributed Network Analysis (DNA) Research Group** **Columbia University**  
*Graduate Research Assistant* 2004 – Present  

- Researched on Internet Economics issues including ISP settlements and Net Neutrality.
- Generalized the slotted-Aloha protocol, performed stochastic and game-theoretic analysis and derived theoretical performance bounds for similar wireless networks.

**Telefónica Research & Development, Internet Research Group** **Barcelona, Spain**  
*Visiting Research Fellow* January 2010 – April 2010  

- Work on ISP traffic data analysis and evaluation of Network Neutrality arguments.
- Research on economics of network systems.

**IBM T.J. Watson Research Center** **Hawthorne, NY**  
*Summer Research Intern* May 2006 – August 2006  

- Worked closely with networking and math operations groups to develop stochastic models and conducted large-scale simulations to evaluate the performance of wireless networks.
- Organized presentations for collaborating researchers to update project progress.

**Department of Electrical Engineering** **Columbia University**  
*Teaching Assistant* 2004 – 2005  

- ELEN E4710 - An Introduction to Network Engineering
- ELEN E6768 - Topics in Telecommunication Networks Topic: Emerging Networks

**Advanced Networking Research Group** **The Chinese University of Hong Kong**  
*Graduate Research Assistant* August 2002 – July 2004  

- Modeled and analyzed the “free-riding” problem in P2P networks.
- Applied “algorithmic mechanism design” approach and designed a bidding mechanism to provide incentives for information sharing in P2P networks.

**Center of Cyber Logistics** **The Chinese University of Hong Kong**  
*System Analyst* 2000 – 2002  

- A core member of an air-cargo logistics platform project which involved database management, web application development and logistical optimization.
- Wrote interactive web interfaces using Java Applet and Java Swing.

**Collegiate Programming Contest** **The Chinese University of Hong Kong**  
*Team Captain* 1999 – 2000

- In charge of weekly training for a 3-member team. Led the development of team strategies for programming contents and coordinated among members on all contest-related issues.
- Led team Neptune to compete in ACM International Collegiate Programming Contests held in Taiwan, Singapore and Hong Kong and achieved a best outcome of 8th out of 30 competing teams in Singapore Regional in 2000.

## Journal Publications

Richard T.B. Ma, Dahming Chiu, John C.S. Lui, Vishal Misra and Dan Rubenstein. **Internet Economics: The use of Shapley value for ISP settlement.** *IEEE/ACM Transactions on Networking*, to appear.

Richard T.B. Ma, Vishal Misra and Dan Rubenstein. **An Analysis of Generalized Slotted-Aloha Protocols.** *IEEE/ACM Transactions on Networking*, 17(3), June, 2009.

Richard T.B. Ma, Sam C.M. Lee, John C.S. Lui, David K.Y. Yau. **Incentive and Service Differentiation in P2P Networks: A Game Theoretic Approach.** *IEEE/ACM Transactions on Networking*, 14(5), October, 2006.

Richard T.B. Ma, Vishal Misra and Dan Rubenstein. **Cooperative and Non-cooperative Models for slotted-Aloha type MAC protocols.** *Performance Evaluation Review*, 33(3), December, 2005.

Richard T.B. Ma, Sam C.M. Lee, John C.S. Lui, David K.Y. Yau. **Incentive P2P Networks: A Protocol to Encourage Information Sharing and Contribution.** *Performance Evaluation Review*, 31(2), September, 2003.

## Conference Publications

Richard T.B. Ma, Dahming Chiu, John C.S. Lui, Vishal Misra and Dan Rubenstein. **On Cooperative Settlement Between Content, Transit and Eyeball Internet Service Providers.** *Proceedings of ACM Conference on Emerging network experiment and technology (CoNEXT 2008)*, Madrid, Spain, December, 2008.

Richard T.B. Ma, Dahming Chiu, John C.S. Lui, Vishal Misra and Dan Rubenstein. **Inter-connecting Eyeballs to Content: A Shapley Value Perspective on ISP Peering and Settlement.** *Proceedings of ACM Network Economics (NetEcon '08)*, Seattle, August, 2008.

Richard T.B. Ma, Dahming Chiu, John C.S. Lui, Vishal Misra and Dan Rubenstein. **Internet Economics: The use of Shapley value for ISP settlement.** *Proceedings of 2007 ACM Conference on Emerging network experiment and technology (CoNEXT 2007)*, New York, USA, December, 2007.

Richard T.B. Ma, Vishal Misra and Dan Rubenstein. **Modeling and Analysis of Generalized Slotted-Aloha MAC Protocols in Cooperative, Competitive and Adversarial Environments.** *The 26th International Conference on Distributed Computing Systems (ICDCS)*, Lisbon, Portugal, July 4-7, 2006.

Richard T.B. Ma, Vishal Misra and Dan Rubenstein. **Cooperative and Non-cooperative Models for slotted-Aloha type MAC protocols.** *In Proceedings of The Seventh Workshop on Mathematical performance Modeling and Analysis*, Banff, AB, Canada, June 6, 2005.

Richard T.B. Ma, Sam C.M. Lee, John C.S. Lui, David K.Y. Yau. **A Game Theoretic Approach to Provide Incentive and Service Differentiation in P2P Networks.** *The ACM Sigmetrics/Performance*, June, 2004.

Richard T.B. Ma, Sam C.M. Lee, John C.S. Lui, David K.Y. Yau. **An Incentive Mechanism for P2P Networks.** *The 24th International Conference on Distributed Computing Systems (ICDCS)*, Tokyo, Japan, March, 2004.

Richard T.B. Ma, Sam C.M. Lee, John C.S. Lui, David K.Y. Yau. **Incentive P2P Networks: A Protocol to Encourage Information Sharing and Contribution.** *In Proceedings of The Fifth Workshop on Mathematical performance Modeling and Analysis*, Marina del Rey, CA, USA, June, 2003.

## Invited Paper

Richard T.B. Ma, Dahming Chiu, John C.S. Lui, Vishal Misra and Dan Rubenstein. **The Shapley Value: Its Use and Implications on Internet Economics.** *Proceedings of*

*Allerton Conference on Communication, Control and Computing, September, 2008.*

**Professional Services** Reviewer (Journals) - IEEE/ACM Transactions on Networking, Operations Research, IEEE Journal on Selected Areas in Communications, Performance Evaluation Journal.

Reviewer (Conferences) - ACM SIGCOMM, IEEE INFOCOM, IEEE ICDCS, ACM PODC.

**Technical Background** **Mathematics: Queueing Theory, Information Theory and Probability Theory.**  
**Economics: Algorithmic Game Theory, Mechanism Design and Microeconomics.**  
**Development Tools: Matlab/Simulink, Mathematica, NS-2, CVS.**  
**Programming Languages: C/C++, Java, Python, Ruby, Smalltalk.**

<b>Awards and Scholarships</b>	<b>Electrical Engineering Fellowship, Columbia University</b>	<b>2004</b>
	<b>Hong Kong Jockey Club Scholarship (HK\$ 0.4 million)</b>	<b>1998 – 2002</b>
	<b>Dean's List, The Chinese University of Hong Kong</b>	<b>1999 – 2001</b>
	<b>The 8th Place (Team Neptune), ACM/ICPC Singapore Regional Championship, Programming Contest, Dept. of Computer Science</b>	<b>2000</b>
		<b>1999</b>

<b>References</b>	Prof. Dan Rubenstein Department of Electrical Engineering CEPSR Room 816 Columbia University New York, NY, USA (212) 854-0050 danr@cs.columbia.edu	Prof. Vishal Misra Department of Computer Science 512 CSC Columbia University New York, NY, USA (212) 929-7061 misra@cs.columbia.edu
	Prof. John C.S. Lui Dept. of Computer Science & Engineering HSH Bldg. Room 111 The Chinese University of Hong Kong Hong Kong (852) 2609-8407 cslui@cse.cuhk.edu.hk	Prof. Dah Ming Chiu Dept. of Information Engineering HSH Bldg. Room 814 The Chinese University of Hong Kong Hong Kong (852) 2609-8357 dmchiu@ie.cuhk.edu.hk