

# MÁRK FÉLEGYHÁZI

## Assistant Professor

Laboratory of Cryptography and System Security (CrySyS Lab)  
Department of Telecommunications (HIT)  
Budapest University of Technology and Economics (BME)  
Hungary  
e-mail: mfelegyhazi@crysys.hu

## PERSONAL

Born in Hungary. Citizen of Hungary.

Languages: Hungarian - native, English - fluent, German - fluent, French - intermediate

## RESEARCH

My current research focuses on the economics network security and risk management. As an assistant professor at Budapest University of Technology and Economics (BME), my research interest covers both the system aspect of secure computing and the corresponding incentives of network participants. I recently initiated a project on risk management with a specific emphasis on the security of future Internet architectures. As a postdoctoral researcher at the International Computer Science Institute (ICSI), I studied the infrastructure used by spammers. With my colleagues, we proposed a proactive mechanism to detect domain names likely to be used in malicious activities. This inference solution was part of our larger effort to characterize the operation of spam infrastructures. At UC Berkeley, I focused on security policy issues, notably on cyber-insurance to manage security risks and reliable incident attribution. During my graduate research at EPFL, I worked on reputation-based key revocation, on reputation systems based on game theory to avoid denial of service in wireless ad hoc networks and on incentive-aware network design for various wireless networks. My earlier work at Ericsson Research focused on wireless network design and implementation for Mobile IP protocol and Bluetooth.

## RESEARCH PROJECTS

### Current Projects

- ▷ Security risk management and cyber-insurance
- ▷ Strategic malware analysis - the case of Duqu
- ▷ Internet domain name registrations
- ▷ Proactive domain blacklisting
- ▷ Attacker-defender games
- ▷ Cyber-crime economy, focusing on scam infrastructure

### Past Projects

- ▷ Economics of cyber-insurance
- ▷ Network neutrality and market entry
- ▷ Key revocation in dynamic mobile networks
- ▷ Evolution of wireless social community networks
- ▷ Incentives to thwart DoS and spam in delay-tolerant networks
- ▷ Selfish channel allocation in cognitive radio networks
- ▷ Wireless network operators in a shared spectrum
- ▷ Cooperative packet forwarding in sensor networks
- ▷ Thwarting selfish denial of forwarding in wireless ad hoc networks
- ▷ Network formation with Bluetooth devices
- ▷ Mobile IP testbed implementation

## PROFESSIONAL EXPERIENCE

**Assistant professor**, *Nov. 2010 – present*

LABORATORY OF CRYPTOGRAPHY AND SYSTEM SECURITY (CRYSYS LAB.)  
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS  
BUDAPEST, HUNGARY

**Postdoctoral researcher, Jan. 2009 – Jul 2010**

INTERNATIONAL COMPUTER SCIENCE INSTITUTE  
BERKELEY, USA

**Postdoctoral researcher, Jan. 2008 – Dec. 2008**

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE (EECS)  
UNIVERSITY OF CALIFORNIA, BERKELEY, USA

**Research and teaching assistant, Sep. 2002 – Dec. 2007**

SCHOOL OF COMPUTER AND COMMUNICATION SCIENCES (IC)  
EPFL, SWITZERLAND

**Trainee, 1999 – 2001**

ERICSSON RESEARCH, HUNGARY

## EDUCATION

**PhD. in communication systems, Sep. 2002 – Apr. 2007**

EPFL, SWITZERLAND

thesis title: *Non-cooperative Behavior in Wireless Networks*

advisor: Prof. Jean-Pierre Hubaux

**Doctoral school in communication systems, Oct. 2001 – Jul. 2002**

EPFL, SWITZERLAND

**Diploma (Dipl. Ing.) in electrical engineering, Sep. 1996 – Jun. 2001**

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS (BME), HUNGARY

thesis title: *Development and Evaluation of a Dynamic Bluetooth Scatternet Formation Procedure*

advisors: Dr. György Miklós and Dr. András Valkó (Ericsson Research, Hungary)

major in telecommunication, minor in mobile communication

Hungarian and German certificate (from UNIVERSITÄT KARLSRUHE (TH), GERMANY)

## TEACHING

### Courses

*Economics of Security and Privacy*, BME – 2011

*Computernetzwerke (Computer Networks)*, BME – 2011, 2012

*Operating Computer Networks*, BME – 2011

### Teaching assistant

*Mobile Networks*, EPFL – 2005, 2007

*Self-Organized Mobile Networks*, EPFL – 2003, 2004, 2005, 2006

*Informatics I-II - C++ programming*, EPFL – 2004, 2005

*Object Oriented Programming - JAVA*, EPFL – 2002

## PROFESSIONAL ACTIVITIES

### General Chair

Co-Chair of GameSec 2012

### Program Committee Memberships

TPC member at P2P 2009, GameSec 2010, WiSec 2011, RAWNET 2012

### Reviewer for scientific journals

IEEE/ACM Transactions on Networking (ToN), IEEE Transactions on Mobile Computing (TMC),

IEEE Transactions on Wireless Communications (TWC), Wiley Transactions on Communications,

ACM/Kluwer Mobile Networks and Applications (MONET), IEEE Communication Magazine,

IEEE Communication Surveys and Tutorials

### Reviewer for scientific conferences, workshops

ACM Mobicom, ACM Mobihoc, IEEE Infocom, IEEE WiOpt, ACM WiSe, IEEE DySPAN, ESAS,  
ACM WiSec

## AWARDS

Swiss National Foundation, "Fellowship for Prospective Researchers", 2008  
Selected poster at Mobicom 2005, in the Student Research Competition (best 7 posters)  
EPFL doctoral school fellowship, Oct. 2001 – Jul. 2002  
3rd price at the Students' Scientific Conference, Budapest, Oct. 2000  
2nd price at the Students' Scientific Conference, Budapest, Oct. 1999  
Fellowship of Universität Karlsruhe (TH), Sep. 1998 – Feb. 1999  
Fellowship of the Budapest University of Technology and Economics (BME), 1996 – 2001

# LIST OF PUBLICATIONS

## SELECTED PUBLICATIONS

- ▷ K. Levchenko, N. Chachra, B. Enright, M. Félegyházi, C. Grier, T. Halvorson, C. Kanich, C. Kreibich, H. Liu, D. McCoy, A. Pitsillidis, N. Weaver, V. Paxson, G. M. Voelker, S. Savage, “*Click Trajectories: End-to-End Analysis of the Spam Value Chain*,” in Proceedings of IEEE Symposium on Security & Privacy 2011, Oakland, CA, USA, May 22-25, 2011.
- ▷ M. Félegyházi, C. Kreibich and V. Paxson, “*On the Potential of Proactive Domain Blacklisting*,” in Proceedings of LEET 2010, San Jose, USA, April 27, 2010.
- ▷ N. Shetty, G. Schwartz, M. Félegyházi, and J. Walrand, “*Competitive Cyber-Insurance and Internet Security*,” in T. Moore, D. Pym, and C. Ioannidis, editors, Economics of Information Security and Privacy, pages 229–247, Springer-Verlag, 2010
- ▷ M. Raya, M. H. Manshaei, M. Félegyházi, and J.-P. Hubaux, “*Revocation Games in Ephemeral Networks*,” in Proceedings of ACM CCS 2008, Alexandria, VA, USA, Oct. 27-31, 2008.
- ▷ M. Félegyházi, J.-P. Hubaux and L. Buttyán, “*Nash Equilibria of Packet Forwarding Strategies in Wireless Ad Hoc Networks*,” IEEE Transactions on Mobile Computing (TMC), vol. 5 nr. 5, May 2006.

## PUBLICATIONS

### Book chapter

- ▷ N. Shetty, G. Schwartz, M. Félegyházi, and J. Walrand, “*Competitive Cyber-Insurance and Internet Security*,” in T. Moore, D. Pym, and C. Ioannidis, editors, Economics of Information Security and Privacy, pages 229–247, Springer-Verlag, 2010
- ▷ M. H. Manshaei, M. Félegyházi, J. Freudiger, J.-P. Hubaux, and P. Marbach, “*Spectrum Sharing Games of Network Operators and Cognitive Radios*,” in Cognitive Wireless Networks, F. Fitzek and M. Katz (eds.), Springer, 2007

### Journals

- ▷ L. Buttyán, L. Dóra, M. Félegyházi, and I. Vajda, “*Barter Trade Improves Message Delivery in Opportunistic Networks*,” in Elsevier Ad Hoc Networks Journal, vol. 8, no. 1, January, 2010
- ▷ M. Félegyházi, M. Čagalj and J.-P. Hubaux, “*Efficient MAC in Cognitive Radio Networks: A Game-Theoretic Approach*,” Transactions on Wireless Communications (TWC), vol. 8 nr. 4, April 2009
- ▷ M. Félegyházi and J.-P. Hubaux, “*Wireless Operators in a Shared Spectrum (abstract)*,” ACM Mobile Computing and Communications Review, vol. 10, nr. 4, Oct. 2006.
- ▷ M. Félegyházi, J.-P. Hubaux and L. Buttyán, “*Nash Equilibria of Packet Forwarding Strategies in Wireless Ad Hoc Networks*,” IEEE Transactions on Mobile Computing (TMC), vol. 5 nr. 5, May 2006.

### Conferences, workshops

- ▷ T. Halvorson, J. Szurdi, G. Maier, M. Felegyhazi, C. Kreibich, N. Weaver, K. Levchenko, and V. Paxson, “*The BIZ Top-Level Domain: Ten Years Later*,” in Proceedings of Passive Active Measurements (PAM 2012), Vienna, Austria, March 12-14, 2012.
- ▷ B. Bencsth, G. Pk, L. Buttyán, M. Felegyhazi, “*Duqu: A Stuxnet-like malware found in the wild*,” BME CrySyS Lab., October, 2011., first published in cut-down form as appendix to the Duqu report of Symantec.

- ▷ L. Buttyan, M. Felegyhazi, and B. Bencsath,  
“CLEARER: CrySyS Laboratory Security and Privacy Research Roadmap,”  
in Proceedings of the 1st SysSec Workshop, Amsterdam, The Netherlands, July 6, 2011.
- ▷ K. Levchenko, N. Chachra, B. Enright, M Félegyházi, C. Grier, T. Halvorson, C. Kanich, C. Kreibich,  
H. Liu, D. McCoy, A. Pitsillidis, N. Weaver, V. Paxson, G. M. Voelker, S. Savage,  
“Click Trajectories: End-to-End Analysis of the Spam Value Chain,”  
in Proceedings of IEEE Symposium on Security & Privacy 2011, Oakland, CA, USA, May 22-25, 2011.
- ▷ G. Schwartz, J. Musacchio, M. Félegyházi, and J. Walrand,  
“Network Regulation and Market Entry,”  
in Proceedings of GameNets 2011, Shanghai, China, April 16-18, 2011.
- ▷ H. Liu, K. Levchenko, M. Felegyhazi, C. Kreibich, G. Maier, G. M. Voelker, S. Savage,  
“On the Effects of Registrar-level Intervention,”  
In Proceedings of LEET 2011, Boston, MA, USA, March 29, 2011.
- ▷ R. Böhme and M. Félegyházi,  
“Optimal Security Investment with Penetration Testing,”  
in Proceedings of GameSec 2010, Berlin, Germany, Nov 22-23, 2010.
- ▷ M. Félegyházi, C. Kreibich and V. Paxson,  
“On the Potential of Proactive Domain Blacklisting,”  
in Proceedings of LEET 2010, San Jose, USA, April 27, 2010.
- ▷ N. Shetty, G. Schwartz, M. Félegyházi, and J. Walrand,  
“Competitive Cyber-Insurance and Internet Security,”  
in Proceedings of WEIS 2009, London, England, June 24-25, 2009.
- ▷ M. Raya, M. H. Manshaei, M. Félegyházi, and J.-P. Hubaux,  
“Revocation Games in Ephemeral Networks,”  
in Proceedings of ACM CCS 2008, Alexandria, VA, USA, Oct. 27-31, 2008.
- ▷ A. Mazlounian, M. H. Manshaei, M. Félegyházi, and J.-P. Hubaux,  
“Optimal Pricing Strategy for Wireless Social Community Networks,”  
in Proceedings of the Economics of Networks, Systems, and Computation (NetEcon’08), Seattle, Au-  
gust 22, 2008.
- ▷ M. H. Manshaei, J. Freudiger, M. Félegyházi, J.-P. Hubaux, and P. Marbach,  
“Wireless Social Community Networks: A Game-Theoretic Analysis,”  
in Proceedings of International Zurich Seminar on Communications 2008, Zurich, Switzerland, Mar.  
12-14, 2008.
- ▷ M. H. Manshaei, J. Freudiger, M. Félegyházi, J.-P. Hubaux, and P. Marbach,  
“On Wireless Social Community Networks,”  
in Proceedings of Infocom 2008, Phoenix, USA, Apr. 13-18, 2008.
- ▷ J. Freudiger, M. Raya, M. Félegyházi, P. Papadimitratos and J.-P. Hubaux,  
“Mix-Zones for Location Privacy in Vehicular Networks,”  
in Proceedings of WiN-ITS 2007, Vancouver, Canada, Aug. 14, 2007.
- ▷ L. Buttyán, L. Dóra, M. Félegyházi, and I. Vajda,  
“Barter-Based Cooperation in Delay-Tolerant Personal Wireless Networks,”  
in Proceedings of AOC 2007, Helsinki, Finland, Jun. 18, 2007.
- ▷ M. Félegyházi, M. Čagalj, D. Dufour, and J.-P. Hubaux,  
“Border Games in Cellular Networks,”  
in Proceedings of Infocom 2007, Anchorage, USA, May 6-12, 2007.
- ▷ M. Félegyházi, M. Čagalj, S. Saeedi, and J.-P. Hubaux,  
“Non-Cooperative Multi-Radio Channel Allocation in Wireless Networks,”  
in Proceedings of Infocom 2007, Anchorage, USA, May 6-12, 2007.
- ▷ M. Félegyházi, M. Čagalj, and J.-P. Hubaux,  
“Multi-Radio Channel Allocation in Competitive Wireless Networks,”  
in Proceedings of IBC 2006,  
in conjunction with ICDCS 2006, Lisboa, Portugal, Jul. 4, 2006.

- ▷ M. Félegyházi and J.-P. Hubaux,  
“*Wireless Operators in a Shared Spectrum*,”  
in Proceedings of Infocom 2006, Barcelona, Spain, Apr. 23-29, 2006.
- ▷ M. Félegyházi and L. Buttyán and J.-P. Hubaux,  
“*Cooperative Packet Forwarding in Multi-Domain Sensor Networks*,”  
in Proceedings of PerSeNS 2005,  
in conjunction with PERCOM 2005, Kauai, Hawaii, USA, March 12, 2005.
- ▷ M. Félegyházi, S. Čapkun and J.-P. Hubaux,  
“*SOWER: Self-Organizing Wireless Network for Messaging*,”  
in Proceedings of WMash 2004,  
in conjunction with Mobicom 2004, Philadelphia, USA, Oct. 1, 2004.
- ▷ M. Félegyházi and L. Buttyán and J.-P. Hubaux,  
“*Equilibrium Analysis of Packet Forwarding Strategies in Wireless Ad Hoc Networks – the Static Case*,”  
in Proceedings of Personal Wireless Communication (PWC 2003), Venice, Italy, Sep. 23-25, 2003.
- ▷ M. Félegyházi and Gy. Miklós,  
“*Development and Evaluation of a Dynamic Bluetooth Network Formation Procedure*,”  
in Proceedings of TCMC 2001, Graz, Austria, Oct. 15-16, 2001.

### Theses

- ▷ M. Félegyházi,  
“*Non-cooperative Behavior in Wireless Networks*,”  
PhD. Thesis, EPFL, Lausanne, Switzerland, Apr. 2007.
- ▷ M. Félegyházi,  
“*Development and Evaluation of a Dynamic Bluetooth Scatternet Formation Procedure*,”  
Master Thesis, Budapest University of Technology and Economics (BME), Hungary, Jun. 2001.

### Patents

- ▷ Gy. Miklós and M. Félegyházi,  
“*Traffic Dependent Bluetooth Scatternet Optimization Procedure*,”  
US Patent Nr.: 09/666529, Jul. 2000.

### Technical reports, posters

- ▷ M. Félegyházi and J.-P. Hubaux,  
“*Game Theory in Wireless Networks: A Tutorial*,”  
EPFL Technical Report: LCA-REPORT-2006-002, accepted to ACM Computing Surveys and withdrawn for copyright reasons, Jun. 2006.
- ▷ M. Félegyházi and J.-P. Hubaux,  
“*Wireless Operators in a Shared Spectrum*,”  
refereed poster at Mobicom 2005, Köln, Germany, Aug. 28 - Sep. 2, 2005.
- ▷ M. Félegyházi, L. Buttyán and J.-P. Hubaux,  
“*The Effect of Mobility on Cooperation in Ad Hoc Networks*,”  
refereed poster at WiOpt 2004, Cambridge, UK, Mar. 24-26, 2004.
- ▷ M. Félegyházi, J.-P. Hubaux and L. Buttyán,  
“*Equilibrium Analysis of Packet Forwarding Strategies in Wireless Ad Hoc Networks – the Dynamic Case*,” EPFL Technical Report IC/2003/68, Nov. 2003.
- ▷ M. Félegyházi,  
“*Design and Analysis of a Bluetooth Network Optimization Algorithm*,”  
Students’ Scientific Conference, Budapest, Oct. 2000, 3rd price. (in Hungarian)
- ▷ M. Félegyházi, Cs. Szabó and V. Tímár,  
“*An Experimental Analysis of Mobile IP in a Wireless Environment*,”  
Students’ Scientific Conference, Budapest, Oct. 1999, 2nd price. (in Hungarian)