

IOANNIS BROUSTIS

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PROFILE OVERVIEW Proven strong record of innovation at leading research institutions with 8 pending patents, 34 scientific papers in highly ranked journals and conferences, and 5 major contributions in world-wide standards. Expertise in leading project design and development all the way from concept, to prototyping and further to customer promotion. Leadership in global standards organizations. Areas of interest include:

- Network and middleware system design; cloud security.
- Security in mobile network and middleware systems and services.
- Wireless network solutions; testbed development, measurements.
- Smartphone application and communication security; development, experimentation.

EDUCATION **Ph.D in Computer Science and Engineering**, December 2007
University of California Riverside, USA

M.Sc. in Computer Science and Engineering, June 2005 (3.94/4)
University of California Riverside, USA

Diploma in Electronics and Computer Engineering, June 2003 (8.37/10)
Technical University of Crete, Greece

PROFESSIONAL EXPERTISE - INTERESTS

- **System design and security**
 - *Machine-to-Machine middleware architecture, networking and security.*
 - *3G/4G architecture, hybrid networking, security.*
 - *Cloud-assisted end-to-end secure communications and services.*
 - *Selfish behavior and DoS detection and mitigation.*
- **Wireless network design and experimentation**
 - *Design and implementation of performance enhancement schemes at all layers.*
 - *Measurements, Network programming/scripting, Performance analysis, Simulation.*
 - *Testbed design, deployment, experimentation, administration.*Main topics: Power control, Load balancing, Channel allocation, Rate control, MIMO, Network coding; *Security*: Routing intrusion detection, Jamming detection and mitigation.
- **Smartphone application security**
 - *Application layer security; malware detection and prevention.*
 - *Android based experimentation.*
- **Ultra Wide Band**
 - *PHY/MAC Layer design for UWB Wireless Networks, Simulation, Analysis.*
 - *Multipath delay spread mitigation.*
 - *Bandwidth slicing for efficient medium access.*

WORK EXPERIENCE

R&D Engineer

Alcatel-Lucent, USA

January 4th, 2010 - today

3G/4G network security, Machine-to-Machine architecture and security, Cloud security, End-to-end secure multimedia solutions, mobile security prototyping, security standardization in 3GPP SA3, IETF and ETSI TC M2M.

Assistant Researcher

University of California, Riverside

February 3rd, 2009 - December 31st, 2009

Research on smartphone security and networking, EVDO security, routing security, network coding system design and experimentation, anti-jamming.

Adjunct Assistant Professor

University of Thessaly, Greece

September 29th, 2008 - January 29th, 2009

Teaching: Wireless Mobile Communications and Networks (graduate level).

Visiting Researcher

University of California, Riverside

July 3rd, 2008 - September 3rd, 2008

Research on Wireless Networking, especially network coding system design, GNU radio set-up.

Researcher in Wireless Networking

CERTH (Center for Research and Technology, Hellas)

January 15, 2008 - January 30 2009

Set-up and deployment of a large-scale wireless testbed. Research on wireless networking, especially network coding, social networking, channel allocation for mesh networks and testbed federations. Participation in EU projects: N-Crave, OPNEX, WIP, ONELAB2 (collaboration with Dr. L. Tassiulas).

Research Intern: Wireless Network Engineer

Intel Research, Cambridge, UK

July 3rd - December 1st, 2006

Set-up and deployment of a large-scale wireless testbed, Research on Self-organized Wireless Access Networks, Implementation and Measurements related to power control, frequency selection and user association. Participation in SWAN project (collaboration with Dr. K. Papagiannaki).

Research Intern: Software Engineer

Nokia R&D - Boston Wireless Platforms

June 13th - September 2nd, 2005

Performance evaluation of the Nokia S40 Mobile Phone Internet Browser (collaboration with S. Keller and K. Kalabokis).

Research Assistant

University of California Riverside

January 2004 – December 2007

Advisors: Dr. S. V. Krishnamurthy and Dr. M. Faloutsos

Teaching Assistant

University of California Riverside

Fall 2003

Teaching: CS164 - Computer Networks

Consultant for Internet Training and Company Support

Technical University of Crete, Greece

March 2003 – July 2003

Member of the “Go-online” action line of the operational programs “Information Society” and “Competitiveness”.

Research Assistant

Technical University of Crete, Greece

January 2002 – July 2003

Research on 802.11 WLANs: Efficient joint video-conference and data support techniques. Collaboration with Dr. M. Paterakis

Research Intern: Cellular Network Engineer

Cosmote SA, Athens, Greece

June 2001 – August 2001

Radio-Network Optimization, Network topology planning, Measurement Analysis, Frequency reuse, BTS set-up and maintenance.

PUBLICATIONS

Book Chapters

- I. Broustis, G. Sundaram, S. Mizikovsky and H. Viswanathan. M2M Communications: A Systems Approach. Wiley-Blackwell; Chapter: M2M Security, ISBN-10: 1119994756, March 2012.

Journals

- I. Broustis, G. S. Sundaram and H. Viswanathan. *Detecting and Preventing Machine to Machine Hijacking Attacks in Cellular Networks*. Wiley Bell Labs Technical Journal, Vol. 17, No. 1, June 2012.
- K. Pelechrinis, I. Broustis, S. V. Krishnamurthy and C. Gkantsidis. *A Measurement Driven Anti-Jamming System for 802.11 Networks*. IEEE/ACM Transactions on Networking, Vol. 19, Issue 4, August 2011.
- I. Broustis, K. Pelechrinis, D. Syrivelis, S. V. Krishnamurthy and L. Tassioulas. *A Software Framework for Alleviating the Effects of MAC-aware Jamming Attacks in Wireless Mesh Networks*. Springer Wireless Networks, Vol. 17, No. 6, August 2011.
- G. Athanasiou, I. Broustis and L. Tassioulas, *Efficient Load-Aware Channel Allocation in Wireless Access Networks*. Journal of Computer Systems, Networks and Communications, Vol. 2011, Article ID 972051, May 2011.
- I. Broustis, A. Vlavianos, P. Krishnamurthy and S. V. Krishnamurthy. *MAC Layer Throughput Estimation in Impulse-Radio UWB Networks*. IEEE Transactions on Mobile Computing, Vol. 10, No. 5, May 2011.
- I. Broustis, K. Papagiannaki, S. V. Krishnamurthy, M. Faloutsos and V. Mhatre. *Measurement Driven Guidelines for 802.11 WLAN Design*. IEEE/ACM Transactions on Networking, Vol. 18, No. 3, June 2010.
- I. Broustis and M. Faloutsos. *Routing in Vehicular Networks: Feasibility, Modelling and Security*. International Journal of Vehicular Technology, Vol. 08, ID. 267513, March 2008.
- I. Broustis, S. V. Krishnamurthy, M. Faloutsos, M. Molle and J. Foerster. *Multi-band Media Access Control in Impulse-Based UWB Ad hoc Networks*. IEEE Transactions on Mobile Computing, Vol. 6, No. 4, pp. 351-366, April 2007.
- I. Broustis, M. Molle, S. V. Krishnamurthy, M. Faloutsos and J. Foerster. *A New Binary Conflict Resolution based MAC protocol for Impulse-Based UWB Ad hoc Networks*. Journal of Wireless Communications and Mobile Computing, Special Issue on Wireless Ad hoc Networks: Technologies and Challenges, Vol. 6, Issue 7, pp. 933-949, November 2006.

Conferences

- M. Arslan, K. Pelechrinis, I. Broustis, S. V. Krishnamurthy, P. Krishnamurthy and P. Mohapatra. *Detecting Route Attraction Attacks in Wireless Networks*. IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS), Valencia, Spain, October 2011.
- Z. Feng, J. Ning, I. Broustis, K. Pelechrinis, S. V. Krishnamurthy and M. Faloutsos. *Coping with Packet Replay Attacks in Wireless Networks*. IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), Salt Lake City, UT, USA, June 2011.
- M. Arslan, K. Pelechrinis, I. Broustis, S. Krishnamurthy, S. Addepalli and K. Papagiannaki. *Auto-configuration of 802.11n WLANs*. ACM International Conference on Emerging Networking Experiments and Technologies, (CoNEXT), Philadelphia, PA, USA, November 2010.
- E. Gelal, K. Pelechrinis, I. Broustis, S. V. Krishnamurthy, S. Mohammed, A. Chockalingam and S. Kasera. *On the Impact of MIMO Diversity on Higher Layer Performance*. IEEE International Conference on Distributed Computing Systems (ICDCS), Genoa, Italy, June 2010.
- I. Broustis, K. Pelechrinis, D. Syrivelis, S. V. Krishnamurthy and L. Tassioulas. *Quantifying the Overhead due to Routing Probes in Multi-Rate WMNs*. IEEE Wireless Communications and Networking Conference (WCNC), Sydney, Australia, April 2010.
- T. S. Kim, S. Vural, I. Broustis, D. Syrivelis, S. V. Krishnamurthy and T. La Porta. *A Framework for Joint Network Coding and Transmission Rate Control in Wireless Networks*. IEEE International Conference on Computer Communications (INFOCOM), San Diego, CA, USA, March 2010.

- E. Gelal, K. Pelechrinis, T. S. Kim, I. Broustis, S. Krishnamurthy, B. Rao. *Topology Control for Effective Interference Cancellation in Multi-User MIMO Networks*. IEEE International Conference on Computer Communications (INFOCOM), San Diego, CA, USA, March 2010.
- K. Pelechrinis, I. Broustis, S. V. Krishnamurthy and C. Gkantsidis. *ARES: An Anti-jamming REinforcement System for 802.11 Networks*. ACM International Conference on Emerging Networking Experiments and Technologies, (CoNEXT), Rome, Italy, December 2009.
- K. Pelechrinis, I. Koutsopoulos, I. Broustis and S. V. Krishnamurthy. *Lightweight Jammer Localization in Wireless Networks: System Design and Implementation*. IEEE Global Communications Conference (GLOBECOM), Hawaii, USA, November 2009 .
- I. Broustis, K. Pelechrinis, D. Syrivelis, S. V. Krishnamurthy and L. Tassiulas. *FIJI: Fighting Implicit Jamming in 802.11 WLANs*. International Conference on Security and Privacy in Communication Networks (SECURECOMM), Athens, Greece, September 2009.
- G. Athanasiou, I. Broustis, T. Korakis and L. Tassiulas. *Routing-Aware Channel Selection in Multi-Radio Mesh Networks*. IEEE International Conference on Communications (ICC), Dresden, Germany, June 2009.
- K. Pelechrinis, I. Broustis, T. Salonidis, S. V. Krishnamurthy and P. Mohapatra. *Design and Deployment Considerations for High Performance MIMO Testbeds*. International Wireless Internet Conference (WICON), Invited, Hawaii, USA, November 2008.
- G. Athanasiou, I. Broustis, T. Korakis and L. Tassiulas. *LAC: A Load-Aware Channel Selection Scheme for 802.11 WLANs*. IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Invited, Cannes, France, September 2008.
- A. Vlavianos, E. Law, I. Broustis, S. V. Krishnamurthy, M. Faloutsos. *Assessing Link Quality in IEEE 802.11 Wireless Networks: Which is the Right Metric?*. IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Invited, Cannes, France, September 2008.
- I. Broustis, A. Vlavianos, P. Krishnamurthy and S. V. Krishnamurthy. *CTU: Capturing Throughput Dependencies in UWB Networks*. IEEE International Conference on Computer Communications (INFOCOM), Phoenix, AZ, USA, April 2008.
- I. Broustis, K. Papagiannaki, S. V. Krishnamurthy, M. Faloutsos and V. Mhatre. *MDG: Measurement Driven Guidelines for 802.11 WLAN Design*. ACM International Conference on Mobile Computing and Networking (MOBICOM), Montreal, Canada, September 2007.
- I. Broustis, J. Eriksson, S. V. Krishnamurthy and M. Faloutsos. *A Blueprint for a Manageable and Affordable Wireless Testbed: Design, Pitfalls and Lessons Learned*. IEEE International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TridentCom), Orlando, FL, USA, May 2007.
- I. Broustis, J. Eriksson, S. V. Krishnamurthy and M. Faloutsos. *Implications of Power Control in Wireless Networks: A Quantitative Study*. Passive and Active Measurement Conference (PAM), Louvain-la-neuve, Belgium, April 2007.
- I. Broustis, A. Vlavianos and S. V. Krishnamurthy. *On the MAC Layer Performance of Time-Hopped UWB Ad Hoc Networks*. IEEE International Conference on Computer Communications and Networks (ICCCN), Arlington, VA, USA, October 2006.
- I. Broustis, G. Jakllari, T. Repantis and M. Molle. *A Comprehensive Comparison of Routing Protocols for Large-Scale Wireless MANETs*. IEEE International Workshop on Wireless Ad Hoc and Sensor Networks (in conjunction with SECON), NY, USA, June 2006.
- I. Broustis, M. Faloutsos and S. V. Krishnamurthy. *Overcoming the Challenge of Security in a Mobile Environment*. IEEE International Performance, Computing, and Communications Conference (IPCCC), Phoenix, AZ, USA, April 2006.
- I. Broustis, S. V. Krishnamurthy, M. Faloutsos, M. Molle and J. Foerster. *A Multiband MAC Protocol for Impulse-Based UWB Ad Hoc Networks*. IEEE Communications Society

Conference on Sensor and Ad Hoc Communications and Networks (SECON), Santa Clara, CA, USA, September 2005 (**Best paper runner up**).

- G. Jakllari, I. Broustis, T. Korakis, S. V. Krishnamurthy and L. Tassiulas. *Handling Asymmetry in Gain, in Directional Antenna Equipped Ad Hoc Networks*. IEEE Personal Indoor and Mobile Radio Communications (PIMRC), Berlin, Germany, September 2005.
- I. Broustis and M. Paterakis. *On the Feasibility of Integrated MPEG Teleconference and Data Transmission over IEEE 802.11 WLANs*. IFIP-TC6 Networking Conference, Athens, Greece, May 2004.

Standard Specifications

- European Telecommunications Standards Institute (ETSI) TS 102 690, Release 1 (2011). *Machine-to-Machine communications (M2M); Functional architecture*.
- European Telecommunications Standards Institute (ETSI) TS 102 921, Release 1 (2011). *Machine-to-Machine communications (M2M); mIa, dIa and mId interfaces*.
- 3rd Generation Partnership Project (3GPP) TR 33.868 V0.3.0, Release 11 (2011-04). *Technical Specification Group Services and System Aspects; Security Aspects of Machine-Type Communications*.
- 3rd Generation Partnership Project (3GPP) TR 33.812 V9.2.0, Release 9 (2010-06). *Feasibility Study on the Security Aspects of Remote Provisioning and Change of Subscription for Machine to Machine (M2M) Equipment*.

IETF Internet Drafts

- V. Cakulev, G. Sundaram and I. Broustis. *IBAKE: Identity-Based Authenticated Key Exchange*. IETF Network Working Group, Internet Draft.
- V. Cakulev and I. Broustis. *An EAP Authentication Method Based on Identity-Based Authenticated Key Exchange*. IETF Network Working Group, Internet Draft.

Technical Reports

- I. Broustis, G. Paschos, D. Syrivelis, L. Georgiadis and L. Tassiulas. *NCRAWL: Network Coding for Rate Adaptive Wireless Links*. Technical Report, arXiv No. 1104.0645, April 2011.
- K. Pelechrinis, I. Broustis, S. V. Krishnamurthy and C. Gkantsidis. *A Measurement Driven 802.11 Anti-Jamming System*. Technical Report, arXiv No. 0906.3038, June 2009.
- I. Broustis and M. Faloutsos. *Routing in Vehicular Networks: Feasibility, Security and Modeling Issues*. Technical Report No. UCR-CS-2006-05219, Department of Computer Science and Engineering, University of California, Riverside, 2006.
- I. Broustis and M. Faloutsos. *Overcoming the Challenge of Security in a Mobile Environment*. Technical Report No. UCR-CS-2004-12001, Department of Computer Science and Engineering, University of California, Riverside, December 2004.
- I. Broustis, G. Jakllari, T. Repantis and M. Molle. *A Performance Comparison of Routing Protocols for Large-Scale Wireless Mobile Ad Hoc Networks*. Technical Report No. UCR-CS-2003-12001, Department of Computer Science and Engineering, University of California, Riverside, December 2003.

PATENTS

Currently 8 pending patents. Topics related to:

- Secure group authentication and key agreement;
- Mobile device hijacking detection and prevention;
- End-to-end secure mobile IP telephony;
- Secure Internet group video-conferencing and group messaging.
- Secure social networking.

Further details are proprietary and can be made available upon request.

PROFESSIONAL ACTIVITIES	<ul style="list-style-type: none"> ● Editorial Board Member, Journal of Recent Patents on Telecommunications ● Web Chair, IEEE SECON 2011 ● Technical Program Committee membership IEEE ICNC 2012, IEEE WINTECH 2011, IEEE SECON 2011, 2012, IEEE ICC 2010, 2011, 2012, ICST QShine 2010, IEEE IOT 2010, IEEE PIMRC 2010, 2012, IEEE Trust-Com 2010, 2011, 2012, IEEE OWC 2010, IEEE WoWMom 2010, ACM Mobicom 2009 Demos, ICST SecureComm/SEWCN 2009, IEEE Globecom 2009, 2010, 2011, IEEE Per-com/IQ2S 2009, ● Paper Reviewing Journals: IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, IEEE/ACM Transactions on Networking, IEEE Transactions on Parallel and Distributed Systems, Springer Wireless Networks, ACM Computer And Communications Review, Elsevier Performance Evaluation, IEEE Network Magazine, ACM Mobile Computing and Communications Review, International Journal of Wireless Information Networks, CEE. Conferences/Workshops: ACM SIGCOMM, IEEE INFOCOM, ACM MOBICOM, IEEE SECON, IEEE PERCOM, IEEE Broadnets, IEEE PIMRC, IEEE ICCCN, IEEE GLOBECOM, PAM, IEEE WCNC, IEEE WoWMoM, IEEE VTC, IEEE ICT, IEEE CCNC. ● IEEE member since September 2005
COMPUTER - RELATED SKILLS	<ul style="list-style-type: none"> ● Operating systems Linux, MAC OS, Windows. ● Programming C, C++, Network programming/scripting (bash, awk, sed, etc.), Wireless driver protocol development, Application and middleware solution development, Android development. ● Network Simulations Scalable Networks QualNet Simulator, UWB proprietary simulator.
SCHOLARSHIPS	<ul style="list-style-type: none"> ● Gerondelis Foundation Scholarship, 2007 ● Dean's Fellowship, University of California, Riverside, 2003
PHD THESIS	Cross-Layer Interference Alleviation in Wireless Networks: Measurements, Models and Protocols. (April 2004 – December 2007)
MSC THESIS	Achieving Efficient Spectrum Usage in Ultra Wide Band Ad Hoc Networks: The Case for a Multiband Approach. (April 2004 – May 2005)
DIPLOMA THESIS	Design and Performance Evaluation of a Mechanism, for the Distributed Transmission of MPEG Videoconference Information and Computer Data over IEEE 802.11 WLANs. (July 2002 – May 2003)
LANGUAGES	English (fluent), Greek (fluent)
REFERENCES	Available upon request.