

# Curriculum Vitae

## IONUT CARDEI

Department of Computer & Electrical Engineering and Computer Science  
Florida Atlantic University  
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## Research Interests

- Wireless networking and cognitive networking
- Communication protocols for delay-tolerant networks
- Software design automation, software engineering
- Quality of Service and resource management in computer networks

## Education

- Ph.D. in Computer Science, University of Minnesota, Minneapolis, MN, 2003  
Thesis: Resource Management in Wireless Networks
- M.S. in Computer Science, University of Minnesota, Minneapolis, MN, 1999  
Project: The Implementation of A Real –Time Adaptive Resource Management System
- M.S. in Computer Science, “Politehnica” University of Bucharest, Romania, 1996  
Project: Architecture Study of NUMA Multiprocessor Systems
- B.S. in Computer Science, “Politehnica” University of Bucharest, Romania, 1995  
Project: Group Communication System for Computer Networks

## Professional Affiliation

- Institute of Electrical and Electronics Engineers (IEEE), senior member
- Association of Computer Machinery (ACM), member

## Employment History

**Department of Computer & Electrical Engineering and Computer Science, Florida Atlantic University, Boca Raton, Florida**

- August 2010 – present, Associate Professor
- August 2004 – August 2010, Assistant Professor

**Honeywell Labs, Minneapolis, MN, August 2001 – July 2004, June 1998 – January 2000, Senior Research Scientist**

- Principal Investigator and technical lead for the Dynamic Policy Management project, funded (\$100K) by the DARPA ATO.
- Modeling and simulation study of VDL Mode 3 aeronautical wireless networks for NASA and FAA. Channel modeling and performance evaluation with Opnet simulations.
- Participated in various DARPA and ONR funded projects as investigator.

**CoManage Corporation, Pittsburgh, PA, January 2000- June 2001, Software Development Engineer.** Designed and implemented the Network Discovery, Integrity Checks and the Remote Method Call Subsystems of the Integrated Service Manager network management product.

## Grants

- [pending review] PI, “CPS: Synergy: Mechanisms for Resilient Engineering of Complex CPS Operating in Challenging Environments”, submitted to the NSF, budget \$617,091, notification expected in 11/2015
- Co-PI, Tecore Networks/FAU Foundation, “Smartphone Cognitive Networking for Rapid Response”, 2011- 2014, \$100,000, CAKE project
- PI, FAU Faculty Seed Research Grant: “Data Link and Communication Protocols for Underwater Laser Sensor Networks”, \$20,000, 2012-2013
- PI for the PHM Communications Architecture (Prognosis and Health Monitoring project), funded by the SNMREC, \$107,000 funding for 03/2010 – 12/2013
- Campus 2020, Indoor Localization, Co-PI, Funded by NSF CAKE I/URC at FAU, Fall 2012- Fall 2013, \$12,000
- College of Engineering and Computer Science Faculty Travel Grant to visit Dr. Martin Herman, Chief of the Information Access Division (IAD) at the National Institute of Standards and Technology (NIST), 03/2013.
- Co-PI, “Smart Building Optimization Systems and Algorithms”, NSF I/UCRC, \$20,700, 01/2012-12/2012

- PI for “SGER-Efficient Routing in Semi-Deterministic Delay Tolerant Networks”, funded by NSF, \$50,000, 08/2008 – 07/2010
- PI for “Research for Undergraduates Experience”, grant funded by NSF, \$15,700, 08/2009 – 08/2010
- PI for the “One Pass to Production”, \$34,000, funded by Motorola, 01/2008-01/2009. Requirements-driven design automation.
- Investigator for the the federally-funded project “Secure Telecommunications Networks” - Global Grid Simulation, \$40,000, 01/2008-01/2009. Develop QoS-aware automated web services composition techniques and simulations for the DoD Global Grid.
- Investigator for “One Pass to Production”, funded by Motorola, \$16,000, 2006-2007. Address automated component-based design with UML and domain-specific knowledge management.
- Co-PI for “Collaborative Research: SENSORS: Energy Efficient Communication in Sensor Networks”, funded by NSF, \$162,000, 2003-2008
- Co-PI for “CISE Instrumentation: Wireless and Sensor Networking Laboratory”, funded by NSF and the Division of Research at FAU, \$85,851, 2004-2007
- Co-PI for “NeTS-NBD: Travel Support for the IEEE MASS 2006 Conference in Vancouver, Canada”, funded by NSF, \$15,000, 2006
- PI for “Dynamic Policy Management for Next Generation Communications Systems”, funded by DARPA-ATO, \$102,000, 2002-2003, while at Honeywell Labs.

## **Refereed Publications**

### **U.S. Patents**

- “Resource Management for Ad Hoc Wireless Networks with Cluster Organizations”, patent 7,460,549, awarded on December 2, 2008
- “Burst-mode weighted sender scheduling for ad-hoc wireless medium access control protocols”, patent 7,274,676; awarded on September 25, 2007

### **Journal Articles**

- Fraser R. Dalgleish, Joseph J. Shirron, David Rashkin, Tom E. Giddings, Anni K. Vuorenkoski, Ionut Cardei, Bing Ouyang, Frank M. Caimi and Mihaela Cardei, “A Physical Layer Simulator for Undersea Free Space Laser Communications,” SPIE Optical Engineering Journal 53 (5), 051410 (April 25, 2014); doi: 10.1117/1.OE.53.5.051410
- Marcus, Anthony, Ionut Cardei, Borko Furht, Osman Salem, and Ahmed Mehaoua. “A Mobile Device Prototype Application for the Detection and Prediction of Node Faults in Wireless Sensor Networks”, International Journal of Soft Computing and Software Engineering (JSCSE), ISSN: 2251-7545 & DOI: 10.7321/jscse, Vol. 3, No. 3, pp. 745-752, 2013.

- Ambrose, Arny, Mihaela Cardei, and Ionut Cardei, "HEMS, a Hurricane Evacuation Management System," *Ad Hoc & Sensor Wireless Networks*, Old City Publishing, (1-2) pp. 143-167, 2013
- Yuan, Quan, Ionut Cardei, and Jie Wu "An Efficient Prediction-based Routing in Disruption-Tolerant Networks," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 23, No. 1, 2012, 19-31.
- Marcus, Anthony, Mihaela Cardei, Ionut Cardei, Eduardo Fernandez, Fulvio Frati, and Ernesto Damiani. "A Pattern for Web-based WSN Monitoring." *Journal of Communications* 6, no. 5 (2011): 393-399, "A Pattern for Web-based WSN Monitoring," *Journal of Communications*, special issue on New Advances in Wireless Sensor Networks, Vol. 6, No. 5, pp. 393-399, Aug. 2011.
- Fonoage, Mihai, Ionut Cardei, and Ravi Shankar, "Mechanisms for Requirements Driven Component Selection and Design Automation," *IEEE Systems Journal*, Vol.4, Issue 3, 2010, pp. 396 – 403, doi 10.1109/JSYST.2010.2055030.
- Yuan, Quan, Jie Wu, and Ionut Cardei, "SMRS: A Scalable Multi-Path Routing Scheme," *International Journal of Parallel, Emergent and Distributed Systems*, Vol. 24, No. 1, February 2009, 69-84.
- Cardei, Ionut, and Mihaela Cardei, "Energy-Efficient Connected Coverage in Wireless Sensor Networks", *Special Issue on Coverage Problems of the International Journal of Sensor Networks*, 2008, Vol.3, No.2.
- Cardei, Ionut, Allalaghata Pavan, and Riccardo Bettati, "Quality of Service guarantees and fault-tolerant TCP services in mobile wireless optical networks," *Special Issue on "System Aspects of Wireless Networks"* of the *International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC)*, 2008, Vol. 3, No.3 pp. 146 - 158
- Cardei, Ionut, Mihaela Cardei, Lusheng Wang, Baogang Xu, Ding Zhu Du, "Optimal Relay Location for Energy Constrained Wireless Ad-hoc Networks," *Journal of Global Optimization*, Vol. 36, No. 3, pp. 391-399, Nov. 2006.
- Cardei, Ionut, Srivatsan Varadarajan, Allalaghata Pavan, Lee Graba, Mihaela Cardei, Manki Min, "Resource Management for Ad-hoc Wireless Networks with Cluster Organization," *The Journal of Cluster Computing in the Internet*, Kluwer Academic Publishers, Vol. 7, No. 1, pp. 91-103, Jan. 2004
- Kim, Joonmo, Mihaela Cardei, Ionut Cardei, Xiaohua Jia, "A Polynomial Time Approximation Scheme for the Grade of Service Steiner Minimum Tree Problem", *The Journal of Global Optimization*, Vol. 24, No. 4, pp.439-450, December 2002
- Pavan, Allalaghata, Rakesh Jha, Lee Graba, Saul Cooper, Ionut Cardei, Mihaela Cardei, Vipin Gopal, Sanjay Parthasarathy, and Saad Bedros, "Real-Time Adaptive Resource Management", *IEEE Computer*, July 2001.

## Conference Papers

- Yuan, Quan, Ionut Cardei, Jing Chen, and Jie Wu, "Multi-copy Routing with Trajectory Prediction in Social Delay-Tolerant Networks", the 2015 IEEE Global Communications Conference Wireless Networks (GLOBECOM 2015) (accepted)
- Rubis, Russ, Ionut Cardei, "The Business Data Object Versioning and Change History Patterns," the PLOP 2015 Conference (accepted)
- Rubis, Russ, Ionut Cardei, "The Extended Money Object Pattern", the PLOP 2015 Conference (accepted)
- Cardei, Ionut, Yueshi Wu, and James Junco. "Backup Wi-Fi Ad-Hoc Network for Emergency Response in Scenarios with Sporadic Connectivity and Primary Users." In Mobile Ad-hoc and Sensor Networks (MSN), 2014 10th International Conference on, pp. 66-73. IEEE, 2014.
- Rubis, Russ, Ionut Cardei, "Business Object State Transition Controller." the PLOP 2014 Conference, October 2014, Monticello, IL
- Rubis, Russ, Ionut Cardei, "Pattern for fine-grain access-controlled business objects." the PLOP 2014 Conference, October 2014, Monticello, IL
- Furht, B., V. Aalo, V. Aalo, A. Agarwal, I. Cardei, M. Cardei, N. Erdol, S. Huang, H. Kalva, T. Khoshgoftaar, I. Mahgoub, O. Marques, M. Petrie, D. Raviv, V. Ungvichian, H. Zhu, "Creating Entrepreneurial University," International Conference of Education, Research and Innovation (ICERI 2013), Nov. 2013.
- Cardei, Ionut, Anthony Marcus, and Gabriel Alsenas. "Efficient link management for the wireless communication of an ocean current turbine testbed." In Systems Conference (SysCon), 2014 8th Annual IEEE, pp. 36-41. IEEE, 2014.
- Rubis, Russ, Ionut Cardei, "The Common Business Objects Pattern, " the PLOP 2013 Conference, October 2013, Monticello, IL
- Rashkin, David, Fraser Dalgleish, Ionut Cardei, Bing Ouyang, Anni Vuorenkoski, and Mihaela Cardei. "Experimental validation of an undersea free space laser network simulator in turbid coastal conditions." In SPIE Defense, Security, and Sensing, pp. 872404-872404. International Society for Optics and Photonics, 2013, <http://dx.doi.org/10.1117/12.2019192>
- Marcus, Anthony, Ionut Cardei, and Gabriel Alsenas, "Automation of the SHIELD methodology for system hazard analysis and resilient design," in Systems Conference (SysCon), 2013 IEEE International, pp. 894-901. IEEE, 2013.
- Cardei, Mihaela, Iana Zankina, Ionut Cardei, and Dan Raviv. "Campus Assistant Application on an Android Platform," IEEE SoutheastCon 2013, Apr. 2013
- Rashkin, David, Ionut Cardei, Mihaela Cardei, F. Dalgleish, and T. Giddings, "Detector noise model verification for undersea free space optical data links," IEEE Oceans, 2012 , vol., no., pp.1,7, 14-19 Oct. 2012
- Marcus, Anthony, Ionut Cardei, Timur Tavtilov, Gabriel Alsenas, "Resilient System Design for Prognosis and Health Monitoring of an Ocean Power Generator," the 6<sup>th</sup> IEEE Systems Conference, Vancouver, Canada, March 2012

- Cardei, Mihaela, Anthony Marcus, Ionut Cardei, and Timur Tavtilov. "Web-based Heterogeneous WSN Integration using Pervasive Communication," IEEE International Performance Computing and Communications Conference (IPCCC 2011), Nov. 2011.
- Cardei, Mihaela, Eduardo B. Fernandez, Anupama Sahu, and Ionut Cardei. "A Pattern for Sensor Network Architectures," the Asian Conference on Pattern Languages of Programs (AsianPLoP 2011), 10/2011
- Cardei, Ionut, Ankur Agarwal, Bassem Alhalabi, Timur Tavtilov, Taghi Khoshgoftaar, Pierre-Philippe Beaujean, "Software and Communications Architecture for Prognosis and Health Monitoring of Ocean-based Power Generator," the 5<sup>th</sup> IEEE Systems Conference, Montreal, Canada, April 2011
- Ambrose, Army, Mihaela Cardei, and Ionut Cardei, "Patient-centric Hurricane Evacuation Management System," the IEEE International Performance Computing and Communications Conference (IPCCC 2010), Dec. 2010
- Duhaney, Janell, Taghi M. Khoshgoftaar, Ionut Cardei, Bassem Alhalabi, and John C. Sloan, "Applications of Data Fusion in Monitoring Inaccessible Ocean Machinery," Proceedings of the 16<sup>th</sup> ISSAT International Conference on Reliability and Quality in Design, Washington, D.C., August 5-7, 2010, pp. 318-323.
- Liu, Cong, Jie Wu, and Ionut Cardei, "Message Forwarding in Cyclic MobiSpace:the Multi-copy Case," the 6<sup>th</sup> IEEE International Conference on Mobile Ad Hoc and Sensor Systems, (MASS 2009), October 12 - 15, 2009, Macau SAR, China
- Fonoage, Mihai, Ionut Cardei, Ravi Shankar, "Mechanisms for Requirements Driven Component Selection and Design Automation," the 3<sup>rd</sup> IEEE Systems Conference, Vancouver, Canada, March 2009
- Yuan, Quan, Ionut Cardei, and Jie Wu, "Predict and Relay: An Efficient Routing in Disruption-Tolerant Networks," the 10<sup>th</sup> ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2009.
- Cardei, Ionut, Cong Liu, Jie Wu, and Quan Yuan, "DTN Routing with Probabilistic Trajectory Prediction," the International Conference on Wireless Algorithms, Systems and Applications (WASA), Dallas, TX, USA, 10/2008
- Cardei, Ionut, Mihai Fonoage, and Ravi Shankar, "Model Based Requirements Specification and Validation for Component Architectures," the 2<sup>nd</sup> IEEE Systems Conference, Montreal, Canada, April 2008
- Cardei, Ionut, Mihai Fonoage, and Ravi Shankar, "Framework for Requirements-Driven System Design Automation," the IEEE Systems Conference, Honolulu, Hawaii, April 2007
- Cardei, Ionut, "Energy-Efficient Target Coverage in Heterogeneous Wireless Sensor Networks," the 3<sup>rd</sup> IEEE International Conference on Mobile Ad-hoc and Sensor Systems, Vancouver, Canada, Oct. 2006
- Cardei, Mihaela, Mohammad O. Pervaiz, and Ionut Cardei, "Energy-Efficient Range Assignment in Heterogeneous Wireless Sensor Networks," the International Conference on Wireless and Mobile Communications (ICWMC'06), Jul. 2006

- Cardei, Ionut, Allalaghatta Pavan, and Riccardo Bettati, "Communications Quality of Service for Ad-hoc Mobile Optical Free-Space Networks," IEEE Consumer Communications and Networking Conference, Jan. 2006, Las Vegas, NV
- Cardei, Ionut, Allalaghatta Pavan, and Riccardo Bettati, "Architecture for Delay-Sensitive Communication in Mobile Optical Free-Space Networks," the 2<sup>nd</sup> IEEE International Conference on Mobile Ad-hoc and Sensor Systems, Washington DC, Nov. 2005
- Cardei, Ionut, "QoS Support for Delay Sensitive Applications in Wireless Networks of UAVs," NSF International Workshop on Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless and Peer-to-Peer Networks, Fort Lauderdale, FL, 2004
- Cardei, Ionut, and Sabera Kazi, "MAC layer QoS support for wireless networks of unmanned air vehicles," Proceedings of the 37<sup>th</sup> Hawaii International Conference on System Sciences (HICSS-37), Kauai, Hawaii, Jan. 2004
- Cardei, Ionut, and Sabera Kazi, "QoS-enabled MAC Protocol For Wireless Networks of Unmanned Air Vehicles," IASTED International Conference on Wireless and Optical Communications (WOC 2003), Banff, Canada
- Cardei, Ionut, Rakesh Jha, Mihaela Cardei, and Allalaghatta Pavan, "Hierarchical Architecture For Real-Time Adaptive Resource Management," The IFIP/ACM International Conference on Distributed Systems Platforms and Open Distributed Processing, April 2000, New York, USA
- Cardei, Ionut, Ionut Cardei, Rakesh Jha, and Allalaghatta Pavan, "Hierarchical Feedback Adaptation for Real-Time Sensor-based Distributed Applications," the 3rd IEEE International Symposium on Object-oriented Real-time distributed Computing (ISORC), March 2000, Newport Beach, California, USA

### **Books and Book Chapters**

- Quan Yuan, Mihai Fonoage, and Ionut Cardei, "Mechanisms for Automatic Web Service Composition", Book Chapter in "Encyclopedia of Next-Generation Mobile Networks and Ubiquitous Computing," IGI Global, 2010
- I. Cardei, C. Liu and J. Wu, "Routing In Wireless Networks With Intermittent Connectivity", Encyclopedia of Wireless and Mobile Communications, CRC Press, Taylor & Francis Group, in production, 2007
- I. Cardei, "QoS Support for Delay Sensitive Applications in Wireless Networks of UAVs", book chapter in "Handbook of Theoretical and Algorithmic Aspects of Ad Hoc, Sensor, and Peer-to-Peer Networks", CRC Press, 2005
- I. Cardei and D.-Z. Du, "Energy Efficient Wireless Networks", book chapter in "Mobile Computing Handbook", edited by Imad Mahgoub and Mohammad Ilyas, CRC Press, ISBN: 0849319714, pp. 689-706, 2004.
- M. Cardei, I. Cardei, D.-Z. Du: "Energy Efficient Approaches in Wireless Networking", book chapter in "Ad Hoc Wireless Networking", X.Cheng, X. Huang and D.-Z. Du (editors), Kluwer Academic Publishers, 2004.

- M. Cardei, I. Cardei, D.-Z. Du (editors): “Resource Management in Wireless Networking”, Kluwer Academic Publisher, 2004.

## **Non-refereed Publications**

### **Technical Reports**

- M. Cardei, D. MacCallum, S. Chen, I. Cardei, D.-Z. Du, “Approximation Solutions for the Resource Management Problem Using the General Cover Problem”, TR01-047, Computer Science Department, University of Minnesota

## **Current Students Supervised**

- Russ Rubis, PhD candidate
- Lynn Grande, PhD candidate
- James Junco, PhD candidate
- David Rashkin, PhD candidate

## **Students Supervised who Graduated**

- Anthony Marcus, PhD, 2013, “Resilient System Design and Efficient Link Management for the Wireless Communication of an Ocean Current Turbine Testbed”
- Saeid Azandaryani, MSc, 2013, “Indoor Localization Using Wi-Fi Fingerprinting”
- Timur Tavtilov, MSc, 2011, “Prognosis and Health Monitoring Communications Quality of Service”
- Mihai Fonoage, PhD, 2010, “Framework for Requirements-Driven System Design Automation”
- Cong Liu, PhD, 2009 (co-adviser), “Design and Implementation of Efficient Routing Protocols in Delay Tolerant Networks”
- Quan Yuan, PhD, 2009, “Probabilistic Prediction-Based Routing in Disruption-Tolerant Networks”



## **Classes Taught at FAU**

### **Undergraduate Classes**

- COP 3530 Data Structures and Algorithm Analysis
- CET 3350 Applied Data Structures
- COP 4331 Object Oriented Design and Programming
- CNT 4104 Introduction to Data Communications
- COP 4610 Computer Operating Systems
- CET 4589 Internet Computing 2
- CET 4915 Capstone Project

### **Graduate Classes**

- COP 5339 Object Oriented Software Design
- CNT 5008 Computer Networks
- EEL 6591 Wireless Networks
- CNT 6516 Advanced Computer Networking
- COT 4930/5930 Wireless Sensor Networks

### **Industry Classes**

- Linux Kernel Programming

## **Service**

### **College Committees (last 5 years)**

- CP&D Committee (2013-2015)
- Undergraduate Programs Committee (2013-2014)

### **Department Committees (last 5 years)**

- Chair of Laboratory/Equipment Committee (2014-2015)
- Laboratory/Equipment Committee (2013-2015)
- New Faculty Hiring Committee (2015)
- Undergraduate CS Program Committee (2013-2015)
- Personnel Committee (2014-2015)
- Executive Committee (2011-2015)

- Teaching and Graduate Assistants Committee (2013-2015)
- Chair of the BIET Program Committee (2007-2012)
- Undergraduate Programs Committee (2010-2013)
- ABET/SACS Committee (2010-2012)

Undergraduate Marshall at the FAU Summer 2015 Commencement Ceremony

## **Professional Service**

- NSF panelist for wireless networks, 2010, 2007
- TPC member for IEEE SysCon 2015, IEEE SysCon 2014, IEEE MSN 2014 (session chair), WASA 2014, CSoNet 2014, IEEE SysCon 2013, IEEE ISPA-11, IEEE Infocom 2011, IEEE WCNC 2011, IEEE ICCCN 2011, IEEE MSN 2010, ICDCS 2010, IWCMC 2010, and others
- reviewer for IEEE Transaction of Mobile Computing, IEEE Transactions on Evolutionary Computation, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Vehicular Technology, ACTA Press, IEEE JPDC, Elsevier Engineering Applications of Artificial Intelligence, IEEE Transactions for Computers, COMNET, Elsevier Journal of Computer Networks, IEEE Transactions for Wireless Communications,
- Proceedings Chair for the 13th IEEE International High Assurance Systems Engineering Symposium
- TPC co-chair for SAPIR 2007
- Information Chair for IEEE MASS 2006
- Invited speaker at the NSF International Workshop on Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless and Peer-to-Peer Networks, February 2004, Fort Lauderdale
- Co-chair for the Quality of Service session at the IASTED Wireless and Optical Communications Conference, Banff, Canada, July 2003
- Referee for conferences and journals

## **Honors and Awards**

- Technical Achievement Award, from the Honeywell Aerospace and Electronic Systems Lab in 2003
- Technical Achievement Award, from the Honeywell Global Controls Lab in 2001
- Technical Achievement Award, from the Honeywell Communication and Software Architectures Lab in 2001

- Second Prize at the Computer Science Workshop at the "Politehnica" University of Bucharest, for "Communication Methods in Distributed Systems. Group Communication in LANs", June 1995
- Third Prize at the National Student Computer Science Contest, Hardware Chapter, Craiova, Romania, May 1994
- Merit Scholarship, from the Ministry of Education, 1991 – 1996