

# Cosmin A. Rusu

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## EDUCATION

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- Ph.D. in Computer Science (expected 2006)  
*University of Pittsburgh, Pittsburgh, PA (GPA 3.81)*
- B. Sc. in Computer Science, June 2000  
*Technical University of Cluj-Napoca, Romania*

## AWARDS

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- First prize in maRTian Task competition, *Real-Time Systems Symposium (RTSS) 2005*  
Simulated robot programming competition involving real-time planning and map discovery.
- Andrew Mellon Predoctoral Fellowship, *University of Pittsburgh 2003-2004*  
Annual fellowship awarded to exceptional Ph.D. students at the University of Pittsburgh, consisting of tuition and a \$16,000 stipend.
- Graduate Student Research Award, *University of Pittsburgh 2003*  
Award given for presenting the best student research paper among computer science graduate students during the academic year 2002-2003, sponsored by Compunetix.
- B. Sc. honors scholarship, *Technical University of Cluj-Napoca (1995 - 2000)*  
Government sponsored merit based scholarship, awarded yearly.

## RESEARCH PROJECTS

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I am interested in Systems in general, with emphasis on Power-aware computing, Real-time systems and Embedded systems.

- *Energy-reward tradeoffs in hard real-time systems*  
Three constraints need to be addressed in power-aware real-time systems: energy, time and task reward/values. I investigated both continuous and discrete reward and power functions, in the context of periodic hard real-time systems [1,2,4,10,12].
- *Energy conservation in QoS-aware soft real-time clusters*  
Local and global power management techniques are proposed for cluster-wide QoS-aware energy minimization. Implementation efforts include a satellite-based embedded cluster and a real-time Apache web server cluster [5,7,9].
- *Power modeling and peak power control in servers*  
My research as a summer intern at IBM's Austin Research Lab (ARL) involved power modeling of the PowerPC 405GP and 405LP embedded processors (Summer 2001, power model is now part of the IBM Mambo PPC405 simulator), instruction reordering for low power on the PPC405 architecture (Summer 2002) and dynamic power budgeting to reduce peak-power consumption in servers (Summer 2004, patent co-author) [3,6,8,11].

## JOURNAL PUBLICATIONS

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1. **C. Rusu**, R. Melhem, and D. Mossé  
Multi-Version Scheduling in Rechargeable Energy-aware Real-time Systems  
*Journal of Embedded Computing*, 2004
2. **C. Rusu**, R. Melhem, and D. Mossé  
Maximizing the System Value while Satisfying Time and Energy Constraints  
*IBM Journal of Research and Development*, vol. 47, no. 5/6, 2003
3. H. Shafi, P. Bohrer, J. Phelan, J. Peterson (IBM ARL), and **C. Rusu**  
The Design and Validation of a System Performance and Power Simulator  
*IBM Journal of Research and Development*, vol 47, no. 5/6, 2003
4. **C. Rusu**, R. Melhem, and D. Mossé  
Maximizing Rewards for Real-Time Applications with Energy Constraints  
*ACM Transactions on Embedded Computing Systems*, vol. 2, no. 4, 2003

## CONFERENCE PUBLICATIONS

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5. **C. Rusu**, A. Ferreira, C. Scordino, A. Watson, R. Melhem, and D. Mossé  
Energy-Efficient Real-Time Heterogeneous Server Clusters  
*IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, San Jose, CA, April 2006
6. W. Felter, K. Rajamani, T. Keller (IBM ARL), and **C. Rusu**  
A Performance-Conserving Approach for Reducing Peak Power Consumption in Server Systems  
*ACM International Conference on Supercomputing (ICS)*, Cambridge, MA, June 2005
7. R. Xu, D. Zhu, **C. Rusu**, R. Melhem, and D. Mossé  
Energy-Efficient Policies for Embedded Clusters  
*ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*, Chicago, June 2005
8. W. Felter, K. Rajamani, T. Keller (IBM ARL), and **C. Rusu**  
Power Shifting: A System-Level Approach for Increasing Performance Under Constrained Power Budgets  
*IBM Austin Conference on Energy-Efficient Design (ACEED)*, Austin 2005
9. **C. Rusu**, R. Xu, R. Melhem, and D. Mossé  
Energy-Efficient Policies for Request-Driven Soft Real-Time Systems  
*IEEE Euromicro Conference on Real-Time Systems (ECRTS)*, Catania, July 2004
10. **C. Rusu**, R. Melhem, and D. Mossé  
Multi-Version Scheduling in Rechargeable Energy-aware Real-time Systems  
*IEEE Euromicro Conference on Real-Time Systems (ECRTS)*, Porto, July 2003  
(2<sup>nd</sup> Best Paper Award)
11. H. Shafi, P. Bohrer, J. Phelan (IBM ARL), and **C. Rusu**  
Event-Based Power Simulation  
*IBM Austin Conference on Energy-Efficient Design (ACEED)*, Austin 2002
12. **C. Rusu**, R. Melhem, and D. Mossé  
Maximizing the System Value while Satisfying Time and Energy Constraints  
*IEEE Real-Time Systems Symposium (RTSS)*, Austin, December 2002

## ACADEMIC EXPERIENCE

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- University of Pittsburgh, Pittsburgh, PA - Graduate Research Assistant (January 2001 - present)
- University of Pittsburgh, Pittsburgh, PA - Graduate Teaching Assistant (August - December 2000)  
Recitations and grading for CS007 (*Introduction to Computer Programming*).
- Cluj-Napoca, Romania - Lecturer (1999)  
Taught lectures on *Introduction to Computers* to unemployed people in government sponsored retraining workshops.

## INDUSTRY EXPERIENCE

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Three summer internships with IBM Austin Research Laboratory - research project on power modeling and peak power control.  
(May-August 2001, 2002, 2004)

## EXTERNAL REVIEWER

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ACM TECS ('05), IEEE TC ('03,'04), IEEE TMC ('05), JPDC('04), IBM Journal of R&D('03), RTSS('02-'05), RTAS('04,'05), ECRS('03-'05), DSN('04), PACS('03), ESCODES('02)

## REFERENCES

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- Rami Melhem, Chair of the Computer Science Department, University of Pittsburgh, 412-624-8493, [melhem@cs.pitt.edu](mailto:melhem@cs.pitt.edu)
- Daniel Mossé, Professor, Computer Science Department, University of Pittsburgh, 412-624-8923, [mosse@cs.pitt.edu](mailto:mosse@cs.pitt.edu)
- Bruce Childers, Assistant Professor, Computer Science Department, University of Pittsburgh, 412-624-8421, [childers@cs.pitt.edu](mailto:childers@cs.pitt.edu)