

# Dr. Daniel D. Deavours

## Research Associate Professor

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- Career Objective** Explore, discover, learn, and teach.
- Areas of Interest** Passive UHF RFID, RFID antennas, microstrip antennas, antenna theory, Markov modeling, modeling languages, simulation, distributed systems, algorithms, compilers, software engineering, security, and numerical methods.
- Grants and Contracts**
- Daniel D. Deavours (PI), “Development of RFID Tags for Starport in Summer, 2009,” Starport Technologies \$15,000 *June 8, 2009 to September 1, 2009.*
- Daniel D. Deavours (PI), “MARC ITSIP Phase 2.0 Supplier Statement of Work ITTC/KU,” HP, an EDS Company \$63,395 *May 21, 2009 to January 31, 2010.*
- Daniel D. Deavours (PI), “Development of the Reduced Form Factor Agility RFID Tag,” Starport Technologies \$5,000 *December 1, 2008 to January 31, 2009.*
- Daniel D. Deavours (PI), Near Field Agility Tags, KTEC Technology Development Fund, \$32,492, *September 2008 – May 2009.*
- Daniel D. Deavours (PI), Title is confidential, Rush Tracking Systems LLC, \$9,300, *March 2008 – May 2008.*
- Daniel D. Deavours (PI), Title is confidential, Sponsor is confidential, \$6,000, *January 2008 – February 2008.*
- Daniel D. Deavours (PI), Passive Sensor-Tags, KTEC Technology Development Fund, \$55,319, *September 2007 – August 2008.*
- Daniel D. Deavours (PI), KU-CFB Tag Development, KTEC Technology Development Fund, \$53,819, *September 2007 – August 2008.*
- Daniel D. Deavours (PI), A project to evaluate metal asset tags (title is confidential), Sponsor is confidential, \$19,965, *July 2007 – October 2007.*
- Daniel D. Deavours (PI), “Development of an ETSI-compliant polycarbonate RFID tag,” Bayer MaterialScience, \$13,920, *August 2007 – November 2007.*
- Daniel D. Deavours (PI), Development of the Portunus RFID Tag, Starport Technologies, \$7,674, *June 1 2007 – August 31 2007.*
- Gary Minden (PI), with Joseph Evans and Daniel Deavours, A Unified Architecture for SensorNet with Multiple Owners: Supplement to Advance SensorNet Technologies to Monitor Trusted Corridors, Oak Ridge National Laboratory, \$1,541,588 (KU \$816,178), *June 2007 – June 2009.*
- Victor Frost (PI), with Gary Minden, Joseph Evans, Coastas Tsatsoulis, John Gouch, and Daniel Deavours, Development of Technologies for Trusted Corridors, KU Transportation Research Institute (through US DoT grant), \$174,706, *September 2006 – December 2007.*
- Daniel D. Deavours (PI), “Wideband and Small Form Factor Planar Microstrip Technology for RFID Application,” KTEC Technology Development Fund, \$53,745, *August 2006 – July 2007.*

Daniel D. Deavours (PI), “RFID System Performance Analysis,” Honeywell Federal Manufacturing & Technologies LLC., \$50,000, *August 2006 – February 2007*.

Daniel D. Deavours (PI), with Ken Demarest, “Affects of Conductivity, Thickness, and Width on UHF RFID Tag Antenna Efficiency,” MacDermid, \$12,154, *July 2006 – November 2006*.

Daniel D. Deavours (PI), A project to track metal assets (title is confidential), Sponsor is confidential, \$29,335, *June 2006 – August 2006*.

Gary Minden (PI), with David Petr, Douglas Niehaus, and Dan Deavours, A Unified Architecture for SensorNet with Multiple Owners, Oak Ridge National Laboratory, \$929,655, *September 2005 – September 2007*.

Daniel D. Deavours (PI), “Metal Mount UHF RFID Tag.” KTEC Technology Development Fund, \$44,276, *August 2005 – June 2006*.

Daniel D. Deavours (PI), “RFID Tag Performance Analysis.” Honeywell Federal Manufacturing & Technologies, LLC., \$35,641, *June 2005 – September 2005*.

Daniel D. Deavours (PI), “Comparative Analysis of EPC Compliant Devices.” Rush Tracking Systems LLC, \$35,000, *June 2004 – May 2005*.

Daniel D. Deavours (PI), with James Juola, *extention to* “Interoperability Testing of Bluetooth Devices: Implementation,” Bluetooth Special Interest Group, Inc., \$29,342, *June 2004 – December 2004*.

Daniel D. Deavours (PI), with James Juola, “Interoperability Testing of Bluetooth Devices: Implementation.” Bluetooth Special Interest Group, Inc., \$44,495, *January 2004 – June 2004*.

Daniel D. Deavours (PI), with James Juola, “Interoperability Testing of Bluetooth Devices: Prototype.” Bluetooth Special Interest Group, Inc., \$36,758, *August 2003 – March 2004*.

Joseph B. Evans (PI), with Daniel D. Deavours, “Protocol, Profile, and Interoperability Testing of Bluetooth Devices.” Bluetooth Special Interest Group, Inc., \$33,067, *November 2002 – February 2003*.

**Gifts**  
Seknion, June 2006, \$2,500  
Seknion, March 2006, \$4,000  
Nashua, October 2005, \$1,200

**Technology Licenses** License Agreement #ANTLI0800KIT. License agreement between University of Kansas Center for Research, Inc. and Starport Technologies, LLC. November 6, 2007.

License Agreement #LI07005IT between the University of Kansas Center for Research, Inc and Container Technology, Inc., February 5, 2007.

License Agreement #LI07011. License Agreement between the University of Kansas Center for Research, Inc. and Starport Technologies, LLC, March 23, 2007.

**Patents and  
Patents Pending**

Daniel D. Deavours and Karthik Narayanan Moncombu Ramakrishnan, “Virtual Short Circuit for Providing Reference Signal in RFID Tag.” US Patent 7,505,001, issued March 17, 2009.

Daniel D. Deavours and Mutharasu Sivakumar, “Microstrip Antenna for RFID Device,” US Patent Application 20070164868, filed December 13, 2006. Issuance pending.

Daniel D. Deavours and Madhuri Bharadwaj Eunni, “Inductively Coupled Feed Structure and Matching Circuit for RFID Device,” US Patent 7,755,757 issued July 7, 2009.

**Education**

University of Illinois at Urbana-Champaign  
Ph.D. in Electrical Engineering, October, 2001. Advisor: Prof. William H. Sanders  
Thesis: “Formal specification of the Möbius modeling framework.”

University of Illinois at Urbana-Champaign  
M.S. in Electrical Engineering awarded August, 1997. Advisor: Prof. William H. Sanders  
Thesis: “Solutions to large Markov Chains Produced by Stochastic Petri Nets.”

University of Illinois at Urbana-Champaign  
B.S. in Computer Engineering awarded December, 1994, with honors.

**Awards**

Received Travel Scholarship from IBM to attend the IPDS '98 conference

Paper “A Novel Planar Microstrip Antenna Design for UHF RFID.” selected as one of the best papers at Computing, Communications and Control Technologies (CCCT '06) (expanded version published in Journal of Systemics, Cybernetics and Informatics), 2007.

Papers “Möbius: Framework and Atomic Models” and “The Möbius Modeling Tool” selected as one of the best papers at IEEE PNPM-9 (expanded and combined version were submitted for publication in IEEE Transactions on Software Engineering), 2001.

Paper “‘On-the-Fly’ Solution Techniques for Stochastic Petri Nets and Extensions” selected as one of the best papers at IEEE PNPM-7 (expanded version published in IEEE Transactions on Software Engineering), 1997.

Paper “An Efficient Disk-based Tool for Solving Very Large Markov Models” selected as one of the best papers at the 9th International Conference on Modeling Techniques and Tools (expanded version published in Performance Evaluation), 1997.

Deans list Fall 1991, Fall 1992, Fall 1993

Edmund J. James Scholar 1990–1992.

**Appointments**

University of Kansas (Lawrence), *August 2009 – present*  
Research Associate Professor.

University of Kansas (Lawrence), *August 2001 – August 2009*  
Research Assistant Professor.

RFID Alliance Lab, *June 2004 – present*  
Director of Research.

- Research Assistantship** University of Illinois at Urbana-Champaign, *June 1995–August 2001*
- Group leader *Summer 1997 – Spring 1999*  
 Managed a small group (4–6 members) of graduate researchers in the development of the Möbius modeling tool written in Java and C++.
- Software maintainer *Summer 1995 – present*  
 Administrated, developed, and maintained the *UltraSAN* modeling software, with over 200 licenses to academic institutions. This involved maintaining over 200K lines of C and C++ code, 7 releases, and ports to several operating systems.
- Other Research Experience** University of Illinois at Urbana-Champaign, *May–December, 1994*  
 Undergraduate research. Performed research by implementing an online software checker for linked lists, and made modest improvements to the algorithm (with correctness proof).
- Teaching Experience** University of Illinois at Urbana-Champaign, *January 1994 – May 1995*  
 Teaching assistant. Assisted both laboratory work and grading papers for a pilot introductory course on electrical and computer engineering.
- Motorola University, Schaumburg, IL, *Fall, 1998*  
 Co-developer. Co-developed a course titled “Validating High-Availability Systems” for Motorola University, a fundamental course on validation methods. This course has been offered more than 10 times to date.
- Motorola University, Schaumburg, IL and Phoenix, AZ, *August 1999*  
 Co-developer and co-instructor. Co-developed course titled “UltraSAN: Modeling, Analyzing, and Simulating High-Availability Systems” for Motorola University, a hands-on class for using *UltraSAN* to validate highly dependable systems. We have offered the course 3 times to date.
- University of Kansas, *Fall, 2002*  
 Lecturer. Taught “Software Engineering” (EECS-448), an undergraduate course on software engineering.
- University of Kansas, *Fall, 2003*  
 Lecturer. Taught “Principles of Programming Languages” EECS-761, a graduate course in programming languages.
- KU Continuing Education, Kansas City, KS, *May 22–24, 2006*  
 Co-developer. Co-developed a three-day short course titled “RFID Implementations” for KU Continuing Education.
- University of Kansas, *Fall, 2009*  
 Joint appointment with EECS. Taught “Communications Networks” EECS-563, an undergraduate course in networking.

- Other Service** University of Illinois at Urbana-Champaign, *Spring 1996*  
CRHC Seminar Committee. Served on the committee that organized research seminars.
- NSF Panel Reviewer (2 in 2004, 1 in 2006).
- Maryland Technology Development Corporation (TEDCO) reviewer (2 in 2005).
- IEEE RFID 2010 Technical Program Committee Chair.
- Conference Organizations and Program Committees** June 2003, Tools Chair for the International Computer Performance and Dependability Symposium (IPDS/DSN), San Francisco, CA.
- September 2003, Workshop Organizer for the Sixth International Workshop on Performability Modeling of Computer and Communication Systems (PMCCS), Urbana-Champaign, IL.
- Member of the Program Committee:
- September 2003, Petri Nets and Performance Models (PNPM), Urbana-Champaign, IL.
  - September 2003, Techniques and Tools for Computer Performance Evaluation (TOOLS), Urbana-Champaign, IL.
  - June 2003, International Computer Performance and Dependability Symposium (IPDS/DSN), San Francisco, CA.
  - September 2004, First International Workshop on Practical Applications of Stochastic Modelling (PASM), London, UK.
  - July 2005, Second International Workshop on Practical Applications of Stochastic Modelling (PASM), Tyne, UK.
  - June 2005, Applied Simulation and Modeling (ASM), Benalamádena, Spain.
  - January 2006, RFID Research Convocation, Boston, MA.
  - April 2009, IEEE RFID 2009, Orlando, FL.
  - April 2010, IEEE RFID 2010 (Technical Program Chair), Orlando, FL.
- Journal paper reviewer for: ACM Sigmetrics Performance Evaluation Review (2001), IEEE Trans. Reliability (2003), IEEE Transactions on Software Engineering (2001, 2005 twice), IEEE Transactions on Dependable and Secure Computing (2006), Journal of Parallel and Distributed Computing (2003), PASM Special Issue (2005). IEEE Trans. Dependable and Secure Computing (2006). IEEE Transactions on Automation Science and Engineering (2007)
- Conference paper reviewer: RFID '10, RFID '09, DSN-PDS '09, MobiCom '07, CAV '06, ASM '05, IPDS '04, DSN '04, TOOLS '03, PMCCS-6, PNPM '03, IPDS '03, and others.

- Journal Publications** Supreetha Rao Aroor and Daniel D. Deavours, Evaluation of the State of Passive UHF RFID: An Experimental Approach. *IEEE Systems Journal*, 1(2), 168–176, December 2007.
- M. Eunni, M. Sivakumar, D. D. Deavours, A Novel Planar Microstrip Antenna Design for UHF RFID. *JSCI*, 5(1), 6–10, January 2007.
- Daniel D. Deavours, Graham Clark, Tod Courtney, David Daly, Salem Derisavi, Jay M. Doyle, William H. Sanders, and Patrick K. Webster. The Möbius framework and its implementation. *IEEE Transactions on Software Engineering*, 28(10):956–969, October 2002.
- Daniel D. Deavours and William H. Sanders. “On-the-fly” solution techniques for stochastic Petri nets and extensions. *IEEE Transactions on Software Engineering*, 24(10):889–902, October 1998.
- Daniel D. Deavours and William H. Sanders. An efficient disk-based tool for solving large Markov models. *Performance Evaluation*, 33:67–84, 1998.
- Conference Publications** Daniel D. Deavours, “Analysis and Design of Wideband Passive UHF RFID Tags Using a Circuit Model,” In *Proc. IEEE RFID*, Orlando, FL, April 27–28, 2009.
- Daniel D. Deavours, “A Circularly Polarized Planar Antenna Modified for Passive UHF RFID,” In *Proc. IEEE RFID*, Orlando, FL, April 27–28, 2009.
- Naaser A. Mohammed, Mutharasu Sivakumar, and Daniel D. Deavours, “An RFID Tag Capable of Free-Space and On-Metal Operation,” In *Proc. IEEE Radio and Wireless Symposium*, San Diego, CA, January 18–22, 2009.
- Supreetha R. Aroor and Daniel D. Deavours, “A Dual-Resonant Microstrip-Based UHF RFID ‘Cargo Tag.’” In *Proc. IEEE MTT-S International Microwave Symposium 2008 (IMS2008)*, Atlanta, GA, June 15–20, 2008.
- Mutharasu Sivakumar and Daniel D. Deavours, “A Dual-Resonant Microstrip Antenna for Paperboard in the Cold Chain.” In *2008 IEEE Sarnoff Symposium*, Princeton, NJ, April 28–30, 2008.
- A. Syed, K. Demarest, and D. Deavours, “Effects of Material Properties on Performance of RFID Tag Antennas.” In *IEEE RFID 2007*, Grapevine, TX, March 26–28, 2007, pp. 57–62.
- Madhuri Eunni, Mutharasu Sivakumar, and Daniel D. Deavours, “A Novel Planar Microstrip Antenna Design for UHF RFID.” in *Proceedings of the 4th International Conference on Computing, Communications and Control Technologies (CCCT ’06)*. Orlando, FL, July 20–23, 2006, pp. 6–10.
- D. D. Deavours and W. Weng and S. Blunt, “Privacy and Opportunity in Passive RFID.” In *Second RFID Academic Convocation*, Las Vegas, NE, May 27–29, 2006.
- Karthik Moncombu Ramakrishnan and Daniel D. Deavours, “Performance Benchmarks for Passive UHF RFID Tags.” In *Proceedings of the 13th GI/ITG Conference on Measurement, Modeling, and Evaluation of Computer and Communication Systems*. Nuremberg, Germany, March 27-29, 2006, pp. 137–154.
- W. H. Sanders, T. Courtney, D. Deavours, D. Daly, S. Derisavi, and V. Lam, “Multi-formalism and Multi-solution-method Modeling Frameworks: The Möbius Approach.” In *Proceedings of the Symposium on Performance Evaluation - Stories and Perspectives*. Vienna, Austria, December 5–6, 2003, pp. 241–256.

W. H. Sanders, C. Polychronopoulos, T. Huang, T. Courtney, D. Daly, D. Deavours, and S. Derisavi. “Overview: An integrated framework for performance engineering and resource-aware compilation.” In *Proceedings of the NSF Next Generation Systems Program Workshop*, Fort Lauderdale, FL, April 15, 2002.

D. D. Deavours and W. H. Sanders. “Möbius: Framework and atomic models.” In *Proc. 9th Int. Workshop on Petri Nets and Performance Models (PNPM '01)*, Aachen, Germany, September 11–14, 2001, pp. 135–144.

D. D. Deavours and W. H. Sanders. “The Möbius Execution Policy.” In *Proc. 9th Int. Workshop on Petri Nets and Performance Models (PNPM '01)*, Aachen, Germany, September 11–14, 2001, pp. 251–260.

G. Clark, T. Courtney, D. Daly, D. Deavours, S. Derisavi, J. Doyle, W. Sanders, and P. Webster. “The Möbius modeling environment.” In *Proc. 9th Int. Workshop on Petri Nets and Performance Models (PNPM '01)*, Aachen, Germany, September 11–14, 2001, pp. 241–250.

Daniel D. Deavours and William H. Sanders. “An efficient well-specified check.” In Peter Bucholz and Manuel Silva, editors, *Proc. 8th Int. Workshop on Petri Nets and Performance Models (PNPM '99)*, Zaragoza, Spain, September 1999, pp. 124–133.

D. D. Deavours and W. H. Sanders. “‘On-the-fly’ solution techniques for stochastic Petri nets and extensions.” In *Proceedings of the 7th International Workshop on Petri Nets and Performance Models (PNPM '97)*, Saint Malo, France, June 1997, pp. 132–141.

D. D. Deavours and W. H. Sanders. “An efficient disk-based tool for solving very large Markov models.” In *Computer Performance Evaluation: Modeling Techniques and Tools: Proceedings of the 9th International Conference, (TOOLS '97)*, Saint Malo, France, June 1997, pp. 58–71.

**Invited  
Presentations**

Gary Clancy and Daniel D. Deavours, “Tracking Industrial Sized Containers.” *EPC Connection* Chicago, IL, October 3, 2007.

Daniel D. Deavours, “Don’t Mitigate the Metal/Water Problem; Solve It!” *Reusable Plastic Container Coalition Educational Forum* Dallas, TX, September 20, 2007.

Daniel D. Deavours, “From Pilot to Production: Practical Considerations in Your RFID Deployment,” Tutorial for *RFID World 2007 Cold Chain track*, Grapevine, TX, March 26, 2007.

Daniel D. Deavours, “RFID TSC110: UHF RFID - Tag Antennas,” Tutorial for *MTT-S 2006*, San Francisco, CA, June 11, 2006.

Daniel D. Deavours, “Gen 2 and Q,” Presentation during exhibition of *RFID Journal Live!*, Las Vegas, NE, May 2–3, 2006.

Daniel D. Deavours, “Data Rates,” Presentation during exhibition of *RFID Journal Live!*, Las Vegas, NE, May 2–3, 2006.

Daniel D. Deavours, “Gen 1 and Gen 2,” Presentation during exhibition of *RFID Journal Live!*, Las Vegas, NE, May 2–3, 2006.

Daniel D. Deavours, “Gen 2 vs. Gen 1,” Presentation during exhibition of *RFID Journal Live!*, Las Vegas, NE, May 2–3, 2006.

Daniel D. Deavours, “Deploying Gen 2,” Breakout session for *RFID Journal Live!*, Las Vegas, NE, May 2, 2006.

Daniel D. Deavours, Weichao Wang, and Shannon D. Blunt, “Privacy and Opportunity in Passive RFID: Authentication and Identification using CDMA,” Academic Convocation presentation at *RFID Journal Live!*, Las Vegas, NE, May 1, 2006.

Daniel D. Deavours, “RFID Alliance Lab: Testing Performance,” Workshop presentation for *RFID World*, Dallas, TX, February 27, 2006.

Daniel D. Deavours, “Passive UHF RFID Performance on Materials,” Poster for the *RFID Research Convocation*, Boston, MA, January 23–24, 2006.

Daniel D. Deavours, “RFID: Measurement and Practice,” University of Illinois, October 4, 2005.

Daniel D. Deavours, “Evaluating EPC Tag Performance,” RFID Journal Webinar, June 29, 2005.

Daniel D. Deavours, “EPC Tag Performance,” RFID Journal Live!, Chicago, IL, April 10–12, 2005.

Daniel D. Deavours, “Performance of Pharma Tags — An Empirical Approach,” RFID Pharmaceuticals Focus, Philadelphia, PA, March 30–31, 2005.

Daniel D. Deavours, “RFID Performance Characteristics,” Midwest RFID Symposium, Kansas City, KS, March 3, 2005.

Daniel D. Deavours, “User Perceived Bluetooth Interoperability,” Kansas City Computer Measurement Group, Fall Impact Conference, Overland Park, KS, October 5–6, 2004.

**Non-refereed  
Publications**

Daniel D. Deavours, “Can Pharma Lead the Debate over RFID and Privacy?” Column for *Pharma Manufacturing*, June 14, 2006.

Daniel D. Deavours, “UHF EPC Tag Performance Evaluation,” RFID Alliance Lab, May 2005. Available from <http://www.rfidjournal.com/labreports>.

Daniel D. Deavours, “Are Item-Level Tags Up to the Job?” In *RFID Journal*, 3(1), 27–32, 2006.

Daniel D. Deavours, “It’s Time for Open RFID?” Column for *Pharma Manufacturing*, March 10, 2005.

Daniel D. Deavours, “The End of Trial & Error,” In *RFID Journal*, 2(1), 37–43, 2005.

Daniel D. Deavours, “A Performance Analysis of Commercially Available UHF RFID Tags Based on EPCGlobal’s Class 1 and Class 0 Specifications,” RFID Alliance Lab, December 2004. Available from <http://www.rfidjournal.com/labreports>.

D. Daly, D. D. Deavours, J. M. Doyle, A. J. Stillman, and W. H. Sanders. Möbius: An extensible framework for performance and dependability modeling. In *Computer Performance Evaluation: Modeling Techniques and Tools: Proceedings of the 11th International Conference (TOOLS 2000)*, Schaumburg, IL, March 2000. In B. R. Haverkort, J. C. Bohnenkamp, and C. U. Smith (Eds.), Lecture Notes in Computer Science No. 1786, pp. 332–336, Berlin: Springer, 2000.

D. Daly, D. D. Deavours, J. M. Doyle, A. J. Stillman, and W. H. Sanders. Möbius: An extensible framework for performance and dependability modeling. In *Tool Descriptions of the 8th International Workshop on Petri Nets and Performance Models (PNPM '99)*, Zaragoza, Spain, September 1999.

D. Daly, D. D. Deavours, J. M. Doyle, A. J. Stillman, P. G. Webster, and W. H. Sanders. Möbius: An extensible framework for performance and dependability modeling. In *Digest of Fast Abstracts presented at the 29th Annual International Symposium on Fault-Tolerant Computing (FTCS '29)*, pp. 15–16, Madison, Wisconsin, June 1999.

W. D. Obal II, M. A. Qureshi, D. D. Deavours, and W. H. Sanders. Overview of *UltraSAN*. In *Proceedings of the IEEE International Performance and Dependability Symposium*, Urbana, IL, September 1996.

D. D. Deavours, W. D. Obal II, M. A. Qureshi, W. H. Sanders, and A. P. A. van Moorsel. *UltraSAN* Version 3 Overview. In *Proceedings of the 6th International Workshop on Petri Nets and Performance Models*, Durham, NC, October 1995, pp. 216–217.

**Graduate Students  
Advised**

Supreetha Aroor, MS EE, August 2008.

Mutharasu Sivakumar, MS EE, January 2008.

Madhuri Eunni, MS EE, December 2006.

Kavya Chandramouli Koushik, MS CS (project), January 2006

Farzana Yasmeen, MS EE (project), December 2005.

Karthik Moncombu Ramakrishnan, MS EE, October 2005.

Rakhee Keswani, MS EE, July 2005.

Manivannan Elangovan, MS EE, May 2004.