

Date: January 7, 2008
Name: Thomas E. Daniels
Department: Electrical and Computer Engineering
Current Rank: Assistant Professor

I Personal History and Professional Experience

A Educational Background

12/2002 **Ph.D. in Computer Science**
Purdue University, West Lafayette, Indiana
Advisor: Eugene H. Spafford

05/1999 **M.S. in Computer Science**
Purdue University, West Lafayette, Indiana
Advisor: Eugene H. Spafford

05/1995 **B.S. in Computer Science**
Southwest Missouri State University, Springfield, Missouri
Advisor: Richard A. Martin

05/1990 **High School Diploma**
Cameron High School, Cameron, MO, Other schools all in the
Cameron, MO school district as well.

B List of Academic Positions since Final Degree

08/2002-Present **Assistant Professor**, Iowa State University, Ames, Iowa

C Other Professional Employment

08/1995-07/1996 **Systems and Software Engineer**, Planning Systems Inc., McLean,
Virginia

05/1995-07/1995 **Software Engineer**, Netplace, Inc., Olathe, Kansas

D Honors, Recognitions, and Outstanding Achievements

03/2007 **IBM Faculty Award Fellowship**

05/2006 **Warren B. Boast Undergraduate Teaching Award**

08/2003 **Digital Forensic Research Workshop Forensic Feud Contest
Champion**

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2002 **Inducted into Sigma Xi**
05/1998-05/1999 **Purdue University Intel Fellowship Recipient**
01/1994-08/1994 **Science and Engineering Research Semester Fellow**, Oak Ridge National Laboratory, Oak Ridge, Tennessee
05/1993 **Inducted into Upsilon Pi Epsilon Computer Science Honor Society**

E Formally Invited Lectures and Invited Conference Presentations

05/2007 “Information Assurance Curricula and Concepts”, 2 day invited talk, Department of Applied Mathematics, University of Wisconsin–Stout

F Offices Held in Professional Societies

NONE

G Editorships of Journals or Other Learned Publications

1 Co-editor of Information Systems Frontiers Special Issue on Secure Knowledge Management, with Nasir Memon, (To Appear in 2007)

H Grants and Contracts Received Since Last Promotion at ISU

1. Thomas E. Daniels. Advanced testbed technologies. NSF I/UCRC Center for Information Protection Award (\$22K / 1 year, Dec 2007).
2. Thomas E. Daniels. Physical diffusion and graph spectral models for network forensic analysis. NSF CyberTrust 200K\$ over 2 years (50% funded, remainder to be funded in 2007-8), August 2006.
3. Thomas E. Daniels. An inverse cluster for cybersecurity and network education. College of Engineering Student Computing Fee Grant (25K\$ in hardware, Aug 2006).
4. Thomas E. Daniels. Information assurance education lab development. Subaward to NSF Seed Proposal via Syracuse University(SEED:Developing Instructional Laboratories for Computer Security Education. PI: Wenliang Du et.al.) 20K\$ over 5, Aug 2006.
5. Doug Jacobson and Thomas E. Daniels. A network security architecture for a high performance information dissemination system. Boeing Corporation (\$15K for 2 Months). October–November 2005.
6. Doug Jacobson, Thomas E. Daniels, and Others. Center for information protection. NSF Industry/University Cooperative Research Center (I/U CRC) \$90K/year for up to 10 years. November, 2005.
7. Thomas E. Daniels. System for analysis and visualization of applied network topologies (savant). NSF I/UCRC Center for Information Protection Award, (\$23K for 1 year). January, 2006.

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8. Thomas E. Daniels. Detecting intrusions in layer one (DILON). NSF I/UCRC Center for Information Protection Award, (\$23K for 1 year). January, 2006.
9. Thomas E. Daniels. Evaluation of spam detection algorithm for egress filtering. NSF I/UCRC Center for Information Protection Award, (\$23K for 1 year). January, 2006.
10. Thomas E. Daniels. On the design and use of digital identities. Subcontract to Purdue, NSF Information Technology Research (ITR) Program, 85K\$ out of 900K\$, over 3 years.
11. Thomas E. Daniels, Steve Russel, and Mani Mina. Detecting the voices of network interfaces. \$16K over 1 year from College of Engineering and ECpE Department, Oct 2003.
12. Yong Guan, Thomas E. Daniels, and Julie Dickerson. Advanced attack attribution. \$150K continued funding from ARDA, Sep 2004.
13. Thomas E. Daniels, Julie Dickerson, and Yong Guan. Advanced attack attribution. \$350K over 9 months from ARDA, Sep 2003. 15% Acceptance Rate.
14. Thomas E. Daniels. Determining the origin of network traffic by exploiting network topology. University Research Grant \$18,000/ 1 year, Jan 2003.
15. Thomas E. Daniels. Sun microsystems hardware grant. \$200,000 over 3 years, 2003.

I Proposals for Grant and Contracts Pending

- 1 In Preparation: "GMNI: Graph Methods for Network Investigation," NSF Career Proposal, July 2007

J Proposals for Grants and Contracts not Funded Since Last Promotion at ISU.

1. Daniel Berleant, Yong Guan, Thomas Daniels, Morris Chang, and Diane Rover. Leveraging learning with opportunity-driven curriculum integration. NSF Engineering Education Grant \$141,000/2 years, Jan 2003.
2. Thomas E. Daniels and Julie Dickerson. Holistic intrusion detection and network forensics. \$450,000 over 3 years, Dec 2002.
3. Thomas E. Daniels. CT-ISG: Network forensics system. NSF Network Systems: 500K\$.
4. Thomas E. Daniels, Mani Mina, and Steve F. Russell. Ct-t: Detecting intrusions at layer one. NSF Network Systems: 625K\$.
5. Thomas E. Daniels, Mani Mina, and Steve F. Russell. Nets-nbd: Detecting intrusions in layer one in next generation networks. NSF Network Systems: 625K\$.

K Grant Review Panels (e.g., for Governmental Agencies, Educational Institutions)

- 1 NSF Cybertrust Panel (Summer 2006)
- 2 NSF Major Research Instrumentation (MRI) Panel (Spring 2006)

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L Policy, Advisory or Corporate Panels or Boards (e.g., for Governmental Agencies, Educational Institutions, Companies)

NONE

II PUBLICATIONS AND CREATIVE WORKS

A Doctoral thesis title

“Reference Models for the Concealment and Observation of Origin Identity in Store-and-Forward Networks”

B Books Authored or Co-Authored (in print or accepted)

C Books Edited or Co-Edited (in print or accepted)

D Chapters in Books (in print or accepted)

E Monographs (in print or accepted)

F Articles in Journals (in print or accepted)

1. M. Mina, T. E. Daniels, S. Russell, and R. Gerdes, “Intrusion detection, performance, assurance, and system maintenance: A new paradigm in computer security,” *Materials Evaluation*, vol. 63, no. 12, pp. 1203–1218, 2005.

2. T. E. Daniels, “A functional reference model of passive systems for tracing network traffic,” *Digital Investigation*, vol. 1, no. 1, 2004.

3. —, “A taxonomy of network origin identification systems,” *Computers and Security*, to appear pending edits.

4. T. E. Daniels and E. H. Spafford, “Identification of host audit data to detect attacks on low-level IP vulnerabilities,” *Journal of Computer Security*, vol. 7, no. 1, pp. 3–35, 1999.

In Submission

1. Y. Tang, R. Y. Liverpool, and T. E. Daniels, “Monitor placement for attack attribution,” *Submitted to IEEE Transactions on Dependable and Secure Computing*, August 2006.

2. W. Wang and T. E. Daniels, “A graph-based approach towards network forensic analysis,” *Submitted to ACM Transactions on Information System Security (TISSEC)*, June 2006.

G Creative Works (Exhibitions, Commissions, Competitions, Performances, Art or Architecture Executed)

1. B. Anderson and T. E. Daniels, “Xen worlds: Xen and the art of security education tutorial,” ACM Conference on Computer and Communications Security (CCS) Invited Tutorial, Alexandria, Virginia, Nov 2006.

2. W. Wang and T. E. Daniels, “Demonstration: Network forensics analysis with evidence graphs,” in *Refereed Demonstration: Digital Forensic Research Workshop*, 2005.

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H Bulletins, Reports, or Conference Proceedings That Have Undergone Stringent Editorial Review by Peers (in print or accepted).

1. B. Anderson, T. Gillespie, and T. E. Daniels, "The role of information warfare in information assurance education: A legal and ethical perspective," in *Submission to the Proceedings of the 2007 ASEE Annual Conference & Exposition*, Honolulu, Hawaii, June 2007.
2. Y. Tang and T. E. Daniels, "On the economic placement of monitors in router level network topologies," in *Proceedings of the 1st Workshop on the Economics of Securing the Information Infrastructure*, Washington, D.C., October 2006.
3. W. Wang and T. E. Daniels, "Diffusion and graph-spectral methods for network forensic analysis," in *Proceedings of the New Security Paradigms Workshop 2006*, Schloss Dagstuhl, Germany, Sep 2006, 30% acceptance rate.
4. Y. Tang, R. Y. Liverpool, and T. E. Daniels, "Monitor placement for stepping stone analysis," in *Proceedings of the 25th IEEE International Performance Computing and Communications Conference (Workshop on Information Assurance WIA-2006)*, Phoenix, AZ, Apr 2006.
5. J. Xin, L. Zhang, B. Aswegan, J. Dickerson, T. E. Daniels, and Y. Guan, "A testbed for evaluation and analysis of stepping stone attack attribution techniques," in *Proceedings of the 2nd International IEEE/Create-Net Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TridentCom 2006)*, Barcelona, Spain, March 2006.
6. B. Anderson and T. E. Daniels, "Xen worlds: Xen and the art of computer engineering education," in *Proceedings of the 2006 ASEE Annual Conference & Exposition*, Chicago, Illinois, June 2006.
7. D. Jacobson and T. E. Daniels, "Information assurance faculty development workshop," in *Proceedings of the 2006 ASEE Annual Conference & Exposition*, Chicago, Illinois, June 2006.
8. R. Gerdes, T. E. Daniels, M. Mina, and S. Russell, "Device identification via analog signal fingerprinting: A matched filter approach," in *Proceedings of the 13th Annual Network and Distributed System Security Symposium (NDSS 06)*, San Diego, California, Feb 2006, 13% Acceptance.
9. G. W. Rice and T. E. Daniels, "A hierarchical approach for detecting system intrusions through event correlation," in *Proceedings of the IASTED International Conference on Communication, Network, and Information Security*, Phoenix, AZ, Nov 2005.
10. T. E. Daniels, M. Mina, and S. Russell, "Short paper: A signal fingerprinting paradigm for physical layer security in conventional and sensor networks," in *Proceedings of the First IEEE/Cretenet International Conference on Security and Privacy*

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for *Emerging Areas in Communication Networks (SecureComm)*, Athens, Greece, Sep 2005.

11. W. Wang and T. E. Daniels, "Building evidence graphs for network forensics analysis," in *Proceedings of the Annual Computer Security Applications Conference*, Dec 2005, 20% acceptance.

12. Y. Tang and T. E. Daniels, "A simple framework for distributed forensics," in *Proceedings of The 2nd International Workshop on Security in Distributed Computing Systems*, Columbus, OH, 2005.

13. B. Al-Duwairi and T. E. Daniels, "Topology-based deterministic packet marking," in *Proceedings of the 13th International Conference on Computer Communications and Networks (ICCCN'04)*, 2004, 36% Acceptance.

14. T. E. Daniels, "A functional reference model of passive network origin identification," in *Proceedings of the Digital Forensic Research Workshop*, Aug 2003.

15. T. E. Daniels and E. H. Spafford, "A network audit system for host-based intrusion detection (NASHID) in linux," in *Proceedings of the Annual Computer Security Applications Conference*, New Orleans, LA, Dec 2000.

16. —, "Network traffic tracking systems: Folly in the large?" in *Proceedings of the New Security Paradigms Workshop 2000*, County Cork, Ireland, Sep 2000.

17. —, "Subliminal traceroute in TCP/IP," in *Proceedings of the National Information Systems Security Conference*, Sep 2000.

18. B. A. Kuperman, T. E. Daniels, and E. H. Spafford, "Penetration analysis of XEROX docucenter DC 230ST: Assessing the security of a multi-purpose office machine," in *Proceedings of the National Information Systems Security Conference*, Sep 2000.

19. F. Buchholz, T. E. Daniels, J. P. Early, R. Gopalakrishna, R. P. Gorman, B. A. Kuperman, S. Nystrom, A. Schroll, and A. Smith, "Digging for worms, fishing for answers," in *Proceedings of the Annual Computer Security Applications Conference*, Las Vegas, NV, Dec 2002.

I Bulletins, Reports, or Conference Proceedings That Have Not Undergone Stringent Editorial Review by Peers (in print or accepted).

J Abstracts (in print or accepted) and Technical Presentations

1. T. E. Daniels and E. H. Spafford, "Problems with network-based intrusion detection for enterprise computing," in *Online proceedings of the First International Workshop on Recent Advances in Intrusion Detection*, September 1998, extended abstract and presentation available online at http://www.raid-symposium.org/raid98/Prog_RAID98/Table_of_content.html.

K Book and Paper Reviews (in print or accepted)

L Patents, Disclosures and Technology Transfer Activities

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- 1 Daniels, Thomas E, Mani Mina, and Steve Russell. ISURF 03130—Fingerprinting Digital Devices Using Electromagnetic Characteristics of their Communications, Filed March 2005.

M Consulting Activities

1999-Present

Paid Pre-Publication Technical Reviews for Prentice Hall PTR

1. William Stallings. *Network Security Essentials*. Prentice Hall PTR, Upper Saddle River, NJ, 2nd edition, 2006.
2. Scott Mann and Ellen L. Mitchell. *Linux System Security: The Administrator's Guide to Open Source Security Tools*. Prentice Hall PTR, Upper Saddle River, NJ, 2000.
3. Tony Mancill. *Linux Routers: A Primer for Network Administrators*. Prentice Hall PTR, Upper Saddle River, NJ, 2001.
4. Tony Mancill. *Linux Routers: A Primer for Network Administrators*. Prentice Hall PTR, Upper Saddle River, NJ, 2nd edition, 2002.

N Other

O Publications and Creative Works Submitted but Not Accepted:

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III INSTRUCTION AND SUPERVISION

A Instruction for ISU

Semester	Course No.	Course Title	Credits Lect/Lab	Students		TA
				On	Off	
Spring 07	CPRE 431	Basics of Information System Security	3/0	31	0	Yes
Fall 06	CPRE 185	Introduction to Problem Solving in C	2/1	90	0	Yes
	CPRE 531	Introduction to Information Assurance	3	40	45	Yes
Spring 06	CPRE 431		3/0	40	0	Yes
Fall 05	CPRE 185		2/1	60	0	Yes
	CPRE 531		3/0	40	40	Yes
Spring 05	CPRE 431		3/0	40	0	Yes
Fall 04	CPRE 531		3/0	40	41	Yes
Spring 04	CPRE 534	Special Topics in Network Security	3/0	25	0	No
	CPRE 592TD		3/0	12	0	No
Fall 03	CPRE 531		3/0	70	42	
Spring 03	CPRE 534	Legal and Ethical Issues in INFAS	3/0	18	0	No
Fall 02	CPRE 531		3/0	53	24	Yes

B Non-ISU Instruction (including Short Courses, Workshops, Training)

- 1 ISU/KEMA Cyber Security Short Course, Minneapolis, MN. 1/2 day (of 3 days total) network security training for SCADA operators
- 2 See faculty development workshops in service below

C Curricular Development Activity

- 1 Spring 2005–Present: Development of XenWorlds system for CPRE 431 projects
- 2 Summer 2005–Present: Development of Lab platform for CPRE 185
- 3 Spring 2005 – Development of CPRE 431
- 4 Fall 2003: Refinement of CPRE 531

D Supervision of Graduate Student Research for Which Candidate is Primary Advisor or Co-Advisor

- 1 Greg Rice, PhD, Sep 2002–Present, Past Prelims, degree expected Aug/Dec 2007
- 2 Wei Wang, PhD, Dec 2003–Present, Past Prelims, degree expected Aug/Dec 2007
- 3 Tang Yongping, PhD, Dec 2003–Present, Past Prelims, degree expected Dec 2007
- 4 Ben Anderson, PhD, Dec 2004–Present, Past Prelims, degree expected Dec 2008
- 5 Majd Al-Kofahi, PhD, Dec 2004–Present, Past Prelims, degree expected Dec 2008
- 6 Ryan Gerdes, PhD, (Mani Mina co-advisor), Jan 2005–Present, in progress, degree expected August 2009
- 7 Dan Gieseman, PhD (non-traditional), Aug 2006–Present, degree expected Dec 2008
- 8 Paras Malhotra, MS, Jan 2006–Present, in progress, degree expected Aug 2007

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- 9 Noah Stahl, MS, Jan 2006–Present, in progress, degree expected Dec 2007
- 10 Vignesh Vijayakumar, MS, Jan 2006–Present, in progress, degree expected Dec 2007
- 11 Shantanu Gattani, MS, 2006–Present, in progress, degree expected Dec 2007

Graduated Students

- 1 Basheer Al-Duwairi, PhD, (M. Govindarasu, co-advisor), Sep. 2003–June 2005, “Mitigation and traceback countermeasures for DDoS attacks.”, now faculty at Jordan University of Science and Technology.
- 2 Ryan Gerdes, MS, (Mani Mina co-advisor), August 2006, “Differentiating Ethernet devices through SNR maximization”, now a Ph.D. Student.
- 3 Hassan Qureshi, MS, August 2006, “Markov Traffic Generator”, now a network engineer at Thomson West, Minneapolis, MN.
- 4 Ed Jackson, MS, (Mani Mina co-advisor), May 2006, “Detecting intrusions at layer one: device fingerprinting for network security”
- 5 Olawale Martins, MS, August 2005, “Affecting IP Traceback with Recent Internet Topology Maps.”, now a program manager at Microsoft in Seattle, WA
- 6 William Sears, MS, August 2005, “PeerCredential: A Support Reputation-based Trust Framework for Peer-to-Peer Applications”, now with US DOE Ames Lab.
- 7 R. Yema Liverpool, MS, Dec. 2004, “Monitor Placement for Network Attack Attribution Using Information Theory Metrics”, now at IBM Rochester.
- 8 Miguel Contreras, MS, Spring 2005.

E Service on Thesis Committees Other than Own Advisees

- 1 Adam Oline, MS
- 2 Rohit Gupta, PhD
- 3 MANY OTHERS

F Supervision of Post-Doctoral Students and Professional Staff

NONE

G Supervision of Undergraduate Research and Independent Study

- 1 HON290 (Spring 2007) - Honors Mentor (Jamin Hitchcock)
- 2 CPRE490 (Fall 2005) - Vignesh Vijayakumar and Jason Stoeker

H Other Contributions to Instructional Programs

- 1 XenWorlds Hypervisor System for Security and OS Labs
- 2 New CPRE 185 Labs to include robotics and sensors

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IV SERVICE (PUBLIC, PROFESSIONAL/DISCIPLINARY, AND UNIVERSITY)

A Public Service

7/2005 **IAC NSF Summer Faculty Outreach Workshop Chairman**

7/2004 **IAC NSF Summer Faculty Outreach Workshop**

Presenter

7/2003 **IAC NSF Summer Faculty Outreach Workshop**

Helped organize and develop material for a three day outreach program to faculty from other programs interested in teaching information assurance. (w/ Doug Jacobson, Jim Davis, and Cliff Bergmann)

B Service to Disciplinary and Professional Societies or Associations

2007 **International Wireless Communications & Mobile Computing Conference (IWCMC 2007)**

Program Committee

2007 **Workshop on Information Assurance 2007 (WIA-2007)**

Program Committee

2007 **Digital Forensic Research Workshop (DFRWS 2007)**

Program Committee

2006 **Secure Knowledge Management 2006 (SKM 2006)**

Program Committee

09/2006 **Annual Conference on Education in Information Security (ACEIS)**

Conference Chair and Organizer

09/2005 **Computer Network Forensics Research Workshop**

Workshop Chair and Program Co-chair (Affiliated with IEEE SecureComm)

01/2004 **Annual Computer Security Applications Conference**

Program Committee Member

12/2003 **Annual Computer Security Applications Conference**

Session Chair

02/2003 **Annual Computer Security Applications Conference**

Program Committee Member

09/2001 **New Security Paradigms Workshop**

Program Committee Member

Session Chair

01/1999 **Second Workshop on Vulnerability Databases**

Discussion Facilitator

Speaker

09/1998 **International Symposium on Recent Advances in Intrusion Detection**

Scribe for panel sessions

Produced *Panel Summary of The Nature and Utility of Standards Organizations for the Intrusion Detection Community* with Don Tobin and Lorenzo Valeri

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Available at http://www.raid-symposium.org/raid98/Prog_RAID98/Panels.html#minutes

C University/Campus Service

05/2007–Present Faculty Senator
01/2005–Present Department Graduate Admission Committee
06/2004–07/2005 Department Promotion and Tenure Committee
08/2004–05/2005 Department Strategic Planning Committee
05/2004–08/2005 Planning Committee for the Infrastructure Security I/U CRC
03/2003 Brought Distinguished Lecturer Mikhail Attallah to Campus

D Other Service

- 1 Fall 2004: Graduate Recruitment Trip to Purdue for College of Engineering
- 2 Fall 2003: Sun Microsystems Development Trip

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