

# Yali Liu

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**EDUCATION**      **University of California, Davis, CA, USA**  
Ph.D., Electrical and Computer Engineering (March 2010)  
• Advisors: Dr. Dipak Ghosal and Dr. Biswanath Mukherjee  
• Thesis Topic: Hide-and-Seek: Concealment and Detection of Sensitive Data Exfiltration in Network Traffic  
M.S., Electrical and Computer Engineering (March 2007)

**Xidian University, Xi'an, China**  
B.S., Communication Engineering (July 2002)

**PROFESSIONAL EXPERIENCE**      **AT&T Labs, San Ramon, CA, USA**  
*Senior Member of Technical Staff*      October 2009 to present  
• Design and develop network analysis tools and performance measurement tools for the mobility network, AT&T Lightspeed and DSL Internet Services networks.  
• Design and performance analysis for core data networks, factors and trends that drive network usage and network engineering principles.  
• Network engineering consulting for wireless system integration, field testing, and troubleshooting.

*Summer Intern*      June 2008 to September 2008 and June 2006 to September 2006  
• Cross functional and cross organizational analysis of the network statistics and video quality impairment for network engineering and operations.  
• Developed algorithms and prototypes for detection of video redistribution over IPTV networks.  
• Design and development of capacity, reliability and performance management models and tools using Video Quality Index (VQI) data and network performance metrics.

**University of California, Davis, CA, USA**  
*Research Assistant*      September 2005 to September 2009  
• Research on detection and mitigation of sensitive data exfiltration in network traffic.  
• Cross layer traffic management for video streaming over broadband networks.  
• Application of signal processing techniques in traffic classification, content identification, and detecting covert communication channels.

**Ruhr-University, Bochum, Germany**  
*Visiting Scholar*      December 2008 to March 2009  
• Research on robust network covert timing channels design and implementation, in collaboration with Technische Universität Darmstadt, Germany.  
• Research on traffic obfuscation mechanisms against network traffic analysis.

**Thomson Corporate Research, Princeton, NJ, USA**  
*Student Intern*      June 2007 to January 2008  
• Designed efficient and robust compression schemes for video transmission with the network packetization schemes, throughput and loss patterns.

- Developed and implemented fine rate control algorithms to meet the bandwidth and storage requirement while maintaining good video quality.

**Tsinghua University**, Beijing, China

*Research Assistant*

September 2002 to July 2005

- Designed and implemented efficient algorithms for the video coding standard H.264/AVC, based on median filter and multiple-interlaced classifiers.
- Implemented a real-time low-bit-rate video coding algorithm on DSP platforms.

**Mediamagic Inc.**, Beijing, China

*Student Intern*

September 2003 to June 2004

- Error resilient video coding design for real-time video communications over unreliable networks.

HONORS AND AWARDS

Research fellowship, Department of Electrical and Computer Engineering, University of California, Davis, 2007-2008.

Outstanding College Graduate (2 in thousands of college graduates of Shan'xi Province), July 2002.

Outstanding Thesis (20 in 2000 graduates), Xidian University, July 2002.

Huawei Scholarship (5 in 1000 students), May 2001.

Excellent Student Cadre (5 in 700 students), Xidian University, June 2001.

Xidian University Scholarship, 1st class (Top 0.5%), 1999 to 2002.

Exemplar Student (3 in 700 students), Xidian University, 2000 to 2001.

SKILLS

Video streaming and communications

Embedded system design and development

Network security technologies in the areas of anonymity and privacy, covert channels, and digital rights management.

***Standards/protocols:***

- Video standards/protocols (MPEG-2, MPEG-4, H.264-AVC/SVC, and Flash video)
- Network protocols (IP, TCP, UDP, RTP, RTSP)
- Wireless standards (802.11 WLANs, 3GPP UMTS, LTE)

***Programming and systems:***

- C/C++, SSE, SSE2, MMX, VHDL, Matlab, assembler, wxwidgets, Java, SQL, Python
- Multi-threading, socket programming, video codec
- Unix/Linux, Windows

PROFESSIONAL SERVICE

**Member of IEEE and IEEE Communications Society**

**Member of the Editorial Board:**

SERSC International Journal of Advanced Science and Technology (IJAST) since 2008

**Member of the Technical Program Committee:**

IEEE International Conference on Communications (ICC) (2007, 2009, 2010, 2011)

IEEE Global Communications Conference (GLOBECOM) (2008, 2009)

SERSC International Symposium on Computer Science and its Applications (CSA) (2008)

SERSC International Conference on Advanced Science and Technology (AST) (2009, 2010)

IARIA International Conference on Creative Content Technologies (CONTENT)(2009, 2010)

SERSC International Conference on Security-enriched Urban Computing and Smart Grid (SU-COMS)(2010)

**Reviewer for Journal Manuscript Submissions:**

IEEE Transactions on Circuits and Systems for Video Technology (2008)  
Journal of Electromagnetic Waves and Applications (2008)  
ACM Transactions on Multimedia Computing, Communications and Applications (2009)  
Elsevier Journal of Systems and Software (2009)  
SERSC International Journal of Advanced Science and Technology (2009)  
Elsevier Integration, the VLSI Journal (2010)  
IEEE Transactions on Information Forensics and Security (2010)

**Reviewer for Conference Manuscript Submissions:**

IEEE International Conference on Communications (ICC) (2007, 2009, 2010, 2011)  
IEEE Global Communications Conference (GLOBECOM) (2008, 2009)  
SERSC International Symposium on Computer Science and its Applications (CSA) (2008)  
SERSC International Conference on Advanced Science and Technology (AST) (2009, 2010)  
Hawaii International Conference on System Sciences (HICSS) (2009)  
IARIA International Conference on Creative Content Technologies (CONTENT)(2009, 2010)  
SERSC International Conference on Security-enriched Urban Computing and Smart Grid (SU-COMS)(2010)  
Information Hiding International Conference (IH) (2009, 2010)  
International Conference on Information Security and Cryptology (ICISC) (2009)

PUBLICATIONS

1. **Yali Liu**, Frederik Armknecht, Dipak Ghosal, Stefan Katzenbeisser, Ahmad-Reza Sadeghi, Steffen Schulz, “Robust and Undetectable Covert Timing Channels for i.i.d. Traffic,” *to appear in the 12th Information Hiding Conferences*, Jun. 2010.
2. **Yali Liu**, Dipak Ghosal, Frederik Armknecht, Ahmad-Reza Sadeghi, Steffen Schulz, Stefan Katzenbeisser, “Hide and Seek in Time-Robust Covert Timing Channels,” *The 14th European Symposium on Research in Computer Security (ESORICS)*, pp. 120-135, Dec. 2009.
3. Qian Xu, Xiaoan Lu, **Yali Liu**, and Cristina Gomila, “A Fine Rate Control Algorithm with Adaptive Rounding Offsets (ARO),” *IEEE Transactions on Circuits and Systems for Video Technology*, vol.19, no.10, pp. 1424-1435, Oct. 2009.
4. **Yali Liu**, Cherita Corbett, Ken Chiang, Rennie Archibald, Biswanath Mukherjee, Dipak Ghosal, “SIDD: A Framework for Detecting Sensitive Data Exfiltration by an Insider Attack,” *The 42st Annual Hawaii International Conference on System Sciences*, pp. 1-10, Jan. 2009.
5. Qian Xu, **Yali Liu**, Xiaoan Lu and Cristina Gomila, “A New Source Model and Accurate Control Algorithm with QP and Rounding Offset Adaption,” *IEEE International Conference on Image Processing (ICIP)*, pp. 2496-2499, Oct. 2008.
6. **Yali Liu**, Canhui Ou, Zhi Li, Cherita Corbett, Biswanath Mukherjee, Dipak Ghosal, “Wavelet-Based Traffic Analysis for Identifying Video Streams over Broadband Networks,” *IEEE Global Communications Conference (GLOBECOM)*, pp. 1-6, Nov. 2008.
7. **Yali Liu**, Ken Chiang, Cherita Corbett, Rennie Archibald, Biswanath Mukherjee, Dipak Ghosal, “A Novel Audio Steganalysis Based on Quality Measurement with Hausdorff Distance and High Order Statistics,” *The 11th Information Security Conference(ISC)*, pp. 487-501, Sept. 2008.
8. **Yali Liu**, Cherita Corbett, Ken Chiang, Rennie Archibald, Biswanath Mukherjee, Dipak Ghosal, “Detecting Sensitive Data Exfiltration by an Insider Attack,” *ACM Cyber Security and Information Intelligence Research Workshop*, pp.1-3, May 2008.
9. **Yali Liu**, Xiaoan Lu, Cristina Gomila and Qian Xu, “A Novel Fine Rate Control Algorithm with Adaptive Rounding Offset,” *IEEE International Symposium on Circuits and Systems (IS-CAS)*, pp. 3490-3493, May 2008.
10. **Yali Liu**, Kun Tang, Huijuan. Cui, “Efficient Probability Based Macroblock Mode Selec-

tion in H.264/AVC,” *Visual Communications and Image Processing (VCIP)*, pp. 1080-1088, July 2005.

11. Xiwei Wang, **Yali Liu**, Kun Tang, Huijuan Cui, “High Efficiency Image Enhancement Algorithm for H.264,” *Tsinghua University Journal*, vol.45, no.7, pp. 904-907, 2005.

12. **Yali Liu**, Jiangtao Wen, “Heuristic Search for Soft-Input Soft-Output Decoding of Arithmetic Codes,” *IEEE Data Compression Conference Proceedings (DCC)* pp. 551, March 23-25, 2004.

#### PATENTS AND DISCLOSURES

1. **Yali Liu**, Mung Chiang, Mike Tisiker, Raj Savoor, Yongdong Zhao and Bruce Shine, “Wireless Network Content Distribution Optimization Based on Active Network Measurement,” Approved for file, Assignee: AT&T Labs

2. **Yali Liu**, Steve Sposato, Raj Savoor and Mike Tisiker, “Method to Control Text-based Communication for Mobile Devices,” Approved for file, Assignee: AT&T Labs

3. **Yali Liu**, Steve Sposato, Raj Savoor and Mike Tisiker, “System and Methods to Identify Targeted Objects Using Smart Devices,” Disclosure pending review, Assignee: AT&T Labs

4. Dimas Noriega, Bo Lee, Raj Savoor, Zhi Li and **Yali Liu**, “An Utran/eUtran Resource Parametric Modeling and Planning Tool,” Disclosure pending review, Assignee: AT&T Labs

5. **Yali Liu**, Xiaoan Lu, Cristina Gomila and Qian Xu, “A Method to Improve the Rate Control Accuracy in a Video Encoder,” US Patent Filed, June 2009, Assignee: Thomson, Corporate Research

6. **Yali Liu**, Xiaoan Lu, Cristina Gomila and Qian Xu, “Method and Apparatus for Rate Control Accuracy in a Video Encoding and Decoding,” US Patent reference number: PU070241, Assignee: Thomson, Corporate Research

7. Canhui Ou, Zhi Li and **Yali Liu**, “Methods to Deliver Personalized Commercials to IPTV Subscribers,” US Patent GR0060040, Assignee: AT&T Labs

#### TECHNICAL REPORT

1. **Yali Liu**, Dipak Ghosal, Biswanath Mukherjee, “TRACI: A Traffic Analysis Framework for Video Content Identification over IP Networks,” *Technical Report, Network Labs, Department of Computer Science, University of California, Davis*, January, 2009.

2. **Yali Liu**, Zhi Li, Dipak Ghosal, “Gigascope Lightspeed Traffic Analysis and HSIA Traffic Analysis,” *Technical Report, Network System Engineering, AT&T Labs Inc.*, October, 2008.

2. **Yali Liu**, Dipak Ghosal, Zhi Li, Canhui Ou, “A Method for Detecting Video Redistribution over Broadband Networks,” *Technical Report, Network System Engineering, AT&T Labs Inc.*, September, 2008.

#### INVITED TALKS

1. “Robust and Undetectable Covert Timing Channels for i.i.d. Traffic,” The 12th Information Hiding International Conferences, Calgary, Alberta, Canada, June 29th, 2010

2. “A Wavelet-based Video Traffic Analysis Framework for Identifying Video Streams over Broadband Networks,” Horst Görtz Stiftung, Technische Universität Darmstadt, Darmstadt, Germany, February 2nd, 2009

3. “Secure Multimedia Communications Using Networking Traffic Analysis,”

Horst Görtz Institute for IT Security (HGI), Ruhr-University, Bochum, Germany, January 14th, 2009

4. "SIDD: A Framework for Detecting Sensitive Data Exfiltration by an Insider Attack,"  
The 42st Annual Hawaii International Conference on System Sciences, Big Island, Hawaii, USA, January 6th, 2009

5. "A New Source Model and Accurate Control Algorithm with QP and Rounding Offset Adaption,"  
IEEE International Conference on Image Processing (ICIP), San Diego, CA, USA, November 15th, 2008

6. "Wavelet-Based Traffic Analysis for Video Streams over Broadband Networks,"  
Network Labs, UC Davis, Davis, CA, USA, November 7th, 2008

7. "A Novel Audio Steganalysis Based on Quality Measurement with Hausdorff Distance and High Order Statistics,"  
The 11th International Information Security Conference(ISC), Taipei, Taiwan, September 18th, 2008

8. "A Novel Fine Rate Control Algorithm with Adaptive Rounding Offset,"  
Thomson Corporate Research, Princeton, NJ, USA, September 28th, 2007

9. "Efficient Probability Based Macroblock Mode Selection in H.264/AVC,"  
Visual Communications and Image Processing (VCIP), Beijing, China, July 15th, 2005

VOLUNTEER  
ACTIVITIES

Chairwoman of Liaison department in Student Union at Xidian University,  
September 1998 to July 2000

Chairwoman of Organizations in Foreign Cultural Club at Xidian University,  
May 1998 to May 2000