

# SEONG SOO KIM

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## *Career Experience*

### ▶ **WORK AUTHORIZATION: F-1 Optional Practical Training**

**05/2005 - present Texas A&M University, Electrical Engineering – Post Doc.**

**09/2001 – 05/2005 Texas A&M University, CPEN in Electrical Engineering – Ph.D.**

### ▶ **Advisor: A. L. Narasimha Reddy**

### ▶ **Course work**

2004 spring	1) Topics in network security	- ELEN/CPSC 689	- N. Reddy et al.
2003 fall	1) Statistical communication theory	- ELEN 646	- D. Halverson
2003 spring	1) Multimedia systems and Networks	- ELEN 627	- N. Reddy
2002 fall	1) Analysis of algorithms	- CPSC 629	- A. Klappenecker
2002 summer	1) Mathematical communication and technology	- MATH 696	- M. Pilant
2002 spring	1) Advanced digital signal processing	- ELEN 644	- E. Serpedin
	2) Estimation and detection theory	- ELEN 662	- D. Halverson
	3) Advanced networking and security	- CPSC 665	- U. Pooch
2001 fall	1) Digital signal processing	- ELEN 444	- Z. Xiong
	2) Computer communications and Networking	- ELEN 602	- N. Reddy
	3) Channel coding for communication systems	- ELEN 604	- S. Miller

### ▶ **Research Interests: computer network security, multimedia including image and signal processing, and stochastic processing**

- i) Tool based on statistical techniques (NP Test) for analyzing network traffic in order to detect, identify and mitigate traffic anomalies such as worms.
- ii) Signal-processing based (DWT), image-processing based (DCT) and Steganalysis (DRM) techniques to analyze such traffic signals.

### ▶ **Publications**

#### [ **Ph.D. Dissertation** ]

"Real-time Analysis of Aggregate Network Traffic for Anomaly Detection", Texas A&M University, May 2005.

## [ Conference ]

7. Seong Soo Kim and A. L. Narasimha Reddy, " NetViewer: A Network Traffic Visualization and Analysis Tool", to appear in *Proceedings of USENIX 19th Large Installation System Administration Conference (LISA '05)*, San Diego, CA, USA, Dec. 2005.
6. Seong Soo Kim and A. L. Narasimha Reddy, "Modeling Network traffic as Images", in *Proceedings of IEEE International Conference on Communication (ICC) 2005*, Seoul, Korea, May. 2005.  
(32.2% acceptance rate, 692/2150)
5. Seong Soo Kim and A. L. Narasimha Reddy, "The real-time detection and containment of network attacks using QoS Regulation", in *Proceedings of IEEE International Conference on Communication (ICC) 2005*, Seoul, Korea, May. 2005.  
(32.2% acceptance rate, 692/2150)
4. Seong Soo Kim and A. L. Narasimha Reddy, "A Study of Analyzing Network traffic as Images in Real-Time", in *Proceedings of IEEE INFOCOM 2005*, Miami, Florida, USA, Mar. 2005.  
(17.2% acceptance rate, 244/1419)
3. Seong Soo Kim, A. L. Narasimha Reddy and Marina Vannucci, "Detecting traffic anomalies through aggregate analysis of packet header data", in *Proceedings of Networking 2004*, Lecture Notes in Computer Science (LNCS) vol. 3042, pp. 1047-1059, Athens, Greece, May 2004.  
(19.1% acceptance rate, 103/539) [SCI-E]
2. Seong Soo Kim, A. L. Narasimha Reddy and Marina Vannucci, "Detecting traffic anomalies using discrete wavelet transform", in *Proceedings of International Conference on Information Networking (ICOIN) 2004*, Vol. III, pp. 1375-1384, (Revised selected papers in LNCS vol. 3090, pp. 951-961), Busan, Korea, Feb. 2004.  
(30.5% acceptance rate in LNCS, 104/341) [SCI-E]
1. Seong Soo Kim, Ki Seong Seo, Chang Hoon Lee, and Kwang Bang Woo, "The Design of a Knowledge-Based Controller for Job Scheduling in Assembly", in *Proc. of Korea Automatic Control Conference '90*, Vol. I, pp. 514-518, Oct. 1990.

## [ Journal ]

4. Seong Soo Kim and A. L. Narasimha Reddy, "An Approach to Evaluating the Effectiveness of Measurement-based Anomaly Detection Techniques (preparing to submission)", in *ACM Computer Communication Review (CCR)*. [SCI-E]
3. Seong Soo Kim and A. L. Narasimha Reddy, "Image-based Anomaly Detection Technique: Algorithm, Implementation and Effectiveness (submitted for publication)", in *IEEE Journal on Selected Areas in Communications (J-SAC) - HIGH SPEED NETWORK SECURITY*. [SCI]
2. Seong Soo Kim and A. L. Narasimha Reddy, "Statistical Techniques for detecting Traffic Anomalies through Packet header data (submitted for publication)", in *IEEE/ACM Transactions on Networking*. [SCI]
1. D.W. Kwon, K. Ko, M. Vannucci, A.L.N. Reddy, and S. Kim, "Wavelet methods for the detection of anomalies and their application to network traffic analysis", to appear in *Quality and Reliability Engineering International (QREI) 2005*. [SCI-E]

## **1991-2001 LG Electronics Co. Ltd., Digital Multimedia & Digital TV Research Lab.**

*Senior Research Engineer*

### **► Work Experiences**

#### **1999-2001 Development of IEEE1394 Digital Interface & HAVi Home-Networks**

- 1) Design IEEE std. 1394 MAC
- 2) Design system software elements of HAVi (using Visual C++, C)
- 3) Comparative study of UPnP, Bluetooth
- 4) Design JPEG, PNG (Portable Network Graphics), AIFF-C parser

#### **1998-1999 Development of Cable Modem & ADSL**

- 1) Design ADSL Communication Protocol (ANSI T1.413 using TI DSP)
- 2) Comparative study of DAVIC, DSM-CC specification & MAC protocol
- 3) Study of IEEE 802.14 LAN protocol (Tree-Based algorithm & p-Persistence algorithm etc.)
- 4) Study of IEEE 802.3 Ethernet & ATM MAC protocol

#### **1997-1997 Research of CAS (Conditional Access System) & Security**

- 1) Coding of Common scrambling spec. of EP-DVB (using C & VHDL)
- 2) Coding of MULTI2 algorithm (using C)
- 3) Coding of Smart card interface software (ISO/IEC 7816 std.)
- 4) Channel coding algorithm (Viterbi decoder, using VHDL)

#### **1995-1996 Development of DBS-STB (Direct Broadcasting Satellite-Set Top Box)**

- 1) Coding device driver for Tuner, QPSK decoder, TP parser, NTSC encoder
- 2) Construct Data Base of MPEG2 PSI & EPG (ISO/IEC 13818 std.)
- 3) ARM porting on RTOS (pSOS+)

#### **1994-1994 Design of VGA to NTSC Encoder ASIC**

- 1) Design of Digital video signal processing logic (using VHDL)
- 2) Develop Evaluation Board (using FPGA: Altera Series)

#### **1992-1993 Development of Caption decoder ASIC (FCC & EIA-608 standard)**

- 1) Develop decoder program (using Intel 8052 assembly language)
- 2) Develop u-code of decoder program (using Zilog Z-80 assembly language)
- 3) Design of data slicer logic (using Schematic entry)

#### **1991-1991 Development of Voice Recognition VCR**

- 1) Develop voice synthesis part (using Intel 8051 assembly language)
- 2) Design board hardware (using PCAD design tool)

**1989-1990 Research Assistant** for Prof. Kwang Bang Woo, Electrical Engineering Yonsei University, Korea. Research on the flexible manufacturing system, especially on the Expert System and optimal flow control.

### ***Education***

**05/05-present TEXAS A&M UNIVERSITY** College Station, Texas, USA

Post Doc. in the Dept. of Electrical Engineering

**09/01-05/05 TEXAS A&M UNIVERSITY** College Station, Texas, USA

Ph.D. in computer engineering in the Dept. of Electrical Engineering

**03/89-02/91 YONSEI UNIVERSITY** Seoul, Korea

Master of Science in Electrical Engineering

**03/85-02/89 YONSEI UNIVERSITY** Seoul, Korea

Bachelor of Science in Electrical Engineering

## ***Honors***

- Receiving Research Assistantship position from Texas A&M University since 2002
- Received Scholarship from Texas A&M University in 2001 and 2002
- Invitation from the Korean President, Young Sam Kim to the Blue House on the Day of Invention in 1997
- Awarded ‘Applied Patents Grand Prize’ from LG Electronics in 1997
- Awarded ‘Patent-Technology Prize’ from the National Patent Officer in 1996
- Awarded ‘Outstanding Research Engineer’ from LG Electronics in 1995
- Received Fellowship from LG Electronics Inc. from 1989 to 1990

## ***Professional Activities***

- Program committee member  
-- *International conference on Information Society (i-Society) 2006.*
- Reviewer for the following conference  
-- *IEEE ICC 2004.*
- A member of ‘YECOM: u-processor based system design club’ in Yonsei University (1987-1990)

## ***Technical Skills***

- Computer Languages: C/C++, Pascal, Assembly (Intel, Zilog, ARM),  
DSP (TI), Java, VHDL and HTML
- ASIC Design: Compass (VHDL Synthesizer & Simulator), FPGA (Altera, Xilinx)
- PCB Design Tools: PCAD
- Signal Tools: MatLab
- Instrument: Oscilloscope, Logic Analyzer, and Pattern Generator

## ***Patents***

- 31 granted and pending from Korea National Patent Office & 5 Abroad

### ***Registered Patents (Korea)***

- 1 Data slicer apparatus in caption display device (Patents No.:P083291)
- 2 Remote-controller controlling method in voice recognition VCR (P084899)

- 3 Confirmatory method in voice recognition system (P086329)
- 4 Caption display controlling device and method (P091725)
- 5 Caption decoding method in scrambled video signal (P097636)
- 6 Apparatus and method for controlling the display of a caption (P104296)
- 7 Caption data decoder and method (P144189)
- 8 Dual caption processing apparatus and method (P161904)
- 9 Conversion method of synchronization signal in TV and PC (P198569)
- 10 TV encoder using normal memory (P217253)
- 11 Mode memory type caption display apparatus (P237243)

### ***Registered Utility Model Patents (Korea)***

- 12 Back cover combination apparatus in electronic device (Patents No.: U86- 22080)
- 13 Recorder using RAM (U91-24468)
- 14 Vibration apparatus for even distributing in toner (U95-35587)
- 15 Extension telephone interface circuit in digital key-phone system (U96-31308)

### ***Application Pending Patents (Korea)***

- 16 Caption controllable device and method (Application No.:P92-18743)
- 17 Control code for national character caption (P95-67193)
- 18 Processing method for national character caption (P96-35325)
- 19 Entrance authentication method using district mobile communication system(P96-72437)
- 20 Detection apparatus for power level (P97-54387)
- 21 Screen adjusting method in satellite broadcasting receiver (P97-80725)
- 22 Usage display method in satellite broadcasting receiver (P97-80739)
- 23 Auto-detection method of broadcasting caption in satellite receiver (P97-80740)
- 24 Data rates modification method in ADSL (P99-03547)
- 25 Customer equipment controlling method in home networks (P00-12540)
- 26 Message transmitting/receiving method in home networks (P00-31376)
- 27 Web server proxy API in home networks without Internet protocol (P00-32686)
- 28 Data reading/writing method in IEEE1394 system (P00-44333)
- 29 User preference setting method in home networks ( P00-44412)
- 30 Device name setting method in home networks using virtual keyboard ( P00-44413)
- 31 Configuration data reading/writing method of CMM1394 in HAVi networks (P00-44414)

### ***Abroad Patent***

- 1 Apparatus and method for controlling the display of a caption on a screen and for maximizing the area devoted to presentation of the received video signal (US patent No.: 5,561,471)

### ***Abroad pending Patents***

- 2 Apparatus and method for controlling the display of a caption ( Japan, No.: 05-254398)
- 3 Apparatus and method for controlling the display of a caption  
(The People Republic of China, Application No.: 93118937.3)
- 4 Message transmitting/receiving method in home networks (US: processing)
- 5 Web server proxy API in home networks without Internet protocol (US: processing)