The Department of Computer Science & Engineering, established in 1983, has actively educated a great number of talents and conducted many high-tech research or more than 30 years. Currently, the department consists of 19 faculty members, 200 Ph.D. and Master students and 400 undergraduate students. The academic objective, which is based on the Christian spirit, is to help students to become global IT experts and moral leaders who will contribute to our society in a positive manner. Our education focuses on the development of the creative thought, adaptation of new technologies, and application for practical use. The social demand of this field is increasing due to the necessity of a large number of software experts, and therefore Computer Science has now a major role to lead the information and communication industry. Currently, our alumni are involved in diverse areas of the high-tech and creative industry. The alumni of the department work in many different fields: researchers at laboratories, professors, engineers in IT companies, founders or employees at start-up companies, and as government employees.
Today’s society is experiencing a rapid transition from a traditional production-driven society to an information-driven one where every aspect of social and corporate activities is processed more quickly and precisely through the utilization of computer technologies. Computer Science is an essential and core science for the future information era, where computational thinking is a fundamental skill used by scientists and engineers in the world in the 21st Century.

The Department of Computer Science & Engineering at Yonsei University has 19 faculty members, 7 research professors, more than 400 undergraduate, and over 200 graduate students. The faculty members at our department are committed to research and discovery at the highest level along with creative teaching. Core research areas of the faculty include artificial intelligence, computer networks, computer graphics, computer architecture and systems, and databases.

The Department of Computer Science & Engineering at Yonsei University aims to foster talents who will be leaders in both academia and industry by providing them with sufficient and professional knowledge in the field of Computer Science and related areas. Students may select courses from a wide range of areas in the undergraduate curriculum and graduate students have tremendous opportunities to engage in research that emphasizes professional skills that both industrial and academic communities demand. To achieve these goals, our department is making sincere and elaborate efforts to educate students to become global leaders in the field of information technology.
Educational Mission of the Department of Computer Science & Engineering

01 **Our education** will equip the students not only with a sound and broad understanding of the foundations of Computer Science, but also the ability to solve problems creatively and think critically.

02 **Our program** expands the student’s advanced knowledge of computer science and prepares them to solve problems in the IT industry, and to apply their thorough knowledge to future-oriented breakthrough technologies.

03 **Our curriculum** seeks to provide students with necessary skills to meet and address the needs of the IT industry.

04 **Computer Science** is one of the most rapidly changing and developing fields. Our program seeks to produce graduates who can not only work as part of a team but also take charge in the competitive international arena.

Specialization

Master’s and doctoral programs offer the opportunity to specialize in multimedia, computer graphics, artificial intelligence, networks, computer architecture, databases, algorithms, computer vision/pattern recognition, intelligent agents, system software, mobile embedded systems, software engineering, programming languages and internet computing for the next generation. These specializations enable the graduates to fulfill job market requirements. By means of highly collaborative and interdisciplinary research, students can enhance their research ability in different specialized areas.
Multimedia / Graphics Lab.

PROFESSOR  Choy, Yoon-Chul
EMAIL       ycchoy@rainbow.yonsei.ac.kr
HOMEPAGE   http://mglab.yonsei.ac.kr
PHONE       +82.2.2123.2712

Biography

• PhD and MS in Operations Research, Univ. of California, Berkeley, 1975-1979
  (PhD program in Computer Science, Univ. of Washington, 1982-1984)
• MS in Industrial Engineering, Univ. of Pittsburgh, 1973-1975
• BS in Electronic Engineering, Seoul National University, 1969-1973
• Professor, Dept. of Computer Science, Yonsei University, 1984-Present
• Senior Researcher, Lockheed and Rockwell International, USA, 1979-1982

Research Areas

• Sketch-based 2D Animation
  - Creating 2D animation using sketch-based interface based on cutout and whiteboard metaphors.
• Image Object Shape Deformation
  - Deformable curve skeleton for real-time deformation and animation.
• Sketch-based Movement Control for 3D Characters and Objects
  - Authoring 3D animation using sketch-based interface for characters and objects.
• Kinetic Typography Research
  - Developing sketch-based tools for kinetic typography

Sketch-Based Interfaces

• Cutout Animation & Whiteboard Animation
• Curve Skeleton based deformation for real-time 2D animation
• Authoring 3D animation
• Synchronization

Sketch-n-Stretch

- 2D animation using sketch-based interface based on cutout and whiteboard metaphors.
- Deformable curve skeleton for real-time deformation and animation.
- Authoring 3D animation using sketch-based interface for characters and objects.
- Developing sketch-based tools for kinetic typography
Artificial Intelligence Lab.

PROFESSOR  Lee, Yilbyung
EMAIL  yilbyunglee@yonsei.ac.kr
HOMEPAGE  http://csai.yonsei.ac.kr/
PHONE  +82.2.2123.2713

Character and Text Recognition / Neural Network / Cognitive Science / Data Mining

BIOGRAPHY
- PhD in Computer & Information Science, University of Massachusetts, Amherst, 1985
- MS in Computer Science, University of Illinois, Urbana-Champaign, 1980
- BS in Electronic Engineering, Yonsei University, Seoul, Korea, 1976
- Chairman: Dept. of Computer science, 1996 – 1998
- President: Korean Data Mining Society, 2003 - 2004
- President: Korean Language Information Society, 2005 - 2006

RESEARCH AREAS
- Brain Modeling and Computer Vision
  - Computational modeling of biological visual pathways and Computer Vision system utilizing those ideas especially in robotic vision
- Pattern Recognition
  - Recognition of OCR and handwritten characters, mostly handwritten numbers and Hangul (Korean Alphabet)
- Data Mining
  - Developing basic algorithms and systems for DM

Neural Modeling and Applications
- Neural Modeling of Biological Visual Pathways: Three dimensional space recognition model and application to computer vision as well as mobile robotics.

Series: Pattern Recognition
- 3D space Recognition model

Data Mining
- Data Mining: Patent document clustering system providing easy 2.5D visual interface and customizable clustering algorithms.
Computer and Communication Lab.

PROFESSOR: Song, JooSeok
EMAIL: jissong@emerald.yonsei.ac.kr
HOMEPAGE: http://onyx.yonsei.ac.kr/
PHONE: +82.2.2123.2714

Computer Networks / Computer and Internet Security / Software Reverse Engineering

BIOGRAPHY
- PhD in Computer Science, University of California, Berkeley
- MS in Electrical Engineering, KAIST
- BS in Electrical Engineering, Seoul National University

RESEARCH AREAS
- In Computer and Communication Lab., we have several research groups focusing on communication issues in various computer networks, and especially security and privacy problems in the fields of computer and the Internet.
- Computer Networks
  - Optimized routing and handover mechanisms for mobile IP
  - Fast and robust communications for wireless ad-hoc networks
  - Efficient and stable inter-networking protocols
- Computer and Internet Security
  - Network security issues in MANETs, VANETs, RFID, and WSNs
  - Security protocols for VoIP, WLANs, and 3G/4G networks
  - Detection of malicious behaviors in computer systems
- Software Reverse Engineering
  - OS and application reversing
  - Analysis of smartphone security architectures
  - Anti-reversing techniques
- Our vision is to advance the various computer systems and networks so as to make them more reliable, with the development of secure and efficient technologies especially pertaining to inter-networking for 4G/WLANs and communications in RFID/USN, MANETs and VANETs.

Computer Networks
- FemtoCall
  - Handoff in heterogeneous networks
  - Secure authentication protocol design
- Ad hoc Networks (MANETs & VANETs)
  - Routing & Data Dissemination
  - Service Discovery Protocols
  - Attacks & Countermeasures

Security Privacy
- RFID/USN Security
  - Attacks measurement
  - Secure authentication protocol design
- Software Reverse Engineering
  - OS & application reversing
  - Analysis of smartphone security architectures
  - Anti-reversing techniques

Routing Issues
Security Issues
- Routing Protocols (RP) Security Protocols (SP)
- Service Discovery Protocol (SDP) Confidentiality
- Handoff in heterogeneous networks Authentication
- Secure protocols design
- Sensor networks

FemtoAP-based overlay networks
- FemtoAP
  - Attack prevention scheme
  - Authentication protocol
  - Designing secure protocols for RFID
  - Attacks measurement
  - Handoff in heterogeneous networks
  - Secure authentication
  - Mobile networks

Femto-Cellular + Femto-Wi-Fi
- Femto-only
  - Wireless channel
  - Wired channel
- Femto-Wi-Fi
  - Wireless channel

Micro/macro coverage
- Public/personal networks:
  - Public networks
  - Personal networks
- Cellular networks:
  - Enterprise/public/home)
- Femto networks:
  - Femto-cellular
  - Femto-Wi-Fi
  - Femto-only

ReaderTag Database (Trustable)
- Reader
  - Reader
  - Tag
  - Attack prevention
  - Man-in-the-middle attack
  - Attack prevention

Functions
- Functions
- Functions
- Functions

Analysis Tools
- Analysis Tools
- Analysis Tools
- Analysis Tools

Assembly code
- Assembly code
- Assembly code
- Assembly code

Found functions
- Found functions
- Found functions
- Found functions

Addition & subtraction
- Addition & subtraction
- Addition & subtraction
- Addition & subtraction
BIOGRAPHY

• PhD in Computer Engineering, University of Massachusetts at Amherst, 1987
• MS in Computer Engineering, Wayne State University, Michigan, 1983
• BS in Electronic Engineering, Yonsei University, Seoul, Korea, 1978

RESEARCH AREAS

• NUI based Smart Space Interaction Design
  - Recognizing user interaction(intents) based on Vision and Sensor
  - 2D / 3D Hand Posture Interaction Design
  - Smart Space Control
  - Marker / Markerless Augmented Reality
  - Pervasive Display and Multi-touch Table

• High-performance ray-tracing hardware
  - High-performance ray-tracing hardware
  - Global illumination algorithms

• GPGPU based on optimized parallelization techniques
  - Exploiting fine-grained parallelism
  - Optimized parallelization building blocks
  - High performance image / vision processing

PROFESSOR
Han, Tack-Don
EMAIL
hantack@msl.yonsei.ac.kr
HOMEPAGE
http://msl.yonsei.ac.kr
PHONE
+82.2.2123.2715

Natural User Interaction / Global Illumination / GPU Programming

Interaction Design for Smart Space and Accelerating Rendering Algorithm

NUI based Smart Space Interaction Design
• Recognizing user interaction(intents) based on Vision and Sensor
• 2D / 3D Hand Posture Interaction Design
• Smart Space Control
• Marker / Markerless Augmented Reality
• Pervasive Display and Multi-touch Table

Next Generation Rendering Technique
• Global illumination algorithms
• High-performance ray-tracing hardware
• Exploiting fine-grained parallelism
• Optimized parallelization building blocks
• High performance image / vision processing
Data Stream Mining / Continuous Query Processing / Data Mining / Big Data (Map/Reduce, Hadoop, NoSQL)

BIOGRAPHY

• PhD in Computer Engineering, Purdue University, 1990
• MS in Computer Engineering, Purdue University, 1987
• BS in Computer Engineering, Boston University, 1985

RESEARCH AREAS

• Database Lab. has various efforts in the area of big data and data streams, with a specific focus on data stream mining and continuous query processing over massive infinite data sets and Map/Reduce evaluation on Hadoop.

• Data Mining & Data Stream Mining
  - Continuous knowledge extraction methods
  - Frequent itemsets, association rules, and sequential patterns mining
  - Multi-dimensional clustering

• Data Stream Management System (DSMS)
  - Continuous query evaluation
  - Adaptive query optimization
  - Dynamic load shedding

• Big Data (Map/Reduce, Hadoop, NoSQL)
  - In-memory big data processing
  - Big data mining operations on Map/Reduce Hadoop systems
  - Scalable cloud information retrieval from the NoSQL data storage

Data Stream Processing

• A data stream is the set of continuous, unbounded, rapid, time-varying streams of data elements
• Occur in a variety of modern applications such as network monitoring, traffic engineering, sensor networks, RFID tags, call records, financial applications, web logs and click-streams
• Various knowledge discovery tasks and real-time monitoring over massive infinite data sets

Database Computing

• Data Stream Mining
  - Continuous knowledge extraction to find a set of frequent patterns, interesting association rules, sequential patterns and similar clusters of data elements over massive infinite data streams.

• DSMS (Data Stream Management System)
  - Continuous knowledge extraction to find a set of frequent patterns, interesting association rules, sequential patterns and similar clusters of data elements over massive infinite data streams.

• Context Aware Computing
  - A system that is always aware of its user’s state and surroundings, and adapts its behavior as per requirement.

• Real-Time OLAP
  - On-Line Analytical Processing
  - OLAP is an approach to answering multi-dimensional analytical queries swiftly. The essential characteristic of a Real-Time OLAP system is in holding all the data in a confined memory space.

• Big Data Mining
  - Big data refers to data sets whose size is beyond the ability of typical database software tools to store, manage and analyze.
  - The objective of big data mining is to perform various data mining operations on Map/Reduce Hadoop systems, providing the ability to scale out to massive datasets and improving the response time.
  - Map/Reduce is a programming model to process large data sets typically using distributed computing on clusters of computers.

• Big Data NoSQL DBMS
  - NoSQL Database is a distributed database that can provide massive scalability, high availability, usually predictable elasticity, and schema flexibility.
  - Scalable and available cloud information retrieval from the NoSQL data storage such as MongoDB, Cassandra, and CouchDB.

• Data Stream Processing (In-Memory)
  - Continuous knowledge extraction to find a set of frequent patterns, interesting association rules, sequential patterns and similar clusters of data elements over massive infinite data streams.

• Continuous queries
  - Adaptive query optimization
  - Dynamic load shedding

• Big Data (Map/Reduce, Hadoop, NoSQL)
  - In-memory big data processing
  - Big data mining operations on Map/Reduce Hadoop systems
  - Scalable cloud information retrieval from the NoSQL data storage

• Big Data
  - Big data refers to data sets whose size is beyond the ability of typical database software tools to capture, store, manage and analyze
  - Perform various operations on Map/Reduce Hadoop systems and information retrieval using several NoSQL data storages such as MongoDB, Cassandra
Algorithm Design Lab.

**PROFESSOR**  
Yang, Sung-Bong

**EMAIL**  
sbyang@yonsei.ac.kr

**HOMEPAGE**  
http://algo.yonsei.ac.kr

**PHONE**  
+82.2.2123.2717

Various Algorithms in MANETs and Mobile Social Overlay Network / M2M File Sharing

**BIOGRAPHY**
- PhD in Computer Science, University of Oklahoma in 1992
- MS in Computer Science, University of Oklahoma in 1986

**RESEARCH AREAS**
- Algorithm LAB focuses on various algorithms in Mobile Computing environments associated with Social Network Services.
  - SNS (Social Network Services)  
    - Online services, platforms, or sites that focus on facilitating the building of social networks or social relations among people
  - Mobile Social Overlay Networks  
    - Delay Tolerant Networks with SNS
    - Dynamic analyses of SNS with Graph theory
  - M2M (Machine to Machine) File Sharing  
    - Seamless file sharing using NFC, Bluetooth, WiFi, and cellular networks
  - Lab vision is to construct User-friendly Mobile SNS Overlay Network Systems in which users communicate with each other without any infrastructures.

**SNS / Mobile**
- Ego networks
- Community detection
- Neighbor node detection
- Tie strength estimation
- Search algorithms

**Mobile Social Overlay Network**
- Dynamic analyses of SNS
- Relation management
- Mobility models
- Theories in Graphs

**M2M File Sharing**
- User-transparent applications
- Platform independent applications
Supercomputing Lab.

Professor Kim, Shin-Dug
Email: sdkim@yonsei.ac.kr
Homepage: http://supercom.yonsei.ac.kr
Phone: +82.2.2123.2718

Universal Unified Memory System / Ubiquitous Computing based on AR / Parallel Computing

Biography

• Assistant professor, Computer Engineering at Kwangwoon University, 1993 – 1994
• PhD in Computer Engineering, Purdue University, 1991
• MS in Computer Engineering, University of Oklahoma, 1988
• BS in Electrical Engineering, Yonsei University, 1982

Research Areas

• Universal Unified Memory System
  - Design of unified memory-disk structure based on new non-volatile memories
  - Power, cost, speed and capacity efficient memory system
  - The challenge of innovative change in conventional memory hierarchy
  - An innovative array of hybrid new memories (PRAM, MRAM, RRAM, Flash)
• Ubiquitous Virtual Personal World based on AR & a Tangible Augmented Reality Service Platform
  - Virtual content design based on objects and a tangible service model design
  - Polymorphism service evolution based on a personal profile
  - User-friendly interface based on augmented reality
  - A tangible service via natural object recognition
  - Natural interface to detect any objects in the real world
  - Polymorphism service depending on environmental contexts
• Heterogeneous Computing for Multi-core and GP-GPU
  - Idle-resources utilization of mobile multi-core system
  - Analysis of factors which affect the performance of mobile Multi-core and GPU
  - Performance optimization of GPU using PC based GPU simulator
  - Energy-efficient heterogeneous computing on Multi-core and mobile GPU
• Super computing power on my hand using innovative computing methodology

Embedded Systems & Ubiquitous Computing

Universal Unified Memory System

Conventional System

Single / Multicore Processor
Main Memory
Storage Devices

Universal Unified Memory System

Hardware Converter
Non-Volatile Translation Layer
NV Array (Non-Volatile Arrays)

Bottleneck
Bottleneck

NVTL (Non-Volatile Translation Layer)
Pre-fetching Buffer
Filtering Buffer

Single / Multicore Processor
On-chip L1/L2/L3 Cache

AR Device
AR Engine

Context Profile
Source from User
• Intention
• Preference
• Profile
• Feedback

Source from Sensors
• Location
• Device activity
• Proximity detectors
• Ambient acoustics
• Accelerometers
• Visual analysis

Utilities
Probabilities
Actions
Behaviors

Networking
Polymerization
Intention
Inference
Model
Virtual Content
Environment
Model
Decision
Inference
Model

Heterogeneous Computing for Multi-core and GP-GPU

Emulation
Performance Simulation & Optimization
- High performance
- Low power consumption
- Balanced mode

Super computing power on my hand using innovative computing methodology

Open GL trace

Profiling real phone
Computer Vision & Pattern Recognition Lab.

**PROFESSOR**  
Byun, Hyeran

**EMAIL**  
hrybun@yonsei.ac.kr

**HOMEPAGE**  
http://cvpr.yonsei.ac.kr

**PHONE**  
+82.2.2123.2719

**BIOGRAPHY**

- PhD in Computer Science, Purdue University
- MS in Computer Science, Yonsei University
- BS in Mathematics, Yonsei University

**RESEARCH AREAS**

- CVPR Lab is dedicated to research fields applying principles of computer vision, pattern recognition, and image processing for analyzing images and videos to generate high-level knowledge such as Human Activity Recognition, Scene Understanding, and Vehicle Vision. Our ultimate goal is to improve the computer vision system beyond human intelligence.

- **Computer Vision**
  - Intelligent Surveillance
  - Vehicle Vision

- **Pattern Recognition**
  - Human Activity Recognition
  - Gesture Recognition
  - Crowded Scene Understanding
  - Face Recognition

- **Digital Image Processing**
  - Image Enhancement
  - Image Segmentation
  - Super-Resolution

**Human Centered Recognition**

- Face Recognition
- Gesture Recognition
- Human Activity Recognition

**Crowded Scene Surveillance**

- Crowded Scene Understanding
- Camera Topology Estimation
- Abnormality Detection

**Vehicle Vision**

- Image Enhancement
- Traffic Sign Recognition
- Lane Detection

**Scene Flow Analysis**

- Foreground Segmentation
- Scene Flow Analysis

**Camera Topology Estimation**

- Abnormality Detection

**Image Enhancement**

- Traffic Sign Recognition
- Lane Detection

**Barack Obama SECRET HANDSHAKE Crowd**
Soft Computing Lab.

**PROFESSOR**
Choi, Sung-Bae  
**EMAIL** sbcho@yonsei.ac.kr  
**HOMEPAGE** sclab.yonsei.ac.kr  
**PHONE** +82.2.2123.2720

**BIOGRAPHY**
- PhD in Computer Science, KAIST, Daejeon, Korea, 1993  
- MS in Computer Science, KAIST, Daejeon, Korea, 1990  
- BS in Computer Science, Yonsei University, Seoul, Korea, 1988

**RESEARCH AREAS**
- **Intelligent Robots**
  - Bayesian inference and design technique for uncertain scene recognition
  - Combination Image filtering and Bayesian inference
  - Navigation technique research for autonomous mobile robot
  - Evolving a mobile robot controller
- **Intelligent Agent**
  - Intelligent virtual secretary agent
  - Conversational agent
  - Intelligent assistants for smart phone service
- **Bioinformatics**
  - Bioinformatics: the collection, classification, storage, and analysis of biochemical and biological information using computers especially as applied in molecular genetics and genomics
  - Classification techniques in Bioinformatics
  - Agent driven virtual cell modeling
- **Biometrics**
  - Analysis and evaluation techniques of fingerprint recognition system
  - Development of classification and matching algorithm for fingerprint recognition
- **Intrusion Detection System (IDS)**
  - HMM-based intrusion detection system
  - Generation of various intrusion patterns using interactive genetic algorithm
  - Viterbi algorithm for intrusion type identification
  - Rule-based integration of multiple measure-models

**RESEARCH AREAS**
- **Intelligent Robots**
  - Bayesian inference and design technique for uncertain scene recognition
  - Combination Image filtering and Bayesian inference
  - Navigation technique research for autonomous mobile robot
  - Evolving a mobile robot controller
- **Intelligent Agent**
  - Intelligent virtual secretary agent
  - Conversational agent
  - Intelligent assistants for smart phone service
- **Bioinformatics**
  - Bioinformatics: the collection, classification, storage, and analysis of biochemical and biological information using computers especially as applied in molecular genetics and genomics
  - Classification techniques in Bioinformatics
  - Agent driven virtual cell modeling
- **Biometrics**
  - Analysis and evaluation techniques of fingerprint recognition system
  - Development of classification and matching algorithm for fingerprint recognition
- **Intrusion Detection System (IDS)**
  - HMM-based intrusion detection system
  - Generation of various intrusion patterns using interactive genetic algorithm
  - Viterbi algorithm for intrusion type identification
  - Rule-based integration of multiple measure-models
Mobile Embedded Systems Lab.

PROFESSOR: Cha, Hojung  
EMAIL: hjcha@yonsei.ac.kr  
HOMEPAGE: http://mobed.yonsei.ac.kr  
PHONE: +82.2.2123.5711

Operating Systems / Energy-aware Embedded System / Mobile Sensing System / Green Computing

BIography

- PhD in Computer Science, University of Manchester, 1991  
- MSc in Computer Engineering, Seoul National University, 1987  
- BSc in Computer Engineering, Seoul National University, 1985

Research Areas

- The MOBED (mobile embedded system) research group at Yonsei University has actively been participating in the research and development of a wide range of embedded and wireless/mobile system software. We are currently interested in (1) embedded operating system, (2) mobile sensing system, and (3) context-aware green computing.

- Embedded operating system  
  - Target-specific power/performance-aware embedded operating systems and optimization  
  - Personalized power management techniques for Linux-based handheld devices such as smartphones  
  - Project: AppScope suite (DevScope, AppScope, AppScopeViewer, UserScope)

- Mobile sensing system  
  - Understand the "human behavior" with crowd sensing (i.e., spatio-temporal information)  
  - Indoor location tracking using mobile device and user context  
  - Project: LifeMap

- Context-aware green computing  
  - Green computing (i.e., smart grid)  
  - Development of context-aware home-energy management  
  - Project: GreenScope
Internet Computing Lab.

BIOGRAPHY

- PhD in Computer Science, Yonsei University, Seoul, Korea, 2001
- MS in Computer Science, Yonsei University, Seoul, Korea, 1997
- BS in Computer Science, Yonsei University, Seoul, Korea, 1995

RESEARCH AREAS

- Internet Computing Lab. has been making contributions to the development of the theoretical and technical foundations of service-oriented computing and its integration with semantic web, mobile computing, and social networks.

- Theoretical and Technical Foundations of Service-Oriented Computing
  - Service and business process modeling
  - Service discovery, selection, composition and engineering
  - Process choreographies & service orchestration

- Web Services, Semantic Web, Social Network and Mobile Computing
  - Semantic web services: discovery, selection, composition
  - Socially-enhanced services computing
  - Context-aware adaptive mobile web services
  - Migration and reconfiguration of web services in mobile environments
  - Service-oriented middleware for smart embedded mobile devices

- Web Science and Cloud Computing
  - Mashups in the web of things (things, services, devices)
  - Cloud services management and composition
  - Crowdsourcing and web engineering
  - Conceptual modeling and the semantic web (ontology development and integration)
Visual Computing Lab.

**PROFESSOR**  Lee, In-Kwon
**EMAIL**  iklee@yonsei.ac.kr
**HOMEPAGE**  http://visualcomputing.yonsei.ac.kr
**PHONE**  +82.2.2123.5713

**Computer Animation / 2D & 3D Image / Video Processing / Music Technology / HCI**

**BIOGRAPHY**
- PhD in Computer Science and Engineering, POSTECH, 1997
- MS in Computer Science and Engineering, POSTECH, 1992
- BS in Computer Science, Yonsei University, 1989
- Film Music Composition Expert Course, Yonsei University (Completed), 2006

**RESEARCH AREAS**
- Visual Computing Lab research focuses on the new ways of interactions among different types of media contents, including visual and audio. Research interests are including computer graphics, image/video processing, music technology, HCI, and more.
- Computer Animation
  - Cartoon style animation
  - Motion editing interface
- 2D & 3D Image/Video Processing
  - Game engine converting 2D game to stereoscopic 3D game
  - NPR techniques for stereoscopic image and video
  - Stereoscopic 3D image composition based on GPU
- Music Technology
  - Computational skills of sound synthesis
  - Music fountain / Show control system
- HCI (Human-Computer Interaction)
  - Emotion-based music Icons
  - Emotion-musical Key Relationship
  - Emotion-based Image Editing

**Image/Video Processing**
- Image/Video Stylization
  - Hidden Picture Generator
  - Caricature Video
- Video Word Balloon Authoring System

**3D Stereo Content**
- Stereoscopic Game Engine
  - Stereoscopic NPR
- Stereoscopic Line Drawing
- Stereoscopic Game Engine

**Computer Animation**
- Cartoon Style Animation
  - Motion Editing Interface
- Cartoon-like Stylization for Character Animation

**Affective Computing**
- Emotion-based Computing
  - Emotion-based Music Icons
  - Emotion-based Image Editing
Embedded and Bio Database Lab.

PROFESSOR  Park, Sanghyun
EMAIL       sanghyun@cs.yonsei.ac.kr
HOMEPAGE   http://embio.yonsei.ac.kr
PHONE      +82.2.2123.5714

BIOGRAPHY
• PhD in Computer Science, University of California, Los Angeles, 2001
• MS in Computer Engineering, Seoul National University, Seoul, Korea, 1991
• BS in Computer Engineering, Seoul National University, Seoul, Korea, 1989

RESEARCH AREAS
• Embedded and Bio Database Lab. has various efforts in the area of both database system technologies with modern hardware and bioinformatics based on data mining.

• Data Management with Modern Hardware
  – Database System Technologies with Modern Hardware
  – High-Performance Indexing
  – Big Data Management on Modern Hardware

• Bioinformatics
  – Systems Biology Studies
  – Developing Tools for Bio-data Analysis

• Our vision is to optimize typical database technologies for modern hardware and big data management. We also aim to research on various computational methods for omics data analysis and high-throughput biological data analysis.

Database, Data Mining, Bioinformatics

• Database System Technologies with Modern Hardware
  – Efficient page layout and file organization
  – Query processing and indexing for modern hardware
  – Column DBMS technologies

• High-Performance Indexing
  – Inverted list index
  – Spatial index

• Big Data Management on Modern Hardware
  – Optimization of Hadoop performance
  – Distributed graph processing

Bioinformatics

• Systems Biology Studies
  – Diagnosis and prognosis of cancer and understanding oncogenesis within the context of biological pathways
  – Identification of functional CMR networks using genotype-phenotype relationship in a genome-wide scale
  – Construction and analysis of disease network to analyze the relationship among various disease including cancers

• Developing Tools for Bio-data Analysis
  – Algorithms for short read alignment and genomic variation detection
  – Automatic annotation tool for biological networks
  – Mining tools for Bio-medical database

Publications (– 2012) VLDB, ICDE, CIKM, Information Sciences, etc.
Mobile Networking Lab.

PROFESSOR  Han, Seung Jae
EMAIL  seunghaehan@yonsei.ac.kr
HOMEPAGE  http://mnet.yonsei.ac.kr
PHONE  +82.2.2123.5723

Scalable Wireless Infrastructure for Human / Machine Communication

BIOGRAPHY
- PhD in Computer Science & Engineering, University of Michigan, Ann Arbor, USA, 1998
- MS in Computer Engineering, Seoul National University, Seoul, Korea, 1991
- BS in Computer Engineering, Seoul National University, Seoul, Korea, 1989

RESEARCH AREAS
- Wireless Self-Organizing Network
  - Self-Configuration
  - Self-Optimization
  - Self-Healing
- Delay Tolerant Network
  - DTN Routing
  - Peer-Link Establishment
  - Throughput Prediction
- Internet of Things
  - Energy Efficient Routing
  - Exploiting Sink Mobility
  - Energy Efficient Clustering
- Video-aware Wireless Network
  - Quality Adaptation
  - Admission Control

Wireless Self-Organizing Network
- Self-Configuration
- Self-Optimization
- Self-Healing

Delay Tolerant Network
- DTN Routing
- Peer-Link Establishment
- Throughput Prediction

Internet of Things
- Energy Efficient Routing
- Exploiting Sink Mobility
- Energy Efficient Clustering

Energy Efficient Clustering
- Reliable Wireless Video Service
- Adaptable Control

Energy Efficient Routing
- Quality Adaptation
- Admission Control

Video-aware Wireless Network
- Quality Adaptation
- Admission Control

Mobile Networking
- Reaction Time
  - milliSeconds
  - seconds
  - minutes
  - hours
- Radio Resource Management
- Centralized Wireless SON
- Policy Control
- Manual, Non-automated
- Self-configuration
- Plug-and-play paradigm
- Self-optimization
- Environment Adaptability
- Self-healing
- Self diagnosis, failure detection

Throughput Prediction
- Routing Issue
  - How to Find Effective Route
- Peer-link Establishment Issue

Energy Efficient Routing
- Exploiting Sink Mobility
- Energy Efficient Clustering

Quality Adaptation
- Reliable Wireless Video Service
- Adaptable Control

Video-aware Wireless Network
- Quality Adaptation
- Admission Control
Lee, Sukyoung  
sklee@yonsei.ac.kr  
http://winet.yonsei.ac.kr  
+82.2.2123.5722


**BIOGRAPHY**

- PhD in Computer Science, Yonsei University, Seoul, Korea, 2000
- MS in Computer Science, Yonsei University, Seoul, Korea, 1995
- BS in Computer Science, Yonsei University, Seoul, Korea, 1992

**RESEARCH AREAS**

- **4G/5G Wireless System**
  - LTE-Advanced Heterogeneous Network
  - Interference and Coordination Management
  - Mobile Data Offloading
  - Seamless Mobility between LTE and WLAN
  - Device to Device (D2D) Communications
- **Context-Aware Networking Architecture**
  - User Behavior/Experience Modeling
  - End-Point Measurement and Reliable Transport protocol
  - Mobility Management
  - Predictive Network Selection
- **Healthcare Network**
  - Energy Efficient MAC Protocols
  - Multi-Hop Routing Protocols
  - Remote Health Monitoring
  - Inter-BAN Communications
- **Healthcare Network**
  - Energy Efficient MAC Protocols
  - Multi-Hop Routing Protocols
  - Remote Health Monitoring
  - Inter-BAN Communications

**Wireless Networking**

- **4G/5G Wireless System**
  - LTE-A/WLAN Network
  - Interference Management
  - Data Offloading
  - Seamless Mobility
  - D2D Communications
- **Context-Aware Networking**
  - UE Modeling
  - End-Point Measurement
  - Mobility Management
  - Predictive Network Selection
- **Healthcare Network**
  - Energy Efficient MAC Protocols
  - Multi-Hop Routing Protocols
  - Remote Health Monitoring
  - Inter-BAN Communications
Embedded System Languages & Compilers Lab.

PROFESSOR: Burgstaller, Bernd
EMAIL: bburg@cs.yonsei.ac.kr
HOMEPAGE: http://elc.yonsei.ac.kr
PHONE: +82.2.2123.5728

Programming Languages and Compilers / Embedded Systems / Parallel Systems

RESEARCH AREAS
- New programming language designs for multi-core architectures
- Machine aware slicing and scheduling of programs
- Multi-core specific performance optimizations

Virtual Execution Environments for Embedded Systems
- A light-weight and versatile programming environment for C programming language
- Mixed-mode execution on the CPU or on a virtual machine
- Energy-efficient code for embedded systems architectures using extensive static program analyses

Symbolic Analysis of Programs
- Compiler optimizations and program verification
- Effective and unified symbolic analysis framework for parallelizing compilers and for software validation tools

BIOGRAPHY
- Postdoctoral Researcher, The University of Sydney, Sydney, Australia, 2005 – 2007
- PhD in Computer Science, Vienna University of Technology, Vienna, Austria, 2005
- Software Engineer at Philips Consumer Electronics, Vienna, Austria, 1997 – 2000
- MS in Computer Science, Vienna University of Technology, Vienna, Austria, 1997

Programming Languages and Compilers

- Modern parallel programming languages and compilers
- High-level parallel programming models
- Task and data parallelism
- Task and data parallelism
- Explicit and implicit parallelism
- Heterogeneous multicore systems
- Embedded system virtual machine
- Code compression
- Mixed-mode execution
- Latest performance enhancing VM implementation techniques
- Stackification of register-based IR
Theoretical Languages, Automata Theory and Applications, and Information Retrieval

**BIOGRAPHY**
- PhD in Computer Science, Hong Kong University of Science and Technology, 2006
- MPhil in Computer Science, Hong Kong University of Science and Technology, 2002
- BS in Computer Science, Pohang University of Science and Technology, 2000

**RESEARCH AREAS**
- Our research group investigates formal languages and automata theory. The theory of computation is the branch of computer science and mathematics that deals with whether or not a problem can be solved computability and how a problem can be solved complexity using algorithms.
- Examining structural properties of various models of computations such as finite-state automata, pushdown automata or Turing machines
- Designing efficient algorithms for these computation models (FAs, PDAs or Turing Machines)
- Developing applications based on automata theory
  - Fast regular-expression searching engine
  - Pattern matching
  - Information retrieval
  - Data similarity

**Formal Verification and Model Checking**
- Program synthesis
- Software verification
- Common fragments of LTL and CTL

**Algorithm Design**
- Algorithm Design
- Algorithm Design
- Algorithm Design

**Edit-distance**
- String similarity
- Language similarity
- Data similarity

**Applications**
- Theoretical Issues
- Applications (Bio-sequence matching)

**Automata Theory and Applications**
- Cellular Automata and Applications
- Formal Verification
- Model Checking (Temporal Logic)
Dependable Computing Lab.

- PhD in Information and Computer Science, University of California at Irvine, 2008
- MS in Computer Science, Yonsei University, Seoul, Korea, 1997
- BS in Computer Science, Yonsei University, Seoul, Korea, 1995

Robust Software for Unreliable Hardware / Mobile Computing / Digital Convergence for Everyday Computing

- Dependable Computing Lab. has various efforts in the area of embedded systems, with a specific focus on cross-layer design and optimization for error-aware and energy-efficient embedded systems spanning both software and hardware.

- Robust Software for Unreliable Hardware
  - Vulnerability estimation in multi-core architectures
  - Robust system design for emerging microarchitectures
  - Selective protection and design exploration in interesting tradeoff space

- Mobile Computing
  - Cross-layer design for resource-constrained mobile devices
  - Secured and energy-efficient mobile video
  - Low power and dependable computing

- Digital Convergence for Everyday Computing
  - IT Convergence in embedded systems
  - Mobile digital signage
  - Monitor and control of micro-cyborgs

- Our vision is to conduct leading-edge interdisciplinary research in embedded systems, emphasizing mobile, automotive, communications and medical applications, and promote technology and knowledge transfer for the benefit of the individual and society.
Computational Photography and Interaction Lab.

**PROFESSOR**  Kim, Seon Joo
**EMAIL**  seonjookim@yonsei.ac.kr
**HOMEPAGE**  https://sites.google.com/site/seonjookim
**PHONE**  +82.2.2123.5709

**Computational Photography / Computer Vision / Human Computer Interaction**

**BIOGRAPHY**
- PhD in Computer Science, University of North Carolina at Chapel Hill, 2008
- MS in Electrical and Electronics Engineering, Yonsei University, 2001
- BS in Electronics Engineering, Yonsei University, 1997

**RESEARCH AREAS**
- Our research focuses on multiple aspects of photography - from capturing images, processing and editing images, and to managing and interacting with photographs.
- **Color Vision and Imaging**
  - Radiometry / Photometry
  - Hyperspectral imaging
  - High Dynamic Range Imaging
- **Image Editing**
  - Deblurring
  - Super-resolution
  - Color Transfer / Correction
- **Interaction and Visualization**
  - Interactive Computer Vision for HCI / Graphics
  - Interaction for Photo Management and Mobile Touch Devices
  - Cultural Heritage
- **Our vision is to integrate different areas of computer science — computer vision, computer graphics, computational photography, and HCI — to enhance all aspects of photography culture.**

**PHOTO-REFINISHING**
- In-camera imaging process
- White balancing
- HDR imaging
- Color transfer
- Image editing
FACULTY INDEX

Department of Computer Science & Engineering

Multimedia / Graphics Lab.
Choy, Yoon-Chul
Email: ycchoy@rainbow.yonsei.ac.kr
Homepage: http://mglab.yonsei.ac.kr
Phone: +82.2.2123.2712

Artificial Intelligence Lab.
Lee, Yilbyung
Email: yilbyunglee@yonsei.ac.kr
Homepage: http://csai.yonsei.ac.kr
Phone: +82.2.2123.2713

Computer and Communication Lab.
Song, JooSeok
Email: joochoon@yonsei.ac.kr
Homepage: http://cns.yonsei.ac.kr
Phone: +82.2.2123.2714

Media System Lab.
Han, Tack-Don
Email: tduck@mls.yonsei.ac.kr
Homepage: http://msl.yonsei.ac.kr
Phone: +82.2.2123.2715

Database Lab.
Lee, Won Suk
Email: leedonald@db.yonsei.ac.kr
Homepage: http://db.yonsei.ac.kr
Phone: +82.2.2123.2716

Algorithm Design Lab.
Yang, Sung-Bong
Email: sbyang@yonsei.ac.kr
Homepage: http://algo.yonsei.ac.kr
Phone: +82.2.2123.2717

Supercomputing Lab.
Kim, Shin-Dug
Email: sdkim@yonsei.ac.kr
Homepage: http://supercom.yonsei.ac.kr
Phone: +82.2.2123.2718

Computer Vision & Pattern Recognition Lab.
Byun, Hyeran
Email: hyerannya@yonsei.ac.kr
Homepage: http://cvpr.yonsei.ac.kr
Phone: +82.2.2123.2719

Soft Computing Lab.
Cho, Sung-Bae
Email: sbchoid@yonsei.ac.kr
Homepage: http://sclab.yonsei.ac.kr
Phone: +82.2.2123.2720

Mobile Embedded Systems Lab.
Cha, Hojun
Email: hjcha@yonsei.ac.kr
Homepage: http://mobil.yonsei.ac.kr
Phone: +82.2.2123.2711

Internet Computing Lab.
Lee, Kyoung-Ho
Email: kkleedbc@yonsei.ac.kr
Homepage: http://ict.yonsei.ac.kr
Phone: +82.2.2123.2712

Visual Computing Lab.
Lee, In-Kwon
Email: kkleedbc@yonsei.ac.kr
Homepage: http://visu.computing.yonsei.ac.kr
Phone: +82.2.2123.2713

Embedded and Bio Database Lab.
Park, Sanghyun
Email: sanghyun@db.yonsei.ac.kr
Homepage: http://db.yonsei.ac.kr
Phone: +82.2.2123.2714

Mobile Networking Lab.
Han, Seung-Jae
Email: seungjaehan@yonsei.ac.kr
Homepage: http://mmt.yonsei.ac.kr
Phone: +82.2.2123.2715

Wireless Networking Lab.
Lee, SuYoung
Email: sklee@yonsei.ac.kr
Homepage: http://wntc.yonsei.ac.kr
Phone: +82.2.2123.2716

Embedded System Languages & Compilers Lab.
Burgstaller, Bernd
Email: bburg@cs.yonsei.ac.kr
Homepage: http://elc.yonsei.ac.kr
Phone: +82.2.2123.2717

Theory of Computation Lab.
Han, Yo-Sub
Email: yoomousbc@yonsei.ac.kr
Homepage: http://tcc.yonsei.ac.kr
Phone: +82.2.2123.2718

Dependable Computing Lab.
Lee, Kyoungwoo
Email: kyoungwoon@yonsei.ac.kr
Homepage: http://drlab.yonsei.ac.kr
Phone: +82.2.2123.2719

Computational Photography and Interaction Lab.
Kim, Seon-Joo
Email: seonjooyoum@yonsei.ac.kr
Homepage: https://sites.google.com/site/seonjooyoum
Phone: +82.2.2123.2720