Advanced Communication Technologies Laboratory


Main Activity

- To do research and develop technologies related to the transmission of information through optical fibers. This includes designing and testing components such as lasers, modulators, detectors, and optical amplifiers, as well as developing techniques for signal processing and system optimization

Research topics

- Advanced optical modulation format conversion
- Orbital Angular momentum
- Resource allocation algorithm for PON
- Energy harvester for IoT node

Courses

- Photonics
- Optical Communication Network
- Internet of Things
- Signal and System

Main equipment

- Real time oscilloscope
- Tunable Laser source
- 40G intensity modulator
- Arbitrary Waveform Generator
- Optical Spectrum Analyzer
- Spatial Light Modulator
- EDFA
- Semiconductor Optical Amplifier
- Infrared camera
- IQ modulator
- U3814A IoT System Training Kit
- Field strength meter
- Wavecontrol MonitEM Hybrid

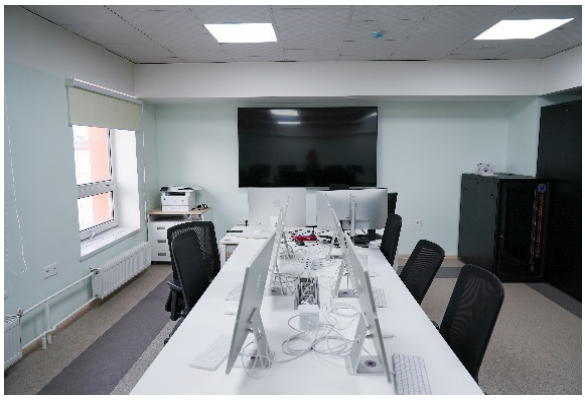
Software

- OptiSystem

Principle Investigator

- Ph.D. Batdalai S, batdalai@must.edu.mn, +976-99007855, Room # 324, SICT-MUST

Advanced Computer Networking Laboratory




Main Activity

- Network Traffic Modeling and Attack Detection

Research topics

- Wireless Network Traffic modelling and Simulation
- Network attack detection
- Embedded Wireless Access Point
- Modelling and Analysis of TCP protocol

Courses

- Wireless Network and Security
- Analyzing Internet protocols
- Computer Networking-I, II
- Advanced Routing and Switching






Main equipment

- Wireless Embedded modules
- Access Point
- Attack detection
- Switch & Router
- Server
- Nuand BladeRF 2.0 micro xA9
- MpSoC Evaluation Kit
- LIDAR SparkFun SEN-14032
- Flir Leton 2.5
- MpSoC Evaluation Kit Xilinx ZCU106
- MTSN Kit

Principle Investigator

- Ph.D. Dashdorj.Ya, dashdorj@must.edu.mn, +976-99882710, Room # 313, SICT-MUST

Chip Design Laboratory

Main Activity

- Research, innovation and academic excellence in cyber security

Research topics

- Logic design, FPGA
- Quantum computer
- Semiconductor Device
- Automation
- Robotic technology
- IoT system design
- Artificial Intelligence

Courses

- Logic design, FPGA
- Semiconductor IC technology
- Driver Programming
- CMOS design
- VLSI

lambda labs

PCB prototyping line

Main equipment

- PCB Prototyping Machine, LPKF ProtoMat S64
- SEM EM-30
- Lambda labs Workstation for AI training
- FPGA Digital Circuit Design Trainer HBE-Combo II-DLD
- Xilinx Digilent ZedBoard Zynq-7000
- Digilent Pmod GPS
- Digilent Pmod MTDS

SEM EM-30

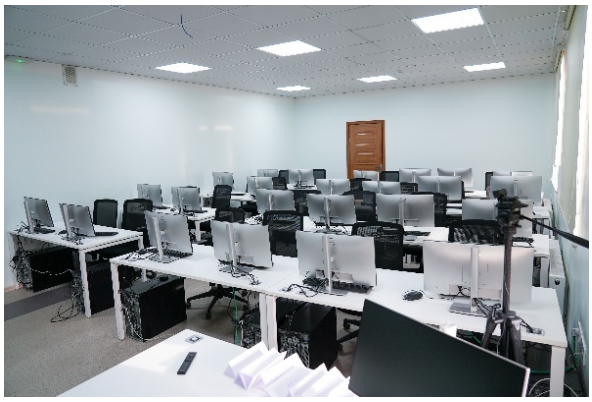
Software

- LabVIEW Education AVL
- Proteus PCB Design Starter Kit

Principle Investigator

- Ph.D. Tengis Ts, tengis@must.edu.mn, +976-99095618, Room # 320, SICT-MUST

Cyber Security Laboratory




Main Activity

- Research, innovation and academic excellence in cyber security

Research topics

- Malware Analysis and Detection
- Cryptography
- Anomaly Detection
- Deep Learning
- Network Intrusion Detection
- Grayscale Image

Courses

- Digital Forensics
- Cryptography
- Ethical Hacking
- Firewall and Intrusion Detection System
- Computer Network

Main equipment

- Dell, Precision 7920 Workstations
- USB-WiFi-Premium Keygrabber
- IDA Pro Disassembler
- Raspberry Pi 400 Personal Computer Kit
- Hak5, USB Rubber Ducky Keystroke injection device
- Hak5, Screen Grabber
- Dualcomm, Dual-Link GbE Copper and Fiber Network Tap

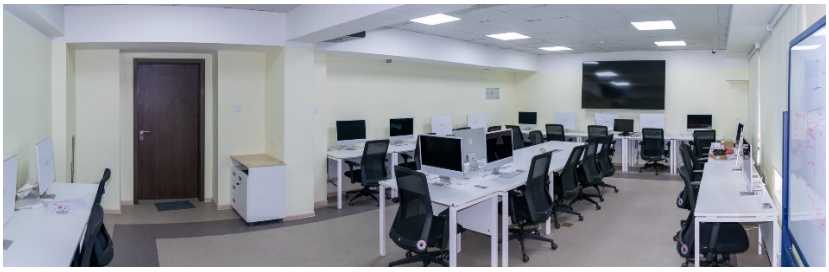
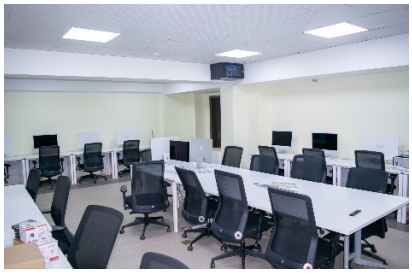




Principle Investigator

- Ph.D. Nyamsuren V, nyamsuren.v@must.edu.mn, +976-9956006, Room # 317, SICT-MUST

Data Analysis Theory and Applications Research Laboratory

Main Activity

- The research focus of our lab is on modern machine learning models, in particular deep learning, which is at the core of many recent successes in data science and artificial intelligence. The key technologies we currently focus on are data analytics, data mining, computer vision, machine learning, deep learning, optimization and process mining. These technologies are leveraged to solve problems originating from a range of application domains such as demand forecasting, mobility pattern mining, credit risk modelling, fraud detection, preference learning in vehicle routing, data-driven logistics, inverse design of complex systems, and healthcare.

Research topics

- Statistics
- Data visualization
- Image processing
- Computer vision
- Artificial Intelligence
- Social media
- NLP

Courses

- Foundation of Data science
- Machine Learning
- Deep learning
- Data mining
- Neural Networks
- Natural language processing
- Big data analytics
- Optimization techniques in machine learning
- R/Python programing

Main equipment

- iMac 24 inch
- MacBook Pro13
- Macbook Pro 16 inches
- LaserJet Pro MFP M428

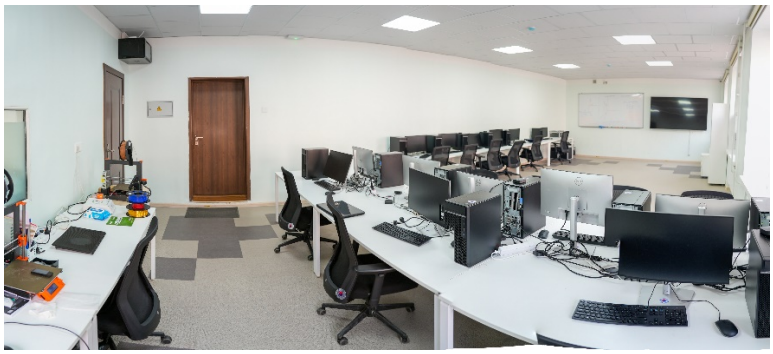
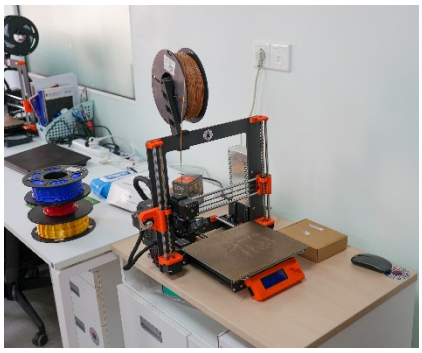
Software

- Microsoft Power BI Pro

Principle Investigator

- Ph.D. Sarangerel G, saran@must.edu.mn +976-99723552, Room # 316, SICT-MUST

Embedded and Robotics System Laboratory

Main Activity

- Embedded system design and Reinforcement learning

Research topics

- Self-driving car
- Embedded system
- Reinforcement learning
- Image Process
- Digital signal process

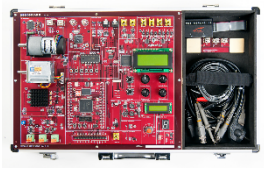
Courses

- Fundamentals of image process
- Robot training and Modeling
- Smart robot modelling

Main equipment

- High-speed data logger
- Asus Xtion 2 depth image
- WeGO –ERP 42MINI – RC car
- AIoT Serbot Series Medium size robot
- Hanback DSP – II trainer
- Holybro X500 Pixhawk 4 Drone
- Robotis OP3 Humanoid Robot
- PowerDebug Module TRACE32 - JTAG for I.MX8
- Raspberry Pi 3 Application Kit for IoT
- EPOC Flex Gel sensor





Software

- LabView NXG professional edition
- 8085 Simulator IDE
- Proteus

Principle Investigator

- Ph.D. Dorj B, dorj@must.edu.mn +976-89211480, Room # 222, SICT-MUST

High Performance Computing Laboratory (HPC)

Main activity

- To support the provision of an efficient network architecture for high-performance systems. It allows high speed network and adjustable computational environment for high-capacity, super-computational research and simulations by researchers, students and off-campus researchers.

Research topics

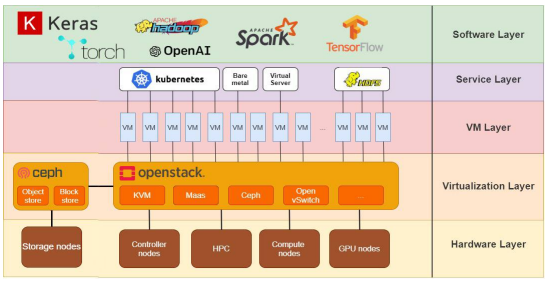
- Artificial Intelligence
- Machine learning
- Deep learning
- Knowledge Management
- Social media
- Bioinformatics
- Big data
- Urban computing
- Multiagent systems
- Graph Neural Networks
- Computer Vision
- Natural Language processing
- Big data analytics

Courses

- Foundation of Artificial Intelligence
- Machine Learning
- Deep learning
- Multiagent Systems
- Neural Networks
- Natural language processing
- Data mining and processing

Main equipment

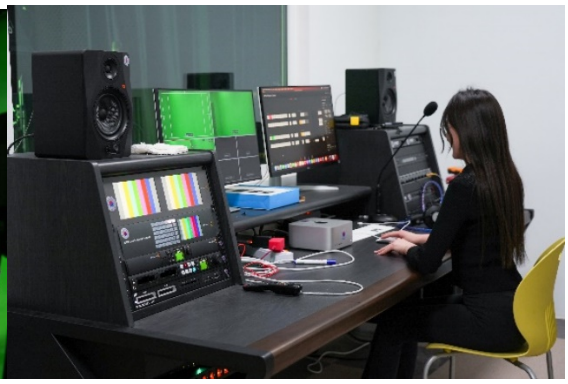
CPU (6 nodes)
Power Edge R6525
2 x Intel Xeon gold 6230R 2.1G, 26C/52T,
RAM: 12 x 16GB, SDD: 2 x 1.92TB SSD
RAM: 24 x 32GB DDR4 3200MHz
GPU node
Power Edge R740
GPU: 3 x NVidia Ampere A100, CPU: 2 x Intel Xeon Gold 6230R 2.1G 26C/52T
CPU: 2 x Intel Xeon Gold 6230R 2.1G 26C/52T
RAM: 24 x 16GB RDIMM
Admin node
Power Edge R640
CPU: 2 x Intel Xeon gold 6230R 2.1G, 26C/52T
RAM: 12 x 16GB
Storage (3 nodes)
Power Edge R740XD
CPU: Intel Xeon Gold 6230R 2.1G 26C/52T
SSD: 24 x 1.92TB STAT
RAM: 4 x 32GB RDIMM
Controller (3 nodes)
Power Edge R640
CPU: 2 x Intel Xeon gold 6230R 2.1G, 26C/52T
RAM: 12 x 16GB



Principle Investigator

- Ph.D. Zolzaya D, zolzaya@must.edu.mn, +976-99228822, Room # 115, SICT-MUST

Multimedia Studio and Computer Vision Laboratory

Main activity

- To develop tools, visualization environments and applications based on VR, AR and MR, tracking and natural interaction, computer vision techniques and visual analytics of large amount of data for the resolution of problems and technological challenges. At lab, the participants mastered the basic tools for creating augmented reality products as well as learn designing the 2D/3D motion.

Research topics

- Artificial Intelligence Image processing
- Content production
- Multimedia programming
- VR & AR development
- Multimedia streaming
- Multimedia Privacy Protection
- Computer vision
- Game Development
- Motion Sensor

Courses

- Multimedia Studio Technology
- VR and AR Technology
- 3D production
- 3D simulation
- Video Production
- Game Development
- Film and Television
- Multimedia Content
- Motion Capture

Main equipment

- Insta360 Pro II
- KAT-VR Walk Mini
- Optitrack
- Boxx Apexx P4i
- Sony PXW-Z90
- Blackmagic Design ATEM 2 M/E Production Studio 4K
- Shining3D EinScan Pro 2X
- Raise3D Pro2
- Brexel VStation-Lightboard
- Apple Mac Studio
- Synology DiskStation DS 1821+
- Brexel VStation-Lightboard
- Dell OptiPlex 7090 Tower

Insta360 Pro II

Boxx Apexx P4i

Software

- Adobe Creative Cloud
- Visual Paradigm Professional
- Unreal Engine
- Maya
- SolidWorks
- Raise 3D
- KAT-VR
- Insta361
- Control App
- Apple Educational Pro App Bundle

VR walking platform

Motion capture

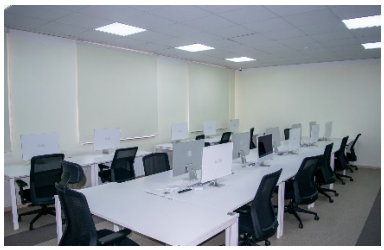
ATEM Television Studio Pro 4K

EinScan Pro 2X

Principle Investigator

- Ph.D. Erdenebayar L, erdenebayar.l@must.edu.mn, +976-91008480, Room # 211-217 SICT-MUST

Mobile Computing Laboratory

Main activity

- Mobile computing laboratory conducts research and teaching in the mobile computing and cloud computing domains. Our research topics include cloud computing, mobile application development, mobile cloud, mobile web services, Internet of Things and migrating scientific computing and enterprise applications to the cloud.

Research topics

- Mobile computing
- IoT
- Image processing
- Computer vision
- Artificial Intelligence
- Cloud computing
- Mobile Networks and Its Applications

Courses

- Cloud computing
- Advanced networking
- Virtualization with VMware
- Mobile app development
- Cyber security
- IoT
- Data security in cloud computing

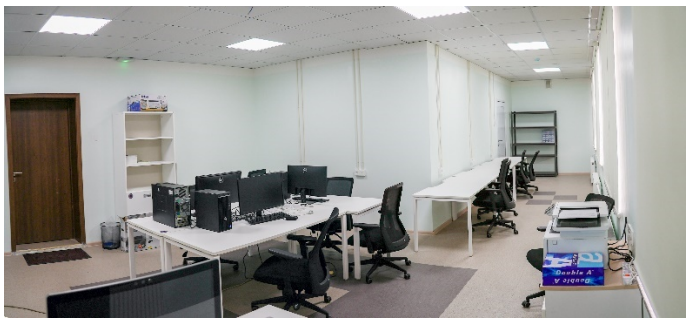
Main equipment

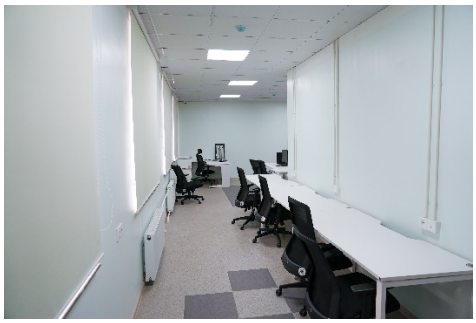
- iMac 24 inch
- MacBook Pro13
- Macbook Pro 16 inches
- Insta360 ONE X2
- Livescribe Sympony
- Samsung Galaxy S22 Ultra 5G
- Samsung SMART TV 85 inch

Principle Investigator

- Ph.D. Zolzaya B, b.zolzaya@must.edu.mn, +976-99535272, Room # 315, SICT-MUST

RF and Antenna Laboratory





Main activity

- RF and Microwave Components design and experiments

Research topics

- Low-profile circularly polarized antennas
- Broadband dual and circularly polarized antennas
- Sensor antennas, high efficient rectennas
- Antenna decoupling techniques
- OAM, MIMO techniques in antenna
- EMC, EM propagation
- Microwave circuits

Courses

- Antenna and Wave Propagation
- Microwave Engineering
- Antenna Design and Application
- RF Network Planning
- RF Transceiver
- Analog and Digital Communication Systems

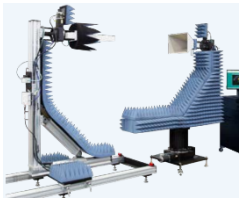
Main equipment

- Vector network analyzer
- Spectrum analyzer
- RF signal generator
- Selective radiation meter
- RF calibration & test kits
- Anechoic chamber SNF-RAZ-0.7 (0.5-20GHz)
  - SNF-RAZ-0.7 (0.5-20GHz)
  - Near-field measurement)
  - Far-field calculation

Broadband Probe Antenna
NSI-RF-RGP-40 (4.0-40 GHz),
NSI-RF-RGP-10 (0.7-10 GHz),
NSI-RF-RGP-370 (0.37-6 GHz)

VNA network analyzer (Keysight E5063A (10 MHz to 6 GHz)

PNA network analyzer (Keysight N5222B 10 MHz to 26.5 GHz)



Antenna positioning and control system (0.5-20GHz, Antenna Size : Dia. 0.7m)

Software

- CST Studio Suite
- PathWave Advanced Design System (ADS)

Principle Investigator

- Ph.D. Chuluunbandi N, chuka@must.edu.mn, +976-88111798, Room # 319, SICT-MUST

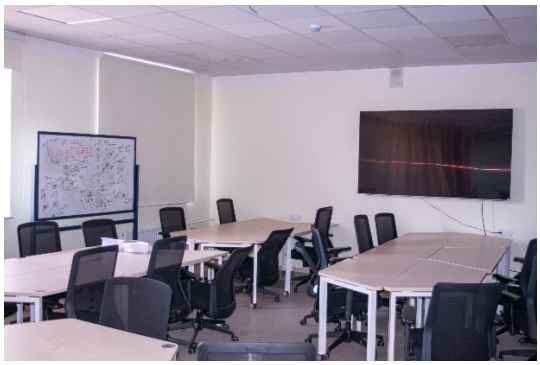
Staff Room

A technical team or lab managers use this room and take a responsible for the operation and maintains of research/training 10 laboratories.

Items

- Laser Printer (A3)
- Epson document Camera
- AIO PC OptiPlex 7400 All-in-One
- Glass Board

KOICA Capstone Lounge



The newly renovated KOICA capstone lounge is designed to give students a space for relaxation and study. The KOICA lounge located on the 3th floor of the SICT. The capstone course allows students to demonstrate expertise in their major or area of study.

Items

- SMART TV 85"
- 8-AIO PC
- Document Camera
- Printer (A4)
- Glass Board
- Whiteboard with Stand

Student Rest Area

The area separated by glass walls is located on 1-3 floors, designed to give students a place for socializing, studying, talking with friends, or simply relaxing while waiting for their next class. The student rest area is open to all currently enrolled students.

Books

Through the project, the library of SICT received 250 books and textbooks that are essential for students, and students are using them for their studies.

B. Joint research projects. Using the newly established laboratories under the project, professors and researchers of SICT will implement a total of 22 research projects together with the professors of Sangmyeon University. The results of the projects will be research articles published in internationally recognized SCI-registered professional journals.