Recruitment Fields

Research Domains	Research Areas
① **Device &** **System**	☐ **Multimedia Processing** - **Photorealistic Graphics** · Advanced Global Illumination (Real-time Ray Tracing, Radiosity, Photon Mapping, etc), Complex Material Rendering, Advanced Post-Effects, GPU-based Parallel Computing and CPU-GPU Hybrid Computing, Physics (Continuum, Fluid Dynamics)-Based Modeling, 3D Animation Processing, 3D Object Surface/Volume Segmentation & Modeling, Geometry/Mesh Processing, Graphic/Real Object Registration, Modeling and Rendering for Mixed Reality - **Visual Processing** · Depth Estimation, Stereo/Multiview Synthesis, Light Field Rendering, Feature Extraction, Motion Estimation, Super Resolution, Video Signal Processing, Computer Generated Hologram, Display Optics, 3D Display Architecture Design, Human Visual Perception - **Pattern Recognition** · Object Segmentation & Tracking, Object Recognition · Face Recognition, Partial Face Detection & Tracking, Eye/Gaze Tracking · Anti-spoofing Biometrics (Finger/Palmprint, Iris, etc.) · Full-body & Hand Pose Estimation, 3D Feature Descriptor · 3D Vision Processing, 3D Modeling and Motion Graphics, Homography and SLAM · (Big Data-driven) Machine Learning, Deep Neural Networks Strong coding skills in C/C++ required
	☐ **Wearable device** - **Ultra low power system design** . Analog/RF architecture for communication and bio-signal sensing . Digital logic / processor design . Real time system / OS / Application - **Signal processing and modeling** . Algorithm optimization for low power operation . Mathematical channel modeling
	☐ **Bio-medical Engineering** - **Bio-signal sensing/acquisition** . Analog Front End & Digital Logic Design . Non-invasive/Implatable bio-signal Sensing - **Bio-signal processing/analysis** . Feature extraction using Signal Enhancement & Pattern classification . ADF design for noise reduction - **Sensor/system architecture** . Sensor Hardware Design & Implementation . Embedded system and Firmware development - **Physiological Analysis** . Healthcare management tech. based on physiology . Sports science & physiological modeling

① **Device &** **System**	**□ Many-core Computing Architecture** **- Processor Core Architecture and HW Implementation** · Reconfigurable processor for multimedia/radio processing · 3D graphics core architecture supporting multi-threading · Highly parallel processor architecture **- Many-core Processor Architecture and Implementation** · Many-core processor supporting efficient synchronization mechanism · Interconnect architecture including Network-on-Chip · Memory architecture including hierarchy and coherency protocol · Data streaming architecture and HW task/thread scheduling · Many-core architecture supporting heterogeneous cores such as CPU+GPU · Heterogeneous memory architecture supporting efficient data transfer **- Many-core Programming Model** · Industry standard many-core programming model such as OpenCL · Core architecture specific programming model extension · 3D Graphics supporting programming model such as OpenGL **- Software Development Tools** · Compilers for single/many-core architecture supporting various parallelism · Simulators for architecture modeling and design space exploration · Profiler for analysis of application/architecture performance · Debuggers for increasing SW productivity **- Processor Verification Framework** · Single/Many-core processor verification tools such as random vector generator · Integrated verification framework from application to HW implementation · Automation and parallelization of verification process

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Device &
 	
System
	□ Intelligent Computing
	
	- Machine Learning & Artificial Intelligence
	· Deep Learning, Statistical Machine Learning,
	   Reinforcement Learning, Pattern Recognition, Inference, Reasoning,
	   Object Recognition, Scene Understanding
	
	- Large-scale Mathematical Analysis and Algorithms
	
	- Big Data Analytics
	· Data Mining, Unstructured Data Analysis, Predictive Analytics
	
	- Autonomous Robot / Vehicle Perception and Control
	· Map Construction, Localization, Path and Motion Planning,
	· High Performance Real-time Embedded System Architecture
	· Detection & Tracking, Sensor Fusion, Statistical Signal Processing
	
	- Natural Language Processing
	· Machine Translation, Dialog Management, Language Model,
	   Natural Language Understanding
	
	□ Brain IT
	
	- Neuromorphic Systems and Processor
	· High Performance Low Power Processor Design
	· Neuromorphic Processor / Sensor design
	· Low Power VLSI chip design (digital/analog circuit)
	· Spiking Neural Network based Information Processing
	  (sensory processing, pattern recognition, inference, learning, memory)

① **Device & System**	□ **Mobile Healthcare** **- Mobile health sensor / noninvasive detection / Optical System Design** · Excitation/detection Optical Package System · Integrated optics Chip Design · Bio-photonics System Design or Analysis **- Mobile health sensor / Embedded system integration** · Real time OS, Real time signal processing **- Mobile health sensor / Chemometrics** · Bio-signal analytic algorithm based on spectrum data · Multivariate data analysis, Statistics **- Mobile health sensor / Optoelectronics** · Si photonics, Integrated Optics, Bio-photonics etc.
	□ **Optoelectronics** - Optical Device Design & Fabrication, MQW(Multi Quantum Well) design and growth, LD, LED, Modulator - Imaging component Design, Extended Field of View (EDOF) - Optoelectronic Device Physics - Light Modulation Technology - Waveguide optics - Optoelectronic System Integration - Photon Generation & detection - Semiconductor Laser (Laser Physics, Silicon Photonics, Hetero Epitaxy)
	□ **Materials & Devices in common** - Nano Fabrication technology (Nanoimprinting) - Inorganic Device (Process, Sensor, Detector etc.) - Soft Electronics (Material/Device for Bendable & Stretchable Electronics) - Sensor (Si, Plasmonics, Metaphotonics, Array sensor, 3D-based Sensor) - Nano Device (Carbon-based Nano Device, Bandgap Engineering, Phononics, Nanowire device)
② **Materials**	□ **Organic Electronics Materials and Devices for OLED/OTFT** - Organic emitting and charge transporting materials design and synthesis - Device fabrication process and evaluation - Device physics (interface analysis, optical analysis, thin film analysis) - Physical Chemistry (material and device degradation mechanism) - Material Science on failure analysis in material and device - Molecular simulation, device simulation
	□ **Organic Materials** - Polymer chemistry and physics - Reaction kinetics, monomer design & synthesis - Electronic optical property control, thermo-mechanical property control
	□ **Optical Films for Display** - Polymeric Materials for optical applications - Film fabrication and coating technology - Polarization and retardation materials - Optical Design and Simulation □ **Functional Materials for Electric Devices** - Anti-Shock, Anti-Scratch, Anti-Fingerprint, Anti-Bacterial Materials

② **Materials**	**□ Inorganic Materials** - Solid state physics, intermetallic compound, inorganic material, DOS engineering, nano-structure - Development & fabrication of inorganic powder. - Nano structured materials and applications · Quantum dot, Metal, inorganic nano structure synthesis/characterization · Inorganic-organic hybrid nanostructure design/preparation · Surface modification of nanostructure/characterization
	□ Battery Materials - Advanced Li-ion, Post Li-ion and novel energy storage/conversion - Inorganic, nanocomposite and metal alloy for ion storage - Organic/polymer design, synthesis and ionic liquid for ion transport - Electrochemical analysis and modeling
	□ Battery System - Electrochemical reaction mechanism and thermal/fluidic behavior analysis - Multiscale modeling and simulation of electrochemical cell - Design of electrochemical cell and battery management system
③ **Computa- tional Science & Analytical Science**	**□ Computational approaches for materials/devices** - Atomistic modeling/simulation · First-principles, Molecular dynamics, Monte Carlo approaches - Meso-scale/Multi-scale modeling/simulation - Electronic/thermal transport modeling - Methods for simulation/analysis of device properties
	□ Applications of computational approaches **- Computational materials and biology modeling/design** · Inorganic / Organic / Film / Energy materials and System-biology etc. **- Theoretical research on solid, optical, statistical physical/chemical science**

	□ High Performance Computing & IT Planning
	
	**- Computational/data-driven systems research via algorithms, optimization,
	  and related High Performance Computing methods**
	 · Grid & Cloud simulation Env. and Services along management.
	 · Big Data Analysis (Splunk, Hadoop, R)
	
	**- Plan & Direct the development and management of enterprise IT systems
	  related in R&D process, and supports business units.**
	 · General Business Systems and R&D Management Systems (LIMS, MES)

	□ Structural analysis of organic/inorganic materials and devices - Characterization of organic/inorganic materials & devices using electron microscopes based techniques : Microstrucral/compositional/chemical analysis - SEM/EBSD, EPMA, TEM etc.
	□ Nuclear Magnetic Resonance (NMR) spectroscopy - Determination of chemical structures of complex molecules - Characterization of organic/inorganic materials in solution and solid-state. - Application of HR-MAS and 2-Dimension technique