IEEE UV2022

The 6th IEEE International Conference on Universal Village

Date: October 22-25, 2022   Virtual

The deadline for all submissions has been extended to September 15, 2022.

Submit Your Paper

We are pleased to announce that the 6th IEEE International Conference on Universal Village (IEEE UV2022) will be held virtually from October 22-25, 2022, with the main venue in Boston, USA.

We warmly invite you to join our IEEE UV2022 conference! All accepted papers will be included in the IEEE Xplore Digital Library and indexed by Elsevier's Engineering Index. We greatly appreciate your leadership and contributions to UV!

Introduction to IEEE UV2022

■ Universal Village (UV) is a new concept proposed by MIT's Universal Village Program in 2012. Universal Village (UV) exemplifies an ideal future society that pursues harmony between humans and nature through the wise use of technologies.

- The IEEE UV Conferences call for collective efforts from world-renowned experts across multi-disciplinary fields to collaborate beyond traditional field boundaries. Previous IEEE UV conferences (UV2013, UV2014, UV2016, UV2018, and UV2020) were groundbreaking international venues that inspired successful collaboration among governments, academia, industries, and civil society.

- On the 10th anniversary of the birth of the UV concept, IEEE UV2022 features the theme of "Post-Pandemic Reflection on Health, Harmony, and Sustainability: Mobility and Virtual Connection; Diversity and System Efficiency; Responsiveness and Resilience; Inclusiveness and Integration."

- Specifically, IEEE UV2022 features the following topics:

  - Developing systematic methodologies to advance UV technologies and to develop UV systems, including Intelligent Transportation Systems, Urban Planning and Crowd Management, Smart Infrastructure, Smart Response Systems for Emergencies, Smart Energy Management, Smart Environmental Protection, Smart Home and Community, Smart Medicine and Healthcare, and Smart Humanity

  - New lifestyles enabled by IT / New energy / New materials / Effective microorganism technology and environmental protection

  - Exploring UV development paths from theoretical exploration, research development, framework design, implementation, and engineering through to integration, appropriate for different regions at different development phases

  - Inspiring successful collaboration among governments, academia, industries, and civil society to address different UV challenges and seeking practical UV solutions

- IEEE UV2022 will have sessions for scientists, students, engineers, entrepreneurs and government representatives to share their perspectives on various research areas.

Part I: Technical Sessions
(Submit Short or Regular Papers)

[TS1] *Session 1. UV Vision, Development, and Evaluation:*

Coordinated Development to achieve harmony between humans and nature

- **[TS1-A] Vision for Universal Village and UV Indices**
  - ➢ Vision for Universal Village
  - ➢ UV Indices: Quantitative Indications of Cities' Smartness, Efficiency, Safety, Environmental Qualities, and Inclusiveness

- **[TS1-B] Development Status of Universal Village**
  - ➢ Development status of current smart cities in different countries
  - ➢ Discussion of limitations and challenges

- **[TS1-C] Evaluation of Smart City-Related Methods, Technologies, and Systems**
  - ➢ Evaluation of current methods and technologies for smart city subsystems
    - ✔ Smart Home and Community
    - ✔ Smart Medicine and Healthcare
    - ✔ Intelligent Transportation, Urban Planning, and Crowd Management
    - ✔ Smart Energy Management
    - ✔ Smart City Infrastructure
    - ✔ Smart Response Systems for City Emergencies
    - ✔ Smart Environmental Protection
    - ✔ Smart Humanity
  - ➢ Analysis of smart cities' impact factors and evaluation of current methods and technologies from these perspectives:
    - ✔ Information flow
    - ✔ Material cycle

- ✔ Lifestyle: issues such as food waste
- ✔ Community

➤ Subsystem coordination and interaction analysis: Analysis of the mutual interactions among smart cities' subsystems and evaluation of the system coordination of current methods and technologies

［TS2］ *Session 2. UV Framework Design, Modeling, and System Integration*

Seeking integrated, resilient, human-centered, sustainable and environment-friendly solutions under the concept of Universal Village

- ■ **[TS2-A] Systematic and Integrated Frameworks for UV Subsystems and Contributing Factors**
- ■ **[TS2-B] Intelligent Modeling, Simulation, and System Analysis**

［TS3］ *Session 3. Mobility, Planning, Management, and Infrastructure Innovations* to achieve safety, efficiency, and connectivity

- ■ **[TS3-A] Intelligent Transportation, Urban Planning, and Smart City Infrastructure**

  ➤ Interconnected transportation systems; intelligent road transportation management; safety enhancement based on the interaction among passengers, vehicles, event planners, and other stakeholders

  ➤ Coordinated traffic control; smart parking; urban planning

  ➤ Smart logistics and distribution services; last-mile delivery

  ➤ Smart facilities; smart construction; smart lighting/heating/cooling/ventilation systems; smart sewerage and sanitation systems; smart water and waste management

  ➤ Coordinated city infrastructure development and operational management; smart infrastructure lifecycle management; predictive analytics for identifying infrastructure vulnerability

- ■ **[TS3-B] Intelligent Vehicles, Mobility Support for Vulnerable Groups**

- ➢ Autonomous vehicles; drones; intelligent electrified vehicles; smart wheelchairs; robotic exoskeletons for vulnerable groups

- ➢ Intelligent driving assistance systems; navigation and localization systems; vehicle hardware/software systems; vehicle on-board diagnostics; vehicular signal processing; smart cockpits

- ➢ Human-oriented sensing and recognition for vulnerable road users and animals; intercommunication among passengers, vehicles, and traffic lights

- ➢ Connected vehicles; vehicle dynamics and control

- ➢ Human factors; cognition and control;; driver monitoring;

- ➢ Policies and regulations for intelligent vehicles

- ■ **[TS3-C] Crowd Management, Smart Response Systems for City Emergencies**

  - ➢ System vulnerabilities identification; crisis prevention and city robustness reinforcement; crowd management

  - ➢ Emergency (natural disasters, crimes, accidents, etc.) prediction, detection and management; cyber-security; smart alerting and hierarchical information collection and distribution; active disaster response and recovery

- ■ **[TS3-D] Information Flow, Communication, Networks, and Security**

  - ➢ Smart data acquisition; mobile sensing; crowdsourcing; the Internet of Things; seamless wireless networks; information and communication technology (ICT) infrastructure

  - ➢ Information integration; information storage, sharing, circulation, and visualization; cloud service; blockchain; data repository

  - ➢ Solutions for security, safety, reliability and privacy issues

[TS4] *Session 4. Energy and Material Innovations* to achieve efficiency, safety, and sustainability

- ■ **[TS4-A] Renewable Energy and Smart Energy Management**
  - ➢ Renewable energy capture and conversion, emerging technologies
    - ✔ Solar energy: photovoltaics, solar thermos
    - ✔ Wind energy: wind turbine materials and novel designs
    - ✔ Hydrogen energy: solar splitting water, fuel cells

- ✔ Other energies: biomass, renewable natural gas, hydroelectric energy, blue energy
  - ➢ Energy storage devices and technologies (batteries, supercapacitors, and fuel cells)
  - ➢ Smart grids; transmission infrastructure; integrated energy management for high efficiency and zero-emission; theoretical simulations of renewable energy and its applications; smart meters; demand response management (DRM)
  - ➢ Resilient operations against disturbances, unexpected errors, accidents, physical and cyber-attacks, and natural disasters
- ■ **[TS4-B] Smart Materials and Devices**
  - ➢ Smart materials for advanced electronic devices (sensors, actuators, transducers)
  - ➢ Smart materials for energy conversion (piezoelectric, magneto-elastic, thermoelectric, electrostriction)
  - ➢ Advanced intelligent devices and systems
  - ➢ Artificial Intelligence (AI) for materials development

[TS5] *Session 5. Manufacturing and Agriculture Innovations* to achieve sustainability

- ■ **[TS5-A] Smart Manufacturing**
  - ➢ Cloud manufacturing
  - ➢ Cloud-edge collaboration in manufacturing
  - ➢ Additive manufacturing and robotics
  - ➢ Planning and scheduling of manufacturing tasks
  - ➢ Quality detection and control
  - ➢ Computer vision and other AI technologies in manufacturing
- ■ **[TS5-B] Smart Agriculture**
  - ➢ Vertical farming; smart crop/soil management; climate-smart agriculture
  - ➢ Smart sensing, monitoring, IoT and decision-making in agriculture

[TS6] *Session 6. Environmental Innovations* to achieve harmony between humans and nature

- **[TS6-A] Smart Ecological and Environmental Systems**

  - Environmental protection: exhaust/wastewater/solid waste management; pollution control (air/water/soil; light/noise/radiation); effective microorganism technology; green roofs

  - Challenges and solutions for climate change; restoration and protection of ecosystems; ecological economics and strategies; ecological informatics and acoustics

- **[TS6-B] Mobility Enabled Material Cycles, the Circular Economy, Trash and Scrap Collection, Processing, Reuse, and Recycling**

  - Smart trash cans and their optimal placement; smart garbage trucks

  - Smart recycling; smart residential trash and industrial scrap collection and transportation; the circular economy; material reuse; second-hand markets;

  - Cultural and economic factors; development of innovative lifestyles, public awareness and community engagement

  - Crowdsourcing, data collection, and visualization for material cycles

  - Material cycles optimization: smart waste management; smart trash and scrap processing, reuse and recycling; smart platform development for coordinated information sharing among smart recycling, user feedback on products, and smart manufacturing

[TS7] *Session 7. Lifestyle Innovations* to achieve mobility, connectivity, efficiency, and happiness

- **[TS7-A] Smart Homes and Community, Virtual Living**

  - Smart appliances and devices; smart windows; intelligent deformation furniture; smart inventory management; smart home OS

  - Safety and security; self-adaptive home-emergency response systems

  - Smart life; fashion AI; home gardening and agriculture

  - Intelligent support for vulnerable groups; homeless care; domestic violence protection

  - Community support and virtual living during pandemics and other city emergencies

- **[TS7-B] Mobility, Connectivity, and Innovative Lifestyles**

- ➢ Integrated and technology-driven solutions to improve the quality of life: quantified self devices and self-tracking technologies; smart textiles; VR/AR-based sports, entertainment and other activities; human-centered transportation, smart mobility and seamless transit systems; smart agents and human-computer interaction

- ➢ New lifestyles to reduce energy consumption and emissions: shared mobility and other new lifestyles made possible by the sharing economy; virtual tours; working from home; electronic surveillance

- ➢ Changing trends in cultures/technologies/lifestyles

［TS8］ *Session 8. Healthcare Innovations* to achieve safety and well-being

- ■ **[TS8-A] Advanced Technologies for Healthcare Monitoring at Home, in Vehicles, and in Communities**

  - ➢ Emerging types of wearable sensors, materials, and smart fabrics

  - ➢ Wearable device applications for medical diagnostics and screening

  - ➢ Flexible, stretchable, printed, and hybrid electronics

- ■ **[TS8-B] Smart Medicine and Smart Healthcare**

  - ➢ Pervasive and non-invasive health-monitoring; telehealth; personalized healthcare and wellness management; smart diet and exercise; mental health

  - ➢ Intelligent nursery and senior care; assistive technologies for mobility-challenged residents

- ■ **[TS8-C] Public Health, Epidemic Prevention and Control**

  - ➢ Alternative medicine; community/rural/urban health; epidemic control and personal hygiene; equity and ethical issues

  - ➢ Epidemic prediction and contact tracing

  - ➢ Coordinated operational management across all levels during emergencies; smart resource allocation; quarantine and isolation; smart medical waste processing

  - ➢ Crowdsourcing, data collection, and visualization

[TS9] *__Session 9. Human-Centered Social Innovations__* to promote diversity, inclusiveness, fairness, and the preservation of cultural heritage

■ **[TS9-A] Urbanization and Smart Communities**

➤ Urbanization: impact and challenges; geographical, cultural, and political factors

➤ Smart communities and neighborhoods; social media and support groups; community resource management; supporting infrastructure; data platforms and community clouds

■ **[TS9-B] Smart Government and Social Services**

➤ Smart government: smart administration, regulation, policy and law; participatory governance; smart resource allocation

➤ Smart social services and social networks; smart education/training; civic engagement

■ **[TS9-C] Integrated Solutions for Smart Humanity**

➤ New legal, social, and ethical challenges posed by applications of AI; integrated solutions: quantified analysis for the safety and ethics of intelligent systems; the social responsibility of enterprises; establish legal, regulatory and ethical frameworks for the development of AI

➤ Integrated solutions to promote diversity, inclusiveness, fairness, and the preservation of cultural heritage

➤ Ecological/environmental/humanistic/organizational psychology; persuasive technology

➤ Adaptive development strategies for various geographic regions at different developmental phases and people of different ages with diverse technology and cultural backgrounds

■ **[TS9-D] Smart Design and Design Ethics**

➤ Evaluation of smart designs and their unintended consequences; emergent technologies for smart designs, simulation platform, and system optimization

➤ Interaction between different smart systems; impact of smart design on lifestyles, communities, and the environment; major challenges and impact factors of smart system design

➤ Coordinated design under the principles of usability, enjoyability, sustainability, inclusiveness, and cultural preservation; design ethics in the AI era

➤ Intelligent electromechanical design; intelligent industrial design; intelligent environmental design; intelligent architectural and infrastructure design; intelligent agent design; digital design; digital media art; visual media design; new media design; animation design; information and communication platform design; virtual environment design; design of logistics, crisis response, city services and applications; multidisciplinary design

[TS10] *Session 10. Data Management and Algorithm Development*

■ **[TS10-A]** **Data Management and Processing**

➢ Data cleaning; data fusion and integration; data quality and integrity; data visualization; data mining; big data analytics

➢ Human-centered/cognitive/mobile/cloud computing

➢ Urban informatics; data-driven monitoring, analysis, prediction, planning and decision making; real-time big data services; smart city control centers; application benchmarking and city indices; knowledge management (KM)

■ **[TS10-B]** **Algorithm Development and Analysis**

➢ Signal processing and understanding (image/video/audio/speech/natural language); semantics interpretation; multimodal sensor fusion and city monitoring; diagnostic algorithms

➢ AI, machine learning and interpretability; fairness, accountability, privacy, transparency, and ethics; deep-fake detection

➢ Intelligent modeling, simulation, prediction, and optimization; system dynamics; system control

[TS11] *Session 11. Special Sessions*

■ **[TS11-A]** **Future Lifestyles and Smart Communities: UV Intelligent Design for Vulnerable Groups**

■ **[TS11-B]** **UV Data Science Competition: Algorithm Report Session**

Part II: Forums / Competitions / Poster & Exhibition / Workshop

(Submit Abstracts, Slide Decks Presentation, Posters, or Design Proposals)

UV Forums

- **[CF] UV City Forum**
  - Reflections on urbanization and its unintended consequences
  - Current development status and challenges of smart cities; vision of future UV development
  - Collaboration among governments, academia, industries, and civil society
- **[SF] UV Student Forum**
  - UV student research, innovations, and discussions
  - UV philosophy and story sharing, technology news, social hot topics, and vision
    - ✔ Preserving cultural heritage in the process of urbanization
    - ✔ Bridging the generation gap and promoting understanding across diverse groups with the aid of UV technologies
    - ✔ Exploring future lifestyles for sustainable happiness
  - UV introduction video, talent shows and online games
  - UV entrepreneurship initiative and pitch competition
  - Future development of UV club and UV student forum
- **[AF] UV Art Forum**
  - Digital arts; non-fungible tokens (NFTs); AI / VR / AR-enabled artifacts
  - Comfort art in the post-pandemic era

UV Competitions

- **[PC] UV Pitch Competition**
  - Reflections on urbanization and its unintended consequences
  - Current development status and challenges of smart cities; vision of UV development
  - Collaboration among governments, academia, industries, and civil society
- **[K12C] UV K-12 Challenge**

- ➤ Innovation Competition
- ➤ Research Presentation
- ➤ Talent Shows
- ➤ Online Game

- ■ **[DSC] UV Data Science Competition**

  Solving problems in the real world and encouraging innovations from the young generation; finding a new way of life in the post-pandemic world

  - ➤ Machine Learning Challenges
  - ➤ Computer Vision Challenges

UV Poster Session and Exhibition

- ■ **[PE1] UV Posters**
- ■ **[PE2] UV Exhibition: Art & Technologies that present the UV concept**

  Organizations/Companies/Startups are welcome.

UV Workshop

- ■ **[WS-UV] UV Introduction**

Part III: Interactive Programs

(Submit Abstracts and Slide Decks Presentation)

UV Roadmap & Round Table Discussion

- ■ **[RMD]** UV Roadmap Discussion

- ■ **[RTD]** UV Round Table Discussion

  We sincerely invite you to propose a discussion topic or to host a roundtable discussion!

UV Panel Discussion

- ■ **[PD1]** Post-Pandemic Reflection

- ■ **[PD2]** New Legal, Social, and Ethical Challenges Posed by Applications of AI

  - ➢ New legal, social, and ethical challenges posed by applications of AI; integrated solutions: quantified analysis for the safety and ethics of intelligent systems; the social responsibility of enterprises; establishing legal, regulatory and ethical frameworks for the development of AI

  - ➢ Lifestyle innovations enabled by emergent technologies: how to reach a balance among improving the quality of life, reducing energy consumption and emissions, and promoting harmony, inclusiveness, resilience, and sustainability

  We sincerely invite you to apply to become a panelist!

SUBMIT YOUR PAPER

(All submissions will start on April 15, 2022)

IMPORTANT DATES AT A GLANCE

The deadline for all submissions has been extended to September 15, 2022.

Submissions start	April 15, 2022
Paper/Abstract/Competition Materials /Presentation/Poster submissions due	September 15, 2022
Notification of acceptance	September 25, 2022
Final manuscripts due	October 05, 2022

INSTRUCTIONS FOR PAPER SUBMISSIONS

CONTACT US