



Call for Papers

IMPORTANT DATE

On behalf of the IEEE WCCI 2020 Organizing Committee, it is our great pleasure to invite you to the bi-annual IEEE World Congress on Computational Intelligence (IEEE WCCI), which is the largest technical event in the field of computational intelligence. The IEEE WCCI 2020 will host three conferences: The 2020 International Joint Conference on Neural Networks (IJCNN 2020 – co-sponsored by International Neural Network Society – INNS), the 2020 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2020), and the 2020 IEEE Congress on Evolutionary Computation (IEEE CEC 2020) under one roof. It encourages cross-fertilization of ideas among the three big areas and provides a forum for intellectuals from all over the world to discuss and present their research findings on computational intelligence.

IEEE WCCI 2020 will be held in Glasgow, Scotland, UK – one of Europe’s most dynamic cultural capitals and the “world’s friendliest city” – located in Scotland, “the most beautiful country in the world” [Rough Guides 2015, 2017]. Steeped in culture, rich in history, and alive with excitement, visitors will sense these as they walk through its elegant Victorian streets, squares, parks and gardens. The Conference is being hosted at the prestigious Scottish Event Campus (SEC), which was a key venue for the Glasgow Commonwealth Games 2014 [<http://www.sec.co.uk>].

IEEE Computational Intelligence Society has maintained its position as a leader of journals in computational intelligence. CIS journals sustained their status as premier scholarly publications, earning high rankings in the Journal Citation Report by Thomson Reuters.

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| » IEEE Transactions on Neural Networks and Learning Systems (IF: 11.683) | » IEEE Transactions on Evolutionary Computation (IF: 8.508) |
| » IEEE Transactions on Fuzzy Systems (IF: 8.759) | » IEEE Computational Intelligence Magazine (IF: 5.857) |

LIST OF TOPICS

IJCNN

NEURAL NETWORK MODELS

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|--|---|--|
| » Feedforward neural networks | » Modular networks | » Learning vector quantization |
| » Recurrent neural networks | » Fuzzy neural networks | » Deep neural networks |
| » Self-organizing maps | » Spiking neural networks | » Randomized neural networks |
| » Radial basis function networks | » Reservoir networks (echo-state networks, liquid-state machines, etc.) | » Other topics in artificial neural networks |
| » Attractor neural networks and associative memory | » Large-scale neural networks | |

MACHINE LEARNING

- » Supervised learning
- » Unsupervised learning and clustering, (including PCA, and ICA)
- » Reinforcement learning and adaptive dynamic programming
- » Semi-supervised learning
- » Online learning
- » Probabilistic and information-theoretic methods
- » Support vector machines and kernel methods
- » EM algorithms
- » Mixture models, ensemble learning, and other meta-learning or committee algorithms
- » Bayesian, belief, causal, and semantic networks
- » Statistical and pattern recognition algorithms
- » Sparse coding and models
- » Visualization of data
- » Feature selection, extraction, and aggregation
- » Evolutionary learning
- » Hybrid learning methods
- » Computational power of neural networks
- » Deep learning
- » Other topics in machine learning

NEURODYNAMICS

- » Dynamical models of spiking neurons
- » Synchronization and temporal correlation in neural networks
- » Dynamics of neural systems
- » Chaotic neural networks
- » Dynamics of analog networks
- » Itinerant dynamics in neural systems
- » Neural oscillators and oscillator networks
- » Dynamics of attractor networks
- » Other topics in neurodynamics

COMPUTATIONAL NEUROSCIENCE

- » Connectomics
- » Models of large-scale networks in the nervous system
- » Models of neurons and local circuits
- » Models of synaptic learning and synaptic dynamics
- » Models of neuromodulation
- » Brain imaging
- » Analysis of neurophysiological and neuroanatomical data
- » Cognitive neuroscience
- » Models of neural development
- » Models of neurochemical processes
- » Neuroinformatics
- » Brain Informatics
- » Other topics in computational neuroscience

NEURAL MODELS OF PERCEPTION, COGNITION AND ACTION

- » Neurocognitive networks
- » Cognitive architectures
- » Models of conditioning, reward and behavior
- » Cognitive models of decision-making
- » Embodied cognition
- » Cognitive agents
- » Multi-agent models of group cognition
- » Developmental and evolutionary models of cognition
- » Visual system
- » Auditory system
- » Olfactory system
- » Other sensory systems
- » Attention
- » Learning and memory
- » Spatial cognition, representation and navigation
- » Semantic cognition and language
- » Grounding, symbol grounding
- » Neural models of symbolic processing
- » Reasoning and problem-solving
- » Working memory and cognitive control
- » Emotion and motivation
- » Motor control and action
- » Dynamical models of coordination and behavior
- » Consciousness and awareness
- » Models of sleep and diurnal rhythms
- » Mental disorders
- » Other topics in neural models of perception, cognition and action

NEUROENGINEERING

- » Brain-machine interfaces
- » Neural prostheses
- » Neuromorphic hardware
- » Embedded neural systems
- » Other topics in neuroengineering

BIO-INSPIRED AND BIOMORPHIC SYSTEMS

- » Brain-inspired cognitive architectures
- » Embodied robotics
- » Evolutionary robotics
- » Developmental robotics
- » Computational models of development
- » Collective intelligence
- » Swarms
- » Autonomous complex systems
- » Self-configuring systems
- » Self-healing systems
- » Self-aware systems
- » Emotional computation
- » Artificial life
- » Other topics in bio-inspired and biomorphic systems

APPLICATIONS

- » Applications of deep neural networks
- » Bioinformatics
- » Biomedical engineering
- » Data analysis and pattern recognition
- » Speech recognition and speech production
- » Robotics
- » Neurocontrol
- » Approximate dynamic programming, adaptive critics, and Markov decision processes
- » Neural network approaches to optimization
- » Signal processing, image processing, and multi-media
- » Temporal data analysis, prediction, and forecasting; time series analysis
- » Communications and computer networks
- » Data mining and knowledge discovery
- » Power system applications
- » Financial engineering applications
- » Security applications
- » Applications in multi-agent systems and social computing
- » Manufacturing and industrial applications
- » Expert systems
- » Clinical applications
- » Big data applications
- » Other applications
- » Smart grid applications

CROSS-DISCIPLINARY TOPICS

- » Hybrid intelligent systems
- » Swarm intelligence
- » Sensor networks
- » Quantum computation
- » Computational biology
- » Molecular and DNA computation
- » Computation in tissues and cells
- » Artificial immune systems
- » Philosophical issues
- » Other cross-disciplinary topics

IEEE CEC

- » Algorithms
- » Ant colony optimization
- » Artificial immune systems
- » Coevolutionary systems
- » Cultural algorithms
- » Differential evolution
- » Estimation of distribution algorithms
- » Evolutionary programming
- » Evolution strategies
- » Genetic algorithms
- » Genetic programming
- » Heuristics, metaheuristics and hyper-heuristics
- » Interactive evolutionary computation
- » Learning classifier systems
- » Memetic, multi-meme and hybrid algorithms
- » Molecular and quantum computing
- » Multi-objective evolutionary algorithms
- » Parallel and distributed algorithms
- » Particle swarm optimization
- » Theory and Implementation
- » Adaptive dynamic programming and reinforcement learning
- » Autonomous mental development
- » Coevolution and collective behavior
- » Convergence, scalability and complexity analysis
- » Evolutionary computation theory
- » Representation and operators
- » Self-adaptation in evolutionary computation
- » Optimization
- » Numerical optimization
- » Discrete and combinatorial optimization
- » Multiobjective optimization
- » Handling of Various Aspects
- » Large-scale problems
- » Preference handling
- » Evolutionary simulation-based optimization
- » Meta-modeling and surrogate models
- » Dynamic and uncertain environments
- » Constraint and uncertainty handling
- » Hybrid Systems of Computational Intelligence
- » Evolved neural networks
- » Evolutionary fuzzy systems
- » Evolved neuro-fuzzy systems
- » Related Areas and Applications
- » Art and music
- » Artificial ecology and artificial life
- » Autonomous mental and behavior development
- » Biometrics, bioinformatics and biomedical applications
- » Classification, clustering and data analysis
- » Data mining
- » Defense and cyber security
- » Evolutionary games and multi-agent systems
- » Evolvable hardware and software
- » Evolutionary Robotics
- » Engineering applications
- » Emergent technologies
- » Finance and economics
- » Games
- » Intelligent systems applications
- » Robotics
- » Real-world applications
- » Emerging areas

FUZZ-IEEE

- » Mathematical and theoretical foundations
- » fuzzy measures and fuzzy integrals
- » fuzzy differential equations
- » fuzzy logic, fuzzy inference systems
- » aggregation, operators, fuzzy relations
- » Fuzzy control
- » optimal control of dynamic systems
- » adaptive and dynamically evolving process control
- » networked control systems
- » plantwide, monitoring, and supervisory control
- » Robotics and autonomous systems
- » navigation
- » decision making and situation awareness
- » handling systems
- » automated factories
- » smart industry
- » Fuzzy hardware, software, sensors, actuators, architectures
- » Fuzzy data and analysis
- » clustering, classification and pattern recognition
- » statistics and imprecise probabilities
- » data summarization
- » big data
- » time series modeling and forecasting
- » data analytics and visualization
- » social networks mining and analysis
- » Data management and web engineering
- » fuzzy data modeling
- » databases and information retrieval
- » data aggregation and fusion
- » fuzzy markup languages
- » Granular computing
- » type-2 fuzzy sets
- » intuitionistic fuzzy sets
- » higher order fuzzy sets
- » interval data processing
- » rough sets and relations
- » hybrid granular approaches
- » data clouds
- » Computational and artificial intelligence
- » fuzzy neural networks
- » fuzzy deep learning
- » fuzzy evolutionary algorithms
- » dynamically evolving fuzzy systems
- » fuzzy agent systems
- » knowledge representation and approximate reasoning
- » elicitation of fuzzy sets
- » explainable artificial intelligence
- » Optimization and operations research
- » fuzzy mathematical programming
- » possibilistic optimization
- » fuzzy algorithms and heuristic search
- » Decision analysis, multi-criteria decision making, and decision