Recent advances in artificial intelligence, cognitive science, neuroscience and robotics have stimulated the birth and growth of a new research field, known as computational autonomous mental development. Although human mental development is a well-known subject of study, e.g., in developmental psychology, computational studies of mental development for either machines or humans had not received sufficient attention in the past. Mental development is a process during which a brain-like natural or artificial embodied system, under the control of its intrinsic species-specific developmental program residing in the genes or artificially designed, develops mental capabilities through its autonomous real-time interactions with its environments (including its own internal environment and components) using its own sensors and effectors. The scope of mental development includes cognitive, behavioral, emotional and all other mental capabilities that are exhibited by humans, higher animals and artificial systems. Investigations of the computational mechanisms of mental development are expected to improve our systematic understanding of the working of the wide variety of cognitive and behavioral capabilities in humans and to enable autonomous development of these highly complex capabilities by robots and other artificial systems.

ICDL-02 is the first regularly scheduled conference following the very successful Workshop on Development and Learning (WDL), funded by NSF and DARPA, held April 5 - 7, 2000 at Michigan State University (http://www.cse.msu.edu/idl). Some discussion about this new direction is available on the Final Report page of the WDL website. A brief discussion of the subject is available in an article appeared in Science, available electronically at: http://www.cse.msu.edu/idl/SciencePaper.pdf.

An autonomous, real-time, incremental, open-ended, sensor-grounded and effector-grounded operational mode of mental development implies that multiple disciplines of human intelligence and artificial intelligence face many similar research issues. Therefore, this conference series is multidisciplinary in nature, inviting researchers from all related fields including, but not limited to, machine intelligence, machine learning, computer vision, speech recognition, robotics, animal learning, psychology, neuroscience, computational intelligence, and philosophy. Although understanding or realizing fully autonomous mode of mental development is a goal, intermediate results toward this goal are all encouraged.

The subjects of the conference include, but not limited to:

1. Architecture of mental development
2. Learning and training techniques that facilitate mental development
3. Development of visual, auditory and other sensory cortices
4. Development of filters and feature detectors
5. Neural plasticity during development
6. Development of value system
7. Development of emotion
8. Development of cognitive system
9. Coordination and integration of behaviors through development
10. Development of attention mechanisms
11. Development of vision system
12. Development of audition system
13. Development of tacton system
14. Integration mechanisms through development
15. Computational models of language acquisition through development
16. Generation of representation during development
17. Integrated developmental programs or systems
18. Autonomous thinking behaviors through development
19. Development of consciousness
20. Robot bodies that facilitate autonomous mental development
21. Robots capable of autonomous mental development
22. Robotic techniques for mental development
23. Comparison of approaches to machine intelligence
24. Social and philosophical issues of developmental robots