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Universality and Emergent Computation in Cellular Neural Networks **Emergent Computation** *Computation at the Edge of Chaos* **The Evolution of Emergent Computation in Cellular Automata** **A Mathematical Structure for Emergent Computation** Emergent Computation Biocomputing and Emergent Computation Emergent Computation **Dynamics, Emergent Computation, and Evolution in Cellular Automata** **Information Processing in Biology** **Universality and Emergent Computation in Cellular Neural Networks** Biocomputing And Emergent Computation - Proceedings Of Bcec97 **From Parallel to Emergent Computing** **Biocomputing and Emergent Computation** *Proceedings of BCEC97* **Emergent Computation** **An emergent computation approach to natural language processing** **Reaction-Diffusion Automata: Phenomenology, Localisations, Computation** **Emergent Computation** Emergent Computation, Proceedings of the Ninth International Conference of the Center for Nonline Studies Ov Self-organizating, and Cooperative Phenomena in Natural and Artificial Computing Networks, USA May 22-26, 1989 *Emergent Computation* **Emergent computation** **Automata, Universality, Computation** *Advances in Unconventional Computing* **Emergent Computing Methods in Engineering Design** **Computation in Cells and Tissues** *Connectionist Models of Neurocognition and Emergent Behavior* Emergent Computation **Advances in Unconventional Computing** *Design Computing Game of Life Cellular Automata Emergent Behavior in Complex Systems Engineering Advances in Physarum Machines* **Emergent Neural Computational Architectures Based on Neuroscience** **Virtual Engineering and Emergent Computing** **Emergent Computing Methods in Engineering Design** Models of Computation From Utopian to Genuine Unconventional Computers **Computational Intelligence for Engineering Systems** *Computational Intelligence*

In the late 1960s British mathematician John Conway invented a virtual mathematical machine that operates on a two-dimensional array of square cell. Each cell takes two states, live and dead. The cells' states are updated simultaneously and in discrete time. A dead cell comes to life if it has exactly three live neighbours. A live cell remains alive if two or three of its neighbours are alive, otherwise the cell dies. Conway's Game of Life

became the most programmed solitary game and the most known cellular automaton. The book brings together results of forty years of study into computational, mathematical, physical and engineering aspects of The Game of Life cellular automata. Selected topics include phenomenology and statistical behaviour; space-time dynamics on Penrose tilling and hyperbolic spaces; generation of music; algebraic properties; modelling of financial markets; semi-quantum extensions; predicting emergence; dual-graph based analysis; fuzzy, limit behaviour and threshold scaling; evolving cell-state transition rules; localization dynamics in quasi-chemical analogues of GoL; self-organisation towards criticality; asynochrous implementations. The volume is unique because it gives a comprehensive presentation of the theoretical and experimental foundations, cutting-edge computation techniques and mathematical analysis of the fabulously complex, self-organized and emergent phenomena defined by incredibly simple rules. Computations are dynamical systems. The formal study of dynamical systems has revealed a spectrum of behaviors ranging from fixed-point dynamics to fully developed chaos. How does computation--especially universal computation--fit into this spectrum of dynamical behaviors? Researchers in several fields are exploring computational systems in which interesting global behavior emerges from local interactions among component parts - an approach called emergent computation. In these systems, interactions among simultaneous computations are exploited to improve efficiency, increase flexibility, or provide more realistic models of natural phenomena. These 31 essays define and explore the concept of emergent computation in such areas as artificial networks, adaptive systems, classifier systems, connectionist learning, other learning, and biological networks to determine what properties are required of the supporting architectures that generate them. Many of the essays share the themes of design (how to construct such systems), the importance of preexisting structure to learning and the role of parallelism, and the tension between cooperative and competitive models of interaction. In the introduction, Stephanie Forrest presents several detailed examples of the kinds of problems emergent computation can address. These include showing how emergent computation can lead to efficiency improvements in parallel processing, establishing the connection between emergent computation and nonlinear systems, and comparing two search techniques to show how the emergent-computational approach to a problem differs from other more conventional approaches. Stephanie Forrest is Assistant Professor in the Department of Computer Science at the University of New Mexico. She is also affiliated with the Center for Nonlinear Studies and Computing Division at Los Alamos National Laboratory. This book is an intellectually stimulating excursion into mathematical machines and structures capable for a universal computation. World top experts in computer science and mathematics overview exciting and intriguing topics of logical theory of monoids, geometry of Gauss word, philosophy of mathematics in computer science, asynchronous and parallel P-systems, decidability in cellular automata, splicing systems, reversible Turing machines, information flows in two-way finite automata, prime generators in automaton arrays, Grossone and Turing machines, automaton models of atomic lattices. The book is full of visually attractive examples of mathematical machines, open problems and challenges for future research. Those interested in the

advancement of a theory of computation, philosophy of mathematics, future and emergent computing paradigms, architectures and implementations will find the book vital for their research and development. Cellular computing is a natural information processing paradigm, capable of modeling various biological, physical and social phenomena, as well as other kinds of complex adaptive systems. The programming of a cellular computer is in many respects similar to the genetic evolution in biology, the result being a proper cell design and a task-specific gene. How should one “program” the cell of a cellular computer such that a dynamic behavior with computational relevance will emerge? What are the “rules” for designing a computationally universal and efficient cell? The answers to those questions can be found in this book. It introduces the relatively new paradigm of the cellular neural network from an original perspective and provides the reader with the guidelines for understanding how such cellular computers can be “programmed” and designed optimally. The book contains numerous practical examples and software simulators, allowing readers to experiment with the various phases of designing cellular computers by themselves. Contents:Cellular Paradigms: Theory and SimulationUniversal CellsEmergence in Continuous-Time Systems: Reaction–Diffusion Cellular Neural NetworksEmergence in Discrete-Time Systems: Generalized Cellular AutomataUnconventional Applications: Biometric Authentication Readership: Graduate students, academics and researchers dealing with nonlinear signal processing, cellular computing systems, biological modeling & computing, neural networks, emergence & complexity, or complex adaptive systems. Keywords:Reviews:“Dogaru's book is a timely addition to the literature published in recent years … This book is highly recommendable to any one who wants to study nonlinear dynamics, circuits, devices and systems, and to the individuals who have interest in expanding their current expertise of mathematics to understand more about the complex nonlinear world.”IEEE Circuits and Systems Magazine “The book is written carefully in a simple and accessible way … this is a beautiful, well-rounded, stimulating, and timely book targeting a multidisciplinary audience. It certainly holds its promise of providing 'first steps towards a consistent theory of designing for emergence'.”International Journal of Robust Nonlinear Control A Concise Introduction to Computation Models and Computability Theory provides an introduction to the essential concepts in computability, using several models of computation, from the standard Turing Machines and Recursive Functions, to the modern computation models inspired by quantum physics. An in-depth analysis of the basic concepts underlying each model of computation is provided. Divided into two parts, the first highlights the traditional computation models used in the first studies on computability: - Automata and Turing Machines; - Recursive functions and the Lambda-Calculus; - Logic-based computation models. and the second part covers object-oriented and interaction-based models. There is also a chapter on concurrency, and a final chapter on emergent computation models inspired by quantum mechanics. At the end of each chapter there is a discussion on the use of computation models in the design of programming languages. Reaction-diffusion and excitable media are amongst most intriguing substrates. Despite apparent simplicity of the physical processes involved the media exhibit a wide range of amazing patterns: from target and spiral waves to travelling

localisations and stationary breathing patterns. These media are at the heart of most natural processes, including morphogenesis of living beings, geological formations, nervous and muscular activity, and socio-economic developments. This book explores a minimalist paradigm of studying reaction-diffusion and excitable media using locally-connected networks of finite-state machines: cellular automata and automata on proximity graphs. Cellular automata are marvellous objects per se because they show us how to generate and manage complexity using very simple rules of dynamical transitions. When combined with the reaction-diffusion paradigm the cellular automata become an essential user-friendly tool for modelling natural systems and designing future and emergent computing architectures. The book brings together hot topics of non-linear sciences, complexity, and future and emergent computing. It shows how to discover propagating localisation and perform computation with them in very simple two-dimensional automaton models. Paradigms, models and implementations presented in the book strengthen the theoretical foundations in the area for future and emergent computing and lay key stones towards physical embodied information processing systems. This book is dedicated to Professor Selim G. Akl to honour his groundbreaking research achievements in computer science over four decades. The book is an intellectually stimulating excursion into emergent computing paradigms, architectures and implementations. World top experts in computer science, engineering and mathematics overview exciting and intriguing topics of musical rhythms generation algorithms, analyse the computational power of random walks, dispelling a myth of computational universality, computability and complexity at the microscopic level of synchronous computation, descriptional complexity of error detection, quantum cryptography, context-free parallel communicating grammar systems, fault tolerance of hypercubes, finite automata theory of bulk-synchronous parallel computing, dealing with silent data corruptions in high-performance computing, parallel sorting on graphics processing units, mining for functional dependencies in relational databases, cellular automata optimisation of wireless sensors networks, connectivity preserving network transformers, constrained resource networks, vague computing, parallel evolutionary optimisation, emergent behaviour in multi-agent systems, vehicular clouds, epigenetic drug discovery, dimensionality reduction for intrusion detection systems, physical maze solvers, computer chess, parallel algorithms to string alignment, detection of community structure. The book is a unique combination of vibrant essays which inspires scientists and engineers to exploit natural phenomena in designs of computing architectures of the future. Modern computing relies on future and emergent technologies which have been conceived via interaction between computer science, engineering, chemistry, physics and biology. This highly interdisciplinary book presents advances in the fields of parallel, distributed and emergent information processing and computation. The book represents major breakthroughs in parallel quantum protocols, elastic cloud servers, structural properties of interconnection networks, internet of things, morphogenetic collective systems, swarm intelligence and cellular automata, unconventionality in parallel computation, algorithmic information dynamics, localized DNA computation, graph-based cryptography, slime mold inspired nano-electronics and cytoskeleton computers.

Features Truly interdisciplinary, spanning computer science, electronics, mathematics and biology Covers widely popular topics of future and emergent computing technologies, cloud computing, parallel computing, DNA computation, security and network analysis, cryptography, and theoretical computer science Provides unique chapters written by top experts in theoretical and applied computer science, information processing and engineering From Parallel to Emergent Computing provides a visionary statement on how computing will advance in the next 25 years and what new fields of science will be involved in computing engineering. This book is a valuable resource for computer scientists working today, and in years to come. The field of biologically inspired computation has coexisted with mainstream computing since the 1930s, and the pioneers in this area include Warren McCulloch, Walter Pitts, Robert Rosen, Otto Schmitt, Alan Turing, John von Neumann and Norbert Wiener. Ideas arising out of studies of biology have permeated algorithmics, automata theory, artificial intelligence, graphics, information systems and software design. Within this context, the biomolecular, cellular and tissue levels of biological organisation have had a considerable inspirational impact on the development of computational ideas. Such innovations include neural computing, systolic arrays, genetic and immune algorithms, cellular automata, artificial tissues, DNA computing and protein memories. With the rapid growth in biological knowledge there remains a vast source of ideas yet to be tapped. This includes developments associated with biomolecular, genomic, enzymic, metabolic, signalling and developmental systems and the various impacts on distributed, adaptive, hybrid and emergent computation. This multidisciplinary book brings together a collection of chapters by biologists, computer scientists, engineers and mathematicians who were drawn together to examine the ways in which the interdisciplinary displacement of concepts and ideas could develop new insights into emerging computing paradigms. Funded by the UK Engineering and Physical Sciences Research Council (EPSRC), the CytoCom Network formally met on five occasions to examine and discuss common issues in biology and computing that could be exploited to develop emerging models of computation. Computational Intelligence for Engineering Systems provides an overview and original analysis of new developments and advances in several areas of computational intelligence. Computational Intelligence have become the road-map for engineers to develop and analyze novel techniques to solve problems in basic sciences (such as physics, chemistry and biology) and engineering, environmental, life and social sciences. The contributions are written by international experts, who provide up-to-date aspects of the topics discussed and present recent, original insights into their own experience in these fields. The authors also include methods that apply to diverse fields such as manufacturing, tourism, power systems, computer science, robotics, chemistry, and biology. Topics include: Simulation and evolution of real and artificial life forms; Self-organization; Models of communication and social behaviors; Emergent collective behaviors and swarm intelligence; Adaptive, complex and biologically inspired systems; Power Systems ; Web-based Applications; Knowledge discovery; Intelligent Tutoring Systems ; Decision support Systems; Intelligent Tutoring Systems. An understanding of emergent computation requires a profound revision of the most fundamental ideas. A

noticeable attempt of such a rethinking is a world view in which natural systems are seen not as separate entities but as integrated parts of a unified whole. The book for the first time presents such a mathematical structure, which remarkably is based on integers as the single concept. As integers are considered to be the most fundamental entities irreducible to something simpler, this makes the mathematical structure a final theory, and thus we do not have to look for its explanation in terms of deeper concepts. The book is not only applicable to models of computation and optimization but also has scientific consequences, as it contributes to a rethinking of the most fundamental ideas about nature. Audience: The book is written at a level suitable for advanced undergraduate students and graduate students as well as research workers and practitioners in computer science information technology, mathematics and physics. The book is suitable as a reference or as supplementary reading material for an advanced graduate course. Only a basic knowledge of calculus is required. The unconventional computing is a niche for interdisciplinary science, cross-bred of computer science, physics, mathematics, chemistry, electronic engineering, biology, material science and nanotechnology. The aims of this book are to uncover and exploit principles and mechanisms of information processing in and functional properties of physical, chemical and living systems to develop efficient algorithms, design optimal architectures and manufacture working prototypes of future and emergent computing devices. This second volume presents experimental laboratory prototypes and applied computing implementations. Emergent molecular computing is presented by enzymatic logical gates and circuits, and DNA nano-devices. Reaction-diffusion chemical computing is exemplified by logical circuits in Belousov-Zhabotinsky medium and geometrical computation in precipitating chemical reactions. Logical circuits realised with solitons and impulses in polymer chains show advances in collision-based computing. Photo-chemical and memristive devices give us a glimpse on hot topics of a novel hardware. Practical computing is represented by algorithms of collective and immune-computing and nature-inspired optimisation. Living computing devices are implemented in real and simulated cells, regenerating organisms, plant roots and slime mould. The book is the encyclopedia, the first ever complete authoritative account, of the theoretical and experimental findings in the unconventional computing written by the world leaders in the field. All chapters are self-contains, no specialist background is required to appreciate ideas, findings, constructs and designs presented. This treatise in unconventional computing appeals to readers from all walks of life, from high-school pupils to university professors, from mathematicians, computers scientists and engineers to chemists and biologists. It is generally understood that the present approachs to computing do not have the performance, flexibility, and reliability of biological information processing systems. Although there is a comprehensive body of knowledge regarding how information processing occurs in the brain and central nervous system this has had little impact on mainstream computing so far. This book presents a broad spectrum of current research into biologically inspired computational systems and thus contributes towards developing new computational approaches based on neuroscience. The 39 revised full papers by leading researchers were carefully selected and reviewed for inclusion in this anthology. Besides an introductory overview by the

volume editors, the book offers topical parts on modular organization and robustness, timing and synchronization, and learning and memory storage. This book is devoted to Slime mould Physarum polycephalum, which is a large single cell capable for distributed sensing, concurrent information processing, parallel computation and decentralized actuation. The ease of culturing and experimenting with Physarum makes this slime mould an ideal substrate for real-world implementations of unconventional sensing and computing devices The book is a treatise of theoretical and experimental laboratory studies on sensing and computing properties of slime mould, and on the development of mathematical and logical theories of Physarum behavior. It is shown how to make logical gates and circuits, electronic devices (memristors, diodes, transistors, wires, chemical and tactile sensors) with the slime mould. The book demonstrates how to modify properties of Physarum computing circuits with functional nano-particles and polymers, to interface the slime mould with field-programmable arrays, and to use Physarum as a controller of microbial fuel cells. A unique multi-agent model of slime is shown to serve well as a software slime mould capable for solving problems of computational geometry and graph optimization. The multiagent model is complemented by cellular automata models with parallel accelerations. Presented mathematical models inspired by Physarum include non-quantum implementation of Shor's factorization, structural learning, computation of shortest path tree on dynamic graphs, supply chain network design, p-adic computing and syllogistic reasoning. The book is a unique composition of vibrant and lavishly illustrated essays which will inspire scientists, engineers and artists to exploit natural phenomena in designs of future and emergent computing and sensing devices. It is a 'bible' of experimental computing with spatially extended living substrates, it spanstopics from biology of slime mould, to bio-sensing, to unconventional computing devices and robotics, non-classical logics and music and arts. This volume contains papers presented at the BCEC97 conference, held in Skövde, Sweden, in September 1997. The conference brought together researchers from biology and computer science to discuss the use of computational techniques in biology, as well as the use of biological metaphors in computing. Examples of the work presented in these papers include computer simulations of embryogenesis; algorithms for protein folding prediction; problem solving using DNA computation; neural-network learning in retina implants; and optimisation algorithms inspired by natural evolution. This volume contains papers presented at the BCEC97 conference, held in Skovde, Sweden, in September 1997. The conference brought together researchers from biology and computer science to discuss the use of computational techniques in biology, as well as the use of biological metaphors in computing. Examples of the work presented in these papers include computer simulations of embryogenesis; algorithms for protein folding prediction; problem solving using DNA computation; neural-network learning in retina implants; and optimisation algorithms inspired by natural evolution. Unconventional computing is a field of advanced computer science, which general goal might be summarised as the quest for both new groundbreaking algorithms and physical implementations of novel and ultimately more powerful - compared to classical approaches - computing paradigms and machines. This volume brings together work that especially focuses on experimental prototypes and

genuine implementations of non-classical computing devices. A further goal was to revisit existing approaches in unconventional computing, to provide scientists and engineers with blue-prints of realisable computing devices, and to take a critical glance at the design of novel and emergent computing systems to point out failures and shortcomings of both theoretical and experimental approaches. Emergent Computation is concerned with recent applications of Mathematical Linguistics or Automata Theory. This subject has a primary focus upon "Bioinformatics" (the Genome and arising interest in the Proteome), but the closing chapter also examines applications in Biology, Medicine, Anthropology, etc. The book is composed of an organized examination of DNA, RNA, and the assembly of amino acids into proteins. Rather than examine these areas from a purely mathematical viewpoint (that excludes much of the biochemical reality), the author uses scientific papers written mostly by biochemists based upon their laboratory observations. Thus while DNA may exist in its double stranded form, triple stranded forms are not excluded. Similarly, while bases exist in Watson-Crick complements, mismatched bases and abasic pairs are not excluded, nor are Hoogsteen bonds. Just as there are four bases naturally found in DNA, the existence of additional bases is not ignored, nor amino acids in addition to the usual complement of 20. Can there be more than "64" possible codons? RNA is examined from the point of view of Nussinov plots. All information is presented from the point of view of regular, context-free, and context sensitive languages, as well as Turing machines and Sequential Machines (and their corresponding semi-groups). Relationships to other subjects of mathematics such as Complex numbers, Quaternions, Algebraic-Topology, and Knot Theory are also mentioned. An examination is made of Splicing Systems as well as Dominoes. Shortcomings illustrating the dangers of mathematical abstractions that ignore biochemistry are pointed out. The papers examine the subjects of interest from the point of view of applying language theory to search for new results, but also as biological-automatons (implementations or machines) to do calculations. This book will be of value to those studying Bioinformatics, Biochemistry, Computer-Science, Mathematical Linguistics, and Biology, as well as Pharmacology (with the possible promise of medically active artificial DNA, RNA, and proteins). Laboratory results to demonstrate the usefulness of the topics discussed are demonstrated both in vitro and in vivo. The papers in this book show the tremendous potential of emerging computing paradigms such as genetic algorithms, evolutionary computing, and neural networks for solving problems of engineering design. Computational Intelligence: Concepts to Implementations provides the most complete and practical coverage of computational intelligence tools and techniques to date. This book integrates various natural and engineering disciplines to establish Computational Intelligence. This is the first comprehensive textbook on the subject, supported with lots of practical examples. It asserts that computational intelligence rests on a foundation of evolutionary computation. This refreshing view has set the book apart from other books on computational intelligence. This book lays emphasis on practical applications and computational tools, which are very useful and important for further development of the computational intelligence field. Focusing on evolutionary computation, neural networks, and fuzzy

logic, the authors have constructed an approach to thinking about and working with computational intelligence that has, in their extensive experience, proved highly effective. The book moves clearly and efficiently from concepts and paradigms to algorithms and implementation techniques by focusing, in the early chapters, on the specific con. It explores a number of key themes, including self-organization, complex adaptive systems, and emergent computation. It details the metrics and analytical tools needed to assess the performance of computational intelligence tools. The book concludes with a series of case studies that illustrate a wide range of successful applications. This book will appeal to professional and academic researchers in computational intelligence applications, tool development, and systems. Moves clearly and efficiently from concepts and paradigms to algorithms and implementation techniques by focusing, in the early chapters, on the specific concepts and paradigms that inform the authors' methodologies Explores a number of key themes, including self-organization, complex adaptive systems, and emergent computation Details the metrics and analytical tools needed to assess the performance of computational intelligence tools Concludes with a series of case studies that illustrate a wide range of successful applications Presents code examples in C and C++ Provides, at the end of each chapter, review questions and exercises suitable for graduate students, as well as researchers and practitioners engaged in self-study Cellular computing is a natural information processing paradigm, capable of modeling various biological, physical and social phenomena, as well as other kinds of complex adaptive systems. The programmingof a cellular computer is in many respects similar to the geneticevolution in biology, the result being a proper cell design and atask-specific gene. The unconventional computing is a niche for interdisciplinary science, cross-bred of computer science, physics, mathematics, chemistry, electronic engineering, biology, material science and nanotechnology. The aims of this book are to uncover and exploit principles and mechanisms of information processing in and functional properties of physical, chemical and living systems to develop efficient algorithms, design optimal architectures and manufacture working prototypes of future and emergent computing devices. This first volume presents theoretical foundations of the future and emergent computing paradigms and architectures. The topics covered are computability, (non-)universality and complexity of computation; physics of computation, analog and quantum computing; reversible and asynchronous devices; cellular automata and other mathematical machines; P-systems and cellular computing; infinity and spatial computation; chemical and reservoir computing. The book is the encyclopedia, the first ever complete authoritative account, of the theoretical and experimental findings in the unconventional computing written by the world leaders in the field. All chapters are self-contains, no specialist background is required to appreciate ideas, findings, constructs and designs presented. This treatise in unconventional computing appeals to readers from all walks of life, from high-school pupils to university professors, from mathematicians, computers scientists and engineers to chemists and biologists. A comprehensive text that reviews the methods and technologies that explore emergent behavior in complex systems engineering in multidisciplinary fields In Emergent Behavior in Complex Systems Engineering, the authors present the theoretical considerations and the tools

required to enable the study of emergent behaviors in manmade systems. Information Technology is key to today's modern world. Scientific theories introduced in the last five decades can now be realized with the latest computational infrastructure. Modeling and simulation, along with Big Data technologies are at the forefront of such exploration and investigation. The text offers a number of simulation-based methods, technologies, and approaches that are designed to encourage the reader to incorporate simulation technologies to further their understanding of emergent behavior in complex systems. The authors present a resource for those designing, developing, managing, operating, and maintaining systems, including system of systems. The guide is designed to help better detect, analyse, understand, and manage the emergent behaviour inherent in complex systems engineering in order to reap the benefits of innovations and avoid the dangers of unforeseen consequences. This vital resource: Presents coverage of a wide range of simulation technologies Explores the subject of emergence through the lens of Modeling and Simulation (M&S) Offers contributions from authors at the forefront of various related disciplines such as philosophy, science, engineering, sociology, and economics Contains information on the next generation of complex systems engineering Written for researchers, lecturers, and students, Emergent Behavior in Complex Systems Engineering provides an overview of the current discussions on complexity and emergence, and shows how systems engineering methods in general and simulation methods in particular can help in gaining new insights in complex systems engineering. The papers in this book show the tremendous potential of emerging computing paradigms such as genetic algorithms, evolutionary computing, and neural networks for solving problems of engineering design. Introduction / Eddy J. Davelaar -- An ecology-based approach to perceptual modelling / E.L. Byrne, D.P.A Corney and R.B. Lotto -- Early development of visual abilities / Alessio Plebe -- A dynamical neural simulation of feature-based attention and binding in a recurrent model of the ventral stream / D.G. Harrison and M. De Kamps -- Model selection for eye movements : assessing the role of attentional cues in infant learning / Daniel Yurovsky [und weitere] -- The importance of low spatial frequencies for categorization of emotional facial expressions / L. Lopez [und weitere] -- Modeling speech perception with restricted Boltzmann machines / Michael Klein, Louis ten Bosch and Lou Boves -- Early language as multimodal learning / Nadja Althaus and Denis Mareschal -- From Motherese to one-word and two-word child language : a multimodal temporal connectionist model / Abel Nyamapfene -- Learning the visual word code / T. Hannagan and J. Grainger -- What are the functional units in reading? Evidence for statistical variation influencing word processing / Alastair C. Smith and Padraic Monaghan -- Testing computational accounts of response congruency in lexical decision / Sebastian Loth and Colin J. Davis -- Sentence comprehension as mental simulation : an information-theoretic analysis and a connectionist model / Stefan L. Frank -- Modelling free recall - a combined activation-buffer and distributed-context model / Anat Elhalal and Marius Usher -- Inference, ontologies and the pump of thought / Andrzej Wichert -- Modelling correlations in "response inhibition" Richard P. Cooper and Eddy J. Davelaar -- A first approach to an artificial networked cognitive control system based on the shared circuits model of sociocognitive capacities / A. Sanchez Boza and R. Haber Guerra --

Digital typology modelling of cognitive abilities / Agnes Garletti -- Using enriched semantic representations in predictions of human brain activity / Joseph P. Levy and John A. Bullinaria -- Variability in the severity of developmental disorders : a neurocomputational account of developmental regression in autism / Michael SC Thomas, Victoria CP Knowland and Annette Karmiloff-Smith -- How do we use computational models of cognitive processes? / T. Stafford -- Some issues in computational modelling; Occam's razor and Hegel' hair gel / Richard Shillcock [und weitere] -- How is hair gel quantified? / Mark A. Pitt and Jay I. Myung -- What do humanoid robots offer to experimental psychology? / Jochen J. Steil Design Computing will help you understand the rapidly evolving relationship between computing, designers, and the many different environments they create or work in. The book introduces the topic of design computing, and covers the basics of hardware and software, so you don’t need to be an expert. Topics include the fundamentals of digital representation, programming and interfaces for design; the shifting landscape of opportunity and expectation in practice and pedagogy; placing sensors in buildings to measure performance; and the challenge of applying information effectively in design. The book also includes additional reading for those who wish to dig deeper into the subject. Design Computing will provide you with a greater awareness of the issues that permeate the field, opportunities for you to investigate, and perhaps motivation to push the boundaries.

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