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# GRANULAR COMPUTING:
# An Introduction

**ANDRZEJ BARGIELA**
*The Nottingham Trent University, Nottingham, UK*
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*University Of Alberta, Edmonton, AB, Canada*

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Granular Computing is an emerging conceptual and computing paradigm of information processing. It has been motivated by the urgent need for intelligent processing of empirical data that is now commonly available in vast quantities, into a humanly manageable abstract knowledge. In this sense, granular computing offers a landmark change from the current machine-centric to human-centric approach to information and knowledge. The theoretical foundations of granular computing are exceptionally sound and involve set theory (interval mathematics), fuzzy sets, rough sets, and random sets linked together in a highly comprehensive treatment of this emerging paradigm.

*GRANULAR COMPUTING: An Introduction* covers a full spectrum of granular computing from the basic methodology through algorithms and granular worlds, to a representative spectrum of applications. This book will appeal to all developing intelligent systems either working at the methodological level or interested in detailed system realizations. The reader is provided with the underlying material on granular computing, as well as exposed to the current developments where it finds the most visible applications. Furthermore, this book provides an extensive bibliography after each chapter—an indispensable source of information to anyone seriously pursuing research in this rapidly developing area.

*GRANULAR COMPUTING: An Introduction* is designed to meet the needs of a professional audience composed of researchers and practitioners in industry and graduate level students in computer science & engineering.

**Contents:** Preface. PART I. Methodology and Mathematical Framework. 1.Granular Computing as an Emerging Paradigm of Information Processing. 2. Sets and Intervals. 3. Fuzzy Sets. 4. Rough Sets. 5. Generalizations of Information Granules. PART II. Algorithms of Information Granulation. 6. From Numbers to Information Granules. 7. Recursive Information Granulation. 8. Granular Prototyping in Fuzzy Clustering. 9. Logic-Based Fuzzy Clustering. 10. Semantic Stability of Information Granules. PART III. Granular World Communications. 11. Communications between Granular Worlds: Fundamentals. 12. Networking of Granular Worlds: Collaborative Clustering. 13. Directional Models of Granular Communication. 14. Intelligent Agents and Granular Worlds. PART IV. Granular Systems Applications. 15. Self-Organizing Maps in the Design and Processing of Granular Information. 16. Temporal Granulation and Signal Analysis. 17. Granular Data Compression. 18. Interval State Estimation in Systems Modelling. Epilogue. Index.

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