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3D Printing in Medicine Frank J. Rybicki 2017-09-27 This book describes the fundamentals of three-dimensional (3D) printing, addresses the practical aspects of establishing a 3D printing service in a medical facility, and explains the enormous potential value of rendering images as 3D printed models capable of providing tactile feedback and tangible information on both anatomic and pathologic states. Individual chapters also focus on selected areas of applications for 3D printing, including musculoskeletal, craniomaxillofacial, cardiovascular, and neurosurgery applications. Challenges and opportunities related to training, materials and equipment, and guidelines are addressed, and the overall costs of a 3D printing lab and the balancing of these costs against clinical benefits are discussed. Radiologists, surgeons, and other physicians will find this book to be a rich source of information on the practicalities and expanding medical applications of 3D printing.

Additive Manufacturing Technologies Ian Gibson 2014-11-26 This book covers in detail the various aspects of joining materials to form parts. A conceptual overview of rapid prototyping and layered manufacturing is given, beginning with the fundamentals so that readers can get up to speed quickly. Unusual and emerging applications such as micro-scale manufacturing, medical applications, aerospace, and rapid manufacturing are also discussed. This book provides a comprehensive overview of rapid prototyping technologies as well as support technologies such as software systems, vacuum casting, investment casting, plating, infiltration and other systems. This book also: Reflects recent developments and trends and adheres to the ASTM, SI, and other standards Includes chapters on automotive technology, aerospace technology and low-cost AM technologies Provides a broad range of technical questions to ensure comprehensive understanding of the concepts covered

Industrializing Additive Manufacturing - Proceedings of Additive Manufacturing in Products and Applications - AMPA2017 Mirko Meboldt 2017-09-05 These proceedings exchange ideas and knowledge among engineers, designers and managers on how to support real-world value chains by developing additive manufactured series products. The papers from the conference show a holistic, multidisciplinary view.

Rapid Manufacturing Neil Hopkinson 2006-02-22 Rapid Manufacturing is a new area of manufacturing developed from a family of technologies known as Rapid Prototyping. These processes have already had the effect of both improving products and reducing their development time; this in turn resulted in the development of the technology of Rapid Tooling, which implemented Rapid Prototyping techniques to improve its own processes. Rapid Manufacturing has developed as the next stage, in which the need for tooling is eliminated. It has been shown that it is economically feasible to use existing commercial Rapid Prototyping systems to manufacture series parts in quantities of up to 20,000 and customised parts in quantities of hundreds of thousands. This form of manufacturing can be incredibly cost-effective and the process is far more flexible than conventional manufacturing. Rapid Manufacturing: An Industrial Revolution for the Digital Age addresses the academic fundamentals of Rapid Manufacturing as well as focussing on case studies and applications across a wide range of industry sectors. As a technology that allows manufacturers to create products without tools, it enables previously impossible geometries to be made. This book is abundant with images depicting the fantastic array of products that are now being commercially manufactured using these technologies. Includes contributions from leading researchers working at the forefront of industry. Features detailed illustrations throughout. Rapid Manufacturing: An Industrial Revolution for the Digital Age is a groundbreaking text that provides excellent coverage of this fast emerging industry. It will interest manufacturing industry practitioners in research and development, product design and materials science, as well as having a theoretical appeal to researchers and post-graduate students in manufacturing engineering, product design, CAD/CAM and CIFM.

3D Printing Cultures, Politics and Hackerspaces Leandros Savvides 2021-10-26 This book appreciably contributes to growing debates within Science and Technology Studies concerned with cultural politics, the emergence of citizen science and civil society interventions in shaping technology. By drawing on fieldwork data, Savvides examines the bourgeoning 3D printing culture in Hackerspaces, Makerspaces and Fab Labs.

Fused Deposition Modeling Based 3D Printing Harshit K. Dave 2021-04-21 This book covers 3D printing activities by fused deposition modeling process. The two introductory chapters discuss the principle, types of machines and raw materials, process parameters, defects, design variations and simulation methods. Six chapters are devoted to experimental work related to process improvement, mechanical testing and characterization of the process, followed by three chapters on post-processing of 3D printed components and two chapters addressing sustainability concerns. Seven chapters discuss various applications including composites, external medical devices, drug delivery system, orthotic inserts, watertight components and 4D printing using FDM process. Finally, six chapters are dedicated to the study on modeling and optimization of FDM process using computational models, evolutionary algorithms, machine learning, metaheuristic approaches and optimization of layout and tool path.

3D Printing of Pharmaceuticals Abdul W. Basit 2018-08-06 3D printing is forecast to revolutionise the pharmaceutical sector, changing the face of medicine development, manufacture and use. Potential applications range from pre-clinical drug development and dosage form design through to the fabrication of functionalised implants and regenerative medicine. Within clinical pharmacy practice, printing technologies may finally lead to the concept of personalised medicines becoming a reality. This volume aims to be the definitive resource for anyone thinking of developing or using 3D printing technologies in the pharmaceutical sector, with a strong focus on the translation of printing technologies to a clinical setting. This text brings together leading experts to provide extensive information on an array of 3D printing techniques, reviewing the current printing technologies in the pharmaceutical manufacturing supply chain, in particular, highlighting the state-of-the-art applications in medicine and discussing modern drug product manufacture from a regulatory perspective. This book is a highly valuable resource for a range of demographics, including academic researchers and the pharmaceutical industry, providing a comprehensive inventory detailing the current and future applications of 3D printing in pharmaceuticals. Abdul W. Basit is Professor of Pharmaceutics at the UCL School of Pharmacy, University College London. Abdul's research sits at the interface between pharmaceutical science and gastroenterology, forging links between basic science and clinical outcomes. He leads a large and multidisciplinary research group, and the goal of his work is to further the understanding of gastrointestinal physiology by fundamental research. So far, this knowledge has been translated into the design of new technologies and improved disease treatments, many of which are currently in late-stage clinical trials. He has published over 350 papers, book chapters and abstracts and delivered more than 250 invited research presentations. Abdul is also a serial entrepreneur and has filed 25 patents and founded 3 pharmaceutical companies (Kuecept, Intract Pharma, FabRx). Abdul is a frequent speaker at international conferences, serves as a consultant to many pharmaceutical companies and is on the advisory boards of scientific journals, healthcare organisations and charitable bodies. He is the European Editor of the International Journal of Pharmaceutics. Abdul was the recipient of the Young Investigator Award in Pharmaceutics and Pharmaceutical Technology from the American Association of Pharmaceutical Scientists (AAPS) and is the only non-North American scientist to receive this award. He was also the recipient of the Academy of Pharmaceutical Sciences (APS) award. Simon Gaisford holds a Chair in Pharmaceutics and is Head of the Department of Pharmaceutics at the UCL School of Pharmacy, University College London. He has published 110 papers, 8 book chapters and 4 authored books. His research is focused on novel technologies for manufacturing medicines, particularly using ink-jet printing and 3D printing, and he is an expert in the physico-chemical characterisation of compounds and formulations with thermal methods and calorimetry.

Microfluidics and Lab-on-a-chip Andreas Manz 2020-09-24 Microfluidic technology is revolutionising a number of scientific fields, including chemistry, biology, diagnostics, and engineering. The ability to manipulate fluids and objects within networks of micrometre-scale channels allows reductions in processing and analysis times, reagent and sample consumption, and waste production, whilst allowing fine control and monitoring of chemical or biological processes. The integration of multiple components and processes enable "lab-on-a-chip" devices and "micro total analysis systems" that have applications ranging from analytical chemistry, organic synthesis, and clinical diagnostics to cell biology and tissue engineering. This concise, easy-to-read book is perfectly suited for instructing newcomers on the most relevant and important aspects of this exciting and dynamic field, particularly undergraduate and postgraduate students embarking on new studies, or for those simply interested in learning about this widely applicable technology. Written by a team with more than 20 years of experience in microfluidics research and teaching, the book covers a range of topics and techniques including fundamentals (e.g. scaling laws and flow effects), microfabrication and materials, standard operations (e.g. flow control, detection methods) and applications. Furthermore, it includes questions and answers that provide for the needs of students and teachers in the area.

Additive Manufacturing Technologies Ian Gibson 2020-11-10 This textbook covers in detail digitally-driven methods for adding materials together to form parts. A conceptual overview of additive manufacturing is given, beginning with the fundamentals so that readers can get up to speed quickly. Well-established and emerging applications such as rapid prototyping, micro-scale manufacturing, medical applications, aerospace manufacturing, rapid tooling and direct digital manufacturing are also discussed. This book provides a comprehensive overview of additive manufacturing technologies as well as relevant supporting technologies such as software systems, vacuum casting, investment casting, plating, infiltration and other systems. Reflects recent developments and trends and adheres to the ASTM, SI and other standards; Includes chapters on topics that span the entire AM value chain, including process selection, software, post-processing, industrial drivers for AM, and more; Provides a broad range of technical questions to ensure comprehensive understanding of the concepts covered.

The Digital Transformation of Logistics Mac Sullivan 2021-03-30 The digital transformation is in full swing and fundamentally changes how we live, work, and communicate with each other. From retail to finance, many industries see an inflow of new technologies, disruption through innovative platform business models, and employees struggling to cope with the significant shifts occurring. This Fourth Industrial Revolution is predicted to also transform Logistics and Supply Chain Management, with delivery systems becoming automated, smart networks created everywhere, and data being collected and analyzed universally. The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution provides a holistic overview of this vital subject clouded by buzz, hype, and misinformation. The book is divided into three themed-sections: Technologies such as self-driving cars or virtual reality are not only electrifying science fiction lovers anymore, but are also increasingly presented as cure-all remedies to supply chain challenges. In The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution, the authors peel back the layers of excitement that have grown around new technologies such as the Internet of Things (IoT), 3D printing, Robotic Process Automation (RPA), Blockchain or Cloud computing, and show use cases that give a glimpse about the fascinating future we can expect. Platforms that allow businesses to centrally acquire and manage their logistics services disrupt an industry that has been relationship-based for centuries. The authors discuss smart contracts, which are one of the most exciting applications of Blockchain, Software as a Service (SaaS) offerings for freight procurement, where numerous data sources can be integrated and decision-making processes automated, and marine terminal operating systems as an integral node for shipments. In The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution, insights are shared into the cold chain industry where companies respond to increasing quality demands, and how European governments are innovatively responding to challenges of cross-border eCommerce. People are a vital element of the digital transformation and must be on board to drive change. The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution explains how executives can create sustainable impact and how competencies can be managed in the digital age - especially for sales executives who require urgent upskilling to remain relevant. Best practices are shared for organizational culture change, drawing on studies among senior leaders from the US, Singapore, Thailand, and Australia, and for managing strategic alliances with logistics service providers to offset risks and create cross-functional, cross-company transparency. The Digital Transformation of Logistics: Demystifying Impacts of the Fourth Industrial Revolution provides realistic insights, a ready-to-use knowledge base, and a working vocabulary about current activities and emerging trends of the Logistics industry. Intended readers are supply chain professionals working for manufacturing, trading, and freight forwarding companies as well as students and all interested parties.

Additive Manufacturing Amit Bandyopadhyay 2015-12-01 The field of additive manufacturing has seen explosive growth in recent years due largely in part to renewed interest from the manufacturing sector. Conceptually, additive manufacturing, or industrial 3D printing, is a way to build parts without using any part-specific tooling or dies from the computer-aided design (CAD) file of the part. Today, most engineered devices are 3D printed first to check their shape, size, and functionality before large-scale production. In addition, as the cost of 3D printers has come down significantly, and the printers' reliability and part quality have improved, schools and universities have been investing in 3D printers to experience, explore, and innovate with these fascinating additive manufacturing technologies. Additive Manufacturing highlights the latest advancements in 3D printing and additive manufacturing technologies. Focusing on additive manufacturing applications rather than on core 3D printing technologies, this book: Introduces various additive manufacturing technologies based on their utilization in different classes of materials Discusses important application areas of additive manufacturing, including medicine, education, and the space industry Explores regulatory challenges associated with the emergence of additive manufacturing as a mature technological platform By showing how 3D printing and additive manufacturing technologies are currently used, Additive Manufacturing not only provides a valuable reference for veteran researchers and those entering this exciting field, but also encourages innovation in future additive manufacturing applications.

Lamination Charles Osheku 2018-03-21 The field of lamination has developed significantly over the past 5000 years. Nowadays, we have a humongous array of structures and technological systems where composite laminates are applied. From the viewpoint of structural mechanics, an interface slip motion between two laminated structures, such as beam plate and plate in the presence of dry friction, can be utilized for slip damping systems. By scientific definition, slip damping is a mechanism exploited for dissipating noise and vibration energy in machine structures and systems. Researchers have developed several mathematical models for noise dissipation, minimization and complete vibration isolation laminated mechanisms. The purpose of this book is to describe new concepts of producing laminated structures and possible modern engineering applications.

3D Printing in Biomedical Engineering Sunpreet Singh 2020-07-16 This book gives a comprehensive overview of the rapidly evolving field of three-dimensional (3D) printing, and its increasing applications in the biomedical domain. 3D printing has distinct advantages like improved quality, cost-effectiveness, and higher efficiency compared to traditional manufacturing processes. Besides these advantages, current challenges and opportunities regarding choice of material, design, and efficiency are addressed in the book. Individual chapters also focus on select areas of applications such as surgical guides, tissue regeneration, artificial scaffolds and implants, and drug delivery and release. This book will be a valuable source of information for researchers and professionals interested in the expanding biomedical applications of 3D printing.

Future Foods Heimo Mikkola 2017-10-04 It is anticipated that by 2050 we will have nine billion people to feed-how can we manage? As scarcities of agricultural land, water, forest, fishery and biodiversity resources, as well as nutrients and nonrenewable energy are foreseen, insect rearing is one solution for food and feed security in the future. In this book, we have nine chapters ranging from mushroom, insect, and earthworm farming to smart packaging and 3D printing of future foods. However, because of their biological composition, several issues should be considered, such as microbial safety, toxicity, palatability, and the presence of inorganic compounds. Specific health implications ought to be kept in mind especially if mushrooms, earthworms, or insects are reared on waste products. Allergies induced through insects' ingestion also deserve attention. A possible HACCP plan has been described considering pre-requirements in insect production and transformation.

Biomedical Applications of Polymeric Materials and Composites Raju Francis 2016-12-19 With its content taken from only the very latest results, this is an extensive summary of the various polymeric materials used for biomedical applications. Following an introduction listing various functional polymers, including conductive, biocompatible and conjugated polymers, the book goes on to discuss different synthetic polymers that can be used, for example, as hydrogels, biochemical sensors, functional surfaces, and natural degradable materials. Throughout, the focus is on applications, with worked examples for training purposes as well as case studies included. The whole is rounded off with a look at future trends.

The 3D Printing Handbook Ben Redwood 2018-03 The 3D Printing Handbook provides practical advice on selecting the right technology and how-to design for 3D printing, based upon first-hand experience from the industry's leading experts.

3D Printing for the Radiologist, E-Book Nicole Wake 2021-05-27 Comprehensive, yet concise, 3D Printing for the Radiologist presents an overview of three-dimensional printing at the point of care. Focusing on opportunities and challenges in radiology practice, this up-to-date reference covers computer-aided design principles, quality assurance, training, and guidance for integrating 3D printing across radiology subspecialties. Practicing and trainee radiologists, surgeons, researchers, and imaging specialists will find this an indispensable resource for furthering their understanding of the current state and future outlooks for 3D printing in clinical medicine. Covers a wide range of topics, including basic principles of 3D printing, quality assurance, regulatory perspectives, and practical implementation in medical training and practice. Addresses the challenges associated with 3D printing integration in clinical settings, such as reimbursement, regulatory issues, and training. Features concise chapters from a team of multidisciplinary chapter authors, including practicing radiologists, researchers, and engineers. Consolidates today's available information on this timely topic into a single, convenient, resource.

Practical 3D Printers Brian Evans 2012-09-25 Desktop or DIY 3D printers are devices you can either buy preassembled as a kit, or build from a collection of parts to design and print physical objects including replacement household parts, custom toys, and even art, science, or engineering projects. Maybe you have one, or maybe you're thinking about buying or building one. Practical 3D Printers takes you beyond how to build a 3D printer, to calibrating, customizing, and creating amazing models, including 3D printed text, a warship model, a robot platform, windup toys, and arcade-inspired alien invaders. You'll learn about the different types of personal 3D printers and how they work; from the MakerBot to the RepRap printers like the Huxley and Mendel, as well as the whiteAnt CNC featured in the Apress book Printing in Plastic. You'll discover how easy it is to find and design 3D models using web-based 3D modeling, and even how to create a 3D model from a 2D image. After learning the basics, this book will walk you through building multi-part models with a steampunk warship project, working with meshes to build your own action heroes, and creating an autonomous robot chassis. Finally, you'll find even more bonus projects to build, including wind-up walkers, faceted vases for the home, and a handful of useful upgrades to modify and improve your 3D printer.

Research and Development Management Tugrul Daim 2017-05-23 This book introduces readers to essential technology assessment and forecasting tools, demonstrating their use on the basis of multiple cases. As organizations in the high-tech industry need to be able to assess emerging technologies, the book presents cases in which formal decision-making models are developed, providing a framework for decision-making in the context of technology acquisition and development. Applications of different technology forecasting tools are also discussed for a range of technologies

and sectors, providing a guide to keep R&D organizations abreast of technological trends that affect their business. As such, the book offers a valuable the theoretical and practical reference guide for R&D managers responsible for emerging and future technologies.

Personal Fabrication Patrick Baudisch 2017-05-08 While fabrication technologies have been in use in industry for several decades, expiring patents have recently allowed the technology to spill over to technology-enthusiastic "makers." Personal Fabrication looks at the massive, disruptive changes that are likely to be seen in interactive computing, as well as to computing as a whole. It discusses six main challenges that need to be addressed for this change to take place, and explains researchers in HCI will play a key role in tackling these challenges.

Fundamentals of 3D Food Printing and Applications Fernanda C. Godoi 2018-11-02 Fundamentals of 3D Food Printing and Applications provides an update on this emerging technology that can not only create complex edible shapes, but also enable the alteration of food texture and nutritional content required by specific diets. This book discusses 3D food printing technologies and their working mechanisms within a broad spectrum of application areas, including, but not limited to, the development of soft foods and confectionary designs. It provides a unique and contemporary guide to help correlate supply materials (edible inks) and the technologies (e.g., extrusion and laser based) used during the construction of computer-aided 3D shapes. Users will find a great reference that will help food engineers and research leaders in food science understand the characteristics of 3D food printing technologies and edible inks. Details existing 3D food printing techniques, with an in-depth discussion on the mechanisms of formation of self-supporting layers Includes the effects of flow behaviour and viscoelastic properties of printing materials Presents strategies to enhance printability, such as the incorporation of hydrocolloids and lubricant enhancers 3D printing features of a range of food materials, including cereal based, insect enriched, fruits and vegetables, chocolate and dairy ingredients Business development for chocolate printing and the prospects of 3D food printing at home for domestic applications Prosumer-driven 3D food printing Safety and labelling of 3D printed food

Wohlers Report 2014 Terry T. Wohlers 2014

Marketing in a Digital World Aric Rindfleisch 2019-09-19 Marketing in a Digital World consists of nine essays on how the digital revolution has affected marketing theory and practice. Leading marketing scholars, including several editors of premier academic journals, provide fresh insights for both scholars and managers seeking to enhance their understanding of marketing in a digital world.

3D Printing in Space Committee on Space-Based Additive Manufacturing 2014-09-29 Additive manufacturing has the potential to positively affect human spaceflight operations by enabling the in-orbit manufacture of replacement parts and tools, which could reduce existing logistics requirements for the International Space Station and future long-duration human space missions. The benefits of in-space additive manufacturing for robotic spacecraft are far less clear, although this rapidly advancing technology can also potentially enable space-based construction of large structures and, perhaps someday, substantially in the future, entire spacecraft. Additive manufacturing can also help to reimagine a new space architecture that is not constrained by the design and manufacturing confines of gravity, current manufacturing processes, and launch-related structural stresses. The specific benefits and potential scope of additive manufacturing remain undetermined. The realities of what can be accomplished today, using this technology on the ground, demonstrate the substantial gaps between the vision for additive manufacturing in space and the limitations of the technology and the progress that has to be made to develop it for space use. "3D Printing in Space" evaluates the prospects of in-space additive manufacturing. This report examines the various technologies available and currently in development, and considers the possible impacts for crewed space operations and robotic spacecraft operations. Ground-based additive manufacturing is being rapidly developed by industry, and "3D Printing in Space" discusses government-industry investments in technology development. According to this report, the International Space Station provides an excellent opportunity for both civilian and military research on additive manufacturing technology. Additive manufacturing presents potential opportunities, both as a tool in a broad toolkit of options for space-based activities and as a potential paradigm-changing approach to designing hardware for in-space activities. This report makes recommendations for future research, suggests objectives for an additive manufacturing roadmap, and envisions opportunities for cooperation and joint development.

Handbook of Research on Entrepreneurship, Innovation, and Internationalization Teixeira, Nuno Miguel 2019-06-28 In a global and increasingly competitive world, companies must be aware of important drivers. Entrepreneurship and innovation are important contributions to the development of economies and creation of employment, gaining relevance in the business context due to a more complex market and needs for higher differentiation. The Handbook of Research on Entrepreneurship, Innovation, and Internationalization provides key data to business managers on dealing with entrepreneurship, as well as for creating networks and complementarities for leveraging the firm? s activity in order to help plan and control innovation and internationalization processes to avoid risk and increase the firm? s value. The content within this publication includes topics such as family business, economics, and business education. It is designed for entrepreneurs, managers, researchers, academicians, and students.

High-Performance Composite Structures A. Praveen Kumar 2021-12-08 This book covers advanced 3D printing processes and the latest developments in novel composite-based printing materials, thus enabling the reader to understand and benefit from the advantages of this groundbreaking technology. The rise in ecological anxieties has forced scientists and researchers from all over the world to find novel lightweight materials. Therefore, it is necessary to expand knowledge about the processing, applications, and challenges of 3D printing of composite materials to expanding the range of their application. This book presents an extensive survey on recent improvements in the research and development of additive manufacturing technologies that are used to make composite structures for various applications such as electronic, aerospace, construction, and biomedical applications. Advanced printing techniques including fused deposition modeling (FDM), selective laser sintering (SLS), selective laser melting (SLM), electron beam melting (EBM), inkjet 3D printing (3DP), stereolithography (SLA), and 3D plotting will be covered and discussed thoroughly in this book. This book also focuses the recent advances and challenges in polymer nanocomposite and introduces potential applications of these materials in various sectors.

Rapid Prototyping & Manufacturing Paul Francis Jacobs 1992 This turnkey technology source provides an introduction to rapid prototyping and manufacturing (RP&M) with emphasis on Stereolithography which represents the majority of all rapid prototyping systems currently in place. The content is based on theory, analysis and experiment with extensive test data, including select case studies from the automotive, simultaneous engineering, and medical sectors.

3D Concrete Printing Technology Jay G. Sanjayan 2019-02-15 3D Concrete Printing Technology provides valuable insights into the new manufacturing techniques and technologies needed to produce concrete materials. In this book, the editors explain the concrete printing process for mix design and the fresh properties for the high-performance printing of concrete, along with commentary regarding their extrudability, workability and buildability. This is followed by a discussion of three large-scale 3D printings of ultra-high performance concretes, including their processing setup, computational design, printing process and materials characterization. Properties of 3D-printed fiber-reinforced Portland cement paste and its flexural and compressive strength, density and porosity and the 3D-printing of hierarchical materials is also covered. Explores the factors influencing the mechanical properties of 3D printed products out of magnesium potassium phosphate cement material Includes methods for developing Concrete Polymer Building Components for 3D Printing Provides methods for formulating geopolymers for 3D printing for construction applications

Additive Manufacturing – Developments in Training and Education Eujin Pei 2018-06-30 This book provides an overview of training and teaching methods, as well as education strategies, for Additive Manufacturing (AM) and its application in different business sectors. It presents real-world applications and case studies to demonstrate the key practical and theoretical fundamentals of AM training, written by international experts from the field. Additive Manufacturing is a rapidly developing technology, and having a well-trained workforce is essential. Accordingly, readers are introduced to new training approaches and recent breakthroughs that can facilitate and accelerate the design, application and implementation of AM. The book's contributors discuss many topics to provide readers a fundamental grasp of AM, including: • collaboration among educational bodies, and between industry and governments; • strategies for implementing AM training; • new teaching methods; • training programs that provide alternative employment choices; • the need for certification by professional bodies; and • promoting awareness of AM in society. This book offers an excellent source of information for researchers and industrial engineers who are interested in expanding their AM expertise, and learning how to implement it. It will also be of interest to readers who want to learn about the practicalities of adopting training and teaching for AM.

Managing Requirements Knowledge Walid Maalej 2013-06-03 Requirements engineering is one of the most complex and at the same time most crucial aspects of software engineering. It typically involves different stakeholders with different backgrounds. Constant changes in both the problem and the solution domain make the work of the stakeholders extremely dynamic. New problems are discovered, additional information is needed, alternative solutions are proposed, several options are evaluated, and new hands-on experience is gained on a daily basis. The knowledge needed to define and implement requirements is immense, often interdisciplinary and constantly expanding. It typically includes engineering, management and collaboration information, as well as psychological aspects and best practices. This book discusses systematic means for managing requirements knowledge and its owners as valuable assets. It focuses on potentials and benefits of "lightweight," modern knowledge technologies such as semantic Wikis, machine learning, and recommender systems applied to requirements engineering. The 17 chapters are authored by some of the most renowned researchers in the field, distilling the discussions held over the last five years at the MARK workshop series. They present novel ideas, emerging methodologies, frameworks, tools and key industrial experience in capturing, representing, sharing, and reusing knowledge in requirements engineering. While the book primarily addresses researchers and graduate students, practitioners will also benefit from the reports and approaches presented in this comprehensive work.

Factories of the Future Tullio Tolio 2019-02-14 This book is open access under a CC BY 4.0 license.This book presents results relevant in the manufacturing research field, that are mainly aimed at closing the gap between the academic investigation and the industrial application, in collaboration with manufacturing companies. Several hardware and software prototypes represent the key outcome of the scientific contributions that can be grouped into five main areas, representing different perspectives of the factory domain: 1) Evolutionary and reconfigurable factories to cope with dynamic production contexts characterized by evolving demand and technologies, products and

processes.2) Factories for sustainable production, asking for energy efficiency, low environmental impact products and processes, new de-production logics, sustainable logistics.3) Factories for the People who need new kinds of interactions between production processes, machines, and human beings to offer a more comfortable and stimulating working environment.4) Factories for customized products that will be more and more tailored to the final user's needs and sold at cost-effective prices.5) High performance factories to yield the due production while minimizing the inefficiencies caused by failures, management problems, maintenance.This books is primarily targeted to academic researchers and industrial practitioners in the manufacturing domain.

Rapid Prototyping C K Chua 2003-03-03 Latest Edition: 3D Printing and Additive Manufacturing: Principles and Applications (with Companion Media Pack). Fourth edition of Rapid Prototyping. Rapid Prototyping (RP) has revolutionized the landscape of how prototypes and products are made and small batch manufacturing carried out. This book gives a comprehensive coverage of RP and rapid tooling processes, data formats and applications. A CD-ROM, included in the book, presents RP and its principles in an interactive way to augment the learning experience. Special features: Most comprehensive coverage of more than 30 RP SystemsUnderstanding of RP through applicationsIn-depth revelation of the basic principles behind major RP techniquesDiscussion of important issues such as STL file problems of RP partsInteractive CD-ROM to demonstrate the major RP techniquesRP company background information and contact addresses

Mastering 3D Printing Joan Horvath 2014-09-18 Mastering 3D Printing shows you how to get the most out of your printer, including how to design models, choose materials, work with different printers, and integrate 3D printing with traditional prototyping to make techniques like sand casting more efficient. You've printed key chains. You've printed simple toys. Now you're ready to innovate with your 3D printer to start a business or teach and inspire others. Joan Horvath has been an educator, engineer, author, and startup 3D printing company team member. She shows you all of the technical details you need to know to go beyond simple model printing to make your 3D printer work for you as a prototyping device, a teaching tool, or a business machine.

Additive Manufacturing Handbook Adedeji B. Badiru 2017-05-19 Theoretical and practical interests in additive manufacturing (3D printing) are growing rapidly. Engineers and engineering companies now use 3D printing to make prototypes of products before going for full production. In an educational setting faculty, researchers, and students leverage 3D printing to enhance project-related products. Additive Manufacturing Handbook focuses on product design for the defense industry, which affects virtually every other industry. Thus, the handbook provides a wide range of benefits to all segments of business, industry, and government. Manufacturing has undergone a major advancement and technology shift in recent years.

3D Printed Microfluidic Devices Savas Tasoglu 2019-01-10 This book is a printed edition of the Special Issue "3D Printed Microfluidic Devices" that was published in Micromachines

3D Printing in Medicine and Surgery Daniel J. Thomas 2020-08-14 3D Printing in Medicine and Surgery: Applications in Healthcare is an advanced book on surgical and enhanced medical applications that can be achieved with 3D printing. It is an essential handbook for medical practitioners, giving access to a range of practical methods, while also focusing on applied knowledge. This comprehensive resource features practical experiments and processes for preparing 3D printable materials. Early chapters cover foundational knowledge and background reading, while later chapters discuss and review the current technologies used to engineer specific tissue types, experiments and methods, medical approaches and the challenges that lie ahead for future research. The book is an indispensable reference guide to the various methods used by current medical practitioners working at the forefront of 3D printing applications in medicine. Provides a detailed introduction and narrative on how 3-D printing can be used towards developing future medicine-based therapies Covers up-to-date methods across a range of application areas for the first time in book form Presents the only book on all current areas of 3D printing in medicine that is catered to a medical rather than engineering audience

3D and Animated Lenticular Photography Kim Timby 2015

Todd Grimm 2004 User's Guide to Rapid Prototyping will help designers, engineers, executive management, and others in the company understand how to apply rapid prototyping technologies such as 3D printing, stereo-lithography, selective laser sintering, and fused deposition modeling to the product development process. Intertwined with rapid prototyping, the processes of rapid tooling and rapid manufacturing are also discussed. An aid to making informed business decisions, the book provides information about when it may be right to implement rapid prototyping in-house versus going to a service provider. The path through justification, evaluation, and implementation is outlined. Readers will gain insights into the benefits, risks, and limitations of each technology.

3D Printing For Dummies Richard Horne 2017-05-22 The bestselling book on 3D printing 3D printing is one of the coolest inventions we've seen in our lifetime, and now you can join the ranks of businesspeople, entrepreneurs, and hobbyists who use it to do everything from printing foods and candles to replacement parts for older technologies—and tons of mind-blowing stuff in between! With 3D Printing For Dummies at the helm, you'll find all the fast and easy-to-follow guidance you need to grasp the methods available to create 3D printable objects using software, 3D scanners, and even photographs through open source software applications like 123D Catch. Thanks to the growing availability of 3D printers, this remarkable technology is coming to the masses, and there's no time like the present to let your imagination run wild and actually create whatever you dream up—quickly and inexpensively. When it comes to 3D printing, the sky's the limit! Covers each type of 3D printing technology available today: stereolithology, selective sintering, used deposition, and granular binding Provides information on the potential for the transformation of production and manufacturing, reuse and recycling, intellectual property design controls, and the commoditization of products Walks you through the process of creating a RepRap printer using open source designs, software, and hardware Offers strategies for improved success in 3D printing On your marks, get set, innovate!

3D Printing with Biomaterials A.J.M. van Wijk 2015-01-15 Additive manufacturing or 3D printing, manufacturing a product layer by layer, offers large design freedom and faster product development cycles, as well as low startup cost of production, on-demand production and local production. In principle, any product could be made by additive manufacturing. Even food and living organic cells can be printed. We can create, design and manufacture what we want at the location we want. 3D printing will create a revolution in manufacturing, a real paradigm change. 3D printing holds the promise to manufacture with less waste and energy. We can print metals, ceramics, sand, synthetic materials such as plastics, food or living cells. However, the production of plastics is nowadays based on fossil fuels. And that's where we witness a paradigm change too. The production of these synthetic materials can be based also on biomaterials with biomass as feedstock. A wealth of new and innovative products are emerging when we combine these two paradigm changes: 3D printing and biomaterials. Moreover, the combination of 3D printing with biomaterials holds the promise to realize a truly sustainable and circular economy.

User's Guide to Rapid Prototyping