

Sergej Fatikow
Editor

Springer Series in
Advanced Manufacturing

Automated Nanohandling by Microrobots



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Automated Nanohandling By Microrobots Springer Series In Advanced Manufacturing

Sergej Fatikow



Automated Nanohandling By Microrobots Springer Series In Advanced Manufacturing:

Automated Nanohandling by Microrobots Sergej Fatikow, 2008 This book provides an introduction to robot based nanohandling It presents work on the development of a versatile microrobot based nanohandling robot station inside a scanning electron microscope SEM Those unfamiliar with the subject will find the text which is complemented throughout by the extensive use of illustrations clear and simple to understand The author has published two books and numerous papers in the field and holds more than 50 patents

Automated Nanohandling by Microrobots Sergej Fatikow, 2007-10-25 What I want to talk about is the problem of manipulating and controlling things on a small scale stated Richard P Feynman at the beginning of his visionary talk There s Plenty of Room at the Bottom given on December 29th 1959 at the annual meeting of the American Physical Society at the California Institute of Technology Today almost half a century after this first insight into unlimited opportunities on the nanoscale level we still want and have to talk about the same issue The problem identified by Feynmann turned out to be a very difficult one due to a lack of understanding of the underlying phenomena in the nanoworld and a lack of suitable nanohandling methods This book addresses the second issue and tries to contribute to the tremendous effort of the research community in seeking proper solutions in this field Automated robot based nanomanipulation is one of the key challenges of microsystem technology and nanotechnology which has recently been addressed by a rising number of R D groups and companies all over the world Controlled reproducible assembly processes on the nanoscale will enable high throughput manufacturing of revolutionary products and open up new application fields The ultimate goal of these research activities is the development of automated nanomanipulation processes to build a bridge between existing precise handling strategies for micro and nanoscale objects and aspired high throughput fabrication of micro and nanosystems

Handbook of Nanophysics Klaus D. Sattler, 2010-09-17 The tools of nanodiagnostics nanotherapy and nanorobotics are expected to revolutionize the future of medicine leading to presymptomatic diagnosis of disease highly effective targeted treatment therapy and minimum side effects Handbook of Nanophysics Nanomedicine and Nanorobotics presents an up to date overview of the application of nan

Nanofabrication Using Focused Ion and Electron Beams Ivo Utke, Stanislav Moshkalev, Phillip Russell, 2012-05 This book comprehensively reviews the achievements and potentials of a minimally invasive three dimensional and maskless surface structuring technique operating at nanometer scale by using the interaction of focused ion and electron beams FIB FEB with surfaces and injected molecules

Intelligent Industrial Systems: Modeling, Automation and Adaptive Behavior Rigatos, Gerasimos, 2010-06-30 In recent years there has been growing interest in industrial systems especially in robotic manipulators and mobile robot systems As the cost of robots goes down and become more compact the number of industrial applications of robotic systems increases Moreover there is need to design industrial systems with intelligence autonomous decision making capabilities and self diagnosing properties Intelligent Industrial Systems Modeling Automation and Adaptive Behavior analyzes current trends in industrial systems

design such as intelligent industrial and mobile robotics complex electromechanical systems fault diagnosis and avoidance of critical conditions optimization and adaptive behavior This book discusses examples from major areas of research for engineers and researchers providing an extensive background on robotics and industrial systems with intelligence autonomy and adaptive behavior giving emphasis to industrial systems design

Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management Lyes Benyoucef, Bernard Grabot, 2010-05-10 Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management addresses prominent concepts and applications of AI technologies in the management of networked manufacturing enterprises The aim of this book is to align latest practices innovation and case studies with academic frameworks and theories where AI techniques are used efficiently for networked manufacturing enterprises More specifically it includes the latest research results and projects at different levels addressing quick response system theoretical performance analysis performance and capability demonstration The role of emerging AI technologies in the modelling evaluation and optimisation of networked enterprises activities at different decision levels is also covered Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management is a valuable guide for postgraduates and researchers in industrial engineering computer science automation and operations research

*Intelligent Production Machines and Systems - 2nd I*PROMS Virtual International Conference 3-14 July 2006* Duc T. Pham, Eldaw E. Eldukhri, Anthony J. Soroka, 2011-07-28 I PROMS 2005 is an online web based conference It provides a platform for presenting discussing and disseminating research results contributed by scientists and industrial practitioners active in the area of intelligent systems and soft computing techniques such as fuzzy logic neural networks evolutionary algorithms and knowledge based systems and their application in different areas of manufacturing Comprised of 100 peer reviewed articles this important resource provides tools to help enterprises achieve goals critical to the future of manufacturing I PROMS is an European Union funded network that involves 30 partner organizations and more than 130 researchers from universities research organizations and corporations State of the art research results Leading European researchers and industrial practitioners Comprehensive collection of indexed and peer reviewed articles in book format supported by a user friendly full text CD ROM with search functionality

Precision Nanometrology Wei Gao, 2010-06-14 Precision Nanometrology describes the new field of precision nanometrology which plays an important part in nanoscale manufacturing of semiconductors optical elements precision parts and similar items It pays particular attention to the measurement of surface forms of precision workpieces and to stage motions of precision machines The first half of the book is dedicated to the description of optical sensors for the measurement of angle and displacement which are fundamental quantities for precision nanometrology The second half presents a number of scanning type measuring systems for surface forms and stage motions The systems discussed include error separation algorithms and systems for measurement of straightness and roundness the measurement of micro aspherics systems based on scanning probe microscopy and scanning

image sensor systems Precision Nanometrology presents the fundamental and practical technologies of precision nanometrology with a helpful selection of algorithms instruments and experimental data It will be beneficial for researchers engineers and postgraduate students involved in precision engineering nanotechnology and manufacturing Mass Customization Flavio S. Fogliatto, Giovanni J.C. da Silveira, 2010-11-09 Mass customization MC has been hailed as a successful operations strategy across manufacturing and service industries for the past three decades However the wider implications of using MC approaches in the broader industrial and economic environment are not yet clearly understood Mass Customization Engineering and Managing Global Operations presents emerging research on the role of MC and personalization in today's international operations context The chapters cover MC in the context of global industrial economics and operations Moreover the book discusses MC topics that are relevant to the manufacturing and service sectors such as product platforms learning curve modeling additive manufacturing and service customization Case studies in manufacturing e.g. apparel and transportation and services e.g. banking and virtual worlds are also included Mass Customization Engineering and Managing Global Operations is a valuable text for mass customization researchers and practitioners Researchers will find a selection of chapters prepared by internationally renowned authors comprising most of their recent research in MC Engineering professionals will be drawn by the vivid discussion of operational aspects and methods of MC as well as by the selection of cases illustrating their practical application *Geometry of Single-point Turning Tools and Drills* Viktor P. Astakhov, 2010-07-29 Geometry of Single Point Turning Tools and Drills outlines clear objectives of cutting tool geometry selection and optimization using multiple examples to provide a thorough explanation It addresses several urgent problems that many present day tool manufacturers tool application specialists and tool users are facing It is both a practical guide offering useful practical suggestions for the solution of common problems and a useful reference on the most important aspects of cutting tool design application and troubleshooting practices Covering emerging trends in cutting tool design cutting tool geometry machining regimes and optimization of machining operations Geometry of Single Point Turning Tools and Drills is an indispensable source of information for tool designers manufacturing engineers research workers and students

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