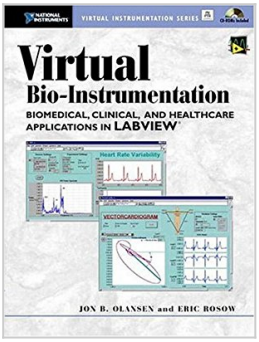

Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW

By Jon B. Olansen, Eric Rosow

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Features: applications across diverse medical specialties; detailed design guides for LabView and Bio Bench applications; and laboratory, clinical, and healthcare applications. This book accompanies a CD containing numerous VI's with source code, and several demos. It includes examples that cover a variety of medical specialties.

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Editorial Review

From the Back Cover

Bringing the power of virtual instrumentation to the biomedical community.

- Applications across diverse medical specialties
- Detailed design guides for LabVIEW and BioBench applications
- Hands-on problem-solving throughout the book
- Laboratory, clinical, and healthcare applications
- Numerous VI's with source code, plus several demos, are available on the book's web site

Virtual instrumentation allows medical researchers and practitioners to combine the traditional diagnostic tools with advanced technologies such as databases, Active X, and the Internet. In both laboratory and clinical environments, users can interact with a wealth of disparate systems, facilitating better, faster, and more informed decision making. *Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW* is the first book of its kind to apply VI technology to the biomedical field.

- Hands-on problems throughout the book demonstrate immediate practical uses
- Examples cover a variety of medical specialties
- Detailed design instructions give the inside view of LabVIEW and BioBench applications

Both students and practicing professionals will appreciate the practical applications offered for modeling fundamental physiology, advanced systems analysis, medical device development and testing, and even hospital management and clinical engineering scenarios.

About the Author

Jon B. Olansen began his career as a NASA flight controller, supporting 32 Space Shuttle missions. He obtained his Ph.D. as a National Instruments Fellow at Rice University, where he specialized in biomedical experimentation in electrophysiology and cardiovascular hemodynamics. He has since returned to NASA, representing the Astronaut Office in the design, development, and operation of human life sciences experiments destined for the International Space Station.

Eric Rosow has over 16 years of experience in biomedical engineering and life science applications of virtual instrumentation. He is Director of Biomedical Engineering at Hartford Hospital, where he introduced virtual instrumentation into the hospital environment. He is also a co-founder of Premise Development Corporation, a software company for the biomedical and healthcare industries, and has co-developed numerous virtual instrument solutions for leading healthcare institutions throughout the world.

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Preface

Graphical Programming and Virtual Instrumentation: Applying Revolutionary Techniques to Advance the Healthcare Industry

Over the last decade, the graphical programming revolution has empowered engineers to develop customized systems the same way the spreadsheet has empowered business managers to analyze financial data. This software technology has resulted in another type of revolution—the virtual instrumentation revolution, which is rapidly changing the instrumentation industry by driving down costs without sacrificing quality.

Virtual instrumentation can be defined asA layer of software and/or hardware added to a general-purpose computer in such a fashion that users can interact with the computer as though it were their own custom-designed traditional electronic instrument.

The major benefits of virtual instrumentation include increased performance and reduced costs. Because the user controls the technology through software, the flexibility of virtual instrumentation is unmatched by traditional instrumentation. The modular, hierarchical programming environment of virtual instrumentation is inherently reusable and reconfigurable.

Virtual instrumentation applications have encompassed nearly every industry, including the telecommunications, automotive, semiconductor, and biomedical industries. In the fields of healthcare and biomedical engineering, virtual instrumentation has empowered developers and end-users to conceive of, develop, and implement a wide variety of research-based biomedical applications and executive information tools. These applications fall into several categories, including clinical research, equipment testing and quality assurance, data management, and performance improvement.

This book opens the boundless potential of virtual instrumentation (VI) into the wide variety of disciplines that exist within the biomedical domain. The power of virtual bio-instrumentation (VBI) is demonstrated not only through the interfacing of VI with traditional medical instruments and devices but also by effectively leveraging other technologies, including the Internet, machine vision, ActiveX components, and integrated database applications. We use specific examples within this book to highlight VBI applications in the laboratory and clinical environment, connectivity to patient information systems, computerized maintenance and management systems (CMMS), and business intelligence and decision support applications. Each VBI application consists of detailed descriptions and, in many cases, interactive demonstrations of how virtual instrument solutions have been conceived and developed to meet specific end-user requirements within the biomedical and healthcare arena. Collectively, these applications support better, faster, and data-driven decisions, thereby enhancing clinical outcomes and reducing costs to the participating healthcare institutions.

As practicing biomedical engineers and virtual instrumentation "evangelists," we wrote this book to inform and, hopefully, inspire you about the ever-expanding capabilities of virtual instrumentation systems within the biomedical and healthcare fields. Many traditional books on bio-instrumentation concentrate on theoretical principles--this book focuses entirely on real-world applications. We refer to these applications as virtual bio-instrumentation, or VBI. Throughout each section and chapter, you'll discover many practical biomedical applications that have been created with LabVIEW. Each example will provide detailed explanations of its design, implementation processes, and utility. We particularly emphasize methods for measurement, analysis, presentation, and distribution of biomedical and health system information. Throughout this book, we have striven to identify common challenges associated with the measurement, analysis, and presentation of information; and we provide you with practical solutions and proven problem-solving techniques from experienced scientists, engineers, clinicians, and healthcare administrators.

Regardless of your application or your experience with LabVIEW, it is our sincere wish that, through this book and the virtual instrument (VI) examples contained on the accompanying CD-ROMs, you will gain insight and appreciation for the many ways in which virtual instrumentation can be applied to the biomedical and healthcare industry.

Users Review

From reader reviews:

Joshua Montgomery:

This Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW book is absolutely not ordinary book, you have after that it the world is in your hands. The benefit you obtain by reading this book is definitely information inside this e-book incredible fresh, you will get information which is getting deeper a person read a lot of information you will get. This particular Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW without we know teach the one who reading through it become critical in contemplating and analyzing. Don't be worry Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW can bring any time you are and not make your tote space or bookshelves' become full because you can have it within your lovely laptop even phone. This Virtual Bio-Instrumentation: Biomedical, Clinical, and Healthcare Applications in LabVIEW having good arrangement in word in addition to layout, so you will not truly feel uninterested in reading.

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Shelia Sepulveda:

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