

**Making Everything Easier!™**

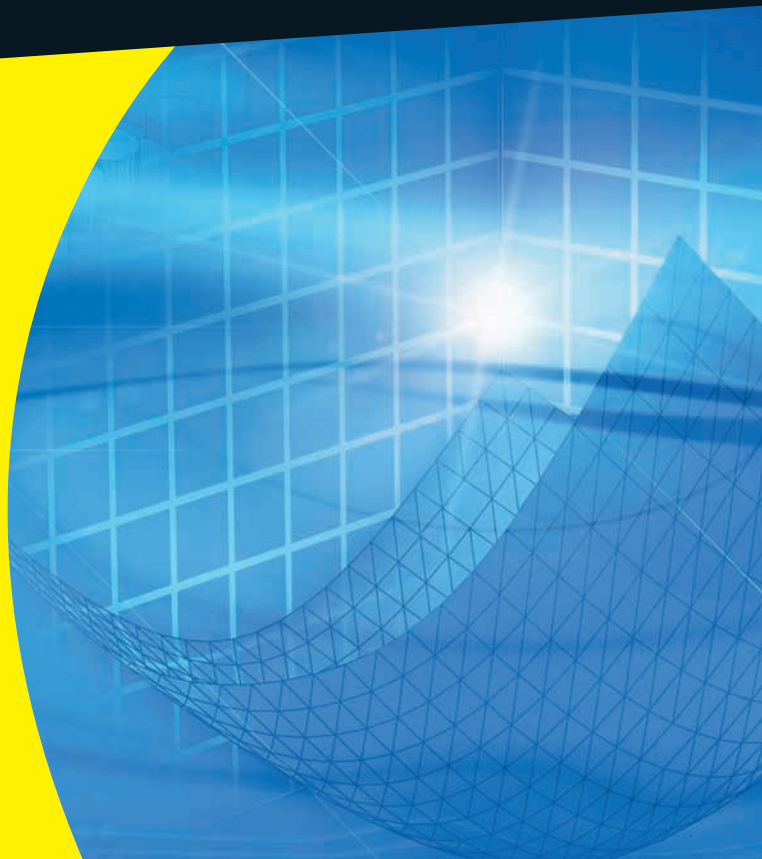
**2nd Edition**

# **SAS<sup>®</sup>** **FOR** **DUMMIES<sup>®</sup>**

## **Learn to:**

- Use SAS® 9 statistical and analytical tools
- Get various types of data into the software
- Use Web tools to produce reports
- Work with operational, financial, performance, and sales data

**Stephen McDaniel**  
**Chris Hemedinger**



# Get More and Do More at Dummies.com®



Start with **FREE** Cheat Sheets

Cheat Sheets include

- Checklists
- Charts
- Common Instructions
- And Other Good Stuff!

**To access the Cheat Sheet created specifically for this book, go to  
[www.dummies.com/cheatsheet/sas](http://www.dummies.com/cheatsheet/sas)**

## Get Smart at Dummies.com

Dummies.com makes your life easier with 1,000s of answers on everything from removing wallpaper to using the latest version of Windows.

Check out our

- Videos
- Illustrated Articles
- Step-by-Step Instructions

Plus, each month you can win valuable prizes by entering our Dummies.com sweepstakes.\*

Want a weekly dose of Dummies? Sign up for Newsletters on

- Digital Photography
- Microsoft Windows & Office
- Personal Finance & Investing
- Health & Wellness
- Computing, iPods & Cell Phones
- eBay
- Internet
- Food, Home & Garden

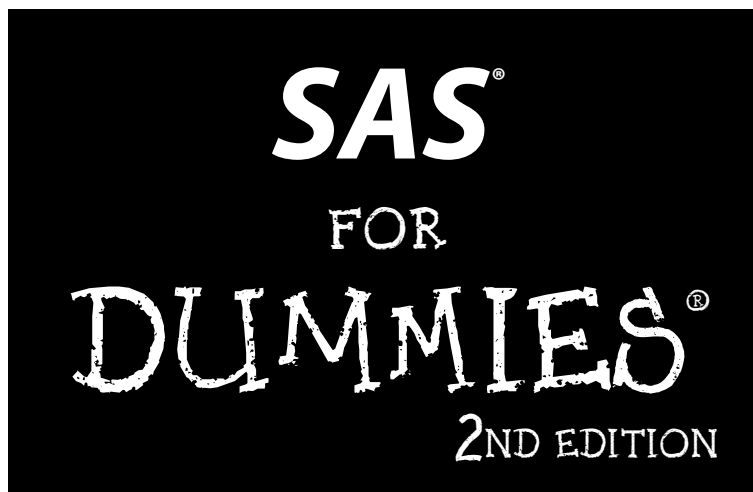
## Find out “HOW” at Dummies.com

\*Sweepstakes not currently available in all countries; visit [Dummies.com](http://Dummies.com) for official rules.



**SAS<sup>®</sup>**  
FOR  
**DUMMIES<sup>®</sup>**  
2ND EDITION





**by Stephen McDaniel and Chris Hemedinger**



WILEY

Wiley Publishing, Inc.

## **SAS® For Dummies®, 2nd Edition**

Published by  
**Wiley Publishing, Inc.**  
111 River Street  
Hoboken, NJ 07030-5774

[www.wiley.com](http://www.wiley.com)

Copyright © 2010 by Wiley Publishing, Inc., Indianapolis, Indiana

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

**Trademarks:** Wiley, the Wiley Publishing logo, For Dummies, the Dummies Man logo, A Reference for the Rest of Us!, The Dummies Way, Dummies Daily, The Fun and Easy Way, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries, and may not be used without written permission. SAS is a registered trademark of SAS Institute, Inc. All other trademarks are the property of their respective owners. Wiley Publishing, Inc., is not associated with any product or vendor mentioned in this book.

**LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.**

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

For technical support, please visit [www.wiley.com/techsupport](http://www.wiley.com/techsupport).

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Control Number: 2010922564

ISBN: 978-0-470-53968-2

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1



# About the Authors

**Stephen McDaniel** has 20 years of experience as a teacher, a consultant, a leader, an innovator, and an author in the fields of visual analytics, business intelligence, data warehousing, and data mining. Stephen is the author of *Rapid Graphs with Tableau Software* and is the cofounder of Freakalytics®, LLC. Freakalytics offers public training, on-site training, and expert consulting that delivers “Rapid Analytics to Explore, Understand, Communicate & Act.”

Previously, Stephen was the senior manager in charge of the SAS Enterprise Guide development team and the SAS Add-In for Microsoft Office development team at SAS. Stephen has been a SAS user for more than 20 years and has experience with more than 50 organizations as a statistician, statistical programmer, product manager, and manager of data warehousing and business intelligence. You can reach him at [www.Freakalytics.com](http://www.Freakalytics.com).

**Chris Hemedinger** is a senior software manager in the Research and Development division of SAS. Chris began his career at SAS in 1993 as a technical writer, creating such hits as *SAS Companion for the OS/2 Environment* (remember OS/2?) and *SAS Companion for the Microsoft Windows Environment*. In 1997, he became involved in a prototype project to make SAS easier to use for nonprogrammers, and that project evolved into the hugely popular SAS Enterprise Guide, a product that Chris has worked with ever since. Chris can be found performing entertaining SAS tricks at [blogs.sas.com/sasdummy](http://blogs.sas.com/sasdummy).



# *Dedication*

I want to thank my wonderful wife and business partner, Eileen, for her patience, support, insights, and encouragement throughout the writing process!—Stephen McDaniel

For my beautiful (and patient) wife, Gail, and our inquisitive three daughters: Maggie, Evelyn, and Gwen. Listen up, girls: Despite what you hear from me, it's usually *not* polite to call somebody a “dummy.”—Chris Hemedinger



# *Authors' Acknowledgments*

The first edition of *SAS For Dummies* took years to assemble, even with the help of dozens of people. It proved popular beyond our wildest expectations. With such momentum, you might think that this second edition would be a piece of cake and practically write itself. Think again.

We, the humble authors, could not have planned and completed this book without the tremendous help of our editors at Wiley and at SAS Press. From Wiley, we relied on Jodi Jensen and Katie Feltman for their coordination and Susan Pink for her thoughtful editing. At SAS Press, Stacey Hamilton served as our acquisitions editor, with help and guidance from Stephenie Joyner and Julie Platt.

Especially for this second edition, we had great technical and content feedback from our panel of reviewers: Marilyn Adams, Marie Dexter, and Jennifer Tamburro at SAS and Eileen McDaniel at Freakalytics.

## **Publisher's Acknowledgments**

We're proud of this book; please send us your comments at <http://dummies.custhelp.com>. For other comments, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

Some of the people who helped bring this book to market include the following:

### ***Acquisitions and Editorial***

**Project Editor:** Susan Pink

**Acquisitions Editor:** Katie Feltman

**Copy Editor:** Susan Pink

**Editorial Manager:** Jodi Jensen

**Editorial Assistant:** Amanda Graham

**Sr. Editorial Assistant:** Cherie Case

**Cartoons:** Rich Tennant  
([www.the5thwave.com](http://www.the5thwave.com))

### ***Composition Services***

**Project Coordinator:** Patrick Redmond

**Layout and Graphics:** Yovonne Grego,  
Joyce Haughey, Christine Williams

**Proofreader:** Shannon Ramsey

**Indexer:** Steve Rath

---

## **Publishing and Editorial for Technology Dummies**

**Richard Swadley**, Vice President and Executive Group Publisher

**Andy Cummings**, Vice President and Publisher

**Mary Bednarek**, Executive Acquisitions Director

**Mary C. Corder**, Editorial Director

## **Publishing for Consumer Dummies**

**Diane Graves Steele**, Vice President and Publisher

## **Composition Services**

**Debbie Stailey**, Director of Composition Services

# Contents at a Glance

<b><i>Introduction .....</i></b>	<b><i>1</i></b>
<b><i>Part I: Welcome to SAS!.....</i></b>	<b><i>7</i></b>
Chapter 1: Touring the Wonderful World of SAS.....	9
Chapter 2: Your Connection to SAS: Using SAS Enterprise Guide.....	19
Chapter 3: Six-Minute Abs: Getting Miraculous Results with SAS .....	43
<b><i>Part II: Gathering Data and Presenting Information .....</i></b>	<b><i>73</i></b>
Chapter 4: Accessing Data: Oh, the Choices! .....	75
Chapter 5: Managing Data: I Can Do That? .....	95
Chapter 6: Show Me a Report in Less Than a Minute .....	123
Chapter 7: Graphs: More Value with SAS.....	143
<b><i>Part III: Impressing Your Boss with Your SAS Business Intelligence.....</i></b>	<b><i>161</i></b>
Chapter 8: A Painless Introduction to Analytics .....	163
Chapter 9: More Analytics to Enlighten and Entertain .....	177
Chapter 10: Data Mining: Making the Leap from Guesses to Smart Choices .....	187
<b><i>Part IV: Enhancing and Sharing Your SAS Masterpieces.....</i></b>	<b><i>199</i></b>
Chapter 11: Leveraging Work from SAS to Those Less Fortunate.....	201
Chapter 12: Use OLAP and Impress Your Coworkers .....	221
Chapter 13: Supercharge Microsoft Office with SAS .....	237
Chapter 14: Web Reporting Fever: SAS Has That Covered.....	257
<b><i>Part V: Getting SAS Ready to Rock and Roll .....</i></b>	<b><i>269</i></b>
Chapter 15: Setting Up SAS.....	271
Chapter 16: SAS Programming for the Faint of Heart.....	283
Chapter 17: The New World Meets the Old: Programmers and SAS Enterprise Guide.....	301
<b><i>Part VI: The Part of Tens .....</i></b>	<b><i>315</i></b>
Chapter 18: Ten SAS Enterprise Guide Productivity Tips .....	317
Chapter 19: Ten Tips for Administrators.....	323
Chapter 20: Ten (or More) Web Resources for Extra Information.....	333
<b><i>Index .....</i></b>	<b><i>337</i></b>



# Table of Contents

## ***Introduction ..... 1***

About This Book .....	1
Conventions Used in This Book.....	2
What You're Not to Read.....	3
Foolish Assumptions.....	3
How This Book Is Organized .....	3
Part I: Welcome to SAS! .....	3
Part II: Gathering Data and Presenting Information .....	4
Part III: Impressing Your Boss with Your SAS Business Intelligence .....	4
Part IV: Enhancing and Sharing Your SAS Masterpieces .....	4
Part V: Getting SAS Ready to Rock and Roll .....	4
Part VI: The Part of Tens.....	5
Icons Used in This Book .....	5
Where to Go from Here.....	5

## ***Part I: Welcome to SAS! ..... 7***

### **Chapter 1: Touring the Wonderful World of SAS ..... 9**

Isn't SAS Just for Gurus? .....	10
Data, Data Everywhere — But Not Where I Need It! .....	10
Data Summaries and Reporting .....	12
The Secret Sauce: Analytics to Optimize the Present and Predict the Future .....	13
Sharing the SAS Wealth.....	15
What the IT Department Needs to Know.....	17
Checking Out Real-World Success Stories .....	18

### **Chapter 2: Your Connection to SAS: Using SAS Enterprise Guide . . . 19**

Using SAS Enterprise Guide, the Swiss Army Knife of SAS.....	20
Using SAS Enterprise Guide for the first time .....	20
Changing what you see onscreen .....	22
Accessing and Managing Data .....	23
Opening SAS data sets.....	23
Filtering SAS data.....	26
Visualizing Success with Charts .....	30
Creating Reports for Even the Crankiest Manager.....	33
Creating a list report with totals.....	33
Getting your hands dirty with code .....	36
Putting it all together — no scissors or glue necessary .....	37