# Data Analysis & Visualization for IT & Information Security Professionals

# Introduction

## Purpose of This Book

## The Power of a Story

## Examples of Storytelling in IT

### Submitting a budget proposal

### Communicating the reason for an outage

### Capacity planning

## Examples of Storytelling in Information Security

### Understanding “normal”

### Creating an incident narrative

### Effectively assessing and communicating risk

## Tools of the Trade

# Part 1: Finding the Story Chapter 1: Data Analysis Fundamentals

## The Role of Analysis in IT & Security

### Strengths & limitations of human intuition

### Proactive vs reactive analysis

### Instilling a culture of analytics

## How to Approach Data Analysis

### Strengths & limitations of statistics

### Beginning with a question

### Has the question been answered already?

### Is the question worth answering?

### Data sourcing & handling

### Cataloging your data sources

### Evaluating the efficacy of your data sources

## The Role of Visualization in Data Analysis

### Realizing that you are the audience

### The importance of iterative exploration

# Chapter 2: Working With Data

## Data Wrangling

### Cleansing data

### Normalizing data

### Storing data for processing and archival

### Avoiding common mistakes

## Harnessing the Power of “Little Data”

### Descriptive statistics

### Understanding continuous vs categorical variables

### Performing common operations on continuous data

### Performing common operations on categorical data

### Correlation, probability and margin of error

### Communicating uncertainty vs variability

### Example: Estimating system uptime

### Communicating complexity

## Analyzing at Scale

### Choosing the right tools and techniques

### Turning “big data” into “little data”

# Part 2: Telling the Story Chapter 3: The Craft of Communication

## The Elements of Communication

### Senders

### Channels

### Recipients

## Characteristics of Successful Communication

### Context

### Clarity

### Integrity

### Style

## Common Pitfalls in Communication

### The curse of knowledge

### Communicating to yourself

### One story fits all

# Chapter 4: Communicating Visually

## Visual Communication is Not a Natural Skill

## Cognitive Science: Decoding the Decoding Process

### Signal Detection & Magnitude Estimation

### Weber’s Law / Steven’s Power Law

### Comparing & Ranking Elementary Perceptual Tasks:

### Cleveland & McGill / Mackinlay

### Encoding Multiple Attributes

### Shape & Lightness / Size & Value /

### Orientation & Size / Shape & Size /

### Length & Length / Angle & Angle

### Understanding Gestalt

### Figure/Ground / Proximity / Similarity /

### Connectedness / Continuity / Closure /

### Common Fate / Transparency

### Visual Processing

### Pre-attentive vs Attentive / Eye Tracking /Using Color Well

# Chapter 5: Producing Pragmatic Visualizations

## Creating and Working with Foundational Visualizations

### Bar charts

### Line charts

### Scatterplots

### Histograms

### Density plots

### Box/violin plots

## Visualizing Complexity

### Recognizing complexity in IT & Security

### Data volume

### Data diversity

### Interconnectedness

### Visualizing networks

### Radial graphs

### Force directed graphs

### Chord diagrams

### Hive plots

### Exploring multivariate data

### Trellis plots

### Scatterplot matrices

### Small multiples

### Parallel coordinate plots

## Adding Animation and Interaction

### Stop motion techniques

### Deliberate vs gratuitous animation

### Giving the audience control

# Chapter 6: Designing for Monitoring

## The Evolution & Elevation of the Dashboard in IT & Security

## Dashboard Data Selection

### What Are You Monitoring For?

### Determining if the Data You Have is the Data You Need

## Creating Effective Dashboards

### Focusing on Speed of Inference

### Highlighting Critical Differences

### Applying Visualization Fundamentals to Your Design

### Knowing When To Use Words & Numbers vs Pictures

## Presenting Dashboards

### Producing the Printed Dashboard

### Designing Dashboards for the Big Screen

### Avoiding “Gotchas” in Mobile Dashboards

### Knowing When to Add Interaction

# Conclusion Chapter 7: Playing the Role of Storyteller

## Training for Your Role

### Creating a cycle of continuous improvement

### Breaking free of constraints

## Avoiding the Pinocchio Syndrome

## Setting Up a Feedback Loop

# Chapter 8: Resources

## Communication Resources

## Data Analysis Resources

## Visualization Resources