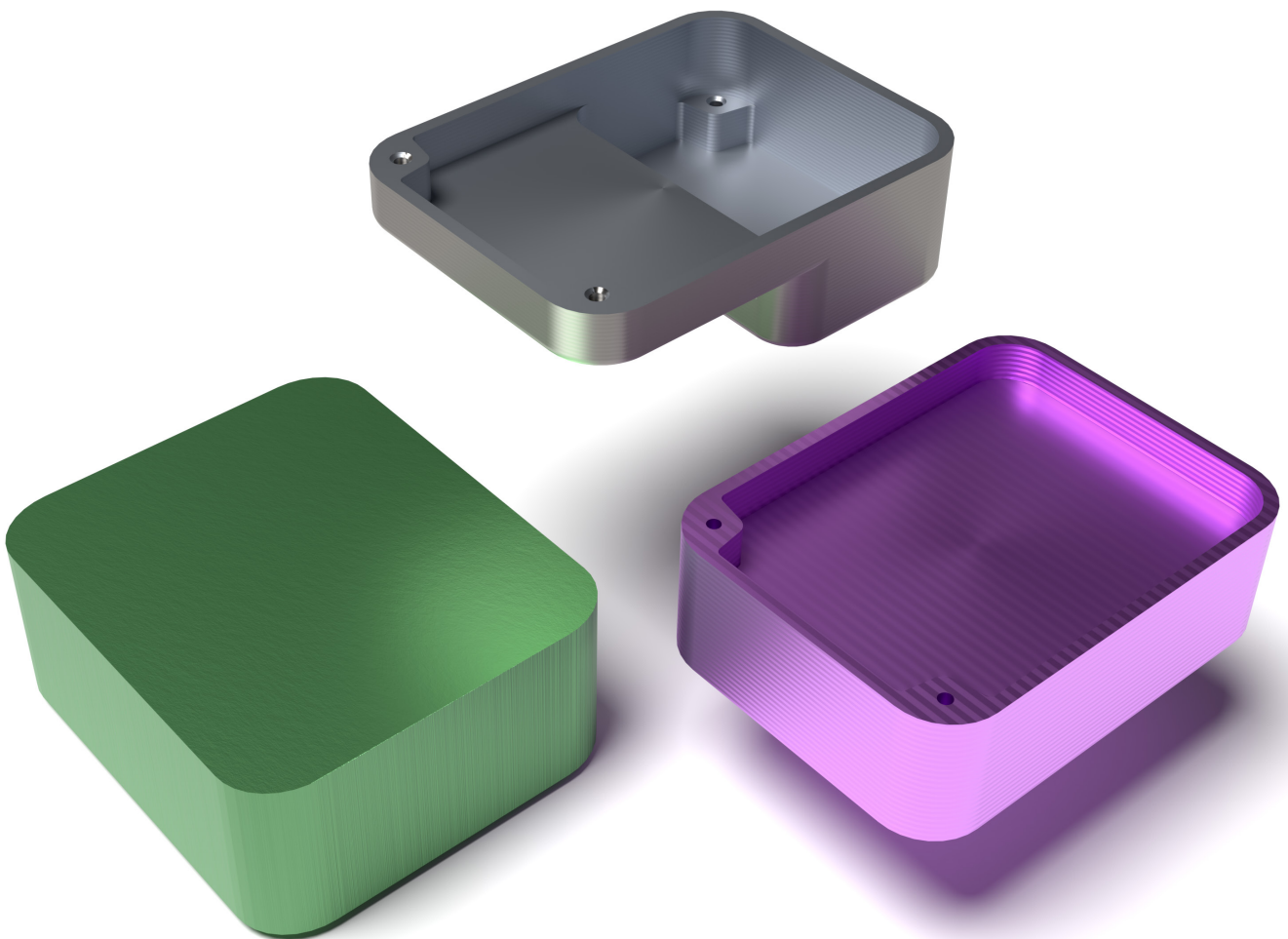


MACHINING SIMULATION USING **SOLIDWORKS® CAM 2023**



Kuang-Hua Chang, Ph.D.

Visit the following websites to learn more about this book:



[amazon.com](https://www.amazon.com)

[Google books](https://books.google.com)

[BARNES & NOBLE](https://www.barnesandnoble.com)

Table of Contents

Preface	i
Acknowledgments	iv
About the Author	v
Table of Contents	vi
Lesson 1: Introduction to SOLIDWORKS CAM.....	1
1.1 Overview of the Lesson	1
1.2 Virtual Machining.....	2
1.3 SOLIDWORKS CAM Packages	4
1.4 User Interface.....	6
1.5 Opening Lesson 1 Model and Entering SOLIDWORKS CAM	9
1.6 Extracting Machinable Features.....	11
1.7 Technology Database.....	11
1.8 Tutorial Examples.....	12
Lesson 2: NC Part Programming.....	17
2.1 Overview of the Lesson	17
2.2 Basics of NC Machines.....	18
2.3 NC Words and NC Blocks	19
2.4 Alphabet Address Codes.....	20
2.5 Preparatory Functions or G Words	21
2.6 Machine Functions or M Words	26
2.7 NC Part Programming.....	27
2.8 Tool Functions and Compensations.....	31
2.9 NC Program Review and Verification	34
2.10 Exercises	35
Lesson 3: SOLIDWORKS CAM NC Editor	37
3.1 Overview of the Lesson	37
3.2 Capabilities of SOLIDWORKS CAM NC Editor	37
3.3 User Interface.....	38
3.4 NC Program Examples.....	39
3.5 Example 1: Trajectory Milling.....	39
3.6 Example 2: Hole Drilling.....	44
3.7 Example 3: Profile Milling	47
3.8 Example 4: Turn Finish Operation.....	51
3.9 G-code Viewers and Editors	54
3.10 Exercises	57
Lesson 4: A Quick Run-Through.....	59
4.1 Overview of the Lesson	59
4.2 The Simple Plate Example.....	59
4.3 Using SOLIDWORKS CAM.....	60
4.4 The Post Process and G-code.....	71
4.5 Reviewing Machining Time.....	72
4.6 Exercises	75

Lesson 5: Machining 2.5 Axis Features.....	77
5.1 Overview of the Lesson	77
5.2 The 2.5 Axis Features Example	78
5.3 Using SOLIDWORKS CAM.....	80
5.4 Creating a Face Milling Operation.....	84
5.5 Re-Ordering Machining Operations.....	86
5.6 Reviewing Machining Time.....	89
5.7 The Post Process and G-code.....	91
5.8 Stepping Through the Toolpath	91
5.9 Exercises	91
Lesson 6: Machining a Freeform Surface and Limitations.....	93
6.1 Overview of the Lesson	93
6.2 The Freeform Surface Example	94
6.3 Using SOLIDWORKS CAM.....	96
6.4 Selecting Avoid Feature to Correct the Toolpath	101
6.5 Modifying the Area Clearance Toolpath.....	103
6.6 Reviewing the Machined Part Quality	106
6.7 Reviewing and Modifying the Z Level Operation	108
6.8 Exercises	111
Lesson 7: Multipart Machining.....	113
7.1 Overview of the Lesson	113
7.2 The Multipart Machining Example.....	113
7.3 Using SOLIDWORKS CAM.....	115
7.4 The Sequence of Part Machining	119
7.5 The G-code.....	120
7.6 Exercises	124
Lesson 8: Multiplane Machining.....	127
8.1 Overview of the Lesson	127
8.2 The Multiplane Machining Example	128
8.3 Using SOLIDWORKS CAM.....	131
8.4 The Sequence of Part Machining	137
8.5 Reviewing the G-code.....	139
8.6 Exercises	142
Lesson 9: Tolerance-Based Machining.....	145
9.1 Overview of the Lesson	145
9.2 The Machining Examples	146
9.3 Using <i>DimXpert for Parts</i> to Define Tolerances.....	151
9.4 Tolerance-Based Machining Settings	154
9.5 Carrying Out Tolerance-Based Machining	157
9.6 Interpreting Information in the Tolerance Range Tab	161
9.7 Exercises	163
Lesson 10: Turning a Stepped Bar.....	165
10.1 Overview of the Lesson	165
10.2 The Stepped Bar Example.....	166
10.3 Using SOLIDWORKS CAM.....	168
10.4 Reviewing the G-code of Turning Sequences.....	177
10.5 Exercises	178

Lesson 11: Turning a Stub Shaft.....	179
11.1 Overview of the Lesson	179
11.2 The Stub Shaft Example	180
11.3 Using SOLIDWORKS CAM.....	182
11.4 Cutting the Thread	188
11.5 Boring the Hole.....	195
11.6 Exercises	196
 Lesson 12: Machining a Robotic Forearm Member	 197
12.1 Overview of the Lesson	197
12.2 The Forearm Members of the SoRo Robotic Arm	198
12.3 Manufacturing of the Rover Forearm Members	200
12.4 Five Machining Setups.....	200
12.5 Modifications of SOLIDWORKS CAM Operations	206
12.6 Post-Processing and G-code Modification.....	208
12.7 Machined Part Clean-up.....	208
12.8 Lessons Learned.....	208
 Lesson 13: Turning a Scaled Baseball Bat	 211
13.1 Overview of the Lesson	211
13.2 The Scaled Baseball Bat Solid Model	211
13.3 Turning the Scaled Baseball Bat.....	212
13.4 Machining Operations.....	212
13.5 Modifications of SOLIDWORKS CAM Operations	214
13.6 Post-Processing and G-code Modification.....	218
13.7 Turning on a HAAS CNC Lathe.....	219
13.8 Lessons Learned.....	219
 Lesson 14: Third-Party CAM Modules	 221
14.1 Overview of the Lesson	221
14.2 The Freeform Surface Milling Example	222
14.3 Removing SOLIDWORKS CAM.....	223
14.4 CAMWorks.....	223
14.5 HSMWorks	231
14.6 Mastercam for SOLIDWORKS	242
14.7 Exercises	259
 Appendix A. Machinable Features.....	 261
Appendix B: Machining Operations	269
Appendix C: Alphabetical Address Codes.....	271
Appendix D: Preparatory Functions	275
Appendix E: Machine Functions.....	277