Exploring Arduino®: Tools and Techniques for Engineering Wizardry

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To my grandmother, whose lifelong curiosity and encouragement inspires me to be a better person every day.
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Courtesy of Jeremy Blum
Jeremy Blum recently received his Master’s degree in Electrical and Computer Engineering from Cornell University, where he previously received his Bachelor’s degree in the same field. At Cornell, he oversaw the design and creation of several sustainable buildings around the world and domestically through his founding and leadership of Cornell University Sustainable Design, a nationally recognized sustainable design organization that has been specifically lauded by the CEO of the U.S. and World Green Building Councils. In that vein, Jeremy has applied his passion for electrical engineering to design solar home energy monitoring systems, revolutionary fiber-optic LED lighting systems, and sun-tracking smart solar panels. He is also responsible for helping to start a first-of-its-kind entrepreneurial co-working space that contributes to the development of dozens of student start-ups (including some of his own creation) every year.

Jeremy has designed award-winning prosthetic control methods, gesture-recognition systems, and building-automation systems, among many other things. He designed the electronics for the MakerBot Replicator 3D printers (which are used by people around the world, and by notable organizations such as NASA), and the prototype electronics and firmware for the MakerBot Digitizer 3D Scanner. As a researcher in the renowned Creative Machines Lab, he has contributed to the creation of robots that can assemble themselves, self-learning quadrupedal robots, and 3D printers that redefine personal manufacturing. He has presented this research in peer-reviewed journals and at conferences as far away as India.

Jeremy produces YouTube videos that have introduced millions of people to engineering and are among the most popular Arduino tutorials on the Internet. He is well known within the international open source and “maker” communities for his development of open source hardware projects and tutorials that
have been featured on the Discovery Channel, and have won several awards and hack-a-thons. Jeremy was selected by the American Institute of Electrical and Electronics Engineers as the 2012 New Face of Engineering.

He offers engineering consulting services through his firm, Blum Idea Labs LLC, and he teaches engineering and sustainability to young students in New York City. Jeremy’s passion is improving people’s lives and our planet through creative engineering solutions. You can learn more about Jeremy and his work at his website: www.jeremyblum.com.

About the Technical Editor

Scott Fitzgerald is an artist and educator who has been using the Arduino platform as a teaching tool and in his practice since 2006. He has taught physical computing in the Interactive Telecommunications Program (ITP) of New York University since 2005, introducing artists and designers to microcontrollers. Scott works for the Arduino team, documenting new products and creating tutorials to introduce people to the platform. He was technical editor of the second edition of Making Things Talk in 2011, and he authored the book that accompanies the official Arduino Starter Kit in 2012.
First, I must thank my friends at Wiley publishing for helping to make this possible: Mary James, for encouraging me to write this book in the first place; and Jennifer Lynn, for keeping me on track as I worked through writing all the chapters. I also owe a big thanks to Scott Fitzgerald for his critical eye in the technical editing of this book.

Had it not been for the great folks at element14, I may never have gotten into producing my Arduino Tutorial Series, a prelude to the book you are about to read. Sabrina Deitch and Sagar Jethani, in particular, have been wonderful partners with whom I’ve had the privilege to work.

I wrote the majority of this book while simultaneously completing my Master’s degree and running two companies, so I owe a tremendous amount of gratitude to my professors and peers who put up with me while I tried to balance all of my responsibilities.

Finally, I want to thank my family, particularly my parents and my brother, David, whose constant encouragement reminds me why I do the things I do.
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