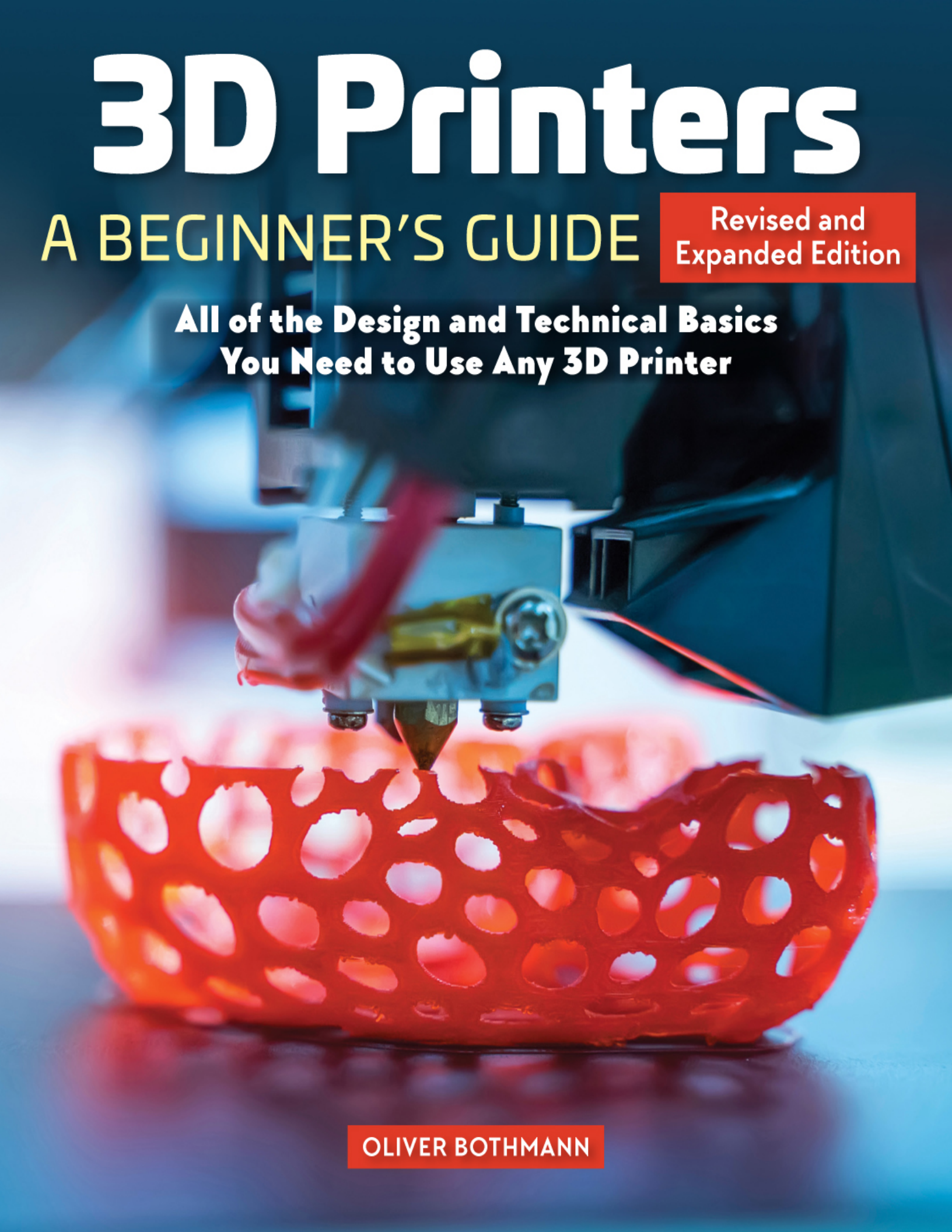
3D Printers

A BEGINNER'S GUIDE

Revised and Expanded Edition

All of the Design and Technical Basics You Need to Use Any 3D Printer



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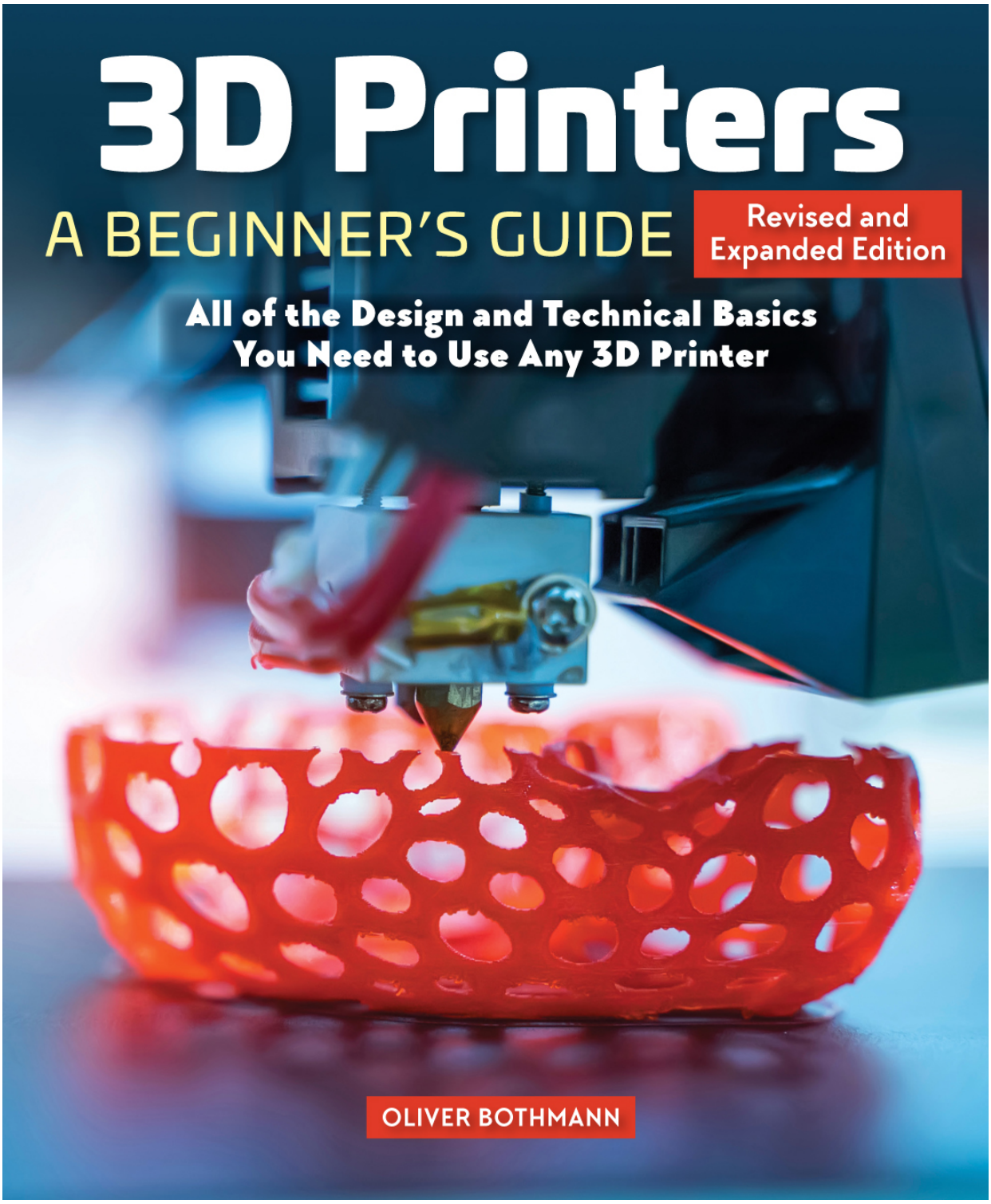
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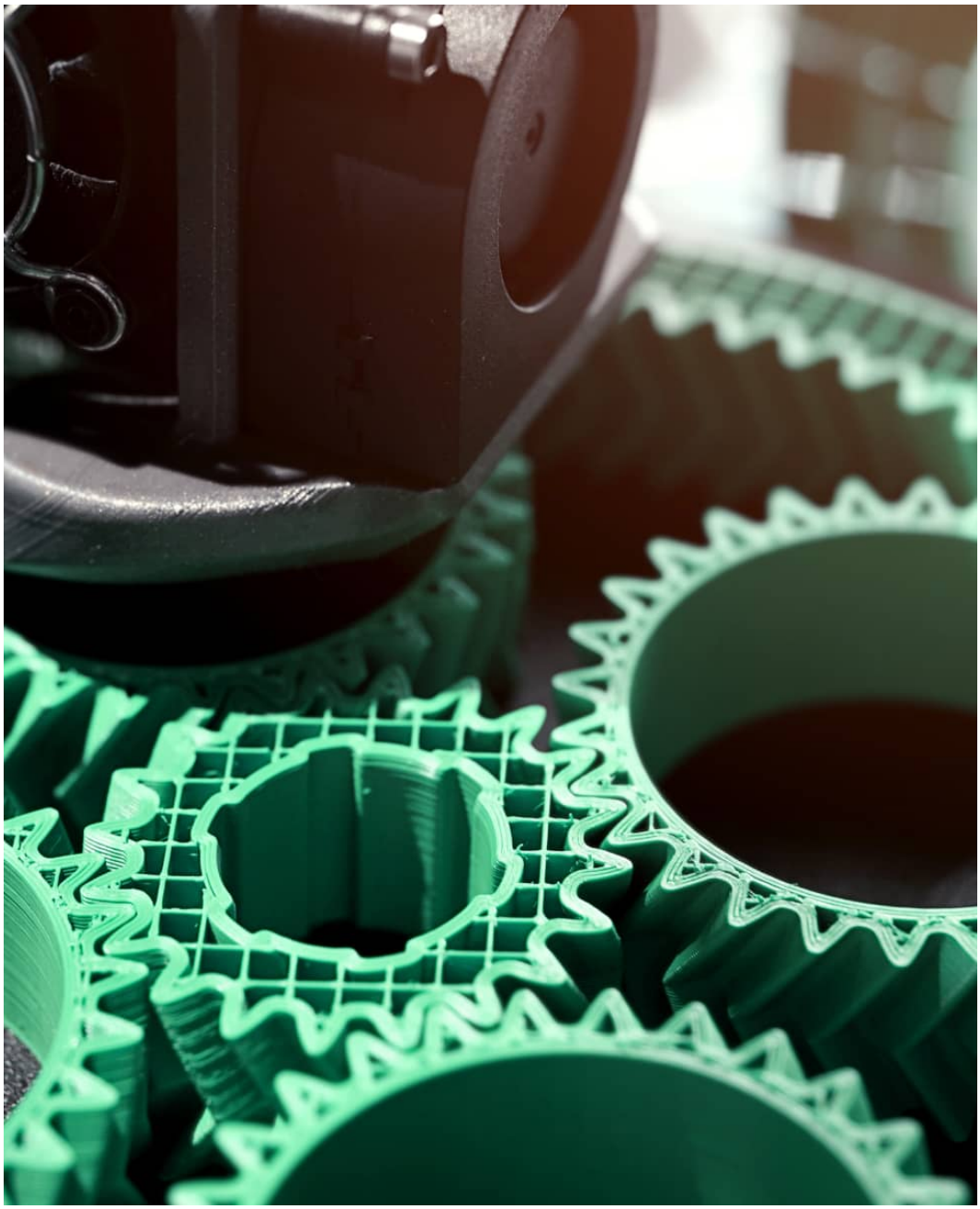
FOX CHAPEL PUBLISHING



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Introduction

Stories about 3D printing appear almost everywhere in the media today. They are often about the danger of weapons being printed at home or things like “You could print yourself a pizza!” This may be interesting for readers of newspapers or TV-channel viewers, but it is not the most important aspect of 3D printing.

This new technology is a revolution compared with production processes as we know them. In the future, there may even be 3D printer, similar to a copy shop. You can already send a digital file of a part, which you have created, to a company that will print it in plastic, steel, brass… or even in titanium, gold, or ceramic.

We can also use these 3D printing techniques at home. However, even with this limited material, it is possible to print almost anything. You can print decorative objects and special toys. It is also possible to print spare parts for nearly everything, such as an old radio or your car. You can print personalized objects, like key rings or bracelets, with your name or the name of your friend on them. As you learn more about the technology, you will find there are a lot more things you can do with a 3D printer at home.

This book will guide you through your first steps in 3D printing. It will show you what is possible and what is not. You will be shown what you need to do to make your first 3D-printed part, and what you have to learn to become a 3D printing professional.

Ten years after the first edition of this book, the content has been completely revised, because ten years is a lot in the field of additive manufacturing. Much has evolved, numerous work steps have become easier, and of course, the costs of this technology have also fallen, which makes it usable for a significantly larger group of people. The software in

particular has made a lot of progress, and numerous work steps have been automated. This was taken into account in the revision.

On the hardware side, the significantly better availability of another printing technique—printing with liquid resin, which is exposed to UV light—is an exciting new possibility that has also found its way into the book.

Gallery

Over the past few years, the technology of 3D printing has grown by leaps and bounds. Many companies and individual artists have been working to push the rapidly expanding limits of the field and create unique, often functional, and always impressive items with

their printers of all sizes. Featured in this gallery are just a handful of inspiring examples of stunning pieces.

The MGX Quin lamp creates its visually striking effect through its 3D-printed shade.

(IMAGE COURTESY BATHSHEBA GROSSMAN, *BATHSHEBA.COM .)*

This flexible dress, the Kinematics Dress, is made from interlocking, articulated modules and is printed as one folded piece.

(IMAGE COURTESY NERVOUS SYSTEM, *N-E-R-V-O-U-S.COM* ; PHOTO BY STEVE MARSEL.)

Believe it or not, this vase was 3D-printed in sugar.

(IMAGE COURTESY 3D SYSTEMS, *3DSYSTEMS.COM* .)

One of the largest models of 3D printer available, the BigRep printer, created this side table in one piece. See chapter 2 here for more information about different printers.

(IMAGE COURTESY BIGREP, *BIGREP.COM .*)

The 3D printer in the International Space Station was shipped into space and first used in late 2014. In this photo, Commander Barry “Butch” Wilmore is setting up the machine in its new home.

(IMAGE COURTESY NASA-TV.)

International Space Station Commander Barry “Butch” Wilmore poses with a science sample container, one of the first items to be printed in space. For more 3D printing from NASA, see here .

(IMAGE COURTESY NASA.)