LEARNING MADE EASY

Blender®

ALL-IN-ONE

for dummies®

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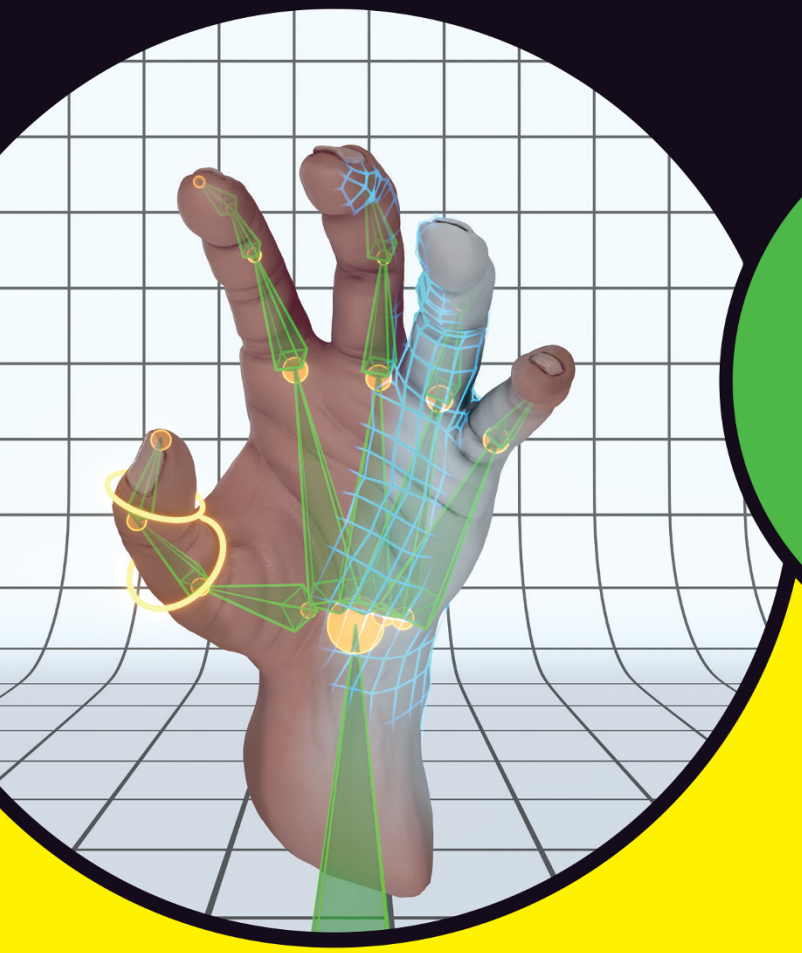

6 Books in one!

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Blender®

ALL-IN-ONE

by Jason van Gumster

for dummies®
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Blender® All-in-One For Dummies®

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Contents at a Glance

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Introduction

Welcome to *Blender All-in-One For Dummies*, your introduction to one of the most well-known free programs for creating 3D computer graphics. With Blender, you can create characters, props, environments, and nearly anything else your imagination can generate. And it's not just about creating objects. You can set them in motion, too. Tell a story in an animation, walk people through a world of your own creation, or add a special effect to some video footage. It's all possible. They still haven't quite designed a way for Blender to give you a foot massage if you've had a bad day, but in all seriousness, it's difficult to imagine a task in computer animation that you can't do with Blender. And just think: the developers of Blender have included all these features in a package you can download for free and run on nearly any computer. Crazy!

Blender sits at a very unique position in the world of 3D computer graphics. In the distant past, to get into 3D modeling and animation, you had only a few options, and most of them were too expensive, too limiting, or — *ahem* — too illegal for people just trying to see what this whole 3D thing was all about. Blender circumvents all those issues because it's free. And not just zero-cost free, but freedom Free. Blender is open source. A world full of developers and users regularly contribute code and documentation to this project, adding enhancements and improvements at a mind-boggling pace.

Of course, 3D computer graphics is a complex topic, and all software of this type is dense with buttons, options, settings, and unique ways of working. Perhaps more than any other program like it, Blender has carried a pretty heavy reputation for being difficult to understand. Blender wasn't typically viewed as software for beginners. But, with every new release, it gets better and better. Of course, there's still a lot in there. That's why this book exists. If I've done my job right, this book will help get you started at a sprint. *Blender All-in-One For Dummies* is not just a book on using Blender. Sure, I explain why things in Blender work in their peculiar Blenderish ways, but I also make a point to explain core principles of 3D computer graphics as they are relevant. There's no use in being able to find a button if you're not really sure what it does or how it works. My hope is that with this combined knowledge, you can actually take advantage of Blender's unique traits to create your own high-quality 3D art as quickly and efficiently as possible. Perhaps you can even become as addicted to it as I have been for the last 25+ years!

About This Book

Blender is an extremely complex program used for the even more complex task of producing high-quality 3D models and animations. In fact, Blender's capabilities have expanded so much since in the three years since *Blender For Dummies, 4th Edition* was released, we couldn't just do a new edition; we had to make it an All-in-One! That said, I can't cover every single feature and button in this powerful tool. For a more comprehensive manual, refer to the excellent online documentation available through Blender's website at `https://docs.blender.org/manual`.

Because I want to bring you up to speed on working in 3D space with Blender so that you can start bringing your ideas to life as soon as possible, I focus on introducing you to the fundamental "Blender way" of working. Not only do I show you *how* something is done in Blender, but I also often take the time to explain *why* things are done a certain way. Hopefully, this approach will put you on the fast track to making awesome work, and also allow you to figure out new parts of Blender on your own when you come across them.

Throughout the book, I refer to the Blender community. Blender's user community is probably one of its most valuable assets. It really is a feature all its own, and I would be remiss to neglect to mention it. Not only do many members of the community create great work, but they also write new code for Blender, write and edit documentation, and help each other improve. And understand that when I make reference to the Blender community, I include you in that community as well. As of right now, you are a *Blenderhead* — a fellow Blender user and, therefore, a member of the Blender community.

Blender is a truly *cross-platform* program running on Linux, Windows, and macOS. Fortunately, not much in Blender differs from one platform to another. However, for the few differences, I'll be sure to point them out for you.

Foolish Assumptions

I've written this book for two sorts of beginners: people who are completely new to the world of 3D and people who know a thing or two about 3D but are completely new to Blender.

Because of the various types of beginners this book addresses, I tend to err on the side of explaining too much rather than too little. If you're someone who

is already familiar with another 3D computer graphics program, such as Maya, Cinema 4D, Houdini, or even an earlier version of Blender, you can probably skip a number of these explanations. Likewise, if you're a complete newbie, you may notice that I occasionally compare a feature in Blender to one in another package. However, that comparison is mostly for the benefit of these other users. I write so that you can understand a concept without having to know any of these other programs.

I do, however, make the assumption that you have at least a basic understanding of your computer. I assume that you know how to use a mouse, and I *highly* recommend that you use a mouse with at least two buttons and a scroll wheel, and that you've configured your operating system to enable the middle- and right-click buttons on your mouse. You *can* use Blender with a one- or two-button mouse or even a laptop trackpad, and I provide workarounds for the unfortunate souls in that grim state (*cough* . . . Mac users . . . *cough*), but it's certainly not ideal.

An exception is if you're using Blender with a drawing tablet like the ones produced by Wacom. Blender is accessible to tablet users and quite useful for tasks like drawing and sculpting. Of course, even though tablets are much less expensive these days than in the past, not everyone has one. For that reason, I focus primarily on using Blender with a mouse, although I will occasionally point out where having a tablet is helpful. Because Blender makes use of all your mouse buttons, I stipulate whether you need to left-click, right-click, or middle-click. And in case you didn't already know, pressing down on your mouse's scroll wheel typically accesses the middle mouse button. I also make use of this cool little arrow (➪) for indicating a sequence of steps. It could be a series of hotkeys to press, menu items to select, or places to look in the Blender interface, but the consistent thing is that all these items are used for steps that you need to perform sequentially rather than simultaneously. For things that have to be done simultaneously like hotkey combinations such as Ctrl+Z for undo, I use a plus symbol (+).

I also assume that you're working with Blender's default settings and theme. You can customize the settings for yourself (in fact, I still use the presets from previous releases of Blender; 20 years of muscle memory doesn't go away easily), but if you do, Blender may not behave exactly like I describe in the book. For that reason, I focus mostly on accessing features through the menu system rather than using hotkeys. Hotkeys are meant to be customized, but the menus in Blender remain a consistent way of accessing features. Bearing in mind the point about Blender's themes, you may notice that the screenshots of Blender's interface are lighter in this book than you see onscreen. If I used Blender's default theme colors, all the figures in the book would appear overly dark. So for the last edition of this book

I created a custom theme with lighter colors that shows up better in print. Since then, that theme has actually been incorporated with Blender and ships with it. If you like the look of it, you can enable the "Print Friendly" theme from the Themes section of Preferences.

Icons Used in This Book

As you flip through this book, icons periodically appear next to some paragraphs. These icons notify you of unique or valuable information on the topic at hand. Sometimes that information is a tip, sometimes it's more detail about how something works, sometimes it's a warning to help you avoid losing data, and sometimes they're images that match icons in Blender's interface (there's a *lot* of them). For the icons that aren't in Blender's interface, the following are descriptions of each icon in this book.

This icon calls out suggestions that help you work more effectively and save time.

This icon marks something that I think you should try to keep in mind while working in Blender. Sometimes it's a random tidbit of information, but more often than not, it's something that you'll run into repeatedly and is, therefore, worth remembering.

Working in 3D can involve some pretty heavy technical information. You can usually work just fine without ever having to know these things, but if you do take the time to understand it, I bet you dollars to donuts that you'll be able to use Blender more effectively.

This icon doesn't show up often, but when it does, I definitely recommend that you pay attention. You won't blow up your computer if you overlook it, but you could lose work.

Blender is a fast-moving target. Quite a bit has changed since the previous edition of this book. These icons point out things that are new or different in Blender so that you can get to be at least as effective (and hopefully *more* effective) with the current version as you were with past versions. Also, because this book focuses on the 3.6 LTS release of Blender, there are some differences that appear in more recent releases. I use this icon to let you know of those as well.

Beyond the Book

Blender All-in-One For Dummies includes the following online goodies only for easy download:

- **Cheat Sheet:** You can find the Cheat Sheet for this book here: `www.dummies.com/article/technology/software/animation-software/blender/blender-for-dummies-cheat-sheet-208646/`, or by going to `www.dummies.com`, typing **blender** in the search box, and clicking Explore Articles.
- **Extras:** I keep and maintain a website at `blenderbasics.com` with additional resources. I have a whole bunch of tutorials, both in written and in video format, specifically for readers of this book. Also, Blender's a big, fast-moving program. I do my best on that site to chronicle changes in Blender that affect the content of this book (and perhaps share a new tip or two as well).

Where to Go from Here

Wondering where to start? The easy answer here would be to say "Just dive on in!" but that's probably a bit too vague. This book is primarily intended as a reference, so if you already know what you're looking for, flip over to the table of contents or index and start soaking in the Blendery goodness.

If you're just starting out, I suggest that you merely turn a couple of pages, start at Chapter 1, and enjoy the ride. And, even if you're the sort of person who knows exactly what you're looking for, take the time to read through other sections of the book. You can find a bunch of valuable little bits of information that may help you work more effectively.

Regardless of how you read this book, though, my one hope is that you find it to be a valuable resource that allows you to flex your creative muscles and, more importantly, have fun doing it.

1 Wrapping Your Brain Around Blender

Contents at a Glance

IN THIS CHAPTER

- Figuring out what Blender is and what it's used for
- Understanding Blender's history
- Getting familiar with the Blender interface

Chapter 1
Discovering Blender

In the world of 3D modeling and animation software, programs have traditionally been expensive — like, thousands-of-dollars-and-maybe-an-arm expensive. That's changed a bit over the years, with software companies moving to more subscription-based ways of selling their programs. The entry cost is lower, but paying each month can still add up pretty quickly. There are *some* valid reasons for the high prices. Software companies spend millions of dollars and countless hours developing these programs. The large production companies that buy this kind of software for their staff, make enough money to afford the high cost, or hire programmers and write their own in-house software.

But what about us, you and me: the little folks? We are the ambitious dreamers with big ideas, high motivation . . . and tight budgets. How can we bring our ideas to life and our stories to screen, even if only on our own computer monitors? Granted, we could shell out the cash (and hopefully keep our arms) for the expensive programs that the pros use. But even then, animation is a highly collaborative art, and it's difficult to produce anything in a reasonable amount of time without some help.

We need quality software and a strong community to work, grow, and evolve with. Fortunately, Blender can provide us with both these things. This chapter is an introduction to Blender, its background, its interface, and its community.

Getting to Know Blender

Blender is a free and open source 3D modeling and animation suite. Yikes! What a mouthful, huh? Put simply, Blender is a computer graphics program that allows you to produce high-quality still images and animations using three-dimensional geometry. It used to be that you'd only see the results of this work in animated feature films or high-budget television shows. These days, it's way more pervasive. Computer-generated 3D graphics are everywhere. Almost every major film and television show involves some kind of 3D computer graphics and animation. (Even sporting events! Pay close attention to the animations that show the scores or players' names.) And it's not just film and TV; 3D graphics play a major role in video games, industrial design, scientific visualization, and architecture (to name just a few industries). In the right hands, Blender is capable of producing this kind of work. With a little patience and dedication, *your* hands can be the right hands.

REMEMBER

One of the things that makes Blender different and special compared to similar 3D software is that it is freely available without cost, and that it's *free and open source* software.

Being free of cost, as well as free (as in freedom) and open source, means that not only can you go to the Blender website (`www.blender.org`) and download the entire program right now without paying anything, but you can also freely download the source or the code that makes up the program. For most programs, the source code is a heavily guarded and highly protected secret that only certain people (mostly programmers hired by the company that distributes the program) can see and modify. But Blender is open source, so anybody can see the program's source code and make changes to it. The benefit is that instead of having the program's guts behind lock and key, Blender can be improved by programmers (and even non-programmers) all over the world!

Because of these strengths, Blender is an ideal program for small animation companies, freelance 3D artists, independent filmmakers, students beginning to learn about 3D computer graphics, and dedicated computer graphics hobbyists. It's also being used (if a bit clandestinely) more and more in larger animation, visual effects, and video game studios because it's relatively easy to modify, has a very responsive development team, and no need for the headache of licensing servers.

Blender, like many other 3D computer graphics applications, has had a reputation for being difficult for new users to understand. At the same time, however, Blender is also known for allowing experienced users to bring their ideas to life quickly. Fortunately, with the help of this book and the regular improvements introduced in each new release of Blender, that gap is becoming much easier to bridge.

Discovering Blender's origins and the strength of the Blender community

The Blender you know and love today wasn't always free and open source. Blender is actually quite unique in that it's one of the few (and first!) software applications that was "liberated" from proprietary control with the help of its user community.

Originally, Blender was written as an internal production tool for an award-winning Dutch animation company called NeoGeo, founded by Blender's original developer and the current head of the Blender Foundation, Ton Roosendaal. In the late 1990s, NeoGeo started making copies of Blender available for download from its website. Slowly but surely, interest grew in this less-than-2MB program. In 1998, Ton spun off a new company, Not a Number (NaN), to market and sell Blender as a software product. NaN still distributed a free version of Blender, but also offered an advanced version with more features for a small fee. There was strength in this strategy, and by the end of 2000, Blender users numbered well over 250,000 worldwide.

Unfortunately, even though Blender was gaining in popularity, NaN was not making enough money to satisfy its investors, especially in the so-called "dot bomb" era that happened around that time. In 2002, NaN shut its doors and stopped working on Blender. Ironically, this point is where the story starts to get exciting.

Even though NaN went under, Blender had developed quite a strong community by this time, and this community was eager to find a way to keep their beloved little program from becoming lost and abandoned. In July of 2002, Ton provided a way. Having established a non-profit organization called the Blender Foundation, he arranged a deal with the original NaN investors to run the "Free Blender" campaign. The terms of the deal were that, for a price of €100,000 (at the time, about $100,000), the investors would agree to release Blender's source code to the Blender Foundation for the purpose of making Blender open source. Initial estimations were that it would take as long as six months to one year to raise the necessary funds. Amazingly, the community was able to raise that money in a mere *seven weeks*.

Because of the Blender community's passion and willingness to put its money where its metaphorical mouth was, Blender was released under the GNU General Public License on October 13, 2002. With the source in the community's hands, Blender had an avalanche of development and new features added to it in a very short time, including somewhat common features like Undo (a functionality that was conspicuously missing and highly desired since the initial releases of Blender by NeoGeo).

Over two decades later, the Blender community is larger and stronger than ever. Blender itself is a powerful modern piece of software, competitive in terms of quality with similar software costing thousands of dollars. Not too shabby. Figure 1-1 shows screenshots of Blender from its early days to the Blender of today.

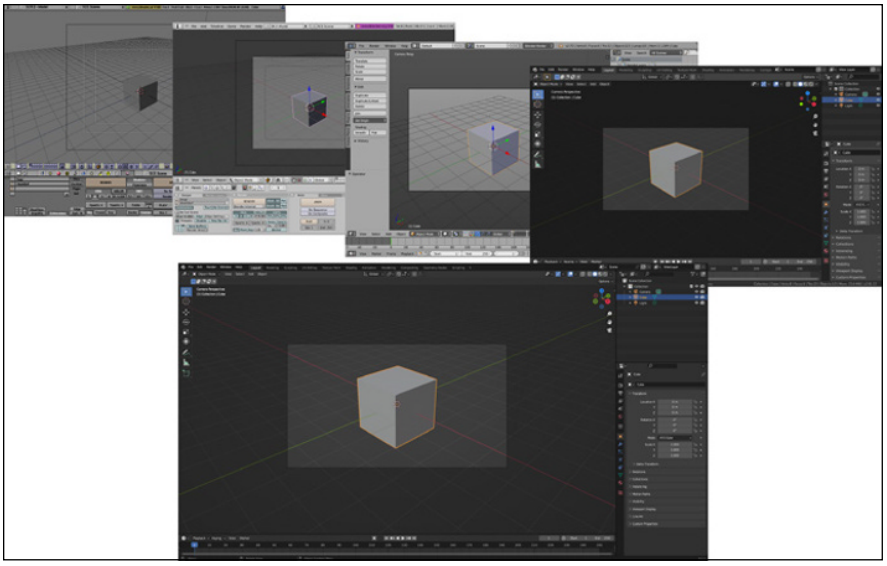

FIGURE 1-1: Blender through the years: (from left to right) Blender 1.8, Blender 2.46, Blender 2.72, Blender 2.83, and the Blender of today (bottom).

Understanding Blender release versions

Multiple releases of Blender come out over the course of a year. As of this writing, typically three releases come out each year. One of those releases is always a long-term support, or *LTS* release. Most 3D software doesn't have such a high-paced release schedule. As Blender has gotten more popular, it's been put to work in a bunch of large organizations: big studios, enterprise environments, and manufacturing facilities. These companies don't actually update their software to new versions all that frequently and prefer to only update for critical bug fixes or security patches.

This approach makes sense. Using the example of large feature-length animated films, those productions often take three years or more to complete. If you're in the middle of producing a multi-million dollar production like that, it's more important to have a stable, predictable tool than to have the latest and greatest new features (with all of the associated bugs and changes that may accompany that feature). Likewise, the process of creating educational material can

sometimes be just as time-consuming. For example, this book is scheduled for release in the first part of 2024. I started working on this book in April of 2023. Three different versions of Blender were released in that time.

It's for these kinds of long schedules that the Blender developers decided to mark certain releases as LTS releases. Those releases of Blender get bug fixes and security updates for two years following their release to ensure that there are stable versions of Blender available for people who are using it for production or creating documentation. Everyone else can stick to the regular, more frequent releases and take advantage of the latest and greatest features when they come out.

For this book, I try to split the difference. The majority of the content in these pages is focused on features that are available in Blender 3.6 LTS. However, sometimes new features are just too cool to skip talking about. So there are a few moments in this book where I cover a feature that's in Blender 4.0. I'll be sure to make you aware of it when I cover those features, so no worries there.

Making open movies and games

One of the cool things about the programmers who write Blender is that many of them also use the program regularly. They're writing code not just because they're told to do it, but because they want to improve Blender for their own purposes. Many of Blender's developers started as artists who wanted to make Blender do something it wasn't able to do before. Part of the programmers' motivation has to do with Blender's open source nature, but quite a bit also has to do with the fact Blender was originally an in-house production tool, built for artists, based on their direct input, and often written by the artists themselves.

Seeking to get even more of this direct artist feedback to developers, the Blender Foundation launched "Project Orange" in 2005. The project's purpose was to create an animated short movie using open source tools, primarily Blender. A team of six community members were assembled in Amsterdam, in the Netherlands, to produce the movie. Roughly seven months later, *Elephants Dream* premiered and was released to the public as the first *open movie*. This means that not only was it created using open source tools, but all the production files — 3D models, scenes, character rigs, and so on — were also released under a permissive and open Creative Commons Attribution license. These files are valuable tools for discovering how an animated film is put together, and anyone can reuse them in their own personal or commercial work. Furthermore, if you don't like *Elephants Dream*, you're free to change it to your liking! How many movies give you that luxury?

Due to the success of the Orange project, Ton established the Blender Institute in 2007 for the expressed purpose of having a permanent space to create open movie and game projects, as well as provide the service of training people in Blender. Since then, the Blender Institute has churned out open projects every couple of years. Like with *Elephants Dream*, both the final product *and* the production files for each project are released under a permissive Creative Commons license. More recently, the Blender Institute has spun off a separate entity, the Blender Animation Studio, a Blender-based animation studio with the goal of producing and releasing a feature-length animated film.

With the completion of each of these projects, the functionality and stability of Blender significantly increased. Much of the content of this book wouldn't even exist without these projects. For example, Chapter 6 in Book 4 covers using Blender's Grease Pencil objects to do 2D animation in 3D space. All the content in Chapter 2 in Book 5 is focused on the *Compositor*, a way of combining and enhancing still images and animations. In fact, nearly all of Book 4 is devoted to features that were enhanced or directly added for one of these open projects.

All these projects continue to exhibit the strength of the Blender community. Each of them was financed in large part by DVD presales (and now Blender Cloud subscriptions) from users who understand that regardless of the project's final product, great improvements to Blender are the result, and everyone benefits from that.

Joining the community

Congratulations! As a Blender user, you're a part of our community. You're joining a diverse group that spans all age ranges, ethnicities, professional backgrounds, and parts of the globe. We are a passionate bunch: proud of this little 3D program and more than willing to help others enjoy using it as much as we do. Have a look at the supplemental website for this book, `blenderbasics.com`, for a list of invaluable community resources, not only for discovering the intricacies of using Blender, but also for improving yourself as an artist.

You can find innumerable opportunities for critique, training, discussion, and even collaboration with other artists, some of whom might also be Blender developers. I've made quite a few good friends and colleagues through the Blender community, both through the various community websites and by attending events like the annual Blender Conference. I go by the name "Fweeb" on these sites, and I look forward to seeing you around!