



Industrial Press, Inc. | Newsletter

Focus On: Teaching & Learning 3D Modeling Software

A Word from Our Editor

As additive manufacturing becomes an ever more pragmatic option, the ability to design a precise prototype for 3D printing within a short period of time has become a high-demand skill set, and more students are taking CAD courses, looking ahead to bright job prospects. While there are many 3D modeling programs and corresponding textbooks available, I believe our books stand out because our authors truly care about making knowledge available to students in a practical way. Reading their interviews, I smile, envisioning a fun and interactive classroom environment.

Our AutoCAD book series has a proven adoption record, thanks to the efforts of expert authors such as Steve Heather. And we are lucky to have Fred Fulkerson on board to add value to our CAD/CAM book collection. Fred has generously offered free access to his *Design of Weldments using SolidWorks* course materials; all you have to do is sign up on our eBookStore at ebooks.industrialpress.com.

Lastly, I would like to express my gratitude to our Managing Editor Laura Brengelman and Production Manager/Art Director Janet Romano-Murray, who work closely with our authors, including Fred and Steve. Laura often comes to me with a big smile, expressing how fun it is to work with our authors. I'm sure they feel the same way working with our team. Thank you to all! — **Taisuke Soda, Editorial Director**



Fredumacation: Talking with Educator and Author Fred Fulkerson

Fred Fulkerson is the author of *SolidWorks Basics: A Project Based Approach*. He has been teaching for more than 15 years and is a professor in the Mechanical Engineering department at Conestoga College. He is a certified Mastercam® and SolidWorks® instructor, as well as a Red Seal Certified General Machinist. He lives in Canada near Cambridge, Ontario, and you can email him about his book at fredumacation@gmail.com.

Industrial Press: What in the world is Fredumacation?

Fulkerson: The reality is that sometimes the material I have to teach is not the most exciting. So I try to interject humor into my lessons to keep students engaged. (The humor is always at my expense.) For instance, in my CNC (Computer Numerical Control) programming class, I was having trouble conveying the concept of “cutter compensation.” I decided to try a different approach. I started off by saying, “All right, everyone, imagine—and try hard because I know

this will be difficult—that I am a tool.” Pausing for effect, I dejectedly looked at the floor, adding, “I am hurt that no one objected.” Then, I used a desk, a piece of cardboard, and myself as a “tool” to explain how the machine tool in question works.

After the class, several of the students commented that my approach worked. I replied, “Well, that is why you pay extra for my classes, so you can be more than educated. You can be Fredumacated.” The term stuck. Whether the students find it to be funny or stupid, it does help them remember the important concepts.

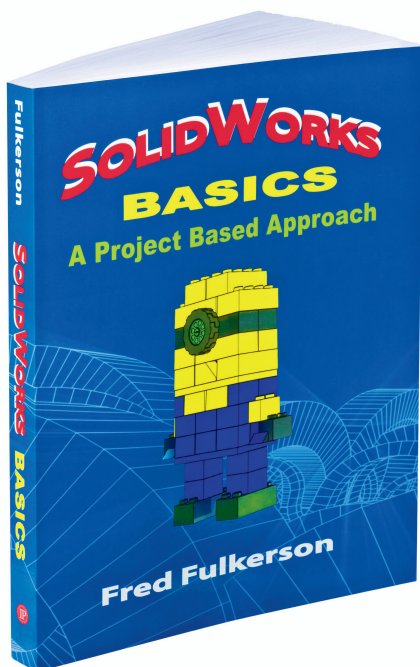
Years ago, I started making instructional videos that students could watch outside of class to help them learn; I posted the videos on the college’s Web page. Finally, the IT department told me that I was taking up more than half of the space on the school’s server and suggested I move my collection to YouTube. I did and called it “Fredumacation.” I now have over 700 videos.



Industrial Press: Can you tell us about your teaching experience and the background of your writing a book about learning and using SolidWorks?

Fulkerson: In 1998, I was working in the engineering department of a local manufacturer that designed and manufactured jigs, fixtures, and special purpose machinery, mainly for the automotive industry. The company rented its CNC equipment to Conestoga College for a Saturday course; when the professor needed help, he was directed to me. He asked if I was interested in working for the college part time.

I enjoyed teaching so much that I applied to the Faculty of Education at the University of Western Ontario. I taught four nights a week and Saturdays, while attending the university. It was a busy time. Our triplet daughters were just a year old when I started, and I commuted three hours every day. After graduating, I taught at a local high school.





My subjects were manufacturing, math, CAD, and coop. (In coop students spend time in class, learning work-related skills, and then in a workplace for hands-on experience.) I also taught part time at Conestoga. Eventually, I accepted a full-time job at the college. The main subjects I teach are CNC programming, machining, jig and fixture design, mechanical design, advanced solid

modeling, and automated manufacturing. As SolidWorks is our software of choice for most courses, I became fairly knowledgeable in its use.

It is difficult to find one textbook that meets all of a course's needs, so I started developing my own material about the use of SolidWorks in the subjects I teach. When the students worked through my material, I encouraged them to tell me where it was unclear or lacking. When I rewrote my lessons for the latest software version, I incorporated their suggestions. Several teachers who also used my material encouraged me to add more and make it into a book. Since we really needed such a book, I thought, "Why not?" So I spent a lot of time at my desk in the basement. Regularly, my wife and kids would throw some food and water down the stairs.

Industrial Press: The instructions in your book are project-based. Why did you chose these projects and what do they help convey?

Fulkerson: The first handouts I created were based on a step by step approach. After a class, I would collect most of them off the floor. One day, I noticed that when my instructions were about a project students were working on that I picked up far fewer handouts at the end of the day.

I realized that, like my students, I would rather learn by creating a project and applying new knowledge as I worked through the steps. From then on, anything I developed was about what you need to learn to get the project done right. Based on my experience addressing various learning styles, I included screen shots and QR codes for my online instructional videos throughout the book.

I decided to start the book with fun projects that would teach basic skills and created drawings resembling LEGO® Minions™. Other practical projects teach more SolidWorks modeling and drawing and give students easily transferable skills. Each project adds to their knowledge base, while helping them hone the skills that they just learned.

Industrial Press: What kinds of projects do you envision your students and other readers of your book creating in SolidWorks?

Fulkerson: There really is no limit to what can be designed using SolidWorks. That is one of the things that I enjoy about teaching the subject.

Frequently, former students will contact me for help with projects. I encourage them to do so, as I love a challenge and trying new techniques using SolidWorks. It is so powerful and does so much that I doubt you could ever learn it all

At our college, we often sit down with students, sign confidentiality agreements, and help them start a new business based on their design concepts. I have helped graduates design aircraft and automotive equipment and parts; air tunnels and duct work; weldments; manufacturing jigs and fixtures; new and upgraded machinery; racecar and motorcycle parts; satellite components; glass walls and light fixtures; a new line of fishing reels; and much more.

Industrial Press: Of the available 2D and 3D modeling software, why is SolidWorks a good choice?

Fulkerson: It seems everybody and their dog makes CAD software now. What I tell my students is that the learning curve for SolidWorks resembles a straight line, because it is such an intuitive software. Most students can start modeling within a few minutes of instruction, and the software is so well designed that once you know a little about it, you can quickly learn more.

Industrial Press: Can you make any predictions about the future of modeling software?

Fulkerson: I am waiting for it to catch up with the movies so I no longer need a keyboard, mouse, and monitor (three monitors, in my case). I think it will get to the point one day, hopefully soon, where I can design and model with my hands in the air.

SolidWorks Basics: A Project Based Approach

By Fred Fulkerson

Published: Summer 2015

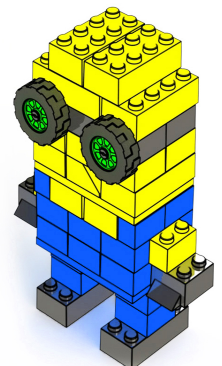
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AutoCAD Saves the Day: A Conversation with Engineer, Author, and AutoCAD Specialist Steve Heather

Steve Heather is co-author, with Cheryl Shrock, of Industrial Press's acclaimed AutoCAD book series. The latest editions are *Beginning AutoCAD 2016* and *Advanced AutoCAD 2016*. These comprehensive workbooks are supplemented by the handy *AutoCAD Pocket Reference*, with the seventh edition coming out shortly.

Heather also is the author of the popular *Engineers Precision Data Pocket Reference*, published in 2014 by Industrial Press. For 35 years, he worked as a precision engineer in the aerospace and defense industries. He then went on to teach mechanical engineering and computer-aided design (CAD) at colleges in the United Kingdom. He lives near Canterbury, England, and welcomes comments about the AutoCAD book series at steve.heather@live.com.



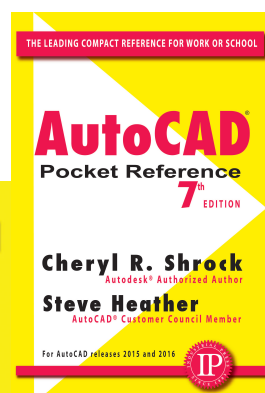
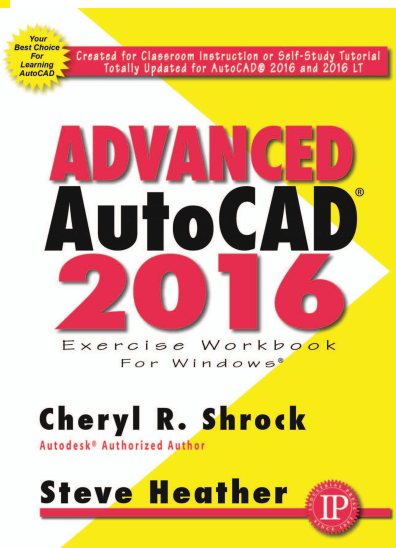
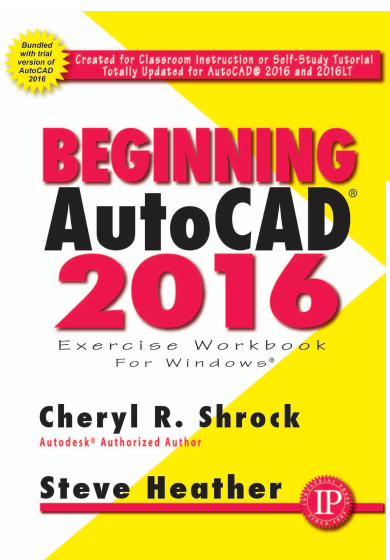
Industrial Press: What is the background of your ongoing co-authorship of the AutoCAD workbooks?

Heather: It all happened purely by chance. As a mechanical engineer, I always purchased the latest editions of the famous *Machinery's Handbook* from Industrial Press. In 2011, I purchased the company's *Machinery's Handbook Collector's Edition: 1914 First Edition Replica*. I was so delighted with the replica edition that I decided to write a complimentary email to one of the directors at Industrial Press. He asked me whether I had ever written an engineering technical book and would I consider writing one for them.

Apart from being a mechanical engineer and teaching the subject, I also taught AutoCAD courses at colleges, so I asked if I could write a book on the subject. I was informed that Industrial Press already had a very successful AutoCAD book series, written and updated yearly by Cheryl Shrock. However, she was soon to retire from this primary role, and they were looking for a co-author to continue on with the yearly updating. I put my name forward on a shortlist of seven people and was pleased when I was picked as the co-author.

I have been updating the books ever since. I continue to improve them by adding the latest upgrades and new commands that are made to the software each year. I am constantly thinking of new and improved lessons to make it enjoyable and easy to learn AutoCAD.

Continued on page 4



AutoCAD 2016 Workbook Series

By Cheryl R. Shrock and Steve Heather

Published: Spring–Winter 2015

Beginning AutoCAD 2016

ISBN: 978-0-8311-3518-8

Pages: 550, Price: \$39.95

Advanced AutoCAD 2016

ISBN: 978-0-8311-3519-5

Pages: 500, Price: \$39.95

AutoCAD Pocket Reference, 7th Edition

ISBN: 978-0-8311-3596-6

Pages: 360, Price: \$24.95

To order and for more information, visit us at:

www.industrialpress.com;
ebooks.industrialpress.com.

Industrial Press: How do the books work together to provide a complete course in AutoCAD?

Heather: If you are a novice in computer-aided design using AutoCAD, you can choose the *Beginning* book as a start. It contains 30 lessons, with each lesson having step-by-step instructions, followed by an exercise designed for practicing the commands you learned. The first few lessons start off with basic two-dimensional (2D) commands and progress to creating your own templates and complex drawings.

The *Advanced* book continues on from the *Beginning* book with 14 step-by-step lessons that teach you the more advanced features of AutoCAD, such as customizing the software and creating your own workspaces. There are an additional eight lessons that introduce you to basic three-dimensional (3D) commands, which give you the knowledge to progress on to using more complex 3D commands. The final part of the *Advanced* book includes three on-the-job type projects: Architectural, Electro-Mechanical, and Mechanical. These allow you to practice all the skills you have learned in previous lessons.

The third book in the AutoCAD series is the *Pocket Reference* book. It is designed as a handy pocket reference that gives you all the fundamental commands, concepts, and how-to information for everyday AutoCAD use. It is a useful supplement to the *Beginning* and *Advanced* books for quick reference.

Industrial Press: What makes the comprehensive course-work provided in this book series so popular?

Heather: Both the *Beginning* and *Advanced* AutoCAD books are designed to give the user the skills needed to confidently use AutoCAD in a working environment. They cover all the fundamental 2D and 3D commands and user settings necessary to become a highly capable user of the software. Many schools and colleges now adopt these AutoCAD instructional books as their preferred method of teaching with consistently excellent results. Professionals using AutoCAD who seek to improve or refresh their skills also find these information-packed books to be helpful.

Industrial Press: Can you make any predictions about the future potential of 2D and 3D modeling software?

Heather: The potential of 2D and 3D modeling software is limitless. Over the past 20 years, we have seen a massive increase in the number of individuals and companies using this type of software for daily work. The days of the old-style method of using a drawing board and pencil have come to an end and have been superseded by CAD software. While we might lament the passing of that tradition, this is progress. We are much more efficient for having it.

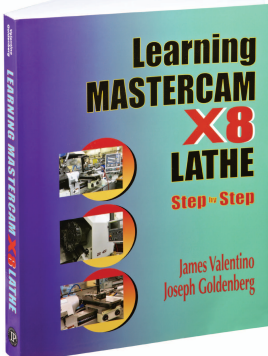
With the latest invention of 3D printing being used for rapid prototyping and, increasingly, manufacturing, CAD software plays an important role. It produces the 3D model that is transferred directly to the 3D printer, which creates a prototype or a production item.

In the next 20 years, I can see CAD software being used for even more advanced technology than we have today. Long may it continue.

Industrial Info

By Laura Brengelman

AutoCAD 2016 is the 30th release of this software, first published 33 years ago by startup MicroCAD. Now known as Autodesk and based in California, the company is, as its Website proclaims, "a leader in 3D design, engineering and entertainment software." Once, CAD programs ran on mainframes. Today, Autodesk has applications for desktop and laptop computers, iPhones, iPads, iPods, Androids, and more. Among its latest innovations, the Spark open professional 3D printing software platform streamlines additive manufacturing. There are 170 million users of AutoCAD consumer applications and 17 million users of professional applications. For more information, visit www.autodesk.com and <https://spark.autodesk.com>.



SolidWorks is a product of Dassault Systèmes, a multinational software company headquartered in France, offering applications that enable 3D CAD; engineering, modeling, simulation; and data and process management. In 1981, a spin-off team of engineers from Dassault Aviation set about designing 3D products and modeling software; their flagship brand, CATIA, was introduced the following year. SolidWorks modeling software was acquired in 1997. Aptly touted as "Inspiring Innovations," this "intuitive, integrated 3D design environment" is used by more than 2.7 million users worldwide and more than 2 million students graduate annually with SolidWorks training. For more information, visit www.3ds.com.

Other popular CAD software includes BricsCAD Classic, DesignCAD 3D Max, RealCAD, SketchUp Pro, Solid Edge, and TurboCAD. A top program from CNC Software, based in Connecticut and one of the oldest developers of highly successful CAD and CAM (computer-aided manufacturing) programs, is Mastercam. Check out these best-selling titles from Industrial Press: *Learning Mastercam X7 Mill 2D Step by Step* (2013, ISBN: 978-0-8311-3486-0, 992 pages, \$74.95) and *Learning Mastercam X8 Lathe 2D Step by Step* (2015, ISBN: 978-0-8311-3511-9, 504 pages, \$59.95), both by James Valentino and Joseph Goldenberg.