Creo™ Parametric

Louis Gary Lamit
With technical assistance from **James Gee**

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Cengage Learning
Cengage Engineering

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About the Author and technical assistant

Louis Gary Lamit is currently a full time instructor and CAD department head at De Anza College (since 1984) in Cupertino, CA, where he teaches Creo Parametric (formerly Pro/ENGINEER). He is the founder of Scholarships for Veterans at www.scholarshipsforveterans.org. Mr. Lamit has worked as a drafter, designer, numerical control (NC) programmer, technical illustrator, and engineer in the automotive, aircraft, and piping industries. A majority of his work experience is in the area of mechanical and piping design. He started as a drafter in Detroit (as a job shopper) in the automobile industry, doing tooling, dies, jigs and fixture layout, and detailing at Koltanbar Engineering, Tool Engineering, Time Engineering, and Premier Engineering for Chrysler, Ford, AMC, and Fisher Body. Mr. Lamit has worked at Remington Arms and Pratt & Whitney Aircraft as a designer, and at Boeing Aircraft and Kollmorgan Optics as an NC programmer and aircraft engineer. He also owns and operates his own consulting firm (CAD-Resources.com- Lamit and Associates), and has been involved with advertising, and patent illustration. He is the author of over 40 books, journals, textbooks, workbooks, tutorials, and handbooks, including children's journals and books (www.walkingfishbooks.com). Mr. Lamit received a BS degree from Western Michigan University in 1970 and did Masters' work at Wayne State University and Michigan State University. He has also done graduate work at the University of California at Berkeley and holds an NC programming certificate from Boeing Aircraft. Since leaving industry, Mr. Lamit has taught at all levels (Melby Junior High School, Warren, Mi.; Carroll County Vocational Technical School, Carrollton, Ga.; Heald Engineering College, San Francisco, Ca.; Cogswell Polytechnical College, San Francisco and Cupertino, Ca.; Mission College, Santa Clara, Ca.; Santa Rosa Junior College, Santa Rosa, Ca.; Northern Kentucky University, Highland Heights, Ky.; and De Anza College, Cupertino, Ca.). His textbooks include:

- *Industrial Model Building*, with Engineering Model Associates, Inc. (1981),
- *Piping Drafting and Design* (1981),
- *Piping Drafting and Design Workbook* (1981),
- *Descriptive Geometry* (1983),
- *Descriptive Geometry Workbook* (1983), and
- *Pipe Fitting and Piping Handbook* (1984), Prentice-Hall.
- *Drafting for Electronics* (3rd edition, 1998),
- *Drafting for Electronics Workbook* (2nd edition 1992), and
- *CADD* (1987), Charles Merrill (Macmillan-Prentice-Hall Publishing).
- *Technical Drawing and Design* (1994),
- *Technical Drawing and Design Worksheets and Problem Sheets* (1994),
- *Principles of Engineering Drawing* (1994),
- *Fundamentals of Engineering Graphics and Design* (1997),
- *Engineering Graphics and Design with Graphical Analysis* (1997), and
- *Engineering Graphics and Design Worksheets and Problem Sheets* (1997), West Publishing (ITP/Delmar).
- *Basic Pro/ENGINEER in 20 Lessons* (1998) (Revision 18) and
- *Basic Pro/ENGINEER (with references to PT/Modeler)* (1999), PWS.
- *Pro/ENGINEER 2000i* (1999), and
- *Pro/ENGINEER 2000i^2 (Pro/NC and Pro/SHEETMETAL)* (2000), Brooks/Cole Publishing (ITP).
- *Pro/ENGINEER Wildfire* (2003), Brooks/Cole Publishing (ITP).
- *Introduction to Pro/ENGINEER Wildfire 2.0* (2004), SDC.
- *Moving from 2D to 3D CAD for Engineering Design* (2007), BookSurge, eBook by MobiPocket.
- *Pro/ENGINEER Wildfire 3.0 Tutorial* (2007), BookSurge, eBook by MobiPocket.
- *Pro/ENGINEER Wildfire 3.0* (2007), Cengage.
- *Pro/ENGINEER Wildfire 4.0 Tutorial* (2008), BookSurge eBook by MobiPocket.
- *Pro/ENGINEER Wildfire 4.0* (2008), Cengage.
- *Pro/ENGINEER Wildfire 5.0* (2010), Cengage.
- *Creo Parametric (2012), Cengage*

James Gee is currently a part time instructor at De Anza College, where he teaches Creo Parametric (formerly Pro/ENGINEER) (application modules including Sheetmetal, Cabling, Surfaces, and Mechanica) and NX. Mr. Gee graduated from the University of Nevada- Reno with a BSME. He has worked in the Aerospace industry for Lockheed Missiles and Space Company, Sunnyvale, Ca.; Space Systems/Loral, Palo Alto, Ca.; and BAE Systems in San Jose, Ca. Mr. Gee has assisted in checking and editing the Pro/ENGINEER series of textbooks by Louis Gary Lamit.

Preface

Creo Parametric is one of the most widely used CAD/CAM software programs in the world today. Any aspiring engineer will greatly benefit from the knowledge contained herein, while in school or upon graduation as a newly employed engineer.

This is the first version of Creo Parametric by PTC. Previously Pro/ENGINEER was PTC's CAD/CAM software product. Significant changes, upgrades, and new capabilities including a new interface have made this new software a completely different product, hence the rebranding. *This is not a revised textbook* but an entirely new book covering all the necessary subjects needed to master this high-level CAD software. There are few if any comprehensive texts on this subject so we hope this text will fill the needs of both schools and professionals alike.

The text involves creating a new part, an assembly, or a drawing, using a set of commands that walk you through the process systematically. Lessons 13-18 and all Lesson Projects are not included in the printed version to keep the length and cost to the user down- lessons and projects not in the printed portion can be downloaded at **www.cad-resources.com.** Lessons and Projects all come from industry and have been tested for accuracy and correctness as per engineering standards. Projects are downloadable as a PDF with live links and 3D embedded models.

Creo Parametric Schools Edition software is available (free) at: **www.ptc.com.**

For the first time, a complete Video Lecture series for this book is available at http://www.cad-resources.com/. Click on the book that you have and navigate to the Video Lectures link. The Video Lectures are in WMV format and run between 25 and 60 minutes for each lesson/project. The Video Lectures are recorded using a commercial version of Creo Parametric and are the exact content presented in the classroom by the author. For a small registration fee you will have access to the complete lecture series. Every Lesson and Project has an accompanying video lecture.

Contact

If you wish to contact the author concerning orders, questions, changes, additions, suggestions, comments, or to get on our email list, please send an email to one of the following:

Web Site: **www.cad-resources.com**
Email: **lgl@cad-resources.com**

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Max Gilliland- instructional associate for CAD at De Anza College has been essential to the CAD program. Besides assisting in the classroom, he maintains the software and hardware for the CAD program and for my publications.

Online CAD Classes at De Anza Collage

All CAD classes at **De Anza College** are available on campus and **on line** at http://www.deanza.edu/cdi/

Creo Parametric:

- CDI70 Beginning
- CDI71 Intermediate
- CDI72 Advanced
- CDI73 Sheetmetal
- CDI74 Surface

SolidWorks:

- CDI60 Beginning
- CDI61 Intermediate
- CDI62 Advanced
- CDI63 Surface

AutoDESK:

- **AutoCAD**: CDI80 Beginning, CDI81 Intermediate
- **Inventor**: CDI85
- **Revit**: CDI83

NX:

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CATIA:

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Dedication

This book is dedicated to my new granddaughter; **Aspen Sky**

gate gate pāragate pārasaṃgate bodhi svāhā

Donations and Scholarships for Veterans (SFV)

A portion of this text's profits go to my tax deductible scholarship fund at Foothill-De Anza Community College District (FHDA Foundation). Ten scholarships have been awarded in the last six years. Your contributions provide extra scholarships as funds are available.

SFV provides funding for a 2-year AS, or AA degree, which covers tuition and fees (or applied to expenses) for 90-quarter or 60-semester units. Scholarships are available to any qualified veteran of the Army, Navy, Air Force, Marines, or Coast Guard. Scholarships are administered by the local college foundations. No administration fees are taken by Scholarships for Veterans.

Committee members of Scholarships for Veterans make final selections. All costs associated with Scholarships for Veterans are borne by Lamit and Associates and CAD-Resources.com. For more information, see Scholarships for Veterans at **www.cad-resources.com/SFV.html**