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Descrizione fisica	1 online resource (207 p.)
Collana	Technology in action Mastering 3D printing
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Soggetti	Computer input-output equipment Multimedia systems Hardware and Maker Media Design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
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Note generali	Includes index.
Nota di contenuto	pt. 1. Open source 3D printers. A brief history of 3D printing: What is 3D printing? ; Nature's 3D printers ; Historical additive manufacturing ; Types of 3D printers ; The early days of robotic 3D printers ; The RepRap movement ; The rise of crowdfunding ; Enabling technologies ; The Arduino ; Open source code repositories ; A case study of the printer evolution -- The desktop 3D printer: Who uses consumer 3D printers? ; Types of filament-based consumer printers ; Cartesian printers ; Deltabots ; Kits vs. assembled printers ; 3D printer design considerations ; Filament ; Frame ; Build platform ; Extruder design ; Moving parts ; Control electronics ; Machine tool or computer peripheral? ; Safety and ventilation -- Open source: Open source infrastructure ; GNU licenses ; Wikis, forums, and open source repositories ; Open source pros and cons ; Meeting the open source 3D-printing community ; The maker movement ; Makerspaces and hackerspaces ; Contributing to the open source community. pt. 2. The 3D printing process. Making a 3D model: What makes a model printable on a 3D printer? ; 3D model file formats ; What does "watertight and manifold" mean? ; Scanning a model ; Consumer-level 3D scanners ; CT scanners ; Downloading and modifying existing models ; Models of everyday things ; Specialized databases ; Creating a

new model ; Using a CAD program ; Programs for specific applications ; Design considerations ; Complexity is free: hardware as a service ; Speed vs. customization -- Slicing a 3D model: What is "slicing"? ; 3D printing as cooking ; Tools and techniques ; Starting a print and getting a model to stick to the platform ; Supporting and orienting a model ; Effects of layer height ; Speed ; Managing internal open space ; Getting started: how to slice open an object ; Slicing programs: Slic3r ; Alternative hosting and slicing programs -- Driving your printer : G-code: Controlling your 3D printer ; Understanding G-code ; Using host programs ; Repetier host ; MatterControl ; Octoprint ; When a print starts ; During a print ; When a print finishes normally ; Getting a part off the build platform ; Picking off support and cleaning up the print ; Restarting or shutting off the printer ; Manually controlling your printer ; Stopping a print ; Changing a filament ; Changing temperatures during a print ; Basic hardware troubleshooting ; Running from an SD card --
Material considerations: Filament quality control ; Selecting and using a filament ; Temperature and speed settings ; Will my filament spool run out during my print? ; Filament materials ; Polylactic acid (PLA) ; Acrylonitrile butadiene styrene (ABS) ; Nylon ; T-glase (PET) ; Polycarbonate ; Thermoplastic elastomers (TPEs) ; Research filaments ; Multiple extruders ; Printing dissolvable support ; Dual-extruder printer with two different materials -- Case studies: Simple print ; Simple print example 1: heart pendant ; Simple print example 2: abstract base ; Printing a vase ; Printing a complex object with fine detail ; Printing with support ; Hand-building support ; Dual extruders ; Dual extruders: using one head for support material ; Dual extruders: models in two colors (or two materials) ; Speed settings.
pt. 3. 3D printing meets traditional prototyping. Moving to metal: The sand-cast process ; Sand-casting terminology ; Patterns made from PLA ; Filling the flask with sand ; Cutting sprues and runners ; Pouring in the metal ; Finishing the sand casting ; Planning ahead for better casting ; Adding draft to patterns ; Avoiding undercuts ; Layer orientation ; Shrinkage and clearances ; Printing your sprues? ; Investment casting ; Lost-PLA process ; Casting vs. printing in metal -- Large prints and post-processing: Printing computationally complex objects ; Printing physically big objects ; Objects that are too long for the build platform ; Objects that are too big in more than one dimension ; Gluing the pieces together ; Sanding, chemical smoothing, painting, and dyeing ; Sanding ; Smoothing and bonding ABS with acetone ; Painting ABS and PLA ; Dyeing nylon -- Troubleshooting: Clicking or grinding noises ; Environmental issues ; Drafts ; Ambient temperature ; Humidity ; Dust ; Printer internal alignment issues ; Prints not sticking to the build platform ; Clogged nozzle solutions ; Cold pull ; Wire brush bristle ; Extruder drive gear teeth clogged ; Eliminate stringing ; Software updates.
pt. 4. Using your printer. Printers in the classroom: Teaching design, engineering, and art ; Hands-on history ; William Hand, Jr. boat hull ; Herreshoff cleat ; Reactions to the 3D prints ; Learning through re-creating history ; The special-needs student ; After-school activities ; Robotics clubs and teams ; DIY girls ; Young maker programs ; Career tech ed ; Early-adopter experiences -- Scientific visualization: Visualizing molecular biology ; Model accuracy considerations ; Example: 3D-printed models of six-helix DNA bundles ; Visualizing mathematical abstractions ; Parabola math manipulative ; Surfaces of revolution ; Sinusoids ; General surface modeling ; Other scientific uses of 3D printing -- Futures: Technology trends ; Extreme users ; Improving the user experience ; Faster printing ; Filament ; Emerging

	3D-printing applications ; Printing food ; 3D printing in medicine ; The developing world ; The business of 3D printing ; Printer patent issues ; Hardware as a service -- Appendix A: typical printer settings: Slic3r typical settings ; Cura settings difference -- Appendix B: links and resources: A brief history of 3D printing ; The desktop 3D printer ; Open source ; Making a 3D model ; Slicing a 3D model ; Driving your printer: G-Code ; Material considerations ; Case studies ; Moving to metal ; Large prints and post-processing ; Troubleshooting ; Printers in the classroom ; Scientific visualization ; Futures ; Focusing on 3D printing.
Sommario/riassunto	Mastering 3D Printing shows you how to get the most out of your printer, including how to design models, choose materials, work with different printers, and integrate 3D printing with traditional prototyping to make techniques like sand casting more efficient. You've printed key chains. You've printed simple toys. Now you're ready to innovate with your 3D printer to start a business or teach and inspire others. Joan Horvath has been an educator, engineer, author, and startup 3D printing company team member. She shows you all of the technical details you need to know to go beyond simple model printing to make your 3D printer work for you as a prototyping device, a teaching tool, or a business machine.