COURSE

Computational Craft: Computational Fabrication Methods for Enabling Craft Production in Textiles and Ceramics

JENNIFER JACOBS, University of California, Santa Barbara, Santa Barbara, CA, United States

EMILIE YU, University of California, Santa Barbara, Santa Barbara, CA, United States

MACKENZIE LEAKE, Adobe Inc., San Jose, CA, United States

NADYA PEEK, University of Washington, Seattle, WA, United States

HANNAH TWIGG-SMITH

EMILY WHITING, Boston University, Boston, MA, United States

Open Access Support provided by:

Boston University

University of California, Santa Barbara

University of Washington

Adobe Inc.

Published: 14 August 2025

Citation in BibTeX format

SIGGRAPH Courses '25: Special Interest Group on Computer Graphics and Interactive Techniques Conference Courses
August 10 - 14, 2025
British Columbia, Vancouver, Canada

Conference Sponsors:
SIGGRAPH

SIGGRAPH Courses '25: Proceedings of the Special Interest Group on Computer Graphics and Interactive Techniques Conference Courses (August 2025)
https://doi.org/10.1145/3721241.3733998
ISBN: 9798400715433

Computational Craft: Computational Fabrication Methods for Enabling Craft Production in Textiles and Ceramics

Jennifer Jacobs
University of California Santa Barbara
Santa Barbara, USA
jmjacobs@ucsb.edu

Emilie Yu
University of California Santa Barbara
Santa Barbara, USA
emyu@ucsb.edu

Mackenzie Leake
Adobe Research
San Francisco, USA
leake@adobe.com

Nadya Peek
University of Washington
Seattle, USA
nadya@uw.edu

Hannah Twigg-Smith
Topologic
Boston, USA
htwiggsmith@gmail.com

Emily Whiting
Boston University
Boston, USA
whiting@bu.edu

Abstract

This course will introduce attendees to foundational concepts and methods in applying computational design and digital fabrication techniques to craft production. Instructors will cover methods from ceramics and textiles. Attendees will learn about craft materials and manual methods for fabrication of these materials, 2) compatible machining methods, and general computational design and optimization techniques for computational fabrication. We will cover general approaches to developing domain-specific computational representations for craft production processes, suitable applications of material simulation and visualization, and methods for enforcing craft-specific constraints in computational design tools without limiting the exercise of craft skills and creative decision-making. In addition, we will introduce computational approaches to dynamically control digital fabrication machine behaviors in ways that align with manual craft production. Overall, we aim to illustrate the connections between methods from graphics research and computational fabrication while providing concrete examples of how the physical realities of craft production require flexible computational methods directly informed by material practice.

CCS Concepts

• **Computing methodologies → Modeling and simulation**; **Computer graphics**; • **Human-centered computing → Interactive systems and tools**.

Keywords

Computational Design, Digital Fabrication, Craft, Ceramics, Knitting, Crochet, Quilting

ACM Reference Format:
Jennifer Jacobs, Emilie Yu, Mackenzie Leake, Nadya Peek, Hannah Twigg-Smith, and Emily Whiting. 2025. Computational Craft: Computational Fabrication Methods for Enabling Craft Production in Textiles and Ceramics. In *Special Interest Group on Computer Graphics and Interactive Techniques Conference Courses (SIGGRAPH Courses '25), August 10–14, 2025, Vancouver, BC, Canada.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3721241.3733998

1 Overview

Computational Craft integrates computational fabrication–the use of computer programming to develop models and machine instructions for digital fabrication– with established craft materials and techniques to fabricate functional and decorative craft artifacts. Instructors will cover methods from two areas of craft production: ceramics and textiles. Within the domain of textiles, we will cover computational techniques applicable to machine knitting, crochet, and quiltmaking. Within the domain of ceramics, we will cover computational methods for surface decoration and clay 3D printing. Attendees will learn about 1) craft materials (e.g., yarn, fabric, and clay) and manual methods for fabrication of these materials, 2) compatible machining methods (e.g., computer numerical control (CNC) knitting, subtractive digital fabrication, and clay 3D printing), 3) general computational design and optimization techniques for computational fabrication, and 4) specific methods from the instructors' research in integrating insights from manual craft practitioners with computational methods to support domain-specific craft-compatible computational fabrication techniques. We will cover general approaches to developing domain-specific computational representations for craft production processes, suitable applications of material simulation and visualization, and methods for enforcing craft-specific constraints in computational design tools without limiting the exercise of craft skills and creative decision-making. In addition, we will introduce computational approaches to dynamically control the behaviors of digital fabrication machines in ways that align with manual craft production. Overall, our course will illustrate the synergies between methods from graphics research and computational fabrication while providing concrete examples of how the physical realities of craft production require flexible computational methods directly informed by material practice.

2 Course Presenters

The course will be presented by faculty, postdoctoral scholars, and researchers with expertise in multiple domains of computational fabrication methods that are compatible with craft materials and processes.

SIGGRAPH Courses '25, Vancouver, BC, Canada

ACM ISBN 979-8-4007-1543-3/25/08
https://doi.org/10.1145/3721241.3733998

2.1 Jennifer Jacobs

Jennifer is an Assistant Professor of Media Arts and Technology at the University of California, Santa Barbara. She directs the Expressive Computation Lab- an interdisciplinary research group that researches the development of domain-specific computational tools for artists, craftspeople, and designers. Much of her recent work focuses on the area of clay 3D printing. Her lab has developed new computational representations for toolpath-level design for clay 3D printing and new software that supports direct manipulation of 3D printer toolpaths. She has also developed new control systems for CNC machines that enable the integration of automated fabrication with direct manual control, as well as new CNC machine architecture that blends traditional craft tools with 3D printing mechanisms. She develops technologies in collaboration with professional artists and craftspeople through an artist residency program. She is the recipient of the NSF CAREER award for research in dynamic computational fabrication control systems and technologies.

2.2 Emilie Yu

Emilie is a postdoctoral researcher at the University of California, Santa Barbara, in the Expressive Computation Lab. She develops software tools and algorithms to support digital artistic expression and manual craft practices. In particular, she has contributed novel techniques for 3D content creation and for the design and fabrication of modular crochet garments. She obtained her PhD at Inria Université Côte d'Azur, which was awarded the French Computer Graphics Association award, and the French Computer Science Society dissertation award. As an active member of the computer graphics research community, she presented her work at SIGGRAPH multiple times, was part of the Wigraph Rising Stars in Computer Graphics program, and serves on the ACM Women in Graphics executive committee.

2.3 Mackenzie Leake

Mackenzie Leake is a research scientist at Adobe, where her work focuses on computational design and media editing tools. Previously, she was a postdoctoral fellow at the MIT CSAIL and received her PhD in Computer Science from Stanford University. Her dissertation focused on computational design tools for quilting. She was named a WiGraph Rising Star in Computer Graphics and a Rising Star in EECS. She is active in the modern quilting community, and her quilts have been exhibited at the Houston International Quilt Festival, the AQS Paducah Quilt Show, and QuiltCon.

2.4 Nadya Peek

Nadya Peek develops unconventional digital fabrication tools, small-scale automation, networked controls, and advanced manufacturing systems. Spanning electronics, firmware, software, and mechanics, her research focuses on harnessing the precision of machines for the creativity of individuals. Nadya directs the Machine Agency at the University of Washington, where she is an associate professor in Human-Centered Design and Engineering. Her research has been supported by the National Science Foundation, the Alfred P. Sloan Foundation, and the Gordon and Betty Moore Foundation, and her teaching has been recognized with the University of Washington's Distinguished Teaching Award for Innovation with Technology. She is on the board of the Open Source Hardware Association, the editor-in-chief of the Journal of Open Hardware, and half of the design studio James and the Giant Peek. She plays drum machines and synths in the band Construction and received her PhD from MIT in the Center for Bits and Atoms.

2.5 Hannah Twigg-Smith

Hannah Twigg-Smith builds playful software for digital/physical creativity. She recently completed her PhD at the University of Washington, where her research focused on the development of software for digital fabrication processes ranging from machine-controlled watercolor painting to machine knitting. She thinks that creative tools shouldn't just help us design new things, they should also help us build intuition about the processes through which things are made. Her tools do this by incorporating visualization and physical simulations into a computational design environment. Currently, Hannah is exploring this approach through the development of software for traditional crafts, including weaving, embroidery, crochet, and hand-knitting, as well as in her role as a software engineer at a startup building new technologies for automatic knitting.

2.6 Emily Whiting

Emily Whiting is an Associate Professor of Computer Science at Boston University and Director of the BU Shape Design & Computation Lab. Her research in Computer Graphics combines digital geometry processing, engineering mechanics, and rapid prototyping to explore the development of computational tools for designing functionally valid and fabrication-ready real-world objects. Her lab's work builds on collaborations in a broad range of fields, including architecture, human-computer interaction, accessible technologies, and art conservation. She received her PhD in Computer Graphics and Building Technology from MIT. She is the recipient of the NSF CAREER Award, Sloan Research Fellowship, and BU Innovation Career Development Professorship. She has also served as General Chair of the ACM Symposium on Computational Fabrication.

3 Course Contents

To introduce attendees to a breadth of approaches in computational craft, we will provide an overview of computational craft, followed by a survey of methods across two craft material domains: ceramics and textiles.

3.1 Part 1: Overview of Computational Craft

Computational design is a broad domain that involves the numerical representation and evaluation of design objectives. Specific categories of techniques include, but are not limited to, parametric modeling, design optimization, and material and part simulation. Digital fabrication technologies can serve as a bridge between computational design methods and the production of physical craft artifacts. By executing automated operations from a computer program, CNC technologies support the fabrication of one-off parts at the same cost as a series of identical items. Current consumer-oriented CNC machines are compatible with an increasing range of traditional materials, including wood, textiles, glass, metal, and ceramics.

Any viable computational fabrication workflow requires establishing correspondences between materials, machining capabilities, and computer instructions. The primary challenge in computational craft involves generating design methods that incorporate material constraints and craft production workflows. Much computational fabrication research emphasizes automating and optimizing the production of digital models. Such approaches can provide powerful mechanisms for digital design, but they require extensive design labor and expertise to convert the resulting models into forms suitable for machine or manual fabrication with craft materials. An alternative approach we explore in this course is to ground the development of computational design and fabrication methods from an understanding of traditional craft fabrication techniques and craft material properties. We research traditional craft domains to identify alignments between skilled craft assembly techniques and material affordances. We then develop domain-specific computation methods to support the planning, visualization, simulation, and fabrication of craft artifacts.

4 Part 2: Computational Textiles

Computational methods are often aligned with textile production. Textile fabrication methods are often inherently algorithmic, as structures and patterns are produced by repeating a discrete set of operations. Weaving and knitting have a history of using procedural pattern representations that are not dissimilar from computer programs. Other textile craft traditions, such as crochet and quilting, involve assembling larger structures from modular geometric components. Finally, for some, but not all, textile craft processes, CNC technologies can produce these textiles in accordance with a coded specification, enabling (semi) automated production of garments and other textile artifacts. We focus on computational design for textile production in three areas: knitting, crochet, and quilting.

4.1 Knitting

Knits are composed of loops of yarn pulled through other loops. A knit stitch consists of a loop pulled from the back; a purl stitch consists of a loop pulled from back to front. Craftspeople use variations on knit structures, including decreases/increases or twists and cables, to produce different knit topologies, colorwork, and surface textures. In addition to hand knitting, knitted garments and textiles can be machine-produced through semi- or fully automated CNC technologies, which consist of machine-actuated beds of needles that perform looping operations. Knitting machines rely on proprietary chart-based design systems, which frequently focus on high-level pattern design and restrict textural customization.

4.1.1 Computational Design and Simulation of Knitting Patterns. A slip stitch retains the previous loop on the needle, and the yarn in work passes by, leaving a float along the fabric. A tuck stitch leaves the prior loop on the needle but adds another loop to the needle without pulling it through. Variations in slip and tuck stitch patterns result in changes in the colorwork of knit textiles and deformation of the fabric. However, they can be hard to predict and plan for with existing pattern representations and design tools. We will provide an overview of our approach to supporting slip and tuck design through the KnitScape software tool [Twigg-Smith et al. 2024b]. KnitScape scaffolds exploration of the design space of slip and tuck colorwork through a split-pane interface of pattern parameters and simulation of the result. Colorwork patterns are built from the base stitch pattern repeat, the color sequence, and the needle positions. Each of these is specified via a resizable bitmap editor and stored in a JSON format. KnitScape includes a custom yarn-level simulation. To simulate the deformation introduced by slipped and tucked stitches, we use the graph of yarn topology to build a two-dimensional spring system. Yarn segments are modeled as springs connecting two particles (the associated contact neighborhoods). Each segment tries to contract to its rest length, applying a force between its two contact neighborhoods. As the simulation runs, the yarns are redrawn according to the updated positions of the contact neighborhoods.

4.1.2 Abstracting Knitting Design Elements for High-level Control. Chart-based design tools for machine knitting focus on stitch-level operations, which restrict a craftsperson's ability to iterate on higher-level design elements like cables, colorwork, and texture. Better design representations can enable higher-level manipulation of surface-level knit effects. We will demonstrate a computational method for abstracting knit design elements by blending raster-based stitch and yarn blocks with vector-based paths and boundaries [Twigg-Smith et al. 2024a]. This allows us to specify and manipulate the relationships between design elements, translate these relationships to groups of low-level knitting operations, and use these representations to generate machine knitting instructions. We will demonstrate how techniques from computer graphics enable the identification of reusable, high-level strategies for stitch block repeats and other rasterization challenges.

4.2 Crochet

Crochet is another textile fabrication method that involves creating looped stitches following a specific pattern. Unlike knitting and other textile fabrication techniques, crochet must be performed by hand. Crochet patterns are more complex than knitting patterns, as crochet allows for the freeform insertion of new loops anywhere within the existing fabric. Computational design tools can support authoring crochet patterns, and novel digital representations can help visualize and simulate crochet textiles.

4.2.1 Applying Digital Fabrication Methods for Non-permanent Assembly. Crochet tiles are inherently modular; however, they are commonly joined through permanent assembly methods using sewing or crochet stitches. Disassembly results in damage to the tiles, limiting their potential for re-use. We will demonstrate a method for using 3D printing with flexible filament to produce non-permanent connectors that mimic the structure of crochet loops and can be integrated into crochet textiles with existing crochet fabrication techniques. This method enables easy assembly and disassembly of modular crochet structures.

4.2.2 Computational Design of Modular Crochet Garments. Designing functional garments with tiles requires finding a feasible assembly that results in a complex 3D form. The garment must fit the wearer's body shape while conforming to potential aesthetic or practical preferences. In contrast with traditional cut-and-sew pattern-making, where the fabric can be cut into arbitrary 2D shapes, tiled patterns can only create shapes that are made of

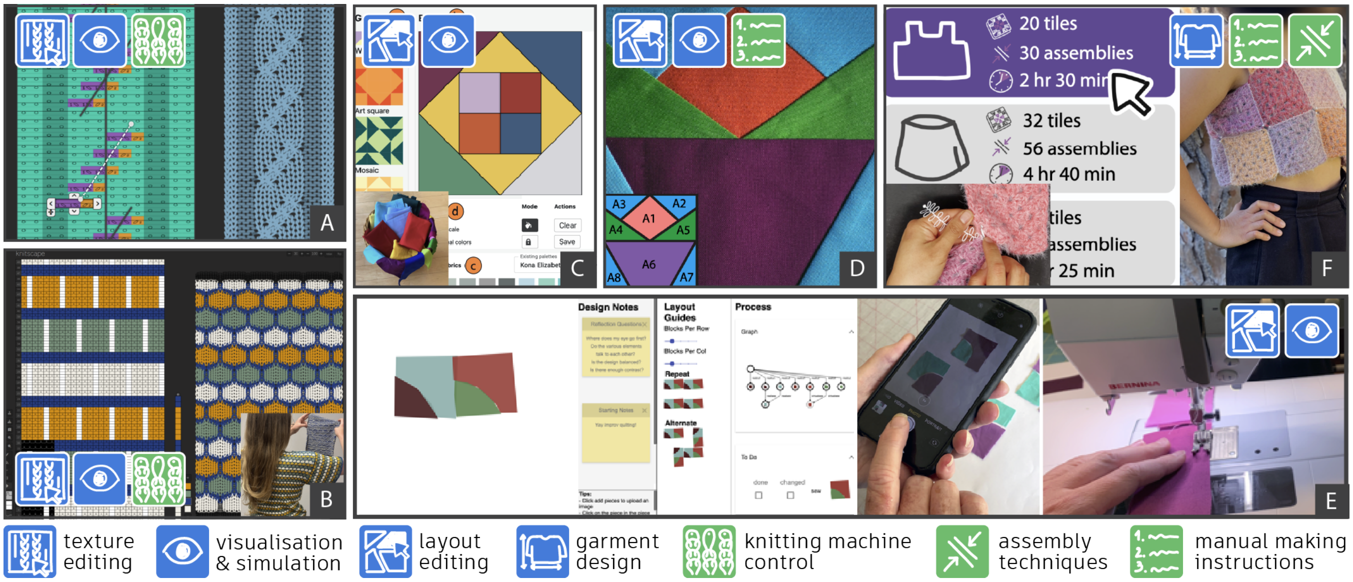

Figure 1: Computational Textiles. Our course will showcase a diverse array of opportunities to apply computational tools to textile crafts, such as computer-aided design methods (blue icons) and computational fabrication techniques (green icons). We will use the work of the course presenters as examples. A: Twigg-Smith et al. 2024 [Twigg-Smith et al. 2024a]; B: Twigg-Smith et al. 2024 [Twigg-Smith et al. 2024b]; C: Leake and Daly 2024 [Leake and Daly 2024] D: Leake et al. 2021 [Leake et al. 2021a]; E: Leake et al. 2021 [Leake et al. 2021b]; F: DelValle et al. [Valle et al. 2025];

whole tiles. We will demonstrate a method to enable garment customization by defining garment templates as generic parametric models for a specific type of garment [Valle et al. 2025]. Setting the parameters of the garment template allows us to obtain specific garment patterns. All parameters of a garment template are integer values corresponding to specific dimensions of a garment. By varying these parameters, we can obtain variations in style. To support users in navigating the large parameter space of a garment template and in achieving a tailored fit, we implemented a pattern solver that takes as input user body measurements and outputs parameters for a garment pattern that achieves a tailored fit. Lastly, we will demonstrate a computational workflow to minimize reassembly labor when converting one modular garment to another. Given two garments, A and B (a), we flatten each garment to a 2D shape. We transform this 2D shape into a grid of pixels where pixels represent tiles and seams. Finally, we find the best alignment between images I_A and I_B to find how to change garment A into B.

4.3 Quilting

Quilting involves creating geometric designs using textile materials. Some of the most exciting aspects of the domain of quilting are the geometric properties, the varied design and construction processes, and the blending of tradition and innovation. From a geometric standpoint, quilting offers an application space for many problems in 2D geometry, such as geometric tiling and generative design.

4.3.1 Quilt Patterning Formalization. We developed a method to mathematically formalize the foundation paper piecing process and created an algorithm that can automatically check if an input pattern geometry is foundation paper pieceable [Leake et al. 2021a]. Our key insight is that we can represent the geometric pattern design using a certain type of dual hypergraph where nodes represent faces and hyperedges represent seams connecting two or more nodes. Determining whether the pattern is paper pieceable is equivalent to checking whether this hypergraph is acyclic, and if it is acyclic, we can apply a leaf-plucking algorithm to the hypergraph to generate viable sewing orders for the pattern geometry.

4.3.2 Interactive Tools to Aid in Quilt Design. We build from our formalization of quilting constraints to develop interactive methods to aid quilters in exploring design options [Leake and Daly 2024]. We will demonstrate methods to support quilters in composing patterns from available scrap materials, improvising quilt designs, a sketch-based tool for defining quilting patterns that the system automatically converts into a quiltable design, and a digital tool for composing quilt patterns in an improvisational style. Collectively, these approaches show how computational constraints applied to established quilting techniques can support multiple approaches to quilting design and fabrication.

5 Part 3: Computational Ceramics

Ceramics manufacture is structured around multiple time-dependent steps that correspond with and are constrained by the material properties of the clay. First, the craftsperson creates a form with wet clay, which typically involves following a ceramic-making technique such as wheel throwing, hand coiling, slab building, casting, 3D printing, or a combination of these techniques. Wet pieces are dried. Completely dry pieces are bisque-fired to remove all moisture from the clay, making it water-insoluble through partial vitrification. Following this, glaze is applied, and pieces are final fired to

Figure 2: Computational Ceramics. Our course will introduce various opportunities in ceramic craft to leverage computational tools such as computer-aided design methods (blue icons) and computational fabrication techniques (green icons). We will use as examples the work of the course presenters. A: Bourgault et al. 2023 [Bourgault et al. 2023]; B: Bourgault et al. 2024 [Bourgault and Jacobs 2024]; C: Moyer et al. 2024 [Moyer et al. 2024]; D: Frost et al. 2024 [Frost et al. 2024]; E: Toka et al. 2023 [Toka et al. 2024]; F: work in progress; G: Toka et al. 2023 [Toka et al. 2023].

make them insoluble, fully vitrified, and safe for use. Throughout the ceramic-making pipeline, clay shrinks and deforms. Craftspeople accommodate shrinkage in their design process by drying pieces in a controlled manner to avoid cracking and by fabricating vessels with consistent wall thickness. The plasticity of wet clay is the primary material affordance as it supports multiple forms of form generation. However, this plasticity retains a "memory" that is a quality of both the material content of clay and the water content, as well as the method in which it is manipulated. This memory will impact deformation in the latter drying and glazing stages. Any computational fabrication methods for ceramics production must account for the inevitable deformation of the ceramic material, which is fundamentally difficult to simulate due to the complexity of factors shaping clay behavior.

5.1 Clay 3D Printing Methods

Clay 3D printing is a relatively new digital fabrication technology that combines the principles of hand coiling with 3D printing. Wet clay is loaded into a tube or canister and then extruded through a nozzle as the printer traverses a 3D toolpath through space. Resulting printed artifacts are dried, fired, and glazed in a manner similar to traditional ceramics. Despite sharing basic principles with plastic 3D printing, Clay 3D printing presents fundamentally different design constraints because of the material nature of clay. Objects cannot be printed as solids because solid clay pieces will crack in the ceramics production pipeline. Unlike thermoplastic, clay remains wet and deformable after extrusion, limiting the geometries that can be produced, and most clay 3D printers lack the ability to retract material, creating bridging between disconnected geometries. We will describe how these qualities limit the geometries it is feasible to print, while also offering new design opportunities not present in thermoplastic 3D printing.

5.1.1 CAM-Based Design for Clay 3D Printing. The thermoplastic 3D printing design workflow involves designing solid geometry in computer-aided design (CAD) software and converting the geometry into machine toolpaths with computer-aided machining (CAM) software. Such an approach limits both the forms and textures that are possible with clay 3D printing. We will demonstrate an alternative design approach known as CAM-based design. In CAM-based design, designers work by describing the machining toolpath rather than the overall vessel geometry. This process enables refined control over toolpath overlap and machine travels and allows different toolpath strategies for different portions of the geometry. Moreover, CAM-based design supports the creation of complex surface textures in clay 3D-printed artifacts by varying the extrusion rate and/or creating unsupported overhangs in the toolpath structure. We will demonstrate two approaches to CAM-based design. The first uses a small set of numeric operators to control a parameterized cylindrical toolpath. This approach allows for the procedural design of complex geometries and textural effects through a small set of primitives [Bourgault et al. 2023]. Second, we will demonstrate a method to use direct manipulation for CAM-based design [Frost et al. 2024]. We will show how toolpaths can be drawn by hand with a digital interface while using computational transformation tools to preserve the precision, repetition, and complexity afforded by CAM-based design with numeric methods.

5.2 Flexible Ceramics Surface Decoration

Ceramic craftspeople across different cultures decorate pottery in rich and distinctive ways. Surface decoration involves a mixture of additive and subtractive fabrication techniques. Each method of surface decoration is constrained in relation to the state of the clay or ceramic material properties, and craftspeople adjust their techniques based on the dynamic nature of clay. Computational fabrication is well aligned with many of the aesthetic objectives of ceramic surface decoration by supporting complex geometric patterning and enabling precise execution of repeating details. However, existing digital fabrication techniques and computational design strategies assume a static and consistent material state. We will outline the limitations of current approaches and present alternatives.

5.2.1 Computational Methods for Adaptable Surface Decoration. We will demonstrate an interactive adaptable workflow to create surface decorations on ceramic vessels using computational fabrication and manual methods [Toka et al. 2023], consisting of four stages: Measuring and averaging physical vessel dimensions and creating or updating a digital vessel model. Decorating the digital model through procedural pattern generation. Unrolling the 3D patterned surfaces of the vessel into 2D surfaces suitable for fabrication. Fabricating and applying the stencil to the physical vessel for manual ornamentation.

5.3 Dynamic 3D printer Control

Limitations of Conventional 3D Printing Control Systems for Clay 3D Printing: Traditional ceramic practitioners produce works through manual material interaction, while 3D printing technologies restrict human interaction primarily to initializing the printing process and responding to errors. Clay 3D printers extrude wet clay that a) continues to be workable by hand following extrusion, and b) often requires manual intervention due to the dynamic nature of clay and limitations of current clay 3D printing technologies. These two combined factors make it desirable for clay 3D printers to support manual intervention and dynamic, real-time control. We will outline the structure of current 3D printer control languages (GCode) and describe computational methods for structuring GCode instructions in ways that enable iterative adjustment of 3D printing behavior while a print is being executed [Moyer et al. 2024]. The methods we demonstrate are specifically targeted for clay 3D printing but are also compatible with thermoplastic printing technology.

6 Course Format

All course components will be presented in lecture format, accompanied by software demonstrations. Presenters will bring material and artifact samples, and if feasible, CNC machines for demonstration and during the break periods. Due to the size of SIGGRAPH courses, it will be infeasible to conduct hands-on sessions operating CNC machines and software. However, attendees will be provided with demonstrated software tools in advance to follow along during lecture sessions.

The total course time will be 3 hours, including two 10-minute breaks to showcase hands-on samples and demonstrations.

7 Learning Objectives and Outcomes

Participants will develop an understanding of the basics of multiple areas of manual craft production within textiles and ceramics. They will be introduced to material and craft-specific computational design methods for shape and texture editing, layout, garment design, visualization, and simulation. These approaches utilize methods commonly employed in graphics research, but we repurpose them for fabrication workflows. Participants will also learn the basics of craft-compatible digital fabrication technologies and fabrication workflows that support the production of robust finished artifacts using these technologies. Finally, participants will be introduced to human-centered design methods that support the development of material- and process-based insights, guiding the creation of appropriate computational representations and interactions for craft-compatible digital design methods.

Acknowledgments

This research was funded in part by the NSF CAREER Program (Award numbers: 2441766 and 2047342).

References

Sam Bourgault and Jennifer Jacobs. 2024. Millipath: Bridging Materialist Theory and System Development for Surface Texture Fabrication. In *Proceedings of the 2024 ACM Designing Interactive Systems Conference (DIS '24)*. Association for Computing Machinery, New York, NY, USA, 50–68. doi:10.1145/3643834.3661599

Samuelle Bourgault, Pilar Wiley, Avi Farber, and Jennifer Jacobs. 2023. CoilCAM: Enabling Parametric Design for Clay 3D Printing Through an Action-Oriented Toolpath Programming System. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23)*. Association for Computing Machinery, New York, NY, USA, 1–16. doi:10.1145/3544548.3580745

Devon Frost, Raina Lee, Eun-ha Paek, and Jennifer Jacobs. 2024. SketchPath: Using Digital Drawing to Integrate the Gestural Qualities of Craft in CAM-Based Clay 3D Printing. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*. Association for Computing Machinery, New York, NY, USA, 16.

Mackenzie Leake, Gilbert Bernstein, Abe Davis, and Maneesh Agrawala. 2021a. A mathematical foundation for foundation paper pieceable quilts. *ACM Trans. Graph.* 40, 4 (July 2021), 65:1–65:14. doi:10.1145/3450626.3459853

Mackenzie Leake and Ross Daly. 2024. ScrapMap: Interactive Color Layout for Scrap Quilting. In *Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology (UIST '24)*. Association for Computing Machinery, New York, NY, USA, 1–17. doi:10.1145/3654777.3676404

Mackenzie Leake, Frances Lai, Tovi Grossman, Daniel Wigdor, and Ben Lafreniere. 2021b. PatchProv: Supporting Improvisational Design Practices for Modern Quilting. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21)*. Association for Computing Machinery, New York, NY, USA, 1–17. doi:10.1145/3411764.3445601

Ilan Moyer, Sam Bourgault, Devon Frost, and Jennifer Jacobs. 2024. Throwing Out Conventions: Reimagining Craft-Centered CNC Tool Design through the Digital Pottery Wheel. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*. Association for Computing Machinery, New York, NY, USA, 22.

Mert Toka, Samuelle Bourgault, Camila Friedman-Gerlicz, and Jennifer Jacobs. 2023. An Adaptable Workflow for Manual-Computational Ceramic Surface Ornamentation. In *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST '23)*. Association for Computing Machinery, New York, NY, USA, 1–15. doi:10.1145/3586183.3606726

Mert Toka, Devon Frost, Samuelle Bourgault, Avi Farber, Camila Friedman-Gerlicz, Raina Lee, Eun-Ha Paek, Pilar Wiley, and Jennifer Jacobs. 2024. Practice-driven Software Development: A Collaborative Method for Digital Fabrication Systems Research in a Residency Program. In *Proceedings of the 2024 ACM Designing Interactive Systems Conference (DIS '24)*. Association for Computing Machinery, New York, NY, USA, 1192–1217. doi:10.1145/3643834.3661522

Hannah Twigg-Smith, Yuecheng Peng, Emily Whiting, and Nadya Peek. 2024a. What's in a cable? Abstracting Knitting Design Elements with Blended Raster/Vector Primitives. In *Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology (UIST '24)*. Association for Computing Machinery, New York, NY, USA, 1–20. doi:10.1145/3654777.3676351

Hannah Twigg-Smith, Emily Whiting, and Nadya Peek. 2024b. KnitScape: Computational Design and Yarn-Level Simulation of Slip and Tuck Colorwork Knitting

Patterns. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*. Association for Computing Machinery, New York, NY, USA, 1–20. doi:10.1145/3613904.3642799

Ashley Del Valle, Jennifer Jacobs, and Emilie Yu. 2025. texTile: Making and Re-making Crochet Granny Square Garments Through Computational Design and 3D-printed Connectors. In *Proceedings of the 2024 ACM Designing Interactive Systems Conference (DIS '24)*. Association for Computing Machinery, New York, NY, USA, 20. doi:doi.org/10.1145/3715336.3735819