

ICLC 2025 - Proposal for Live Performances

Live Performances (including audio, visual, and A/V or multimedia) will largely be sorted into one of two formats: a concert format, with seated audience; and an Algorave format, unseated and intended for dancing. As we explore venues and dates, and according to patterns that we see emerge from the submissions received, we intend to program several different subcategories of the concert format.

1. General Information

- **Performance Title:** The Printer Jam
- **Main Contact:** Evan Raskob
- **Additional Performers:** Nick Rothwell
- **Performance Type:** Algorave or Concert

2. Abstract

The Printer Jam (Project Cassiel X BITPRINT) is a performance duo using livecoding to take advantage of the intrinsic musicality of 3D printing. The performers create 3D printed objects that, during fabrication, activate the printer motors at certain musical pitches and rhythms which are then recorded, processed and looped, building up both physical objects and rhythmic soundscapes. Each performance and its resulting artefacts are unique experiences. This work “entangles the artist, machine, algorithms, and their potential audience in the creation and re-creation of the work, questioning the finality and determinacy of controlled fabrication processes” [Raskob, 178:2023]

This work challenges the idea of 3D printing as a process for creating finished objects by turning the process of making into a musical performance. Rather than thinking about the objects as having physical dimensions in space, they are re-contextualised as a series of printing movements composed from livecoded rhythmic instructions in metrical time and musical intervals. This follows on from traditions of thinking about dimensionality in terms of visual rhythms, as in Paul Klee’s insight that “space itself is a temporal concept” [Raskob 2020, 2023].

One performer (BITPRINT) takes on the role of both live composer of each algo-mecha-musical piece and conductor of the different movements and actions of the printer-as-instrument, such as heating, bed leveling, material handling, waste removal. They use the livecoding system for 3D printers, LivePrinter (<https://github.com/pixelpusher/liveprinter>), running on a laptop and communicating with a standard 3D printer using the open source operating system Marlin. The audience experiences this performance via a live camera feed of the printer cavity overlaid with the LivePrinter coding environment.

The other performer (Project Cassiel) uses the printer as a sole sound source, recording, looping and layering the sounds of the printer. These echoes and loops

revisit key actions, layering and contrasting sounds of mechanical movements at different speeds, smoothing out calibration sequences and other parts of the performance that aren't inherently musical but are essential to the integrity of the 3D printing process. This smoothing out of irregularities through sequencing and iteration, to paraphrase Alvin Lucier, gives us a better understanding of underlying rhythmic qualities of the machine in the same way that the resonance of a piano and the reverberant quality of its physical environment immerses us in the vibration of its strings, the resonance of the frame.

Audio is processed using a bespoke virtual mixing matrix controlled by a live-coded Lisp REPL, routing audio between virtual effects processors and looping devices. The Lisp environment can be controlled directly in code or mediated using physical control surfaces such as Monome Arc and Midi Fighter.

This performance builds on prior work with "3D printed techno" from Raskob, 2020, live-coded performance by Project Cassiel at ICLC 2017, and performances with sitar player Shama Rahman in Berlin and Tübingen.

Collins, Nicolas. "I Am Sitting in a Room" Album notes". Archived from the original on 18 August 2017.

Rothwell, Nick. *Live Coding in the 1990s: The Pulse Sequencer. International Conference on Live Coding 2017*, Morelia, Mexico.

Raskob, E.S. 2023. Space as Time. *Trópos Vol. 15 No. 1*, pages 177-198.

Raskob, E. 2020. Filling In: Livecoding musical, physical 3D printing tool paths using space filling curves. *Proceedings of the 2020 International Conference on Live Coding (ICLC2020)*, 150–158. <https://zenodo.org/records/3939258>.

3. Video and/or Audio Material

Please provide one or multiple links to video or audio material related to this performance here.

- Video recording of an early practice session
- Live recording of The Printer Jam's first performance at the ICLC 2024 Satellite Algorave in London
- Example of live 3D printing without looping

4. Program Note

Please provide a short (max. 150 words) program note. This will be shared in the online Conference program and used for any printed program materials.

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performance and its resulting artefacts are unique experiences. This work “entangles the artist, machine, algorithms, and their potential audience in the creation and re-creation of the work, questioning the finality and determinacy of controlled fabrication processes” [Raskob, 178:2023]

5. Artist(s) Biography

Please provide a short biography (max. 150 words each) for each performer involved in this performance. These will be published in the proceedings of the Conference.

Nick Rothwell is a composer, performer, software architect, coder and visual artist. He has built media performance systems for projects with Ballett Frankfurt and Vienna Volksoper, composed sound scores for Aydın Teker (Istanbul / Kapadokya), Shobana Jeyasingh Dance, AWA Dance and Undercurrent Theatre, programmed physical media sculptures with Simeon Nelson and Rob Godman, live coded in Mexico and in Berlin with sitar player Shama Rahman, collaborated with the body>data>space collective in Prague, Paris and Dresden, written software for Studio Wayne McGregor, the Pina Bausch Foundation and Nesta’s FutureFest, consulted on media artworks at Tate Modern, and developed algorithmic visuals for large-scale outdoor projections in Poland, Estonia, Cambridge Music Festival and Lumiere (London / Durham). He also writes for Sound On Sound magazine and teaches at the Creative Coding Institute, UAL.

In addition to developing and delivering the BSc Computer Science curriculum at UAL’s Creative Computing Institute (CCI), Evan Raskob creates computational art using data and interactive programming for 3D printers; develops live architectures for interactively programming 3D printers and creating generative art; consults with small and large businesses for software development, especially on the web; creates science fiction/speculative design card games like The Peek Game; composes and performs live music and visuals, often with code (livecoding); develops international workshops on topics like for interactive media, mixed reality, VR, augmented sensory design, and electronics for artists and designers; and organises livecoding event as part of LiveCode London.

In the past Evan has collaborated with the artists Robert Whitman and Julie Martin, both of the E.A.T. collective; helped create an immersive, interactive LED lighting system for the Fairchild Communications (Vogue Magazine, etc.) flagship offices in New York City with architectural firm SOM; and worked closely with companies such as BBH and Barclays on student placements and user experience design consulting projects.

ICLC 2025 – Technical Requirements

Live Performances

1. General Information

1.1 What setting is the performance intended for?

Please describe the ideal conditions, e.g. Algorave with dancing audience, concert setting with seated audience, setting with moving/exploring audience? Inside, outside, lighting preferences Please indicate if any conditions are simply nice-to-have or absolute showstoppers.

- Two performers, standing, with table-top space for printer and audio equipment
- Inside but with good ventilation
- Audience can be seated or standing or moving but not too close to the printer
- Need space for a 3D printer and camera on tripod alongside two performers with laptops
- Need ample setup time for the 3D printers and sound check
- Need two projectors with screens required, audience-facing
- Audio output: twin 1/4" jack - foldback required
- Some lighting required for 3D printer (desk light or small other light) and usual stage lighting
- Need power outlets for printer, two laptops, camera, audio interface, small light, video mixer

1.2 How many performers will be in the performance?

Two

1.3 Are you open to being paired with another performer?

If you're submitting a visual-only or music-only Algorave performance, the Committee may select a complimentary performer to create a combined A/V set, without additional input from you. You may answer "no" if you don't want to be paired in this way.

No.

1.4 Will your performance require technical support during the set?

Is support needed, e.g. to run lighting changes, timings, etc.? If yes, please describe.

Sound engineer to check levels and feedback during performance; need time to setup printer just before performance (10 mins)

2. Materials Needed

VIDEO

2.1 What are your projection needs?

Please state what connector type(s) you need (HDMI, VGA, ...), and the ideal or minimum resolution. Do you need one or more extra projections, in addition to the main screen?

Two projectors total, 1080p over HDMI.

AUDIO

2.2 How many input channels on the mixing console do you need?

Please also mention your preferred type(s) of input (XLR, 1/4", etc.).

2X 1/4"

2.3 Do you require a microphone? If so, how many microphones does your performance need?

Yes, to speak to audience before if possible.

2.4 Do you require a monitor, either over headphones or otherwise?

Yes, on stage monitors but far enough away from the 3D printer to not cause feedback.

2.5 Are you bringing your own audio interface?

If you can't bring your own for any reason, please state what you need or what you think would be compatible.

Yes.

OTHER

2.6 How much table/floor space will you need for your performance? How many chairs?

No chairs if we can be standing — large table or two tables for performers with either extra table roughly 50x50cm for 3D printer. Need tables to be near standing height if standing.

2.7 Do you need an internet connection during the performance?

Please state if you need Wi-Fi, if you could use Ethernet, and how the performance relies upon a remote connection of any kind.

Helpful but not required.

2.8 Anything else you need?

Cables, adapters, power strips, anything else you can't bring yourself?

As said above, power strips for all our devices, plus enough 1/4" cables for stereo input.