

# Live Coding / Weaving – Penelopean Mêtis and the Weaver-Coder’s Kairos

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## *Abstract*

Drawing on my experience as a critical interlocutor within the *Weaving Codes, Coding Weaves* project (2014 – 2016, <http://kairotic.org/>), in this paper I propose potential points of connection between Ancient weaving and live coding, considering both practices through the prism of the Ancient Greek concept of *technē*, a species of tactical knowledge combining the principles of *mêtis* (cunning intelligence) and *kairos* (opportune timing). Specifically, this enquiry addresses the human qualities of attention, cognitive agility and tactical intelligence activated within both live coding and live weaving, arguing that such practices might have potential as ‘practices of the self’, as a means for cultivating a more critical mode of human agency and subjectivity.

This paper elaborates ideas emerging from my experience as respondent/interlocutor within the current research project *Weaving Codes, Coding Weaves* (2014 – 2016), which is an interdisciplinary collaboration (funded by an UK Arts and Humanities Research Council Digital Transformations Amplification Award). Led by principle investigators Ellen Harlizius-Klück and Alex McLean (alongside collaborative developer Dave Griffiths and co-investigator Kia Ng), *Weaving Codes, Coding Weaves* explores the historical and theoretical points of resonance between the practice of weaving and computer programming. My own role – as interlocutor – addresses the insights gained if we bring these activities together, identifying and elaborating possible ways in which the practices of live coding and ancient weaving might connect, somehow *interweave*. I approach the project through the prism of my own practice as a writer-artist with a background in Fine Art but without specialist knowledge or expertise related to either weaving or coding. Rather than tackling the research area from the perspective of a specific discipline (weaving or coding) and the technical preoccupations associated therein, my approach is one of attending to what is “inter”. “Inter” – a contingent state of being *between*, betwixt, amongst, in the midst of. “Inter” signals towards what is produced *during*, emerging from within. The term also refers to the act of being put to ground, the condition of a body buried. Here, ‘burying oneself’ (myself) might describe the state of being immersed or embedded in a particular situation or site, working from the *interior*.

My embedded involvement in *Weaving Codes, Coding Weaves* echoes and develops the interlocutory role I performed in a previous research project (led by co-investigators Alex McLean and Hester Reeve) entitled *Live Notation: Transforming Matters of Performance*, also funded within the UK Arts and Humanities Research Council *Digital Transformations* theme, for exploring the possibilities of relating live coding (performing with programming languages) and live art (performing with actions). My response to that project was an article entitled, *Live Notation: Reflections on a Kairotic Practice* (Cocker 2013), where I elaborated an idea of ‘live notation’ (within both live art and live coding) as a contemporary manifestation of the Ancient Greek concept of *technē*, a species of knowledge combining the principles of *mêtis* (cunning intelligence) and *kairos* (opportune timing). Through the new research undertaken as part of the *Weaving Codes, Coding Weaves* project, I extend this enquiry in order to address how the practice of live coding and ancient loom weaving might also be considered through the prism of *technē*, with its attendant principles of wiliness and timeliness.

Still in its emergent research phase, in this paper I reflect on points of potential connection between live coding and ancient loom weaving, paying particular attention to the principles of Penelopean *mêtis* and the weaver-coder’s *kairos* operating therein. It is perhaps useful to stress that the current phase of research is still in progress and as such this paper offers a conceptual proposition, which will be further ‘fleshed out’ through closer attention to the material technicalities of both live coding and ancient weaving as the *Weaving Codes, Coding Weaves* project evolves. Additionally, I am collaborating with Geoff Cox and Alan

Blackwell on the development of *Live Coding Alternatives*, a live coding workshop (as part of *Critical Alternatives*, 5<sup>th</sup> Dicennial Aarhus Conference, August 2015) for testing and exploring live coding as a creative, aesthetic and potentially political practice for constructing ‘critical alternatives’ within both computing and everyday life. I approach these contexts – as well as the *International Conference on Live Coding* (ICLC) itself – as live sites for testing and developing a proposition, for inviting further dialogue with the live coding community rather than presenting my argument as a *fait accompli*.

It is also perhaps also useful to situate this specific enquiry ‘*Live Coding/Weaving – Penelopean Mêtis and the Weaver-Coder’s Kairos*’ against the context of a broader investigation within my research activity, focused on identifying contemporary manifestations of *technē* (especially within artistic practice – and with an interest in *drawing* in particular), and in advocating how the particular qualities, capacities and knowledges produced therein might have a critical, perhaps even resistant potential (Cocker 2010). Within this ongoing investigation, I address how a more augmented, affective expression of human agency and subjectivity might be cultivated through the activation of *technē*, through attending to and nurturing the principles of *mêtis* (cunning intelligence) and *kairos* (opportune timing) within both creative practice and daily life. Here, *technē* is not used in its habitual sense, where it is taken to simply mean the skillful art of *making* and *doing*, the technical facility of craftsmanship. Whilst retaining the idea of *technē* as a means of making/doing, my intent is to explore how Ancient Greek weaving and philosophy might intertwine with live coding on both technical *and* conceptual levels. Making a return to how the term was used within Ancient Greek culture, I refer to *technē* as a disruptive – even subversive – species of tactical knowledge, capable of dealing with contingent situations and fully harnessing their capricious force (for example, a knowledge capable of seeing and seizing the potential of chance, randomness and indeterminacy and converting this towards unexpected direction). As Janet Atwill argues “Because *technē* defined itself in terms of intervention and invention, it is concerned solely with situations that yield indeterminacies that would allow one to discern the opportune moment and to ‘seize the advantage’” (Atwill 1998, 70 – 71). This intimates towards the rather unexpected aspect of *technē*, for it is not a practice intent on stabilizing or limiting the contingency of unstable or indeterminate forces (nor resisting their pressures), but rather on the transformation of their force towards opportunity. For Atwill *technē* “challenges those forces and limits with its power to discover (*heuriskein*) and invent new paths (*poroi*)”; it “deforms limits into new paths in order to reach – or better yet, to produce – an alternative destination” (Atwill 1998: 69).

My assertion is that there are certain contemporary, creative processes (for example, live coding, as well as forms drawing, performance and indeed weaving) that display the properties of *technē*, that require a specific quality of alertness or attentiveness to the live circumstances or ‘occasionality’ of their own production, moreover, that these qualities (identified and *practiced*) have the capacity to be applied to other situations, indeed to the living of a life. In this sense, my own research investigation might be conceived in relation to Michel Foucault’s late work on Ancient Greek ethics and the ‘care of the self’, his analysis of the various ‘techniques of life’, ‘arts of existence’ or ‘practices of the self’ through which it might be possible to ‘make life a work of art’, a material capable of being made malleable, transformed *through* practice (Foucault 1997, 1992/1984, 2001). For the Ancient Greeks, the training and cultivation of *technē* was central to the construction of both self and civic life, the capacity of invention, intervention and conceptualizing of critical alternatives. Indeed, the Greeks developed a complex interlocking system of preparatory training and reflexive exercises (or *askēsis*) for testing mind and body, the convergence of athletics and rhetoric for exercising language as well as limbs (Hawhee 2004). My current enquiry asks – what are the human capabilities and capacities (related to *mêtis* and *kairos*) cultivated through the practice of live weaving and live coding; indeed, how might weaving and coding be *practiced* as *askēsis*, as potential practices of the self?

The connections between live coding and ancient weaving that I seek to excavate are less directly to do with the shared technology (the relation between the computer and the loom), nor shared notational systems (pattern and code) or mathematical algorithms, nor even the relationship or resonance between the resulting weaves (whether digital or textile). My focus is more on the capacities, knowledges and qualities of attention activated “inter”, emerging *in between* the disciplinary lines, moreover, through the relation or negotiation between human and machine; through the live and embodied process of decision-making involved in both weaving and coding which conventional notational systems seem arguably unable to fully account for. What ‘lost’ or buried connections between coding and weaving emerge through disrupting or dislodging the position of the Jacquard loom in the historical development and conceptualization of these

practices? What knowledges or capacities become lost or devalued through the privileging of speed, productivity, economic efficiency and standardization that technological developments such as the Jacquard loom facilitate? How might these knowledges and capacities be recuperated or retrieved? Indeed, certain technologies actively create the conditions of ignorance or alienation, where a technology has the capacity to be used or operated in the absence of any knowledge of underpinning process, principles or structure. In doing so perhaps, what becomes cultivated is a reliance on templates, on a received standard or model developed for a specific (predetermined) purpose or function. The possibility of deviation from the norm, for bespoke options, for modification or adaptation becomes problematized, increasingly less of an option. In time, the capacity to imagine other ways of doing things might dissolve or dissipate; possibilities conform to the standard fit, the path of least resistance. Here perhaps, it is possible to argue how the acceptance of standards or templates alongside ignorance of underpinning structures and causes within one context, facilitates the same in other aspects of lived experience. Or else perhaps, more affirmatively, *can* the questioning of standards or templates alongside increasing awareness of underpinning structures and causes within one context facilitate the same in other aspects of life? The revelation and live reworking of digital code through the performance of live coding involves showing and sharing the unfolding logic of a language so instrumental to contemporary life, but in which few are fluent. Learn the language of the operator (the programmer or code-writer) or be forever subject to another's code. "Program or be programmed", (Rushkoff 2010); code or be coded; write or be written; weave or be woven.

The live coding and ancient weaving practices that I have encountered within the *Weaving Codes, Coding Weaves* project invite a more complex, nuanced or even entangled human/machine relation, where technology is not so much put to use as *worked with*, the process unfolding through attending to – even collaborating with – the resistance exerted by the technology or apparatus rather than conceiving it simply as a tool that needs to be brought under control, *mastered*. Creating the right tension – a process of improvisatory working emerges through cultivating an understanding of tolerance, how far something can be pushed or pressured before it breaks, indeed, when to instill breaks or rests. Gilles Deleuze names the power to affect other forces – *spontaneity*, and to be affected by others – *receptivity* (Deleuze 1999: 60). Somewhere between spontaneity and receptivity, somewhere between control and letting go, somewhere between affecting and being affected. Rather than giving over responsibility to the inevitability of a rule's logic, within live coding and live weaving practices the coder-weaver consciously adopts a medial position, actively maintaining the conditions that will keep the unfolding of action dynamic. Debra Hawhee conceptualizes the medial position of "invention-in-the-middle" as a *kairotic* movement involving "simultaneous extending outwards and folding back"; it is a "space-time that marks the emergence of a provisional 'subject', one that works on and is worked on by – the situation" (Hawhee 2002: 18). *Medial*. I think of the helmsman steering the boat, navigating the competing pressures and forces of the water and the wind, or else the *artist-pencil* drawing. Loom like boat like laptop – each an extension of human capacity, embodied prosthesis. Within these various practices (weaving, coding, drawing, indeed sailing), where does the capacity of body end and prosthesis/apparatus begin? Both live coding and ancient weaving foreground understanding of process and structure, refusing or even undoing the logic of a given, accepted model or concept in order for it to be reworked or modified. Yet, the mode for understanding process is not based wholly on abstraction as such or taken as a given, rather cultivated through use and experiment, through trial and error, by doing something as a way of knowing how something is done, moreover, for knowing how it might be changed, *swerved*, taken in a different direction. Or rather, understanding is cultivated through the oscillation or even 'shuttling' between 'discontinuous' systems of abstract notation and the 'continuous' experience of a lived process. What are the cognitive and bodily intelligences operating in this space between the discontinuous and continuous, between the abstract and the lived?

For the Ancient Greeks, the term *mêtis* described a form of *wily* intelligence capable of seizing the opportunities (*kairos*) made momentarily visible as the prevailing logic within a given structure or system yields. *Mêtis* is the art of preparing for what could not have been anticipated or planned for in advance; it the same skill used in catching the force of the wind or the turn of the tide, which as Marcel Detienne and Jean-Pierre Vernant note is "as prompt as the opportunity that it must seize on the wing, not allowing it to pass" (1991/1978: 15). Harnessing the properties of dexterity, sureness of eye and sharp-wittedness, *mêtis* "attempts to reach its desired goal by feeling its way and guessing"; it is a "type of cognition which is alien to truth and quite separate from *episteme*, knowledge" (Detienne and Vernant 1991/1978: 4). Reflecting on its role within Ancient Greek rhetoric, Detienne and Vernant describe *mêtis* as, "a type of intelligence and of

thought, a way of knowing; it implies a complex but very coherent body of mental attitudes and intellectual behaviour which combine flair, wisdom, forethought, subtlety of mind, deception, resourcefulness, vigilance, opportunism [...] It is applied to situations which are transient, shifting, disconcerting, and ambiguous, situations which do not lend themselves to precise measurement, exact calculation or rigorous logic” (Detienne and Vernant 1991/1978: 3 – 4). Knowledge through experiment might take the form of *doing and undoing*, the repeated labour of trying something out, over and over, again and again; tacit knowledge cultivated through the accumulation of tests and attempts. Here, repetition might be undertaken less towards the perfection of a given move or manoeuvre but rather towards the building of confidence and capacity. A working knowledge of a process or material such that it becomes ingrained in mind and muscle, activated at the fingertips and in the process of thinking *en acte*, live and emergent to the situation rather than pre-planned in advance. In these terms then, it could be argued that the nature of the knowledge is less of a tacit kind or of a ‘know how’, but rather a form of *knowing* closer to the “immanent *intensification*” of thinking which philosopher Alain Badiou (following Nietzsche) asserts “is not effectuated anywhere else than where it is given – thought is effective in situ, it is what ... is intensified upon itself, or again, it is the movement of its own intensity” (Badiou, 2005 58 – 9). A tactical knowledge performed through receptivity to the possibility of what remains unknown, open to the unfolding situation. Not a knowledge that is easily banked and transferable, but rather acquired *through* practice, moreover, activated only in-and-through practice.

To improvise within a given structure requires skillfulness and attention, a capacity for biding one’s time and knowing when and how to act. Here then, rules or instructions are not to be diligently followed but rather have the capacity to be modified or adapted even while they are being executed, the tension of an unfolding thread of weave or code varied as it is being woven/written, or else undone and rewoven, enabling the possibility of a change of tack. For live coders including the collective *slub* (Dave Griffiths, Alex McLean and Adrian Ward) “the preferred option for live coding is that of interpreted scripting languages, giving an immediate code and run aesthetic” (Collins *et al.* 2003: 321). Here, audiences encounter projected code as a running command line whilst it is being modified and rewritten by the programmer and in some specific instances *by* the code or interpreting system itself. Cox notes, within certain live coding practices the, “running code is also able to edit its own source code ... That these self-modifications happen directly to the code being edited in real time puts the code visibly on the same level as the programmer” (Cox 2013: 61). The live running code makes manifest a developing logic based on the principles of *what if*, through the testing of the possibility of *this* or *this* or *this* or *this*. What then, is the specificity of thinking-in-action activated whilst improvising within a live running code, and how might it relate to *working on* the loom? Indeed, the *means* through which the same result is arrived can create different kinds of knowledge, different human capacities.

Rather than through the unfolding of trial and error – the generative testing of *this* or *this* or *this* – knowledge might be acquired through the inversion of a given process. Here, undoing comes *first*: reverse engineering of a weave or code necessary for seeing the underpinning structure, not only the surface pattern. This capacity for differentiating the pattern from the structure has an implicit political imperative or application, cultivating the ability to discern an essential sameness within certain options offered, for recognizing that certain choices are effectively cut from the same cloth. An active undoing then for knowing how something works or is structured, for seeing beyond the surface of things. Acts of appropriation, hacking and backtracking as a means of taking back control, no rather for *resisting* control, for reasserting the potential for creative improvisation within a seemingly standardized process, for recuperating human agency within systems whose options seem increasingly closed, prohibitive. A form of “creative consumption” (Michel de Certeau 1984) or the cultivation of a “minor language or practice” (Deleuze and Guattari 1986) wherein the prescribed ‘codes’ and patterns of the dominant culture are appropriated (hacked), modified or inverted (creatively reverse-engineered), and then redirected towards other (often less utilitarian) ends. Here then, existing patterns, rules and codes are not to be taken as given (as fixed or unchangeable) but rather appropriated as a found material with which to work, rework. The process of coding or weaving in these terms is not conceived as an algorithmic operation whose logic is simply imported, set in motion and allowed to run its course; rather both have the capacity to be unraveled and rewritten as events unfold. Not so much the Beckettian “fail again, fail better” model (Beckett 1999: 7) – a doing and undoing for reflecting a relation between utility and futility – but rather an affirmative *and* resistant practice.

Doing and undoing, undoing and re-doing: performed as a mode of deviation or subversion, of purposefully non-productive labour. I am reminded of Penelope, wily weaver of Ancient myth, wife of Odysseus in Homer's *Odyssey* – weaving by day and unweaving by night, willfully unraveling the weave such that by morning the task might begin afresh. Hers is the act of unweaving and reweaving to avoid the completion of a task, for refusing the teleology of outcome or commodity, the production of a product and its consequences. This might be seen in the writing of certain live coders, who rather than working towards some teleological endpoint, might even attempt to begin and end with nothing. For Penelope – the stakes of whose weaving were indeed quite high – the practice of unweaving and reweaving was performed as an act of quiet resistance, so as to thwart the terms of a situation from which there would seem to be no way out. For the contemporary live coder, might not the Penelopean logic of doing and undoing, or even undoing and then redoing, also be harnessed as an act of 'minor resistance', conceived as an attempt to thwart or subvert capture by capital, refusing the terms of easy assimilation. Here, code is woven only to be unraveled, or else the emphasis is process-oriented, code remaining only as a trace or residue of live action, for making tangible the process of decision-making.

Whilst the remains of code from a live performance enables the capacity for something to be repeated again or reworked, it would appear that both live coding / live weaving are somehow less about approaching the situation with 'a code prepared in advance', but rather have to be practiced *as a practice*. Weaving and unweaving of both code and thread as an open-ended process, not so much concerned with the production of product as *experience*. Yet, what *other meanings* and capacities – if not products – might be produced therein? I think of Luce Irigaray when she says, "one must listen differently in order to hear an other meaning which is constantly in the process of weaving itself, at the same time ceaselessly embracing words and yet casting them off to avoid becoming fixed immobilised" (Irigaray 1980: 103). What kinds of performativity, what politics, what philosophies, what poetics emerge therein? For Barbara Clayton, the Penelopean poetics of weaving and unweaving are generative, where "undoing does not signify loss or nullity, but rather life affirming renewal and the constant possibility of new beginnings" (Clayton 2004: 124). Not the repetitive practice of sameness then, but rather one of attending to difference, to the potential twists, variations and permutations of the thread or code. Here, a 'doing-undoing-redoing' perhaps akin to the Deleuzian conceptualization of a *plier/déplier/replier*, where the act of folding, unfolding and refolding "no longer simply means tension-release, contraction-dilation, but enveloping-developing, involution-evolution" (Deleuze 2006: 9). Or else the practice of undoing might be undertaken in order to create the conditions for doing over and again, repetition as a means of embodied and affective knowledge production, the knowledge that comes from a process *practiced*, cultivation of the art of knowing *when* as much as *how*.

Repetition of a process as training or as exercise, *askēsis* even? *Askēsis*: preparatory training and reflexive exercises connected to the cultivation of *technē*. Could live coding and indeed live weaving be conceived as *askēsis* for practicing or testing the art of timing or of timeliness, the capacity for responding to the new situation as it unfolds, attending to the gaps and deciding how to act. In one sense, both live coding and weaving can be considered *kairotic* practices based on the principles of intervention and invention-in-the-middle. *Kairos* is an Ancient Greek term meaning an opportune or fleeting moment whose potential must be grasped before it passes. It describes a qualitatively different mode of time to that of linear or chronological time (*chronos*). It is not an abstract measure of time passing but of time ready to be seized, an expression of timeliness, a critical juncture or 'right time' where something *could* happen. *Kairos* has origins in two different sources: *archery*, where as Eric Charles White notes, it describes "an opening or 'opportunity' or, more precisely, a long tunnel like aperture through which the archer's arrow has to pass", and *weaving* where there is "a 'critical time' when the weaver must draw the yarn through a gap that momentarily opens in the warp of the cloth being woven" (White 1987: 13). In *kairotic* terms, the importance of weaving is reiterated – as both a practice and also as a metaphor for articulating a particular quality of thinking-in-action (perhaps even 'loom thinking') (Jefferies 2001). A seizing of opportunity based on cunning intelligence and propitious timing, on the *kairotic* art of knowing when as much as where and how.

Yet, the opportunity of *kairos* has little power on its own; it requires the perceptions and actions of an individual capable of seizing its potential. As Debra Hawhee states, "*kairos* entails the twin abilities to notice and respond with both mind and body ... the capacity for discerning *kairos* ... depends on a ready, perceptive body" (Hawhee 2004: 71). For White, *kairos* involves a "will-to-invent" or form of improvisation,

that necessitates “adaption to an always mutating situation. Understood as a principle of invention ... *kairos* counsels thought to act always, as it were, on the spur of the moment” (White 1987: 13) or perhaps in live coding terms through a process of coding “on the fly”. As Nick Collins *et al* note, live coders “work with programming languages, building their own custom software, tweaking or writing the programs themselves as they perform” (Collins *et al.* 2003:1). Code is written as it is performed; a practice often referred to as ‘coding on the fly’ or ‘just-in-time coding’ (or what I would propositionally name ‘*kairotic* coding’). White states, “*Kairos* stands for a radical principle of occasionality which implies a conception of the production of meaning in language as a process of continuous adjustment to and creation of the present occasion” (White 1987:14 – 15). Based on the twin principles of *mêtis* and *kairos*, Ancient *technē* affords an alternative epistemological framework for addressing key questions of live-ness and dexterity critical to live coding as a practice.

A practice based on timing and timeliness, emerging between the principle of biding one’s time and knowing when to act. The weaver-coder navigates a course of action by intuiting when to yield to the rule or code or even the technology itself and when to reassert control, by knowing when to respond and when to interrupt. Yet within the logic of *technē*, opportunities are produced rather than awaited. It is a practice or art deemed capable of setting up the conditions wherein *kairos* (the time of opportunity) might arise and in knowing (through a form of *mêtis* or intuitive intelligence) how and when to act in response. *Kairos* involves the making of the situation at the same time as deciding how to act. A gap is made in the weave at the same time as deciding how (and when) to shuttle the thread through. A language is generated simultaneous to its use. A live and present practice: the live toggling back and forth of the cursor and the shuttle, decisions made from inside the weave, from within the continuity of a process (a running code) rather than applied by as a process of design from without. A *kairotic* practice is not one of planning in advance or designing from a distance. There is no concealment of preparation, no cuts to be made after the fact – all is visible, all part of the work. The back and the front of a process are indivisible; moreover, the polar logic of self and technology, discontinuous and continuous process, hidden and visible becomes blurred. Preparation becomes folded into the practice itself, is part of (and not prior to) the process. Moreover, each action has the capacity to create the conditions or scaffolding for the next; what is at first the weft will later become the warp. Perhaps it is in this sense that such practices might be considered *askēsis* or training exercises, the principles cultivated therein – of one action setting up the conditions for the next – expanded as a ‘practice of the self’, life as a work of art practiced as the warp and weft of an unfolding code/weave. In this sense, my paper addresses the relation between ancient weaving and live coding through the prism of *technē*, a form of practical knowledge combining principles of opportune timing (the weaver-coder’s *kairos*) and cunning intelligence (a specifically *Penelopean metis*), in order to ask more speculatively, ‘how might live coding and live weaving be imagined as pragmatic technologies of the self and society for twenty-first century life’?

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