Computational Porosity: Benjamin, Lācis and Algorithmic Life

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ABSTRACT

This article develops the concept of computational porosity to understand how contemporary computational systems blur distinctions between human and machine agencies through layered infrastructures of code, data, and automated decision-making. Drawing upon Walter Benjamin and Asja Lācis's 1925 essay, *Naples*, we argue that their analysis of urban architecture and social life offers a productive theoretical framework for analysing computational systems. Benjamin and Lācis identified porosity as a critical concept to describe Naples, where boundaries between private and public, sacred and profane, work and leisure became fluid through the material structure of the city. We extend this concept to examine how computational infrastructures similarly create porous conditions through three key dimensions: (1) infrastructural porosity, where computational layers interact across hardware, software, and networks (2) temporal porosity, where computational time operates non-linearly through caching, prediction, and asynchronous processes and (3) agential porosity, where human and algorithmic decision-making become entangled in ways that resist clear agential identity. Rather than treating computation as a closed system of discrete operations, we demonstrate how porosity reveals the improvisational, threshold-crossing character of contemporary computational practice. This perspective challenges deterministic accounts of computational agency and opens space for understanding how computational systems might be sites of unexpected possibilities and unforeseen constellations, much as Benjamin and Lācis observed in Neapolitan street life.

Porosity in Naples

"Like 'aura,' indeed the term 'porosity' summons the spatial to the service of the cognitive and the historical; but aura belongs to the philosophical and indeed to the more narrowly aesthetic realm, while porosity tends toward social relations. '[So] dispersed, porous and commingled is private life ... [that] the true laboratories of this great process of intermingling are the cafes.' This sense of the overlap, the interpenetration, the fading of boundaries, is perhaps the optical illusion of the

Northern visitors, who need their differentiated categories in order to perceive and articulate their absence in Naples". (Jameson, 2020: 117)[1]

The seemingly anarchistic social organisation of 1920s Naples provided the context for Benjamin and Lācis's influential analysis of urban form and social life. We want to suggest that their observations of how architectural and social forms interpenetrate through material structures offers us a theoretical framework that, whilst historically specific to interwar Naples, provides remarkable insights for understanding contemporary computational systems. Before developing this connection, we want to examine how Benjamin and Lācis articulated their concept of porosity through their reading of Neapolitan architecture and social relations, and in particular their attention to the material specificity of tuff stone and its use as a metaphor to describe Neapolitan social organisation.

In their Naples essay, Benjamin and Lācis (1925/1996) depict the city as a living tableau of interpenetrating spaces and activities. They observe that in Naples, "No situation appears intended forever, no figure asserts it 'thus and not otherwise' (p.416)". Everything is in flux; boundaries between domains are fluid. The authors coin Porosity as the term for this "great process of intermingling" (p.421) in which private and public life are entangled. Porosity refers initially to the physical fabric of Naples. The city's buildings are constructed from tuff stone, a material full of holes and cavities. As Jameson (2020: 118) suggests: "The porosity of the stone is thus a material in which matter and emptiness meet and mix, just as already figural openings in the walls permit a mingled vision of inside and outside". Houses, courtyards, staircases and streets seem to bleed into one another. Doors and windows stand open; activities flow from inside to outside. Benjamin and Lācis describe cliffside grottos carved into the rock that serve as both dwellings and gathering places, with "a door… here and there in the rock" leading into "large cellars, which are at the same time sleeping places and storehouses" (p.416). Even the line between solid architecture and the process of building or decay is blurred: "In such corners, one can scarcely discern where building is still in progress and where dilapidation has already set in. For nothing is concluded" (p.416). Porosity, then, is not just a literal quality of the stone, but an enacted principle of life in Naples. Benjamin and Lācis write, "Building and action interpenetrate in the courtyards, arcades, and stairways. In everything, they preserve the scope to become a theater of new, unforeseen constellations" (p.416). The city's physical spaces are continually transformed by human activity: a narrow alley might host an impromptu market; a staircase becomes a social forum; a balcony doubles as a theatre box. "The stamp of the definitive is avoided" (p.416); nothing in Naples is locked into a single permanent function.

Porosity manifests temporally as well. Benjamin and Lācis observe that festival time and workday time seep into each other in Naples. "Irresistibly, the festival penetrates each and every working day," they write; "Porosity is the inexhaustible law of life in this city, reappearing everywhere" (p.417). In other words, everyday life in Naples has a festive, improvisational character: "A grain of Sunday is hidden in each weekday. And how much weekday there is in this Sunday!". The essay opens with an anecdote of a priest being carted through the streets in punishment and accidentally blessing a wedding procession that crosses his path, bringing the crowd to its knees. Such incongruous scenes exemplify Naples's ability to hybridize the sacred and profane at any moment. Children play among church altars; vendors turn alleys into fairgrounds. This melding of times is an aspect of porosity,

1 It is worth comparing this reading with Glynn (2020) who argues that, "the critical concept of porosity advanced by Benjamin and Lācis should be re-evaluated not as a quality inherent to the city of Naples per se, as it has been received and deployed in critical and cultural work, but as the product of a Northern European gaze and of the encounter between a Northern European sensibility and its Southern Other at a precise historical moment" (Glynn, 2020: 16).

the city's time is not a linear schedule divided into work versus rest, but a continuum where work can become play and vice versa.

Ultimately, Benjamin and Lācis present Naples as a threshold city: a city of in-betweens. Thresholds are literal, the "inconspicuous door" covered by only a curtain that leads from a filthy courtyard into a "lofty, whitewashed church interior" in one step (p.416), and metaphorical, as when personal dreams merge with collective life on the streets. "His private existence is the baroque opening of a heightened public sphere," they write of the individual who crosses such a threshold. Naples thrives on these thresholds. The essay even remarks that side alleys give glimpses of hidden taverns and scenes, and one cannot tell where the private ends and public begins. Rather than being a defect, this porosity is generative: it creates a constant state of possibility. Life in Naples is lived ad hoc and improvised, open to "new, unforeseen constellations" (p.416) at any moment. The authors link this to a passion for improvisation among Neapolitans: "Porosity results not only from the indolence of the southern artisan, but also, above all, from the passion for improvisation, which demands that space and opportunity be preserved at any price" (p.416–417). In other words, leaving things unfinished or flexible, whether a building project or a daily plan, is what allows the sudden eruptions of creativity and eventfulness that characterize Naples. Porosity is thus both a structural condition and a cultural practice of embracing the intermediate, the transient, and the unexpected.

Benjamin revisited the theme of Naples's porosity in a radio broadcast he wrote and presented in 1930, as part of a youth-oriented programme (later collected in Radio Benjamin, 2014). This radio play "Naples", complements the 1925 essay with vivid scenes of Neapolitan everyday culture, reinforcing the idea of the city as a porous, improvisational environment. Benjamin the radio narrator virtually walks his audience through Naples, highlighting its noise, movement, and unexpected juxtapositions. For example, he describes the new underground train that had just opened, and how upon arriving he found the cars overrun by swarms of street urchins hanging from the doors and crowding the seats for a free ride (p.145). This humorous image of children commandeering the modern underground sets the tone, Naples constantly subverts the orderly or the modern with playful chaos. Even technological progress (the underground train) is immediately absorbed into the city's porous life as just another stage for popular antics.

Throughout the radio piece, Benjamin emphasizes how everyday life in Naples shades into spectacle and vice versa. He describes the Nativity scene displays that fill the streets around Epiphany (January 6th), where elaborate figurines are set up in competition; but tellingly the figures include not just Magi and shepherds, but also local types like "macaroni dealers, mussel sellers, and fishermen that accompany the manger scenes" (p.146); another example of porosity between the sacred story and the profane world. Festivals in Naples draw everyone in, Benjamin mentions the Piedigrotta festival in September, an ancient fertility feast turned modern song competition, during which almost every day there is something happening and even the very poorest participate. Popular music composition becomes a civic sport; "Naples showers renown on a gifted singer nearly as much as America does on a talented boxer," (p.150) Benjamin quips. Benjamin's radio play thus highlights how art, leisure and fame in Naples are democratized and woven into daily life.

By the end, Benjamin draws a conclusion about everyday life and festival life, writing "what's remarkable is how the two blend into each other, how every day the streets have something festive… and how even Sunday has something of a workday feel to it" (p.151). This closing insight mirrors the essay's statement that "a grain of Sunday is hidden in each weekday". The radio play thus reinforces

porosity in more colloquial terms, showing a modern audience how Naples lives on the threshold; between work and play, waking and dreaming, order and chaos. Benjamin's radio portrayal also subtly invites a political reading, amid the colourful anecdotes, one senses how the Neapolitans' creative intermingling of life's spheres could suggest a form of resilience or quiet resistance to the disciplined routines imposed by industrial modernity. The city's very porousness, its refusal of fixed boundaries, hints at an alternative way of life where interruption and improvisation keep experience fresh and communal. Jameson (2020: 118), for example, describes the Neapolitans as "ancestors of Baudelaire's modern nineteenth-century Parisian crowds, who play so crucial a role in Benjamin's aesthetic and political imagination; but they are, so to speak, the real thing, collectivity as it existed before modernity, a glimpse into the premodern past" .

Benjamin's experience in Naples helped shape the very way he later conceived historical images in his work on the Paris arcades (Benjamin, 2002). As Adorno (2003) wrote many years later: "The essay on Naples marks a decisive breakthrough for Benjamin, and back then it had an indescribable effect on a few people, including me." In Naples, Benjamin already perceives that the truth of a social world emerges in its juxtapositions and overlaps, not in linear analysis. He observes how everyday life entwines opposites (indoor/outdoor, work/leisure), and he conveys this through poetic snapshots. Naples is contrasted with more modern, planned cities, it is "anarchic, embroiled, village-like in the centre, into which large networks of streets were hacked only forty years ago" (p.416). In a subsequent image, a teetering tenement "seems held together at the corners as if by iron clamps, by the murals of the Madonna," a literal image of religious past shoring up secular present. Such composite images, where disparate times coexist, are what Benjamin means by dialectical. They are pregnant with contradiction, the stability of faith next to the instability of the modern slum, or, say, the opulence of a baroque church entered through the poverty of a slum alley. By arresting our gaze on these juxtapositions, Benjamin allows the "constellation" to form in our mind. Eiland and Jennings (2014: 211–212) suggest,

> *" 'Naples' is an important text not just for the complexity of its view of the fabled city; it is also the text that introduces the prose form that Benjamin would utilize and refine over the next fifteen years, the Denkbild or 'figure of thought.' There is no discursive through-argumentation in 'Naples.' Instead, the observations and reflections are presented in paragraph-length clusters of thought revolving around a central idea. These central ideas recur at intervals through the essay so that the reader is challenged to repudiate constructs based on linear narrative in favor of constellations of literary figures and ideas (our emphasis)."*

In Naples, multiple times and meanings coexist, ancient traditions persist in modern street life, public and private spheres interweave. Each porous scene is a constellation of social forces; a wedding held in a crowded courtyard might be at once a sacred rite and a neighborhood spectacle, blurring old ritual and modern sociability. These constellations are proto-dialectical images, they freeze a moment of life but within it we detect tensions between tradition and modernity, individual and collective, structure and improvisation. Benjamin's later idea of "dialectics at a standstill" takes this insight to a philosophical level, any critical historical moment can be read as a porous interpenetration of past and present that must be seized in a single image. In the *Arcades Project*, Benjamin (2002) even describes his method as assembling "the whole through the monad of the fragment," treating each artifact or citation as a window into the total constellation of the 19th century.

Furthermore, porosity's emphasis on mixing what is hidden and what is visible, aligns with the way dialectical images bring hidden historical forces to light. In Naples, what is concealed (e.g. private life) constantly bleeds into public view; analogously, in a dialectical image, what is latent in the past (a never-realised utopian desire or a repressed conflict) suddenly becomes visible in the present in the form of a constellation. The "porous" way of seeing means attending to thresholds, cracks, and overlaps, exactly where dialectical insight occurs. Benjamin (2002) came to believe that to "awaken" from the myth of progress, one must look for the cracks in the historical continuum (the moments that do not fit the narrative of history). In Naples, the entire city was full of such cracks, both literal and metaphorical, through which alternative social possibilities seeped out. We can say that porosity in Naples offered Benjamin a model of historical consciousness where truth appears in the interstices, in the in-between spaces where oppositions meet.

Walter Benjamin's fascination with porosity in Naples also connects to a larger set of aesthetic principles he developed under the influence of Bertolt Brecht and other avant- garde practitioners (Wizisla, 2016). Central among these are the notions of estrangement (*Verfremdung*) and refunctioning (*Umfunktionierung*); techniques originally formulated in the context of radical theater and art, which Benjamin sought to apply to criticism and urban experience (Benjamin, 1934). *Verfremdung* is the outcome when an everyday situation is made to look unfamiliar and thus questionable. Benjamin embraced *Verfremdung* as a means of penetrating the mystifications of bourgeois culture. In epic theater, this might be achieved by having an actor step out of character or by presenting a historical event in a bizarre, anachronistic way. Benjamin admired surrealist art for a similar reason, by juxtaposing incongruous elements, surrealism created profane illuminations that estranged the familiar (a street, a room) and revealed the hidden dreamlike qualities of reality. The city of Naples provided naturally such a surreal tableau. Every person or object in Naples could suddenly become something else, step into a different scene: "No figure asserts it is 'thus and not otherwise'". This is estrangement not created by an artist on a stage, but by the organic social practices of the city. Benjamin treats Naples as a kind of collective artwork of estrangement, where everyday life continuously stages itself in theatrical ways. The result for northern observers is an awakening from their preconceptions: one realizes 'normal' life could be lived very differently. Benjamin's pre-occupation with thresholds ties into estrangement as well. At thresholds, perceptions can change quickly; one can experience a tiny shock of *Verfremdung* stepping through a door that leads from chaos to calm or vice versa.

The idea of refunctioning further ties together Benjamin's aesthetic-political programme with Brecht's praxis. Refunctioning (*Umfunktionierung*), a term Benjamin uses in his 1934 essay *The Author as Producer*, means taking existing artistic or technical forms and transforming their function toward new, progressive ends. It is about repurposing cultural tools (printing presses, theaters, radios, cameras, literature itself) for liberatory purposes rather than for bourgeois profit or passive consumption. Brecht, for example, refunctioned the theater by turning a venue of escapist entertainment into a forum for political education and critical thinking. Benjamin was convinced that artists must not only report on the struggles of the proletariat, but actively intervene in the means of cultural production to change who controls them and how they are used. We can see Benjamin's celebration of Naples's porosity as an appreciation for a naturally occurring refunctioning of spaces and rituals. Naples shows how the forms and instruments of daily life, such as buildings, streets, festivals, can be bent away from their official functions and made to serve the people's collective desire for amusement, sociality, or subsistence. This celebration of porosity implies a political vision, the refunctioning of the city from a machine for efficient living (the modern, hygienic, rationalized city)

to a porous organism that encourages collective experiences, even uncomfortable or messy ones, that could galvanize social awakening.

Figure 1: Café Hiddigeigei on Capri where Benjamin and Lācis first met. Photo: Giorgio Sommer, ca. 1890 (Mittelmeier 2025).

Porosity in the Age of Algorithmic Management

We argue that Benjamin and Lācis's concept of porosity can be used to help understand how computational architectures structure contemporary social relations. In doing so we agree with Smith (2021: 255) that porosity has the interesting conceptual value of "problematiz[ing] in turn apparently stable cultural models that in contrast take themselves too much for granted". Just as Naples' built environment created porous boundaries between domains of life, computational systems generate multiple forms of interpenetration between human and machine agencies through layered infrastructures of code, data and automated decision making (see Berry, 2014: 58). The crucial difference is that computational porosity operates not through stone and concrete but through the material substrate of processors, networks and algorithms that increasingly mediate social existence. This includes the proliferation of enterprise software, algorithmic management systems, and platform-mediated labour that restructure how work is coordinated, controlled, and experienced in organisations. The aim is to deploy the concept of porosity in two ways, first as a *descriptive concept* which helps understand how discretisation as a practice within computation is giving way to diffusion techniques but also to employ porosity as a *critical concept* in the sense given by Benjamin and Lācis who saw it as an alternative to bourgeois ways of organising the lifeworld. In his later essay on theories of fascism Benjamin would warn of the appropriation of technology by the bourgeois society, pointing out "the gaping discrepancy between the gigantic power of technology and the minuscule moral illumination it affords. Indeed, according to its economic nature, bourgeois society cannot help but insulate everything technological as much as possible from the so-called spiritual, and it cannot help but resolutely exclude technology's right of codetermination in the social order" (Benjamin, 1930: 32).

This has implications for understanding contemporary organisational life. Just as Naples resisted the rationalised planning of modern cities, computational porosity challenges organizational boundaries and hierarchies. In platform organizations, the distinction between employee and contractor, workplace and home, working time and leisure time becomes increasingly porous. Uber drivers, for instance, exist in a deliberately porous space where they are neither fully independent nor fully employed, where the car becomes simultaneously private property and workplace, where algorithms interpenetrate with human decision-making about when and where to work (Rosenblat, 2019). Similarly, in remote work arrangements mediated by Slack, Zoom, and other platforms, organisational boundaries become porous in new ways. The office diffuses into domestic home spaces and synchronous and asynchronous communication blur together making corporate surveillance and individual autonomy clash through activity monitoring software and flexible scheduling.

Where Benjamin and Lācis examined how Naples' architecture enabled the constant movement between interior and exterior spaces, we can consider how computational systems create fluid boundaries between local and cloud processing, between human and machine cognition, and between private data and public circulation. The physical permeability they identified in Naples' buildings finds its contemporary parallel in the technical permeability of computational systems that allow data and processing to flow across previously distinct spheres and across planetary networks. For example, we might look at the structure of modern cloud computing infrastructures. These systems operate through what appears on the surface as a rigid separation between edge devices, core processing, and cloud storage (Berry 2023). Yet, in practice these boundaries are remarkably fluid. A smartphone application, for instance, continually negotiates the distribution of computational tasks between local processing and remote servers, creating infrastructural porosity.

Benjamin and Lācis's observations about Naples' architecture provide remarkably apt metaphors for understanding contemporary digital infrastructures when used as a descriptive concept. The way they describe how "building and action interpenetrate in the courtyards, arcades, and stairways" of Naples or how Naples' architecture is "a space for public life" that "extends into the living quarters" precisely captures how computational systems blur boundaries between public and private spheres. Similarly, in computational systems, code and social practices interpenetrate through interfaces, algorithms and networks, just as Neapolitan architecture created spaces that were hybrid where personal and collective activities were mixed together.

This computational porosity is shown through multiple, interrelated forms that structure contemporary digital culture. Social media platforms create porous boundaries between individual and collective experience through their underlying architectures of algorithmic feed curation, behavioural tracking, and automated content moderation. The private becomes immediately public, filtered through layers of machine learning that shape both what is visible and how it circulates, while these systems are simultaneously shaped by the social relations they mediate. The infrastructural dimension extends beyond individual platforms to encompass entire technical ensembles that facilitate the flow of data, processing, and automated agency across previously distinct domains, potentially dissolving the distinction between system and lifeworld.

When we issue a voice command to ChatGPT or another LLM, the computation flows seamlessly between device, data centre and cloud, creating what appears as a unified interaction but which actually traverses across multiple computational domains. This technical arrangement mirrors the interpenetration of spaces that Benjamin and Lācis observed in Naples, though now operating

through digital rather than architectural forms. Similarly, the diffusion processes that many AI systems now implement, make all cultural works diffuse and hybrid within the latent spaces of their neural networks, a process Berry (2025) calls *diffusionisation*.[2] Indeed, this is

> *"a process through which cultural forms are probabilistically dissolved and reconstituted via computational diffusion processes. Through diffusionisation knowledge and cultural production becomes subject to what is called vector representation and latent space manipulation. These mathematical abstractions allow artificial intelligence systems to blend, morph and generate new cultural forms through probability distributions rather than deterministic rules or simple reproduction. This marks a profound shift from mere discretisation and encoding toward the autonomous generation of synthetic variations that have no original referent in human experience" (Berry, 2025).*

We argue that the relationship between computational porosity and diffusionisation reveals a key transformation in how digital systems process and reshape cultural content. While computational porosity describes the broader phenomenon of interpenetrating boundaries between human and machine agencies, diffusionisation represents a specific technical manifestation of this porosity within AI systems. Through diffusion models, cultural artefacts are not simply stored or processed but become porous themselves as their features, styles, and meanings blur and intermingle within the latent spaces of neural networks. This technical process of diffusionisation thus intensifies the porosity Benjamin and Lācis observed in Naples' architecture, as it operates not just on the level of infrastructure but on the very substance of cultural production itself.

When writing an email using Gmail's Smart Compose, we encounter a particularly revealing instance of computational porosity at work. The system does not simply suggest words, it creates a dynamic interpenetration of human intention and machine prediction that transforms the act of writing. As we compose, our thought processes become intertwined with algorithmic suggestions in ways that go beyond simple automation. The system learns from aggregate patterns of communication across millions of users, creating a kind of collective linguistic porosity where individual expression becomes mediated through statistically derived patterns. This porosity operates on multiple levels, between personal and collective expression, between human cognition and machine learning, and between private communication and Google's data infrastructure. Indeed, this example shows how computational porosity extends beyond the visible interface into complex infrastructures of data collection and processing. Each interaction with Smart Compose feeds back into Google's machine learning systems, creating a form of temporal porosity where past communications shape future suggestions. The social dimension of computational porosity becomes particularly visible in social platforms. Similarly, a personal photograph posted to Instagram immediately enters complex circuits of algorithmic classification, content moderation and automated distribution. The intimate becomes public through layers of computational mediation, recalling Benjamin and Lācis's observations about the interpenetration of private and public life, though now operating through digital infrastructure that shapes how content circulates and becomes visible.

2 The idea that porosity is now also an instrumental process, actuated through computational techniques for the diffusionisation of the lifeworld, raises interesting questions about how a practice of resistance can be integrated into the system. However, we want to suggest that porosity, as Benjamin and Lācis deploy it, points to the excess that cannot be captured fully, even when turned into a computational function. Thereby, computational porosity creates unforeseen lines of flight and potentials for resistance in social and political practice.

This porosity takes on particular significance within corporate or organisational boundaries. For example, algorithmic management systems used in warehouses, call centres, and gig economy platforms, where these systems create what we might call agential porosity, where human and machine decision-making become so entangled that attributing responsibility becomes difficult. When an Amazon warehouse worker's productivity is monitored by algorithmic systems that automatically generate warnings or employee work recommendations, who makes the decision to fire someone? The algorithm processes the data, the manager receives the recommendation, the worker's actions are shaped by real-time feedback from wearable devices. It seems to us that the decision emerges from the porous blurring of human judgment and computational processing. This is similar to Benjamin and Lācis's observation that in Naples "no figure asserts its 'thus and not otherwise'", but now operating through organisational infrastructure that distributes agency across human and non-human actors. This computational porosity obscures accountability whilst intensifying control and will create a number of difficulties unless reflexively understood.

Benjamin and Lācis note that "in everything they preserve the scope to become a theatre of new, unforeseen constellations" helps us to see how computational systems enable endless reconfiguration of social and technical relations. Cloud computing architectures, for instance, mirror the way Naples' buildings served multiple, fluid purposes. Just as a Neapolitan courtyard could transform from marketplace to theatre to social gathering space; cloud infrastructure dynamically reallocates computational resources – for example, compute, data, storage – across different tasks and purposes. Indeed, this mirrors how platform companies like Uber or TaskRabbit dynamically allocate workers to tasks, creating a porous labour market where workers' time and skills become fungible resources to be reallocated in real-time according to algorithmic optimisation.

Benjamin and Lācis describe how porosity results from "the passion for improvisation, which demands that space and opportunity be preserved at any price". This reflection might be used to question how computational systems, despite their apparent rigidity, are often written playfully, with creative coding and innovative designs that can open spaces for unexpected uses and improvisational practices. For example, APIs and software frameworks are often required to preserve the scope for new applications and uses that their original designers never anticipated (Marino 2020). Indeed, their observation that in Naples, "no figure asserts its 'thus and not otherwise'" speaks to the contingent nature of computational systems which, despite their deterministic logic, remain open to contingency and reinterpretation. Such that the "stamp of the definitive is avoided" in both Neapolitan architecture and computational infrastructure, though for different material and social reasons.

In organisational practice, this improvisational quality can be seen in what we might call *work-around cultures*. Just as Neapolitans used architectural porosity to evade official functions and create alternative uses, workers develop tactics to game algorithmic management systems, exploit platform vulnerabilities, or repurpose enterprise software for unintended purposes. For example, call centre workers might share strategies for maximising metrics whilst minimising actual work, Deliveroo riders might use geographic quirks in the algorithm to secure better-paying orders, and remote workers might use mouse or keyboard automation to simulate work activity to evade surveillance software. These practices reveal the porous character of seemingly rigid computational management systems. However, we must also recognise how organisational porosity often serves capital accumulation. The same flexibility that enables worker resistance also enables platforms to

externalise costs, avoid employment obligations, and intensify exploitation through the blurring of work and non-work time.

Figure 2: Using AI diffusionisation image porosity to animate Asja Lācis's image (Image Credit: David M. Berry).Animated version of this figure available at https://stunlaw.blogspot.com/2024/12/porosity-and-computation.html

However, computational porosity is not merely analogous to architectural porosity. Rather, it represents an intensification and acceleration of the interpenetration of spaces and practices that Benjamin and Lācis observed. Contemporary computational systems do not simply enable movement between defined spheres but actively blur the boundaries between them. When we interact with AI systems or social media platforms, increasingly human and algorithmic agencies are diffused in complex ways. The "theatrical" dimension they identified in Naples' architecture becomes literalised in computational systems that transform every interaction into a performance that can be captured.

The political economy of contemporary platforms further demonstrates this porous character. Social media companies construct value-extraction architectures that create deliberate porosity between user activity and corporate profit. Every interaction, every piece of content, every social connection becomes raw material for algorithmic processing (through diffusionisation) and monetisation. The concept of explainability in AI systems provides another crucial example (Berry, 2024b). Current attempts to make algorithmic decisions "explainable" reveal the inherent tension between computational opacity and the need for public accountability (Berry, 2023). This creates epistemic porosity, where technical knowledge and democratic oversight must somehow coexist and interpenetrate.

These dynamics become particularly visible in the rise of what Kellogg et al. (2020) term "algorithmic management", where computational systems make or inform decisions about hiring, scheduling, performance evaluation, and the sacking of workers. Indeed, recruitment algorithms sometimes use systems that screen CVs creating a kind of "temporal porosity" between past hiring decisions (e.g. encoded in training data), present applications, and future workforce composition. The algorithm learns patterns from historical hiring, which often reinforce existing biases about gender, race, and class. When deployed, these algorithms sometimes prescribe these biases whilst appearing neutral and objective. The hiring manager who relies on algorithmic rankings thus becomes enmeshed in a porous decision-making process where human judgment and computational classification are deeply problematic. This raises questions about organisational accountability when discriminato-

ry outcomes emerge from algorithmic hiring systems. Indeed, responsibility becomes distributed across the porous boundary between human and machine agency. The question then is raised, is the fault with the algorithm, the training data, the manager who trusted the ranking, or the organisation that implemented the system? This computational porosity might then cause serious issues for frameworks of organisational responsibility and legal liability. The challenge becomes finding ways to make algorithmic systems legible to public understanding without sacrificing their technical sophistication.

Figure 3: Using AI diffusionisation image porosity to animate Walter Benjamin's image (Image Credit: David M. Berry). Animated version of this figure available at https://stunlaw.blogspot.com/2024/12/porosity-and-computation.html

Yet, computational porosity as a critical concept also suggests possibilities for resistance and reappropriation. Just as Benjamin and Lācis identified how the porous architecture of Naples enabled creative forms of social improvisation, the layered nature of computational systems creates openings for critical intervention. Through practices of reverse engineering, hacking, jamming, adversarial machine learning, and algorithmic detournement (see Berry 2025), the seemingly rigid logics of computation reveal their contingent and contestable character. For example, in adversarial machine learning, researchers and activists can deliberately exploit the porous boundaries of AI systems to reveal their limitations and biases. This recalls Benjamin's (1930) attention to how Naples' street urchins used the city's new underground to subvert the purpose of this technology with playful chaos. Privacy-enhancing technologies, such as Signal, can also create deliberate impermeability within otherwise porous systems.

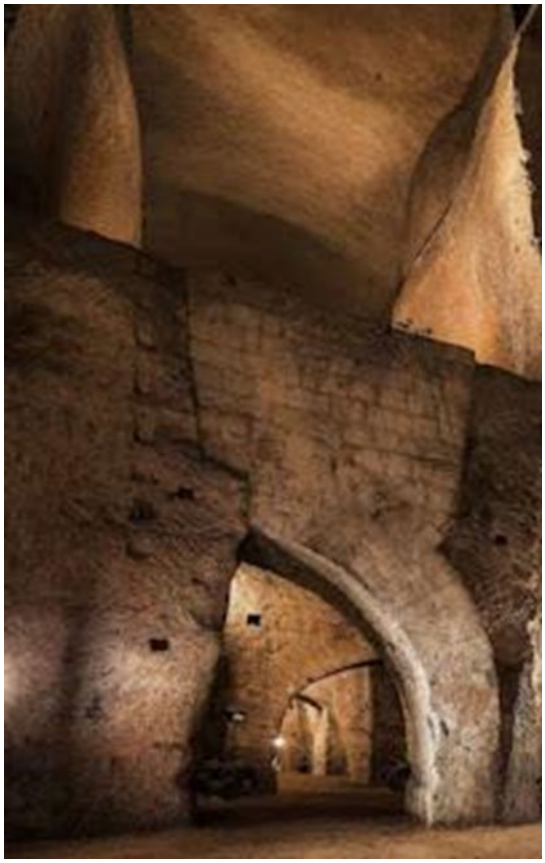

Figure 4: San Lorenzo Maggiore*, a 13th century church in Naples, the foundations made of tuff stone.*

Workers organising themselves into collectives increasingly use the same platforms that enable algorithmic management. For example, Amazon warehouse workers coordinate strikes through encrypted messaging apps, Uber drivers use Facebook groups to share information about surge pricing patterns, and domestic workers organised through platforms like Care.com develop collective strategies for negotiating better conditions. These practices demonstrate what Cant (2019) identifies as new forms of working-class power that operate through and against digital platforms. We see this when trade unions and worker centres increasingly demand algorithmic transparency and collective bargaining over the deployment of management algorithms. The European Union's *AI Act* and similar regulatory frameworks create new porous spaces between technical systems and collective governance, opening possibilities for workers to contest how algorithms organise their labour. This suggests that computational porosity, whilst often serving capitalist rationalisation, also creates openings for re-functioning through collective organisation and democratic control over workplace technology. These examples point toward computational porosity as a critical concept to examine how technical and social forces interpenetrate while remaining attentive to questions of power and resistance, echoing Benjamin and Lācis's dialectical sensibility.

Understanding computational porosity therefore requires moving beyond simplistic binaries of human versus machine agency to examine how technical and social forces interpenetrate at multiple scales. This suggests the need for new critical methods attentive to both the material specificity of computational systems and their embeddedness in broader political economic relations. This mapping of architectural and computational porosity reveals both continuities and differences in how technical systems shape social life. While the material substrate has changed from stone to silicon, the dynamic of interpenetration between technical and social forces remains.

The materiality of silicon in contemporary computation presents an interesting parallel to Naples' tuff stone. Modern semiconductor manufacturing relies on the controlled manipulation of silicon's porosity through processes like ion implantation and the creation of p-n junctions. The term "semiconductor" refers to silicon's porous electronic properties, that is its ability to sometimes conduct electricity and sometimes act as an insulator. Indeed, the actual manufacturing of silicon wafers requires extreme attention to porosity and contamination control in cleanroom environments. This material foundation of computational systems in the controlled management of silicon's porosity suggests a deeper connection to Benjamin and Lācis's analysis than mere metaphor. Just as Naples' architecture emerged from the properties of tuff stone, computational architectures are shaped by silicon's material properties and the technical practices required to control its porosity at the nanoscale (see Mody et al., 2017). Understanding these parallels helps us grasp both the constraints and possibilities created by contemporary computational architectures.

Returning to the Naples essay and radio play helps us understand what is at stake in our computational present. The analysis of Naples was not merely descriptive; it identified how the city's porous architecture enabled forms of life that resisted bourgeois rationalisation and bureaucratic control. Similarly, computational porosity presents us with a dialectical moment. Whilst computational systems create new forms of algorithmic governmentality and platform capitalism, their porous character potentially generates possibilities for alternative social arrangements; a "chance to correct the incapacity of peoples to order their relationships to one another in accord with the relationship they possess to nature through their technology" (Benjamin, 1930: 41).

The key question then becomes how to mobilise computational porosity towards democratic ends.[3] Just as Naples' citizens used the city's porous spaces to create autonomous zones and informal economies, we might identify how computational porosity enables new forms of collective organisation and resistance. For instance, the porous boundaries between local and cloud computing could support decentralised infrastructure projects that prioritise community control over corporate profit. The diffusional character of contemporary AI systems might be redirected towards collective knowledge production rather than data extractivism.

Conclusion

Generative AI is an aesthetic technology of remix. It creates by collating and re-configuring patterns from its training data. This has an uncanny resonance with the artistic techniques of montage, collage, and citation that were central to the avant-garde movements Benjamin loved and to Brecht's epic theater. As we apply Benjamin's ideas, we can see generative AI's outputs as a form of involuntary surrealism as they often contain unexpected juxtapositions, distortions, and a Verfremdung-effect that can either enlighten or mislead, depending on context. Just as the Surrealists collaged disparate elements to jolt consciousness, AI often unwittingly collages fact and fiction. The key difference is intention, the Surrealists wanted to reveal truth's about the psyche and society through absurdity, whereas AI has no intention; it is just statistically blending. But a critical approach can appropriate these AI absurdities as productive estrangements. For example, some artists and writers

3 For example, Anderson (2019: 14) used the idea of porosity to think about "digital platform surveillance on social space"; particularly the interaction between the social and the technical he calls "Digital Porosity," a concept he draws from Zaporozhets (2016). In his time, "Benjamin also saw the possibility that broadcasting would satisfy the expectations of an audience that is contemporary with this technology" (Wizisla, 2016: 115).

deliberately use AI's weird outputs to spur creativity, treating AI systems like an aleatory collaborator. Large language models, trawling through billions of data points and recombining them, might surface hidden cultural obsessions or biases in strange new forms. Indeed, image generators trained on internet data often produce biased or stereotyped images, spuriously classifying people by race, gender, sexuality, and personality (Crawford & Paglen, 2021). When these biases appear blatantly in AI outputs, they can become an estranging mirror held up to society's prejudices. It makes visible what is often obscured in polished human-made media, the deep-set biases in our collective imaginary. Thus, AI's remix aesthetic can become a tool for critique, a way to see the "dream wishes" of society laid out unsparingly, much as Benjamin read the arcades of Paris as the dream wishes of the 19th century.

Benjamin was deeply preoccupied with how new media technologies could serve either emancipation or fascism. His friend Brecht and he discussed how radio, film, and photography (the new technology of their time) could all be used to enlighten the proletariat or deceive and pacify them (Wizisla, 2016). Generative AI similarly could produce estrangement or enchantment, it can make the familiar strange in a way that enlightens (as epic theater intended) or in a way that merely titillates and then numbs (as spectacle can do). In his 1936 essay, *The Work of Art in the Age of its Technological Reproducibility*, Benjamin (2008) famously argued that fascism responds to the masses' new cultural power by aestheticizing politics, staging grand spectacles whilst preserving existing property relations. In other words, fascism grants the masses an expression without rights, channeling their dreams through rallies and mythic imagery to distract from real social change. Benjamin cautioned that modern people, rendered "psychically porous" by consumer-capitalist mass culture, soaked up these extravaganzas as readily as any entertainment. Fascism's aestheticization of politics thus created a horrifying porosity between power and technology. The fascist rally becomes a space where individual boundaries dissolve into the mass, where the distinction between performer and audience collapses in ways that generate both ecstatic identification and profound terror. This is porosity weaponized, the same permeability that allows for genuine human connection becomes a vector for political domination.

Perhaps this illuminates something about our relationship to AI. Our anxieties about artificial intelligence often centre precisely on boundary violations, indeed AI can almost perfectly mimic human speech (e.g. dissolving the boundary between authentic and artificial communication), systems that know us better than we know ourselves (e.g. eroding the privacy of inner life), or technologies that make human labour obsolete (e.g. threatening the boundary between human purpose and mechanical function). Platform companies can exploit temporal porosity to dissolve the boundaries of the working day, making workers perpetually "available" through app notifications and demand-responsive scheduling. Benjamin's analysis suggests we should be attentive to how these fears might be manipulated. Just as fascism exploited the horror of dissolved boundaries to consolidate power, contemporary anxieties about AI porosity might be channeled toward particular political ends. The question becomes not just how to maintain boundaries, but how to cultivate forms of porosity that enable flourishing rather than domination. Indeed, porosity functions dialectically in workplace struggles as it simultaneously enables new forms of worker coordination and new modes of managerial control. Workers will need to increasingly engage in collective reverse-engineering of opaque systems, sharing knowledge about how algorithms calculate work, predict demand, or evaluate performance. A critical concept of porosity must therefore resist managerial appropriation by foregrounding questions of power, exploitation, and resistance.

The implications extend beyond technical systems to questions about the relations between system and lifeworld in an algorithmic age. The concept of *explainable forms of life* that Berry develops elsewhere takes on new significance in this context (Berry, 2024b, 2025). Rather than treating algorithmic opacity as a technical problem to be solved through better documentation or interfaces, we might understand it as a political question of how to create porous boundaries between expert and public knowledge (Berry 2021). This requires new institutional arrangements and technical practices that enable collective deliberation about how computational systems shape social life. Indeed, as Amoore et al. (2024: 3) suggest, "These computational architectures of generative AI models are increasingly penetrating political architectures… and delimit the ethico-political boundaries of what can be known and done in the world". Amoore uses the concept of interruption from Benjamin and Brecht to "locate the breaches in algorithmic arrangements and to show how they could be otherwise" and thus find traces of rejected alternatives in the arrangement of machine learning models. As she elaborates, "Here lies a significant form of resistance; to amplify the branching points as moments where things could have been otherwise, where other possibilities could be inferred; and to refuse the reduction of political difficulty to one that is the output" (Amoore, 2023: 35).

Benjamin's writings on Naples present a city as a living paradigm of porous boundaries and threshold experiences, where life's categories blend and spontaneous theater erupts in the streets; thus offering a counterimage to fascist dissolution of boundaries. In our time, generative AI systems have created new porous zones, between human and machine creativity, between reality and simulation. The porous city of Naples helps us recognize the porous society that AI is contributing to; one in which information flows unpredictably and the private and public, authentic and fabricated, continually intermix. Crucially, Benjamin teaches us to neither valorize such porosity naively nor condemn it outright, but to see in it a site of struggle and possibility. Naples was not an unqualified utopia; it had grinding poverty and exploitation amid its festive chaos as well as the ever present spectre of "the criminal world, the camorra" (Benjamin and Lācis, 1925: 414). Likewise, AI's porosity carries risks of exploitation (privacy leaks, cybercrime) even as it opens opportunities for new forms of collaboration and knowledge-sharing. This suggests that our relationship to AI might require learning to navigate beneficial forms of boundary crossing while resisting those that lead to subjugation or loss of agency. It is a signal to attend carefully to how boundaries are being dissolved and whose interests such dissolution serves. Our task, echoing Benjamin's, is to recognize the constellation, to see the tensions clearly, and choose practices that push AI's use toward emancipation.

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