

Infrastructuring Pop-Up Cities with “Social Layer”: Designing Serendipitous Co-Livings for Temporary Intentional Communities

DANWEN JI, Tongji University, China
 BOTAO ‘AMBER’ HU, University of Oxford, UK

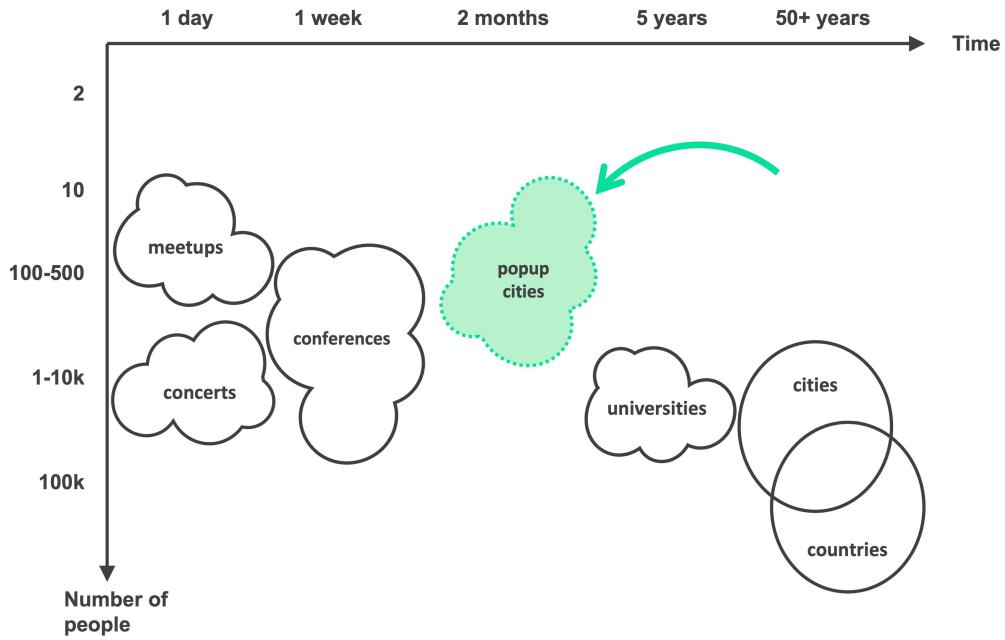


Fig. 1. The Missing Piece: Coordinating Sustainable Communities. Adapted and redrawn from a slide by Janine Leger (2023), originally credited to Balaji Srinivasan.

After the pandemic, a new form of “pop-up city” has emerged—co-living gatherings of 100–200 people for 4–8 weeks that differ from conferences and hack houses. These temporary intentional communities leverage existing urban infrastructure, blending daily life (housing, meals, care) with self-organized activities like learning, creating, and socializing. They coordinate bottom-up programming through an “unconference” system for identity, calendaring, RSVP, and social discovery that fosters spontaneous, serendipitous, enduring ties. This paper examines the design of “Social Layer,” an unconferencing system for pop-up cities. We studied its real-world deployment in ShanHaiWoo (Jilin, China, 2023), muChiangmai (Chiangmai, Thailand, 2023), Edge Esmeralda, Edge Esmeralda (Healdsburg, CA, USA, 2024), Aleph (Buenos Aires, Argentina, 2024), and Gathering of Tribe (Lisbon, Portugal, 2024). Our findings distill: (1) the strong concept “scaffolded spontaneity”—infrastructural affordances that balance structure with openness, amplifying participant agency while maintaining privacy and lightweight governance; (2) design implications for design researchers working on pop-up cities.

Additional Key Words and Phrases: Pop-up City, Temporary Intentional Community, Unconference, Infrastructuring

Authors’ Contact Information: Danwen Ji, Tongji University, Shanghai, China, danwen_ji@tongji.edu.cn; Botao ‘Amber’ Hu, University of Oxford, Oxford, UK, botao.hu@cs.ox.ac.uk.

1 Introduction

For most of modern history, sustained co-living has meant marriage and family life, student residencies in universities, or long-term inhabitation of cities. Shorter formats—workshops, festivals, conferences—create bursts of co-presence and exchange but rarely support the texture of everyday life together. After pandemic, emerging between these poles is a form of collaborative living that is longer than a conference yet shorter than a graduate program: "pop-up cities" [Saleh 2024]—multi-week, residential, self-organized, and thematically oriented cohorts that occupy or overlay existing urban infrastructures. Participants work, learn, and live together while co-creating an evolving program of events, projects, and rituals. They function as situated experiments in how strangers become collaborators, how programs take shape without planners, and how communities organize themselves in time-bounded worlds.

Pop-up cities expose systemic tensions—openness versus safety, spontaneity versus coordination, porous boundaries versus coherent identity—requiring designs that shape relational conditions rather than discrete features. We take "infrastructure" in the CSCW sense—as relational, emergent, and enabling rather than merely technical [Hillgren et al. 2011; Karasti 2014; Le Dantec and DiSalvo 2013; Star 1999; Star and Bowker 2010; Star and Ruhleder 1994]. A socio-technical infrastructure for pop-up cities must make participation visible and legible [Erickson and Kellogg 2000], lower activation energy for hosting and attending, protect privacy while establishing trust, and allow communities to "breathe"—tightening to converge, loosening to explore. Designing for pop-up cities also requires attending to emergent social networks [Ahrens 2018], understanding how infrastructures shape opportunities [Murphy and Jones 2020, 2021], and treating friction as generative rather than eliminable [Ozkaramanli 2022]. Serendipity research further highlights the roles of affordances, discovery, and structured openness [André et al. 2009; Björneborn 2017; Busch 2024; Kotkov et al. 2016; Makri and Blandford 2012], while social network theory emphasizes weak ties, brokerage, and small-world mixing [Burt 2004; Granovetter 1973; Uzzi and Spiro 2005].

Designing for such temporary intentional communities requires rethinking "program." Conferences rely on detailed schedules, expert-curated tracks, and tightly managed keynote economies. Degree programs build semester arcs, syllabi, assessments, and credentialing. Both are heavyweight, predictable, and optimized for coordination under certainty. By contrast, pop-up cities aim for what participants often describe as "serendipitous criticality": enough structure to build trust, safety, momentum, and activation; enough openness to enable discovery, self-direction, and serendipity. This aligns with systemic design principles emphasizing emergent behaviors, and evolutionary change [van der Bijl-Brouwer et al. 2024; van der Bijl-Brouwer and Malcolm 2020]. These communities blend the weak structures of unconferences [Park et al. 2023] with the everydayness of co-living. This raises a core question for HCI and design research:

How can we design infrastructures for serendipity at the scale of a temporary city, and what key characteristics support it?

This paper reports our findings through a Research-Through-Design [Zimmerman and Forlizzi 2014] process involving continuous design and deployment of "*Social Layer*"¹, a modular online infrastructure supporting serendipitous co-living in pop-up cities. It scaffolds spontaneity within temporary intentional communities and reconfigures relational conditions through privacy-preserving credentials for identity and trust, lightweight event initiation and RSVP mechanics, visibility cues, and tools for social discovery and portable community memory. We distill our knowledge through deployments in real-world communities—as "living laboratories" [Björgvinsson et al. 2010; Karasti 2014; Pipek and Wulf 2009].

We contribute: (1) an real-world exploration of pop-up city infrastructure as a systemic design space within temporary urbanism and intentional community [Bishop and Williams 2012; Firth 2019; Meijering et al. 2007; Quinn 2025; Sager 2018]; (2) an articulation of Social Layer as an infrastructural intervention that modulates

¹<https://www.sociallayer.im/>

emergent serendipitous co-living in pop-up cities; and (3) design implications centered on the strong concept of “scaffolded spontaneity”—operating near the edge of chaos [Holland 2003; Kauffman 1993]—which supports serendipity, trust, plurality, and collective agency in time-bounded worlds.

2 Background

2.1 Intentional Communities, Temporary Urbanism, and Pop-up Cities

Human experiments in intentional community have a long history. From ecovillages and artist colonies to 1970s utopian communes and contemporary co-living startups, such initiatives explore alternative forms of collective living, governance, and social innovation [Brown 2002; Shenker 3 31]. They often reconfigure daily life—housing, work, leisure, decision-making—around shared values. While many communities remain small or persistent, recent years have seen the rise of temporary intentional communities, bringing large groups together for bounded periods. Some evolve into long-term formations, echoing historical precedents such as Chautauqua², demonstrating potential for sustained social experimentation.

Urban studies frame “Temporary Urbanism” as tactical, cultural, and strategic interventions that reconfigure space and social relations [Andres 2025; Bishop and Williams 2012; Firth 2019; Mould 2014; Schuster 2001; Stevens and Dovey 2023]. Festivals, pop-ups, and residencies mobilize existing urban infrastructures while layering temporary civic order. Burning Man illustrates temporary cities as socio-cultural infrastructures shaping identities, practices, and collaborative production [Chen 2012; Smith et al. 2022; Turner 2009].

Pop-up cities inherit this lineage but extend it toward hybrid work–learning–living arrangements, often among digitally networked residents. Zuzalu³ assembles a temporary, invitation-based community to co-live and co-work around technology, governance, and decentralized innovation, functioning as a living lab for prototyping social forms, governance models, and collaborative practices [Fitzpatrick et al. 2024; Landa-Avila et al. 2022; Pereno and Aulizio 2025; van der Bijl-Brouwer and Malcolm 2020]. Inspired by Zuzalu, similar pop-up cities have emerged globally⁴, using temporary, mission-driven settlements to build intentional communities and test ideas that typically circulate only online. These arrangements foreground emergent networks, relational infrastructures, improvisation at scale, and methodologically pluralistic approaches, reflecting systemic design’s emphasis on multiple epistemologies and reflective practice [Fitzpatrick et al. 2024; van der Bijl-Brouwer et al. 2024].

2.2 Serendipity and Groupware

Serendipity—positive, meaningful, and unexpected discovery—has been studied across information science, HCI, and organizational scholarship [André et al. 2009; Busch 2024; Copeland 2019; Makri and Blandford 2012; McCay-Peet and Toms 2011]. Rather than discrete events, serendipitous experiences emerge relationally under exposure, novelty, and interpretive readiness. Computational systems operationalize serendipity via novelty, diversity, and coverage [Ge et al. 2010; Kotkov et al. 2016], increasing the probability of meaningful encounters without over-determining interactions.

Organizational scholarship connects weak-tie bridging and network range to creativity and innovation [Burt 2004; Granovetter 1973; Tortoriello et al. 2012; Uzzi and Spiro 2005]. These studies show that individuals embedded in diverse and loosely coupled networks are more likely to access non-redundant information, encounter divergent perspectives, and form novel collaborations [Frydenberg 2024]. Urban research on “third places” [Oldenburg 1997] and social infrastructure [Klinenberg 2018] shows informal environments fostering micro-encounters and broader social cohesion. Designing for serendipity entails cultivating affordances, enhancing visibility and legibility (social translucence), and enabling gentle temporal rhythms [Björneborn 2017; Busch and Barkema

²<https://www.chq.org/>

³<https://wiki.p2pfoundation.net/Zuzalu>

⁴<https://www.nsforum.net/posts/a-recap-of-zuzalu-inspired-pop-up-cities>

2021; Erickson and Kellogg 2000]. In pop-up cities, these principles intersect with systemic design methods, as participatory and embodied practices structure emergent learning, collaboration, and reflection [Fitzpatrick et al. 2024].

2.3 Infrastructuring for Unconferencing, Events, and Temporary Co-living

“Infrastructure” in CSCW and STS is relational and becomes visible through breakdowns or design interventions [Star 1999; Star and Ruhleder 1994]. Infrastructuring foregrounds ongoing socio-material work and coordination across heterogeneous actors, often via boundary objects [Björgvinsson et al. 2010; Bowker and Star 1999; Karasti 2014; Pipek and Wulf 2009; Star 1989]. Contemporary platforms blur lines between application and infrastructure [Plantin et al. 2018a,b].

Pop-up cities layer municipal and digital infrastructures, combining Open Space Technology principles with everyday logistics [Owen 2008]. OST self-organizing mechanisms structure emergent participation while maintaining coherence. Social Layer⁵ operationalizes this stance digitally, supporting the continuous surfacing of invitations, RSVP, and gentle coordination. Trust and privacy are supported through identity systems enabling “proofs without disclosure” (e.g., zero-knowledge proofs, Zupass⁶) and proof-of-attendance artifacts (POAPs⁷) that record participation without centralizing identity.

These arrangements exemplify how systemic design scaffolds emergent community practices, balances openness and safety, and integrates infrastructure, rhythms, and technology into cohesive experimental ecosystems [Aulizio et al. 2024; Fitzpatrick et al. 2024; Goss et al. 2024; Pereno and Aulizio 2025; van der Bijl-Brouwer et al. 2024; van der Bijl-Brouwer and Malcolm 2020]. These studies highlight the methodological pluralism of systemic design, showing how multiple approaches, reflective practices, and context-sensitive strategies inform the design of complex communities.

3 Method

We follow a research-through-design (RtD) approach [Bowers 2012; Gaver 2012; Zimmerman and Forlizzi 2014; Zimmerman et al. 2007, 2010], analyzing the Social Layer artifact in use across multiple deployments while iteratively refining its architecture to investigate how infrastructural design can scaffold serendipity in temporary intentional communities.

Rather than formulating a fixed hypothesis and running controlled experiments, we:

- Co-designed and implemented Social Layer with organizers of pop-up cities;
- Deployed and adapted the system across multiple
- Analysed how infrastructural choices shaped participation, serendipity, and memory.

The authors were embedded as designers, facilitators, and participants in several of the deployments. This insider–outsider position afforded rich access to configuration decisions, breakdowns, and emergent practices, while also requiring reflexive attention to our own role in shaping the phenomena we study.

Our inquiry integrates three complementary strands of data: (1) **Public and archival materials** documenting community operations, programs, and schedules across five deployments (e.g., ShanHaiWoo, muChiangmai, Edge Esmeralda, Aleph, Gathering of Tribe); (2) **Design and facilitation field notes** generated through ongoing participation in system integration, onboarding, and community governance; and (3) **Platform artifacts and interaction traces**, including configuration schemas, event logs, and interface iterations of the Social Layer system. Together, these sources provide a multi-scalar perspective—from system architecture and community design choices to participants’ situated improvisations.

⁵<https://app.sola.day>

⁶<https://github.com/proofcarryingdata/zupass>

⁷<https://poap.xyz>

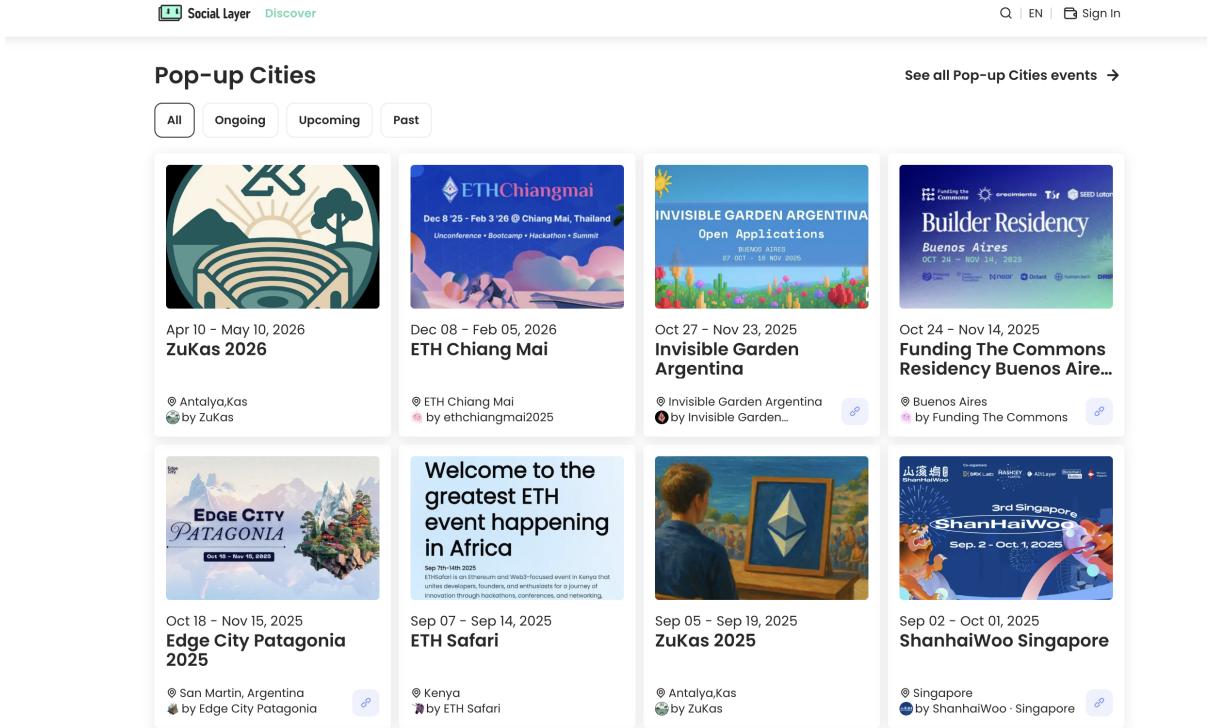


Fig. 2. Solar Layer is a modular infrastructure for the design, scale, and sustainability of pop-up communities and cities.

We conducted an interpretivist thematic analysis [Braun and Clarke 2021], sensitized by concepts from infrastructuring [Karasti 2014; Pipek and Wulf 2009] and social translucence [Erickson and Kellogg 2000].

We coded the data in three stages: firstly, identifying material and social arrangements that shaped participation (e.g., visibility, modularity, portability); secondly, tracing how these arrangements enabled emergent coordination or trust; and thirdly, abstracting design patterns that constitute the “social layer” as an infrastructural condition for serendipity.

4 System Design: Solar Layer

Social Layer was conceived not as a discrete “app” but as a living infrastructural ensemble co-developed with and within temporal intentional communities. From its earliest prototypes, the system has evolved through cycles of deployment, feedback, and re-composition in contexts such as pop-up cities and residency-style gatherings. Each iteration translated tacit organizer knowledge—how to convene, announce, and host—into concrete interface elements: buttons, forms, and flows that scaffold collective action. In this sense, Social Layer embodies infrastructuring rather than engineering: it is continually shaped by the very communities it supports.

4.1 Design Principles

4.1.1 Identity and Trust. In temporary or nomadic communities, trust must be established quickly and maintained without relying on heavy credential systems. Social Layer integrates privacy-preserving credentials and lightweight verification cues that allow participants to recognize one another without disclosing unnecessary

personal data. Profiles operate less as static self-descriptions and more as “trust surfaces”—showing enough about someone’s presence, history, and contributions to enable accountability without collapsing privacy boundaries.

Different communities articulate different notions of membership and belonging. To accommodate this, Social Layer supports configurable boundary modules: communities can define how identity is verified (for example, invitation tokens, wallet-based proof of participation, peer approval, or open registration). These modular boundaries are not only security mechanisms but also social structures—ways of defining how open or bounded a collective should be. This flexibility enables communities to experiment with new governance models and iterate their own norms of trust.

4.1.2 Unconference-Style Event Initiation. The core interaction model re-imagines event creation as an act of invitation rather than administration. Any participant can propose a gathering—an impromptu talk, dinner, or co-working session—by entering minimal information (“what,” “where,” “when”). Events emerge from the periphery of attention rather than from top-down schedules, aligning with the improvisational logic of unconferences and pop-up cities.

The system supports dynamic rescheduling and conflict prevention: participants can adjust times or locations and the platform detects overlapping uses of shared spaces. This reduces the need for dedicated coordinators and releases organisers from heavy logistical labour, allowing them to focus on facilitating content and dialogue instead.

Communities may also define their own rules of structure—for instance, detailed booking policies or spontaneous room allocation—and these can be adjusted over time. Unlike many commercial SaaS systems where rules are hard-coded, Social Layer treats structure itself as an editable layer. This allows communities to collectively negotiate and iterate norms for shared space usage.

4.1.3 RSVP and Presence Cues. Attendance in pop-up environments is fluid; people drift between sessions, meals, and projects. Social Layer therefore adopts a lightweight RSVP rather than strict registration. The interface provides affordances for varying degrees of formality as will ; hosts of structured gatherings may activate a simple check-in process with the QR code and the camera in their mobile if needed. And the participant list indicator who is having a mutual topic.

These cues enact social translucence: they make participation visible enough to coordinate, while preserving the ambiguity necessary for serendipitous encounters. The map interface visualises upcoming or nearby events, supporting low-commitment exploration—participants can discover “what’s happening nearby soon” and spontaneously join.

Instead of algorithmic personalisation, serendipity arises through infrastructural visibility—the system’s spatial and temporal rhythms that let patterns self-organise. This design encourages participants to balance planning with discovery, structure with openness.

4.1.4 Memory and After-life. Although the communities using Social Layer are temporary, their interactions produce knowledge, relationships, and artifacts worth carrying forward. The system therefore can be seen as a memory layer that preserves event histories, photos, notes, and participation traces as portable memories. These archived traces form a connective tissue between pop-ups, enabling practices and relationships to travel into future iterations.

This design supports not only co-presence but also after-presence—the lingering infrastructures of connection that sustain collaboration beyond the lifespan of a single residency. Memories are community-owned, exportable, and can seed the setup of future deployments, helping participants build continuity across ephemeral worlds.

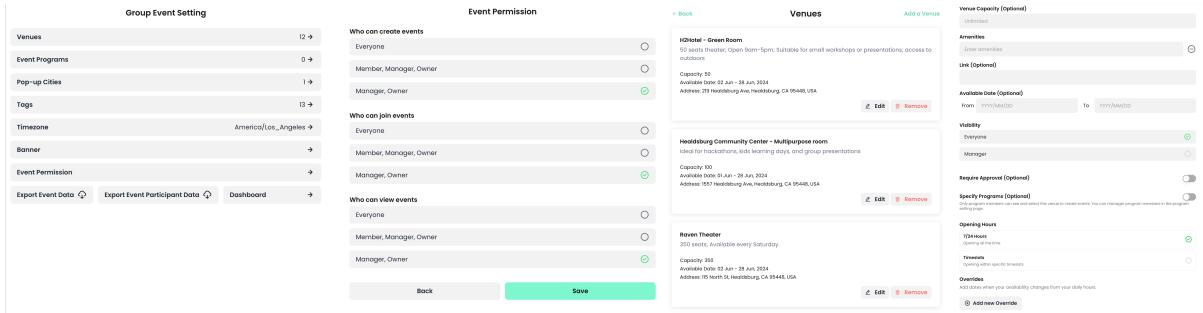


Fig. 3. Coordinator Dashboard from Solar Layer

4.2 Architecture and Interfaces

4.2.1 Coordinator Dashboard. The coordinator-facing interface provides configuration and infrastructural management capabilities. From the dashboard, community managers can define the parameters that shape collective coordination (Fig. 3):

- **Group and Event Settings** — Coordinators can set global parameters such as time zone, event visibility, and participant permissions (e.g., who can create, join, or view events). These settings allow each community to experiment with openness and self-governance.
- **Programs and Venues** — Events are grouped into *Programs* (e.g., thematic residencies) and attached to *Venues* that represent physical or virtual spaces. Each venue includes editable metadata such as location, description, capacity, amenities, availability windows, and opening hours. Coordinators can restrict venues to specific programs or make them globally available.
- **Permission and Role System** — Facilitators, members, and participants can have distinct roles. These roles determine which functions are accessible in a given context—allowing a single user to act as organiser in one residency and as participant in another.
- **Data Export and Transparency** — Event and participation data can be exported, supporting community ownership and further analysis. This functionality treats data not as proprietary but as a shared resource.

The dashboard thus constitutes the infrastructural layer of the social fabric—where boundaries, capacities, and rhythms of visibility are collectively defined.

4.2.2 Participant Interface. The participant-facing interface emphasises immediacy, discovery, and serendipity. Its structure supports fluid movement between planned and spontaneous participation (Fig. 4).

- **Prominent Event Creation** — A visible “Create Event” button anchors the interface. Participants can initiate gatherings with minimal input (title, time, venue), lowering the threshold for contribution. Optional modules allow hosts to add co-hosts, speakers, tickets, or tags, but these remain secondary.
- **Event Schedule and Discovery** — A unified schedule displays all ongoing and upcoming activities across programs. Users can toggle between compact, list, venue, or weekly views. The schedule visualises overlaps and temporal rhythms, supporting coordination through visibility rather than control.
- **Filtering and Navigation** — Events can be filtered by tag, venue, or program, enabling participants to navigate thematic and spatial affinities while still being exposed to adjacent activities. The map view provides a spatial view of ongoing and upcoming events across venues. Each event is geolocated, supporting both navigation and serendipitous encounters.

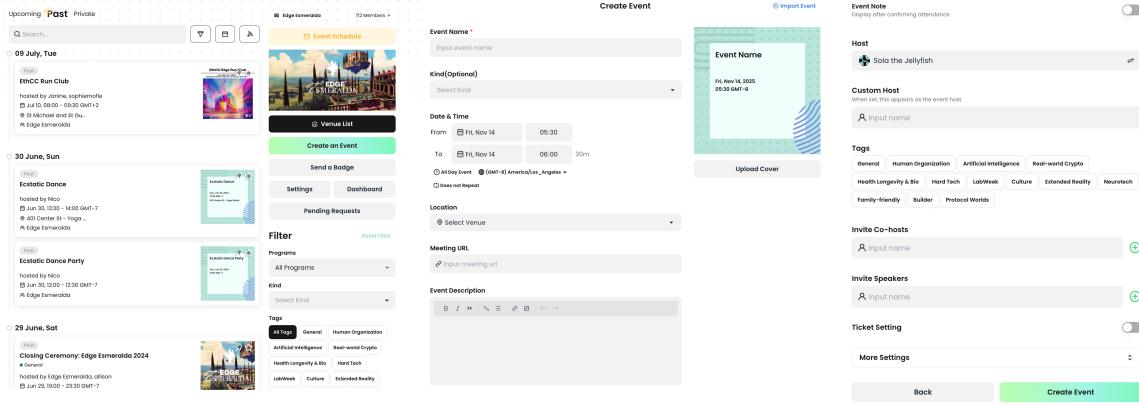


Fig. 4. Event Creation Process from Solar Layer

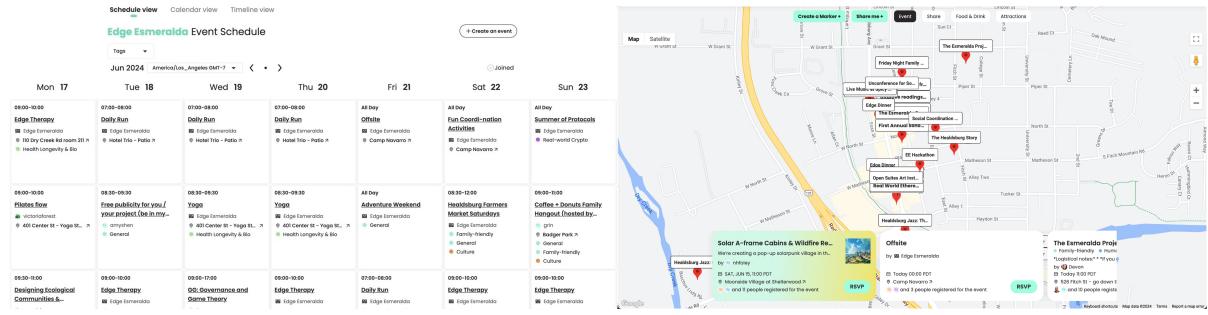


Fig. 5. Shared Schedule and Map View from Solar Layer

- **RSVP and Presence Cues** — Participants can mark attendance or interest("star") without committing fully. Hosts may optionally enable QR-based check-in. Presence indicators make participation visible enough for coordination while maintaining the ambiguity conducive to informal joining.
- **Badges and Tickets** — Tickets can be configured as free or paid, with optional qualification badges granting access or privileges. These symbolic elements support informal reputation and reciprocity within the community.

Together, these features create a digital topology where structured programs coexist with improvisational events, allowing planned and serendipitous gatherings to emerge side by side.

4.2.3 Shared Schedule and Spatial Coordination. The shared schedule acts as the system's central coordination surface. Each event is embedded within time and place, connecting the digital interface to the lived geography of the pop-up city or residency. The schedule displays daily and weekly rhythms—yoga sessions, deep-work sprints, talks, dinners—and makes them legible to all participants (Fig. 5).

By visualising temporal proximity and venue co-location, the schedule surfaces potential intersections: users might notice overlapping sessions or nearby gatherings and decide to join spontaneously. This infrastructural visibility replaces algorithmic recommendation with a collectively perceivable temporal map.

4.2.4 Configurability and Portability. All data and configurations are exportable for community member with the permissions, allowing communities to migrate, fork, or recompose the system for future residencies. The architecture treats each deployment as a version rather than an instance: communities can inherit prior structures while reshaping them to local conditions. This supports continuity across temporary gatherings and builds an evolving ecology of interconnected infrastructures.

5 Results: Diving into the Co-Livings of Pop-Up Cities with Social Layer

Through a research-through-design process, we examined how infrastructural design might scaffold serendipity at the scale of temporary, intentional communities. Social Layer evolved from a speculative prototype into a functioning socio-technical infrastructure adopted by multiple pop-up residencies. Each deployment tested how lightweight coordination, visibility, and modular trust mechanisms could support the emergence of improvisational order. Each deployment not only tested design hypotheses about serendipity and participation but also enacted infrastructuring in practice—embedding the system into local contexts, governance patterns, and event ecologies.

5.1 Macro-level Observations Across Communities

Across its deployments, Social Layer has supported a diverse network of pop-up residencies and intentional gatherings, including *Shanghaiwoo 2023*⁸, *muChiangmai 2023*⁹, *Edge Esmeralda 2024*¹⁰, *Aleph 2024*¹¹, and *Gathering of Tribe 2024*¹². These deployments ranged from week-long micro-residencies to month-long community experiments, with participant communities ranging from roughly 100 to 800 members. Collectively, they served as living laboratories for infrastructuring temporary social worlds—spaces where digital coordination tools, physical proximity, and shared intent intersected to create ephemeral but socially dense collectives.

We summarize macro-level participation metrics across these deployments in Table 1.

Table 1. Statistics Across Deployments

Comm.	Dur. (d)	Evts	Self-Org.	Hosts	Parts.	Part.-Instances
Shanghaiwoo	27	133	126	40	102	915
muChiangmai	47	118	46	25	120	571
Edge Esmeralda	28	554	405	136	582	4952
Aleph	28	417	173	86	889	4496
Gathering of Tribe	6	364	356	89	151	1100

Note. **Comm.** = name of the pop-up city; **Dur. (d)** = duration in days; **Evts** = total number of events; **Self-Org.** = self-organized (member-initiated) events not hosted by official organizers; **Hosts** = number of unique hosts; **Parts.** = number of unique participants; **Part.-Instances** = total participation instances (including multiple attendances by the same individual). Only recorded RSVP data are included; many participants joined directly without registration.

Across all deployments, participants collectively hosted 1,586 events, of which 1,106 (69.7%) were self-organized after the community had already begun. This high proportion indicates that spontaneous, member-driven activity was not peripheral but central to how these temporary collectives evolved. As residents became familiar with shared rhythms and infrastructures, they increasingly initiated their own gatherings, transforming the platform from a coordination tool into a medium for emergent authorship.

⁸<https://www.shanghaiwoo.com/recap>

⁹<https://the-mu.xyz/blog/muchiangmai>

¹⁰<https://www.edgeesmeralda.com/2024>

¹¹<https://crecimiento.build/blog/aleph>

¹²<https://the-gathering.earth/>



Fig. 6. Moments in ShanHaiWoo

The intensity and form of self-organization varied considerably across sites. *Gathering of Tribe* demonstrated an almost fully emergent mode, with 98% of its 364 events organized within a six-day period—an ecosystem of serendipitous encounters arising from high temporal density. *Shanhaiwoo* similarly exhibited strong “bottom-up” dynamism (95%), where informal dinners, discussions, and workshops continuously reconfigured social connections. By contrast, *muChiangmai* and *Aleph* balanced structured programming with open-ended extensions (41%), blending planned coordination with unplanned improvisation. *Edge Esmeralda*, showing how even large-scale communities can sustain distributed, serendipity-driven creation once infrastructural conditions are in place.

Across these contexts, serendipity operated less as random chance and more as an infrastructured affordance—a pattern of social emergence enabled by lightweight tools for visibility, coordination, and invitation. The Social Layer thus facilitated not merely participation but the continuous re-authoring of community life through unplanned yet consequential encounters.

5.2 Micro-Level Observations: In Case of ShanHaiWoo 2023

Zooming in, *ShanHaiWoo* 2023 offers a rich view of micro-level affordances and social emergence. Held in Beidahu, Jilin, over four weeks, the residency gathered around 100 participants from art, design, technology, and regenerative culture. Over 120 events were recorded—many spontaneous, self-initiated, and socially contagious through the platform’s one-click event creation.(Fig. 6).

“Social Layer made it effortless to start something—it removed permission, roles, and the need for approval.”(P1)

“It was a social-technical system that amplified individual agency—turning a personal spark into collective action.”(P2)

“It’s not the tool that created results—it simply set the condition for serendipity out of chaos.”(P3)

From the analysis of field notes and participant reflections, five intertwined patterns emerged.

5.2.1 Emergent Self-Organization and Collective Rhythm. Participants described a dynamic equilibrium between freedom and coherence—a boundary that felt both free and safe. Through minimal scaffolding (shared calendar, chat channel, physical notice board), self-organization flourished:

“After the first unconference, spontaneous events filled every hour until everyone was exhausted.” (P5)
“People from different disciplines came together and self-organized activities—there was never a shortage of ideas.” (P4)

The infrastructural visibility of others’ actions created temporal rhythm: morning yoga, afternoon unconferences, late-night bonfires—all loosely synchronized yet emergent.

5.2.2 Playful Improvisation and Situated Making. Spontaneous play and experimentation became social bonding rituals.

“A group of not-so-outdoorsy people spent an hour putting up four tents, held the first ‘mountain assembly,’ and welcomed newcomers through a face-to-face onboarding ritual.” (P7)

“While playing around, we learned new things, and while learning, new ideas emerged.” (P9)

Improvisation was central—not as deviation but as situated making: acting in context with others to shape shared meanings and material conditions.

5.2.3 Amplified Agency and UGC-Style Participation.

“Within three days we launched a Women Coding Camp—friends who were just chatting the day before suddenly became mentors.” (P15)

The system’s low-friction creation mechanism transformed passive attendance into user-generated culture (UGC). Participants internalized a permissionless ethos: “anyone can host,” leading to a cascade of peer-driven initiatives that blurred the line between organizer and participant.

5.2.4 Real Encounters and Social Trust.

“On a hike, we could trace an idea from its spark to realization—through intimate, one-to-one exchanges.” (P12)

“Shared meals became the seed for an on-chain art game.” (P11)

Physical co-presence intertwined with digital visibility, fostering trust through encounter. Serendipitous proximity—seeing others’ open events and joining spontaneously—enabled deeper relational bonds than planned networking could achieve.

5.2.5 World-Building and Collective Imagination.

“In just a few days, the snowfield turned into a miniature world—a place of collisions and surprises.” (P16)

“People took on roles—mountain dwellers, sea dwellers, spirit beasts. The only way to ‘level up’ was by contributing to the story itself.” (P13)

Participants collectively world-built a symbolic narrative that connected diverse activities into a shared imaginary. The Social Layer’s open architecture supported these evolving fictions, letting stories, rituals, and identities emerge from within.

5.2.6 Mini Case: Counting Rice. A defining micro-level example of serendipity in action was the event *Counting Rice*, spontaneously initiated by a participant (P1) during ShanHaiWoo 2023(Fig. 7).

The event occurred in a small, sunlit office space on the Shanhaiwoo residency site. P1 placed a event notice on Social Layer interface allowed participants to see the event immediately, RSVP, and join without any formal permission or approval. Within minutes, eight participants gathered, each approaching the task differently—some meticulously arranging grains into strict grids, others experimenting with diagonal patterns or playful abstractions.

Participants described a mixture of curiosity, amusement, and focused engagement:



Fig. 7. Improvisational Event: Counting Rice

"I didn't know why I was doing it, but it felt like a small rebellion against usual productivity. Each grain was like a tiny decision, and together, we created a collective rhythm." (P8)

"It was utterly meaningless, yet deeply absorbing. The room felt like a shared mental playground, where everyone's small actions influenced the emergent whole." (P6)

Participants later reflected that the event would likely never occur in a traditional structured setting:

"It felt useless but fun. I cannot imagine it happening anywhere else. The fact that I could just start something—without asking anyone—made me feel I could shape this place." (P2)

"These micro-rituals made the residency alive. You could sense things forming—like small gravitational fields—around spontaneous gatherings." (P4)

Through *Counting Rice*, we see how low-friction tools, visible cues, and an open social architecture coalesced to create an emergent, playful, and socially meaningful experience. The event exemplifies how infrastructuring conditions can transform trivial or absurd actions into rich, serendipitous interactions that enhance trust, collaboration, and creative exploration.

5.3 Infrastructuring Serendipitous Co-living

Across these deployments, Social Layer's infrastructural affordances—visible participation cues, frictionless event creation, and flexible boundary modules—enabled serendipity not by prescribing it, but by sustaining conditions for its emergence. In this sense, the system did not 'cause' spontaneous encounters, but made them infrastructurally possible at community scale. The following section synthesizes these insights as design patterns for future improvisational infrastructures.

6 Discussion

6.1 Scaffolded Spontaneity: Improvisational Infrastructures at the Edge of Chaos

We articulate scaffolded spontaneity as a strong concept to describe how infrastructures can be designed as sets of affordances that invite improvisation rather than prescribe programmes. In our account, scaffolded spontaneity refers to infrastructural conditions that make it easy, safe, and legible for participants to initiate and recombine

activities, while keeping the collective near the “edge of chaos” rather than in full order or entropy [Holland 2003; Kauffman 1993].

Social Layer operationalises this concept through concrete affordances: a prominent “Create Event” button with ultra-minimal schema (“what, where, when”), a shared schedule and map view that render all activities co-visible in time and space, lightweight RSVP and presence cues, and flexible boundary and role settings that treat rules as editable rather than hard-coded. These structures do not dictate content; they signal how to start something and where it might fit. Participants explicitly linked these affordances to their sense of agency: Social Layer “made it effortless to start something—it removed permission, roles, and the need for approval,” and “amplified individual agency—turning a personal spark into collective action.”

Our macro-level findings show how these affordances scaled. Across five deployments, 69.7% of 1,586 events were self-organized, with *Shanghaiwoo* and *Gathering of Tribe* reaching 95–98% member-initiated events within highly compressed timeframes. Micro-cases such as *Counting Rice*—an ostensibly “useless” but “artsy” activity that quickly gathered eight participants into an absorbing shared experiment—demonstrate how low-friction initiation, shared visibility, and open invitations can turn trivial sparks into collective improvisation and world-building.

Design-wise, scaffolded spontaneity foregrounds calibrated friction as a key lever. Requiring every event to have a host, time, and place, and to appear on a common schedule, introduced “just enough” friction to prevent collapse into noise, while keeping initiation near zero-cost. Treating user-initiated actions as first-class interactions, instrumenting shared rhythms (meals, unconference slots, rituals), and allowing communities to tune rules over time together compose a repertoire of affordances through which improvisational infrastructures can be designed, tested, and iterated in pop-up cities.

6.2 Serendipitous Criticality: Weak-Tie Bridging in Temporary Co-living

Our findings reinforce social theory about the strength of weak ties [Granovetter 1973] and illustrate how technology can facilitate weak-tie interaction in temporary physical communities. Traditional community design often focuses on strengthening bonds among members (bonding capital), but bridging capital – connecting across diverse groups – is equally vital for innovation and learning [Burt 2004]. Social Layer’s design patterns (open invitations, visibility of others’ interests, prompt to “see what’s happening nearby”) intentionally surface opportunities for people to step outside their usual circles. We observed that this led to many cross-pollinating encounters that participants valued. For design researchers, this suggests designing “bridge prompts” – features that gently encourage interaction between otherwise unconnected subgroups. Examples might include highlighting events that draw mixed attendance, or suggesting collaborative activities that span disciplines. The key is that these are not personalized recommendations (“You and X should meet”), but rather environmental nudges (like public postings of activities) that rely on human initiative to bridge. This respects individual agency and avoids over-curation, aligning with philosophy that serendipity cannot be forced, only invited [André et al. 2009; Björneborn 2017]. In sum, surfacing weak-tie opportunities should be a design goal for systems aiming to enhance community serendipity. The benefits are improved creativity, faster dissemination of ideas, and a more inclusive social mesh, as newcomers or peripheral members find entry points to engage.

6.3 Limitations and Future Work

While our findings are encouraging about the role of digital infrastructure in fostering serendipitous co-living, there are important limitations and open questions. First, our data relied on cases that were all somewhat aligned in ethos – these were communities predisposed to openness and tech friendliness. We do not know how Social Layer would fare in a community with more resistant culture or where digital tools are viewed skeptically. Future work could deploy similar systems in more varied contexts, or even in corporate innovation workshops, to test generality.

Second, we did not conduct systematic post-hoc interviews in this study (to avoid overburdening participants who already had reflection rituals). Our insights come from observations and voluntary feedback. A more structured evaluation (e.g., measuring social network change or surveying perceived serendipity) would strengthen the evidence. We plan to complement this with trace ethnography and interviews in upcoming deployments to assess long-term outcomes: e.g., did people form collaborations that persisted months later? How inclusive was the spontaneity – did everyone feel equally empowered to host, or did subtle hierarchies remain (like language barriers, etc.)? These questions touch on inclusion and well-being, which are vital if such infrastructures are to be heralded as socially beneficial.

A tension worth exploring is scaling and overload. In Edge Esmeralda (580 people), some reported feeling overwhelmed by the sheer number of events (hundreds in 4 weeks). Serendipity can have a paradox: too many choices might lead to decision fatigue or fragmentation of community (everyone in their niche micro-events). Designing interfaces that help surface relevant serendipity without overwhelming is an open challenge. We consciously avoided heavy recommendation, but maybe gentle personalization could help in larger settings (while still preserving transparency). There's space for research on how to balance discovery and focus, perhaps through better visualization or community moderation (Edge Esmeralda introduced a daily digest meeting to highlight certain events).

7 Conclusion

Pop-up cities are a distinct socio-technical form: longer than conferences, shorter than degrees; more structured than everyday urban anonymity yet less scripted than academic programs. By analyzing the design and deployment of Social Layer across multiple communities, we articulated “scaffolded spontaneity” and documented infrastructuring moves that enable serendipity while maintaining trust, rhythms, and care. Our account bridges CSCW/STS notions of infrastructuring and boundary objects with HCI concerns about social translucence and with urban studies on temporary urbanism. Future work will combine in-depth interviews with trace ethnography to evaluate how these infrastructures shape inclusion, well-being, and long-term collaboration—so that temporary cities can be both playful and profound.

References

- Petra Ahrens. 2018. Qualitative Network Analysis: A Useful Tool for Investigating Policy Networks in Transnational Settings? *Methodological Innovations* 11, 1 (Jan. 2018), 2059799118769816. doi:10.1177/2059799118769816
- Lauren Andres. 2025. *Adaptable Cities and Temporary Urbanisms*. Columbia University Press. https://books.google.com/books?hl=en&lr=&id=pxYaEQAAQBAJ&oi=fnd&pg=PT6&dq=andres+2013+temporar&ots=M_-qN_sMB9&sig=y7L VF-7Y98_2Cri_u0MHo30faiE
- Paul André, m.c. schraefel, Jaime Teevan, and Susan T. Dumais. 2009. Discovery Is Never by Chance: Designing for (Un)Serendipity. In *Proceedings of the Seventh ACM Conference on Creativity and Cognition* (New York, NY, USA) (C&C '09). Association for Computing Machinery, 305–314. doi:10.1145/1640233.1640279
- Asja Aulisio, Silvia Barbero, and Amina Pereno. 2024. (Systemic) Design for Sustainable Territorial Transition: A Literature Review of State of the Art. 1 (2024). doi:10.30682/diiddsi231b
- Peter Bishop and Lesley Williams. 2012. *The Temporary City*. Routledge.
- Erling Björvinsson, Pelle Ehn, and Per-Anders Hillgren. 2010. Participatory Design and "Democratizing Innovation". In *Proceedings of the 11th Biennial Participatory Design Conference* (New York, NY, USA) (PDC '10). Association for Computing Machinery, 41–50. doi:10.1145/1900441.1900448
- Lennart Björneborn. 2017. Three Key Affordances for Serendipity: Toward a Framework Connecting Environmental and Personal Factors in Serendipitous Encounters. 73 (2017). doi:10.1108/JD-07-2016-0097
- John Bowers. 2012. The Logic of Annotated Portfolios: Communicating the Value of 'Research through Design'. In *Proceedings of the Designing Interactive Systems Conference* (New York, NY, USA) (DIS '12). Association for Computing Machinery, 68–77. doi:10.1145/2317956.2317968
- Geoffrey C. Bowker and Susan Leigh Star. 1999. *Sorting Things out: Classification and Its Consequences*. MIT Press.
- Virginia Braun and Victoria Clarke. 2021. Can I Use TA? Should I Use TA? Should I Not Use TA? Comparing Reflexive Thematic Analysis and Other Pattern-Based Qualitative Analytic Approaches. 21, 1 (2021), 37–47. doi:10.1002/capr.12360

- Susan Love Brown. 2002. *Intentional Community: An Anthropological Perspective*. SUNY Press. https://books.google.com/books?hl=en&lr=&id=DU3B6JdItFUC&oi=fnd&pg=PP9&ots=KOstdbK_AX&sig=XyOgZGi619ZjAb4Ga2QYF7c1R1s
- Ronald S. Burt. 2004. Structural Holes and Good Ideas. 110, 2 (2004), 349–399. doi:10.1086/421787
- Christian Busch. 2024. Towards a Theory of Serendipity: A Systematic Review and Conceptualization. 61, 3 (2024), 1110–1151. doi:10.1111/joms.12890
- Christian Busch and Harry Barkema. 2021. Planned Luck: How Incubators Can Facilitate Serendipity for Nascent Entrepreneurs Through Fostering Network Embeddedness. 46 (2021). doi:10.1177/1042258720915798
- Katherine K. Chen. 2012. Artistic Prosumption: Cocreative Destruction at Burning Man. 56, 4 (2012), 570–595. doi:10.1177/0002764211429362
- Samantha Copeland. 2019. On Serendipity in Science: Discovery at the Intersection of Chance and Wisdom. 196, 6 (2019), 2385–2406. doi:10.1007/s11229-017-1544-3
- Thomas Erickson and Wendy A. Kellogg. 2000. Social Translucence: An Approach to Designing Systems That Support Social Processes. 7, 1 (2000), 59–83. doi:10.1145/344949.345004
- Rhiannon Firth. 2019. Utopianism and Intentional Communities. In *The Palgrave Handbook of Anarchism*, Carl Levy and Matthew S. Adams (Eds.). Springer International Publishing, 491–510. doi:10.1007/978-3-319-75620-2_28
- Haley Fitzpatrick, Tobias Luthe, and Birger Sevaldsen. 2024. Methodological Pluralism in Practice: A Systemic Design Approach for Place-Based Sustainability Transformations. (2024).
- Synne Frydenberg. 2024. Cultivating Serendipity in Design Complexity. (2024). https://www.researchgate.net/profile/Synne-Frydenberg/publication/383312892_Cultivating_Serendipity_in_Design_Complexity_Exploring_Designs_of_Augmented_Reality_Technologies_for_Ship_Bridges/links/66c875eac2eaa5002312df68/Cultivating-Serendipity-in-Design-Complexity-Exploring-Designs-of-Augmented-Reality-Technologies-for-Ship-Bridges.pdf
- William Gaver. 2012. What Should We Expect from Research through Design?. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York, NY, USA) (CHI ’12). Association for Computing Machinery, 937–946. doi:10.1145/2207676.2208538
- Mouzhi Ge, Carla Delgado-Battenfeld, and Dietmar Jannach. 2010. Beyond Accuracy: Evaluating Recommender Systems by Coverage and Serendipity. In *Proceedings of the Fourth ACM Conference on Recommender Systems* (New York, NY, USA) (RecSys ’10). Association for Computing Machinery, 257–260. doi:10.1145/1864708.1864761
- Hannah M. Goss, Nynke Tromp, and Hendrik N. J. Schifferstein. 2024. Design Capability When Visioning for Transitions: A Case Study of a New Food System. 91–92 (2024), 101246. doi:10.1016/j.destud.2024.101246
- Mark S. Granovetter. 1973. The Strength of Weak Ties. 78, 6 (1973), 1360–1380. jstor:2776392 <https://www.jstor.org/stable/2776392>
- P.-A. Hillgren, A. Seravalli, and A. Emilson. 2011. Prototyping and Infrastructuring in Design for Social Innovation. 7, 3–4 (2011), 169–183. doi:10.1080/15710882.2011.630474
- John H. Holland. 2003. *Hidden Order: How Adaptation Builds Complexity*. Basic Books.
- Helena Karasti. 2014. Infrastructuring in Participatory Design. In *Proceedings of the 13th Participatory Design Conference: Research Papers - Volume 1* (New York, NY, USA) (PDC ’14). Association for Computing Machinery, 141–150. doi:10.1145/2661435.2661450
- Stuart A. Kauffman. 1993. *The Origins of Order: Self-Organization and Selection in Evolution*. Oxford University Press.
- Eric Klinenberg. 2018. *Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life*. Crown. <https://books.google.com/books?hl=en&lr=&id=j21DDwAAQBAJ&oi=fnd&pg=PA1&dq=klinenberg+2018+palaces&ots=K0yVAXiQwK&sig=ecrlHeT7ymu0fFtViocsX8n4JUA>
- Denis Kotkov, Shuaiqiang Wang, and Jari Veijalainen. 2016. A Survey of Serendipity in Recommender Systems. 111 (2016), 180–192. doi:10.1016/j.knosys.2016.08.014
- Cecilia Landa-Avila, Sofia Bosch Gómez, Sine Celik, Josina Vink, and Ben Sweeting. 2022. Rethinking Design for a Complex World: The Systems Track. (2022). <https://dl.designresearchsociety.org/cgi/viewcontent.cgi?article=2770&context=drs-conference-papers>
- Christopher A Le Dantec and Carl DiSalvo. 2013. Infrastructuring and the Formation of Publics in Participatory Design. 43, 2 (2013), 241–264. doi:10.1177/0306312712471581
- Stephan Makri and Ann Blandford. 2012. Coming across Information Serendipitously – Part 1: A Process Model. 68, 5 (2012), 684–705. doi:10.1108/00220411211256030
- Lori McCay-Peet and Elaine Toms. 2011. Measuring the Dimensions of Serendipity in Digital Environments. 16, 3 (2011). <https://eric.ed.gov/?id=EJ946482>
- Louise Meijering, Paulus Huigen, and Bettina Van Hoven. 2007. Intentional Communities in Rural Spaces. 98, 1 (2007), 42–52. doi:10.1111/j.1467-9663.2007.00375.x
- Oli Mould. 2014. Tactical Urbanism: The New Vernacular of the Creative City. 8, 8 (2014), 529–539. doi:10.1111/gec3.12146
- Ryan J. A. Murphy and Peter Jones. 2020. Leverage Analysis: A Method for Locating Points of Influence in Systemic Design Decisions. 13, 2 (2020), 1–25. <https://doi.org/10.7577/formakademisk.3384>
- Ryan J. A. Murphy and Peter Jones. 2021. Towards Systemic Theories of Change: High-Leverage Strategies for Managing Wicked Problems. 16, 1 (2021), 49–65. doi:10.1111/dmj.12068
- Ray Oldenburg. 1997. Our Vanishing “Third Places”. 25 (1997).

- Harrison Owen. 2008. *Open Space Technology: A User's Guide*. Berrett-Koehler Publishers. https://books.google.com/books?hl=en&lr=&id=HQ-JM6_tMWYC&oi=fnd&pg=PR7&dq=owen+2008+ost&ots=0pMJX5rVgu&sig=xJi7XPJYNNAM_S7-4qGFa5zHq_g
- Deger Ozkaramanli. 2022. Dilemmas and Conflicts in Systemic Design: Towards a Theoretical Framework for Individual-System Dialectic. <https://rsdsymposium.org/>
- Soya Park, Eun-Jeong Kang, Karen Joy, Rosanna Bellini, Jérémie Lumbroso, Danaë Metaxa, and Andrés Monroy-Hernández. 2023. The Future of Conferences Is Unconferences: Exploring a Decentralized Network of Regional Meetups. *Interactions* 30, 5 (Sept. 2023), 50–53. doi:10.1145/3612939
- Amina Pereno and Asja Aulisio. 2025. Teaching Systemic Design to Foster Sustainability Learning in Non-Design Curricula. (2025). doi:10.1108/IJSHE-03-2024-0225
- Volkmar Pipek and Volker Wulf. 2009. Infrastructuring: Toward an Integrated Perspective on the Design and Use of Information Technology. 10, 5 (2009). doi:10.17705/1jais.00195
- Jean-Christophe Plantin, Carl Lagoze, and Paul N Edwards. 2018a. Re-Integrating Scholarly Infrastructure: The Ambiguous Role of Data Sharing Platforms. 5, 1 (2018), 2053951718756683. doi:10.1177/2053951718756683
- Jean-Christophe Plantin, Carl Lagoze, Paul N Edwards, and Christian Sandvig. 2018b. Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook. 20, 1 (2018), 293–310. doi:10.1177/1461444816661553
- Bernadette Quinn. 2025. Understanding Urban Cultural Festivals as Social Infrastructure. 19, 7 (2025), e70042. doi:10.1111/gec3.70042
- Tore Sager. 2018. Planning by Intentional Communities: An Understudied Form of Activist Planning. 17, 4 (2018), 449–471. doi:10.1177/1473095217723381
- Figo Saleh. 2024. *The Rise of Pop-up Cities*. IOSG Ventures. <https://medium.com/iosg-ventures/the-rise-of-pop-up-cities-db75af966510>
- J. Mark Schuster. 2001. Ephemera, Temporary Urbanism, and Imaging. In *Imaging the City*. Routledge.
- Barry Shenker. 2011-03-31. *Intentional Communities (Routledge Revivals): Ideology and Alienation in Communal Societies*. Routledge. doi:10.4324/9780203832639
- Andrew Smith, Guy Osborn, and Bernadette Quinn. 2022. *Festivals and the City: The Contested Geographies of Urban Events*. University of Westminster Press. <https://library.oapen.org/handle/20.500.12657/58064>
- Susan Leigh Star. 1989. The Structure of Ill-Structured Solutions: Boundary Objects and Heterogeneous Distributed Problem Solving. In *Distributed Artificial Intelligence*. Morgan Kaufmann, 37–54. doi:10.1016/B978-1-55860-092-8.50006-X
- Susan Leigh Star. 1999. The Ethnography of Infrastructure. *American Behavioral Scientist* 43, 3 (Nov. 1999), 377–391. doi:10.1177/0027649921955326
- Susan Leigh Star and Geoffrey C. Bowker. 2010. How to Infrastructure. In *Handbook of New Media: Social Shaping and Social Consequences of ICTs, Updated Student Edition*. SAGE Publications Ltd, 230–245. https://sk.sagepub.com/hnbk/edvol/embed/hdbk_newmedia/chpt/how-infrastructure
- Susan Leigh Star and Karen Ruhleder. 1994. Steps towards an Ecology of Infrastructure: Complex Problems in Design and Access for Large-Scale Collaborative Systems. In *Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work* (New York, NY, USA) (CSCW '94). Association for Computing Machinery, 253–264. doi:10.1145/192844.193021
- Quentin Stevens and Kim Dovey. 2023. *Temporary and Tactical Urbanism:(Re) Assembling Urban Space*. Routledge. <https://api.taylorfrancis.com/content/books/mono/download?identifierName=doi&identifierValue=10.4324/9781003284390&type=googlepdf>
- Marco Tortoriello, Ray Reagans, and Bill McEvily. 2012. Bridging the Knowledge Gap: The Influence of Strong Ties, Network Cohesion, and Network Range on the Transfer of Knowledge Between Organizational Units. 23, 4 (2012), 1024–1039. doi:10.1287/orsc.1110.0688
- Fred Turner. 2009. Burning Man at Google: A Cultural Infrastructure for New Media Production. 11, 1–2 (2009), 73–94. doi:10.1177/1461444808099575
- Brian Uzzi and Jarrett Spiro. 2005. Collaboration and Creativity: The Small World Problem. 111, 2 (2005), 447–504. doi:10.1086/432782
- Mieke van der Bijl-Brouwer, Sine Celik, Alexander de Koning, Jotteand Nieuwborg, and Nynke Tromp. 2024. Systemic Design Reasoning for Societal Transitions. (2024). <https://dl.designresearchsociety.org/drs-conference-papers/drs2024/researchpapers/146>
- Mieke van der Bijl-Brouwer and Bridget Malcolm. 2020. Systemic Design Principles in Social Innovation: A Study of Expert Practices and Design Rationales. 6, 3 (2020), 386–407. doi:10.1016/j.shei.2020.06.001
- John Zimmerman and Jodi Forlizzi. 2014. Research Through Design in HCI. In *Ways of Knowing in HCI*, Judith S. Olson and Wendy A. Kellogg (Eds.). Springer, 167–189. doi:10.1007/978-1-4939-0378-8_8
- John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. Research through Design as a Method for Interaction Design Research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York, NY, USA) (CHI '07). Association for Computing Machinery, 493–502. doi:10.1145/1240624.1240704
- John Zimmerman, Erik Stolterman, and Jodi Forlizzi. 2010. An Analysis and Critique of Research through Design: Towards a Formalization of a Research Approach. In *Proceedings of the 8th ACM Conference on Designing Interactive Systems* (New York, NY, USA) (DIS '10). Association for Computing Machinery, 310–319. doi:10.1145/1858171.1858228