

Abstracts

Papers, Performances and Playshops and Tutorial

June ASC 2019 Vancouver B.C.

Cretu, Andrei

Toward a Deconstruction of Teleology: An Experiment in Second Order Cybernetic Modeling

Context: An interesting circularity is apparent in the foundational debates surrounding concepts such as representation, intentionality and anticipation within artificial intelligence and cognitive science. At the root of this circularity is an apparent failure to draw operational distinctions using these concepts, which are closely related to purpose and teleology.

Purpose: The present paper aims to develop an understanding of the cybernetic significance of this circularity, by modeling how scientists construct and use teleological concepts.

Method: The notion of the complement of a system is introduced and the basic mathematical assumptions underlying the definitions of the teleological concepts of interest are translated into category theoretic diagrams; the relationship of the diagrams is investigated.

Result: Failure to draw the distinctions of interest can be explained by the fact that there is a free construction of anticipatory or otherwise teleological systems from simple “reactive” systems, and an adjoint, “forgetful” construction of reactive systems from anticipatory systems. These constructions formalize the intuition that a) the dynamics of any given system can be interpreted as telic (as argued by Dennett, *The Intentional Stance*, 1987), and b) no teleological mechanisms need be postulated to account for the behavior of a known dynamical system (as indirectly argued by Searle, *Minds, Brains and Programs*, 1980), or, in anticipatory systems parlance, any system that meets the requirements for anticipation has a purely reactive functional equivalent (as argued in Rosen, *Anticipatory Systems*, 1985).

Implications: The result confirms that the distinction between cybernetically active and cybernetically inert systems cannot be drawn based on first-order (state) dynamics; a second-order perspective, centered on the dynamics of function, is necessary (as illustrated e.g. by Ashby 1952); cybernetics only occurs in systems that are capable of reconfiguring themselves. Successful modeling requires a link between the domain of states and the domain of functions (von Foerster 2003) enabling goals (expressed in terms of states) to function as function selectors and guide the self-organization of the system; self-organization requires a definite amount of randomness (see Gaines 1974, von Foerster 1960) in both system and environment function.

Di Stasi, Mariah and Anja Pratschke

Acting cybernetically in Architecture: reviewing programs

The paper aims to present final results of an academic master research about the contribution of cybernetic subtheories related to the architectural explorations of the North American Architect and Researcher Buckminster Fuller, realized at the São Paulo University and supervised by Anja Pratschke. The findings in our detailed research allows us an understanding that proves the intrinsic relation between cybernetics and the design explorations of Buckminster Fuller. Under the light of ecosystemic approach, two main Cybernetic theories: The Ideal Machine Concept by Ross Ashby and the Viable System Theory, by Stafford Beer are compared to two main developments by Buckminster Fuller and Team: The Dymaxion House and the Geodesic Project. Our paper aims to present both in the light of a cybernetic conversation, challenging a contemporary ecosystemic thinking, which is underlining the work of this important architect. By acting cybernetically, Fuller searched interlocations outside the conventional design process, in order to respond to necessities which he observed in technological and ecological developments of his time and context.

Erfran, Aftab and Bill Torbert

Learning for Timely Action: An Introduction to the Cybernetics of Collaborative Developmental Action Inquiry (CDAI)

In this presentation we introduce the basic tenets and the many possible flavors of a paradigm of simultaneous action and inquiry, named Collaborative Developmental Action Inquiry (CDAI) (Erfran & Torbert, 2015; Chandler & Torbert, 2003), following a suspicion that this may be the social science research methodology that cybernetics did not know it was missing. We then invite our audience to become co-participants in enacting first-, second-, and third-order cybernetic learning (or as we call it, action inquiry), for a brief but true taste of what the methodology has to offer.

Fischer , Thomas

A Theory of (and for) Enquiry

At the heart of much academic design research lies a paradox: An appreciation of designing requires, systemically speaking, an inside perspective, while scientific research requires robustness under scrutiny by outside criteria. This presentation develops a theory of (and for) enquiry from previously unrelated cybernetic models, showing how “comfortable marriages” of design and research may be achieved by concatenating and nesting multiple kinds of enquiry within the same body of work. The purpose of this theory is to describe such concatenations and nestings and to inform postgraduate and PhD-level acting in design research and supervision, especially where they face scrutiny by scientific standards.

Heatley, Stephen

Learning Methods: Addressing Habits of Thought and Action

We have a universal human characteristic that shows us how much we are inherently learning creatures. We go about our lives and all is fine until suddenly we are brought awake in the moment by some symptom—a pain, a tension, anxiety, frustration, or some other tangible experience—which we feel as negative or 'low-value'. We immediately feel that something is wrong and we want to do something to make things ok again.

All too often, though, we seem to mistake this property for a problem. We mistake the wake-up call (the symptom) as if it were the problem and immediately get busy trying to get rid of the symptom. We cast about for what to do to end the symptom and get back to the way things were before. If our way of changing things works for the moment to rid us of the symptom, we are happy—for the moment. But what happens if the problem returns a day or a week or a month later?

LearningMethods is a simple way to discover for oneself just what the problem is and therefore what needs changing, by systematically looking at our own already-existing experiences, thoughts and feelings, uncovering our current understanding of these experiences and our underlying belief systems (the way I see things) in order to reveal any assumptions, mismatches and misconceptions. The work gives us a direct way to make our own real-life explorations and experiments to find out more accurately the way things work for us and then choose different and better pathways in our life.

Hohl, Michael and Mathilde Scholz

Acting cybernetically: Practicing theory and theorising practice as a participatory learning journey

In this paper we will present an experimental and structured approach to teaching design theory to 1st year BA design students. Our intrinsically cybernetic and constructivist approach connects theory and practice in an applied manner, encouraging students to observe problems in their local environment. In the process they learn to apply design methods, both academic and professional, design and test prototypes, reflect and connect their learning experiences to existing design theory. Step by step they take over responsibilities, moderating the seminar, and of their own learning process, discovering intrinsic motivation, and working together in groups. In this paper we describe the methodology behind our approach and also in detail the structured agenda that guided our learning process.

In another paper we reported about an earlier radical format in which the teaching process of a 3-day seminar was unstructured, waiting for structure to emerge. In our current approach we prescribe a rigid structure, within which, surprisingly, practice and theory converge and great freedom emerges. We begin with nothing, just curiosity, a structured agenda and 1 1/2 hours. Under our guidance, from this structure emerges what we make from it.

Ison, Ray

Acting cyber-systemically to effect governing performances fit for the Anthropocene

A set of cyber-systemic metaphors for governing are introduced to explore how failing governance systems might be transformed so as to realise governing performances fit for the Anthropocene. Whilst evidence of the systemic failure of governance is growing, most analyses are partial rather than systemic and stop at first-order change (improving the current system rather than changing the 'whole system'). This paper uses a generic, heuristic model of governance as it now exists – the 'diamond' – and its elements of the state, the law, the private sector including the media, and civil society. How and why these elements are needed but function inadequately for the modern world are explored. There is conceptual, structural and praxis dysfunction contributing to inadequate governing performances as evidenced by the emergent properties arising from the relational dynamics between elements. A choreography and dramaturgy are needed to craft more effective governing performances. Three new elements, the biosphere, the technosphere and social-purpose are introduced as additions to the heuristic. The ambition of the new heuristic is to facilitate new conversations and designs able to realise dynamics that may, with systemic sensibility, systems literacy and systems thinking in practice capability, enable crafting of new governing performances and governance institutions. The understandings developed can be applied at the level of projects, organisations and nations.

Johansson, Robert (Playshop)

Parenting Cybernetically: Empowerment

To conduct a parenting exploration for some participants. The first part is telling stories about the participants' family systems. The second part is using a cybernetic control model (as contrasted to the behaviourist model) to explore the structure of these different family systems, the parent's role, critical points and the nature of empowerment.

This is a small group of eight to twelve who are interested in exploring their parenting. Our experience was in the inner-city, so we have stories. But the depth of the experience is dependent on the willingness to play.

Johansson, Robert (Performance)

Systems of Control: The 1919 Winnipeg General Strike - an historical monologue

J. S. Woodsworth, the first leader of the Cooperative Commonwealth Federation, Canada's socialist political party, after a career as social worker, as Methodist minister, as editor of the Strike Bulletin for the 1919 Winnipeg General Strike, and as Member of Parliament, recounts the various efforts to get him under control.

Kauffman, Louis H

Laws of Form, Eigenform and Cybernetics

This talk explores the idea of a sign and the idea of a distinction by discussing the semiotics of sign and distinction in the contexts of Charles Sanders Peirce, G. Spencer-Brown and his work "Laws of Form" and the concept of Eigenform begun by Heinz von Foerster in the context of cybernetics. We explore the semiotics of a single sign that stands for itself - by indicating the the distinction made by the sign in the eye of its beholder. We will discuss how a mark of distinction such as < > can, for an observer, stand for itself and stand for the observer as well. Self-reference can occur with implicit recursion and in the case of the re-entering mark and other eigenforms, with explicit recursion, explicit circularity. The dialogue of implicit and explicit circularity is very important for cybernetics and we shall discuss other examples with regard to communication and understanding in natural sciences and social sciences. One key to understanding the differences between second order science and standard science is to appreciate how implicit circularity in standard science becomes explicit circularity in second order science.

Krippendorff , Klaus

Agency, algorithms, new forms of oppression, and what cyberneticians can do

In my view, the most important contribution of cybernetics is to see the world we live in reflexively, i.e., in terms of the circularities of our own involvement. We experience the consequences of this conceptual innovation everywhere. In the natural sciences, cybernetics added some circularity to their traditionally linear explanations. Engineering and artificial Intelligence is developing self-organizing algorithms, which we are now facing in cars, social media, businesses, governmental agencies, and juridical decision making. Cybernetics had promised heterarchical and participatory social structures but it is largely responsible for the growing might of algorithmic authorities which cannot be held accountable for the oppression they may cause. I want to explore how cybernetics can help us to live with its algorithmic realities.

Krippendorff, Klaus (Playshop)

Preserving conversational circularities against all odds.

Genuine conversations are mundane but rare occurrences. They are constituted in complex reflexive circularities among participants who respect each other and create possibilities for each other that neither can imagine on their own. Genuine conversations are rare because they are vulnerable to erosions into other forms of communication, monologues, for one example. Not that other forms of communication are always undesirable, however, they tend to trade the creative potential of conversations for the benefits of achieving larger social objectives and their fundamental equality for hierarchical forms of coordinations involving

authorities and submission. This playshop explores the moves that can destroy conversations, how one may prevent them and whether the consequences of such moves can be repaired and reversed.

Leonard. Allenna (Playshop)

Viable System Model

In this playshop participants will have an opportunity to role play the questions and decisions entailed at each of the five systems in the Viable System Model.

I will put the VSM down on the floor with painter's tape and invite people to take a position in one of the systems. They will have a version of the VSM questions for each system that I shared with you before. I'll facilitate and play the role of the environment to introduce changes or disturbances (unless there are lots of people to include the environment roles). We'll start with the day-to-day operations and anticipated future and see how we go introducing more change. People start out discussing their issues, checking with people in other blocks and incorporating information. Then, we would fishbowl each system in turn to finish.

Lissack, Michael

What Cognition and Awareness Mean in Acting Cybernetically

Cybernetics teaches us that ethics demands self awareness of agency.

To act cybernetically is to act with awareness of the context one is in, the systems of which one may be a part, the goals of the action one is instantiating, and the effect of all that on next steps or adjacent possibles. Awareness, like attention, comes in varying depths only some of which approach understanding or the assignment of meaning. Much of the time we lack the cognitive equipment to pay more than a surface level awareness to context, systems, goals and effects ("CSGE"). Our minds seem limited to processing not more than three to five unrelated variables at once, and yet we live in a world where 3 to 5 variables cannot capture the requisite complexity of situations and actions. We are then forced to attend to only some aspects of the CSGE at hand. Those aspects we treat as-if they were the whole they represent. Consciously or subconsciously we make choices. Each such choice poses its own ethical challenges - no one as-if is free of ethical implications. Given that second order cybernetics is about including the role of the observer, third order cybernetics would be about having the observer/actor not only acting with awareness of CSGE but also with awareness and attention to the ethics involved regarding these choices. What aspects of CSGE we attend to and make an explicit part of our awareness are the foundation of the as-if we then treat as the reality we act within. How we include our own self awareness of these as-ifs directly impacts our ability to act cybernetically.

Lombardi, Judith (jude) (Playshop)

Brunamentals

If there is anyone I know who in his behavior, thinking and composing acted cybernetically, it was Herbert Brün. During the 1995 ASC conference in Chicago, Brün presented 9 Fundamentals that he claimed useful when he wanted to know what he was thinking about. He claimed his fundamentals were a result of exploring cybernetic concepts such as circularity, recursion and self-reference. He also claimed that his fundamentals were influenced by the writings of Ross Ashby, Gregory Bateson, Heinz von Foerster, Humberto Maturana and Gordon Pask.

Fundamentals I consider a set of guidelines for acting cybernetically.

In this 90 minute session, participants will view a 25 minute video of Brün's 1995 presentation of his Brunamentals. Then we will discuss the 9 fundamentals and time permitting, compose scenarios for how they invite each listener's interpretations for acting cybernetically.

Mansell, Warren

"Can Perceptual Control Theory (PCT) Deliver the Promises of Cybernetics?"

The post-war advent of cybernetics promised a new science integrating the sciences, mathematics, engineering and potentially the arts and humanities. I will argue the contentious case that only one outsider in cybernetics - William T. Powers - identified an inherent structure of control within living organisms that enables this promised transformation of interdisciplinary advances. Powers' bold insight was to abandon linear causality to propose that, fundamentally, an organism controls its own inputs through a feedback loop with the environment that matches perception to a hierarchy of internally specified reference values (goals). A detailed functional architecture spanning the biopsychosocial domains unfolds from this premise. I will describe the most recent advances in research by my own research group at University of Manchester, UK, including human perception, action control, robotics, psychological therapy, and communication in dementia, as well as recent forays into sport, nature engagement, music and theatre.

Marken, Richard

Human Behavior Through Control Theory Glasses

In this talk I will present a brief overview of the Perceptual Control Theory (PCT) model of human behavior developed by William T. Powers. PCT is distinguished from all other theories of behavior by its recognition of the fact that that what we call "behavior" is a process of control. So I will begin by explaining what control is and how to see human behavior as a control process by looking at it through

“control theory glasses”. I will then show how control theory, in the form of PCT, explains human behavior as the control of perceptual input. I will then describe the complete PCT model of behavior as the result of the operation of a hierarchy of control systems, each controlling their own perceptual input by specifying the perceptions to be controlled by systems lower in the hierarchy. I will use some of the “portable demos” developed Powers to show how this hierarchy of perceptual control can be seen in actual behavior. I will end with some speculation about how this hierarchy of control systems develops over the course of a lifetime – a process called reorganization -- and how consciousness might play into that process. My goal in this talk is to provide a basic introduction to PCT that will provide the background needed to appreciate Warren Mansell’s discussion of the psychotherapeutic application of PCT.

Matic, Goran

Acting Cybernetically in Complex Social Challenges: Designing for Sustainable Innovation

We inquire as to whether and to what extent it might be possible to enact sustainable innovation initiatives in complex social environments – when the very systems we are attempting to act within can be seen as intrinsically characterized by the contextual, cognitive and cooperative ambiguities (Matic, 2017) that tend to manifest as emergent 'paradoxes' – comprised out of interacting yet in principle unknowable 'black boxes' (Glanville, 1982), that imply approaches capable of addressing imperfect knowledge (Head & Alford, 2015), cognitive blind-spots (Alrøe & Noe, 2014) and scenarios of information loss (Caron & Serrell, 2009).

In such environments of uncertainty – where the key stakeholders are not likely to fully agree on what the underlying 'wicked problem' actually is, or what it might be caused by (Rittel & Webber, 1973) – a common strategy is to engage the ecosystemic actors in some mode of dialogic design (Christakis & Brahm, 2003), such as in the instance of collaborative rationality approach that "requires diverse and interdependent participants using authentic dialogue" (Innes & Booher, 2016) as a mechanism of incorporating a richer dimension of views, perspectives and knowledge.

However, the necessity of a conversational approach posits questions around how might we ensure that – when engaging through dialogical devices and methods arising out of the conversation theory (Pask, 1984) – we might be structuring our inquiry in an ethical manner (Sweeting, 2015), so that we might be able to 'act cybernetically' and empower sustainable value creation in multi-stakeholder environments?

We posit that cybernetic ways of acting can enable creation of mutual trust relationships by considering the available internal ecosystemic energy as a social corollary of 'exergy' (Wall & Gong, 2001), in order to minimize build-up of entropic complexity asymmetries that potentially give rise to unwanted phenomena such as schismogenesis (Bateson, 1935) – and propose generative questions for further research and exploration.

Midgley, Gerald

A Systems Theory of Marginalization and its Implications for Systemic Intervention

In this talk, Gerald Midgley will present the systems theory of marginalization that he has been developing and applying in systemic interventions for 28 years. This theory offers a generic model of marginalization processes that is equally relevant to relationships between people in small groups, organizations, communities and international relations. Gerald will not only explain the theory itself, with practical examples from several projects with marginalized sectors of the community, but will also discuss its implications for social policy (e.g., for housing asylum seekers, supporting the victims of rape, and encouraging the take-up of solar power in communities). In discussing the application of this theory in systemic intervention projects, Gerald will share several strategies for challenging marginalization. However, some of these strategies have a dark side that needs to be acknowledged if our interventions are not to have unforeseen negative side-effects. The talk will then end with explorations of some new opportunities for developing the theory of marginalization through engagements with ideas from cybernetics and beyond.

Nizami, Lance

At the utter core of any Black Box there are two (or more) White Boxes, required to stay in

This paper concerns the 'Black Box'. It is not the engineer's 'black box' that can be opened to reveal its mechanism, but rather, one whose operations are inferred through input from (and output to) a companion 'observer'. We are observers ourselves, and we attempt to understand minds through interaction with their host organisms. To this end, Ranulph Glanville followed W. Ross Ashby in elaborating the Black Box. The Black Box and its observer together form a system having different properties than either component alone, making it a 'greater' Black Box to any further-external observer. How 'far' into this 'greater' box can a further-external observer probe? The answer is crucial to understanding 'Black Boxes', and so an answer is offered here. It employs von Foerster's 'machines', abstract entities having mechano-electrical bases, just like putative Black Boxes. Von Foerster follows Turing, E.F. Moore, and Ashby in recognizing archetype machines that he calls 'Trivial' (predictable) and 'Non-Trivial' (non-predictable). It is argued here that Non-Trivial Machines are the only true Black Boxes. But Non-Trivial Machines can be concatenated from Trivial Machines. Hence, the utter core of any 'greater' Black Box (a Non-Trivial Machine) may involve two (or more) White Boxes (Trivial Machines). This is how an unpredictable thing emerges from predictable parts. Interactions of White Boxes – of Trivial Machines – may be the ultimate source of the mind.

Pinsker, Eve and Teresa Veramendi (Playshop)

Crossing Borders and Boundaries: the Cybernetic Patterns that Connect Marshallese and Latinx Migrant Children in the US

Pickering (2009) saw the British cyberneticians of the 1950's and 1960's (Walter, Ashby, Pask, Bateson, Beer, and Laing) as taking an embodied perspective on exploring the brain and/or humans in interrelationship --practicing a kind of "ontological theater" whether via built mechanisms like Walter's tortoises or Ashby's homeostats, or via observing the natural history of human interaction. In any case, "Rigid, controlled experiments [were] abandoned in favor of pursuing a 'dance of agency' ... the injunction is to stage performative events, see where they take you and enjoy the ride" (M.C. Jackson, 2019, p. 96). That is a very different approach to systems modelling than top-down command and control, much more emergence-friendly.

Independently of these thinkers/doers, but in a similar playful and radical spirit, Brazilian theater director Augusto Boal (1931-2009) developed participatory theater, namely "Theatre of the Oppressed," as a form of embodied modeling. This enabled him to work with communities to explore the openings for challenging oppressive social structures and power relationships.

For this playshop, short written descriptions of 2 contexts affecting the well-being of migrant children in the US (Latinx children crossing the southern border, and Marshallese Islander cross-cultural child adoptions) will provide sets of constraints and power dynamics for participants to explore using some of Boal's improvisational exercises including Image Theatre, followed by reflection and debriefing. No prior theater experience is required. Some willingness to move is helpful (e.g. we will be using body stance and position to shape "power over, power under")-- but forms can be modified so that everyone can participate and "enjoy the ride."

Riecke, Bernhard and Patrick Pennefather

A Fun Palace: Cybernetics, feed(loops)back and mixed reality

Riecke and Pennefather will present on the process of reimagining a version of the Fun Palace, realized as a mixed reality installation. This will be combined with detailing the types of persistent feedback loops that occurred (and are still occurring) during the research creation process, and those designed to manifest within the mixed reality Fun Palace installation.

Richards, Larry

"Acting Cybernetically?"

In this presentation, I question the mandate implied by the adverb “cybernetically” when used to modify human activity or behavior: “act cybernetically”. It invokes a moral, perhaps even ideological, imperative, which I could argue is not cybernetic. Having said that, I admit to observing those with a deep interest in the ideas of cybernetics acting or behaving differently; we might say “they march to a different tune”. Are the differences I observe: (1) consequences of intention, driven by a new cybernetic ethic, (2) consequences of exposure to cybernetic ideas that, once accommodated, cannot be ignored, or (3) characteristics already exhibited by individuals prior to encountering cybernetics, the compatibility of which motivated their pursuit of the ideas? Perhaps any, or all, of these? I propose to address two questions: (1) What ideas in cybernetics might have distinguishing impacts on the behaviors of those exposed to them, and why? and, (2) Under what circumstances might the adverb “cybernetically” be used as a descriptor of human action or behavior without carrying moral or ideological overtones? I begin by saying that, while I cannot reach it in the current society, I aspire to act cybernetically; I end by saying that, when I realize my aspiration in an alternative society, the adverb becomes superfluous.

Schanda, Angelica (Playshop)

Playful change of head, heart & hand: From systems observation to systems action

How can cyberneticians and systems scientists (C&S) support society effectively with their expertise? To better understand, be able to communicate and collaborate with different stakeholders, partners, clients, other scientists and the public, C&S need to reflect upon and face their own behaviors, underlying thought patterns, attitudes, mindsets, narratives, worldviews, biases, epistemological concepts and emotions which guide them

But how do you move from your cognitive understanding of yourself as a societal observer, from changing your knowledge and updating your mental models, to practically manifesting this knowledge emotionally, and to integrating it into your actions & behavior? This playshop trains you with many practical exercises and methodological debriefings to do just that.

The playshop is designed to offer a playground by employing not only cognitive, but creative, kinesthetic, aesthetic, emotional, and audio-visual exercises, in individual, partner and group settings, which allow you a wide range of experiences.

Scholte, Tom, et. al. (Performance)

Systems Theatre Pilot Performance Featuring Conflict Theatre@UBC

Conflict Theatre@UBC is a joint initiative of UBC's Human Resources and Theatre and Film Departments that uses Forum Theatre to explore blockages to authentic and productive communication in situations of workplace conflict. A Forum Theatre play depicts complex social situations and then invites audience members to intervene by replacing characters and trying out new approaches to the conflicts portrayed in order to steer the play towards a more desirable outcome. This performance by members of the CT@UBC troupe will pilot elements of director Tom Scholte's Systems Theatre research by adding computer assisted tools of cyber-systemic analysis to the live Forum Theatre event.

Silverman, Howard

Recursive identity in purposeful social change

My interest is in purposeful social change. I see this as a designerly imperative, in which one seeks to "fail better" (Glanville 2007:1173), with the goal of developing situational understandings and/or affordances for oneself or others to be more effective in such situations.

I develop this inquiry in two parts, each of which follows a particular sequence of steps, which I think of as constituting a design methodology: (1) frame an area of inquiry, (2) appreciatively survey existing approaches to this inquiry, (3) develop (e.g., bricolage, fragment, analogize) a variant approach, and (4) investigate analogies and distinctions across approaches.

Throughout this inquiry, I incorporate performative, narrative, and visual models. By model I mean a representation and abstraction that can be used in investigating and understanding "how things work" (Silverman and Hill 2018). In this sense, models are not necessarily mathematical, empirical, or predictive; rather, they are conceptual tools that may aid in "mak[ing] aspects of the world perceptually salient and cognitively distinctive" (Stafford 2007:207).

Like other recent cybernetic writings (Ison 2010, Bunnell 2018, Chapman 2019), my approach is both based in cybernetics and also interdisciplinary.

Part one: How has the first- and second-order duality been characterized? How might it be?

Von Foerster (1979/2003) described the first- and second-order duality as between observed systems and observing ones. Pask (1970) described it as the purpose of the focal system and the purpose one adopts when engaging with the system. Here, I characterize this duality in terms of identity. In the first order, one's focus is on the identity of the system in question. In the second order, it is on recursive affiliations between one's own identity and that of the system in question.

Part two: How has recursive identity been used to characterize social discontinuities and/or purposeful social change? How might it be?

Silverman and Hill (2018) developed a resilience-based bricolage: an individual-to-ecological, identity-based model of recursive affiliations and constraints~affordances. Here, I compare this approach (examine analogies and distinctions) with Maturana's (1988, 2015) and Luhmann's (2002/2013, Moeller 2006), as well as with philosophical investigations (Noonan and Curtis 2018, Appiah 2018) and Vickers's (1980:82) narrative of "identity and continuity."

Sweeting, Ben

Cybernetics and Spatial Experience

Within architectural discourse, cybernetics is closely associated with interactive and digital technologies. Notable examples include Gordon Pask's collaboration with architect Cedric Price and theatre director Joan Littlewood on the influential Fun Palace project during the 1960s, which can be understood as the embedding of design processes into the life and organisation of a building. It is important, however, not to conflate cybernetics with technology. In Pask's most prominent text on architecture, it is Gaudi's Parc Guell that is picked out as "one of the most cybernetic structures in existence". Here the cybernetic quality is within the dynamism of spatial experience, while the architecture itself remains passive.

In this paper, I develop an account of spatial experience in cybernetic terms via Ranulph Glanville's understanding of design as a foundational human activity. One of the most important contributions that cybernetics has made to design is Glanville's account of scientific research as a form of design activity. He later generalised this argument, drawing on Jean Piaget's notion of equilibration to understand design as an essential part of thinking. Glanville's principle intention is to articulate what is so special about design activity, and, in so doing, to support its disciplinary status and ability to inform other fields. It is possible to develop his argument in spatial terms, through his references to Piaget: the process of equilibration is applicable to spatial experience and has had some influence in architectural theory through the work of Christian Norberg-Schulz. A consequence of Glanville's argument is that spatial experience can be understood as a design activity *on behalf of the experiencer*, as well as something with which professional designers are concerned. When architects design spaces, they can thus be understood as designing frameworks for others to design with, with projects such as the Fun Palace being particularly radical versions of this.

Taylor, Martin

Tensegrity and Collective Perceptual Control

"Tensegrity" is a property usually associated with physical (including biological) structures composed of linear compression members I call "rods" and tension members I call "wires". A "tensegrity" structure is strong, lightweight, elastic, absorbs external forces from any direction by distributing and storing the external energy throughout the structure, and can return that energy to the environment rapidly and with direction.

I suggest that the “pull” of a control loop’s reference value on the environmental value corresponding to the controlled perception is functionally equivalent to wire tension in a physical structure.

An “emergent” property of a structure is not a property of any set of its components, but is a property only of the structure. “Control”, or “Perceptual Control” requires a kind of asymmetric negative feedback loop called a “control loop”. Two control loops operating on perceptions of the same environmental variable can generate “stiffness”, “Collective Control”, and “Conflict”. “Stiffness” is a property of a wire in tension in a “Conflict” configuration.

By building a sequence of emergent properties of increasingly complex structures of control loops, I show that the Powers perceptual control hierarchy is inherently a tensegrity structure, and that social structures are also likely to evolve toward structures that have tensegrity properties. One social structure built from two tensegrity control structures has an emergent collective control property I call “tradability”, the final emergent in the sequence I describe.

Time limits do not allow this presentation to go into further emergent properties that can develop from networks of tradability units, such as “Money” which seems to require the existence of at least three tradability structures, but the emergents described in the presentation should suggest what can be built from, and perhaps only from the elemental property “Perceptual Control”, that emerges from a Perceptual Control Loop.

Tore Gulden

Not-play and play How Acting Cybernetically happens in human play

Play has been explored from many disciplines and is typically regarded as an observable phenomenon serving as a resource for studying “what is potential in man (Erikson in: Piaget & Piers, 1972, p. 127).” This understanding has directed research towards emphasizing on what play is, its role in evolution, how it serves to practice for adulthood, social training, among others. That is, the research represents a perspective which describes a study distanced from the actual act of play itself. In this tradition, play has thus been explored from somewhere, a tradition, a theory, and so forth, to explore the outcomes and consequences of play, and not so much from within, which constitutes another but less studied perspective. Researching play from within can be understood as an exploration of how it is to be at play or play as a “state of mind”. Play as a state of mind can be described through complex networks of: encounters, cognitive activation, feelings, communication, relations, reactions and actions, the will to continue and engage, among few or many people and entities, which will differ from descriptions of the outcome of play. These networks make complex contexts, and I believe that analyzing these networks as a whole, through a cybernetic understanding will contribute to knowledge about being at play, what it means to play, how one might engage in game research, as well as design and service products intended for play. to game, service, and product design. In addition I think that analyzing the situation of being at play, as a whole complex dynamic evolving context, may give different results than exploring

sequences and parts of experiencing play, as isolated entities without influence on each other, which I believe will contribute to the epistemological and methodological dimension of play research. The cybernetic view involves describing play as systems, relations, and systems dynamics. I aim thus to describe the systemic contexts of being at play, through cybernetic explanation by mapping (Bateson, 2000/1972, p. 401).

Tien, Laurel

Graduate Education that nurtures the experience of collective wisdom: A relational education for our emerging future?

How does relational learning support awareness of the systemic complexity in our personal, societal, educational, and ecological concerns in pursuit of a more sustainable world. Viewing generative collective wisdom as an ontology of performative becoming in action—a cybernetic praxis between theory and practice—considers how we can intentionally live and act in our world(s). The Graduate Institute for Transformative Learning (GIFT-L) is a low-residency interdisciplinary program with a distributed and relational learning model grounded in learner-driven inquiry within a self-renewing learning community.

Umpleby, Stuart A.

Some Examples of how Cybernetics is Contributing to Traditional Disciplines

Since they were founded in the mid-twentieth century the fields of systems science and cybernetics have worked to create more general theories for existing fields, to define theories of control and communication to complement theories of matter and energy, and to aid existing fields by using helpful knowledge from other fields. This paper will describe a few examples of how systems and cybernetics have in the past and are currently contributing ideas to traditional disciplines. The traditional disciplines taken as examples are management, the social sciences, and philosophy of science.

The field of management has benefited from Ashby's theory of adaptive behavior and his Law of Requisite Variety, which provides a quantitative relationship between information and selection. Management has also benefitted from Beer's Viable System Model, which is based on the structure of the human nervous system. Other contributions to management have been group decision-making methods such as Beer's concept of syntegrity and Ackoff's Interactive Planning.

The fields of psychology, economics, and political science have benefitted from Vladimir Lefebvre's theory of reflexive control and George Soros's theory of reflexivity. Lefebvre's theory describes two systems of ethical cognition. The theory is helpful in making a transition from confrontation and conflict to the rule of law. George Soros's theory of reflexivity explicitly includes the decisions and actions of

observers. It places the social scientist inside the system observed and makes clear the difficulty of forecasting in social systems since they include thinking participants.

The philosophy of science has had, at least since Plato and Aristotle, more than one epistemology. Warren McCulloch suggested resolving different views of epistemology by investigating how the brain works. The strategy was to study cognition by conducting neurophysiological experiments. These ideas are embodied in the literature on second order cybernetics, which has taken up the challenge of critiquing the development of science, an interest earlier practiced by the philosophy of science.

Wallis, Steven

Learning to Map and Act Cybernetically Without Learning Cybernetics: How Many Loops are Needed to Enable Effective Decisions and Actions?

Central to a cybernetics perspective is the idea that we must understand feedback loops of systems in order to make effective decisions to reach desired goals. When diagrams are created to clarify and communicate those loops, we can think of them as maps, models, or theories that represent real world systems.

It is generally accepted that (within some context) a better map is one that presents more loops; at least until the point where the complexity of the map overwhelms the cognitive limits of the viewers. What is not known is “how many” loops might be, in some sense, “optimal” for the map’s representation of a real world system; regardless of the limits of human cognition.

At least three streams of research have shown that more “structured” knowledge (which may be represented as maps – with or without loops) supports better decisions and actions for reaching desired goals. This paper and presentation kick-starts a stream of research to identify loops found within a variety of theories and compare the number of loops with the usefulness or effectiveness of the theories.

Theories are ubiquitous across academic disciplines and fields of practice; therefore, this research is expected to support multi/inter/trans-disciplinary scholars and practitioners. To that goal, theories will be drawn from a variety of disciplines and stages of evolution within those disciplines to show how theories have evolved over time from lesser to greater usefulness; and, how the evolution of usefulness corresponds with increased use of loops in those theories. By developing this understanding, we expect to support the development of more useful/effective theories that will, in turn, support improved decision making for organizations and nations.

Because this is an emerging and potentially influential stream of research, the presentation will maximize the time for comments, questions, and conversations.

Wallis, Steve (Playshop)

Playing with Cybernetic Concepts to Enable More Effective Action

In order to Act Cybernetically, we must have a clear map of how that is done. While fuzzy understandings lead to uncertain applications, recent advances in the science of conceptual systems (SOCS) shows that theories/knowledge/maps that are “more systemic” and “more cybernetic” are more useful for understanding situations, making decisions, and reaching goals. Importantly, we can measure “how systemic” or “how cybernetic” our knowledge is, thus providing a relatively objective path for improving the usefulness/effectiveness of our understanding.

In this game-like process, participants share their perspectives, concepts, and understanding of cybernetics as they collaborate in creating a knowledge map. This experiential interactive playshop engages participants on multiple levels including creativity, reflection, and critical thinking.

The resulting maps will be both practical and functional, providing clear guides to how we may Act Cybernetically in our daily lives. Those maps can also be used from an academic perspective to identify key leverage points for future research while the process as a whole supports more rapid advancements in the field.

Woollard, Robert

"Unrequited love: cybernetics and the promotion of health"

“Health” can usefully be defined as the capacity of an organism, a person, a society or an ecosystem to adapt positively to changes in their internal or external environment. This will usually be achieved by being a complex adaptive system and/or subsystem. Cybernetic feedback loops with varying levels of awareness, volition and efficacy are essential to healthful adaptation when we are buffeted by complex forces for change. While “acting cybernetically” might be a useful admonition and aspiration for a diseased person or disordered health care system, both scales are frequently distracted by our centuries long uncritical and largely unrequited love affair with technology and hyper-specialization.

Frequently, our systems and ourselves are managed, not as complex biologic systems, but as complicated problems to be solved by dissection and a search for mutable, linear cause and effect relationships—almost the antithesis of acting cybernetically. The management assumption is that our problems are complicated when, in fact, they are complex. Here, the unit of analysis needs to be the relationships between the parts of the system. In addition, the issue of values enters the decisions that are made around health, disease and quality of life.

Can a more careful attention to cybernetics advance a more healthful approach to healing and health system reform? Does Donald Schon’s concept of reflective practice draw us into being second order cybernetic actors? What is the role of the participant observer? Is objectivity in the healing and caring process possible—or

even desirable? What kinds of partnership relationships are most likely to address complexity, values and choices—at the individual, family and systems levels?

A pentagram partnership and an approach of appreciative inquiry are posited as a viable mechanism for fostering health at all three scales.

Young, Jason

Bridging Bateson's Gap: Participating cybernetically in a more-than-human world

Gregory Bateson posited that “the major problems in the world are the result of the difference between how nature works and the way people think” (2011). This difference is (at least in part) between a creative nature that is complex, non-linear and arational on the one hand, and a thinking mind that is conceptual, linear and rational on the other. In this paper, I will explore modalities of participation (acceptance, feeling and imagination) as a means to bridge this gap.

This vision of participatory engagement requires us to look beyond Cartesian subject-object dynamics towards autopoietic, enactive perspectives (Varela, Thompson, & Rosch, 1991) of the “self” as being-in-the-world (Heidegger, 1953/2010), meaning generation as disclosure (Kompridis, 2006) and nature as a process of becoming (Whitehead, 1934). By so doing, we find that there is no singular self capable of objectively conceptualizing or controlling nature’s processes. For unlike the Cartesian subject that finds meaning according to the perceived “accuracy” of its representations of an external, objective reality, the enacted “self” discloses meaning through its ongoing structural coupling within a pre-reflective, holistically structured background of pre-understanding.

There is then, no privileged place “outside” of nature from which we can act. Our immanent activity (participation) is a perpetually creative “dance with ambiguity” (Bunnell, 2015) performed without the apodictic certainty of conceptualizations arrived at through strictly rational analysis. Participating in this interpretive-relational dynamic requires that we supplement conceptualization, linear thinking and logical analysis with acceptance, feeling and imagination. By so doing, it is hoped that we might find resonance with the processes of the more-than-human world in such a way that how we “think”, and how nature “works” can harmonize (with) each other.