

Leverhulme Network

Narrative and Complex Systems: Developing an Interdisciplinary Methodology

Abstract

The Narrative and Complex Systems network brings together scholars across Europe whose work in complexity science or narrative theory has brought them up against the boundary between these two fields. The issue is a methodological one of negotiation between incommensurate paradigms, which has immediate consequences for the representation of complex systems, and for theories of narrative as a cognitive faculty. The network's premise is that the tension between systemic processes and narrative understanding is also a relation of mutual dependence; one which provides a focussed case study for a new model of cross-disciplinary research between the sciences and humanities.

Why the Leverhulme

The Narrative and Complex Systems network directly addresses the challenge at the heart of the Leverhulme's distinctive mission: how to pursue effective and innovative research beyond the constraints of established disciplinary, institutional and intellectual structures. The origins of the proposal lie in my work on literary narrative, but narrative is ubiquitous as a cognitive, communicative and cultural phenomenon in research across the humanities. Complexity science is similarly pervasive across the sciences, and both are fundamentally concerned with modelling processes; yet narrative and complex systems are fundamentally at odds with each other. This limit to narrative has strong potential to illuminate my theoretical research, and initial dialogue with complexity scientists at York has confirmed that there are reciprocal prospects for insight from their perspective. The encounter is broadly emblematic of the "two cultures" divide first described by C.P. Snow, but because its interest lies in the divide itself, it suggests a new approach to the conduct of radically interdisciplinary dialogue: instead of a drive towards synthesis, the goal of the network is to use complementary perspectives to throw each other into relief and generate productive research on both sides. The network participants are persuaded that this methodology is not only feasible, but exciting; proving and refining it will be directly valuable to the research of the participants themselves, and a pioneering model for future interdisciplinary research. It is a vision that eludes the Research Councils' funding framework, but is ideally suited to the more expansive agenda of the Leverhulme Trust.

Network partners

1. Institution: University of Abertay
Address: Dundee, DD1 1HG
Country: Scotland

Description of Institution: Abertay is a modern university with world leading research strengths in environmental research in soil science, innovative visualisation of complex datasets and a strong established interdisciplinary research relationship between systems science and interactive media

representations, for example the application of computer game technologies to create visualisations of environmental systems.

Role in Network: The Abertay partnership offers technical and theoretical expertise in interdisciplinary collaboration between systems biology models and digital media representations, providing a foundation of ongoing research of the kind the network aims to develop.

Contact: Prof James Bown, School of Arts, Media and Computer Games, j.bown@abertay.ac.uk

2. Institution: University of Warwick

Address: Gibbet Hill Rd, Coventry CV4 7AL

Country: England

Description of Institution: Warwick is a Russell Group university and one of the UK's leading research institutions, ranked at 7th overall in the UK (based on multi-faculty institutions) in the last Research Assessment Exercise.

Role in Network: The Centre for Interdisciplinary Methodologies at Warwick provides research strength directly addressing the project's methodological concerns with interdisciplinary dialogue, with expertise across the humanities and social sciences, including complexity theory.

Contact: Dr Emma Uprichard, Centre for Interdisciplinary Methodologies, e.uprichard@warwick.ac.uk

3. Institution: University of Tartu

Address: Ülikooli 18, 50090 Tartu

Country: Estonia

Description of Institution: The University of Tartu is the largest and highest-ranked university in Estonia, and in the top 3% of universities world-wide (Times Higher Education World University Rankings 2011-2012). The Institute of Cultural Research and Fine Arts is one of four comprising the Faculty of Philosophy, the most internationally recognised centre for research in the humanities in Estonia, with a particular emphasis upon semiotics – one of the core disciplines of the Centre of Excellence in Cultural Theory.

Role in Network: The research expertise at Tartu in semiotics, and specifically the Tartu-Moscow school of semiotics founded by Juri Lotman, provides a crucial theoretical frame of reference for the network's exploration of the limits of narrative representation.

Contact: Prof. Marina Grishakova, Department of Comparative Literature, marina.grisakova@ut.ee

4. Institution: Aarhus University

Address: Nordre Ringgade 1, 8000 Aarhus C

Country: Denmark

Description of Institution: Aarhus University is Denmark's second largest university, and ranks in the top 100 of the world's best universities. Within the Department of Aesthetics and Communication it has substantial research strengths in narrative theory and in interdisciplinary evolutionary studies.

Role in Network: The Aarhus contribution to the network will be both theoretical, deriving especially from their narratological work on the borders of fictional and non-fictional narration, and exemplary, drawing upon the case study of their interdisciplinary work on evolution as a complex systemic process and communication challenge.

Contact: Prof Henrik Skov Nielsen, Department of Aesthetics and Communication, norhn@hum.au.dk

5. Institution: University of Helsinki

Address: Yliopistonkatu 4, 00100 Helsinki

Country: Finland

Description of Institution: The University of Helsinki is a world top 100 university and member of the League of European Research Universities. The Helsinki Collegium for Advanced Studies is a prestigious independent institute within the University with an international community of fellows in the humanities and social sciences; it has a mission to promote dialogue across disciplines and encourage theoretical and methodological reflection.

Role in Network: The network's collaboration with the Collegium will provide for both meta-methodological expertise across disciplines and specific research strength in narrative cognition and complexity theory.

Contact: Dr Merja Polvinen, Helsinki Collegium for Advanced Studies, merja.polvinen@helsinki.fi

Summary

This network will examine the significance and research implications of the mismatch between narrative representation and complex systems modelling. The watchwords of narrative are sequence, cause and effect, agency, perspectival unity, teleology; the watchwords of complex systems are simultaneity, recursiveness, systemic relations, multiplicity, emergence. The way that things happen in complex systems exceeds the limits of narrative cognition, which nonetheless remains, as part of our evolutionary legacy, at the core of what constitutes human understanding of temporal processes; of necessity, systems and narrative are constantly brought into relation with each other.

The point of intersection between the two fields is emergent behaviour, where complex systemic interactions produce effects that are readily narratable, but not in terms of the base-level model of the system itself. Since the nature of complex systems is such that the base-level description necessarily exceeds the limits of narrative intelligibility, this is an interesting threshold. It holds out the possibility that narrative theory, a field of inquiry with its roots in literary study, can contribute

to the understanding of complex systems; and reciprocally that complex systems analysis can illuminate the limitations and affordances of narrative in human cognition and knowledge representation, and so bring new insight to the analysis of narratives in literature and other cultural media. But the descriptive gap between narrative and complex systems also raises fundamental issues about the methodology of cross-disciplinary research collaboration, and defines one of the key challenges in communicating scientific research.

Aims

The network aims to test the principles of a cross-disciplinary methodology that respects the premise of incommensurability between complex systems modelling and narrative, and generates productive reciprocal insight through a dialogue within this limiting condition between narrative theorists and complexity scientists. The network's activity will directly further research in both fields and simultaneously function as a meta-methodological proof of principle for its non-synthetic approach to interdisciplinary research, with possible applications across the range of academic inquiry, especially for encounters between the humanities and the sciences.

By examining the principled incompatibility between narrative representations and complex systems models we propose to shed useful light on the phenomenon of emergent behaviour, a problematic and currently ill-defined feature of complex systems; and in the process to help qualify and redefine the representational and rhetorical foundations of narrative theory. In both cases the objectives are feasible despite, and in fact because of, the discontinuity between the two frames of reference.

The methodological innovations involved in pursuing this topical inquiry will be developed and tested as research goals in themselves, in two respects. Firstly, the network's model of engagement between disciplinary perspectives will be conceptualized as an approach of practical value to researchers involved in other cross-disciplinary research formations, and of theoretical value as a meta-methodology for conceptualizing engagement across the divide between the sciences and the humanities. Secondly, we will consider both the topical encounter and its principled methodological implications in the context of science communication, and assess the potential of our complementary methodology for the narrative representation of complexity science in contemporary media.

Methodology

This network will bring together complex systems researchers and narrative theorists, spanning the divide between the sciences and humanities. But the collaboration will be based precisely upon a point of discontinuity, so that the network's topical focus directly corresponds to the central problem of cross-disciplinary methodology. The network will take up this opportunity to trial an innovative approach to the encounter between incompatible disciplinary paradigms, and to explore possible meta-methodological implications. The proposition to be tested is that dialogue between the sciences and humanities can most productively take place without an expectation of consilience between the disciplinary perspectives concerned, and that this strategy may be both practically and theoretically enabling.

The network will cultivate reciprocal insights through collaborative exchanges between, on the one hand, complexity researchers working in computer science, the life sciences, artificial intelligence,

earth sciences and sociology; and on the other hand researchers in literary studies, digital media, history of ideas, film studies, history of art and semiotics. Cross-disciplinary collaboration and dialogue are central to the network's research methods and (at a meta-level) to its research topic, and accordingly the principal vehicle for our work will be a structured series of topically-focused workshops, research seminars, and symposia.

Need for proposed collaboration

The proposed network brings together researchers from six institutions, embedded in a set of different research formation that will each make a distinctive contribution to the collaboration.

At the University of York, the network will involve the Interdisciplinary Centre for Narrative Studies (Richard Walsh), and the York Centre for Complex Systems Analysis (Prof. Susan Stepney), which between them provide the overarching framework for the interdisciplinary dialogue proposed combined with strong theoretical interests in both complex system modelling and narrative theory.

At the University of Abertay, Prof James Bown, Professor of Systems Biology and Director of Research in the School of Arts, Media and Computer Games, and Lynn Parker, Lecturer in Computer Arts, bring to the network a track record of collaboration between complexity science and creative new media.

The University of Warwick participants, Dr Emma Uprichard, Prof. Celia Lury, and Dr Olga Goriunova belong to the Centre for Interdisciplinary Methodologies, and have a strong background in complex systems and narrative in the social sciences.

Prof Marina Grishakova, at the University of Tartu, is currently the leader of a research project funded by the Estonian Science Foundation, "Narrative Forms and Functions in Contemporary Culture: Narrative as a Means of Cognition, Communication and Sense Making," and is an authority on Lotman's Tartu-Moscow School semiotics.

The Aarhus University participants bring a strong narratological research group led by Prof Henrik Skov Nielsen, in the Department of Aesthetics and Communication, as well as the expertise of Stine Grumsen and Matthias Clasen in Interdisciplinary Evolutionary Studies.

Dr Merja Polvinen, of the Helsinki Collegium for Advanced Studies within the University of Helsinki, is a specialist in cognitive narrative theory, and also brings the Collegium's commitment to interdisciplinary dialogue and methodological reflection in research.

Proposed visits, workshops, other activities

The core activity of the network will be a series of six three-day workshops staged over three years, each focussed upon the research agenda of one of the six participating institutions. The workshops will be held at York, hosted by either the York Centre for Complex Systems Analysis or the Interdisciplinary Centre for Narrative Studies, and will bring into dialogue ongoing research, within the parameters of each occasion's topical focus, from participants on the complexity and narrative sides. Each occasion will assume the incommensurability of the juxtaposed disciplinary perspectives and develop complementary rather than consilient models of the case study under examination. In doing so we shall explore the possibility of productive exchange across disciplinary frontiers without

a coercive demand for synthesis, and sustain a meta-methodological review of the approach and its implementation throughout.

The network will also include a joint event with the Estonian Science Foundation project “Narrative Forms and Functions in Contemporary Culture: Narrative as a Means of Cognition, Communication and Sense Making,” led by Marina Grishakova. This collaboration will be held in the University of Tartu, and will bring the network’s research and methodology to an overlapping constituency of European narrative scholars.

There will be a strand of nine more narrowly focussed research seminars running on a termly cycle throughout the project, allowing a single network participant’s research to be foregrounded in its own terms. The priority on these occasions is to present a research topic within the scope of the network to a broader research community at York, testing the relevance of the network’s approach for scholars with adjacent interests.

Years one and two of the network will each culminate in a three-day symposium; the first will be hosted by YCCSA and will present formal research papers in response to the year’s dialogue from the complexity science perspective; the second will be hosted by the ICNS and will similarly present formal research papers from the narrative studies perspective. Each symposium will extend the reach of the network’s topical and methodological work to the respective research communities at large at York and other regional universities.

York network participants will also represent the network’s work in progress, and in particular its interdisciplinary methodology, to annual international conferences in narrative studies and complex systems modelling, in order to propagate the approach and the dialogue it involves among scholars receptive to ways of looking beyond their disciplinary horizons.

The network will culminate in two co-ordinated high-profile events at York: a three-day conference aimed at drawing together the constituencies of researchers in narrative studies and complexity science respectively, in order to further the goal of breaking down the institutional barriers between the sciences and humanities; and an exhibition mounted in conjunction with the York Festival of Ideas, in which we shall trace the continuity between the network’s vision of complementary interdisciplinary research, the theoretical issues of complex systems modelling and narrative representation, and the consequences of this work for science communication and for narrative’s role in the cultural assimilation of complexity.

Current references to literature on topic

Abbott, H. Porter, 2003. “Unnarratable Knowledge: the Difficulty of Understanding Evolution by Natural Selection.” *Narrative Theory and the Cognitive Sciences*, ed. David Herman, 143–62. Center for the Study of Language and Information. A valuable exposition of some of the cognitive limitations of narrative sense-making, in relation to the systemic process of evolution by natural selection.

Abbott, H. Porter, 2008. “Narrative and Emergent Behavior.” *Poetics Today* 29.2: 227–44. Theoretical elaboration of Abbott’s earlier essay, making explicit the duality of the relation between narrative and complexity as manifested in the concept of emergent behaviour.

Clarke, Bruce, 2008. *Posthuman Metamorphosis: Narrative and Systems*. Fordham University Press. On the cultural impact of second-order systems upon narrative and cognition, from a cybernetic perspective.

Clarke, Bruce and Mark B. N. Hansen, eds. 2009. *Emergence and Embodiment: New Essays on Second-Order Systems Theory*. Duke University Press. Essays on conceptual encounters between literature and complexity theory, with interdisciplinary implications for both the humanities and the social sciences.

Doxiadis, Apostolos and Barry Mazur, eds. *Circles Disturbed: The Interplay of Mathematics and Narrative*. Princeton University Press, 2012. An interdisciplinary collaboration that examines the relationship between mathematics and narrative, including the narrative representation of complex systems.

Grishakova, Marina, ed., 2009. *Semiotics, Communication, Cognition 1: J. Lotman. Culture and Explosion*. De Gruyter. A detailed semiotic account of how culture influences the way we experience reality. Grishakova's afterword situates Lotman and the Tartu-Moscow school, and brings out their relevance to cognitive narratology.

Herman, David. *Story Logic: Problems and Possibilities of Narrative*. University of Nebraska Press, 2002. A comprehensive and synoptic theoretical overview of narrative from its function at the cognitive level to its elaborate literary manifestations, conceiving story logic as a fundamental human way of making sense.

Polvinen, Merja, 2008. *Reading the Texture of Reality: Chaos Theory, Literature and the Humanist Perspective*. Helsinki University Press. Offers readings of literary responses to the concepts of chaos theory and examines the use of those concepts in literary scholarship.

Poulaki, Maria, 2011. *Before or Beyond Narrative? Towards a Complex Systems Theory of Contemporary Films*. University of Amsterdam. Invokes the concepts of complexity theory in order to address the dynamic forms of certain post 1990s films, viewing them as complex systems in themselves.

Ryan, Marie-Laure. "Narratology and cognitive science: A problematic relation." *Style* 44. 4, 2010: 469-495. Resists the unilateral tendency of cognitive narratology to adopt concepts ready-made from the cognitive sciences and applying them to texts.

Turner, Mark. *The Literary Mind*. Oxford University Press, 1996. Argues for a view of story as a central principle of our understanding and parable as a tool of everyday reason, and hence for the idea that literary thought is fundamental to basic cognition.

Wilson, Edward O. *Consilience: The Unity of Knowledge*. Alfred A. Knopf, 1998. An eloquent statement of the fundamental premise rejected by this network, the assumption of consilience between every branch of learning. It is therefore the foil to our own interdisciplinary methodology.