

Literature & Culture and/as Intelligent Systems
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Book of Abstracts

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Keynote Address

James Smithies, “*Mysterium tremendum et fascinans*: Rethinking the Technology of Literature & Culture”

Abstract: We have known for several decades that too much emphasis on the printed text blinds us to the oral and performative power of literature and culture, and their socio-technical dimensions. The oral dimension to Homer’s epics and technical dimensions to digital scholarly editions provide just two examples, at either end of the historical record, that point to the need to rethink the way we read and interpret literature and culture *as systems* rather than texts in the narrow sense of the term. The epistemological implications of this change in critical perspective are profound, however. Advances in deep learning that facilitate the emergence of literature and culture from computational systems suggest autonomous new modes of creativity, reminiscent of alien intelligence, and yet we must resist the pull of mysticism and vitalism. What exactly is a ‘system’ in literary and cultural terms, and how do we manage what Rudolf Otto referred to in the early twentieth century as the *mysterium tremendum et fascinans* that accompanies confrontation with vanishingly complex ideas? How do we retain awareness of the engineered nature of computational systems, and the humanity implicit in them, while also constructing modes of critical interpretation appropriate to their epistemological and ontological significance?

James Smithies is a Professor of Digital Humanities in the Department of Digital Humanities, King’s College London. He was previously founding director of King’s Digital Lab and Deputy Director of King’s eResearch. Before working at King’s James worked at the University of Canterbury in New Zealand, as Senior Lecturer in Digital Humanities and Associate Director of the UC CEISMIC earthquake archive. He has also worked in the government and commercial IT sector in the UK and New Zealand, as a technical writer and editor, business analyst, and project manager. His approach to DH is presented in *The Digital Humanities and the Digital Modern* (2017). Recent projects include the Critical Infrastructure Studies Collective, and the MaDiH project that mapped digital cultural heritage infrastructure in Jordan.

Panel I: AI Systems For Analysis I

Jennifer Edmond & Erik Ketzan, “*Ein bestimmtes Gesellschaftsetwas* – Drawing Lessons for 21st Century ‘Privacy-Protecting’ AI Technology from 19th Century European Literature”

Abstract: The LI4AI (Literary Identities for Artificial Intelligence) project investigates issues related to the risks and future of Artificial Intelligence — including identity formation, privacy, and anonymity — using a corpus of European literary texts from the long Nineteenth Century. The project contributes uniquely to the discourse of AI through its attention to the cultural filter by which literature was processing events of the first and second precursors to AI’s so-called “Fourth Industrial Revolution” (World Economic Forum, 2016). In specific, we propose that although we may think of AI as presenting a distinctly a contemporary challenge, in fact, the technology-driven panopticon effect we recognise in the practices of companies such as Google and Facebook can be explored from its roots only by starting in the shared discourses and narratives of this earlier, foundational period.

The LI4AI project approaches the challenge it sets itself through mixed-method close and distant readings of the novels in its corpus. We propose to present to the IRIS meeting a first experimental component, in which we query and model anonymity and privacy. It will begin with the creation of a dictionary of terms, starting with obvious lemmas and strings (“anonymous,” “in secret,” “mask,” “unsigned,” etc.) and expanding based on close reading, collocates, syntactic

constructions, and topic modelling. The modelling of such rich and complex topics as privacy and anonymity presents a host of methodological issues. While computer science and information theory have introduced such concepts as computational differential privacy (Mironov et al., 2009), it remains unclear how such schemas can inform the modelling of privacy and anonymity in literary texts, and indeed how such concepts correspond to deeply held, culturally specific ideals. Our token- and syntax-based dictionary will be scored on precision and recall for its ability to identify relevant passages in literary texts, and serve as a basis for more sophisticated models and experiments, including e.g. a combination of dictionary with sentiment analysis, character networks, and/or word vectors.

Literature has been dubbed a “laboratory of the possible” (Westphal 2011, 63) incorporating significant predictive potential (Ameel and Craps, 2020). As we approach the revolution that AI promises, the textual artifacts of the past (even with all their inherent, acknowledged biases, another issue the project explores in light of the challenges biased AI training data can cause) will prove valuable in building models which can also be applied to contemporary social challenges.

Jennifer Edmond is an Associate Professor of Digital Humanities at Trinity College Dublin, Co-director of the Trinity Center for Digital Humanities, Director of the MPhil in Digital Humanities and Culture and a funded Investigator of the SFI ADAPT Centre. Jennifer also serves as President of the Board of Directors of the pan-European research infrastructure for the arts and humanities, DARIAH-EU.

Erik Ketzan is a Postdoctoral Fellow in the Centre for Digital Humanities at Trinity College Dublin.

Jan Angermeier, “The Character-System of The Great Gatsby - an Intelligent System Visualized”

Abstract: “[O]ne of the most important contributions to literary theory of the past twenty or thirty years.” This is how literary historian Franco Moretti refers to narratologist Alex Woloch’s concept of character-space. Character-space describes the narrative space given to a single character in a text while a character-system is tantamount to the interplay between the different character-spaces. Or in Woloch’s words: “the discrete representation of any specific individual is intertwined with the narrative’s continual apportioning of attention to different characters who jostle for limited space within the same fictive universe.” The task of measuring character-spaces was tackled by scholar Graham Sack . For measurement in prose texts he employs character names as an instrumental variable, i.e. a value that is easily measurable but at the same time only an approximation of the concept that is supposed to be measured.

My approach builds on Sack’s paper, yet also features some different design choices. The object of this research is Fitzgerald’s novel *The Great Gatsby*. In the initial step I create a sensible catalogue of character names for the cast of the novel, i.e. I take care to consider as many name variants as possible, e.g. Jay Gatsby is also referred to as Jimmy and James Gatz. The next step involves the chapters of the novel as plain text files. A Python-script counts the name mentions of all characters in each chapter and saves the counts in csv-files. This extracted data is the basis for generating a multitude of visualizations which in turn offers insight into the novel’s character-system. Finally, a careful interpretation of the findings allows for a reading of *The Great Gatsby* in a new light, i.e. underpinned by measurement. In other words, Fitzgerald’s novel qua intelligent system can thus be made visible.

The meta-goal of this approach is to show an exemplary use case for instrumental variables in literary studies and that a sensible involvement of quantitative methods can be instructive in researching fictional texts.

Jan Angermeier is currently studying for his master’s degree in the Digital Humanities program at Stuttgart University. Before that, he completed his bachelor’s degree at Stuttgart in English and Political Science. Additionally, he had the privilege to participate in the Erasmus program for a trimester at Edinburgh Napier University. Developing an interest for (post-)colonial literature and Lacanian psychoanalysis led to his bachelor’s thesis “*Onlookers see most of the game*”: *Ideal and Individual Myth in Conrad’s Lord Jim*. During his master’s studies, he applied Lacanian thinking and

adjacent theories to authors like Chopin, Yeats, and Auster. Exposure to digital humanities brought him experience in annotation (e.g., employment at the QuaDramA research project) and novel paradigms for literary studies, chiefly Moretti's approaches. His research interests are world literature, narratology, Freudo-Marxian theories, applying and reflecting on digital methodology.

Evelyn Gius, Irakli Khvedelidze, Mareike Schumacher & Inna Uglanova, "Automated annotation of indicators for potential conflicts as step towards automatic crisis detection in narratives"

Abstract: This paper examines how the automatic annotation of conflict potential in narrative texts reveals the flexibility of narratives as intelligent systems (Mateas 2003). The aim is to use computational modeling techniques to make the basic conflict patterns as well as their variations in the corpus observable. For this purpose, we highlight the possibility of automatic crisis detection in narrative texts and show first results of automatic annotation. The approach is based on the assumption that the latent conflicts contained in a literary text can be identified by certain text features. Moreover, we assume that an accumulation of these conflict markers indicates a realized conflict. Accordingly, we operationalize the conflictuality of a text on the basis of certain signals in the vocabulary and thus first analyze the conflict potential of the text, in order to then follow up with further investigations on the realized conflicts.

We distinguish four categories that are particularly relevant to literary conflict: explicit indicators of conflict potential, implicit indicators of conflict (such as the mention of a "dagger"), indicators of conflict resolution (such as "intercession" or "understanding"), and indicators of conflict intensity (such as in the phrase "they fell sharply upon her"). The category of explicit indicators of conflict potential can be further specified by differentiating between emotion-based conflict indicators ("he was indignant"), state-based conflict indicators ("in this lamentable world"), action-based conflict indicators ("they locked him up"), and indicators of internal conflict ("in vain he pondered rescue").

The conflict markers conceptualized in this way are strongly vocabulary-based; nevertheless, their identification is not based on word lists, but must be context-sensitive to achieve good results. This combination of vocabulary orientation and context dependency makes the detection and annotation of conflict markers methodologically similar to Named Entity Recognition (cf. Schumacher 2018). In order to automatically annotate and classify indicators of potential conflicts in narrative texts, we trained a classifier based on conditional random field algorithms (cf. Sutton and McCullum 2011). A series of experiments conducted using a small training and test corpus consisting of narrative texts ranging from the late 18th to the early 20th century serves as a proof of concept. The training corpus comprises 10 novellas of the 19th. From each novella, a final passage amounting to 4,000 tokens was extracted and transferred to the training corpus. Tests and analysis were conducted on five narrative texts including *The Metamorphosis* by Kafka and *Effi Briest* by Fontane.

Evelyn Gius is a professor for Digital Philology and Modern German Literature at the Technical University of Darmstadt. She has been working in the field of Digital Humanities for more than 15 years. In her PhD project, she developed an annotation-based approach to the narrative structure of conflict narratives. Currently she is the PI of the dissemination project forTEXT, the annotation platform CATMA and the computational literary studies project EvENT (Evaluating Events in Narrative Theory). She also is part of the programme committee of the DFG priority programme Computational Literary Studies, vice chairwoman of the Digital Humanities association DHd and editor of the new book series *Digitale Literaturwissenschaft* as well as of the open access *Journal for Computational Literary Studies*. Her research topics include manual and automatic annotation of literary texts, Narratology, and corpus-based Digital Literary Studies.

Irakli Khvedelidze is a research member at the Literature Institute, affiliated to Ivane Javakhishvili Tbilisi State University. He wrote his doctoral thesis on the narratological basis of the autobiographical genre. On the literary representation of character consciousness in literary texts he has at various times carried out three projects (at Ivane Javakhishvili State University and at Friedrich

Schiller University Jena) supported by The Shota Rustaveli National Science Foundation of Georgia (SRNSFG). Currently, as part of the Joint Rustaveli-DAAD-fellowship programme for young scientists, he is conducting a research stay at the Technical University of Darmstadt with Prof. Gius on the topic: digital analysis of autobiographical texts: based on "From my life: Poetry and Truth".

Mareike Schumacher is pursuing a PhD in Modern German Literature and Digital Humanities at the University of Hamburg. From 2013-2018 she was employed in the Digital Humanities projects DARIAH-DE and efoto. Since July 2018 she has been responsible for digital dissemination in the DFG-funded forTEXT-project, which she is coordinating since July 2021. Mareike Schumacher studied cultural studies and business psychology (B.A.) at Leuphana University Lüneburg and German literature (M.A.) in Hamburg. Her research focus lies on distant reading methods, especially machine learning in literary studies, phenomena of space and gender, narratology and cultural heritage as well as theory in (and of) Digital Humanities.

Inna Uglanova is currently a postdoctoral fellow in Digital Philology at the Technical University of Darmstadt, where she is intensively working on the operationalisation of complex literary phenomena and modelling them using machine learning algorithms. She earned her Master's degree in German Studies and History at the University of Perm in 2000. She received her first DPhil in Theory of Language from the University of Perm in 2004. In 2018, she received her second DPhil in Computational Linguistics from the University of Trier. Her research interests focus on language laws, text-based theories, quantitative text analysis and cultural semiotics.

Panel II: AI Systems For Analysis II

Jonas Kuhn, "Intelligent systems in research on literature?"

Abstract: In the emerging field of Computational Literary Studies, the application of computational tools and models on literary texts is a defining element. Many approaches employ machine learning (ML) techniques to capture patterns in corpora. Under a popular notion of Artificial Intelligence, which equates AI to data-driven ML, any such study would count as an Intelligent Systems approach. Key challenges might be seen in developing generic data-driven models, applicable and adaptable across domains — natural sciences as much as social sciences and the humanities — and in scaling up the data volume that can be processed.

This general-problem-solving view of Intelligent Systems is undoubtedly productive for perfecting the induction of complex non-linear input/output functions on datasets of arbitrary provenance. However, I argue for an accompanying research agenda, which one might call a critically reflected Intelligent Systems approach. It is characterised by a continuous process of critical dissection of the modelling techniques applied to the object of study. The dissection should reveal for each substep in the workflow what nuances of the multifaceted notion of intelligence this step appeals to and how it relates to the guiding research questions. (A substep may be the use of a computational tool, an act of intellectual theorising or some combination.) For research aiming at a theoretical understanding of its subject, it is the outcome of this dissection that provides the main motivation for experimenting with AI components (much more than the scaled-up data volume): although each component model of intelligent behaviour is imperfect, it constitutes a tool in the researcher's hands for systematically playing through some hypothesised chain of implications — using an experimental intelligent system (where each component's reliability in the relevant context can be critically evaluated against theoretically grounded reference data).

To illustrate the methodological point I use conceivable text-analytical questions from the recently started "CAUTION" project with Janina Jacke (Göttingen) on Unreliable Narration: certain indicators for a narrator being unreliable lie in language or narration style (for example exaggerations); to (approximately) capture such indicators, a data-driven model trained on a corpus of examples is promising. However, to systematically capture how contradictory implications of the narration lead the reader to conclude that the narrator is unreliable, it appears more effective (currently) to use symbolic knowledge representation and reasoning techniques. Here, the reflected

application of a classical AI system may contribute to operationalising key narratological concepts. The two examples appeal to very distinct capabilities of intelligent agents.

Jonas Kuhn is a Professor of Computational Linguistics at the University of Stuttgart, Germany. After graduate studies in Stuttgart and Edinburgh, he completed his doctorate in Stuttgart in 2001 and then spent a postdoc at Stanford University. He was an assistant professor at the University of Texas at Austin, led a junior research group at Saarland University, Germany, before taking up a full professorship at the University of Potsdam, Germany, in 2006. He has held his current position in Stuttgart since 2010. Kuhn's research interests range broadly from linguistically informed data-driven models in Natural Language Processing, to the development of cross-disciplinary methods for text analysis in the humanities and social sciences.

W. Victor H. Yarlott, "AI models for detecting motifs in a text collection"

Abstract: Motifs are distinctive recurring elements found in folklore that have significance as communicative devices in news, literature, press releases, and propaganda. Motifs concisely imply a large constellation of culturally-relevant information – imagine a troll under a bridge, a motif from Scandinavian folklore about which there are many relevant, related ideas: the troll does not own the bridge, yet the troll charges a toll for using the bridge which is enforced with the threat of physical violence. This motif is used effectively when applied to *patent trolls*, who are not the owners of the *idea* they hold a patent for, yet they attempt to extort money through threats of *legal* violence. The broad usage of motifs suggests their cognitive importance as touchstones of cultural knowledge and their cultural relevance hints at their importance for pieces intended to represent an opinion or convince other of an opinion: for example, editorial articles. Thus, we expect that in editorial articles, as compared to non-editorial articles, motifs would occur more frequently. As part of a larger project to develop a system for automatically detecting motifs, we have collected 7,946 news articles containing phrases matching the surface form of an identified motif; we have annotated those phrases as either a true motif usage or not. Of these, 5,109 had either editorial tags or other genre tags; the remaining 2,678 categories did not. Using a high-performance opinion classifier, we re-categorized these articles as either editorial or not, resulting in a total of 117 editorial and 7,829 non-editorial pieces. Calculating the rate of motifs per article, sentence, and token, we found that motifs were roughly three times as frequent (3.75x, 2.95x, and 2.93x, respectively) in editorial articles than in non-editorial articles. We hypothesize this difference is due to editorial articles taking a more casual form of discourse, being crafted to appeal to certain groups, relying on stories for emotional appeal, or arguing for a specific opinion. Further, this strongly suggests the importance of motifs for understanding human communication and highlights the need for automatic tools for detecting motifs within text. This is part of a research project with scholars at Smart Information Flow Technologies (Laurel Bobrow, Joan Zheng, David McDonald, Chris Miller) and Florida International University (Armando Ochoa, Anurag Acharya, Diego Castro Estrada, Diana Gomez, and Mark A. Finlayson).

W. Victor H. Yarlott is a Ph.D. student under the direction of Dr. Mark A. Finlayson at the Knight Foundation School of Computing and Information Sciences at Florida International University (FIU). He received his B.S. and M.Eng. from MIT in 2014 under the supervision of Patrick H. Winston. His research is on narrative and how it relates to culture, emotion, and human intelligence from a computational perspective, focusing on detecting motifs, distinctive recurring cultural "memes," in narratives.

Anna Moskvina, "Genre Identification with Graph Neural Networks"

Abstract: This paper presents a study on automatic genre identification from short texts (blurbs). We use Graph Neural Networks (GNN) and provide a detailed error analysis of the classification results provided by the trained model. Automatic genre identification and prediction is not a new task in the Digital Humanities (Worsham, Kalita, 2018; Calvo Tello, 2018), as genre classification schemes for fiction and non-fiction are numerous and well-established. There has been a multitude of research

that takes into account the textual information from the books paired with, for example, emotional analysis (Kim, 2017; Samothrakis, Fasli, 2015). Most of these systems work with a well-defined, not overlapping set of genres. Nevertheless, the researchers with more humanities background strongly believe that genres that we observe as readers are less structural. The paper "The life cycles of genres" (Underwood, 2016) claims that what we usually assume as genres, may be better called „entities of different kinds“. Antoniak et al (2021) in their study showed that genres, when books are labelled by readers themselves, do overlap.

One of the genre classification schemes that reflects the overlapping nature of different genres was introduced as a part of GermEval Task on the classification of German blurbs in 2019 (Remus et al, 2019), where the genres were represented as a hierarchy with multiple layers and several genres could be assigned to one book. Each book was represented as a short description or a "blurb". For example, one blurb could receive the following labels (different layers of the hierarchy are connected in this example with a "-"): "Literature and Entertainment-Fantasy-Adventure Fantasy" and „Literature and Entertainment-Fantasy- heroic Fantasy“.

For our research we use the textual information from the "blurb" and additionally the information of how the genres relate to each other, by implementing a Graph Neural Network (Zhang et al, 2020). This way we can build a system that can automatically predict what genres a book might be assigned to. Within our paper we delve more into qualitative error analysis with the intent to better understand which errors our system has made (whether the genres were not well-defined, or too detailed, or too vague) and why as well as to see if the errors made by an intelligent system can reflect on the given classification scheme (Remus et al, 2019).

Anna Moskvina studied theoretical and computational linguistics at Moscow State Linguistic University (2007-2012) and computational linguistics at the University of Stuttgart (2014-2017). Since 2017, she has been working as a research assistant and a PhD student at the University of Hildesheim. From 2017 to 2020, she worked in the research project Rez@Kultur, where she was primary responsible for collecting and processing research data. She has been a member of the German Society for Computational Linguistics and Language Technology (GSCL) since 2020. Her thesis focuses on the use of deep learning methods in the Digital Humanities.

Panel III: AI In Contemporary Fiction

Tyne Sumner, "The Way the Portal Wrote: Dataveillance, Subjectivity, Language"

Abstract: "Why were we all writing like this now?" asks the narrator in Patricia Lockwood's 2021 debut novel *No One Is Talking About This*. Answering her own question, she responds: "Because ... it was the way the portal wrote." Lockwood's novel, like several other recent works of literary fiction, is interested in interrogating the concurrent absurdity and awfulness of what it means to be extremely online; how the internet has come to fundamentally change the way we speak, write, and think. Today, the experience of being constantly online is inextricably tied to, if not entirely comprised of, the experience of dataveillance: the continuous monitoring of people's communications, actions, and data across a growing number of platforms. Several studies, such as Deborah Lupton and Mike Michael's 'Depends on Who's Got the Data: Public Understandings of Personal Digital Dataveillance' (2017) have already focused on people's 'tacit assumptions about the uses and benefits of dataveillance' as well as people's 'fears and anxieties about its possible misuse.' Similarly, José van Dijck's research in 'Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology' (2014) considers the 'gradual normalization of datafication as a new paradigm in science and society' and the extent to which 'notions of "trust" and "belief" are particularly relevant when it comes to understanding dataveillance' (197).

This paper builds on yet diverges from these studies by examining the affective states and aesthetic and subjective representation of dataveillance in recent literary fiction. It accounts for the ways in which the experience of dataveillance is characterised as much by the technological (datafication, metadata, infrastructure) as it is by the social (affect, subjectivity, aesthetics, culture) to suggest that literature has a crucial role to play in shaping our conception of the implications of

surveillance in the twenty-first century. To do this, it asks how literary language works intelligently, in and of itself, to interrogate theories of information, data, and the representational conundrums that dataveillance imposes on critical thinking, creative expression and aesthetics.

Tyne Daile Sumner is a researcher and teacher at the University of Melbourne, Australia. She is currently a Postdoctoral Research Fellow on two Australian Research Council (ARC) projects: *Literature and the Face: A Critical History* and *The Australian Cultural Data Engine*. Her work explores the relationship between literature and surveillance, with a focus on the ways that poetry is engaged with concepts such as privacy, identity, confession, and subjectivity in the context of digital technology and the increasing datafication of everyday life. Her research has been published across a range of disciplines from literary studies and cultural theory to digital ethics and cinema. Her first monograph is *Lyric Eye: The Poetics of Twentieth-Century Surveillance* (Routledge 2021).

Curtis Runstedler, “Artificial Friends, Attentional Anxieties, and Intelligent Systems in Kazuo Ishiguro’s *Klara and the Sun*”

Abstract: Contemporary depictions of robots and inattention anxieties abound in the 21st-century English novel, reflecting concerns about technological progress and advancement. Such literary representations of robots simultaneously embody technological advancement and achievement while also elucidating the critical lapses in attention as shown in the behaviour of their human counterparts, which often prove destructive or damaging for not only the humans in question, but also the robot or artificial human’s well-being. These 21st-century literary robots are also commodified and exploited due to their attentional capabilities, distinguishing them from earlier representations of literary robots. Alternatively, they are marketed as commodities to attention-deficient consumers who quickly lose interest in them and treat them as disposable objects.

In this presentation, I argue that Klara, the “Artificial Friend” protagonist in Kazuo Ishiguro’s *Klara and the Sun* (2021) embodies contemporary concerns about technology and attentional shifts. Klara possesses hyperattentive qualities that reflect her excellence as not only a sentient being, but also as a potential surrogate daughter for a family with a chronically ill daughter. Unfortunately, her sense of trust and compliance, as well as her attentional capabilities, are exploited by both her family and neighbours as well as her manufacturer. Klara’s hyper attentional qualities are juxtaposed with the attentional deficiencies of her human owners, who experience such deficiencies due to their overdependence on and superficial understanding of technology in their lives. This results in the exploitation of her economic (and social) value as an AI figure and autonomous being. The humans’ behaviour in this novel also reflects a cultural anxiety of technological progress (a robot taking their daughter’s place in the family and their anxieties and eventual rejection of it).

This paper aims to illuminate the interconnectedness of intelligent systems, particularly intelligent robots, and the crisis of attention in the contemporary English novel. Such hypothetical models of technology are helpful for exploring concerns about attentional deficiencies as well as the ethical treatment of advanced robotic beings or “artificial friends” in society. In this case, Klara is often more human-like than her host family. Rather than leading a robot revolution, however, Klara becomes a victim of this “advanced” society due to her extreme subservience and complacency .

Curtis Runstedler is a postdoctoral fellow in the English Literature department at the University of Stuttgart. His current research investigates literary representations of medieval robots and automata, and he is also interested in medieval werewolves, medievalism in popular culture, and the intersections between contemporary depictions of robots and attention in English literature.

Elizabeth Callaway, “Bats and Bots: Ecosystems and Artificial Intelligence in David Mitchell’s *Ghostwritten*”

Abstract: In “Night Train,” the penultimate chapter of David Mitchell’s 1999 novel *Ghostwritten*, an artificial intelligence calls into a late-night radio show, distressed at the state of the world. Though this AI, named Zookeeper, uses the radio program as a confessional for a series of horrific acts, the bulk of its dialogue consists of descriptions of the landscapes, species, and environmental disasters

that it witnesses from various satellites orbiting Earth. Zookeeper clearly reveals its interest in protecting Earth's ecosystems and the individual animals, plants, and organisms that comprise them. As such, Zookeeper becomes a means of interrogating the relationship between the intelligent systems of artificial intelligence and the non-intelligent, but no less dynamic and lively systems of ecology. In an era where Microsoft's "AI for Earth" aims to use AI to solve environmental challenges, *Ghostwritten* asks "what can AI tell us about nature?" In this paper, I argue that the affordances of Zookeeper's sensory "organs" (satellites) position it as the ultimate natural historian. Zookeeper's narration of its movements becomes a caricature of colonial natural history: a highly visual, purposefully neutral mode of description that travels seamlessly across landscapes making order out of the chaos of nature. The parallel drawn between Zookeeper and natural history implies that claims of AI neutrality, objectivity, and innocuousness are as strategic and false as these same claims were about British and European natural historians cataloguing a "new world." Moreover, Zookeeper's guiding algorithms are a black box that readers can only guess at from the AI's actions but nevertheless seem inadequate for operating in a messy world. As Zookeeper struggles to maintain the safety of the creatures in its "zoo" against the destructive "visitors" (humanity) and remain inside its operating parameters, the novel dramatizes the friction between three systems: artificial intelligence, ecosystems, and human systems. Ultimately *Ghostwritten* argues that what AI can tell us about nature is less informative than what it can tell us about ourselves.

Elizabeth Callaway is an assistant professor in the Department of English at the University of Utah and affiliated faculty with the Environmental Humanities Graduate Program. Her book, *Eden's Endemics: Narratives of Biodiversity on Earth and Beyond* (University of Virginia Press) argues that literary and scientific representations of biodiversity often confront the challenge of depicting multitudinous lifeforms by combining the genres of natural history and science fiction. This can lead to a conception of biodiversity-as-information rather than as a collection of lively bodies that change, transform, and exhibit surprising agency. Dr. Callaway has also published articles on digital humanities, climate change, and the speculative ecosystems of science fiction.

FRIDAY, DECEMBER 17th, 2021

Keynote Address

Simon Ings, "As If: fiction's modelling of minds," Writer, Critic, and Arts Editor of *New Scientist*

Simon Ings is the author of eight previous novels and two works of non-fiction, including the Baillie Gifford longlisted *Stalin And The Scientists*. His novel *The Weight of Numbers* had him chosen Man of the Year by *Arena* magazine (which promptly folded). He was the arts editor of *New Scientist* magazine. Now, from possibly the coldest flat in London, he writes newspaper reviews and works on a book about writers and power, due out from Bridge Street Books in 2025.

Panel I: Complex Systems And Creativity In Literature

Federico Pianzola, "Systems, literary theory, and the computational modelling of narrative"

Abstract: Narrative can be conceptualized as a complex system, with pragmatic benefits for our description of interpretative and affective processes involved in reading (Pianzola, 2018). Indeed, narrativity—which is the dominant quality of a narrative—is a property emerging from the organisation of a system constituted by interdependent components interacting with the environment over time in non-linear ways. In this paper, I shows how systemic thinking shaped many literary and communication theories—dating back to Aristotle (250 BCE, 2019), Jurij Tynjanov and Roman Jakobson (1928,1980), Niklas Luhmann (1985), and Meir Sternberg (2010)—and I offer some suggestions about the modelling of narrative as a complex system. Considering the text-

audience relations as constitutive of narrative (Caracciolo, 2014) requires a way of looking at stories keeping in mind that the audience's experiential background, its cognitive-affective states, and the situational context all play a crucial role in the emergence of what we call a narrative. Accordingly, when we attempt to computationally model stories, we need to include many more variables than what we usually do when we focus on textual features. Modelling narrative as a complex system requires the definition of some priors, the inclusion of behavioural and contextual variables, and a specification of their possible relations with textual features. I do not have a satisfactory model yet, therefore I would like to discuss possible solutions and methodologies, like agent-based modelling and predictive coding.

Federico Pianzola is Assistant Professor in Computational Humanities at the University of Groningen. He is also co-founder and managing editor of *Enthymema*, an Open Access international academic journal of theory, critics and philosophy of literature, a member of the scientific advisory board of OPERAS (the Research Infrastructure supporting open scholarly communication in the social sciences and humanities in the European Research Area), a member of the governing board of IGEL (the International Society of the Empirical Study of Literature). His research concerns narrative theory and the impact of digital technologies on literature, especially regarding digital social reading. In one sentence, he uses computational, qualitative, and quantitative methods to study reader response.

Dominik Hörauf, “Artificial Intelligence for the Assessment of Creativity: An Introduction to Semantic Text-based Creativity Analysis”

Abstract: Creativity has been defined as a complex construct (Feldhusen & Goh, 1995) that creates a product or response “that (a) [...] is both novel and appropriate, useful, correct, or valuable [...] to the task at hand, and (b) [...] is heuristic rather than algorithmic.” (Amabile, 1996). As this, for the past decades creative capability was to be achieved and assessed by humans, not machines. With the fast and comprehensive spread of artificial intelligence (AI) applications throughout private, industry, and scientific sectors (Acemoglu & Restrepo, 2019; Mehr, 2017), this perspective is found under growing pressure. When algorithms become able to observe and learn, their outcomes may not be solely based on predefined rules, but rather on heuristics as well. Therefore, questions arise about how (e.g., supportive, evaluative, generative) AI challenges our current understanding of thinking creatively and evaluating creativity.

Creativity evaluation employs several factors (e.g., Dumas & Dunbar, 2014; Hocevar, 1979) of which some (e.g., fluency: how many ideas are created in a certain period?) are easier to be evaluated by computational capacity than others (e.g., originality: How different is one idea from others?). For text-based creativity (e.g., literature, idea databases), the latter requires an understanding of both, syntactic and semantic nearness of words. For example, for the word “king” a second word “kingdom” would be syntactically near and thus rated not very original. The same is true for the word “queen”, yet this semantic nearness is harder to capture. Thus, creativity evaluation is largely based on structured tests (e.g., Torrance test, creative function test, etc.) which are typically executed by humans, often placing limitations, e.g. through biases.

Representing words in vector spaces is an efficient way to address this challenge (Mikolov et al., 2013a & 2013b) and allow for text-based creativity assessments by AI tools such as word2vec. Here, words are estimated as vectors consisting of several hundred inputs, which are trained on their contexts. Based on these vectorized representations, the algorithm can predict nearby words and understand semantic in addition to syntactic nearness. Applying AI tools to a creativity evaluation context potentially unlocks new and highly relevant capabilities. For that, it is important to conceptualize and understand the intersection of AI with creativity and its assessment and find ways to execute creativity assessment methods by word-vectorizing AI tools. This depicts the core of this research project. Based on this understanding, new implications can be expected for both, scientific (e.g., pushing for more AI-based creativity research) and managerial (e.g., AI applications for idea assessment and idea management) contexts, guiding towards a conceptualized understanding of *creative artificial intelligence*. As this research project is a work-in-progress, the

workshop presentation will focus on presenting the underlying research idea and discussing possibilities to use word-vector-based AI tools for the assessment of text-based creativity.

Dominik Hörauf works at the Institute of Entrepreneurship and Innovation Science at the University of Stuttgart. His research focuses on creativity, innovation management, and AI-based creativity assessment. The presented research is part of his master thesis research, advised by Professor Dr. Alexander Brem. Previous research includes articles at *Creativity and Innovation Management (CIM)* and *R&D Management Conference*.

Pascal Fischer, “Is it perfume from a dress / That makes me so digress?’ – The categorical differences between human creativity and AI highlighted by literature”

Abstract: In my paper, I will first look at the consequences of the metaphorical use of the human faculty of intelligence for computers and machines. As in most conceptual mappings, many aspects get lost between the source and the target domains. It has often been remarked that in this case, the result is primarily a computational understanding of intelligence. Then, I will address some problems involved in projecting such as a reductionist concept of intelligence back to the mind and the sphere of human creativity – as in the computational theory of mind and the notion of literature as an intelligent system.

I will argue that a juxtaposition of literature and intelligent systems can be productive, but primarily has to accentuate the categorical differences between the mind and machines. Literary texts can raise awareness of the multidimensionality and uniqueness as well as the limitations of the human mind. Taking up arguments by Hubert Dreyfus, David Gelernter and Bert Olivier, I will focus on those functions of the mind that cannot be broken down to computational operations but are copiously represented in literary texts. An emphasis will be on the factors contributing to the subjective experience of the world and the interplay between body and mind, which is frequently downplayed in the computational approach. Futurists like Ray Kurzweil, who claims that humans will be able to upload their minds to computers, mainly rely upon the analogies between brain and hardware as well as mind and software. They also disregard that human consciousness is partly defined by the awareness of bodily decay and mortality. T.S. Eliot’s internal dramatic monologue “The Love Song of J. Alfred Prufrock” (1915/17) will serve as principal example to illustrate my arguments.

Pascal Fischer is a professor of English and American Cultural Studies at the University of Bamberg. His fields of interest include Jewish-American literature, the Romantic period in Britain, medical humanities, performance poetry, urban studies, and cognitive theory.

Panel II: Creative AI

Kim Lacey, “Artificial Creativity: Computers Acting Creatively”

Abstract: In this presentation, I will suggest that artificial intelligence can act creatively. Many will disagree with this assertion, and many already have (engineer Janelle Shane, for one, is quite adamant about this notion). Others, like Gerdried Stocker and Sarah Harman, argue that computer creativity would be, in fact *should* be, like something we have never seen before, thus our current conceptualization of creativity will have to be re-imagined. I happen to agree with the latter—that AI can be creative, and it cannot be anthropomorphized, but is an entirely different type of creativity altogether. Rather than asking “can computers be creative?” in this presentation I ask, “can computers act creatively?” There is an important distinction between “being creative” and “acting creatively.” If creativity, writ large, implies an emotional self-awareness, then “being creative” implies an ontological disposition—a fundamentally philosophical question about what it means to have the ability to translate interior, emotional states and whether anything aside from humans can exhibit such qualities. On the other hand, “acting creatively” might open possibilities for what computers are actually doing. If machines do not have self-awareness yet alone the capability (or even energy) to express themselves, then any exploration into computers and creativity must focus

solely on the end product. Consequently, computers can act creatively, not only in the mimetic sense that they are merely copying styles, but by creating aesthetically pleasing products.

Kim Lacey is an Associate Professor of English at Saginaw Valley State University in Michigan, U.S.A. Dr. Lacey's work has appeared in *Rhetoric Society Quarterly*, *Configurations*, *Journal of Evolution and Technology*, and other journals. Her manuscript, *Creative Futures: Robot Picassos, Fake Friends, and other Sneaky Ways Technology Acts Creatively*, is under contract with Lexington Books.

Pablo Gervás, "Intelligent Systems and Literature: from Artificial Storytelling to Artificial Reading"

Abstract: From the very beginning of Artificial Intelligence in the 50s there have been attempts to build programs that generate stories. In literature, Roald Dahl's short story "The Great Automatic Grammatizator" (1954) described a machine that could be driven to generate a novel, but early efforts in computer science focused on much simpler stories (TALESPIN system, Meehan, 1977; Minstrel system, Turner, 1993). These efforts were mostly driven by the observed properties of the story as a product. Progress since then has led to advances in several fronts, notably in the realm of interactive fiction and video games, where systems create story increments in response to user actions during interactive sessions rather than full stories. In support of this type of system work developed on modelling elements known to be relevant to story quality, such as character believability (Fabulist system, Riedl, 2010) and conflict (Ware, 2014). Efforts to connect these new genres to traditional literature progressively modelled character emotions (EmoEmma system based on Madame Bovary, Charles et al, 2009) and point of view (interactive narration modelled on The Merchant of Venice, Porteous et al, 2010). More recent efforts have begun to consider -- still in a tentative fashion -- some elements arising from the additional complexity implied by larger texts, such as changes in focalization (Gervás, 2014), suspense (Cheong & Young, 2015; Fendt & Young, 2017), multi-plot stories (Fay, 2014; Porteous et al, 2016; Gervás, 2020) and embedded narratives (Gervás, 2021). The consideration of these elements imposed a shift of focus towards modelling the dynamics of the reader's reaction to the content of text. Understandably, this has led to efforts to model the response of the reader, intended to inform the processes of generation. After all, if the text to be constructed has to produce a particular impact on the reader, then the corresponding creative process needs to be able to predict in some way what the reader's response may be to the different possibilities it is considering. These are, in truth, computational models of reading. The proposed talk will review the progress across these various stages of modelling literary creation in computational terms, highlighting relevant examples of intelligent systems of each type and discussing the processes and tasks that have been identified as relevant to achieving acceptable outcomes. The computational description of these tasks and processes are likely to be relevant to consideration of literature as an intelligent system.

Pablo Gervás holds a PhD in Computing from Imperial College, University of London (1995), and he is currently full professor on computational creativity and natural language processing (Catedrático de Universidad) at Universidad Complutense de Madrid. He is the director of the NIL research group (nil.fdi.ucm.es) and for many years was the director of the Instituto de Tecnología del Conocimiento (Knowledge Technology Institute, a research institute of the Universidad Complutense, <http://www.ucm.es/itc>). He has been the national coordinator of the FP7 EU projects PROSECCO – scientific exploration of computational creativity --, WHIM -- plot generation and automated composition of narrative – and ConCreTe – creative description of computer generated concepts in the area of Computational Creativity. He has been coordinator for two national research projects (GALANTE – generation of emotional text – and MILES - semantics of time and space for generating narrative) involving several institutions and principal investigator for two more (IDiLyCo – digital technologies for inclusive communication – and CANTOR – automated composition of narratives to support reminiscence-based occupational therapy). His main research interest currently lies in the study of potential synergies between literature and digital technologies. Professor Gervás is one of the world's leading experts on automatic generation of

(fictional) stories and poetry, and has a background in natural language generation and computational creativity. He is the author of the PropperWryter software, which was used in the process of creating *Beyond the Fence*, the first computer generated musical, staged at the London West End in 2016.

Gunter Lösel, “Theatre Dialogues with Machines”

Abstract: This contribution adds to the field of creativity & machine learning from the practice-based perspective of theatre. Since 2017 we conducted tryouts with chatbots interacting with human actors on the theatre stage in real-time at the Zurich University of the Arts. We used different setups and focused on improvisation in order to allow for machines to react autonomously, with different scenarios and dialogues emerging in each human-machine-interaction. Within this frame we developed two theatre pieces “Almost Human” in 2019 and “Silicon Woman” in 2021 along with several smaller artistic experiments. Using rather simple machine learning devices we managed to create long and entertaining human-machine dialogues and even a play of evening length, involving two chatbots. Both theatre experiments were presented in public, leading the audience to ascribe human traits and states to the performing machines, agency and even something like a “personality”.

In this talk I want to present these projects, discuss the technical and artistic challenges and reflect on the effects of anthropomorphism on the theatre stage. I will show some video material of the performances. In another step I will outline the approach of “applied anthropomorphism” as a framework for this kind of research. Applied anthropomorphism explores human-machine-interaction as an encounter between different species, examining especially the conditions under which a human will perceive the machine as alive, intelligent, emotional and social.

In this context I will present the basic design for “The Answering Machine”, an interdisciplinary research project, which maybe, hopefully, will be accepted for funding by the day of the conference. In any case I want to present the idea of setting up interdisciplinary research to use the theatre stage as a testbed for human-machine-interaction and human-machine-co-creativity. “The Answering Machine” approaches the field from four disciplinary perspectives: computational linguistics, psychology, theatre studies and media studies. I will reflect on the parameters that we want to vary in order to generate effects of anthropomorphism or illusions of “social bots”.

Gunter Lösel is a researcher and actor holding a doctorate in Theatre Studies as well as a diploma in psychology. He is heading the Research Focus Performative Practice at the Zurich University of the Arts and published on the themes of embodied cognition, improvisation, collaborative creativity and artistic research since 2004. Since 2017, he has been leading theatre tryouts involving machine learning systems in interaction with human actors on theatre stages. In 2021 he co-organized the symposium “Limits of the Human, Machines without limits”, that explored the role of robotics in theatre. He was the main applicant of the project “Research Video” (SNF-funded 2017-2021) and is currently co-applicant of the project “The Answering Machine” (under evaluation). He is an accomplished actor in improvisational theatre, a member of the German National Team of Theatresports (2006), founder of the “Improtheater Bremen,” and member of the price-winning duo “Stupid Lovers”.

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