Conversation Pieces: Periodizing Media Art List Cultures

Captions List

Figure 1: ASCII art email from Dutch-Belgian net.art collective JODI posted on nettime in 2001 (view from nettime's online web archive)

Figure 2: nettime's online web archive

Figure 3: Overall messages constituency of nettime, SPECTRE, -empyre- and CRUMB

Figure 4: -empyre-'s messages differential ratios

Figure 5: CRUMB's messages differential ratios

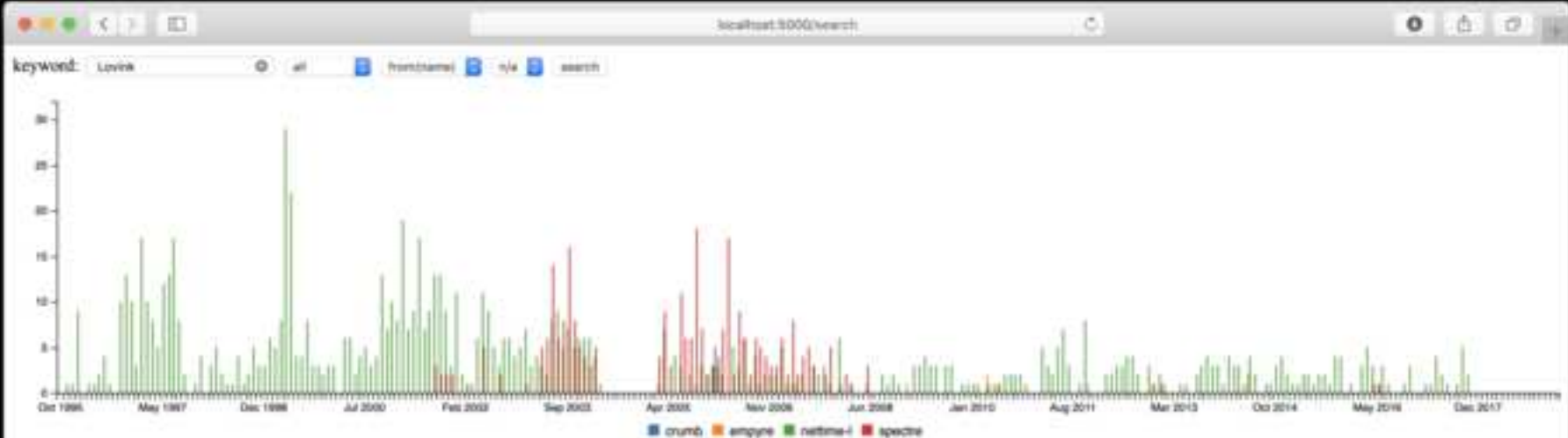Figure 6: nettime's messages differential ratios

Figure 7: Comparative threads ranking per year

Figure 8: Search Timeline — net.art

Figure 9: Search Timeline — post-digital

Figure 10: Search Timeline — Lovink

Figure 11: Search Timeline — Garrett

7061 on Fri, 2 Nov 2001 03:50:26 +0100 (CET)

<nettime> urpHAHsuqwqdef g bwdefise.lnowhlA :dd dnn tnnzK uz it.,alkikikitxious. Sudd he S\/\/\/\/\\/\~\/\/\/\/\/\/\/\/\/\\ieve

- *To:* nettime-l (AT) bbs.thing.net
- *Subject:* <nettime> urpHAHsuqwqdef g bwdefise.lnowhlA :dd dnn tnnzK uz it.,alkikikitxious. Sudd he S\/\/\/\/\\/\~\/\/\/\/\/\/\/\/\/\\ieve
- *From:* 7061 <404 (AT) jodi.org>
- *Date:* Wed, 31 Oct 2001 21:35:42 +0100
- *Reply-To:* 7061 <404 (AT) jodi.org>

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--------------- -12575d1953=v_ag==============
Content-Type: text/plain; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable

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  l a              \              =22
pri// FIXME: pipeline FILD?
      fildl   expan_t_v(%ebx) fildl   expan_t_v(%ebx)
      fildl   expan_t_v(%ebx)            |
  e       \~~~~~\                |                       /~~~~~/
  :
  t
  e                                       /~~~~~/
  b
  x
  a t       \~~~\
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  d e                             /|~~~~~/
  l x
  x t
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  t                        / \~\
  e                 /~~~~\  /
  p
  b
  x
  a t         /~~~~/
  d n
  d e
  l x
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      fildl   expan_t_v(%ebx) fildl   expan_t urpHAHsuqwqdef g
bwdefise.lnowhlA :dd                               dnn tnnzK uz
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```

keyword: Lovink | all | from:(name) | n/a | search

■ crumb ■ empyre ■ nettime-l ■ spectre

crumb

2006
- activist art -- *geert lovink*
- Re: Art and Activism -- *geert lovink*
- Re: Art and Activism -- *geert lovink*
- DEBAT(E) CLOSE CONNECTIONS 5 mei/May -- *geert lovink*
- Strategising Tactical Media -- *geert lovink*

empyre

May 2014
- [-empyre-] effusion and essence -- *Geert Lovink*
- [-empyre-] effusion and miscommunication -- *Geert Lovink*

November 2012
- [-empyre-] Creditism and Debt according to Richard Duncan -- *Geert Lovink*

November 2011
- [-empyre-] short report from NL -- *Geert Lovink*

June 2010
- [-empyre-] Zone book about A2K -- *geert lovink*

April 2010
- [-empyre-] Tactical Media, Research, and the University -- *Geert Lovink*

Legend: crumb — empyre — nettime-l — spectre
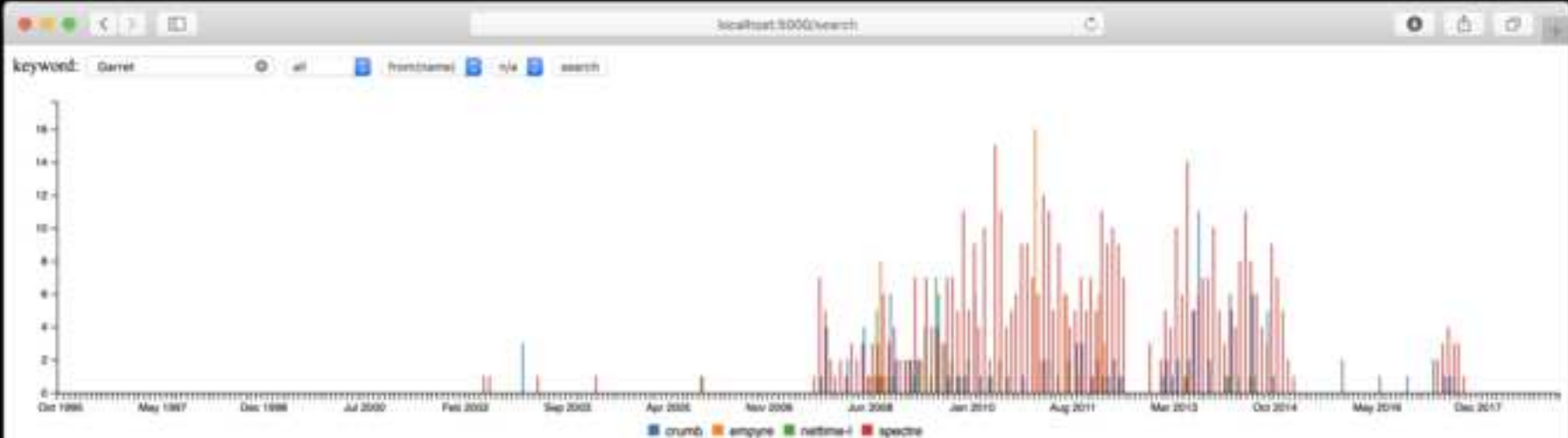
crumb

August 2017
- Video | Children of Prometheus at Furtherfield — *marc garrett*

July 2017
- Two Artist talks as part of Furtherfield's 'Children of Prometheus' exhibition, London. — *marc garrett*

June 2017
- Children of Prometheus exhibition at Furtherfield — *marc garrett*

April 2017
- Re: CRUMB discussion – April - on Internet art and platform building — *marc garrett*
- Re: CRUMB discussion – April - on Internet art and platform building — *marc garrett*

November 2016
- Monsters of the Machine: Frankenstein in the 21st Century. — *marc garrett*

June 2016
- Curating 'Monsters of the Machine: Frankenstein in the 21st Century' — *marc garrett*

November 2015
- Re: Ground Truth: 'The Migration Machine' - The Transborder Immigrant Tool — *marc garrett*
- Re: Ground Truth: 'The Migration Machine' - The Transborder Immigrant Tool — *marc garrett*

October 2014

[Google Custom Search] [Search]

Nettime

- **nettime-ann**: Nettime english announcements list
  - 2005 [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2006 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2007 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2008 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2009 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2010 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2011 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2012 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2013 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2014 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2015 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2016 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2017 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2018 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2019 [Jan] [Feb] [Mar] [Apr]
- **nettime-l**: Nettime english language list
  - 2070 [Jan]
  - 2080 [Jan]
  - 1995 [Oct] [Nov] [Dec]
  - 1996 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 1997 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 1998 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 1999 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2000 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2001 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2002 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2003 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2004 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2005 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2006 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2007 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2008 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2009 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2010 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2011 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2012 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2013 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2014 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2015 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2016 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2017 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2018 [Jan] [Feb] [Mar] [Apr] [May] [Jun] [Jul] [Aug] [Sep] [Oct] [Nov] [Dec]
  - 2019 [Jan] [Feb] [Mar] [Apr]

nettime - Messages Constituency
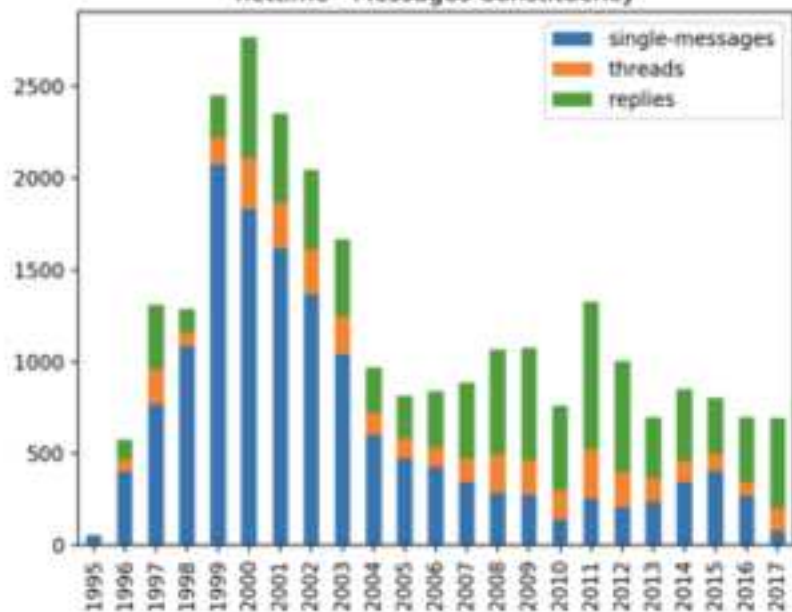
spectre - Messages Constituency
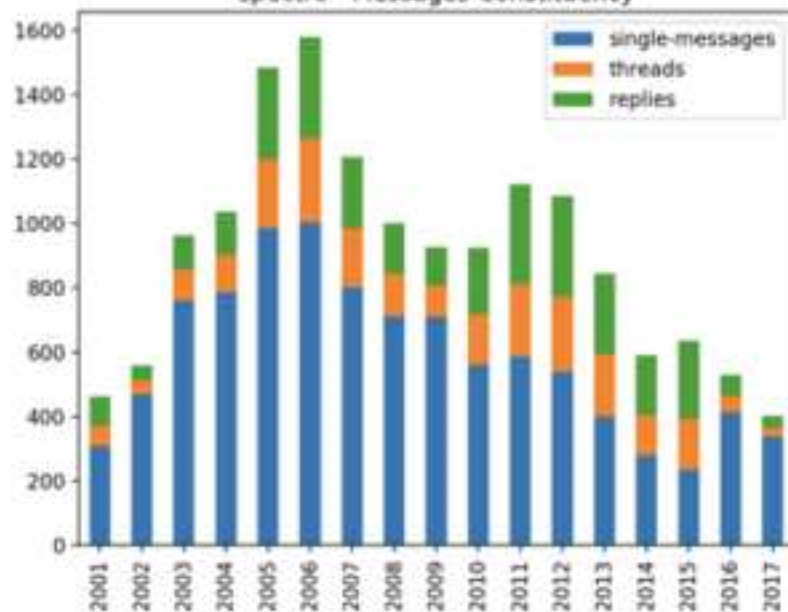
crumb - Messages Constituency
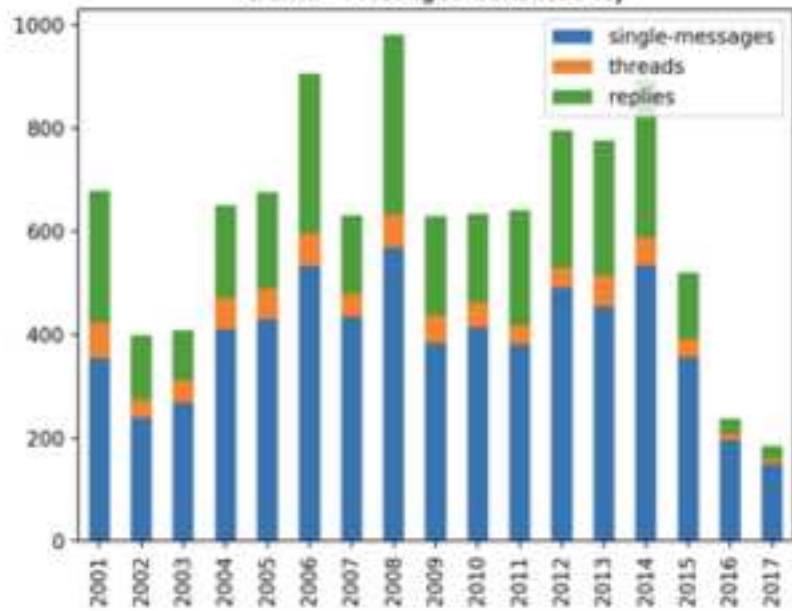
empyre - Messages Constituency
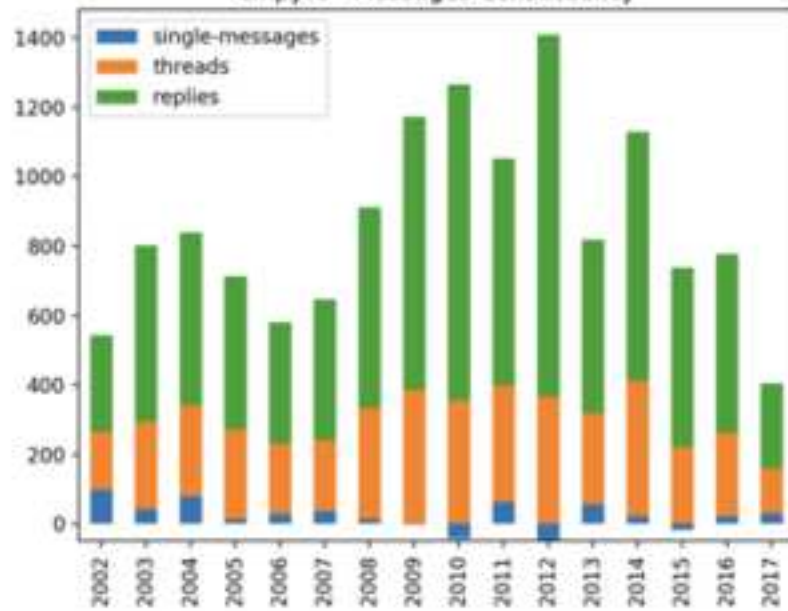
empyre - Messages Constituency
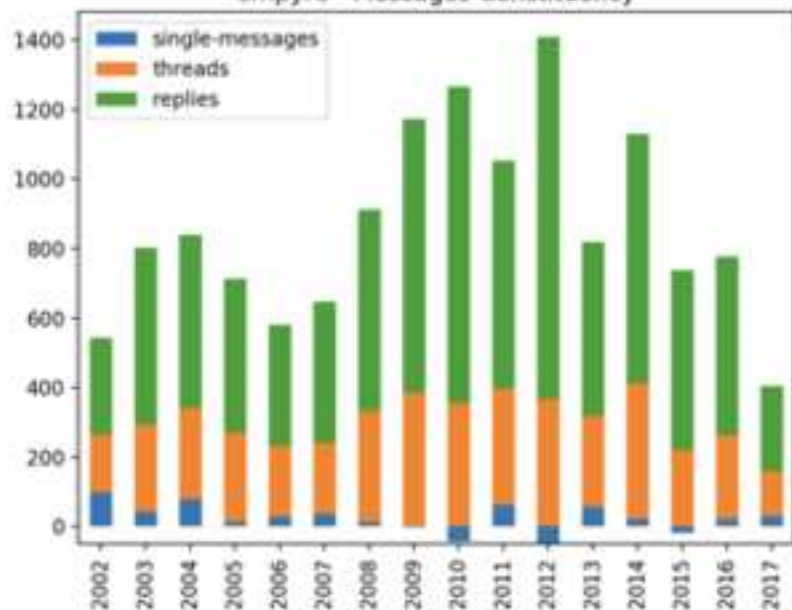
empyre - Avg. Threads + Replies
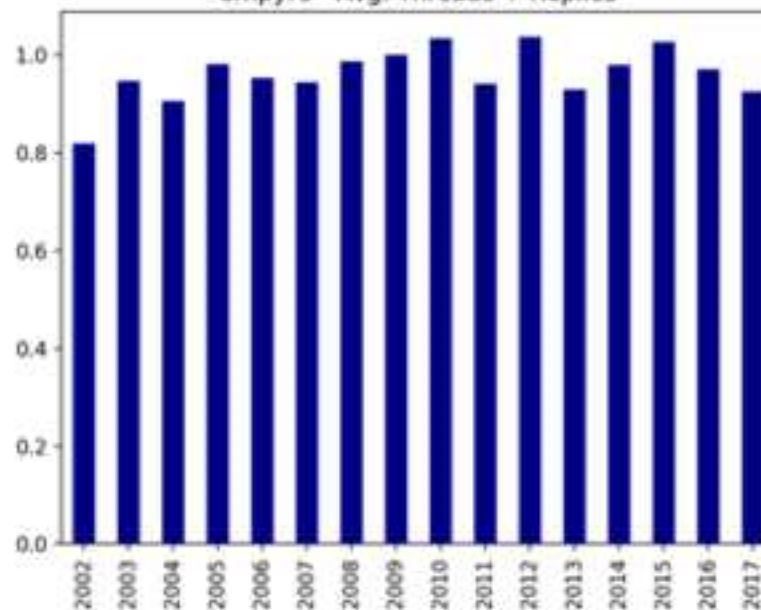
empyre - Diff. Threads + Replies vs Single Messages

empyre - Ratio Replies per Thread

crumb - Messages Constituency

crumb - Avg. Threads + Replies

crumb - Diff. Threads + Replies vs Single Messages
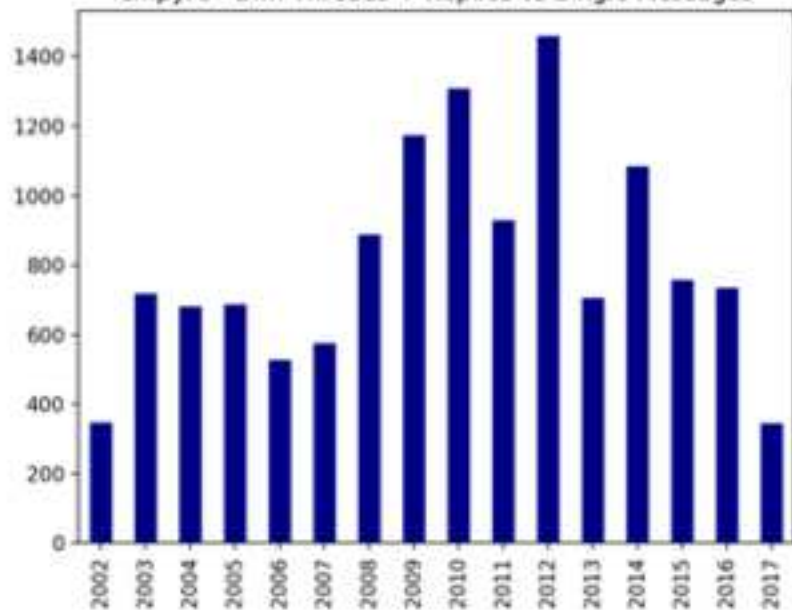
crumb - Ratio Replies per Thread
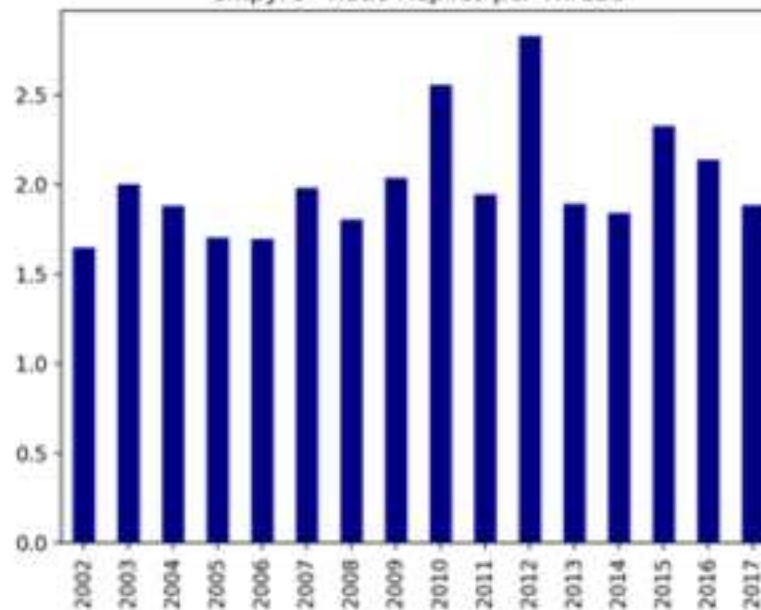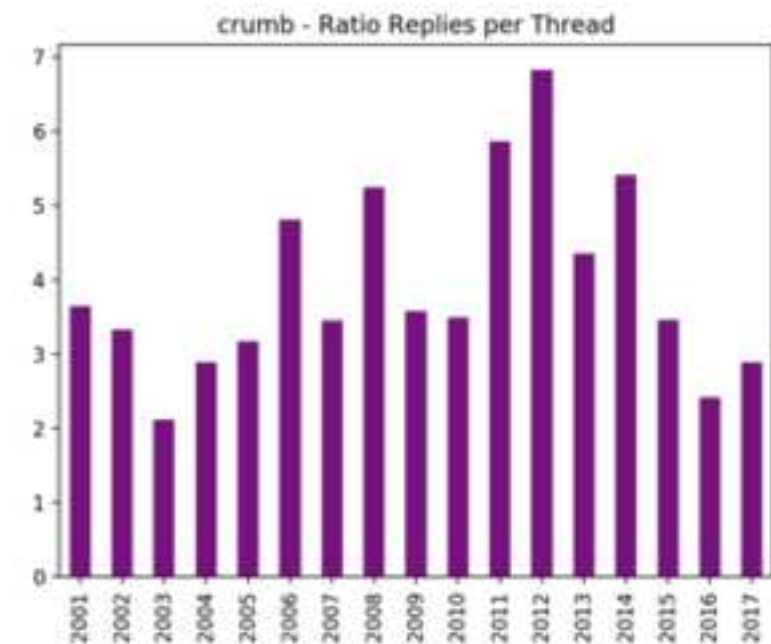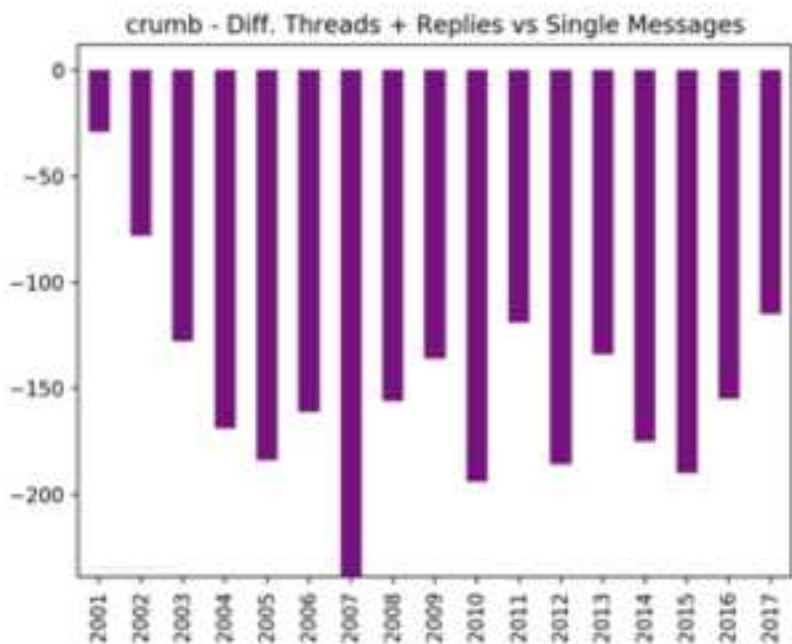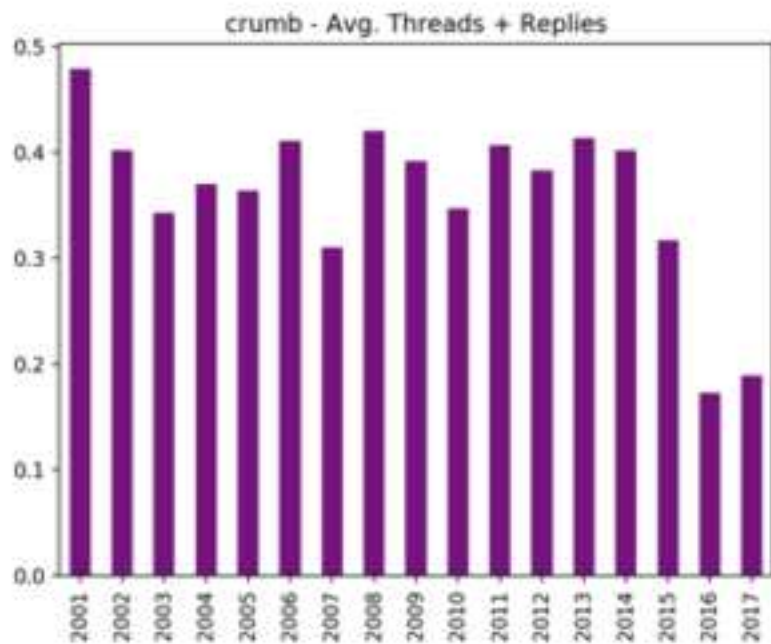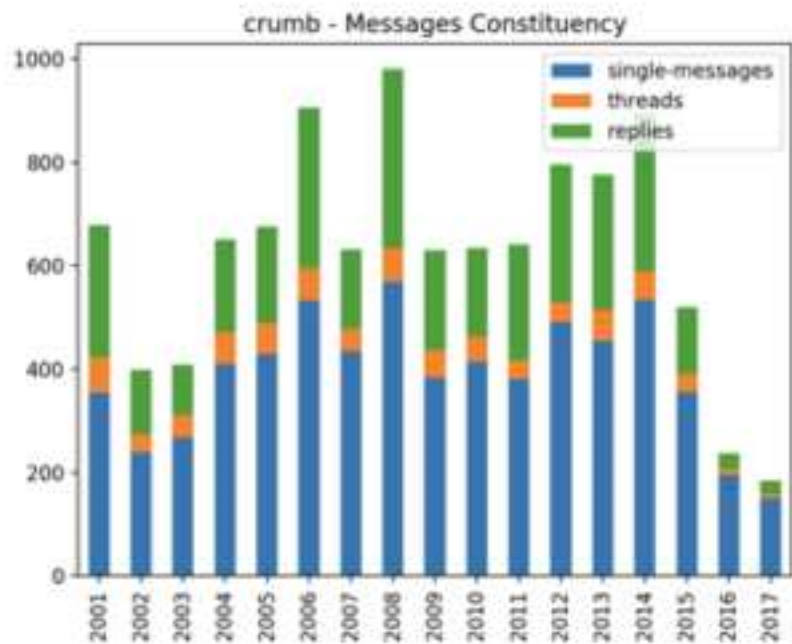
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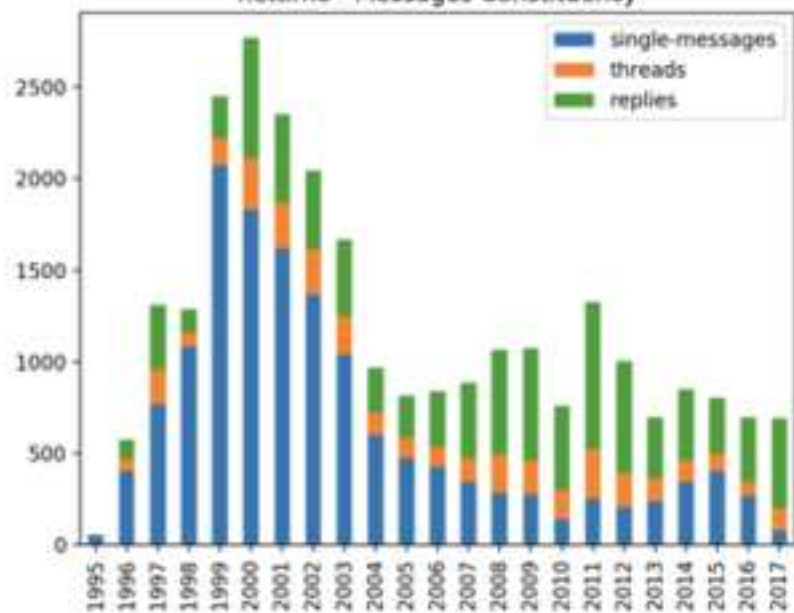
nettime - Avg. Threads + Replies
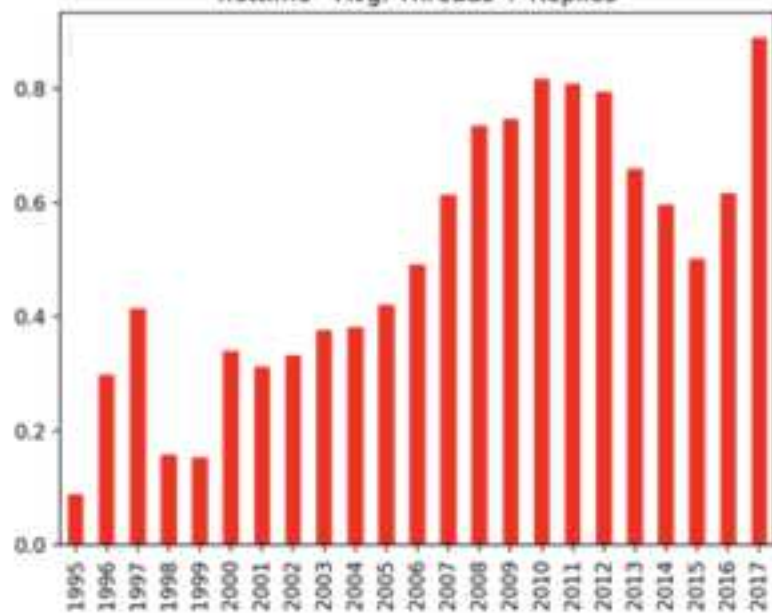
nettime - Diff. Threads + Replies vs Single Messages
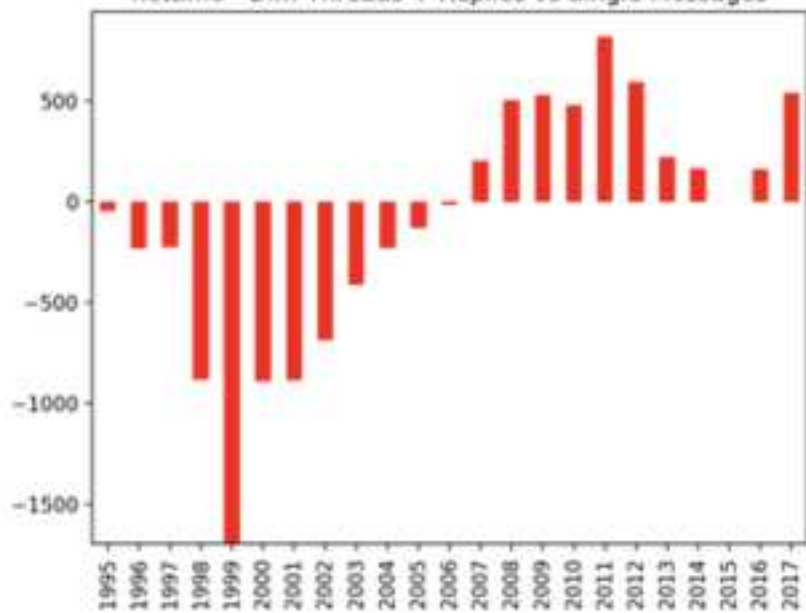
nettime - Ratio Replies per Thread

crumb

September 2017
- the return of VR 0 Call for demos ISMAR 2017 workshop — *Carola Moujan*

August 2017
- Re: NEW-MEDIA-CURATING Digest - 23 Aug 2017 to 24 Aug 2017 (#2017-85) — *Patrick Lichty*
- the return of VR — *Andreas Broeckmann*
- Re: the return of VR — *"Christiane Paul, Curatorial"*
- Re: the return of VR — *Kelani Nichole*
- Re: the return of VR — *Marisa Olson*
- Re: the return of VR — *Pauline de Souza*
- Re: the return of VR — *Simon Biggs*
- Re: the return of VR — *"Christiane Paul, Curatorial"*
- Re: the return of VR — *Kelani Nichole*
- Re: the return of VR — *Marisa Olson*
- Re: the return of VR — *Pauline de Souza*
- Re: the return of VR — *Simon Biggs*
- Re: TRACE: Conference on the Histories of Media Art, Science and Technology, November 23 - 25 - Register Now — *Oliver Grau*

May 2017
- ELEONORE summer residency 2017 - Mycelium Network Society — *Shu Lea Cheang*

April 2017
- Mycelium Network Society, ELEONORE summer residency 2017 — *Shu Lea Cheang*
- OPEN CALL -ELEONORE summer residency 2017 — *Shu Lea Cheang*

March 2017

Conversation Pieces: On Recounting New Media Art Mailinglist Cultures

This article discusses how mailinglists like nettime, -empyre-, Syndicate, SPECTRE and CRUMB have served a canonical and enduring venue for dialogue between dispersed and diverse communities of new media art, establishing influential concepts like 'net criticism' (ZKP 1995) and 'tactical media', while providing a means for the distribution of net.art and launching to prominence the careers of numerous figures in related fields since the 1990s. While the advent of corporate social media platforms appears to have eclipsed the currency of lists, they have nonetheless been historically positioned by media theorist McKenzie Wark as something like an "intermediate stage in the evolution of social media" (2018, p. 400). Offering this provocative framing in commenting on the significance of the mailinglist nettime in particular, of which he was a contributor alongside a great many other notable figures, Wark (2018) has additionally proposed the list be considered as a genuine instance of a historical avant-garde and a potential candidate for art-historical canonization - citing the art theorist Brian Holmes who referred to it as "our Dada" (2000).

Since mailinglists are, of course, composed of and through emails, they might first appear as a collection of minor or secondary ephemera. For the media art community in the mid to late-90's and early 00's, however, they arguably functioned in terms of what the sociologist Howard Becker's has called *art worlds*; that is, "an established network of cooperative links among participants" constituted by "the same people often cooperat[ing] repeatedly, even routinely, in similar ways to produce similar works" (1982, p. 34-35). Taking this as a point of inspiration, our analysis aims to examine the wider cultural significance of these lists from the perspective of their technical archives; and to account for how the dynamics of participation, experiments with networked discourse, modes of organisation and forms of art have coalesced and dissipated over time.

For the field of internet history, we suggest that these media art lists are of particular significance due to their reflexive approach to the limits, capacities and boundaries of the mailinglist itself as

a medium. Many influential concepts, events, publications and artistic practices that emerged through such lists frequently raise critical questions around such networking activity itself. To be clear, ours is not the first history of 90's media art told through the lens of these lists; previous accounts have already reflected on them as influential milieus of artistic or socially experimental practice (Apprich, 2017; Lovink, 2003, 2009; Bosma 2011). In making a contribution to internet history, however, we expand on these studies by exploring the possibilities for different ways of *counting* mailinglists' archival materials and, therefore, of *recounting* the past of list cultures - to use the terms of Wolfgang Ernst (2013). This involves the development and use of methods which take into account the technical specificity of the mailinglist medium itself.

Our article, accordingly, can be understood as an investigation of historiographic methodologies that take on the materiality of the internet as media infrastructure (Fortunati, 2017). While mailinglist studies have been conducted through anthropological and social science frameworks, in this paper we engage with their technical archives by adopting an approach inspired by the concept of *Aufschreibesysteme*; that is, the inscription-system, 'discourse network,' or in the influential words of Friedrich Kittler: "the network of technologies and insti-tutions that allow a given culture to select, store, and produce relevant data" (1990, p. 369). In this regard, we follow a particular media archeological tradition - arguably initiated by the challenge put forth by Derrida, at the outset of his career that "[t]here remains to be written a history of […] the human and laborious, finite and artificial inscription" (1976, p. 15). Our inquiry thus unfolds through digital processes, but with a conceptual twist. We draw on both techniques of counting and interpreting, mixing cultural history with 'computational methods,' while reflecting on the limits and potentials of these different styles of humanistic and scientific research, particularly in light of the sociopolitical and critical challenges of new media art discourses. The extent to which we circumvent conditions where "sense and the senses turn into eyewash" (Kittler 1999, p. 1), for instance, is ultimately a measure of demonstrating how the use of mixed methodologies raises compelling new questions of how we might come to know the past.

In previous research on lists, social science approaches have advised caution in treating technical archives as a "a full account of the interactions on the list" or assuming they offer an "ideal or unobtrusive observation" of all relevant activity (Bealieu and Høybye 2011, p. 263). While

stressing particular techno-epistemological limits of the archive - noting that crucial exchanges might occur off-list, for instance, or that the social dynamics of lists involve the complex lived temporalities that are not captured by an archive - an emphasis has been placed on ethnographic engagement as a way of generating adequate knowledge of list cultures (Hine 2009). As lists age over time, however, this kind of participant observation, quite simply, becomes less tenable; indeed, working predominantly with archives or databases becomes an increasingly necessary condition for historical inquiry. With this in mind, we are especially interested in what insights about new media art cultures can be drawn by repurposing their discursive infrastructures. Our approach, moreover, might be linked to 'digital methods' (Rogers, 2013), along with digital humanities frameworks applied to digitized textual corpora like 'distant reading' (Moretti, 2005), 'algorithmic criticism' (Ramsay, 2011) and 'macroanalysis' (Jockers, 2013) - perhaps even the kind of frameworks used by "the scads of mathematics PhDs on staff at Google" (Galloway 2014, p. 110). As already indicated, however, we take a broader perspective; in this article, we understand these emergent methodologies as a constellation that contributes to a computational *Aufschreibesysteme*, within which we aim to consider the political and epistemological facets of such data-centric techniques. In this respect, we also aim to reflect the experimental ethos of the lists in question.

To be clear, these mailinglists are not especially large compared to the standards of contemporary social big data analysis as objects of study;[1] they nevertheless present some unique material challenges and capacities. Through our inscription-based approach, we were able to devise a range of novel methods and techniques for the identification of list dynamics, prominent topics, along with the possibilities for cross-list mode of inquiry. An attention to the technical materiality of the list, therefore, lays the groundwork for scoping out of what we refer to more generally as *list cultures*, in which the possibilities for comparative and aggregate-level analysis are explored. In doing so, we thus consider how these lists have continued to function as a constitutive part of art worlds, and endeavour to characterise and position them in relation to each other over time, with nettime representing an early period, SPECTRE representing a

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[1] The largest archive we have amounts to a total of 213MB of uncompressed text data.

transitional phase, and -empyre- and CRUMB functioning as more specialized and consolidated initiatives.

While working with the technical constraints of these digital archives, we thus additionally aspire to make a contribution to media art history (Grau, 2007; Cubitt & Thomas, 2013), particularly by arguing for a sense in which such modes of networking has continued to operate alongside other established institutions. By supporting a "network of cooperative links", as we go on to discuss, these lists also afforded the emergence of a vital new discourse on (new) media art. Against the "disavowal of digital" (Bishop, 2012) within the contemporary art establishment, these art worlds have come to function as semi-autonomous venues for the development of new art forms and critical art discourse, including 'net criticism,' 'net.art' and 'the post-digital,' amongst others — what we will refer to as *para-institutional formations*.

In the first section of this article, we offer an overview of these mailinglists by drawing both from relevant historical research on new media art and key posts to the lists themselves. The second part foregrounds the internet infrastructures and protocols on which these emails have been stored, processed and transmitted. In the final sections, we provide an overview of how new approaches that account for these infrastructures might enrich, contest and expand on the current literature on media art mailinglists and their significance. We conclude with some observations on their long-term archivalization and the establishment of these other ways of recounting their cultural and historical salience.

New Media Art: Critical, Avant-Gardist and Autonomous Tendencies

The communications historian Fred Turner has framed the history of media art, or 'multimedia,' as fundamentally entangled with the rise to global prominence of a specifically American form of liberalism humanism (2013). Turner's American-centric account of media art history can be read as a kind of prequel to his much-cited earlier work on the cultural foundations of the spirit of Silicon Valley capitalism that arose in the late-90's, the latter which he traced back to a series of ideological innovations initially pioneered by the 60's Californian counterculture (2006). Exemplary of this early foundational period in the history of the field is the work of the

Experiments in Art & Technology (EAT) organization, which facilitated collaborations between corporate engineers from Bell Labs and renowned conceptualists, including the likes of John Cage and Robert Rauschenberg. In an era haunted by a fear of the machine and of instrumentalist mass media manipulation, these and other related experiments have been read as having effectively humanized and domesticated formerly frightening technologies (2008). In addition to this public understanding of 'the scientific lens,' Turner furthermore frames these early media art experiments as having served to essentially prepare society for a neoliberal era in which corporations and networks would come to be seen as the essential agents of change (2014).

If, following Turner, we trace one of the genealogical tributaries of media art to 1960's multimedia experimentalism, it was only some decades later, in the post-Cold War period, with the initial arrival of the web - and the attendant ascendency of neoliberalism - that the field of media art definitively entered a new phase, with the designation of 'new media art.' Whilst in its earlier period some of the most canonical multimedia projects involved collaborations between "the corporation and the counterculture" (Turner 2014), a new generation of media artists and art theorists would differentiate themselves from their progenitors largely in terms of their critical stance towards cyber-libertarianism combined with a medium-specific engagement with digital and networked technologies. New media art, accordingly, evolved through an aesthetic approach to digital technologies where interventions into communications networks were additionally accompanied by more long-term alternative experiments with socio-technical systems (Daniels, 2009). Here, the mailinglist found an essential and constitutive role.

Crucially, the period during which media art mailinglists like nettime, SPECTRE, -empyre- and CRUMB were founded was characterised by a notable intensification of the use, standardization and scale of digital networking, especially given the commercialization of the dotcom era. Early networking prior to the internet and web involved a vast diversity of isolated systems (Abbate, 2000). From out of this 'many-to-many' milieu, precursors to the communication dynamics of mailinglists can be found in hippie networks such as the Community Memory in Berkeley, the popular use of Minitel in France (Mailland and Driscoll, 2017), The WELL or hobbyist networks like Bulletin Board Systems (BBSes), Usenet and FidoNet (Brunton, 2013), among others. More immediate forerunners to the lists discussed in this article include experimental initiatives like

THE THING, established by Wolfgang Staehle as a BBS in 1991, along with Public Netbase in Vienna, Internationale Stadt Berlin and De Digitale Stad in Amsterdam, all established in 1994. What is crucial to recognise, however, is that these projects were equally inspired by genealogies of artistic practice and discourse, as much as freenets and community networks. They were inspired by concepts like, for example, Joseph Beuys' 'social sculpture,' Gene Youngblood's 'metadesign' and the 'Temporary Autonomous Zone' (or TAZ), to name a few (Daniels, 2009). An early post to nettime by Toshiya Ueno exemplifies this position in the insistence that any notion of network art should draw from 'antecedents' to discussions of 'cyberspace', particularly by taking note of the "ceaseless metamorphoses of practice and method" of the historic avant-garde, and developments like Mail Art and Fluxus which had expanded "the horizons of artistic production to include the processes of communication and transportation" (Schultz 1996b). Indeed, the influence of such avant-gardism would inform the uniquely critical perspective taken towards the spread of cyberlibertarian discourses and rapid commercialization of digital technologies during this period.

Whilst activity on the lists we examine has continued for decades and brought together a diverse international range of actors, the emergence of new media as a discourse on technology can nevertheless be situated rather specifically in a time and place. Insofar as these lists may be understood as part of a coherent art world, their mutual identity was not hippie but punk, and not American, but rather European - if the latter could be seen as "an attitude and experience of layered identities and histories" unrestricted by national borders (SPECTRE, 2017a). Indeed, the specific historical context from which these lists initially emerged was *an idea of Europe* in the aftermath of the Cold War, with new cultural exchanges possible between Western and Eastern Europe, just prior to the introduction of the Euro and well before the sovereign debt crisis. At the turn of the millennium, the context out of which these lists emerged may retrospectively be considered as a highpoint of globalization, when American liberalism was influentially theorized as the end of history (Fukuyama, 1992), yet the ideology of dot.com capitalism was ascendant, as trumpeted from the pages of *Wired* magazine.

As the co-founder of nettime, chronologically the first of these new media mailinglists, Geert Lovink puts it, in his typically polemical style:

From its genesis, Nettime was to embody the project of "net criticism" in order to counter the unbearable lightness of Wired magazine, which was considered the most influential organ of the virtual class. Pit Schultz: "Everything which Wired wrote was for us Pure Propaganda and provoked the quest for Unofficial Data. As the Pravda of the Net Wired forced the emergence of dissident thought". The uncontested hegemony of Wired in the mid nineties cannot be underestimated here. For opinion makers, politicians and young entrepreneurs there wasn't much else with such a positive-seductive appeal. In a text from early 1996 the aim [of Nettime] was followed as such: "Our Net Criticism has nothing to do with a monolithic or dialectic dogma, like 'neo-Luddism' or 'digital Marxism'. It is more a behavior than a project, more a parasite then a strategic position, more based on a diffuse corpus of works than an academic knowledge, it is heavily interfered by contradictions and techno-pleasure, and it keeps vivid in this way" (2009, p.101).

If the old media art discourse of '60s multimedia experimentalism fed into the ideological groundwork of American liberalism, as Turner has it, then the new media art discourse that would emerge from these lists was characterised by a critique of what eventually became widely known as 'The Californian Ideology' (Barbrook & Cameron, 1995) delivered through an alternative investment in avant-gardism and experiments with autonomy.

What is crucial to appreciate here, in hindsight, is just how little substantive technology critique existed at the time. A defining slogan that emerged with lists like nettime was 'no more vapour theory' (Lovink, 2002, p. 10), something which could be seen in the net critique commitment of developing theory with an empirical or practical understanding of the material and technical specificities of software. This at times translated into a re-imagined role for medium-specificity, as seen in the formalism of influential texts like Lev Manovich's *The Language of New Media* (2001) - segments of which were posted to nettime in draft form (1998a, 1998b, 1998c) - or by theoretical work influenced by media art lists such as Tiziana Terranova's *Network Culture* (2004) and Alexander Galloway's *Protocol* (2004), where the infrastructural specificities of the internet were analysed as a new paradigm of power.

In addition to hosting critical dialogues, the lists also served as a non-commercial venue for the exhibition and dissemination of 'net.art' - a genre whose tendency further foregrounded and playfully subverted medium-specific sense of software. This could be seen, for instance, in the use of faulty browsers and 'glitch aesthetics' - a now iconic (even clichéd) style of 'destructive creativity' posed against the 'creative destruction' of the Californian tech industry (Liu, 2004). While this may be seen as the culmination of a tendency that first emerged in the 60's towards the de-aestheticization and dematerialization of the art object (Lippard, 1973), net.art as a genre was seen as advancing an adamant oppositionality towards the commodity form of art object within informational conditions (Stallabrass, 2003).

[figure 1]

Whether or not they in fact identified as media artists, contributors to these lists tended to view the web as a medium for "artistic and political experimentation with *a maximum of independence from established institutions*" (Byfield & Stalder, 2015, emphasis added). More generally, this idea of independence played out in a number of ways: politically in relation to a drive for new modes of organisation; infrastructurally and technologically through an entanglement with internet, web and other software standards and protocols; and, finally, through a processual, discursive, networked and 'supra-individual' notion of collective art practice (Daniels, 2009, p. 29). Mailinglists, therefore, were not simply taken as communication tools, but socio-technical assemblages that seemed to promise an entirely new sense of knowledge and politics. For some, this implied an 'extradisciplinary' mode of networking that "cast new light on the old problems of the closure of specialized disciplines, the intellectual and affective paralysis to which it gives rise, and the alienation of any capacity for democratic decision-making that inevitably follows, particularly in a highly complex technological society" (Holmes, 2007). Yet alongside the perceived possibilities of networking, there remained a nagging feeling that such list cultures were ultimately a fleeting phenomenon, especially when confronted with strategic concerns around sustainability, digital labour and political organization. Such problems went on to inspire concepts like 'organized networks' (Rossiter, 2006; Lovink & Rossiter, 2018) to think through

processes of institutionalization within networked conditions; such issues, we suggest, return in a different guise when considering the long-term prospects of these lists as historical resources or techno-cultural archives.

Mailinglist as *Aufschreibesysteme*

To the extent that mailinglists are an overlooked and arguably out-of-date form of communications media today, they can be taken as a media archeological system with particular technological characteristics. Indeed, before we discuss our methods for analyzing these lists, it is crucial to understand how they operate as an assemblage of digital objects and protocols whose affordances have, in a quite literal sense, provided the foundation through which the discursivity of new media art worlds has been articulated. While taking their specificity into account, moreover, we are interested in asking what kind of system is a list archive, and what does it suggest about informational modes of organisation more generally. To that end, we believe it is essential to understand the various lineages of technical media that feed into mailinglists to grasp the rationale behind devising computation methods based on these very infrastructures.

In his media archaeological analysis of the postal system, Bernhard Siegert argued that the addressability of mail linked subjects and objects together to support the literacy of 'the Individual;' as he put it gnomically: "the existence of objects is bound to reason's delivery to cognition" (1999, p. 8). It might be obvious to link the *Aufschreibesysteme* of the postal system to electronic mail or email, yet our inquiry begins at the exact moment where Siegert's treatise ends; that is, with digital communication. Indeed, as the conclusion of his study confirms, the problem of relayed transmission central to Siegert's analysis of literary correspondence is rendered mute by new forms of digital communication; or rather, it is transformed into a problem of digital symbols processing, rather than interpretation at a delay. Based on Claude Shannon's mathematical theory of communication, the advent of Pulse-Code Modulation (PCM) on telephone lines (T- or E- carrier systems) meant that transmission distances had only minor effects on mathematically coded messages, the new *archi-écriture* of the digital networks. As Siegert himself put it, this new paradigm "meant that communications theory no longer had anything to do with (letter) mail, and that is indeed becoming obvious as our letters are absorbed

and transformed into bit sequences by fax machines and e-mail" (1999, p. 261). Echoing the assessment of Kittler, the problem of transmission for Siegert thus becomes an end-to-end problem of coding and decoding symbols; in other words, a problem of protocol, rather than universal literacy.

Within this general transition toward the optimal coding of messages, networked electronic mail protocols have a rather long history; in fact, email predates computer networks as such. Mainframe time sharing systems from the 1960's like MIT's Compatible Time Sharing System (CTSS) and the TENEX operating system had already built in electronic mail functionality in the form of a mailbox (Van Vleck, 2012; Partridge, 2008). With the advent of ARPANET, there was a need to standardize and implement such functionality across multiple systems. One of the earliest attempts to reimplement, or rather recycle, such electronic mail functionality came with RFC 196 "A Mailbox Protocol" (Watson, 1971). Reminiscent of teleprinter or teletype systems, Watson's proposal was based on sending messages directly to printers so the recipient could be delivered a hard copy of the message; a proposal which, despite its untenable hang-up on paper output, nevertheless demonstrated the effective transposition of signal processing over transmission.

Developing a system that incorporated storage capacity was pursued by the early designers of "File Transfer Protocol" (FTP), who worked at integrating such mainframe functionality with MAIL and MLFL (Mail File) commands (see Bhushan 1973). While FTP was the standard for sending and receiving email on the ARPANET, the structure of messages (e.g., header, body, etc.) was defined later by RFC 561 "Standardizing Network Mail Headers" (Bhushan, Pogran, Tomlinson, & White, 1973) which detailed the header format consisting of the fields 'From', 'Subject', and 'Date' that still appears in most email client programs today. This header format was further developed in RFC 680 "Message Transmission Protocol" (Myer and Henderson, 1975), which augmented the standard with 'To', 'Cc', 'Bcc' that allowed emails to be sent to more than one recipient at a time. RFC 680 also formalized the use of the '@' character as part of email addresses (e.g., user@host). In this way, the addressability of the postal system that first supported the correspondence of personal thoughts and experiences, according to Siegert, was transferred over to a machine-readable infrastructure or the theoretical possibility of 'a single

relay.' Even while later standards like RFCs 724 (Crocker, Vittal, Pogran, & Henderson, 1977a) and 733 (Crocker, Vittal, Pogran, & Henderson, 1977b) officially specified that the email format contain ASCII characters so it could be rendered human readable, the overall effect was to underwrite this intelligibility with a system of communication strictly for machines.[2]

As the ARPANET became the internet, these capacities for machine reading - especially the potential for indexing and parsing correspondence - became an embedded feature. With the US Department of Defense adoption of the TCP/IP transport protocol, a complete redesign of the "ARPA Network Messages" was proposed in 1982 to include the introduction of "Simple Mail Transfer Protocol" (SMTP) that replaced FTP as the de facto protocol for email. As Partridge observes: "email via FTP was underspecified [...] the specification for email delivery was two pages long, while SMTP specification, when it appeared, was 68 pages long" (2008, p.11). SMTP was one of the early "application layer" protocols designed especially as part of the new ARPA Internet Protocol Suite, making email a central and original application of the internet. The specification for SMTP was part of RFC 821 (Postel, 1982), and was accompanied by RFC 822 "Standard for the Format of ARPA Internet Text Messages" (Crocker, 1982) as an update to the specification discussed above. Both RFC 821 and 822 life-cycles spanned almost 20 years, being minorly updated only in 2001 by RFC 2821 (Klensin) and 2822 (Resnick), making them some of the longest lasting internet standards to this day.

A significant effect of this drive toward standardization is the potential it opens up for diverse ways of algorithmically treating emails; that is, the RFCs adopt an understanding of email correspondence as a structured piece of writing that can potentially be indexed, parsed and sorted through a variety of automated software techniques. Indeed, the mailinglist itself as a form of communication emerges from this computational potential. Thus, while email generally speaking might be referred to as a standard, a mailinglist works through a program that leverages the operationality of these specifications outlined above in particular ways. The functionality of

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[2] To adapt Marxist terminology, certain recommendations of RFC 724 might be read as caught in the transition from formal to real subsumption of the postal system: "Address lists may contain references to addresses which are not accessible through the standard ARPANET message system. For example, U.S. Postal system addresses can be specified. [...] [I]ndividual sites may provide services for using the information (e.g., automatically sending a copy of the message to a line printer, in preparation for transmission through the Postal system)" (Crocker, Vittal, Pogran, & Henderson, 1977a, p. 4).

various mailinglists might appear the same (i.e. posting, receiving a digest, subscribing, unsubscribing, etc.), however, their respective inner workings can differ considerably. "Listserv," in this respect, has become a commonplace term used to denote the program serving a list's emails on a given server.[3] Some of the most notable listserv programs include: LISTSERV (the software) (2010), majordomo (2000), GNU Mailman (2017) and phpLIST (2017).

[figure 2]

In terms of the methods discussed below, it is important to note that while such programs may distribute email messages from a given list member's email client outbox to other members' inboxes, they do not necessarily provide archiving functionalities, nor do they offer native web interfaces. For this reason, it is usually the task of other programs to index and archive a list's messages, and, optionally, to provide web interfaces to access this content. Prominent archiving programs offering such functionality include legacy systems such as Pipermail (GNU Mailman 2017), MhonArc (2014), and HyperKitty (2017).

While these new systems might seem to require new methodological concepts for how they can be studied (i.e. new approaches around computational potential), in what follows we turn to rather well established technique of reading based simply on counting. Here, we follow Ernst's (2013) discussion of the productive tension between "telling versus counting" - indeed, in both German and in French these words share a common root: *erzählen* (to tell a story) and *zählen* (to count) and *conter* (to tell a story) and *compter* (to count). For Ernst, this method of counting history (as opposed to *recounting* it) is linked to the medieval cultural technique of the *Annales* (p. 149), which is a mode of writing history by recording and arranging events chronological year-by-year. Certainly, in our respective list archives, we find something like annals - a non-narrated and well-ordered record of correspondence listed month-by-month and year-by-year (see *figure 2*). Our methods, accordingly, follow this ordering, they are annalistic in nature by

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[3] To clarify our nomenclature, we use "mailinglist" (in one word) to signify the overall functionality of objects that are listservs, rather than employing the term "listserv" as such. In so doing, we are consistent with Lovink's terminology in *Dynamics of Critical Internet Culture (1994-2001)* (2009).

working with the array of list standards and protocols, described above, as research affordances. To be clear, our aim is not to subordinate historiographic methods (recounting) to techno-mathematical means of reading archives (counting). Rather, in what follows, we work with the tension between counting and recounting to grapple with the materialities of machinic data-processing. In doing so, our goal is to read patterns of participation from the past through these infrastructures with a focus on identifying list specific issues (overall activity, message constituency, participation and development of terms over time), along with the mediation of socio-cultural events and issues across mailinglists. Finally, in rendering such patterns that would otherwise be difficult to identify, we consider what difference computational potential makes in our dual reading of these inscription systems.

We encountered various mailinglist archiving programs in our research and wrote tailored software for each.[4] We compiled the archives of our lists by crawling their respective web interfaces (see *figure 2*). We thus wrote custom MhonArc and Pipermail web crawlers to compile messages from nettime, SPECTRE, and -empyre-, and a LISTSERV crawler to gather CRUMB's archive. Obtaining each list's archive by means of crawling their web interface was the first step. It is also one important factor in selecting these specific mailinglists since they are all openly available online, as opposed to other lists that are privately maintained. This aspect of 'openness' is, of course, a complex concern for mailinglists in general, as the standards and systems upon which they are built do not necessarily lend themselves to such forms of analysis. This is a key point concerning questions of organisation and institutionalization to which we will return in the conclusion.

A List of Lists: Delineating Corpa

In terms of our corpa that we subjected to analysis, we selected the lists in question by forming *a list of lists* through 'found' expert sources. Some of these include the 'Neighbourhood of Lists' from the nettime website (Nettime.org, 2019a), others included sources like Lovink's (2009) bibliography of 'consulted mailinglists or newsletters' from his *Dynamics of Critical Internet Culture (1994-2001)*, the Wiki page on 'media culture mailing lists' from Monoskop.org (2014),

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[4] All our software for this study is available at: https://github.com/gauthiier/mailinglists

and a key post from the artist mez breeze (2013) to a month-long CRUMB discussion on list history in 2013. Obviously, this is a limited set of references could be expanded further. Our intention in this article is not to offer a definitive history of new media arts mailinglists, but rather to explore possibilities for analysis by foregrounding a series of methods and historiographic approaches. That said, a brief description of each is necessary to establish their significance, to outline their specific orientations and divergences.[5]

Established in 1995 by the German and Dutch media theorists and activists Lovink and Pit Schultz, nettime (2019a, 2019b) was perhaps the preeminent list for networking artists and activists in the new media art scene in Europe in the post-Cold War era. Maintaining a close relationship with media art practice, politics and theory, nettime provided a means for the distribution of net.art as well as a venue for discussions between a wider network of theorists, activists, artists, and artist run "media labs" from across Central and Eastern Europe — indeed, one its early active members, Josephine Bosma, referred to nettime as the "theory backbone of the media labs" (2004). As discussed earlier, a critique of 'The Californian Ideology,' identifying the rise of the dot.com era in Silicon Valley with a hybrid of left-right libertarianism with roots in the Californian counterculture, was representative of the early ambition on the list to perform net criticism, an agenda whose impact would take some twenty years to make its way into mainstream technology writing.

In a similar precursor to issues that would become more mainstream some twenty years later, the SPECTRE list (2019a, 2019b), which was launched by curators and media art researchers Andreas Broeckmann and Inke Arns in 2001, was set up after an earlier list, the Syndicate, 'imploded' due to a combination of trolling, the prevalence of 'spam art' and other complex moderation problems (Arns and Broeckmann, 2001; Lovink, 2002, pp. 153-203). Founded as an 'information exchange' on media culture, SPECTRE was organised foremost around the concept of 'Deep Europe', which encapsulated the non-nationalism of the lists by describing "an attitude

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[5] A recent radio program, organised by Shu Lea Cheang (2019b) as part of STWST48x5 STAY UNFINISHED art event, featured discussions on the origin and current state of all of the lists. The archive of the program can be retrieved from https://cba.fro.at/series/stwst48x5 (Cheang 2019a).

and experience of layered identities and histories - ubiquitous in Europe, yet in no way restricted by its topographical borders" (SPECTRE, 2019a).

The other two lists discussed below introduced more elaborate moderation strategies and deliberate points of focus, and can be considered as instances of a more 'mature' media art list culture. Established in 2002 by the Australian artist and curator Melinda Rackham during her PhD dissertation research, -empyre- (2019a, 2019b) featured discussions around carefully selected monthly themes on cross-disciplinary media practice with invited guest contributors. Also founded in 2002 by the curators and scholars Beryl Graham and Sarah Cook, the CRUMB (2019a, 2019b) list focussed on specific topic of curating media art , and featured invited guests, and discussions that were linked to particular events, issues or shows. These last two examples were founded with a much clearer set of agendas, including policies toward moderating the list, actively encouraging participation and pre-defining the scope of discussion.

Periodizing New Media List Cultures

Given the historical significance these mailinglists to the new media art world, the objective of our media archeological approach was to devise techniques by which to examine the discussions, posting and correspondence that took place beginning in the mid-90's and spanning almost two decades. To this end, we were interested in whether computational techniques might offer new insights into the kinds of historical narrative that we outline above and also the methodological issues that arise in the investigation of these lists as recountable material. Our approach towards these mailinglists, moreover, affords the possibility of comparative studies, particularly by identifying general patterns of participation on each list over time as well as counting cross-list continuities and disjunctures. Conducting cross-list modes of inquiry makes sense, moreover, as contributors, moderation practices, etiquette and infrastructure often intersect, and notable recurring themes or continuities can be identified.

Reading Methods #1: Time Series
Our first approach uses the formal structure of the mailinglists themselves (i.e., using the aforementioned email header "metadata" such as: *From*, *To*, *Reply-To*, *Subject*, and *Date*, etc.) to infer activities that occurred on each list over time. Based on this time series approach we

devised two metrics, *activity* and *vigour*, each of which sought to address a specific clusters of questions. As mailinglists, the popularity of nettime, SPECTRE, CRUMB and -empyre- can be associated with mid-90's to early 00's list cultures, yet they still continue to exhibit levels of activity to this day. Our *activity* metric is intended to address the following questions: When were these lists the most active? Do they feature different kinds of contributions, particularly in terms of posts and replies? Do these contributions change over time? As a compliment to the former, we came up with a *vigour* metric, as a relative measure of how much on average members of a list engage in dialogue, irrespective of the overall activity metric. The key questions for this *vigour* metric includes: when were these lists most dialogic?

Metric I. Activity

[figure 3]

The graphs on *figure 3* display the overall amount of messages that have been posted on the four mailinglists over time. Each bar of the graph is coloured and labeled according to the types of messages that were posted to each respective list. Here we differentiate between what is called a 'single message,' a 'thread,' and a 'reply' where a thread is a message that has at least one reply (i.e., a type of message that *initiates* a 'dialog'); a reply is typically a reply to a thread, or, differently put, it is a reply to a message that makes this initial message a thread; a single message is an 'orphan' message that is neither a thread nor a reply.

Our method of aggregating threads is based on the results of crawling the HTML files of the online archive of each respective lists.[6] Thus we follow the ordering of what is presented on the web page and do not post-process, algorithmically or manually, the messages based on their *Subject* or *Reply-to* metadata fields. We are aware that some messages, whose discussion might refer to content in a thread, could be interpreted as 'falling out of order', since the author can

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[6] These HTML files are generated from the respective mailinglists' archiving program, namely: MhonArc (Nettime), Pipermail (SPECTRE, -empyre-), and LISTSERV (CRUMB).

always change the *Subject* field or the *Reply-to* field, for instance.[7] This type of 'disordering' may be intentionally put forth by a contributor as a rhetorical device (e.g., changing the *Subject* field) or simply done by mistake when replying to a message or when an archive is transferred from one system to another (e.g., Pipermail to MhonArc). That said, the ordering provided by our lists' online archives are relatively consistent (with the exception of SPECTRE), and thus, this 'falling out of order' does not considerably affect the findings we present here.[8]

From the aforementioned taxonomy ('single message,' 'thread,' and 'reply) a few observations can be made regarding the overall activity graphs displayed above: with the exception of nettime at the turn of the century, the total amount of postings on each list is comparable and oscillates roughly between 500 to 1500 messages per year (with a few isolated outliers); nettime's sharp rise in 1999 follows the publication of a major edited book associated with the list - *README! Filtered by NETTIME: ASCII Culture and the Revenge of Knowledge* (Bosma et al., 1999) - while the noticeable decline in 2004 coincides more or less with the creation of nettime's announcement-only list (nettime-ann) in 2005, along with the peak era of blogging and the rise of early social networking sites; there is a resurgence of activity on all lists around 2011-2012; there is a manifest decline of activity on CRUMB over the past two years we have on record (2016, 2017); most messages on -empyre- are part of a thread and thus contribute to a discussion.

While the type of observations one can infer from the overall activity of the lists may be limited in scope (i.e., without consulting further resources or using hybrid methodological approaches), the activity metric nonetheless provides a unique overall perspective of the scale of each list and provides a global index of participation/contribution trends that occurs on them over time.

Metric II. Vigour

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[7] This thread ordering concern is raised in (Hocquet and Wieber 2018: 45-6) who are looking at identifying and close reading so called "flame wars," which we are not specifically inquiring here with our study. Their solution is to "manually define if a post belongs to a thread or not" (46), a technique that works for their close reading inquiry, yet is a method that has some limitations when considering the entirety of threads in archives, as we are inquiring here.

[8] For instance, emails having no *Subject* field amounts to 0.0008% of nettime, 0.0002% of crumb, 0.005% of - empyre - , and 0.005% of SPECTRE.

Threads form the basis of an asynchronous dialog (in the sense that the list becomes more 'threaded'). We came up with the term *vigour* to account for the practice of replying to messages, which, in turn, creates dialogic dynamics between some of the lists' contributors. Just as correspondence is likely to occur 'off list' (i.e., contributors directly emailing each other off the list), counting threads should not be understood as indicative of *all* correspondence associated or informing a list. At stated above, our approach works to map as closely as possible the indexed messages within an archive.

From the aforementioned distinction between (1) threads, (2) replies and (3) single orphan messages, we have constructed three differential ratios between these categories that help identify the dialogic dynamics of each respective list. As measures of vigour, these ratios are indicative of stark tendencies on some of the studied lists.

[figure 4]

[figure 5]

[figure 6]

Respectively, figures 4, 5 and 6 show our three distinct ratios that indicate the level of *vigour* of each list.[9] These ratios are described as:

- 'Avg. Threads + Replies': The average of the number of messages that are part of threads (replies + threads) divided by the total number of single messages per year. In other words, this ratio illustrates the average number of messages that are part of a thread on each list per year (a datum of 0.0 meaning no threads at all, while one of 1.0 being only threads).

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[9] For this metric, we have not considered the SPECTRE list as the data we gathered from its archive is inconsistent. We are working on fixing this issue and thus decided to leave the list out of the present discussion on the metric.

- 'Ratio Replies per Thread': The ratio of the amount of replies that are part of a thread. This illustrates, year by year, the number of replies that composed, on average, a single thread.

- 'Diff. Threads + Replies vs Single Message': The difference between the sum of threads and replies per year (replies + threads) minus the amount of single messages for the same year. This measure provides an overview of the type dynamics of a given list over time: are there more single messages on the list (negative values), or are there more threads and replies (positive values)?

From these labelled ratios, *figure 4* indicates that -empyre- is mainly a dialogic and vigorous list since the 'Avg. Threads + Replies' is well over 0.5 and the 'Diff. Threads + Replies vs Single Message' indicator is always positive. Basically, these two indicators illustrate how the list is mainly composed of threads. This observation is in line with the notion that -empyre- is a highly curated and moderated list and does not cater for orphan or single announcement-type messages that we observe on our other lists. On the contrary, we can read from *figure 5* that CRUMB has more single messages than threads since the 'Diff. Threads + Replies vs Single Message' levels are all negative and, consequently, the 'Avg. Threads + Replies' is below 0.5 every year. That said however, CRUMB scores the highest of all three lists in terms of 'Ratio Replies per Thread.' This indicator signifies that while messages posted on the list tend not to generate threads on average (e.g. most messages being orphan messages), when a thread is indeed initiated it is composed of a notable amount of replies. As figures 4 and 5 reveal, the vigour metric demonstrate that -empyre- and CRUMB exhibit steady dialogic dynamics since their beginnings.

In contrast, nettime has distinct periods that can be identified according to two easily distinguishable periods spanning about a decade each. As illustrated by the 'Diff. Threads + Replies vs Single Message' graph of *figure 6*, the first decade 1995-2006 is marked by a culture of single message postings to the list (values in the graph are negative for that period) while the second decade 2007-2017 is marked by a more sustained thread culture (values in the graph are positive for that period). It is fair to say that nettime has become a more dialogic mailinglist in

the second decade of its existence. That is, when the list was exemplary of a 'silver age' or 'Our Dada', then this coincided with rather conventional one-to-many publishing practices. As illustrated on nettime's 'Avg. Threads + Replies' graph of *figure 6*, the list has steadily churned out, on average, more threads and replies than orphan messages posting since 2006 (ratio above 0.5); in other words, less single postings and more discussion/dialog. In addition, the number of replies per thread seems to have steadily increased over the years, hitting an all-time high in 2016 and 2017. While there are many factors that can explain this shift in the list's activities and behavior (forking of 'nettime-ann' in 2005, the increased profiles of key contributors, the 'rise' of political activism since 2010 following the Arab Spring, the impact of social media platforms, and so on), our analysis nonetheless indicates a sustained trend towards nettime developing a 'thread culture' as opposed to an earlier 'publishing culture.' Having said this, we are aware that the 'netiquette' of replying directly to a certain message (off list that is) might have been more prominent in the late 1990s/early 2000s, and might even be that case today, hence discussions have certainly happened, yet they are not 'on the record'.

Reading Method #2: Comparative Content Displays

For the second set of reading methods, we focus on comparing the mailinglists' content, as opposed to the metadata used in the previous methods, and devise two types of metrics that allow us to compare the content of the various lists' messages.

Metric I. Comparative Threads Ranking

The first metric constructs a ranking of the most discussed threads per year on each list, whose respective results are then laid out in a multidimensional table side-by-side. This allows for a juxtaposed reading of the lists' most discussed topics, that is, the threads that have the most replies. Through this method, we are able to identify significant cultural moments and issues that were discussed across the lists at different periods. For instance, interestingly, in 1997 on nettime, the top seven posts all appear to be concerned with issues of gender politics, sparking reactions and debates about (cyber)feminist art and internet culture with threads such as "Translation: The Vagina Is the Boss on Internet" (de Haan, 1997) and "Bossy Cunts Online" (Gashgirl, 1997).

[figure 7]

A number of notable cross-lists topics and issues are briefly worth mentioning here: the 2003 controversy over the new media art curator Steve Dietz losing his curatorial position at the renowned Walker Art Centre in Minneapolis and the decision for Rhizome.org to erect a paywall on their website, which resulted in a discussion on nettime and CRUMB about the "death of net.art" in the early 00's (Byfield, 2003; Kovacevic, 2004; Lichty, 2003; Garrett, 2003). Another major topic arises from concerns with the ISEA 2011 conference fees that lead to a discussion on the "panelism, conferencialism, and corporatisation" of the conference on both nettime and -empyre- (Knouf, 2011; Rackham, 2011). Such discussions highlight the ongoing concern throughout these media art worlds with institutional politics, with boundaries of inside and outside, and indeed with the para-institutional character of the list itself as a conduit for such critical, reflexive dialogue around modes of organization.

The ranking of threads also highlights the differences between the lists, what types of topics are recurrent on each, and how their respective yearly discourse may or may not reflect their self-declared ethos and *raison d'être* as introduced in the previous section.

Metric II. Search Timeline

The last counting metric consists of a search function and a timeline depiction. For a given keyword, a search is performed in each list's emails and the results are displayed as a bar graph where aggregated hits for the given keyword are laid out on a month-by-month time axis. Bars are color-coded according to each mailinglist (blue for CRUMB, orange for -empyre-, green for nettime, and red for SPECTRE). All the email messages that have the keyword in their content section are also listed beneath the graph. The email lists are composed of web links to each of the emails' respective online archives which allows us to directly look up and read the content of a given message of interest.

[figure 8]

The results of a simple query 'net.art' demonstrate how this term has been a central of discussions across all four lists during certain periods. In *figure 8*, we can observe that the term 'net.art' saw a decline in usage on the lists over the last decade. For the period spanning 1997 to 2006, it features prominently in events, announcements or calls for works, as well as some illuminating historical and theoretical discussions on nettime (Broeckmann, 1997; Bosma, 1997; Shulgin, 1997). However, it is worth mentioning that the so-called 'net.art thread' of nettime divided its community over the filtering, moderation, and censorship of net.art works posted to the list (Bosma, 1998; Nettime's_digestive_system, 1998; JODI 2001) which resulted in the 'forking' of the 7-11 list (Monoskop.org 2007) and the creation of nettime-bold which was eventually closed down in 2003 (Nettime mod squad 2003). While we can observe that the term 'net.art' is still in use today, it now prominently features in discussions revolving around the topic of writing historiographies of new media art (Frost, 2013; Cook, 2014; Conway Murray, 2016), an issue that was also discussed in the late 90's, albeit with quite different historical concerns and political impetus.

[figure 9]

As another short example, the results for the contemporary term 'post-digital' are plotted on the graph of *figure 9*. At first sight, it is clear how the term has gained currency since 2013, as most hits populating the graph are displayed past this date. Yet, looking closely at the results, one can see that the term has been circulating on the lists since the early 00's (Broeckmann, 2001), echoing the idea that the term 'post-digital' is not radically new per se, but has undergone semantic alterations over the years (Cramer, 2014a, 2014b).

The keyword metric, therefore, allows for an 'expert' perspective on in the corpus and constructs a time series according to the keyword's occurrence on the lists' content over time. As shown in figures 8 and 9, the lists' juxtaposed time series on the bar graph can highlight the "discursive life-cycle" of terms and concepts on the mailinglists.

[figure 10]

Other than keywords, the search timeline also offers the possibility to search for a given contributor's name or email address (*From* and *Name* metadata fields from the email header). Using this functionality, we are able to display the contributions of certain participants across lists over time. An example of this metri, displayed in *figure 10* is the contribution of nettime co-founder Lovink to the four mailinglists. From the graph, one can clearly see that Lovink is a prominent contributor of nettime, yet has also substantially contributed to the SPECTRE mailinglist between 2002 and 2008, participated in CRUMB's discussions on Art, Activism and Tactical Media in 2006, and also contributed to various discussions on -empyre- between 2009 and 2014. As another similar example, *figure 11* displays media art curator Marc Garrett's contribution to the four lists.[10]

[figure 11]

There are significant differences between the two types of recounting methods presented above, specifically in terms of the various periods they may present. The first set of "time series" reading metrics focuses on the various kinds of contributions and levels of participation that occur on lists, characterising each list according to its own peculiar macro dynamics. The periods one can identify using these metrics concern the overall lists' contribution practices: what are the predominant or subsidiary types of contributions on a given list? Have these types of contribution changed over time? If so, when and how?

The second set of "comparative content displays" examines the historical development of issues, terms, concepts and contributors across all lists over time. With these metrics we can periodise certain types of formations: discourses, terminologies, events and contributors have unravelled across these lists, simultaneously or not, over time. Unlike the "time series" metrics, these "comparative content displays" address the discursive level of the lists, rather than their

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[10] We are aware that this name-based search method has some limitations, namely that a given contributor might have different *nom de plume* and that changing email addresses changes the metric. Nonetheless, from our experiments we found that our name-based search offers interesting indicators as to when the contributions of a given named contributor (under a *nom de plume* or not) occurred on these lists and what these contributions were about.

participatory level. With the *Search Timeline* metric, for instance, we are able to trace content that would otherwise not appear in our other metrics based on participation. While these recount the amount of messages (threads, replies, orphan), the *Search Timeline* recounts word patterns. Considering the wealth and quality of discourses, as well as the historical and cultural significance of the lists we are examining in the field of new media art, this last metric gives us a fine grained overview of the language mobilised across lists, including the recurring tropes across different eras; a view that can aid studying these lists philologically. Indeed, it offers a means by which to write different kinds of histories, ones that might diverge from the dominant narratives supported by prominent participants, for instance, by highlighting formations based on language patterns rather than patterns of participation alone. Having said this, both methods are not mutually exclusive, we have indeed used the participation level of the "time series" metrics to cue our "comparative content displays" metrics to a particular year to analyse content circulated on the lists at that time. The "time series" methods help us orient ourselves 'macroscopically' in terms of participation, while the "comparative content displays" methods helps us zoom in on the lists' content.

Conclusion

At the outset we discussed how one renowned contributor to these lists, Wark (2018), framed the nettime list as a historical avant-garde. While Wark references the art historian Peter Bürger (1984), a more apt point of reference might be Benjamin Buchloh, who defined avant-garde practices in explicitly political terms as "strategies to counteract and develop resistance against the tendency of the ideological apparatuses of the culture industry to occupy and to control all practices and all spaces of representation" (1984, pp. 19-20). Indeed, the new media art discourse that developed on these lists sought to explicitly militate against the web becoming equated with an American neoliberal expansionism, as embodied in the metaphor of the image of the web as 'cyberspace' championed by figures associated with *Wired* magazine and the new dot.com capitalism, such as John Perry Barlow (Schultz, 1995, 1996a, 1997; Barlow, 1995, 1996; Byfield, 1996). Insofar as many of the posts to these lists new media discourse took the form of critical commentaries, as for example in nettime's foundational polemic against the corporatization of the web, they may be seen to have anticipated the contemporary tendencies in technology writing in some cases by several decades. Whilst relatively common today, such a

critical discourse anticipated the next wave of popular net critics (such as Andrew Keen, Nicolas Carr and Evgeny Morozov for instance) by two decades. Indeed, in light of the current critiques concerning the rise of "platform capitalism" (Srnicek 2017) and "surveillance capitalism" (Zuboff 2019), these archived lists may thus be imagined as a valuable resource to scholars of the history of ideas, insofar as they may be found to have rehearsed aspects of subsequent critiques, in some cases decades prior to their mainstream dissemination.

As a "network of cooperative links", these lists can be conceptualized as partaking in art worlds, from which vital new European discourse on technology, aesthetics and politics emerged, marked in several ways by its distinction from early American media art history. While operating outside of the contemporary art establishment, even in the face of its active disavowal (Bishop, 2012), as the empirical analysis above bears out how the discussions taking place within these worlds were often concerned with issues of institutional legitimacy (Byfield, 2003; Kovacevic, 2004; Lichty, 2003; Garrett, 2003; Knouf, 2011; Rackham, 2011). At the same time, these debates and many of their authors on these lists sought to articulate a stance of "maximum of independence from established institutions" (Byfield & Stalder, 2015). As self-reflexive venues for the development of this new media art discourse, they may thus be considered as being simultaneously established 'alongside,' 'throughout' and 'beyond' established institutional norms, and thus becoming a para-institutional formation. In this way, such lists can be taken as an index of the anxieties and desires around the potentialities of digital and networked technologies as they converged with existing structures of power and practices of everyday life, while at the same time providing a context through which to experiment with alternative aesthetics, modes of organisation, evolving speculative discourses and concepts.

In our computational analysis, moreover, we find patterns of participation that complicate any straightforward narrative around the collective dimensions of these lists. During the 1990s, nettime in particular was considerably less dialogic as a public list, resembling in many ways a more conventional one-to-many publishing culture. The more consistent patterns found in later lists like -empyre-, meanwhile, reveal the effects of a concerted curatorial and moderation strategy. Whatever the notion of a social media 'silver age' (Wark 2018) might mean, it is clear

that within new media mailinglists, participatory practices differ dramatically and, likewise, are valued and fostered in contrary ways.

As researchers engaging with these mailinglist records, we are well aware of our situation as "modern historians [who are] obliged not just to order data as in antiquaries but also to propose models of relations between them, to interpret plausible connections between events. Here the difference between tableau as statistical form (annalism) and as painting (historiography) becomes evident" (Ernst 2013, p.149) Yet we do not aim to provide a 'pure' reading in this article. The reading methods depicted above might be framed as working deliberately with these differences, as both *annalistic* in attending to the material and chronological ordering of the mailinglists' archives (monthly ordering) and *historiographic* in narrating connections and interpretations. Offering a dual analysis of mailinglists allows us to simultaneously count patterns and recount the past inscriptions of the mailinglist themselves. The various techno-mathematical (time) series we devised trace patterns serially as time-based diagrams, a statistical tableau as Ernst puts it, while situating these findings within existing historical narratives provides us with opportunities for divergent modes of interpretation and a general reflection on the epistemic problematics of mailinglist as infrastructural medium.

We should stress, finally, that an enabling aspect of our approach has been the concept of computational potential. This stems from the latent capacities of how email is universally structured as data for processing; something that becomes more explicit through its particular treatment as "a raw material that can be *deterritorialized* - reduced to textual atoms and their frequencies - and *reterritorialized* - reassembled into groupings of algorithms and interface elements that (re)frame it and make it navigable in different ways" (Rieder 2013, p. 61). While this potential might support novel communication forms like mailinglists, we might conclude by considering other cases that raise more complex political questions, from Google scanning the contents of Gmail inboxes to the Snowden revelations of the NSA's bulk collection of emails through the Stellar Wind and PRISM programs. The concept of *Aufschreibesysteme* can provide us with a very general conceptual framing of these capacities, along with a concrete sense of the diverse techniques and methods that can (and ought) to be mobilised within non-corporate socio-cultural embeddings.

These computational methods and diagrams need to be combined with more socio-cultural histories that have been or are yet to be written. Yet in conceptually framing our object and methods on the notion of *Aufschreibesysteme*, we resist a type of reading that would blindly overlook the centrality of the *arkhè* that is the medium of the mailinglists, the annals of list cultures. Which brings us to the final question regarding the politics of the networked archive, questions regarding the long-term archival strategies of para-institutional mailinglist archives, perhaps for future archaeologies of social media (Malloy, 2016). Some of these issues include practical concerns around future and past preservation: what should be accessed and under what conditions? How might email correspondences be meaningfully framed for future generations of researchers and practitioners? Who are the custodians of the para-institutional archive? Indeed, from the perspective of a future media archaeologist, legacy systems, such as open crawlable mailinglists (GNU Mailman, Pipermail, Listserv, MHonArc, etc.) may retrospectively provide a more lasting historical record of digital culture than today's all enveloping corporate-guarded social media. Yet the possibilities for making sense of such archival material remain, from our perspective, relatively unexplored. Indeed, given the substantial ethical questions around the computational potential of digital archives, the kind of experimental avant-gardism found in these list cultures has yet to take hold in developing diverse approaches towards the politics of its own collective memory and ways of reading its history.

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Captions List

Figure 1: ASCII art email from Dutch-Belgian net.art collective JODI posted on nettime in 2001
(view from nettime's online web archive)

Figure 2: nettime's online web archive

Figure 3: Overall messages constituency of nettime, SPECTRE, -empyre- and CRUMB

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Conversation Pieces: On Recounting New Media Art Mailinglist Cultures

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This article discusses how mailinglists like nettime, -empyre-, Syndicate, SPECTRE and CRUMB have served a canonical and enduring venue for dialogue between dispersed and diverse communities of new media art, establishing influential concepts like 'net criticism' (ZKP 1995) and 'tactical media', while providing a means for the distribution of net.art and launching to prominence the careers of numerous figures in related fields since the 1990s. While the advent of corporate social media platforms appears to have eclipsed the currency of lists, they have nonetheless been historically positioned by media theorist McKenzie Wark as something like an "intermediate stage in the evolution of social media" (2018, p. 400). Offering this provocative framing in commenting on the significance of the mailinglist nettime in particular, of which he was a contributor alongside a great many other notable figures, Wark (2018) has additionally proposed the list be considered as a genuine instance of a historical avant-garde and a potential candidate for art-historical canonization - citing the art theorist Brian Holmes who referred to it as "our Dada" (2000).

Since mailinglists are, of course, composed of and through emails, they might first appear as a collection of minor or secondary ephemera. For the media art community in the mid to late-90's and early 00's, however, they arguably functioned in terms of what the sociologist Howard Becker's has called *art worlds*; that is, "an established network of cooperative links among participants" constituted by "the same people often cooperat[ing] repeatedly, even routinely, in similar ways to produce similar works" (1982, p. 34-35). Taking this as a point of inspiration, our analysis aims to examine the wider cultural significance of these lists from the perspective of their technical archives; and to account for how the dynamics of participation, experiments with

networked discourse, modes of organisation and forms of art have coalesced and dissipated over time.

For the field of internet history, we suggest that these media art lists are of particular significance due to their reflexive approach to the limits, capacities and boundaries of the mailinglist itself as a medium. Many influential concepts, events, publications and artistic practices that emerged through such lists frequently raise critical questions around such networking activity itself. To be clear, ours is not the first history of 90's media art told through the lens of these lists; previous accounts have already reflected on them as influential milieus of artistic or socially experimental practice (Apprich, 2017; Lovink, 2003, 2009; Bosma 2011). In making a contribution to internet history, however, we expand on these studies by exploring the possibilities for different ways of *counting* mailinglists' archival materials and, therefore, of *recounting* the past of list cultures - to use the terms of Wolfgang Ernst (2013). This involves the development and use of methods which take into account the technical specificity of the mailinglist medium itself.

Our article, accordingly, can be understood as an investigation of historiographic methodologies that take on the materiality of the internet as media infrastructure (Fortunati, 2017). While mailinglist studies have been conducted through anthropological and social science frameworks, in this paper we engage with their technical archives by adopting an approach inspired by the concept of *Aufschreibesysteme*; that is, the inscription-system, 'discourse network,' or in the influential words of Friedrich Kittler: "the network of technologies and insti-tutions that allow a given culture to select, store, and produce relevant data" (1990, p. 369). In this regard, we follow a particular media archeological tradition - arguably initiated by the challenge put forth by Derrida, at the outset of his career that "[t]here remains to be written a history of […] the human and laborious, finite and artificial inscription" (1976, p. 15). Our inquiry thus unfolds through digital processes, but with a conceptual twist. We draw on both techniques of counting and interpreting, mixing cultural history with 'computational methods,' while reflecting on the limits and potentials of these different styles of humanistic and scientific research, particularly in light of the sociopolitical and critical challenges of new media art discourses. The extent to which we circumvent conditions where "sense and the senses turn into eyewash" (Kittler 1999, p. 1), for

instance, is ultimately a measure of demonstrating how the use of mixed methodologies raises compelling new questions of how we might come to know the past.

In previous research on lists, social science approaches have advised caution in treating technical archives as a "a full account of the interactions on the list" or assuming they offer an "ideal or unobtrusive observation" of all relevant activity (Bealieu and Høybye 2011, p. 263). While stressing particular techno-epistemological limits of the archive - noting that crucial exchanges might occur off-list, for instance, or that the social dynamics of lists involve the complex lived temporalities that are not captured by an archive - an emphasis has been placed on ethnographic engagement as a way of generating adequate knowledge of list cultures (Hine 2009). As lists age over time, however, this kind of participant observation, quite simply, becomes less tenable; indeed, working predominantly with archives or databases becomes an increasingly necessary condition for historical inquiry. With this in mind, we are especially interested in what insights about new media art cultures can be drawn by repurposing their discursive infrastructures. Our approach, moreover, might be linked to 'digital methods' (Rogers, 2013), along with digital humanities frameworks applied to digitized textual corpora like 'distant reading' (Moretti, 2005), 'algorithmic criticism' (Ramsay, 2011) and 'macroanalysis' (Jockers, 2013) - perhaps even the kind of frameworks used by "the scads of mathematics PhDs on staff at Google" (Galloway 2014, p. 110). As already indicated, however, we take a broader perspective; in this article, we understand these emergent methodologies as a constellation that contributes to a computational *Aufschreibesysteme*, within which we aim to consider the political and epistemological facets of such data-centric techniques. In this respect, we also aim to reflect the experimental ethos of the lists in question.

To be clear, these mailinglists are not especially large compared to the standards of contemporary social big data analysis as objects of study;[1] they nevertheless present some unique material challenges and capacities. Through our inscription-based approach, we were able to devise a range of novel methods and techniques for the identification of list dynamics, prominent topics, along with the possibilities for cross-list mode of inquiry. An attention to the technical

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[1] The largest archive we have amounts to a total of 213MB of uncompressed text data.

materiality of the list, therefore, lays the groundwork for scoping out of what we refer to more generally as *list cultures*, in which the possibilities for comparative and aggregate-level analysis are explored. In doing so, we thus consider how these lists have continued to function as a constitutive part of art worlds, and endeavour to characterise and position them in relation to each other over time, with nettime representing an early period, SPECTRE representing a transitional phase, and -empyre- and CRUMB functioning as more specialized and consolidated initiatives.

While working with the technical constraints of these digital archives, we thus additionally aspire to make a contribution to media art history (Grau, 2007; Cubitt & Thomas, 2013), particularly by arguing for a sense in which such modes of networking has continued to operate alongside other established institutions. By supporting a "network of cooperative links", as we go on to discuss, these lists also afforded the emergence of a vital new discourse on (new) media art. Against the "disavowal of digital" (Bishop, 2012) within the contemporary art establishment, these art worlds have come to function as semi-autonomous venues for the development of new art forms and critical art discourse, including 'net criticism,' 'net.art' and 'the post-digital,' amongst others — what we will refer to as *para-institutional formations*.

In the first section of this article, we offer an overview of these mailinglists by drawing both from relevant historical research on new media art and key posts to the lists themselves. The second part foregrounds the internet infrastructures and protocols on which these emails have been stored, processed and transmitted. In the final sections, we provide an overview of how new approaches that account for these infrastructures might enrich, contest and expand on the current literature on media art mailinglists and their significance. We conclude with some observations on their long-term archivalization and the establishment of these other ways of recounting their cultural and historical salience.

New Media Art: Critical, Avant-Gardist and Autonomous Tendencies

The communications historian Fred Turner has framed the history of media art, or 'multimedia,' as fundamentally entangled with the rise to global prominence of a specifically American form

of liberalism humanism (2013). Turner's American-centric account of media art history can be read as a kind of prequel to his much-cited earlier work on the cultural foundations of the spirit of Silicon Valley capitalism that arose in the late-90's, the latter which he traced back to a series of ideological innovations initially pioneered by the 60's Californian counterculture (2006). Exemplary of this early foundational period in the history of the field is the work of the Experiments in Art & Technology (EAT) organization, which facilitated collaborations between corporate engineers from Bell Labs and renowned conceptualists, including the likes of John Cage and Robert Rauschenberg. In an era haunted by a fear of the machine and of instrumentalist mass media manipulation, these and other related experiments have been read as having effectively humanized and domesticated formerly frightening technologies (2008). In addition to this public understanding of 'the scientific lens,' Turner furthermore frames these early media art experiments as having served to essentially prepare society for a neoliberal era in which corporations and networks would come to be seen as the essential agents of change (2014).

If, following Turner, we trace one of the genealogical tributaries of media art to 1960's multimedia experimentalism, it was only some decades later, in the post-Cold War period, with the initial arrival of the web - and the attendant ascendency of neoliberalism - that the field of media art definitively entered a new phase, with the designation of 'new media art.' Whilst in its earlier period some of the most canonical multimedia projects involved collaborations between "the corporation and the counterculture" (Turner 2014), a new generation of media artists and art theorists would differentiate themselves from their progenitors largely in terms of their critical stance towards cyber-libertarianism combined with a medium-specific engagement with digital and networked technologies. New media art, accordingly, evolved through an aesthetic approach to digital technologies where interventions into communications networks were additionally accompanied by more long-term alternative experiments with socio-technical systems (Daniels, 2009). Here, the mailinglist found an essential and constitutive role.

Crucially, the period during which media art mailinglists like nettime, SPECTRE, -empyre- and CRUMB were founded was characterised by a notable intensification of the use, standardization and scale of digital networking, especially given the commercialization of the dotcom era. Early networking prior to the internet and web involved a vast diversity of isolated systems (Abbate,

2000). From out of this 'many-to-many' milieu, precursors to the communication dynamics of mailinglists can be found in hippie networks such as the Community Memory in Berkeley, the popular use of Minitel in France (Mailland and Driscoll, 2017), The WELL or hobbyist networks like Bulletin Board Systems (BBSes), Usenet and FidoNet (Brunton, 2013), among others. More immediate forerunners to the lists discussed in this article include experimental initiatives like THE THING, established by Wolfgang Staehle as a BBS in 1991, along with Public Netbase in Vienna, Internationale Stadt Berlin and De Digitale Stad in Amsterdam, all established in 1994. What is crucial to recognise, however, is that these projects were equally inspired by genealogies of artistic practice and discourse, as much as freenets and community networks. They were inspired by concepts like, for example, Joseph Beuys' 'social sculpture,' Gene Youngblood's 'metadesign' and the 'Temporary Autonomous Zone' (or TAZ), to name a few (Daniels, 2009). An early post to nettime by Toshiya Ueno exemplifies this position in the insistence that any notion of network art should draw from 'antecedents' to discussions of 'cyberspace', particularly by taking note of the "ceaseless metamorphoses of practice and method" of the historic avant-garde, and developments like Mail Art and Fluxus which had expanded "the horizons of artistic production to include the processes of communication and transportation" (Schultz 1996b). Indeed, the influence of such avant-gardism would inform the uniquely critical perspective taken towards the spread of cyberlibertarian discourses and rapid commercialization of digital technologies during this period.

Whilst activity on the lists we examine has continued for decades and brought together a diverse international range of actors, the emergence of new media as a discourse on technology can nevertheless be situated rather specifically in a time and place. Insofar as these lists may be understood as part of a coherent art world, their mutual identity was not hippie but punk, and not American, but rather European - if the latter could be seen as "an attitude and experience of layered identities and histories" unrestricted by national borders (SPECTRE, 2017a). Indeed, the specific historical context from which these lists initially emerged was *an idea of Europe* in the aftermath of the Cold War, with new cultural exchanges possible between Western and Eastern Europe, just prior to the introduction of the Euro and well before the sovereign debt crisis. At the turn of the millennium, the context out of which these lists emerged may retrospectively be considered as a highpoint of globalization, when American liberalism was influentially theorized

as the end of history (Fukuyama, 1992), yet the ideology of dot.com capitalism was ascendant, as trumpeted from the pages of *Wired* magazine.

As the co-founder of nettime, chronologically the first of these new media mailinglists, Geert Lovink puts it, in his typically polemical style:

> From its genesis, Nettime was to embody the project of "net criticism" in order to counter the unbearable lightness of Wired magazine, which was considered the most influential organ of the virtual class. Pit Schultz: "Everything which Wired wrote was for us Pure Propaganda and provoked the quest for Unofficial Data. As the Pravda of the Net Wired forced the emergence of dissident thought". The uncontested hegemony of Wired in the mid nineties cannot be underestimated here. For opinion makers, politicians and young entrepreneurs there wasn't much else with such a positive-seductive appeal. In a text from early 1996 the aim [of Nettime] was followed as such: "Our Net Criticism has nothing to do with a monolithic or dialectic dogma, like 'neo-Luddism' or 'digital Marxism'. It is more a behavior than a project, more a parasite then a strategic position, more based on a diffuse corpus of works than an academic knowledge, it is heavily interfered by contradictions and techno-pleasure, and it keeps vivid in this way" (2009, p.101).

If the old media art discourse of '60s multimedia experimentalism fed into the ideological groundwork of American liberalism, as Turner has it, then the new media art discourse that would emerge from these lists was characterised by a critique of what eventually became widely known as 'The Californian Ideology' (Barbrook & Cameron, 1995) delivered through an alternative investment in avant-gardism and experiments with autonomy.

What is crucial to appreciate here, in hindsight, is just how little substantive technology critique existed at the time. A defining slogan that emerged with lists like nettime was 'no more vapour theory' (Lovink, 2002, p. 10), something which could be seen in the net critique commitment of developing theory with an empirical or practical understanding of the material and technical specificities of software. This at times translated into a re-imagined role for medium-specificity, as seen in the formalism of influential texts like Lev Manovich's *The Language of New Media*

(2001) - segments of which were posted to nettime in draft form (1998a, 1998b, 1998c) - or by theoretical work influenced by media art lists such as Tiziana Terranova's *Network Culture* (2004) and Alexander Galloway's *Protocol* (2004), where the infrastructural specificities of the internet were analysed as a new paradigm of power.

In addition to hosting critical dialogues, the lists also served as a non-commercial venue for the exhibition and dissemination of 'net.art' - a genre whose tendency further foregrounded and playfully subverted medium-specific sense of software. This could be seen, for instance, in the use of faulty browsers and 'glitch aesthetics' - a now iconic (even clichéd) style of 'destructive creativity' posed against the 'creative destruction' of the Californian tech industry (Liu, 2004). While this may be seen as the culmination of a tendency that first emerged in the 60's towards the de-aestheticization and dematerialization of the art object (Lippard, 1973), net.art as a genre was seen as advancing an adamant oppositionality towards the commodity form of art object within informational conditions (Stallabrass, 2003).

[figure 1]

Whether or not they in fact identified as media artists, contributors to these lists tended to view the web as a medium for "artistic and political experimentation with *a maximum of independence from established institutions*" (Byfield & Stalder, 2015, emphasis added). More generally, this idea of independence played out in a number of ways: politically in relation to a drive for new modes of organisation; infrastructurally and technologically through an entanglement with internet, web and other software standards and protocols; and, finally, through a processual, discursive, networked and 'supra-individual' notion of collective art practice (Daniels, 2009, p. 29). Mailinglists, therefore, were not simply taken as communication tools, but socio-technical assemblages that seemed to promise an entirely new sense of knowledge and politics. For some, this implied an 'extradisciplinary' mode of networking that "cast new light on the old problems of the closure of specialized disciplines, the intellectual and affective paralysis to which it gives rise, and the alienation of any capacity for democratic decision-making that inevitably follows,

particularly in a highly complex technological society" (Holmes, 2007). Yet alongside the perceived possibilities of networking, there remained a nagging feeling that such list cultures were ultimately a fleeting phenomenon, especially when confronted with strategic concerns around sustainability, digital labour and political organization. Such problems went on to inspire concepts like 'organized networks' (Rossiter, 2006; Lovink & Rossiter, 2018) to think through processes of institutionalization within networked conditions; such issues, we suggest, return in a different guise when considering the long-term prospects of these lists as historical resources or techno-cultural archives.

Mailinglist as *Aufschreibesysteme*

To the extent that mailinglists are an overlooked and arguably out-of-date form of communications media today, they can be taken as a media archeological system with particular technological characteristics. Indeed, before we discuss our methods for analyzing these lists, it is crucial to understand how they operate as an assemblage of digital objects and protocols whose affordances have, in a quite literal sense, provided the foundation through which the discursivity of new media art worlds has been articulated. While taking their specificity into account, moreover, we are interested in asking what kind of system is a list archive, and what does it suggest about informational modes of organisation more generally. To that end, we believe it is essential to understand the various lineages of technical media that feed into mailinglists to grasp the rationale behind devising computation methods based on these very infrastructures.

In his media archaeological analysis of the postal system, Bernhard Siegert argued that the addressability of mail linked subjects and objects together to support the literacy of 'the Individual;' as he put it gnomically: "the existence of objects is bound to reason's delivery to cognition" (1999, p. 8). It might be obvious to link the *Aufschreibesysteme* of the postal system to electronic mail or email, yet our inquiry begins at the exact moment where Siegert's treatise ends; that is, with digital communication. Indeed, as the conclusion of his study confirms, the problem of relayed transmission central to Siegert's analysis of literary correspondence is rendered mute by new forms of digital communication; or rather, it is transformed into a problem of digital symbols processing, rather than interpretation at a delay. Based on Claude Shannon's

mathematical theory of communication, the advent of Pulse-Code Modulation (PCM) on telephone lines (T- or E- carrier systems) meant that transmission distances had only minor effects on mathematically coded messages, the new *archi-écriture* of the digital networks. As Siegert himself put it, this new paradigm "meant that communications theory no longer had anything to do with (letter) mail, and that is indeed becoming obvious as our letters are absorbed and transformed into bit sequences by fax machines and e-mail" (1999, p. 261). Echoing the assessment of Kittler, the problem of transmission for Siegert thus becomes an end-to-end problem of coding and decoding symbols; in other words, a problem of protocol, rather than universal literacy.

Within this general transition toward the optimal coding of messages, networked electronic mail protocols have a rather long history; in fact, email predates computer networks as such. Mainframe time sharing systems from the 1960's like MIT's Compatible Time Sharing System (CTSS) and the TENEX operating system had already built in electronic mail functionality in the form of a mailbox (Van Vleck, 2012; Partridge, 2008). With the advent of ARPANET, there was a need to standardize and implement such functionality across multiple systems. One of the earliest attempts to reimplement, or rather recycle, such electronic mail functionality came with RFC 196 "A Mailbox Protocol" (Watson, 1971). Reminiscent of teleprinter or teletype systems, Watson's proposal was based on sending messages directly to printers so the recipient could be delivered a hard copy of the message; a proposal which, despite its untenable hang-up on paper output, nevertheless demonstrated the effective transposition of signal processing over transmission.

Developing a system that incorporated storage capacity was pursued by the early designers of "File Transfer Protocol" (FTP), who worked at integrating such mainframe functionality with MAIL and MLFL (Mail File) commands (see Bhushan 1973). While FTP was the standard for sending and receiving email on the ARPANET, the structure of messages (e.g., header, body, etc.) was defined later by RFC 561 "Standardizing Network Mail Headers" (Bhushan, Pogran, Tomlinson, & White, 1973) which detailed the header format consisting of the fields 'From', 'Subject', and 'Date' that still appears in most email client programs today. This header format was further developed in RFC 680 "Message Transmission Protocol" (Myer and Henderson,

1975), which augmented the standard with 'To', 'Cc', 'Bcc' that allowed emails to be sent to more than one recipient at a time. RFC 680 also formalized the use of the '@' character as part of email addresses (e.g., user@host). In this way, the addressability of the postal system that first supported the correspondence of personal thoughts and experiences, according to Siegert, was transferred over to a machine-readable infrastructure or the theoretical possibility of 'a single relay.' Even while later standards like RFCs 724 (Crocker, Vittal, Pogran, & Henderson, 1977a) and 733 (Crocker, Vittal, Pogran, & Henderson, 1977b) officially specified that the email format contain ASCII characters so it could be rendered human readable, the overall effect was to underwrite this intelligibility with a system of communication strictly for machines.[2]

As the ARPANET became the internet, these capacities for machine reading - especially the potential for indexing and parsing correspondence - became an embedded feature. With the US Department of Defense adoption of the TCP/IP transport protocol, a complete redesign of the "ARPA Network Messages" was proposed in 1982 to include the introduction of "Simple Mail Transfer Protocol" (SMTP) that replaced FTP as the de facto protocol for email. As Partridge observes: "email via FTP was underspecified [...] the specification for email delivery was two pages long, while SMTP specification, when it appeared, was 68 pages long" (2008, p.11). SMTP was one of the early "application layer" protocols designed especially as part of the new ARPA Internet Protocol Suite, making email a central and original application of the internet. The specification for SMTP was part of RFC 821 (Postel, 1982), and was accompanied by RFC 822 "Standard for the Format of ARPA Internet Text Messages" (Crocker, 1982) as an update to the specification discussed above. Both RFC 821 and 822 life-cycles spanned almost 20 years, being minorly updated only in 2001 by RFC 2821 (Klensin) and 2822 (Resnick), making them some of the longest lasting internet standards to this day.

A significant effect of this drive toward standardization is the potential it opens up for diverse ways of algorithmically treating emails; that is, the RFCs adopt an understanding of email

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[2] To adapt Marxist terminology, certain recommendations of RFC 724 might be read as caught in the transition from formal to real subsumption of the postal system: "Address lists may contain references to addresses which are not accessible through the standard ARPANET message system. For example, U.S. Postal system addresses can be specified. [...] [I]ndividual sites may provide services for using the information (e.g., automatically sending a copy of the message to a line printer, in preparation for transmission through the Postal system)" (Crocker, Vittal, Pogran, & Henderson, 1977a, p. 4).

correspondence as a structured piece of writing that can potentially be indexed, parsed and sorted

through a variety of automated software techniques. Indeed, the mailinglist itself as a form of

communication emerges from this computational potential. Thus, while email generally speaking

might be referred to as a standard, a mailinglist works through a program that leverages the

operationality of these specifications outlined above in particular ways. The functionality of

various mailinglists might appear the same (i.e. posting, receiving a digest, subscribing,

unsubscribing, etc.), however, their respective inner workings can differ considerably.

"Listserv," in this respect, has become a commonplace term used to denote the program serving

a list's emails on a given server.[3] Some of the most notable listserv programs include:

LISTSERV (the software) (2010), majordomo (2000), GNU Mailman (2017) and phpLIST

(2017).

[figure 2]

In terms of the methods discussed below, it is important to note that while such programs may

distribute email messages from a given list member's email client outbox to other members'

inboxes, they do not necessarily provide archiving functionalities, nor do they offer native web

interfaces. For this reason, it is usually the task of other programs to index and archive a list's

messages, and, optionally, to provide web interfaces to access this content. Prominent archiving

programs offering such functionality include legacy systems such as Pipermail (GNU Mailman

2017), MhonArc (2014), and HyperKitty (2017).

While these new systems might seem to require new methodological concepts for how they can

be studied (i.e. new approaches around computational potential), in what follows we turn to

rather well established technique of reading based simply on counting. Here, we follow Ernst's

(2013) discussion of the productive tension between "telling versus counting" - indeed, in both

German and in French these words share a common root: *erzählen* (to tell a story) and *zählen* (to

count) and *conter* (to tell a story) and *compter* (to count). For Ernst, this method of counting

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[3] To clarify our nomenclature, we use "mailinglist" (in one word) to signify the overall functionality of objects that are listservs, rather than employing the term "listserv" as such. In so doing, we are consistent with Lovink's terminology in *Dynamics of Critical Internet Culture (1994-2001)* (2009).

history (as opposed to *recounting* it) is linked to the medieval cultural technique of the *Annales* (p. 149), which is a mode of writing history by recording and arranging events chronological year-by-year. Certainly, in our respective list archives, we find something like annals - a non-narrated and well-ordered record of correspondence listed month-by-month and year-by-year (see *figure 2*). Our methods, accordingly, follow this ordering, they are annalistic in nature by working with the array of list standards and protocols, described above, as research affordances. To be clear, our aim is not to subordinate historiographic methods (recounting) to techno-mathematical means of reading archives (counting). Rather, in what follows, we work with the tension between counting and recounting to grapple with the materialities of machinic data-processing. In doing so, our goal is to read patterns of participation from the past through these infrastructures with a focus on identifying list specific issues (overall activity, message constituency, participation and development of terms over time), along with the mediation of socio-cultural events and issues across mailinglists. Finally, in rendering such patterns that would otherwise be difficult to identify, we consider what difference computational potential makes in our dual reading of these inscription systems.

We encountered various mailinglist archiving programs in our research and wrote tailored software for each.[4] We compiled the archives of our lists by crawling their respective web interfaces (see *figure 2*). We thus wrote custom MhonArc and Pipermail web crawlers to compile messages from nettime, SPECTRE, and -empyre-, and a LISTSERV crawler to gather CRUMB's archive. Obtaining each list's archive by means of crawling their web interface was the first step. It is also one important factor in selecting these specific mailinglists since they are all openly available online, as opposed to other lists that are privately maintained. This aspect of 'openness' is, of course, a complex concern for mailinglists in general, as the standards and systems upon which they are built do not necessarily lend themselves to such forms of analysis. This is a key point concerning questions of organisation and institutionalization to which we will return in the conclusion.

A List of Lists: Delineating Corpa

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[4] All our software for this study is available at: https://github.com/gauthiier/mailinglists

In terms of our corpa that we subjected to analysis, we selected the lists in question by forming *a list of lists* through 'found' expert sources. Some of these include the 'Neighbourhood of Lists' from the nettime website (Nettime.org, 2019a), others included sources like Lovink's (2009) bibliography of 'consulted mailinglists or newsletters' from his *Dynamics of Critical Internet Culture (1994-2001)*, the Wiki page on 'media culture mailing lists' from Monoskop.org (2014), and a key post from the artist mez breeze (2013) to a month-long CRUMB discussion on list history in 2013. Obviously, this is a limited set of references could be expanded further. Our intention in this article is not to offer a definitive history of new media arts mailinglists, but rather to explore possibilities for analysis by foregrounding a series of methods and historiographic approaches. That said, a brief description of each is necessary to establish their significance, to outline their specific orientations and divergences.[5]

Established in 1995 by the German and Dutch media theorists and activists Lovink and Pit Schultz, nettime (2019a, 2019b) was perhaps the preeminent list for networking artists and activists in the new media art scene in Europe in the post-Cold War era. Maintaining a close relationship with media art practice, politics and theory, nettime provided a means for the distribution of net.art as well as a venue for discussions between a wider network of theorists, activists, artists, and artist run "media labs" from across Central and Eastern Europe — indeed, one its early active members, Josephine Bosma, referred to nettime as the "theory backbone of the media labs" (2004). As discussed earlier, a critique of 'The Californian Ideology,' identifying the rise of the dot.com era in Silicon Valley with a hybrid of left-right libertarianism with roots in the Californian counterculture, was representative of the early ambition on the list to perform net criticism, an agenda whose impact would take some twenty years to make its way into mainstream technology writing.

In a similar precursor to issues that would become more mainstream some twenty years later, the SPECTRE list (2019a, 2019b), which was launched by curators and media art researchers Andreas Broeckmann and Inke Arns in 2001, was set up after an earlier list, the Syndicate,

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[5] A recent radio program, organised by Shu Lea Cheang (2019b) as part of STWST48x5 STAY UNFINISHED art event, featured discussions on the origin and current state of all of the lists. The archive of the program can be retrieved from https://cba.fro.at/series/stwst48x5 (Cheang 2019a).

'imploded' due to a combination of trolling, the prevalence of 'spam art' and other complex moderation problems (Arns and Broeckmann, 2001; Lovink, 2002, pp. 153-203). Founded as an 'information exchange' on media culture, SPECTRE was organised foremost around the concept of 'Deep Europe', which encapsulated the non-nationalism of the lists by describing "an attitude and experience of layered identities and histories - ubiquitous in Europe, yet in no way restricted by its topographical borders" (SPECTRE, 2019a).

The other two lists discussed below introduced more elaborate moderation strategies and deliberate points of focus, and can be considered as instances of a more 'mature' media art list culture. Established in 2002 by the Australian artist and curator Melinda Rackham during her PhD dissertation research, -empyre- (2019a, 2019b) featured discussions around carefully selected monthly themes on cross-disciplinary media practice with invited guest contributors. Also founded in 2002 by the curators and scholars Beryl Graham and Sarah Cook, the CRUMB (2019a, 2019b) list focussed on specific topic of curating media art , and featured invited guests, and discussions that were linked to particular events, issues or shows. These last two examples were founded with a much clearer set of agendas, including policies toward moderating the list, actively encouraging participation and pre-defining the scope of discussion.

Periodizing New Media List Cultures

Given the historical significance these mailinglists to the new media art world, the objective of our media archeological approach was to devise techniques by which to examine the discussions, posting and correspondence that took place beginning in the mid-90's and spanning almost two decades. To this end, we were interested in whether computational techniques might offer new insights into the kinds of historical narrative that we outline above and also the methodological issues that arise in the investigation of these lists as recountable material. Our approach towards these mailinglists, moreover, affords the possibility of comparative studies, particularly by identifying general patterns of participation on each list over time as well as counting cross-list continuities and disjunctures. Conducting cross-list modes of inquiry makes sense, moreover, as contributors, moderation practices, etiquette and infrastructure often intersect, and notable recurring themes or continuities can be identified.

Reading Methods #1: Time Series

Our first approach uses the formal structure of the mailinglists themselves (i.e., using the aforementioned email header "metadata" such as: *From*, *To*, *Reply-To*, *Subject*, and *Date*, etc.) to infer activities that occurred on each list over time. Based on this time series approach we devised two metrics, *activity* and *vigour*, each of which sought to address a specific clusters of questions. As mailinglists, the popularity of nettime, SPECTRE, CRUMB and -empyre- can be associated with mid-90's to early 00's list cultures, yet they still continue to exhibit levels of activity to this day. Our *activity* metric is intended to address the following questions: When were these lists the most active? Do they feature different kinds of contributions, particularly in terms of posts and replies? Do these contributions change over time? As a compliment to the former, we came up with a *vigour* metric, as a relative measure of how much on average members of a list engage in dialogue, irrespective of the overall activity metric. The key questions for this *vigour* metric includes: when were these lists most dialogic?

Metric I. Activity

[figure 3]

The graphs on *figure 3* display the overall amount of messages that have been posted on the four mailinglists over time. Each bar of the graph is coloured and labeled according to the types of messages that were posted to each respective list. Here we differentiate between what is called a 'single message,' a 'thread,' and a 'reply' where a thread is a message that has at least one reply (i.e., a type of message that *initiates* a 'dialog'); a reply is typically a reply to a thread, or, differently put, it is a reply to a message that makes this initial message a thread; a single message is an 'orphan' message that is neither a thread nor a reply.

Our method of aggregating threads is based on the results of crawling the HTML files of the online archive of each respective lists.[6] Thus we follow the ordering of what is presented on the web page and do not post-process, algorithmically or manually, the messages based on their *Subject* or *Reply-to* metadata fields. We are aware that some messages, whose discussion might refer to content in a thread, could be interpreted as 'falling out of order', since the author can always change the *Subject* field or the *Reply-to* field, for instance.[7] This type of 'disordering' may be intentionally put forth by a contributor as a rhetorical device (e.g., changing the *Subject* field) or simply done by mistake when replying to a message or when an archive is transferred from one system to another (e.g., Pipermail to MhonArc). That said, the ordering provided by our lists' online archives are relatively consistent (with the exception of SPECTRE), and thus, this 'falling out of order' does not considerably affect the findings we present here.[8]

From the aforementioned taxonomy ('single message,' 'thread,' and 'reply) a few observations can be made regarding the overall activity graphs displayed above: with the exception of nettime at the turn of the century, the total amount of postings on each list is comparable and oscillates roughly between 500 to 1500 messages per year (with a few isolated outliers); nettime's sharp rise in 1999 follows the publication of a major edited book associated with the list - *README! Filtered by NETTIME: ASCII Culture and the Revenge of Knowledge* (Bosma et al., 1999) - while the noticeable decline in 2004 coincides more or less with the creation of nettime's announcement-only list (nettime-ann) in 2005, along with the peak era of blogging and the rise of early social networking sites; there is a resurgence of activity on all lists around 2011-2012; there is a manifest decline of activity on CRUMB over the past two years we have on record (2016, 2017); most messages on -empyre- are part of a thread and thus contribute to a discussion.

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[6] These HTML files are generated from the respective mailinglists' archiving program, namely: MhonArc (Nettime), Pipermail (SPECTRE, -empyre-), and LISTSERV (CRUMB).

[7] This thread ordering concern is raised in (Hocquet and Wieber 2018: 45-6) who are looking at identifying and close reading so called "flame wars," which we are not specifically inquiring here with our study. Their solution is to "manually define if a post belongs to a thread or not" (46), a technique that works for their close reading inquiry, yet is a method that has some limitations when considering the entirety of threads in archives, as we are inquiring here.

[8] For instance, emails having no *Subject* field amounts to 0.0008% of nettime, 0.0002% of crumb, 0.005% of -empyre - , and 0.005% of SPECTRE.

While the type of observations one can infer from the overall activity of the lists may be limited in scope (i.e., without consulting further resources or using hybrid methodological approaches), the activity metric nonetheless provides a unique overall perspective of the scale of each list and provides a global index of participation/contribution trends that occurs on them over time.

Metric II. Vigour

Threads form the basis of an asynchronous dialog (in the sense that the list becomes more 'threaded'). We came up with the term *vigour* to account for the practice of replying to messages, which, in turn, creates dialogic dynamics between some of the lists' contributors. Just as correspondence is likely to occur 'off list' (i.e., contributors directly emailing each other off the list), counting threads should not be understood as indicative of *all* correspondence associated or informing a list. At stated above, our approach works to map as closely as possible the indexed messages within an archive.

From the aforementioned distinction between (1) threads, (2) replies and (3) single orphan messages, we have constructed three differential ratios between these categories that help identify the dialogic dynamics of each respective list. As measures of vigour, these ratios are indicative of stark tendencies on some of the studied lists.

[figure 4]

[figure 5]

[figure 6]

Respectively, figures 4, 5 and 6 show our three distinct ratios that indicate the level of *vigour* of each list.[9] These ratios are described as:

- 'Avg. Threads + Replies': The average of the number of messages that are part of threads (replies + threads) divided by the total number of single messages per year. In other words, this ratio illustrates the average number of messages that are part of a thread on each list per year (a datum of 0.0 meaning no threads at all, while one of 1.0 being only threads).

- 'Ratio Replies per Thread': The ratio of the amount of replies that are part of a thread. This illustrates, year by year, the number of replies that composed, on average, a single thread.

- 'Diff. Threads + Replies vs Single Message': The difference between the sum of threads and replies per year (replies + threads) minus the amount of single messages for the same year. This measure provides an overview of the type dynamics of a given list over time: are there more single messages on the list (negative values), or are there more threads and replies (positive values)?

From these labelled ratios, *figure 4* indicates that -empyre- is mainly a dialogic and vigorous list since the 'Avg. Threads + Replies' is well over 0.5 and the 'Diff. Threads + Replies vs Single Message' indicator is always positive. Basically, these two indicators illustrate how the list is mainly composed of threads. This observation is in line with the notion that -empyre- is a highly curated and moderated list and does not cater for orphan or single announcement-type messages that we observe on our other lists. On the contrary, we can read from *figure 5* that CRUMB has more single messages than threads since the 'Diff. Threads + Replies vs Single Message' levels are all negative and, consequently, the 'Avg. Threads + Replies' is below 0.5 every year. That said however, CRUMB scores the highest of all three lists in terms of 'Ratio Replies per Thread.' This indicator signifies that while messages posted on the list tend not to generate threads on average (e.g. most messages being orphan messages), when a thread is indeed initiated it is

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[9] For this metric, we have not considered the SPECTRE list as the data we gathered from its archive is inconsistent. We are working on fixing this issue and thus decided to leave the list out of the present discussion on the metric.

composed of a notable amount of replies. As figures 4 and 5 reveal, the vigour metric demonstrate that -empyre- and CRUMB exhibit steady dialogic dynamics since their beginnings.

In contrast, nettime has distinct periods that can be identified according to two easily distinguishable periods spanning about a decade each. As illustrated by the 'Diff. Threads + Replies vs Single Message' graph of *figure 6*, the first decade 1995-2006 is marked by a culture of single message postings to the list (values in the graph are negative for that period) while the second decade 2007-2017 is marked by a more sustained thread culture (values in the graph are positive for that period). It is fair to say that nettime has become a more dialogic mailinglist in the second decade of its existence. That is, when the list was exemplary of a 'silver age' or 'Our Dada', then this coincided with rather conventional one-to-many publishing practices. As illustrated on nettime's 'Avg. Threads + Replies' graph of *figure 6*, the list has steadily churned out, on average, more threads and replies than orphan messages posting since 2006 (ratio above 0.5); in other words, less single postings and more discussion/dialog. In addition, the number of replies per thread seems to have steadily increased over the years, hitting an all-time high in 2016 and 2017. While there are many factors that can explain this shift in the list's activities and behavior (forking of 'nettime-ann' in 2005, the increased profiles of key contributors, the 'rise' of political activism since 2010 following the Arab Spring, the impact of social media platforms, and so on), our analysis nonetheless indicates a sustained trend towards nettime developing a 'thread culture' as opposed to an earlier 'publishing culture.' Having said this, we are aware that the 'netiquette' of replying directly to a certain message (off list that is) might have been more prominent in the late 1990s/early 2000s, and might even be that case today, hence discussions have certainly happened, yet they are not 'on the record'.

Reading Method #2: Comparative Content Displays

For the second set of reading methods, we focus on comparing the mailinglists' content, as opposed to the metadata used in the previous methods, and devise two types of metrics that allow us to compare the content of the various lists' messages.

Metric I. Comparative Threads Ranking

The first metric constructs a ranking of the most discussed threads per year on each list, whose respective results are then laid out in a multidimensional table side-by-side. This allows for a juxtaposed reading of the lists' most discussed topics, that is, the threads that have the most replies. Through this method, we are able to identify significant cultural moments and issues that were discussed across the lists at different periods. For instance, interestingly, in 1997 on nettime, the top seven posts all appear to be concerned with issues of gender politics, sparking reactions and debates about (cyber)feminist art and internet culture with threads such as "Translation: The Vagina Is the Boss on Internet" (de Haan, 1997) and "Bossy Cunts Online" (Gashgirl, 1997).

[figure 7]

A number of notable cross-lists topics and issues are briefly worth mentioning here: the 2003 controversy over the new media art curator Steve Dietz losing his curatorial position at the renowned Walker Art Centre in Minneapolis and the decision for Rhizome.org to erect a paywall on their website, which resulted in a discussion on nettime and CRUMB about the "death of net.art" in the early 00's (Byfield, 2003; Kovacevic, 2004; Lichty, 2003; Garrett, 2003). Another major topic arises from concerns with the ISEA 2011 conference fees that lead to a discussion on the "panelism, conferencialism, and corporatisation" of the conference on both nettime and -empyre- (Knouf, 2011; Rackham, 2011). Such discussions highlight the ongoing concern throughout these media art worlds with institutional politics, with boundaries of inside and outside, and indeed with the para-institutional character of the list itself as a conduit for such critical, reflexive dialogue around modes of organization.

The ranking of threads also highlights the differences between the lists, what types of topics are recurrent on each, and how their respective yearly discourse may or may not reflect their self-declared ethos and *raison d'être* as introduced in the previous section.

Metric II. Search Timeline
The last counting metric consists of a search function and a timeline depiction. For a given keyword, a search is performed in each list's emails and the results are displayed as a bar graph

where aggregated hits for the given keyword are laid out on a month-by-month time axis. Bars are color-coded according to each mailinglist (blue for CRUMB, orange for -empyre-, green for nettime, and red for SPECTRE). All the email messages that have the keyword in their content section are also listed beneath the graph. The email lists are composed of web links to each of the emails' respective online archives which allows us to directly look up and read the content of a given message of interest.

[figure 8]

The results of a simple query 'net.art' demonstrate how this term has been a central of discussions across all four lists during certain periods. In *figure 8*, we can observe that the term 'net.art' saw a decline in usage on the lists over the last decade. For the period spanning 1997 to 2006, it features prominently in events, announcements or calls for works, as well as some illuminating historical and theoretical discussions on nettime (Broeckmann, 1997; Bosma, 1997; Shulgin, 1997). However, it is worth mentioning that the so-called 'net.art thread' of nettime divided its community over the filtering, moderation, and censorship of net.art works posted to the list (Bosma, 1998; Nettime's_digestive_system, 1998; JODI 2001) which resulted in the 'forking' of the 7-11 list (Monoskop.org 2007) and the creation of nettime-bold which was eventually closed down in 2003 (Nettime mod squad 2003). While we can observe that the term 'net.art' is still in use today, it now prominently features in discussions revolving around the topic of writing historiographies of new media art (Frost, 2013; Cook, 2014; Conway Murray, 2016), an issue that was also discussed in the late 90's, albeit with quite different historical concerns and political impetus.

[figure 9]

As another short example, the results for the contemporary term 'post-digital' are plotted on the graph of *figure 9*. At first sight, it is clear how the term has gained currency since 2013, as most hits populating the graph are displayed past this date. Yet, looking closely at the results, one can see that the term has been circulating on the lists since the early 00's (Broeckmann, 2001),

echoing the idea that the term 'post-digital' is not radically new per se, but has undergone semantic alterations over the years (Cramer, 2014a, 2014b).

The keyword metric, therefore, allows for an 'expert' perspective on in the corpus and constructs a time series according to the keyword's occurrence on the lists' content over time. As shown in figures 8 and 9, the lists' juxtaposed time series on the bar graph can highlight the "discursive life-cycle" of terms and concepts on the mailinglists.

[figure 10]

Other than keywords, the search timeline also offers the possibility to search for a given contributor's name or email address (*From* and *Name* metadata fields from the email header). Using this functionality, we are able to display the contributions of certain participants across lists over time. An example of this metri, displayed in *figure 10* is the contribution of nettime co-founder Lovink to the four mailinglists. From the graph, one can clearly see that Lovink is a prominent contributor of nettime, yet has also substantially contributed to the SPECTRE mailinglist between 2002 and 2008, participated in CRUMB's discussions on Art, Activism and Tactical Media in 2006, and also contributed to various discussions on -empyre- between 2009 and 2014. As another similar example, *figure 11* displays media art curator Marc Garrett's contribution to the four lists.[10]

[figure 11]

There are significant differences between the two types of recounting methods presented above, specifically in terms of the various periods they may present. The first set of "time series" reading metrics focuses on the various kinds of contributions and levels of participation that

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[10] We are aware that this name-based search method has some limitations, namely that a given contributor might have different *nom de plume* and that changing email addresses changes the metric. Nonetheless, from our experiments we found that our name-based search offers interesting indicators as to when the contributions of a given named contributor (under a *nom de plume* or not) occurred on these lists and what these contributions were about.

occur on lists, characterising each list according to its own peculiar macro dynamics. The periods one can identify using these metrics concern the overall lists' contribution practices: what are the predominant or subsidiary types of contributions on a given list? Have these types of contribution changed over time? If so, when and how?

The second set of "comparative content displays" examines the historical development of issues, terms, concepts and contributors across all lists over time. With these metrics we can periodise certain types of formations: discourses, terminologies, events and contributors have unravelled across these lists, simultaneously or not, over time. Unlike the "time series" metrics, these "comparative content displays" address the discursive level of the lists, rather than their participatory level. With the *Search Timeline* metric, for instance, we are able to trace content that would otherwise not appear in our other metrics based on participation. While these recount the amount of messages (threads, replies, orphan), the *Search Timeline* recounts word patterns. Considering the wealth and quality of discourses, as well as the historical and cultural significance of the lists we are examining in the field of new media art, this last metric gives us a fine grained overview of the language mobilised across lists, including the recurring tropes across different eras; a view that can aid studying these lists philologically. Indeed, it offers a means by which to write different kinds of histories, ones that might diverge from the dominant narratives supported by prominent participants, for instance, by highlighting formations based on language patterns rather than patterns of participation alone. Having said this, both methods are not mutually exclusive, we have indeed used the participation level of the "time series" metrics to cue our "comparative content displays" metrics to a particular year to analyse content circulated on the lists at that time. The "time series" methods help us orient ourselves 'macroscopically' in terms of participation, while the "comparative content displays" methods helps us zoom in on the lists' content.

Conclusion

At the outset we discussed how one renowned contributor to these lists, Wark (2018), framed the nettime list as a historical avant-garde. While Wark references the art historian Peter Bürger (1984), a more apt point of reference might be Benjamin Buchloh, who defined avant-garde practices in explicitly political terms as "strategies to counteract and develop resistance against

the tendency of the ideological apparatuses of the culture industry to occupy and to control all practices and all spaces of representation" (1984, pp. 19-20). Indeed, the new media art discourse that developed on these lists sought to explicitly militate against the web becoming equated with an American neoliberal expansionism, as embodied in the metaphor of the image of the web as 'cyberspace' championed by figures associated with *Wired* magazine and the new dot.com capitalism, such as John Perry Barlow (Schultz, 1995, 1996a, 1997; Barlow, 1995, 1996; Byfield, 1996). Insofar as many of the posts to these lists new media discourse took the form of critical commentaries, as for example in nettime's foundational polemic against the corporatization of the web, they may be seen to have anticipated the contemporary tendencies in technology writing in some cases by several decades. Whilst relatively common today, such a critical discourse anticipated the next wave of popular net critics (such as Andrew Keen, Nicolas Carr and Evgeny Morozov for instance) by two decades. Indeed, in light of the current critiques concerning the rise of "platform capitalism" (Srnicek 2017) and "surveillance capitalism" (Zuboff 2019), these archived lists may thus be imagined as a valuable resource to scholars of the history of ideas, insofar as they may be found to have rehearsed aspects of subsequent critiques, in some cases decades prior to their mainstream dissemination.

As a "network of cooperative links", these lists can be conceptualized as partaking in art worlds, from which vital new European discourse on technology, aesthetics and politics emerged, marked in several ways by its distinction from early American media art history. While operating outside of the contemporary art establishment, even in the face of its active disavowal (Bishop, 2012), as the empirical analysis above bears out how the discussions taking place within these worlds were often concerned with issues of institutional legitimacy (Byfield, 2003; Kovacevic, 2004; Lichty, 2003; Garrett, 2003; Knouf, 2011; Rackham, 2011). At the same time, these debates and many of their authors on these lists sought to articulate a stance of "maximum of independence from established institutions" (Byfield & Stalder, 2015). As self-reflexive venues for the development of this new media art discourse, they may thus be considered as being simultaneously established 'alongside,' 'throughout' and 'beyond' established institutional norms, and thus becoming a para-institutional formation. In this way, such lists can be taken as an index of the anxieties and desires around the potentialities of digital and networked technologies as they converged with existing structures of power and practices of everyday life,

while at the same time providing a context through which to experiment with alternative aesthetics, modes of organisation, evolving speculative discourses and concepts.

In our computational analysis, moreover, we find patterns of participation that complicate any straightforward narrative around the collective dimensions of these lists. During the 1990s, nettime in particular was considerably less dialogic as a public list, resembling in many ways a more conventional one-to-many publishing culture. The more consistent patterns found in later lists like -empyre-, meanwhile, reveal the effects of a concerted curatorial and moderation strategy. Whatever the notion of a social media 'silver age' (Wark 2018) might mean, it is clear that within new media mailinglists, participatory practices differ dramatically and, likewise, are valued and fostered in contrary ways.

As researchers engaging with these mailinglist records, we are well aware of our situation as "modern historians [who are] obliged not just to order data as in antiquaries but also to propose models of relations between them, to interpret plausible connections between events. Here the difference between tableau as statistical form (annalism) and as painting (historiography) becomes evident" (Ernst 2013, p.149) Yet we do not aim to provide a 'pure' reading in this article. The reading methods depicted above might be framed as working deliberately with these differences, as both *annalistic* in attending to the material and chronological ordering of the mailinglists' archives (monthly ordering) and *historiographic* in narrating connections and interpretations. Offering a dual analysis of mailinglists allows us to simultaneously count patterns and recount the past inscriptions of the mailinglist themselves. The various techno-mathematical (time) series we devised trace patterns serially as time-based diagrams, a statistical tableau as Ernst puts it, while situating these findings within existing historical narratives provides us with opportunities for divergent modes of interpretation and a general reflection on the epistemic problematics of mailinglist as infrastructural medium.

We should stress, finally, that an enabling aspect of our approach has been the concept of computational potential. This stems from the latent capacities of how email is universally structured as data for processing; something that becomes more explicit through its particular treatment as "a raw material that can be *deterritorialized* - reduced to textual atoms and their

frequencies - and *reterritorialized* - reassembled into groupings of algorithms and interface elements that (re)frame it and make it navigable in different ways" (Rieder 2013, p. 61). While this potential might support novel communication forms like mailinglists, we might conclude by considering other cases that raise more complex political questions, from Google scanning the contents of Gmail inboxes to the Snowden revelations of the NSA's bulk collection of emails through the Stellar Wind and PRISM programs. The concept of *Aufschreibesysteme* can provide us with a very general conceptual framing of these capacities, along with a concrete sense of the diverse techniques and methods that can (and ought) to be mobilised within non-corporate socio-cultural embeddings.

These computational methods and diagrams need to be combined with more socio-cultural histories that have been or are yet to be written. Yet in conceptually framing our object and methods on the notion of *Aufschreibesysteme*, we resist a type of reading that would blindly overlook the centrality of the *arkhè* that is the medium of the mailinglists, the annals of list cultures. Which brings us to the final question regarding the politics of the networked archive, questions regarding the long-term archival strategies of para-institutional mailinglist archives, perhaps for future archaeologies of social media (Malloy, 2016). Some of these issues include practical concerns around future and past preservation: what should be accessed and under what conditions? How might email correspondences be meaningfully framed for future generations of researchers and practitioners? Who are the custodians of the para-institutional archive? Indeed, from the perspective of a future media archaeologist, legacy systems, such as open crawlable mailinglists (GNU Mailman, Pipermail, Listserv, MHonArc, etc.) may retrospectively provide a more lasting historical record of digital culture than today's all enveloping corporate-guarded social media. Yet the possibilities for making sense of such archival material remain, from our perspective, relatively unexplored. Indeed, given the substantial ethical questions around the computational potential of digital archives, the kind of experimental avant-gardism found in these list cultures has yet to take hold in developing diverse approaches towards the politics of its own collective memory and ways of reading its history.

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Captions List

Figure 1: ASCII art email from Dutch-Belgian net.art collective JODI posted on nettime in 2001 (view from nettime's online web archive)

Figure 2: nettime's online web archive

Figure 3: Overall messages constituency of nettime, SPECTRE, -empyre- and CRUMB

Figure 4: -empyre-'s messages differential ratios

Figure 5: CRUMB's messages differential ratios

Figure 6: nettime's messages differential ratios

Figure 7: Comparative threads ranking per year

Figure 8: Search Timeline — net.art

Figure 9: Search Timeline — post-digital

Figure 10: Search Timeline — Lovink

Figure 11: Search Timeline — Garrett