

Vague Terrain

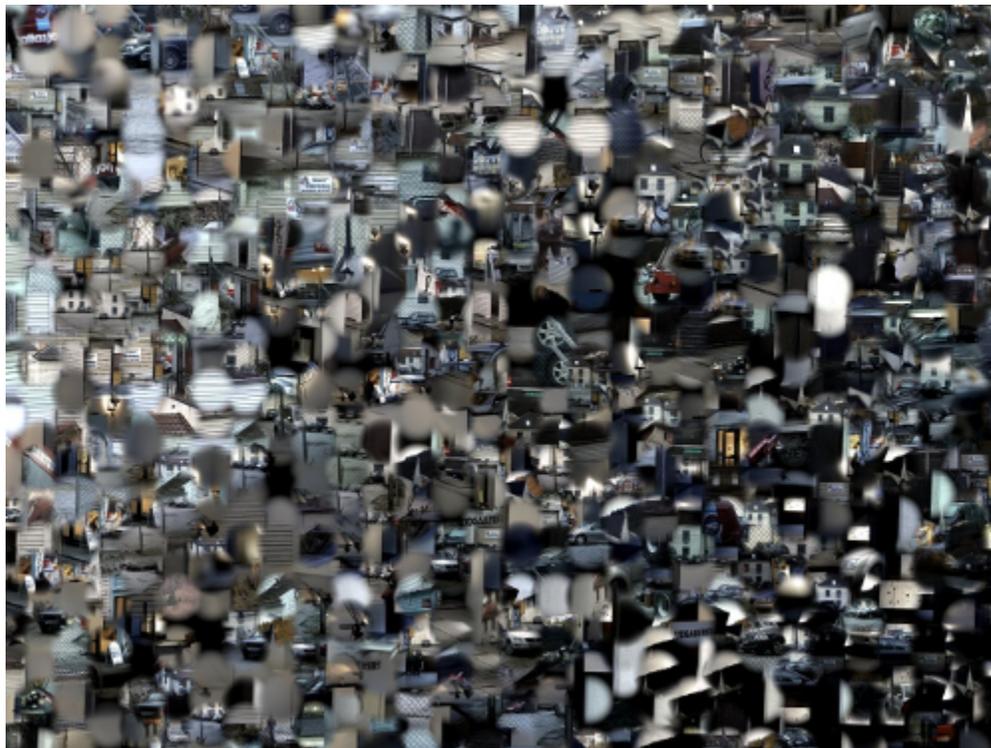
http://vagueterrain.net/content/2011/09/origination-and-metacreation-conversation-ben-bogart

March 23, 2012

Ben Bogart is a Canadian artist whose works encompass science, machine creativity and open source ethics. His innovative and fascinating investigations on artificial imagination and machine learning are effectively demonstrated through his body of work, which is neatly underpinned and strongly characterized by a critical analysis of the paradigm of creativity.

[Output from *Dreaming Machine #1*]

Marco Donnarumma:
Ben, to what extent can creativity be investigated through algorithmic means and which of your works best embodies such a practice? In which ways can the development of creative machines foster a better understanding of individuals as makers?



Ben Bogart: My research group (MAMAS), directed by Philippe Pasquier, my Ph.D. supervisor) is a group of students and faculty

many of whom are working on "metacreation", where we attempt to design systems that exhibit creative behaviour. Personally, I came to academia not to explore creativity directly (creative machines that is), but origination: how something (idea, form, life, universe) could come to be. The early genesis of this thinking is apparent in my 2005 paper "untitled iterations" in *Vague Terrain*. I started my M.Sc. degree with the idea of making a site-specific artwork that could "find its own relationship to its context". Eventually this lead to research on creativity and creative machines. *Memory Association Machine* (MAM) (2007) was an answer to this investigation of a machine forming its own relationship to context.

MAM implements a simplified conception of creativity proposed by Liane Gabora that emphasizes origination over evaluation. According to this theory, all the experiences of an agent are broken down into micro-features and encoded in memory. The 'world-view' is the whole collection of memories of a person, and they are organized in a structure that is unique to their life experience. Creativity is an association through this field of memories, where components of previous experiences are combined and new juxtapositions are formed. Rational and creative thought are two extremes of a single process. Rational associations involve activations of few memories in very focused directions, while creative associations involve the activation of many memories in many different directions. For more information on this see my M.Sc. Thesis. In order to continue my interest in origination, I'm moving away from creativity and looking at mental processes that may not involve any agency. My Ph.D. project is the development of a 'Dreaming Machine' that explicitly implements cognitively oriented models of concept generation, perception, memory and dreaming.

Creative machines are a way to test out theories of creativity, and could be used to validate certain

models of cognitive processing. I'm not interested in using art to validate science, but interested in some mutual overlap between these areas. I believe that science is just another cultural practise. The use of scientific models is more about a better understanding of science than it is about a better understanding of 'makers'. To simply accept these models without critique is to accept the doctrine that only science can construct new knowledge, which I don't think is the case.

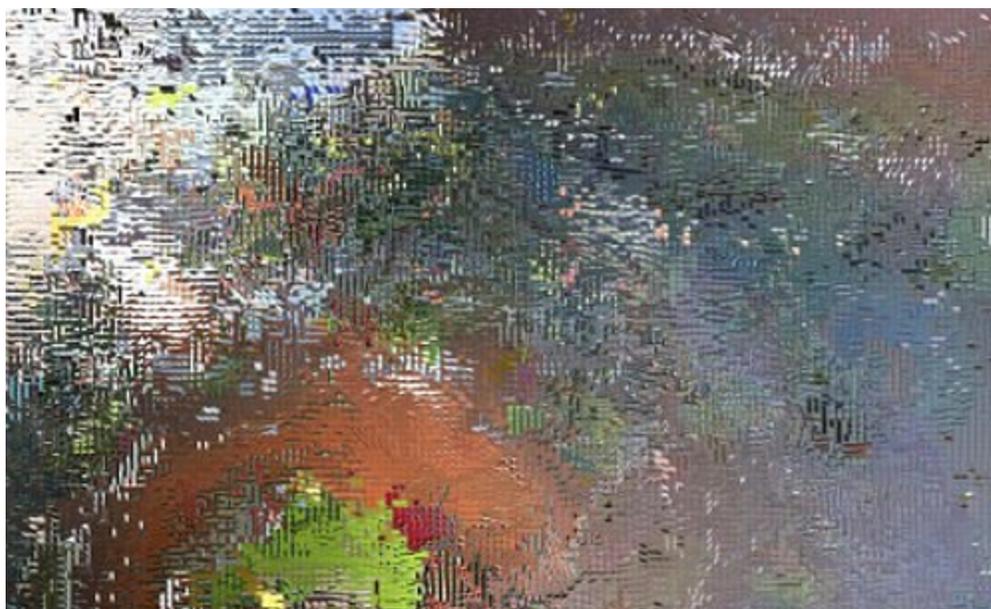
There are features regarding the study of creativity that are really interesting, and others than I find tiresome. It becomes very clear when looking at 'creativity' that one of the most imperative aspects is that of evaluation. Boden explicitly defines creativity as the construction of something (idea or artifact) that is new, surprising and valuable. This thinking permeates much work in metacreation, where some mechanism randomly creates variation, which is then edited down by a secondary process. Almost any process can create massive amounts of random variation and, according to this mindset, the process of evaluation becomes paramount. In computational systems much effort is put into the "fitness" and evaluation functions that allow a machine to decide what is worth keeping, and what is not. In order to design such algorithms one must build in a criteria for what is important in an idea or artifact. This cuts against my interest in origination because the problem moves from "lets build a machine that originates" to "lets determine a measure of creativity". I don't really care what relationship MAM will form with its context, what is important is the formation itself (or at least the effort in that direction) not the qualities of the relationship. I find the idea of formally encoding evaluation criteria quite unpleasant.

Perhaps it comes down to the AI debate between 'symbolic' and 'interactionist' poles. One side is 'top-down', where intelligence is considered a rational process that can be reduced to symbolic logic. For this side, evaluation is natural as it's a top-down process. On the other side we have a 'bottom-up' approach, where methods are often inspired by biological systems, for example artificial neural networks. Intelligence is an emergent property that arises from the interaction between an agent and its environment. In this case, evaluation does not explicitly exist, it too is emergent. The bottom line is that for something to be created it must first originate before it can be evaluated.

Creativity, for me, is really an exploration of the big project of AI: building machines that do things that we normally attribute to people. In looking at creativity I'm interested in rejecting the notion of rational intelligence and interested in mental processes that go beyond rationality. This also explains my interest in origination, which could be considered irrational, due to a potential lack of evaluation. Choices may not be made for an explicit reason, they could be random, they could be unintelligible, they could be insane. Evaluation, on the other hand, is extremely rational. In Boden's terms, it involves knowing what has happened before (to judge newness), what is normal (to judge surprise), and what is needed (to judge value).

[*Self-Organized Landscape #32*,
University of Limerick:
Study from Video]

MD: That's indeed a good point; but now I wonder: would you also attempt at mimicking or reconstituting human forgetfulness and fallacy in machines? I'm pointing at that obscure mental process which makes human beings forget



or hide their memories, or even rebuild them, patch them together by deploying pretentious ambitions or delusional feelings. I believe such processes greatly affect human creativity by simultaneously creating grounds and expectations.



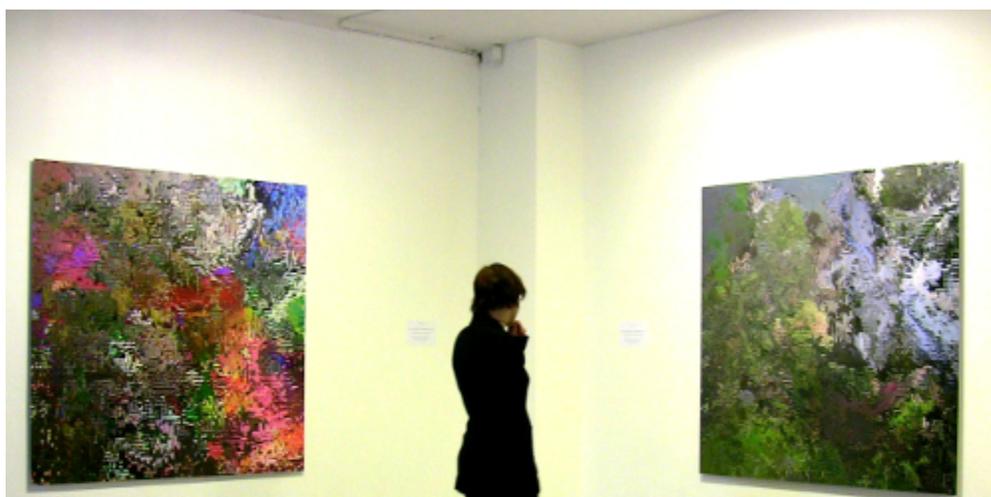
BB: Just today on the radio I heard a reference to a link between creative genius, irrationality and destructive behaviour. There has been a line of argument that creativity and insanity are related, but, as far as I understand, this argument depends on an extremely simplistic notion of creativity. Through the process of working on MAM, many interesting issues came up, the subtitle of my first publication on MAM (before it was even titled as such), "seizures, blindness and short-term memory", highlights the nature of the machine's disability. Early implementations of the free-associative system were very temperamental and often became over-activated, causing CPU spikes and lockups. It was Dr. Steven Barnes that made the connection between this behaviour and epilepsy. Blindness and short-term memory are fairly obvious limitations of the system. Forgetfulness seems fairly clear in a system with finite memory, humans and machines alike. In regards to fallacy, it seems to me that even the notion of human fallibility depends on the consideration of humans as rational creatures. A mistake requires some goal-oriented task. What if the machine does not have such a task, does it's fallibility have any significance?

In my background research for the current dreaming machine I came across this paper, "Toward Daydreaming Machines", which describes architectures that could give machines the ability to resolve cognitive tension by relegating facts and memories to their subconscious. I'm not so interested in these high level models of human cognition, but the aspect of illness and disability is interesting in the context of a cultural reflection: what is normal. Deaf and autistic cultures being examples of 'differences of ability' rather than disability. I think that creative ability likely brings to bare all aspects of cognition, including illness, inability and so on. Creativity is a function of the whole of the mind, as informed by the whole of a person's bodily experience in the world. Perhaps for a machine to be creative in a truly significant way, it would need to have an emotional base that drives an irrational process. Now we're back to the problem of origination. One theory of human emotion is that it is rooted in biological needs, as a machine is not biologically alive, its not clear what these needs would be. Machines are not designed to survive, certainly not on the scale that living things, at the level of species, do.

[*Self-Organized Landscapes*, Pixelache 2010]

MD: How would an 'intelligent' or 'creative' machine benefit from such intrinsic human traits? Would a machine benefit from it at all?

BB: It depends on the purpose of the machine.



If it is meant to be a tool, a system that (creatively or through reasoned deduction) generates new artifacts/ideas, then those cognitive



(dis)abilities related to managing cognitive dissonance would likely just get in the way. On the other hand, a machine with these traits could be a mirror through which we could reflect on ourselves. In general, the question of whether such traits would be a benefit depends on what function those traits have in living systems. It's possible they only have functions for survival.

MD: A machine as a techno-cultural mirror of our intellectual and emotional drifts. Sounds intriguing. Talking about science as a cultural practise, I seem to identify a convergent force which is moving all digital arts toward more scientific approaches; increasingly, the digital arts community appear to question the nature of humanity and society by means of hybridized methodologies involving scientific methods or theories.

BB: There is this issue of methodology. I don't think that it is appropriate to apply a hard-lined quantitative methodology to an artistic practise, simply because the purpose, the direction of the production in artistic practise, is always being reconsidered. It's not appropriate to give up on a scientific experiment before getting the results, but an artist's reflective practise means that they are constantly reconsidering the whole of the work, not just executing an idea or finding the truth value of a hypothesis, but questioning whether the artistic idea is worth following and what its implications may be. That is not to say that quantitative methods don't have a place. I certainly believe they should be integrated into an artistic practise in cases of computational art. The difference is that in this case these methods are used to solve sub-problems, not prove the validity of the whole project.

MD: Aside from the (seemingly) wider distribution of more complex technologies, which could be an obvious trigger of such scientific hybridization of arts, how is this phenomena taking place? Has art always been following the pace of science? If a growing interest in science is really informing artists' creativity, how will the knowledge that art produces be different than it was 50 years ago?

BB: I believe it was once thought that philosophy (the original science) was concerned with ideas, while art was concerned with forms. I think we now know that forms are a special kinds of ideas and that this dichotomy does not hold true. Artists who construct forms certainly have ideas that extend past the forms themselves. I think the processes of thinking/reasoning/hypothesizing and the construction of forms have always been complimentary. I don't think the argument for constructing form without thought holds a lot of water, as the effort to make form without thought is in itself an artistic idea. In order for thought to be communicated, it has to be manifest in some form, verbal, textual and so on. I believe both art and science are centrally concerned with constructing representations that enrich our understanding through a discourse. In the case of science these representations are texts, equations and figures that communicate models, in the case of art they are a multitude of media constructed in an artistic framework in a tradition of ideas. Science is highly rigorous and pointed in its depth first search of a space of enquiry. Art is free-associative, relational, subjective and centrally reflexive. I'm not sure art knowledge is really different than it was 50 years ago. It reflects our time now, but I don't think that nature has changed. It is interesting you choose 50 years, bringing us right back to the start of art/science/engineering integrations of the "Experiments in Art and Technology" (EAT) group.

MD: Presently, the theme of innovation and innovators seems to be a topic of interest in the artistic and hacktivist communities; while some of the latest corporations' technological devices have been creatively hacked and re-distributed (PS3 Eye, Kinect), several anti-(capitalist)social networks projects were developed (*Seppukoo*, *Web 2.0 Suicide Machine*, and the more recent *Thimbl*) in an attempt to claim back the primal peer2peer character of the Internet. As comprehensively outlined

in *FLOSS+Art*, and, more recently, in the *Telekommunist Manifesto*, there exists a multi-stranded relation between capitalism and innovation, and innovation and open creativity. What are the modalities by which Open Source ethics can encourage innovative practices? Could we argue that innovation is intrinsic to the Open Source ethos?

BB: If we consider science (and therefore technology) a cultural practise, then it is clear that no idea forms in isolation, but is given life thanks to a context of other ideas. In Gabora's theory of creativity the 'world-view' contains all the components of all the things we have seen and remember. It is only from this pool that a new idea can be constructed from existing components. For this very reason I can't believe in intellectual property (IP). Ideas cannot be owned because they cannot be attributed to an isolated person. Everything we have is not thanks to individuals, but to a culture that enables collaboration. This is why I endeavour to use only free and open-source software.

Innovation is about refinement, and it requires a large and varied pool of cultural components (ideas and technologies). As corporations sequester more and more knowledge in their IP vaults, there is less for others to work with. It's insane to think this would do anything but stifle innovation, where the components needed for innovation are increasingly controlled. Patents were thought up to encourage innovation by trading the explicit documentation of a design for a monopoly on the production of that design for a limited amount of time. The reason why a patent claim must contain so much detail is so that when the patent expires the design can be quickly reimplemented and transformed by culture at large. If a maker does not file a patent, then they can simply choose not disclose the design, and would never be obliged to share it. With this in mind we can think of FLOSS as an extreme version of this. By publishing the source, the maker is releasing a design to the cultural world, where it can be refined and used right away. It has an additional feature: since the copyright notice must follow source through its life, it includes a record of the contributions of those who were involved. Imagine a remix culture where this credit is automatically managed, you download a movie clip and your mashup automatically contains a reference to the original, a history of the production beyond a single maker. Imagine generational art or software projects that are passed down, like an oral history, from parent to child. With each generation the history and the work itself is being continuously enriched. FLOSS is about sharing, and innovation is at its best when ideas and methods are shared widely and openly.

[*Dreaming Machine #2*
in Sao Paulo]

MD: Another topic which is being critically discussed at the moment is pervasive computing, or the Internet of Things. Although I personally believe such paradigm to be nothing more than a regenerated definition of a founding concept underlying the historical development of today's information society, it seems that a novel, mainstream awareness of the nature of ubiquitous computing is coming



to life. Do you believe that a pervasive digital art could ever exist in the future? In which ways will the ubiquitous presence of computational devices shape digital creativity and electronic arts?

BB: I don't own a cell phone, and I'm still using a Sony Clie, made in 2005, I bought used for \$60. The first computer I bought was a used Amiga 3000, that one ended up in a museum when I bought my first PC, a Duron 800 around ~2000. That machine only died a month ago, after three drives, two ram upgrades, two graphics cards, and two PSUs. For 10 years it was my primary machine, running Linux of course. I don't use Facebook, though I do use IRC on occasion. I have always had an extremely critical eye for the technologies that I use. I do not support the ubiquitous computing platforms largely for one reason: eWaste. Our needs for faster and faster smart phones is already creating a horrible waste problem. A device designed to be manufactured by the millions, and kept for only a few years, or months, is a ecological nightmare. They can't be designed to be recyclable, because that would increase production costs too much. They can't be built to last, because then the manufacturer would not be able to sell the latest and greatest. If all our current 'dumb' devices became 'smart' then our ability to reclaim those materials would drop significantly. I've already come to the realization that in the future people will have to develop methods to mine the landfills to reclaim that which we have discarded. I'm all for the acceptance of digital and electronic media art projects as broadly into the public as possible, but there is an ethical issue with the platforms that may enable that kind of penetration.

I'm not sure that creativity will be transformed in a world of increasing ubiquitous computing. Creativity always operated against constraints, and within a tradition. How would the introduction of ubiquitous computing devices be any different than the introduction of any other "new" technology? The greatest value of ubiquitous computing is the aspect of embodiment. How we deal with information would no longer be in the top-down realms of our minds, but we may be able to feel it in our bones and on our skin. If we were able to solve the eWaste problems of technology then there is potential for public art to take on a new meaning, being integrated in social structure and architectural space. Maybe this would make art more relevant to the public, we just have to be aware of the ethical consequences.

MD: 'Ethical consequences', yes, many of us probably wish there would be a better awareness of ethical consequences about several matters. It seems to me that still in 2011 the majority of the world population is not aware of the real power, impact and utility (or abuse) of technology; a good part of our population is perhaps 'technology-aware': they recognize technological products and means surrounding them and they understand some of the social implications that today's eInfrastructures are based on. However, only a small number of us consciously realizes where technologies come from, on which principles they are based on, and the embedded logical and moral fallacy they cherish; lastly, an incredibly tiny amount of people is actively involved in the production of technology, for commercial, creative or hacktivist purposes.

BB: I agree, and I think your observation applies the same for science, a general lack of understanding and an unwillingness to criticize technological and scientific knowledge. The popularity of "making" and a new coolness for craft and nerds perhaps indicates that things are changing. "The big bang theory" TV show certainly has references in it that require a pretty good foundational understanding of science. I wish and dream we could end up with a population that is as media and technologically literate as they are textually literate. Part of why I'm interested in public art and public space is to engage with a broad public on these matters.

MD: Don't you think that the acceleration of technological advance, coupled with the ubiquity of tech end-products, could possibly weaken our awareness by not giving us the room and time to realize, in depth, what we are dealing with?

BB: I think that it is inevitable that technologies are developed and marketed before we even have a chance to understand the previous incarnation. It's possible that we will never understand the ramifications of a technology, it being forgotten and obsolete before we can really see it. This is a frightening thought, that a technology could come and go, changing us in some way we cannot, and will never, know. Our ability to habituate, to integrate our minds and tools such that we are not aware of

them, is that which makes us special, but perhaps also that which makes us victims of our own power structures.

MD: Finally, do you have any new projects in the pipeline? Would you like to share something with us?

I'm working on a few things at the same time, and blogging the process in the "production" section of my website. I'm continuing to work on my *Self-Organized Landscapes*, which are a spinoff of MAM and *Dreaming Machine #2*. My Ph.D. Project "*Dreaming Machine #3*" (DM3) is the next step. Where MAM and *Dreaming Machine #1* and *#2* all make use of Gabora's model of creativity and a self-organizing map, DM3 will make explicit use of cognitive models of perception, memory and perhaps most importantly concept formation. DM3 will learn patterns in the world (not whole images) that will form into concepts. Concepts will then allow the reconstruction of these patterns into new images. These images will be imagined by the machine, and constructed of components that the machine has seen. This project would be perhaps less a creative machine and more like a young child attempting to make sense of the world, and that sense being reflected in its dreams. Just as we explore and understand ourselves through cultural representations, the artwork will attempt to make sense of us and our world by constructing itself (or lack of self).

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