(Learning) The Grammar of the Act

Liat Grayver

Creating Context

Making art for me is the attempt to manifest one's own intimate biography in a public and social discourse. This is not only about the form or the finished object, but also about the process, the perspective and perception of a structure — all of which are defined by our dynamic surroundings and contemplated through the use of materials and tools, mediums and technology of the present time and localized context.

Exploration and playfulness through art-related mediums in general, and painting in particular, have been part of my life and identity since early childhood. However, the fact that I grew up in a peripheral region of Israel in a Jewish Iraqi immigrant family set me at a distance from the urban art establishment; conversely, my aspirations to assimilate into that milieu contributed to the formation of a certain distance between myself and my own family's cultural heritage.

My reflections on this situation are not, however, intended as an attempt to reconnect with, recover or reanimate a "lost culture" but rather as a means to investigate and question the hybrid, multifarious culture I am now operating in — the way I understand, process and practise the creation and generation of visual imagery, most notably through painting. When making a value judgment on the use of a medium — oil painting, printmaking or drawing, for example — I previously positioned myself in direct relation to "the" predecessors, who were by and large figures from the historical European art establishment. In my formative years, one of the most difficult tasks for me as a young female artist was to break free from the need to work in such recognizable and established forms in order to define neutral ground upon which I could operate and define myself as an individual artist.

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Our present era can be distinguished from other historical periods by the sheer amount of data to which we have access — the availability of and rapidity with which information can travel and be translated across disciplines and between places. Physical spaces like museums and the concept of the *white cube gallery* are today's conventional and ubiquitous spaces for presenting art and artefacts.

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Over the past decade, these increasingly uniform spaces have reinforced the tendency for artworks to be produced for no specific space, intended for consumption by an unspecific audience — it should be possible to exhibit or display the work everywhere, and everyone around the world should be able to view it. Furthermore, digital media in general and the Internet in particular are the most immediate and common ways we consume visual information today. This has an enormous impact on the way we as individuals are able to perceive and appreciate, for example, imagery or artefacts. Within more traditional settings this can very often result in a *decontextualized experience* for the individual in the post-digital and post-Internet epoch.

This fragmentary, decontextualized experience is the space I investigate in my artistic process, through the use of *data*, whether it be a symbol, a reduced geometrical form or a code, derived from diverse and familiar or foreign sources.

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Today there exists an ever-growing international community in artistic, academic and urban centres that is devoted to creating, modelling, reflecting upon and subsequently being remodelled by new constellations of culture. This corresponds to the dynamic transformation of our society through technology and media, not to mention the increasingly frequent movement of people and the mixture of cultures brought about by various forms of migration, both voluntary and forced. It is this contemporary mixed, fragmented and often contrasting society that I have long seen as my "home base", in part due to its familiarity, as I grew up in a country that was, at the time, predominantly inhabited by first- to third-generation immigrants that were educated largely on foreign and imported European cultural values. The rich potential of such cultural convergence offers infinite inspiration for me to investigate new channels of perception, creation and communication of visual imagery through collective as well as individual expression and experiences, using the physical mediums of printmaking, drawing, painting and robotics-assisted painting.

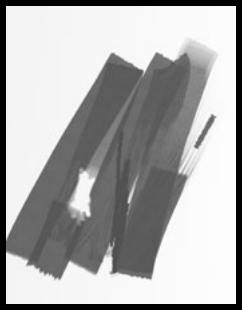
Since 2015, I have focused on investigating methods to redefine one of the primitive forms of art — painting — within our current technology-based era. In collaboration with computer engineers, neuroscientists and machine engineers, I am exploring new methods for the application of materials on surfaces, alongside computer-assisted generation of physical images, in the service of exploring new æsthetic avenues in painting. My work in this area aspires to constitute a novel context for the establishment of new and innovative ground in contemporary artistic practices.

Working in a new artistic field, namely robotics-assisted painting, gave me the privilege to operate in a space that was refreshingly devoid of preconceived rule systems of "right" or "wrong" in terms of æsthetic values, working methodologies or reflections on form and structure. Redefining boundaries and norms to create novels forms and perspectives on artistic practices is, in my opinion, one of the main tasks with which artists are *obliged* to engage in the creation of contemporary and post-digital art.

(Learning) The Grammar of the Act

Examination and reflection on the structure and use of the medium of painting in relation to contemporary technological innovations. Methods of human expressiveness and manners of visualization of information in the post-digital age.

This catalogue brings together several bodies of works that varyingly employ painting, printmaking, digital technologies, robotics and video. Both organic practices and machine-based systems have been used to create structures from physical actions (operation) and from the mind (perception), with the goal of investigating the relation between these two seemingly opposing creative approaches.



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As a whole, the body of works comprising *(Learning) The Grammar of the Act* explores the range of correspondences encountered between physical actions (manipulation of materials) and visual outcome. One of the interests in presenting them as a collection is to be able to more thoroughly examine the creative application of rules and protocols in the service of a recurring and even repeatable creative act such that the *act itself*, witnessed in multifarious form throughout the works, can then feature as subject matter. Through the integration of computers and robotics in the artistic process, it becomes possible not only to store information such as trajectories and patterns in order to manipulate and reuse them, but also to *translate* such data for repurposing in other mediums.

For example, physical movement can be captured using motion detection, analyzed and transformed as data that can subsequently be recomposed in the material world in the form of a painting. When this process is made visible, it translates into an artistic experience for viewers that can assist them in the discovery of underlying or even inconspicuous patterns and structures, the perception of which can help augment their understanding and appreciation of the artwork.

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Each of the individual works, whether a painting or rice paper and ink work, a digital composition or video-based material, is the outcome of an ever-changing, interactive constellation of human, computer, robotics, processes and materials. Obviously, an inter-disciplinary working platform in which artist, computer scientist, artistic practice and pedagogical reflections converge inspires a large range of questions regarding the use of technologies in the creative process of painting. How does one incorporate the use of computers, robots and machines in the very intuitive and gestural acts and practice of making a painting? How could we decompose the act of making a mark (human) into a corporal movement (machine) in such a manner that logic-based decisions (computer) and emotional intentions (artist) can coexist in a fruitful, symbiotic relationship? Stimulated by the experience and by exchanges with collaborators from the worlds of informatics and robotics, I found myself compelled to challenge and reconceptualize the foundations of the painterly practice, starting with the bodily movement of the single brushstroke all the way to questions concerning control and loss of control in the creative process.

Brushstrokes

Order in painting is traditionally achieved through the self-regulation of the painter and by external intervention. It is necessary to distinguish between — and balance — those characteristics relevant to the realm of individual artistic perception and that which is external to the artist's motives, intentions and preferences. The brushstroke — in its various manifestations — is the singular tool of communication that is encountered in paintings and drawings throughout all epochs. At the core of the primordial personal and artistic practice that has led to the creation of these works is a preoccupation with the study and exploration of the *act of creating* a painting, from the perspective of this most essential act — the process of making of a line — as opposed to the study of the painting itself — the artistic object.

As part of an ongoing collaboration with the e-David painting robot project at the University of Konstanz since February 2016, I have designed and integrated into its system an extensive (and growing) library of brushstrokes, gestures, trajectories and patterns. These can be programmed individually or collectively in various combinations, so that they can be used and executed by the painting robot, enabling a customized and interactive human-machine creative environment.

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Two closely related features naturally arise from the working methods inherent to this constellation. The integration of computer and robotic technologies in the painterly process makes it possible to capture, save, translate and manipulate simple gestures and more complex tasks as digital information. Quite naturally, this creates a certain distance between the painting and the painter, who is now simultaneously the viewer and the executor. Strokes can be generated that *appear* organic but are realized in a manner that only a machine

is capable of: with *exact* repetition, for example. The robot becomes a powerful tool to explore an entire realm of creative practice that extends beyond the physical and perceptual limitations of solely human-level practices. As a painter and a consumer of art I wondered, however, if it would be possible to recognize brushstrokes done by a robot in a more complex, generated work. Such questions opened up the terrain for the creation of several groups of works done in series.

Six Variations on Gestural Computer-Generated Brushstrokes (October–November 2016) is a series of computer-generated sets of brushstrokes that reflect the quality of spontaneous hand movement inspired by the practice of Japanese calligraphy. Using the e-David, the same generated path was painted again and again, each time on a new canvas, with the knowledge that this kind of exact repetition of movement could never be achieved by a human hand.

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Although each of the *Variations* was executed with the same path and an identical velocity, they are nevertheless distinct. Both physical and computational variables were integral to the creative process. For each new work, the robot was fitted with different brushes and the viscosity of the paint altered, while the computer instructions sent to the robot for the realization of each work contained a unique set of rules for such things as colour values and the number of times to load the brush with more paint at specific points in the overall process.

In last of the six works, the same generated path was used as in the first five *Variations*, but further experimentation on the repetition was made using a "destructive" layering method. The production process was sometimes resumed before the paint had been given enough time to dry, so that instead of the brush applying a new layer of paint on a dry, predictably controllable surface, it actually scraped some of the paint off the canvas, creating some surprising and pleasing surface effects. To distinguish the layers from each other and to give the painting some visual depth, and in contrast to the other works that were created with a single "rule set", different painting techniques (glaze, colour variation, viscosity variation) were applied using a juggled and reordered version of the stored information that controls the entire act. Because the robot was stopped and restarted at different points in the process, the loop action could be broken up into fragments, reassembled and executed in a different order than for the previous works.

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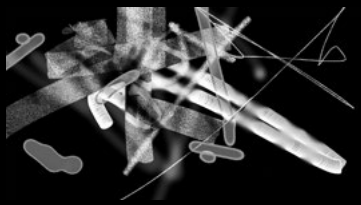
Tools and Materials

Printmaking, drawing, painting, photography, generated data and robotic technologies are tools used in my artistic practice to explore, retain and express visual information in relation to the digital and machine-based world we live in today. The works presented here explore the different ways the body and mind perceive not only the visual objects themselves (such as painting), but also the process through which they are created — what is seen as a whole (form) and what is felt as energy (vector).



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During the working process, passive materials (canvas, paper, wood surfaces, etc.) react to the active manipulation of materials upon them; both the passive and active elements are equally and reciprocally important to the process as well as to the finished work. Using and mixing different media in one work creates a rich context in which the tension between marks that are made with body gestures and those made with different degrees of technological intervention can be explored.

An individual work may consist of, for example, human and robotic brushstrokes, prints, photopolymer of digital painting and photographs on unmounted canvas.

Layering (Material and Temporal)

Made with the collaboration of the e-David Project (University of Konstanz) and video artist Marcus Nebe, *Traversing the Threshold* (2018) is a room installation of robotics-assisted calligraphic works and videos. The works stretch into and expose the temporal and physical space of creative process through the mediums of painting and video.

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What could have been executed as one painting constructed of thousands of brushstrokes has instead been decomposed and distributed over numerous sheets of rice paper. Different sections of the master particle generator image were cropped and the individual particles were translated into single brushstrokes (assigning parameters such as, for example, the size, length, pressure and speed variation of the strokes), before the data was sent to the robot for the final execution.

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The individual paper works are extracted from a complex of computer-generated particles *(Simulation of a World Overview*, 2018*)* according to Newton's Law of Universal Gravitation. Scaled to different sizes, each can be viewed not only as an individual work but also as part of the modular wall installation. Nebe's video compositions utilize close-up footage he made of the ink and paper interacting as I created the works manually, offering intriguing temporal perspectives on the material's response and impact on the act of painting.

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The fragility of the ink-infused rice paper work in particular stands in sharp contrast to the industrial robot used to create them. As with Japanese calligraphy (the reference is obvious and undeniable), the brush trajectories and the ink's behaviour as it penetrates the surface are here of several magnitudes more importance than the perception of the object itself.

Language

The practice of digital image-making represents a new manner by which images can be created whose sources are not derived from painting or photography, but rather arise through the writing of computer code, and are therefore not based on existing images of things. Such an approach makes it possible to deal with the cultural and psychological implications of our environment through symbols. This particular manner of creating images can, of course, encapsulate a huge amount of information, emanating from the most diverse sources — for example, fractal models from nature, physical phenomena and mathematical laws — that can then be translated into the visual domain.

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Transhuman Expression

The interactive room installation *Transhuman Expression* (2018) examines and reflects upon the artistic potential of the structure as well as the experience of the medium of painting positioned within the context of contemporary technological innovations. *Transhuman Expression* was conceived, developed and presented at Casa Paganini | InfoMus in Genova (Italy) in the context of a Vertigo STARTS residency, a programme that supports collaborations between artists and technology-based projects. Methods of information visualization in the post-digital age constitute a key focus. In its current form, the work results from the convergence of several concepts intrinsic to recent works and collaborative projects in which robotic technologies, motion tracking, video art, printmaking and painting were varyingly employed. As a whole, this generative artwork investigates the relation between physical, human-level activities and machine-based systems, both of which act — within a feedback system — synchronously upon each other via structures built using data extracted from the physical actions of participants (visitors) in the exhibition area.

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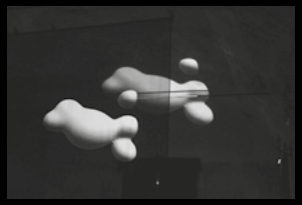
Participants are fitted with motion-tracking sensors before entering the exhibition space. Once inside they are free to move about as individuals or to interact with other visitors. The computer system recognizes the movements and evolution of both individual participants and group dynamics taking place within the space, and continuously registers data relating to these actions. The data is analyzed, processed and visualized according to different predefined rules of representation. The entire process takes place in real time (as it occurs "on stage"), i.e. participants see the live video projection (output) that results from their actions (input). They are free to explore and examine how they become part of a larger structure of situations and constellations: how their own movement, in relation to the space and to other participants, shapes the visualization. The interactive nature of the platform thus stimulates visitors to explore various ways to manipulate (control) the ever-changing state of the continuously evolving digital-painting artwork.



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The installation comprised three projectors, each assigned one of three different visualizations that are projected on three large, transparent black screens hung in the exhibition space. This approach is a direct outgrowth of practices in recent works exploring the layering of materials and using transparency and light as artistic materials. The projected images were thus visible from both sides as well as beyond the screens on the frescoed walls of Casa Paganini's auditorium.

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One of the key interests in presenting the visualization of subject matter in the form of a room-size composition is the formalization of rules and protocols for the repetition of a specific creative act, as well as for its recognition, such that the *act itself* can then feature as the primary subject matter of the work. In the earlier works in this collection, for example, the artistic exploration concerned the act of *creating* a painting from the perspective of its most primordial act — the process of committing a singular brushstroke to canvas or paper. The *identity indicators* of such artworks are located and perceived within the experience of understanding the artistic and production process, rather than externally

represented as a singular artistic object. In *Transhuman Expression*, a similar approach to the exploration of the creative process is extended into open space using advanced technological means — here, the canvas is replaced with a room of variable size and the brush-strokes with visitors to the installation work.

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Using motion tracking, movement analysis and data processing, pre-defined characteristics of temporally based physical activities can be digitally recorded as they occur in a given space (gallery, theatre, hallway or outdoor square), and some or all of this data can subsequently be extracted, decomposed and recomposed into the material world in the form of a new artwork. As this process is made visible to the participants, it translates into an artistic experience that assists them in the discovery of patterns and structures, the perception of which can help augment their understanding and appreciation of artwork in general.

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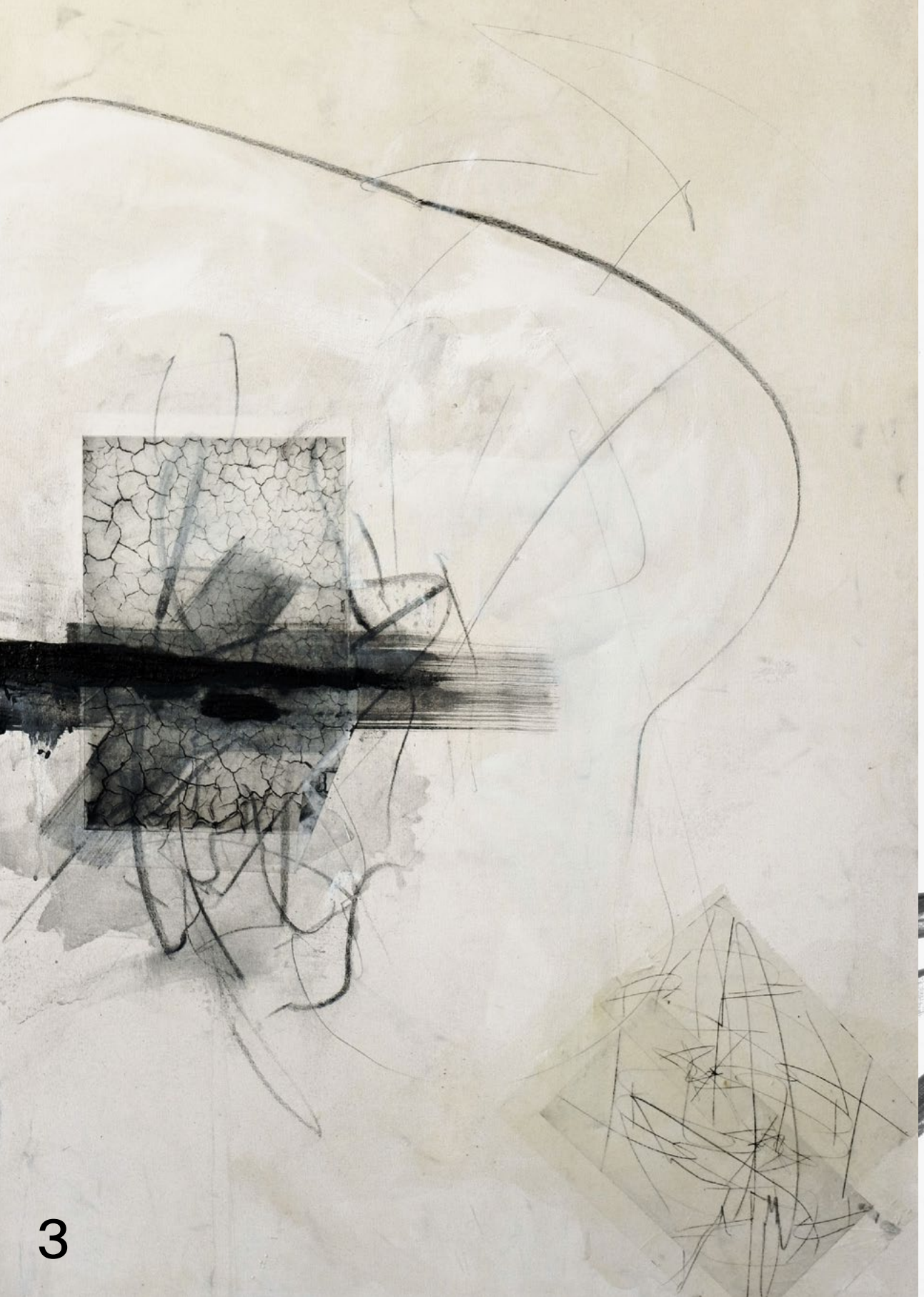

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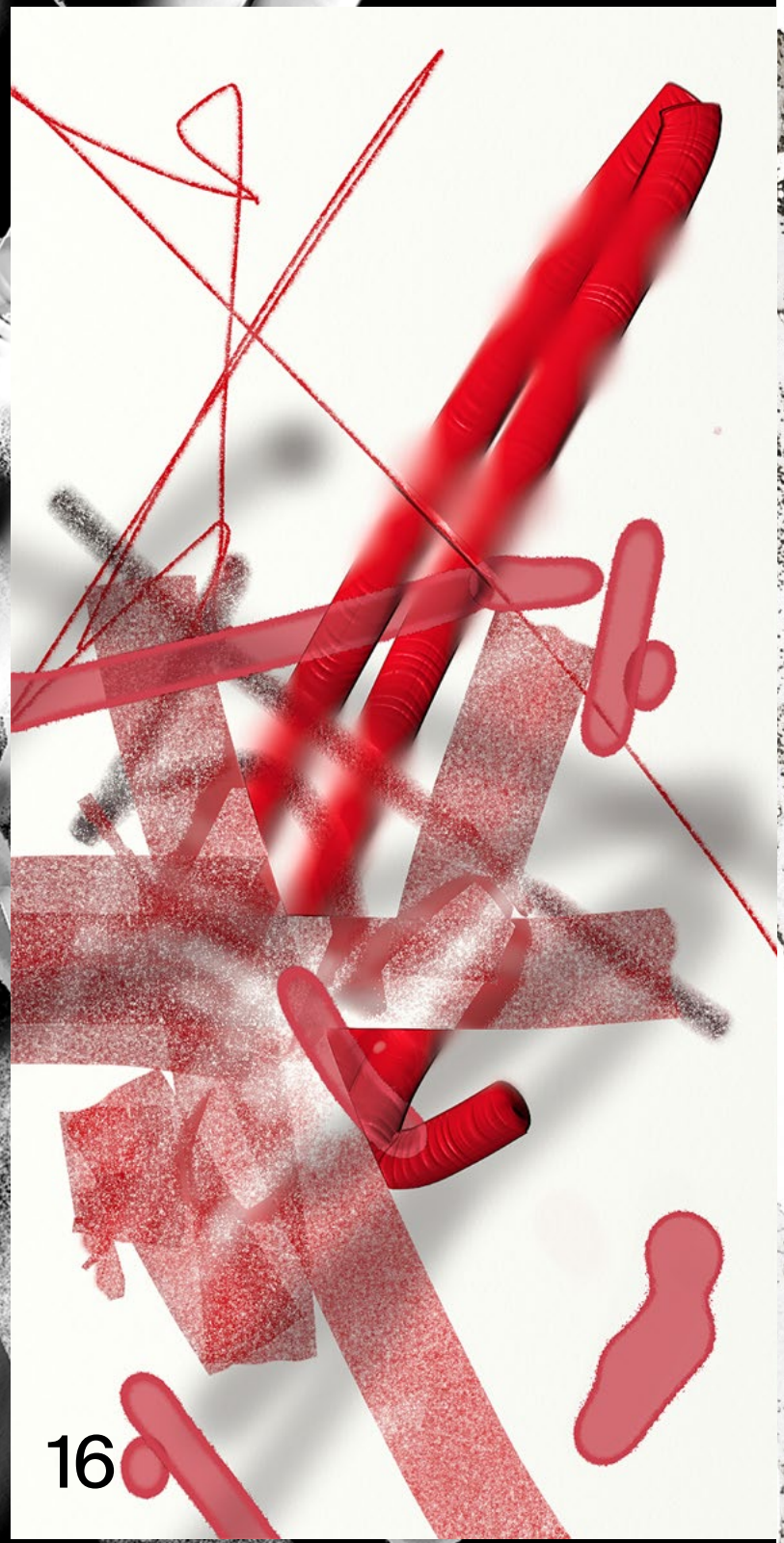
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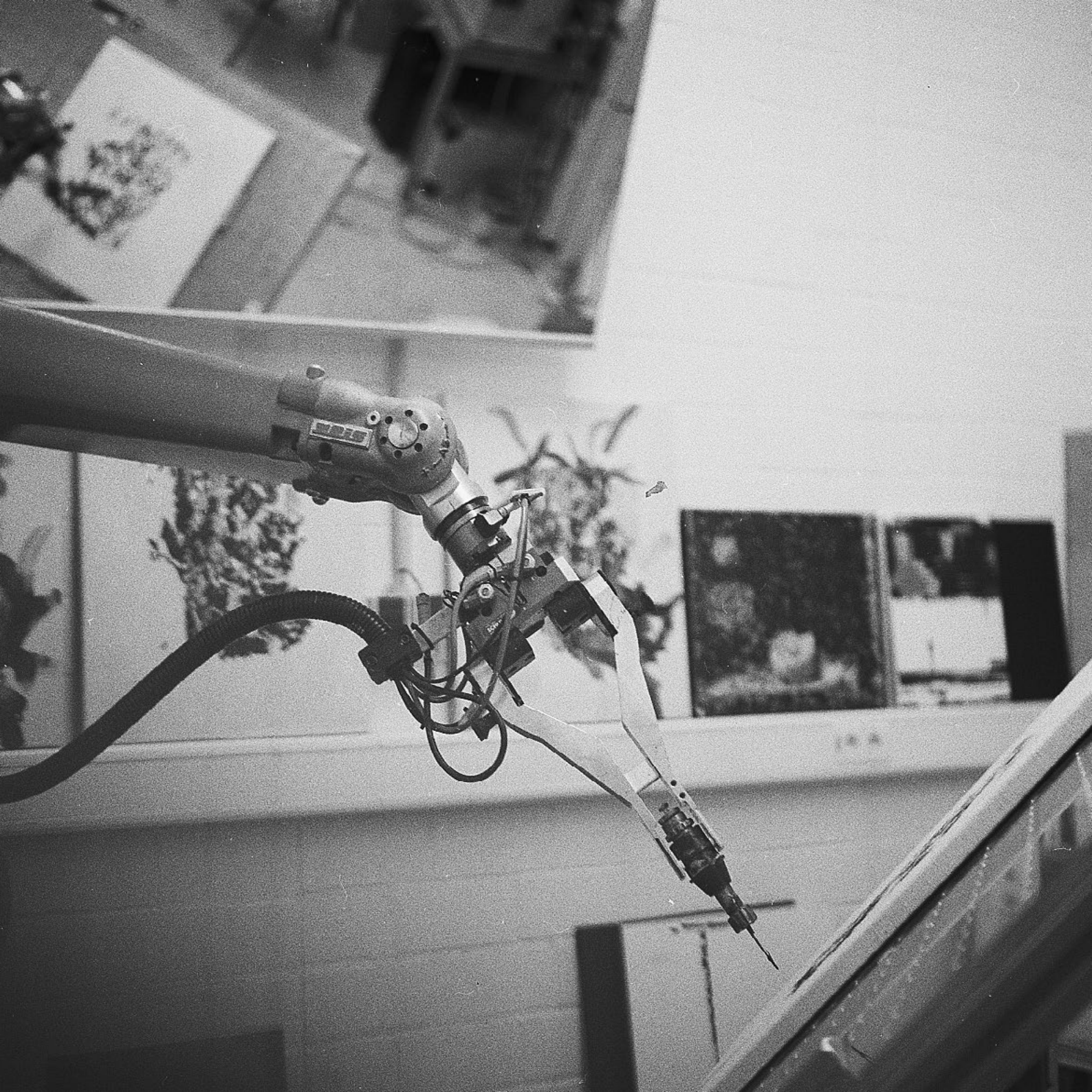
SAMSUNG

e-David

In 2008, Oliver Deussen (Visual Computing) built an Electronic Drawing Apparatus for Vivid Image Display at the University of Konstanz. The e-David is a robotic painting system that self-supervises using a visual feedback loop that allows it to compare the current state of the canvas or paper with a digital reference. It is intended as a cross-disciplinary research platform in which arts, informatics and robotics converge. The project addresses questions such as the potential and intentions of creating a painting machine that can implement both human and computational models of decision-making in an interactive, real and simulated world. Depending on the context, the system supports various hardware implementations, ranging from industrial welding robots to much simpler XY plotters. e-David is capable of both autonomous painting and collaboration with human painters.

Thomas Lindemeier worked on the optimization of the system, colour calibration and autonomous, image-based processes through 2018. Marvin Gülzow has been integrating adaptability, interactivity and transportability into the e-David since 2018.



Liat Grayver

Liat Grayver (Kfar Yehezkel, Israel) is a cross-disciplinary painter and media artist, investigating methods to redefine one of the primitive forms of art — painting — within the current technology-based era. Grayver studied at the Academy of Fine Arts Leipzig (HGB). During her master's degree (Diplom) in painting under Heribert C. Ottersbach, she was also an Erasmus exchange student at the Accademia di Belle Arti (Napoli, Italy). In 2018, she completed her doctoral studies (Meisterschülerin) in Media Art under Joachim Blank at the HGB. Since 2014, Liat Gravyer is based and working in Berlin.

Grayver's academic education has been complemented by a range of private studies and courses, including consultations with Neo Rauch (Leipzig, Germany), the Shiboku Studio for Japanese calligraphy (Haifa, Israel) and the Jerusalem Studio School of Painting and Drawing (Israel). She has been invited to undertake several artist residencies, among them: a "Cultural Foundations of Social Integration" fellowship at the Centre of Excellence of the University of Konstanz (Germany) in 2018–19; a Vertigo STARTS Residency at Casa Paganini | Infomus (Genova, Italy) in 2018; research into robotics at MIT (Cambridge, USA) in 2015; the Art Students League (New York City) in 2014.

Various institutions, including Vertigo STARTS (European Commission), the Centre of Excellence Konstanz, Dagesh Kunstlab and the Jewish Museum Berlin, ELES Studienwerk, Leonardo-Büro Sachsen and the DAAD have supported Grayver's work and studies. She has been invited as a guest artist to give presentations on the use of robotics and technologies in the visual arts at a range of institutions, including Goldsmiths (University of London, 2019), Centre Pompidou (Paris, 2019), Aalto University (Helsinki, 2019), MIT (Cambridge, USA, 2015) and the 35th Chaos Communication Congress (Leipzig, 2018), among others.

Liat Grayver is the recipient of the 1st Dagesh Kunstpreis (2018) from the Jewish Museum Berlin and ELES. She was a finalist for the 2017 Edition F Award, which recognizes the social, cultural and technological innovations of 25 women in Germany. The painting she did in collaboration with the e-David team, "Homage to Jackson Pollock," was awarded Fourth Prize in the 2017 international Robot Art competition.

Since January 2016, Liat Grayver has been collaborating with the University of Konstanz on the e-David project, exploring various approaches to integrate robotic and computer languages in the processes of painting and creative image-making. In 2018, with Marvin Gülzow and Oliver Deussen, she co-authored "Self-Improving Robotic Brushstroke Replication," published by MDPI journal.

Her works have been exhibited in a range of international museums, galleries and institutions, including solo exhibitions at the Jewish Museum Berlin, Exgirlfriend Gallery Berlin, Weizmann Institute of Science (Rehovot, Israel), Kurt-Tucholsky-Literaturmuseum (Rheinsberg, Germany) and Halle 14 (Leipziger Baumwollspinnerei), and in group shows at the Museum der Arbeit (Hamburg), NRW Forum (Düsseldorf), Fresh Paint Art Fair (Steinhardt Museum of Natural History, Tel Aviv), Museum of the Printing Arts Leipzig and Chung-Ang University's Gallery 301 (Seoul).

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Many thanks are due to the Exgirlfriend Gallery Berlin, Halle 14 (Leipziger Baumwollspinnerei) and Casa Paganini | Infomus for hosting exhibitions featuring the works presented in this catalogue.

Video and media artist Marcus Nebe has been a close and valued colleague since 2016. He collaborated on the creation of the video works for *Traversing the Threshold* (2018), produced the videos for *Brushstrokes in the Digital Age* (2017), and assisted with the exhibition and produced the video documentation of *Transhuman Expression* (2019).

Thanks to Jef Chippewa for his support in the construction of the hanging frames for *Traversing the Threshold* and the installation of various exhibitions over the years.

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