Michaelina Wautier's *Flower Garland with Butterfly* Investigated: Technical Studies as a Source for Scholarship on Early Modern Women

Kirsten Derks, Koen Janssens, Katlijne Van der Stighelen, and Geert Van der Snickt

Kirsten Derks obtained her PhD in Art History and Sciences (KU Leuven and University of Antwerp) in 2023. Her PhD focused on the materials and techniques of Brussels Baroque artists such as Michael Sweerts and Michaelina Wautier. Before that, she obtained a BA in Art History (Radboud University Nijmegen) and a master's in Technical Art History (University of Amsterdam). In 2023-2024, Kirsten was the Flanders State of the Art Postdoctoral Research Fellow at the Center for Netherlandish Art (Museum of Fine Arts Boston), where she conducted technical research into the works of seventeenth-century Dutch and Flemish women painters. She is currently an FWO junior postdoctoral fellow at the University of Antwerp, where she continues her technical research into seventeenth-century Dutch and Flemish women painters.

Koen Janssens is full professor of general and analytical chemistry at the University of Antwerp in Belgium. He received his PhD in 1989 on a thesis dealing with the use of artificial intelligence techniques for automated treatment of X-ray analysis data. Since then, he has made use of strongly focused X-ray micro- and nano-beams for non-destructive material analysis. Janssens is (co)author of c. 300 scientific papers and has served as (co)editor of four scientific books dealing with non-destructive analysis in the cultural heritage area. From 2015 to 2021 he was vice-dean of the Faculty of Science of the University of Antwerp. In 2016, he was appointed 'Senior Scientist' (hon.) at the Rijksmuseum, Amsterdam.

Katlijne Van der Stighelen is professor emerita in Art History at KU Leuven. She has worked extensively on Anthony Van Dyck, Cornelis de Vos, and Michaelina Wautier. In 1999 she co-curated the first exhibition on women artists in Belgium and The Netherlands, entitled *Elck zijn waerom*. Meanwhile, she published widely on different aspects of Flemish art in general and Flemish portraiture in particular. In 2018, she curated an exhibition on Michaelina Wautier in the MAS Museum in Antwerp. She recently completed volume XIX.3. of the *Corpus Rubenianum Ludwig Burchard*, on Rubens's unidentified portraits. She is currently collaborating on an exhibition on Michaelina Wautier at the

DOI 10.51750/emlc.23025 - URL: http://www.emlc-journal.org
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Kunsthistorisches Museum in Vienna and The Royal Academy in London (2025-2026) and will co-curate with Anna Orlando the exhibition Van Dyck l'Europeo at the Palazzo Ducale in Genoa, opening in Spring 2026.

Geert Van der Snickt received his Master's in Conservation-Restoration in 2003 at the University of Antwerp. Shortly after, he affiliated with the Department of Chemistry of the same institute. In 2012, he successfully defended his PhD thesis *James Ensor's pigments studied by means of portable and synchrotron radiation-based analysis. Identification, evolution and degradation*, guided by professor Koen Janssens. From 2014 to 2018 he held a Chair on Chemical Imaging for the Arts within the same group. In 2019, he returned to the Conservation-Restoration department by accepting a position as tenure track professor.

Abstract

While the field of technical art history has progressed tremendously over the last decades, there has been little technical research into paintings made by early modern women artists. As archival and documentary evidence on these women is often scarce, the objects made by them are our best sources for learning more about them as artists. This article explores the potential of this methodology: how can technical examinations of paintings provide us with more information on women artists, and more specifically their studio practice, training, and artistic and professional network? Michaelina Wautier's *Flower Garland with Butterfly* serves as a case study. Technical research into this painting revealed a clear technical influence of Antwerp-based specialised flower painters on the materials and painting techniques employed by Wautier. The way Wautier used a lay-in to prepare the composition shows many similarities with a specific painting technique developed and employed by specialised flower painters from Antwerp. Moreover, Wautier's use of the pigment orpiment shows more of this technical influence from flower painters.

Keywords: technical art history, MA-XRF scanning, Michaelina Wautier, flower still life painting, painting techniques

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Michaelina Wautier (1614-1689) was one of the most exceptional women artists of the seventeenth century. While she is mostly known for her history pieces, portraits, and genre pieces, she also produced still life paintings of flowers. Two flower paintings by Wautier, considered to be pendant paintings, have come down to us.[1] Both are signed and dated 'Michaelina Wautier fecit 1652'. One of them, *Flower Garland with Butterfly*, is the central starting point of this essay. This painting was examined to gain a better understanding of Wautier's working methods when painting flower still lifes.[2]

Flower Garland with Butterfly shows a floral wreath hanging from two animal skulls against a dark brown, undefined background (fig. 1). The skulls, probably oxen, are incorporated into architectural elements. It is unclear how the garland is attached to the skulls, as no ribbons or rope can be seen. The flower garland is composed of several different flowers of varying size and colour. The main flowers are pink and white roses, but the garland also includes pot marigolds, carnations, pansies, sweet williams, larkspur, feverfew, common jasmine, common broom, and calla lily or white morning glory.[3] The flowers are all attached to a garland of ivy, above which a white butterfly is depicted. Wautier signed her work in the upper right corner of the painting, on the architectural element.

1 Van der Stighelen, *Michaelina Wautier*, 254. Research for this article was funded by FWO (project no. GOD2618N and project no. 1215625N). It was also made possible by the Flanders State of the Art Fellowship programme at the Center for Netherlandish Art, which is generously supported by the Government of Flanders. The founders of the Center for Netherlandish Art are Rose-Marie and Eijk van Otterloo and Susan and Matthew Weatherbie. The authors gratefully acknowledge the involved parties for the opportunity to examine the painting: the anonymous owner of Michaelina Wautier's *Flower Garland with Butterfly* and the Noordbrabants Museum. We would like to extend particular thanks to Ingrid Sonderen and Susanne Stangier.

2 For a more in-depth discussion of the technical examination of *Flower Garland with Butterfly*, see Derks et al., 'Garland Galore'.

3 Derks, *Scanning*, I, 174-175. For the identification of the flowers we consulted Paul Van den Bremt, a research scientist in historical ecology at the Flemish Heritage Institute in Brussels.

Fig. 1 Michaelina Wautier, Flower Garland with Butterfly, *1652, oil on panel, 42 × 57 cm, Den Bosch, Noordbrabants Museum (loan from a private collection).*

Wautier's *Flower Garland with Butterfly* holds a special place within her oeuvre, as it is one of only two flower paintings known to be made by her. It is generally accepted that Wautier learned the tricks of the trade from her brother Charles (1609-1703), who was also a painter. However, it should be noted that he never seemed to have painted flowers. This raises the question of Wautier's sources when painting her *Flower Garland*. In any case, the painting fits perfectly within the development of flower painting as a genre, and more specifically within that of flower garlands. Wautier's *Flower Garland* is dated 1652, which is relatively soon after the introduction of autonomous flower garlands as a sub-genre of flower still life painting in the mid-1640s by Daniël Seghers (1590-1661).[4] This sub-genre was practiced almost exclusively in the Southern Netherlands and can be considered a typical Antwerp speciality: garlands made by Dutch artists are almost completely absent from art history.[5]

Michaelina Wautier's *Flower Garland with Butterfly* was examined with MA-XRF scanning in June 2021.[6] The result of this scan was a multitude of elemental maps, each for every element detected in the painting. The elemental maps are grayscale images which show the distribution of that element: white indicates the areas richest in the particular element, while black indicates that the element was not detected. Furthermore, *Flower*

4 Segal and Alen, *Dutch and Flemish Flower Pieces*, 263; Van der Stighelen, *Michaelina Wautier*, 256; Merriam, *Garland Paintings*, 4-5, 91, 107-124; Mertens and Aumann, *Krijg en kunst*, 167, 288-289.

5 Segal and Alen, *Dutch and Flemish Flower Pieces*, 94; Van Dorst, *Bloemenvaas*, 31.

6 MA-XRF is a non-invasive imaging technique based on X-ray fluorescence (XRF). This analytical technique allows for the collection of elemental information about the materials present in a work of art. It has been an invaluable way to investigate an artist's palette. MA-XRF scanning can reveal the distribution of elements in surface and subsurface layers, allowing in many cases for the identification of pigments used, as well as the visualisation

Garland with Butterfly also underwent a thorough visual examination.[7] In addition to this, one paint sample was collected and prepared as a cross-section.[8] This cross-section was studied under several lighting conditions to gain a better understanding of the layer build-up as well as the pigments used in the painting.

So far, very little technical research has been carried out into works made by women.[9] However, we believe that technical examinations of their paintings can provide us with more information on women artists, and more specifically their studio practice, training, and artistic and professional network. In this paper, we explore this methodology with Wautier's *Flower Garland with Butterfly* serving as a case study.[10] The elemental distribution maps of MA-XRF scanning, combined with the thorough microscopic examination of the painting and analysis of a paint sample taken from a strategic location, provided us with a wealth of information on Wautier's painting techniques.[11] As will become clear, it was possible to establish a connection between Wautier and specialised Antwerp painters through a thorough technical analysis of her *Flower Garland*.

Abstract Patches as Preparation

The MA-XRF maps gave us more information about the way Wautier built up her composition. In this aspect, the mercury distribution map is the most interesting. Mercury is

of preparatory stages and pentimenti underneath the surface. For more on MA-XRF scanning and XRF spectroscopy, see Van der Snickt et al., 'In situ macro X-ray fluorescence (MA-XRF) scanning'; Alfeld, *Development of scanning*; Dik et al., 'Visualization of a Lost Painting'. MA-XRF examination of *Flower Garland with Butterfly* was carried out by Kirsten Derks, using the AXIL scanner. This is a mobile MA-XRF scanner built in-house by the AXIS research group at the University of Antwerp. This scanner consists of a 50W molybdenum anode microfocus X-ray tube (XOS X-Beam Powerflux), a fixed polycarpellary lens and a silicon drift diode (SDD) detector. This is all mounted on an X and Y motorised stage. The maximum scan area measures circa 57 by 57 cm in a single scan. The X-ray source is generally operated at 50 kV voltage and 1 mA current. The working distance between the surface of the painting and the X-ray tube was generally set at circa 20-25 mm. The data collected with the AXIL scanner were processed into elemental distribution maps using the data analysis software packages PyMca (Python Multichannel Analyzer) and Datamuncher Gamma 1.4.

7 For the visual examination, carried out by Kirsten Derks, a head loupe and a handheld monocular were used. The head loupe is of the type OptiVISOR DA-10, with a magnification of 3.5 times. The monocular was an Eschenbach VarioPLUS Prism monocular, type 1674-820, with a magnification of up to 25 times. This monocular was converted to a stand magnifier using its plastic stand.

8 The paint sample was taken by Susanne Stangier, conservator of the Noordbrabants Museum. Kirsten Derks embedded it into a resin and made it into a cross-section. The resin used was the Epofix resin.

9 Most of the published technical research into women are case studies, like Tummers, *Judith Leyster*. Derks has carried out extensive research into the artistic practice of Wautier (see Derks, *Scanning*). Currently, several institutions are collaborating in a research project into the artistic practice of Rachel Ruysch. These institutions include the Museum of Fine Arts Boston, the Fitzwilliam Museum (Cambridge), and the Alte Pinakothek (Munich).

10 This painting was examined in the context of an FWO funded PhD research project (project no. GOD2618N), which resulted in Derks's doctoral dissertation, see Derks, *Scanning*. For more information on this, see: https://researchportal.be/en/project/screening-michael-sweerts-en-michaelina-wautier-added-value-advanced-imaging-characterising/ (Accessed on 18 March 2025). In this project, two artists were studied: Michael Sweerts (1618-1664) and Michaelina Wautier.

11 For more results of the MA-XRF examination of *Flower Garland with Butterfly*, see Derks, *Scanning*, I, 159-204, and II, 267-279.

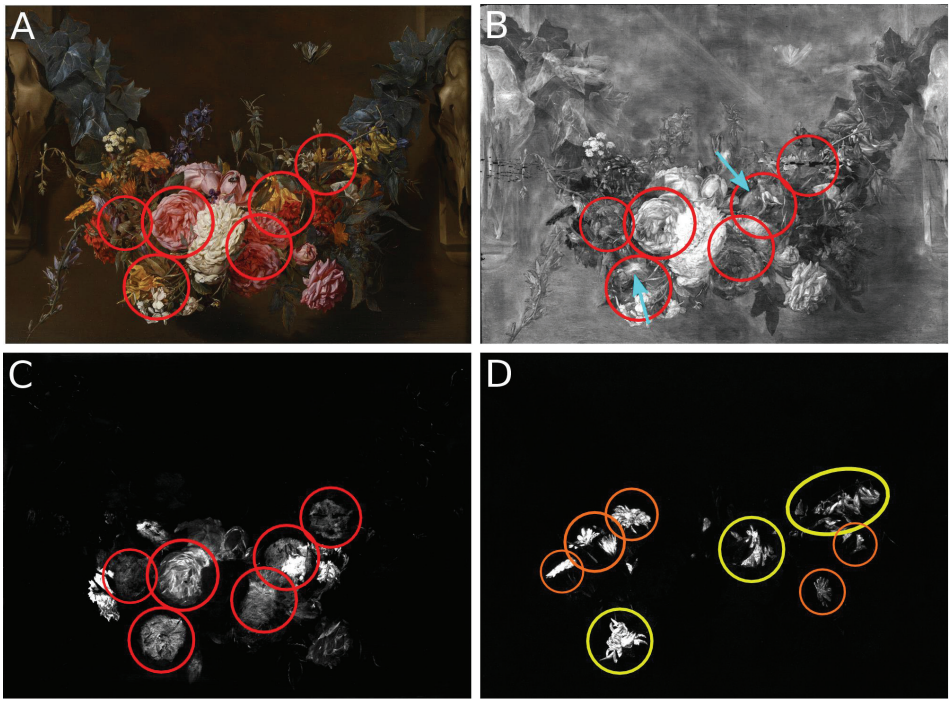

Fig. 2 (A) Michaelina Wautier, Flower Garland with Butterfly, *1652, oil on panel, 42 × 57 cm, Den Bosch, Noordbrabants Museum (loan from a private collection). (B-D)* MA-XRF *maps of fig. 2A: (B) Lead (Pb-L) map; (C) Mercury (Hg-L) map; (D) Arsenic (As-K) map. The red circles indicate the areas where a vermilion-based underpainting was used to prepare for roses. The blue arrows indicate where this lay-in for the roses is also visible in the lead map. The orange circles in fig. 2D indicate the orange flowers painted with an arsenic-based paint (orpiment and/or realgar?). The yellow circles indicate the yellow flowers painted with orpiment.*

one of the main constituents of the bright orangey-red pigment vermilion. The Hg-L map (fig. 2C) visualises the distribution of the pigment vermilion throughout the painting. In this map, it can be seen that vermilion is present in several areas, including areas where no red colour is visible to the naked eye. Rounded shapes rich in mercury are evenly distributed along the garland. This indicates that Wautier may have prepared multiple (red or pink) flowers with a vermilion underpainting or dead-colouring in the early painting stage. Some of these flowers were discarded later in the creative process.

The round patches rich in mercury do not have a well-defined shape.[12] This means they only roughly indicate the final shape and placement of the flower. Wautier seemed to have applied this dead-colouring rather thinly. Moreover, these mercury-rich patches do not show up in any other elemental maps, with the exception of the lead (Pb-L) map: a few of these patches,

12 This may be due to a number of reasons, including the scanning conditions (the set dwell time per pixel and step size during scanning), as well as the interference of the surface layers with the signal from the mercury in the subsurface layers.

or parts of them, are also visible in the Pb-L map (fig. 2B). This indicates that Wautier used a monochrome red or pink paint based on vermilion mixed with some lead white to apply this lay-in. This lay-in was intended to be worked up in a later stage of the creative process.

A paint sample taken in a strategic area confirms this layer build-up in the area of the pink roses (fig. 3). The cross-section shows that on top of the *imprimatura* (layer 3,

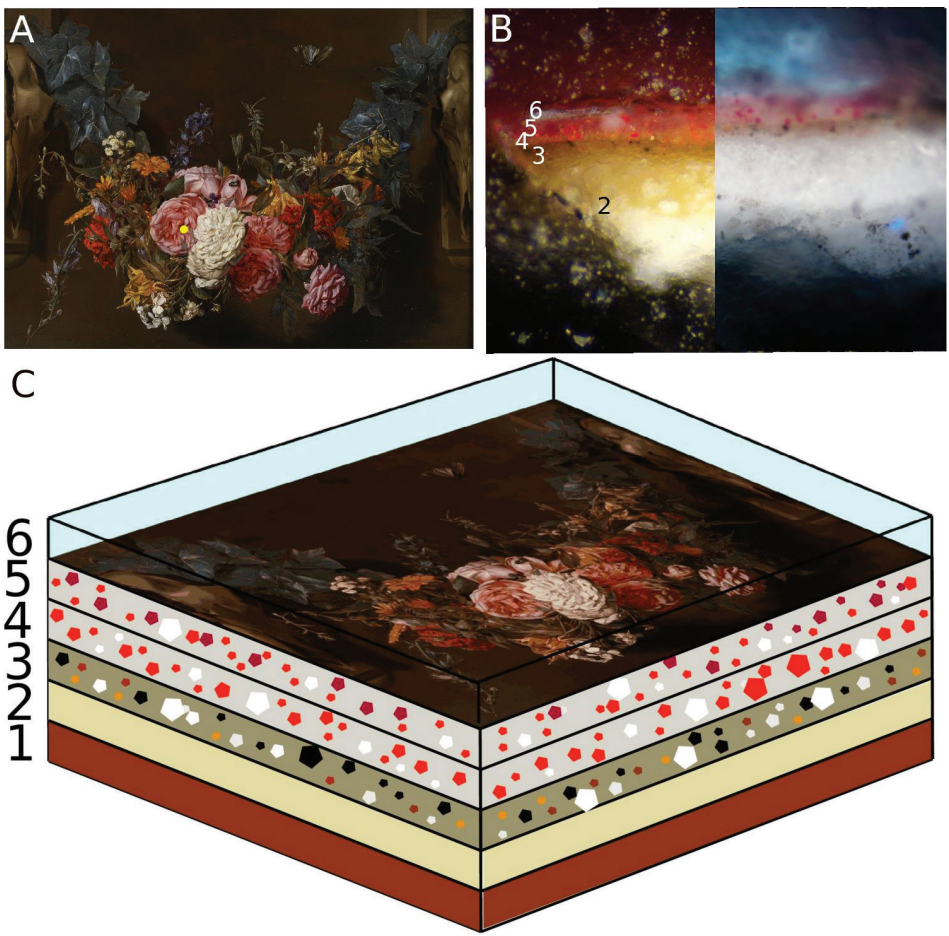

Fig. 3 (A) Michaelina Wautier, Flower Garland with Butterfly, *1652, oil on panel, 42 × 57 cm, Den Bosch, Noordbrabants Museum (loan from a private collection). The yellow dot indicates the spot where the paint sample (HNBM99.422X001) was taken. (B) Paint cross-section HNBM99.422X001, Bright Field (left) and UV (right), magnification 50×. (C) Schematic overview of the layer build-up of* Flower Garland with Butterfly. *Layer 1 is the wooden panel. Layer 2 indicates the chalk and glue ground used to prepare the panel. On top of that, a greyish* imprimatura *was applied (layer 3). This layer consists of lead white, some earth pigments, and some carbon black. Layer 4 corresponds with the bright orangey-red lay-in. It consists of lead white and vermilion, and perhaps also some red lake. Layer 5 is a deeper red paint layer, consisting mostly of red lake pigment. This is applied to work up the monochrome lay-in of layer 4. Layer 6 is a varnish layer.*

figs. 3B-3C), Wautier applied a red or pink coloured underpainting as preparation for the rose (layer 4). This lay-in consists of vermilion and a little lead white. Another paint layer (layer 5), consisting of mostly red lake, some lead white, and vermilion, was applied on top of this underpainting.[13] This paint layer, of a deeper red colour, was applied to work up the rose and deepen the shadows. The layer build-up of the cross-section thus confirms the hypothesis that Wautier used a monochrome lay-in as preparation for the flowers, followed by one or multiple paint layers to work up the colours.[14]

This painting technique of using brightly-coloured, abstract patches was first introduced by one of the most eminent flower painters of the seventeenth century, Daniël Seghers (1590-1661).[15] It remains unclear exactly when this painting technique was introduced, however; Seghers's predecessors (such as Jan Brueghel the Elder) did not use this technique.[16] The technique was subsequently adopted by other specialised flower painters, including Jan Davidsz. de Heem (1606-1684).[17]

It is interesting to consider how or where Wautier learnt this painting technique in such a way that she was able to employ it herself. We know virtually nothing about Wautier's life and artistic training. She was not a member of the Brussels guild of painters, goldbeaters, and stained-glass makers. This was not uncommon in the seventeenth century: only a few women painters became guild members in the Low Countries.[18] Women were also restricted in their access to artistic training. Drawing formed the foundation of an artist's education in the seventeenth century: students drew from drawings, paintings, prints, and sculpture, and eventually from life.[19] These drawing sessions, however, were not accessible to women. This does not mean that artistic women did not have any opportunities. In this period, women could become a painter and they could access artistic training in one of two ways: they either had a male family member (usually their father or brother) who was a painter and could teach them in their own studio, or they were born in a wealthy family that valued and paid for artistic training as part of the general education for their daughters.[20]

In the case of Wautier, it is generally assumed that she learned how to paint from her brother Charles, who was a successful artist himself. She probably learned (most of) the

13 The identification of the pigments is based on visual characteristics. More research is needed to confirm the identification.

14 In the cross-section, only one paint layer was found on top of the monochrome lay-in, but it may be possible that Wautier used multiple paint layers to work up the flowers in other areas. The paint sample is not necessarily representative of the entire painting.

15 Van Dorst, *Bloemenvaas*; Van Dorst, 'Daniël Seghers'; Van Dorst, 'Brueghel, Seghers en de Heem'.

16 Albrecht et al., 'How to paint a bouquet', 8.

17 De Keyser et al., 'Jan Davidsz. de Heem'. Other artists who adopted this technique include Jacob van Hulsdonck (1582-1647), Jan Philip van Thielen (1618-1667), and Jean Baptiste Morel (1662-1732). See Albrecht et al., 'How to paint a bouquet'.

18 Judith Leyster was one of the few women painters to become member of the painter's guild of St. Luke in Haarlem in 1633: Hofrichter, *Judith Leyster*. However, many women were active in the arts: Brosens et al., 'MapTap and Cornelia'. See also Judith Noorman's NWO-funded project 'The Female Impact', www.thefemaleimpact.org (Accessed on 19 March 2025).

19 Yeager-Crasselt, *Michael Sweerts*, 56.

20 Van der Stighelen and Westen (eds.), *Elck zijn waerom*, 27-38; Huet and Grieten, *Oude meesteressen*, 204-206.

tricks of the trade in the setting of her home. At the same time, it seems that Wautier had a great interest in artistic education. This can be deduced from her drawing *Study of an Antique Bust*.[21] This drawing shows that she may have had drawing lessons and studied (Antique) sculpture, much like any other artist in the mid-seventeenth century.[22] Moreover, one of her other paintings suggests that she studied human anatomy, another major component of artistic training. Around 1655, she painted *Triumph of Bacchus*, in which she depicted naked figures convincingly.[23] This shows that she was familiar with painting – and most likely also drawing – naked bodies.[24] It makes one wonder about Wautier's opportunities for artistic training: did Charles help her and perhaps acted as a mediator in getting the proper training that a painter with Wautier's talent needed?

This interest in artistic training may have led her to look for the 'proper way' to paint flower still lifes when she decided to take on that particular challenge. But this may not have been the only reason: Charles never painted flower still lifes or any flowers at all. If Wautier wanted to learn how to paint flowers, she had to look for additional artistic training elsewhere in her social and artistic network, outside of her own home. By the mid-seventeenth century, when Wautier took on the challenge of painting her flower garlands, the Antwerp specialists Seghers and De Heem were some of the most influential and eminent flower painters in the Low Countries. It seems likely that Wautier turned to their work for inspiration, and perhaps also to the artists themselves for advice on painting materials and techniques.

It is possible that Wautier had the chance to converse with Seghers on how to paint flowers. The Wautier siblings were both very well-connected artists at the court of Archduke Leopold Wilhelm of Austria (1614-1662).[25] Leopold Wilhelm was an avid art lover and collector, and seemed to have a preference for flower still life painting: by 1659, his collection contained no fewer than 135 flower pieces.[26] He seemed to have been particularly fond of the work of Seghers, as his collection contained several of Seghers's paintings and he even visited the artist in his studio in 1648.[27]

It is through her connection with the archduke that Wautier may have had the opportunity to study the work of Seghers, or even may have met the Antwerp-based flower painter. This even raises the question of whether Wautier joined Leopold Wilhelm on his trip to Seghers's studio in 1648. By that time, Wautier was already a well-established portraitist

21 Michaelina Wautier, *Study of an Antique Bust*, c. 1650-1660, black, white, and ochre-coloured chalk on paper, 4,3 × 2,83 cm, private collection (Belgium). Signed on the reverse: 'Michaelina Wautier fecit'.

22 Van der Stighelen, *Michaelina Wautier*, 234-237.

23 Michaelina Wautier, *Triumph of Bacchus*, c. 1655, oil on canvas, 27 × 35,4 cm, Vienna, Kunsthistorisches Museum.

24 Van der Stighelen, *Michaelina Wautier*, 148-149.

25 Leopold Wilhelm probably commissioned Wautier's monumental *Triumph of Bacchus*. Moreover, by 1659, when Jan Anton van der Baren drew up the archduke's inventory, he owned no fewer than three paintings by Michaelina Wautier. That Charles also had strong ties with Leopold Wilhelm's court is demonstrated by the fact that he painted several portraits of the archduke and other courtiers.

26 Mertens and Aumann, *Krijg en kunst*, 91.

27 Mertens and Aumann, *Krijg en kunst*, 90-91; Van der Stighelen, *Michaelina Wautier*, 136-138.

at the court.[28] Moreover, this trip took place only a few years before Wautier painted her flower garlands. It is possible that Leopold Wilhelm, being a fan of Wautier's work, took her on as a protégé and introduced her to (the work of) Seghers.

Material Influence of Antwerp Flower Painters

MA-XRF scanning revealed the presence of a specific range of arsenic sulphide pigments, namely yellow orpiment and/or red realgar.[29] Both pigments can be identified by MA-XRF scanning due to the elemental presence of arsenic and sulphur content, which were both detected in the orange and yellow flowers in *Flower Garland with Butterfly* (figs. 2C-2D). This implies that orpiment was used for the yellow flowers, but that either realgar or various paint mixtures including orpiment and/or realgar might have been used for the orange.[30] Pinpointing the exact pigments would require further (invasive) chemical analysis, which is beyond of the scope of this essay.

It is remarkable that orpiment was found in Wautier's *Flower Garland with Butterfly* for multiple reasons. Firstly, it has not been positively identified in any other painting by Wautier.[31] This suggests that she considered it necessary to use it in her flower still life, either for its colour or for the artistic effects that could be achieved with the pigment. Secondly, working with these pigments is not straightforward. While acknowledging its beautiful, golden yellow colour, authors of seventeenth-century art technological sources warn their readers of the difficulties of working with orpiment. It discolours easily and is incompatible with lead- and copper-containing pigments.[32] The safe and successful use of orpiment required the artist to possess extensive knowledge and experience. This may also be the reason why many painters turned to alternatives for orpiment, such as lead-tin yellow.[33]

28 Wautier painted several portraits of courtiers, including the portrait of Andrea Cantelmo, made in or before 1643: Van der Stighelen, *Michaelina Wautier*, 156.

29 Orpiment and realgar are both arsenic sulphide pigments. They are similar in elemental composition, and MA-XRF scanning is not able to distinguish between the two. They can be distinguished visually, as orpiment is a yellow and realgar a red pigment. Orpiment has been used in both its natural and artificial form in painting. It seems to have been employed in European art from the ninth to the late nineteenth century. In scholarship, realgar has not often been positively identified in paintings; only a few instances of its use in European painting have been noted: West FitzHugh, 'Orpiment and Realgar', 47-51.

30 The main component in both the orange and the yellow flowers is arsenic, indicating that Wautier probably used orpiment and/or realgar to create these flowers. However, other elements were also detected in these flowers. The orange flowers also contain some iron and lead, indicating that Wautier may have used earth pigments and lead-based pigments (most likely lead white) in the orange paint mix as well. Besides arsenic, the yellow flowers also contain lead and calcium. This indicates that Wautier may have used a lead-based pigment (lead white or lead-tin yellow) to create the highlights in these flowers, and perhaps a yellow lake pigment to create their deeper yellow tones. See also Derks et al., 'Garland Galore'; Derks, *Scanning*, I, 181-182, 198-200, and II, 267-280. Recent research has shown that artists like Rembrandt did use arsenic-sulphide pigments (realgar, pararealgar, and orpiment) in combination with several other pigments: De Keyser et al., 'Discovery of pararealgar'.

31 Although orpiment has not been identified in any other paintings by Wautier, its presence in her *Triumph of Bacchus* is suspected. More analysis is needed to confirm this.

32 This incompatibility has been described from the twelfth century onwards, for instance in *Mappae clavicula* (twelfth century), Cennino Cennini's *Il Libro dell' Arte* (c. 1400), and Karel van Mander's *Schilderboeck* (1604).

33 Thompson, *Materials and Techniques*, 178.

Although many authors of art technological sources advised against using orpiment, the pigment is often found to be present in (flower) still lifes, albeit in degraded and/or discoloured form. Specialised flower painters made use of its ideal paint properties to create luminous golden highlights on their flowers and fruits or on golden metalwork.[34] The main goal for flower painters was to achieve and imitate the perfect surface textures and the accurate appearance of objects. To do this, they needed a systematic approach, a fine and detailed painting technique, and also a wide variety of pigments. A flower painter was able to achieve certain artistic effects with orpiment that could not be achieved with different (yellow) pigments.

The fact that Wautier used orpiment, and possibly also realgar, for her *Flower Garland with Butterfly* thus indicates the influence of specialised flower painters on her use of materials. She adapted their palette, including the pigments that are tricky to work with. This choice for orpiment must have been a conscious one: Wautier probably considered it necessary to create the golden yellow and orange colour of the flowers and found that other yellow pigments would not suffice. Moreover, our hypothesis is strengthened by the fact that, so far, orpiment has also not been identified in any painting by her brother Charles.[35] This hints to the possibility that Wautier received additional artistic training from another artist, and more specifically on how to work with the difficult pigment orpiment.

The orpiment in Wautier's flower garland painting has remained in relatively good condition. This is quite remarkable: in many seventeenth-century flower still lifes, the orpiment has discoloured severely, resulting in loss of definition and three-dimensionality in some of the flowers.[36] The fact that the yellow and orange flowers in Wautier's *Flower Garland with Butterfly* have been well-preserved indicates that Wautier was skilled in working with this pigment. This knowledge was not self-evident and as Wautier had never used this pigment before, it suggests she may have had access to knowledgeable sources regarding the use of orpiment. Considering that she may have been inspired by his artistic practice regarding the build-up of flower still lifes, it could be possible that she also learned how to work with orpiment from Seghers.

Conclusion

While the field of technical art history has progressed tremendously over the last decades, very few paintings made by women painters have yet been studied with technical means. We virtually know nothing of the studio practice and painting techniques of these women. However, as we have shown in this essay, technical studies into their paintings can help in our understanding of them, as well as shed more light on women painters' artistic training and professional network, and perhaps reveal (unexpected) technical influences between

34 De Keyser et al., 'Jan Davidsz. de Heem'; De Keyser et al., 'Reviving degraded colors'.

35 It should be noted that almost no technical analyses have been carried out into the works of Charles Wautier. However, the typical bright golden yellow colour of orpiment cannot be found in the paintings of Charles, indicating that it is unlikely that he used this pigment.

36 Orpiment has a tendency to degrade and/or discolour over time, as can be seen in many seventeenth-century (flower) still life paintings: De Keyser et al., 'Reviving degraded colors'.

artists. It can give us a firmer grasp on how and where artistic techniques circulated among painters: similarities in specific painting techniques between women painters and their male peers could indicate that they may have been in contact with each other.

The technical research into Michaelina Wautier's *Flower Garland with Butterfly* has revealed that the painting shows influences of the work of Daniël Seghers, not only iconographically, but more importantly in the way Wautier used her materials and painting techniques. While it is assumed that she received her artistic training from her brother Charles, it is unlikely that she learned how to paint flower still lifes from him, as he never painted flowers. Wautier may have found alternative ways of receiving additional artistic training, and it seems likely that she learned how to paint flowers from another artist, perhaps Seghers. The technical examinations of *Flower Garland with Butterfly* thus shed more light on Wautier's professional network: not only was she familiar with Seghers's work, but she also may have had access to his studio and the artist himself. This connection is important to stress, as it gives us an insight into Wautier's dedication and artistic ambition.

While traditional art historical approaches have proven inadequate in allowing for a thorough understanding of the artistic practice and network of early modern women artists, technical studies may be a fruitful research avenue to uncover more about these women. And indeed, the case study of Wautier's *Flower Garland with Butterfly* shows that the approach works. This object-based approach may help in our understanding of their studio practice, their working methods, but also their artistic training and professional network.

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