

# EXAMINATION OF CALLIGRAPHY IN IRANIAN ISLAMIC TEXTILES

Narges Nohekhan Baigy<sup>1\*</sup>

<sup>1\*</sup>Iran\_Noshahr\_Kamallolmolk Textile Clothing Design.

Corresponding Author:<sup>1\*</sup>nohekhan@aftermail.ir

NargesNohekhanBaigy. Examination of Calligraphy in Iranian Islamic Textiles--Palarch's Journal of Archaeology of Egypt/Egyptology 18(4), 7664-7678. ISSN 1567-214x

Keywords: Calligraphy, Iranian Islamic Textiles, Artistic Traditions.

### Abstract

Because the beauty of art is important in establishing the art of a land and shaping the image of visual and conceptual traditions, applied arts have carried the same concepts at the grassroots level and are the most important means of transmitting culture among ancient nations. In fact, the cause of the unity of artistic traditions and the expansion of themes in Iranian art should be sought in this connection between the arts. In some periods, we even encounter artists who have dealt with both fields of art. Therefore, the present article was conducted with the aim of examining the visual and graphic values of calligraphy with their meaning and concept in terms of changing the macro approaches of Iranian Islamic art and the change and evolution of this dynamic and living art. Therefore, the present study examines the place of calligraphy in Iranian Islamic textiles. In this regard, the three remaining calligraphy examples from the Al-Buwayh, Seljuk and Safavid eras are examined visually and graphically. This study examines the differences between calligraphy in terms of shape and content, the effect of Islamic and Iranian cultures on the patterns of textile calligraphy and the relationship between visual and graphic values of calligraphy with their meaning and concept. Information about customs, culture, art and textiles was collected through libraries and finally the Al-Buwayh, Seljuk and Safavid eras were studied historically, culturally and artistically using historical-analytical methods. At the end of this research, a scientific, symbolic and comparative study of textile calligraphy in the three mentioned periods is done and by comparing calligraphy, we point out their differences in terms of shape and content. According to the research findings, it can be concluded that calligraphy in textiles of these periods, in addition to practical and aesthetic aspects, also had a conceptual and symbolic aspect.

# **INTRODUCTION**

Because the beauty of art is important in establishing the art of a land and shaping the image of visual and conceptual traditions, applied arts have carried the same concepts at the grassroots level and are the most important means of transmitting culture among ancient nations. In fact, the cause of the unity of artistic traditions and the expansion of themes in Iranian art should be sought in this connection between the arts. In some periods, we even encounter artists who have dealt with both fields of art. Therefore, the present article was conducted with the aim of examining the visual and graphic values of calligraphy with their meaning and concept in terms of changing the macro approaches of Iranian Islamic art and the change and evolution of this dynamic and living art (1).

The art of calligraphy and calligraphy is one of the most prominent Iranian Islamic arts and also calligraphy can be considered as the most prominent art in the Islamic lands, and the common artistic language for all Muslims. Calligraphy has always been considered by Muslim artists because it is the art of embodying the word of revelation. In Islamic lands, calligraphy was used not only in writing the Qur'an, but also in most arts such as inscriptions and various handicrafts such as pottery, mosaics, inlays, inlays, metalwork, and textile weaving. In Islamic art, calligraphy and calligraphy can be seen everywhere. They have used a decorative factor(2).

Calligraphy on pottery and metal tools and even the molds and forms of many vessels mainly testify to the role of calligraphy on these vessels. The surviving calligraphy in Persepolis and other historical monuments left over from the Parthian and Sassanid eras all indicate the use of calligraphy in these periods. In fact, a large number of calligraphies, based on their nature, underwent a historical evolution in Iran and remained and infiltrated other periods. Among these periods, we can mention the period of Al-Buwayh, Seljuks and Safavids. Much calligraphy on textiles has reached from the Al-Buwayh period to the Seljuk period and finally to the Safavid period with slight changes in form and execution(3).

Iranian Islamic art can be studied from different aspects, one of which is the study of Iranian textiles, which today has been considered by many researchers from different aspects. Both text and image lead to the creation of valuable works on textiles, and so far each of these categories has been examined separately(4). Therefore, in this article, we intend to examine Iranian textiles visually and graphically with their meaning and concept.

# THE EVOLUTION OF TEXTILES IN THE POST-ISLAMIC PERIOD IN IRAN

In early Islam, weaving methods were used before Islam. Therefore, all the woven textiles during these years were very similar to the pre-Islamic textiles. Simultaneously with the Al-Buwayh era, Iran made significant progress in terms of the textile industry and the variety of textile designs(5). In addition to the demand of the society, the interest of the Umayyad rulers in Iranian textiles was another reason for the development of this industry. In the time of the Umayyads, Shush fabrics, woolen garments and silk curtains were the first in the city of Fasa, silk garments in the Parand of Isfahan and glabtundozi in Tabarestan. In this piece, the fabrics of women's clothes, which were made of Shush silk and red in color with white stripes, are mentioned (6).

After the domination, the Seljuks took over the weaving workshops of Al-Buwayh and used their designs. During the Seljuk period, textiles have a stronger design and texture, and traces of the method of previous periods can still be seen on some of them. One of the special features of Seljuk textiles is the natural landscapes adapted from contemporary painting (7).

From the third century AH, a line appeared on textiles and fabrics called Taraz. The word Taraz means embroidering. The word came from Arabic to describe an honorary dress, as well as a margin that included handwriting. This inscription was usually in the fabric or sewn on it. In the early days of Islam, styles were artistically and politically important and were themselves an important historical source. According to Masoudi, in the early Islamic period, the Pahlavi script and later the Kufic script were woven around the edges of fabrics. The weaving process of such fabrics continued until the beginning of the Mongol invasion in the seventh century AH. These calligraphies were also very effective in changing the style of decoration in Iranian industries (8).

In general, the use of calligraphy in Islamic art was a message of unity among the Muslims of the world; because Islamic culture and civilization became a combination of art and culture of different ethnic groups and nations"(9). In most cases, the proportion between the role and the text in the designs on the textiles was observed. One of the famous textiles of this period is the wool and silk fabric with the role of a double eagle, in which the eagles, despite their small size, are huge due to their abstract design (Figure 1).



**Figure1**The double-horned eagle with the pattern of Kufic lines on the top of the head on this fabric, the phrase "I am the match of the entire precious price" (the one who has the highest effort is more valuable) is repeatedly woven on the wings of the eagles. Also inside the frame around the motifs, the sentence "I seek the original of ZakiFaleh" (one who seeks the original, turns his action into good) can be seen(10). Therefore, according to what has been said, textiles had different uses in the Islamic era. One group of textiles was used to wear clothes with verses and prayers and inscriptions in praise of kings and elders, and another group was used in the form of cloth which included prayers and verses and was used to cover tombstones. Others had cloth as gifts that kings and nobles gave to each other on various occasions.

#### TEXTILE ART AND CRAFT IN THE TIME OF AL-BUWAYH

The Buyid clan was Zaidi Shiites from the DeylamDeylam region (south of the Caspian Sea) who claimed to be pre-Islamic Iranians. The rule of this dynasty for one hundred and twenty years from 320- 932 / H.M. It began and during this period various industries and trades expanded(11).

The areas ruled by the kings of Al-Buwayh were important centers of textile weaving where all kinds of fabrics were woven and the most famous production centers of that time included the cities of Susa, Shushtar, Fars, Rey and Yazd(12). At the same time as the Buyid era, the weaving and design of textiles flourished tremendously; so that among the arts, textile weaving can be considered a symbol of the rise of Iranian artistic support (13). The Buwayhid rulers of this industry included the use of exquisite silk robes as a reward for their subordinates and their special attention as a commercial commodity. Fabric was also very important in terms of customs and luxuries; the clothes of rulers and courtiers were selected from exquisite fabrics and the palaces were decorated with luxurious weaves of this period(14). In the time of Al-Buwayh, the main weaving centers, Merv and Neishabour were the most famous weaving centers. In the time of Al-Buwayh, the production of silk and cotton fabrics were supported.

#### TEXTILE ART AND CRAFT DURING THE SELJUK ERA

The Seljuk rule began in 1032/429 with the Seljuk Tughral domination of Sultan MassoudGhaznavi and continued until 1194/591. The kings of this period were patrons of arts and crafts, and weaving flourished. Factors such as: information of past craftsmen, the existence of common Islamic styles in the region and the influence of Chinese styles in the accurate drawing of plants and animals has been effective in this development(15). The Seljuks religiously defended the interests of the Sunni religion. Finally, the Mongols, by capturing Ray, the capital of the Seljuks, in 6 AH, laid the foundation of their government. With the rise of the Seljuks, the textile industry flourished. During the Seljuk period, unique advances in the field of art emerged that lasted until the Mongol era(16).

The textile industry of the Seljuk period had reached an excellent level in terms of weaving style, initiative of various designs and beautiful colors, and although there are not many pieces of fabrics of that period, but there are enough to show the excellent designs and technical skills of weavers of this era. Their beauty is due to features that are completely different from pre-Seljuk periods, including the fact that the Seljuk weaver, who was not interested in luxurious colors, recognized the contrast of garlic and bright colors and often preferred only two colors. For example, he has used light blue or crimson, black or green on a white or red background.

# TEXTILE ART AND CRAFT IN THE SAFAVID ERA

The Safavid government came to power nine hundred years after the dissolution of the Sassanid government. According to many government scholars, it elevated Islamic Iran to the status of a national government and established the first large and unified government in post-Islamic Iran. The Safavid period was an era of security, authority, economic development and

the growth of culture and art. Agriculture and livestock industries increased so much that Iran at that time was recognized as one of the world's largest exporters. The Safavid period is the most important period of weaving in Iran. The support of the Safavid sultans for this industry and the construction of royal weaving workshops in the capital and the development of trade, especially in the field of various weavings, culminated in the art of weaving during the Safavid period (17). Almost all cities in the Safavid period found a new boom in textile weaving. Areas such as Tabriz, Gorgan, Tabarestan, Azerbaijan, Deylam, Kurdistan and Fars in the texture of silk, Yazd, Shushtar and Fasa in the texture of various types of taffeta, Merv, Neishabour and Isfahan and Shiraz in the texture of cotton and woolen fabrics were very famous (Forouzan) Descent (107).

Decorating gold and silk textiles with Naskh and Nastaliq calligraphy is one of the common methods in the Safavid period and was woven to cover graves or curtains that were used in tombs or holy places. In addition, gold-plated fabrics were used for women's clothing, curtains, or to cover the walls of palaces and the homes of elders.

In the late Safavid era, especially since the reign of Shah Abbas II, plant and animal motifs in the form of flowers and chickens were used as the main design in fabrics (18).

#### LINE ON FABRIC IN THE TIME OF AL-BUWAYH

In the time of Al-Buwayh, the line on textiles appeared in style. The word style also referred to the margin that included handwriting. As the study of textiles shows, in the early Islamic period, the Pahlavi script and later the Kufic script were woven around the edges of fabrics. The process of weaving and calligraphy in such fabrics continued until the beginning of the Mongol invasion in the seventh century AH. These calligraphies were also very effective in changing the style of decoration in Iranian industries. From this period, textiles, including garments, shrouds, and cloth arches, with burial and religious inscriptions have survived. Kufic calligraphy was one of the most common calligraphy in this period, which we also see on the textiles of this period (Figure 2).



Figure 2Kufic Line on Silk (19)

In the picture below, you will see an example of a Kufic line on the shroud of Saint Jose Abu Mansour Bakhtkin.

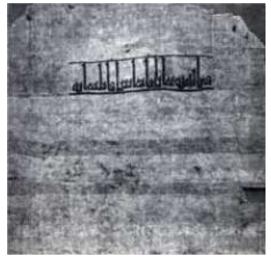


Figure 3Kufic Script on Textiles, Safavid Era

Kings often engraved historical information on style fabrics, so the textiles of this period included inscriptions that indicated their place and history. The performance of the fabric, depending on where it is used, aided the role worked on it. If one of the elders died in this era, he would be placed in silk and gold and embroidered and embroidered fabrics, so that many shrouds from this period are made of two-ply silk cloth with inscriptions in calligraphy. Kofi that was worked on them and even in the margins of most fabrics were written the name of their weaving place and this was a sign of diversity and prosperity and expansion of the textile industry and its abundant trade (20).

The inscriptions on the fabrics are mostly embroidered or sometimes even woven, starting with the name  $\mathfrak{z}$  and the name of the ruler and his title, followed by a phrase including greetings and greetings, and at the end the place of production and its date is mentioned. The inscriptions were either placed in a simple background or in the form of narrow margins next to abstract shapes or animal or bird motifs or placed inside the thorns (Figure 4) (21).

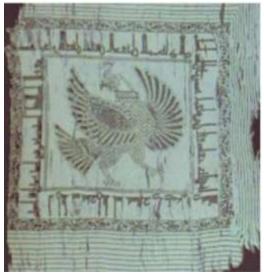


Figure 4Grave Cover Textiles

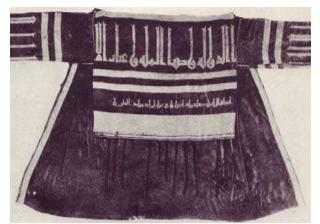


Figure 5An Inscription in the Name of Bahadolleh Caliph

### LINE ON CLOTH DURING THE SELJUK PERIOD

The textiles of this period and the use of beautiful lines on these fabrics show that the textile art had reached perfection in this era and the delicate and unique fabrics left are a living proof of this claim. During the Seljuk period, the influence of the Sassanid style on fabrics gave way to designs in which Islamic Turkish expressions were combined with scroll lines and palm leaf shapes. These artists used bird and animal motifs on silk and fine fabrics (22). On the style in this era, apparently the name of the sultan of the time and sometimes after that the crown prince were written in a thin and delicate way; Along with the borders and ornaments that could be seen with engravings on the Sultan's robes (Figure 6).



Figure 6 A Shirt with an Inscription Called Bahar Al-Dawla

The Kufic script, which in the beginning was only for expressing religious themes, became decorative in this era. Some of the fabrics of this era were designed in long cut and used as a cover for coffins or tombs, and have calligraphy and Quranic prayers, and other examples have circular or geometric shapes with animal designs facing each other or back to back, which before They were prepared for burial from burial (23)(Figure 7).

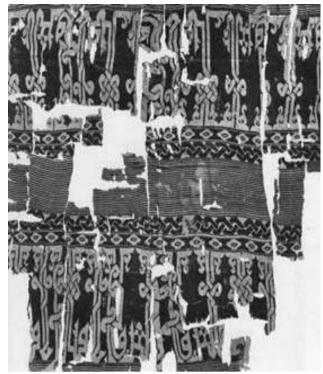


Figure 7Kufic Lines on the Tomb Cover

During this period, the line was merged with the pattern of the fabric and the empty parts of the fabric space were filled with flowers and leaves or a pattern was repeated; So that the ornaments of the fabrics, which included drawings and calligraphy together, became more rich in this era, and this is one of the characteristics of Seljuk silk (24).

During the Seljuk period, designs appeared on fabrics in which Islamic expressions were combined with scroll lines and palm leaf shapes. These artists used bird and animal motifs on the textiles. Textiles in the Seljuk period have dense Seljuk ornaments and are full of small motifs, in the middle of each circle the role of one or two ancient animals has been used and plant forms act as an axis in the central orbit.

Also, the Seljuk period merged the line with the fabric and filled the empty parts of the fabric with flowers and leaves or repeated the pattern, so that the fabric decorations, which included drawings and calligraphy together in this era. They became richer and this is one of the characteristics of Seljuk textiles. During the Seljuk period, the patterns that were common before Islam were abandoned and metal fibers, ie gold threads, were wrapped around the string to create protrusions and contrast on the fabric. The repetition of patterns on fabric in this era was to create a sense of diagonal movement in the viewer and the patterns of Ilkhanid fabrics had Chinese roots, so it can be said that the characteristics of this period are Chinese and patriarchal tastes in the weaving industry.

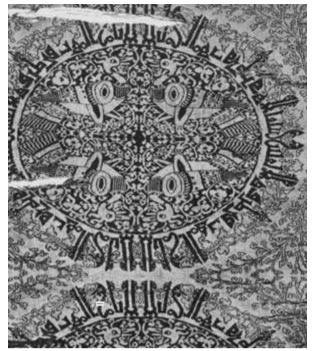


Figure 8Wool and Silk Fabric

## LINE ON FABRIC DURING THE SAFAVID ERA

The Safavid period was one of the most brilliant periods of the development of various Iranian lines, especially the third, Nasta'liq and Naskh; so that many kings at this time were calligraphers themselves or were interested in this art; this art influenced other arts such as weaving in this period and along with images, they created beautiful combinations (Figure 9).



Figure 9Line on a Double Silk Fabric

The decoration of the fabrics in the Safavid era was human and animal motifs, birds, flowers and plants with themes from martial and feather stories adapted from Shahnameh and Nezami (Figure 10).



Figure 10 Decorating the Fabric with different Motifs and Themes from Martial Arts and Party Stories

These textures, paintings, and manuscripts of books, created a strong bond. Quranic verses, prayers and hadiths were engraved on the cloths of this era with Kufic lines, abrogations, thirds and dust).



Figure 11Patterned Linen Shirt

Fabrics were also embroidered with the method of embroidery, which according to the use of the common type of calligraphy, expressed the verses of the Qur'an, prayers, hadiths, poems and proverbs, and sometimes the name of the weaver or the customer on it. In general, it can be noted that the use of Persian themes from the Seljuk period became common on fabrics, and in the Timurid and Safavid periods, due to the proximity of painting and book-making to the fabric, the subjects of epic and love stories became the main pillars of cloth decoration (Figure 12) (25).

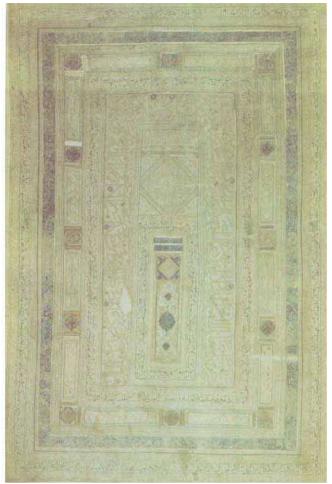


Figure 12Inscription Pen Type Curtain

Ms. Barzin calls the Safavid era the Golden Age in terms of textile industry and writes: Zari has been one of the common fabrics of the Safavid era. This design is often woven to cover graves or for curtains used in tombs or shrines. An example of that piece of gold is the golden background if the place of Nasrullah and Fatah... (Figure 13)(26).

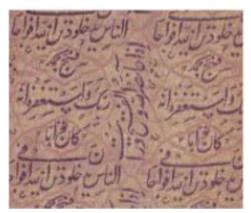


Figure 13 Part of the Gold Cloth of the Property, Belonging to the Grave Covering

After the domination, the Seljuks took over the weaving workshops of Al-Buwayh and used their designs, so it is difficult to distinguish between Buoy and Seljuk fabrics. During the Seljuk period, textiles have a stronger design and texture, and traces of the methods of previous periods can still be seen on some of them. In general, Islamic-Iranian textiles can be got rid of in terms of calligraphy and patterns in the table below.

C	and Pattern		
	Calligraphy	Patterns	Patterns and calligraphy
Al Buwayhid			
Saljoughi	الدولة وحوا المهدي عاد الم		
Safavi			

**Table 1**Comparative Study of Islamic-Iranian Textiles based on Calligraphy and Pattern

## CONCLUSION

According to the researches of the fabrics of the Islamic period, if it is onesided, the layout of the writing has a decorative use. But if they are double, in addition to decorative use, they are also legible (see Figure 12). Another noteworthy thing about fabrics of the Islamic era is that the text written on the fabric is different according to the use of the fabric. The fabric, depending on whether it is for clothing use or covering a tombstone or for donation, etc., can include religious, decorative, etc. Even the type of line varies depending on the application of the fabric. Calligraphy has usually appeared in textiles in different ways and with different combinations. If the line is used as a motif and has a decorative application, they appear symmetrically in the fabric; or the motifs are repeated in a sequence. It should be noted that when the line

appears as a motif or symmetrically on the fabric, it does not contain any special content and the line drawing on the fabric has only a decorative use (Figures 13 and 11). Choosing the right lines for designing the fabric is very important that the letters in the text are high in terms of visual capability and are diverse in terms of geometric forms such as circles, triangles, it should be noted that the weaving method affects the shape of the letters and it is necessary to choose a method for weaving the written fabrics as much as possible so that the fundamental changes do not take shape after the weaving of the fabric in the shape of the letters (Figures 6,11). Another important point that can be considered here is that the lines have the possibility of variation in composition according to their type. In the Nasta'liq line, it is possible to stack the letters to fill the negative space, and in the Kufic line, it is possible to fill the negative space with the letters themselves (decorations) (Figure 13). In the examples of fabrics that are more especially in the Safavid period, it can be seen that painting was a part of fabric design and besides these designs, writings have also appeared in the description of the pictures; Just like the paintings at the time when writing was present in the composition of the painting (Figure 12). After Islam and the revelation of the Qur'an, the letters and words took on the aspect of sanctity and their presence on the fabric also brought this sense of sanctity, so the presence of words and alphabets on the fabric was to induce the atmosphere of sanctity, which in different eras according to the presence Each line appeared on the fabrics, such as various types of Kufic lines, Naskh, Thals, Nastaliq.... The presence of lines on the fabric can be considered in terms of its visual properties. One of the features is the visual structure of the lines; what forms play a role in terms of the existence of the initial visual forms in the structure of the letters themselves.

Line drawings can be used as a decorative element and like a frame around the fabric, or as a decorative element between the images and in a regular manner. Even writing like a line can be repeated over and over again. Another important visual factor is the decorations around the lines; that the ornaments can appear linearly or act as your motifs; the connection between the ornaments and the line is important. In such a way that the decorations follow a linear composition; either the ornaments follow the linear range and are independent of the linear composition, or the ornaments follow the linear composition and are connected to the linear elements. The cases mentioned above were visual factors that played an important role in the composition of fabrics.

#### REFERENCES

- Dadvar, A.A.Q., &Hadidi, E. (2011).Study of Textile Patterns of The Early Islamic Centuries (from the first century AH to the end Seljuk period). *JelveyeHonar*, (6), 2-15.
- Sabah Khosravi Zadeh, Sabah Ghanbari (2011). Diplomatic etiquette and its definition from the beginning of Qajar to the end of the Nasserite period. *Journal Article: Research in History*, Winter 2011 No. 5.
- HoushangKhosroBeigi, MeysamGholampour (2013). Social and economic situation of Damavand in the Qajar period (from the beginning to the end of the Nasserite period). *Journal Article: Social History Research, Fall and Winter* 2013 No. 2.

- AzitaBalaliOskooi, SanamEbrahimzadehAdham, Niloufar Akbari Haghighat (2015). Analytical study of the geometry of Iranian schools in the Ilkhanid to Qajar period. *Conference paper: National Conference on Indigenous Architecture and Urban Planning of Iran*–2015.
- Zahra Gholamrezaei (2015). Drawings of Iranian textiles from ancient times to the Safavid era. *Journal Article: Iranian People's Culture* »2015 – Issue.
- Khalilzadeh Moghadam, Maryam, SadeghpourFiroozabad, Abolfazl (2012). Comparative study of Safavid and Gurkhani patterns. *Negare Quarterly*, 7(21), 21-36.
- Taghipour Parisa, FahimiSafaMaliheh (2015). Comparative study of Seljuk and Qajar fabrics. *Conference Paper: International Conference on Research in Science and Technology*-2016.
- Somayeh Mohammadzadeh Moghadam (2019). Investigation of motifs and decorations of picture books of the Seljuk period. *Journal Article:* Shabak, April 2017 No. 40.
- HojjatKafashi (1398). A comparative study of textile designs of the Safavid period with the early Islamic centuries (from the first century to the late Seljuks). Conference Paper: The Fourth World Conference and the First National Conference on Modern Research in Iran and the World in Management, Economics and Accounting and Humanities.
- Arefeh Sadat Hakmabadi, Mohammad Khazaei and SeyedAbutorabAhmadpanah (2015). Investigation of patterns of Samani fabrics. *Greater Khorasan*, Issue (02) Fall 2015.
- SimaKhaleghian, ShimaKandahari and FarzanehFassihi (2019). A Comparative Study of the Relationship between Anthropographs of Palaces and Textiles of the Safavid Era (Case Study: Chehelston Palace, Isfahan). Second year No. 9 June 1398.
- FaridehTalebpour (2015). The effect of Sassanid motifs on Andalusian textiles. *Cultural history studies; Research Journal of the Iranian History Association*. Seventh year, twenty-fifth issue, autumn 2015, pp. 72-45.
- Sara HosseinzadehGheshlaghi, Maryam MonsiSorkheh (2015). *Investigating the commonalities and differences between Safavid and Ottoman fabrics*. Scientific-Research Quarterly.
- Peck, A., 2013. Interwoven globe: the worldwide textile trade, 1500-1800, Thames&Hudson, London.
- Islamic Textiles: History & Designs. (2016). https://study.com/academy/lesson/islamic-textiles-historydesigns.html.
- Knipe, P., Eremin, K., Walton, M. (2018). Materials and techniques of Islamic manuscripts. Herit Sci6, 55 (2018). https://doi.org/10.1186/s40494-018-0217-y
- Delaney JK, Ricciardi P, Glinsman LD, Facini M, Thoury M, Palmer M, René de la Rie E. Use of imaging spectroscopy, fiber optic reflectance spectroscopy, and X-ray fluorescence to map and identify pigments in illuminated manuscripts. *Stud Conserv.*, 2014;59:91–101.
- Mahgoub H, Chen H, Gilchrist JR, Fern T, Strlic M. Quantitative chemical near-infrared hyperspectral imaging of Islamic paper. In: Bridgland J, editor. ICOM-CC 18th triennial conference preprints, Copenhagen, 4–

8 September 2017, Art. 1606. Paris: International Council of Museums.

- Eremin K, Gretch C. Materials and techniques of Persian lacquer. In: A collectors passion: Ezzat-Malek Soudavar and Persian lacquer, Smithsonian Institution and Harvard art museums. 2017; p. 39–48.
- De Faria DLA, Edwards HGM, Careaga V, Walt N, Maier MS. A definitive analytical spectroscopic study of Indian yellow, an ancient pigment used for dating purposes. *Forensic Sci Int.*, 2017;271:1–7.
- Mousavi SM, Ahmadi H, Abed-Esfahani A, Mortazavi M, Aceto M. Identification and analytical examination of copper alloy pigments applied as golden illuminations on three Persian manuscripts. *Restaurator.* 2015;36(2):81–100.
- Delaney JK, Ricciardi P, Glinsman LD, Facini M, Thoury M, Palmer M, René de la Rie E. Use of imaging spectroscopy, fiber optic reflectance spectroscopy, and X-ray fluorescence to map and identify pigments in illuminated manuscripts. *Stud Conserv.*,2014;59:91–101.
- Ploeger R, Shugar A. The story of Indian yellow—excreting a solution. *J Cult Herit.*, 2017;24:197–205.

https://doi.org/10.1016/j.culher.2016.12.001.

- Zekgroo S, Nel P, Sloggett R. Peacock Ink: investigation into the constituents of the most prized ink of Persia. *Restaurator.*,2017;38(2):205–33. https://doi.org/10.1515/res-2016-0033.
- Zekgroo S. Methods of creating, testing and identifying traditional black Persian inks. Restaurator. 2014;53(2):133–58. https://doi.org/10.1515/rest-2014-1001.
- Anselmi C, Ricciardi P, Buti D, Romani A, Meretti P, Beers KR, Brunetti BG, Milianai C, Sgamellotti A. MOLAB meets Persia: non-invasive study of a sixteenth-century illuminated manuscript. *Stud Conserv.* 2015;60(sup1):S185–92.

https://doi.org/10.1179/0039363015Z.00000000223