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Title

Field Report: Gandharan Sculptures Mar 24th – 25th 2026 Government Museum & Art Gallery, Chandigarh, India

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Field Report:

Gandharan Sculptures

Mar 24th – 25th 2026

Government Museum & Art Gallery, Chandigarh, India



Textured (left) and geometric (right) detail of a figure of Buddha

Field report prepared April 2026

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Expedition Overview and Objective:

Over the course of 2 days in March 2026, five Gandharan sculptures were digitized using photogrammetry as part of a preliminary investigation, which will lead to a proposal supporting the capture of metrologically accurate 3D models of Silk Road cultural artifacts from sites and museums all over the world. These assets would be available for free public access to encourage comparative studies into the transmission of artistic and cultural conventions along the Silk Road, and to facilitate open scholarly engagement with material that would otherwise remain physically inaccessible to most researchers worldwide.

Given that Gandhara was a region heavily involved in the Silk Road trade, studying the syncretic sculptures of the region is of immense importance. The Government Museum and Art Gallery boasts an impressive collection of 627 pieces in its Gandharan Sculpture collection, containing many examples excavated in the 19th century.

3D documentation enables the metrological study of artifacts, but also reveals important details which are otherwise difficult to see in person. As demonstrated in Fig. 3, three-dimensional models can recover carved detail from weathered surfaces that is barely visible in conventional photography, highlighting the analytical value of this approach for Gandharan schist sculptures whose surface geometry preserves information that centuries of erosion have rendered illegible to the eye.

This project is being planned in collaboration with members of the University of California San Diego, University of the Aegean in Greece, the University of Henan in China, the European Academy of Sciences and Arts, and with the Central Asian Archaeological Landscapes project at University College London.

Special thanks to Ms. Seema Gera, the curator, and the rest of the cooperative staff at Government Museum and Art Gallery, Chandigarh, and to the Kinsella Innovation fund at UC San Diego.

The dataset generated by this expedition is publicly available on [OpenHeritage3D.org](https://openheritage3d.org), which includes an interactive viewer enabling live measurement on the web.

Data Citation:

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Expedition Team

Aviral Agarwal (UC San Diego)

Data Acquisition:

Our imaging tools and methodologies are outlined below:

Canon EOS R50



Mirrorless interchangeable-lens camera used for close-range photogrammetric capture of Gandharan sculptures.

- 24.2 MP APS-C CMOS sensor
- 22.3 × 14.9 mm sensor size
- 3.72 μm pixel pitch
- ISO 100–32000
- RF-S 18–45mm f/4.5–6.3 IS STM lens
- In-camera focus bracketing
- Canon CR3 RAW format

Fig. 1. Canon EOS R50

Methodology

~200 images were taken for each sculpture from various angles in orbital rings around the sculpture for optimal coverage. Additional images were taken to cover otherwise obscured spots.

All photos were taken in ambient museum lighting with the following camera settings:

- ISO: 100-200
- Aperture: f/4.5
- Shutter Speed: 1/13 - 1/8

Measurements of regular elements of the scene, such as the museum plinth base, were taken in order to scale the model accurately. In other cases, a one-foot ruler was placed in the scene. These measurements were used to create control points and constraints in RealityScan while generating the models.

Images were captured in Canon CR3 RAW format or JPEG. All other capture parameters—orbital passes, scale establishment via plinth measurement and ruler placement—remained consistent across sculptures.

In RealityScan, the images were first aligned and then the model was created with the high quality preset. The model was then scaled using the aforementioned control points. It was then exported as LAS, cleaned up in CloudCompare and then prepared for ingestion into Potree by running the Potree Converter.

The data provided by this project is not certified by a licensed surveyor. Measurements provided are subject to error.

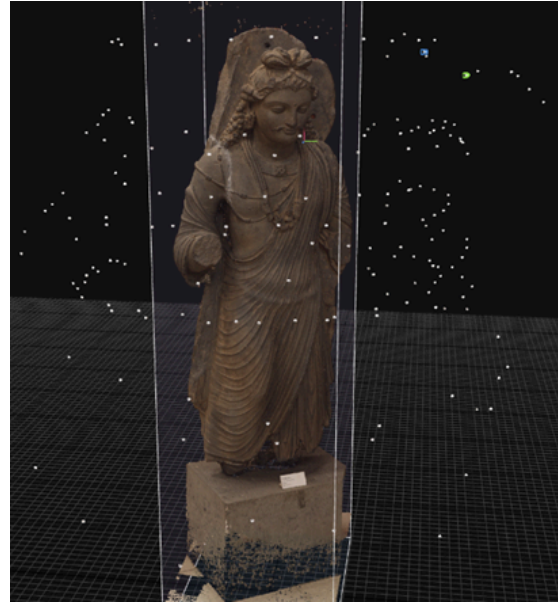


Fig. 2. Model of the Bodhisattva statue, Acc. 2342 in RealityScan with alignment cameras

Three-dimensional models offer analytical capabilities beyond conventional photography. By interrogating surface topology directly, researchers can recover detail from worn, damaged, or low-contrast areas of a sculpture that would otherwise be illegible, as demonstrated in Fig. 3, where carved relief barely visible in the photograph becomes clearly readable in the corresponding point cloud. This is particularly significant for Gandharan schist sculptures, where centuries of weathering and handling have eroded surface detail that the underlying stone geometry still preserves.



Fig. 3. Detail becomes visible on the weathered base of the sculpture: (Top) Regular image; (Bottom) 3D point cloud with EDL shading

Sculptures

Each sculpture imaged is outlined below:

Seated Buddha Figure, Acc. 19

226 images (CR3 RAW) | 5.22 GB | 4th century AD | Provenance Unknown | 92.5 x 48.5 cm

A seated Buddha figure dateable to the 4th century AD on the basis of its rationalized drapery, bared shoulder, curly hair, and the spirituality of the facial expression. The figure sits in the ascetic 'lotus pose', cross-legged with the soles turned upwards. The bare shoulder and Hellenistic wet drapery with fine parallel folds reflect the Greco-Buddhist figural tradition characteristic of the Gandharan school. The hand gesture is of particular iconographic interest: rather than the conventional dharmacakrapravartana-mudra, the left hand holds a notional lotus stalk whose petals the right hand appears to expose, a pose identified as the bodhyangi-mudra, the gesture of the assimilation of wisdom (Bhattacharyya 2002, p. 83).

Particular attention was given to the drapery folds and recessed areas to ensure complete geometric coverage of the relief detail. The damaged base of the sculpture particularly benefits from the topology view (Fig. 3).



Fig. 4. Seated Buddha Figure, Acc. 19. colored point cloud (top) and topology view (bottom) shown from three orientations: frontal view, left profile, right profile. The uncolored topology view emphasises surface geometry, revealing carved detail independent of color and lighting variation.

Maitreya Figure, Acc. 719

188 images (CR3 RAW) | 4.07 GB | Early 3rd century AD | Provenance Unknown | 132 x 38 cm

This standing Bodhisattva figure is identified as Maitreya, the Buddha of the next age, by the sacred flask of water in his left hand.

He is depicted as an Indian prince, clothed in flowing drapery and richly adorned with necklaces (Fig. 7), earrings, bracelets, jeweled sandals, arm-bands and a headdress.

It is also believed that these sculptures were originally painted and gilded (Pannuzi et al. 2019).



Fig. 5. Maitreya Figure, Acc. 719. colored point cloud (left) and topology view (right)



Fig. 6. Detail of the base with worshippers around a fire brazier surrounded by Corinthian columns. Possibly donor figures.



Fig. 7. Detail of the jeweled chest of the figure.

Amitabha Preaching Stele, Acc. 1134

241 images (CR3 RAW) | 5.42 GB | Late 3rd century AD | Muhammad Nari | 105 x 77 cm

This enigmatic stele has a number of striking elements: a central preaching Buddha on an elevated lotus, flanked by two standing Bodhisattvas, women peeping out through the balconies, a crowded celestial or courtly assemblage, upper subsidiary figures and a pedestal register with the seven Buddhas and Maitreya (Fig. 13).

In the upper register, on the left sits a figure, perhaps a Bodhisattva, resting his foot on a pedestal and on the right sits another figure, also throned. Both are flanked by attendants. In the center, two scenes of the Great Departure are depicted.

Among other interesting details are the variety of columns with different capitals and pillars, a few being of the Corinthian order (Fig. 11 and Fig. 12). The four columns in the central register are being held up by winged atlantes (Fig. 10), yet another element of Hellenistic influence.

This relief belongs to the group of the famous Muhammad Nari type complex steles, which have generated substantial iconographic debate.

The museum catalogue identifies the scene as Amitabha Preaching in Sukhavati Heaven, though the entry itself entertains alternative possibilities drawing on the Mahavastu Avadana (Bhattacharyya 2002, p. 112). More broadly, studies have variously interpreted such monuments as the Great Miracle at Shravasti (Foucher 1909), the paradise of Amitabha/Sukhavati (Huntington



Fig. 8. Amitabha Preaching, Acc. 1134. Colored point cloud.

1980; Harrison and Luczanits 2011), a "wondrous vision" of a supramundane Buddha possibly linked to visualization practice (Rhi 2003; 2011), or, most recently, the Enlightenment of the Buddha Dipamkara as narrated in the Mahavastu (Vendova 2023).

Vendova specifically discusses the present stele (her Figure 14) as supporting evidence for the Dipamkara reading, noting that the presence of Shakyamuni life scenes alongside the Seven Buddhas and Maitreya in the pedestal register is consistent with a "lineage stele" interpretation rooted in mainstream Buddhist worship rather than Mahayana Pure Land iconography. For a detailed review of the competing interpretations, see Harrison and Luczanits 2011 and Vendova 2023.

Particular attention was given to the deeply incised relief details and recessed crevices between figures, which required angled shots at close range to ensure adequate coverage for photogrammetric reconstruction.

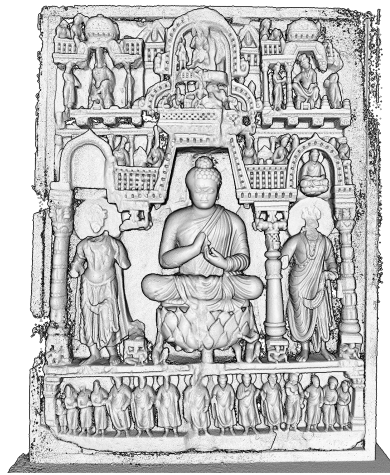


Fig. 9. Amitabha Preaching, Acc. 1134. Topology view.



Fig. 10. Detail of a bearded Atlas figure, holding up a column.



Fig. 11. Detail of two distinct columns with distinct capitals being held up by atlantes.



Fig. 12. Detail of two columns with Corinthian capitals of differing design.



Fig. 13. Detail of the Seven Buddhas with Maitreya in the pedestal register. They are surrounded on the two sides, perhaps by donor figures.

Standing Buddha Figure, Acc. 2083

89 images (JPEG) | 507 MB | 2nd century AD | Sikrai | 77.5 x 35.5 cm

Similar Buddha figures have been found in large numbers across various Gandharan sites. This figure displays the typical abhaya mudra, although the right hand is damaged. In the left, he grasps a short looped length of drapery, the sanghati, a naturalistic detail.

Another interesting detail is the lack of the urna, or the forehead mark, though that might reflect surface damage.

The limited viewing angle imposed by the display conditions resulted in a reduced image count of 89.



Fig. 14. Standing Buddha Figure, Acc. 2083. colored point cloud (top) and topology view (bottom) shown from three orientations: frontal view, left profile, right profile.

Bodhisattva Figure, Acc. 2342

173 images (JPEG) | 920 MB | 2nd century AD | Sikrai | 147 x 61 cm

This near life-size figure of a Bodhisattva, being richly adorned with jewels and having a lowered left arm possibly indicating a water flask, may be identified as Maitreya as well.

The Hellenistic stylistic details such as the tapering drapery, wavy hair and a muscular chest are the most apparent in this example. The drapery in particular is finely rendered. A further element of the realism is the girdle being visible beneath the drapery around the waist.

The contours of the drapery become especially prominent in the topology view.



Fig. 15. Bodhisattva Figure, Acc. 2342. colored point cloud (top) and topology view (bottom) shown from three orientations: frontal view, left profile, right profile.



Fig. 16. Detail of the head.



Fig. 17. Detail of the jeweled chest of the figure showing two worshippers sitting on a necklace.



Fig. 18. Detail of the elaborate hairstyle and headdress.

Appendix - Datasets

#	Name	Acc. No.	Collector	# of Images	CHEI Data Location
1	Seated Buddha Figure	19	A. Agarwal	226	"Z:\aviral\gandharan\buddha_19"
2	Maitreya Figure	719	A. Agarwal	188	"Z:\aviral\gandharan\maitreya_719"
3	Amitabha Preaching Stele	1134	A. Agarwal	241	"Z:\aviral\gandharan\amitabha_preaching_1134"
4	Standing Buddha Figure	2083	A. Agarwal	89	"Z:\aviral\gandharan\buddha_2083"
5	Bodhisattva Figure	2342	A. Agarwal	173	"Z:\aviral\gandharan\bodhisattva_2342"

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