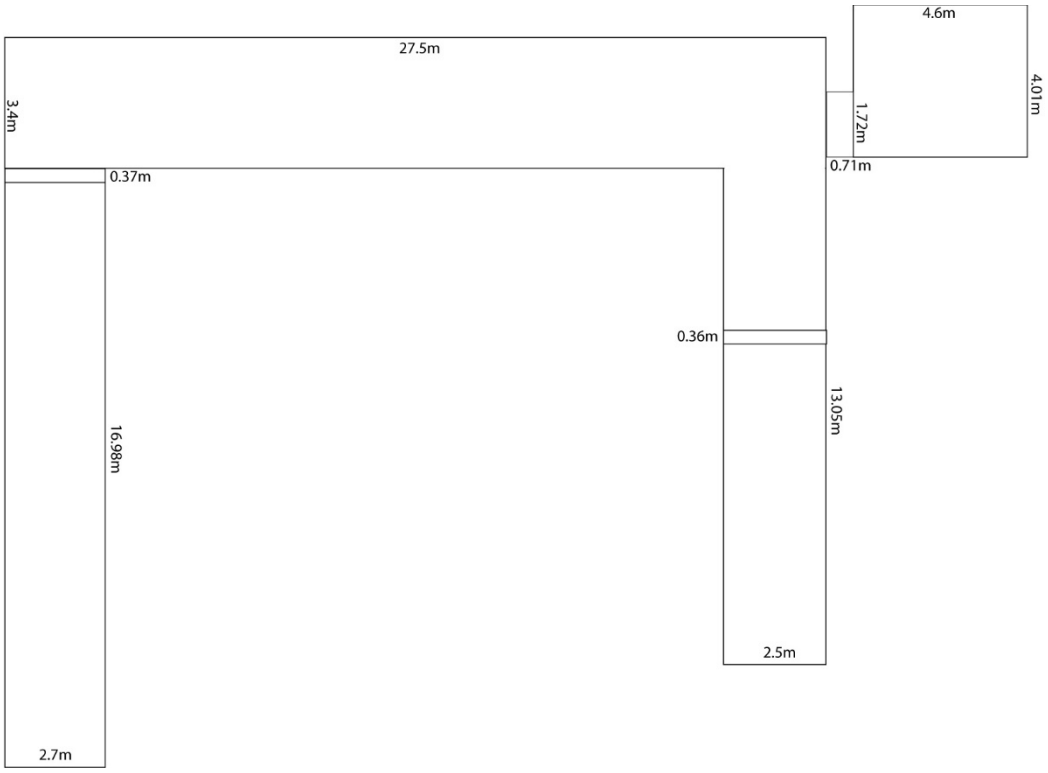
Newcastle University, School of History, Classics and Archaeology - 3D Scanning and Structure from Motion (SfM) of Buildings and Objects at Parco Archeologico di Pompei and Parco Archeologico di Ercolano 2017-2018

JOB
Job title:
House of the Cryptoporticus, Pompeii

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of the House of the Cryptoporticus for visualization and display. To derive orthographic elevations from the point cloud to enable planning of the Expanded Interiors installation.

Deliverables:
Raw Data in .FLS for processing and .XYZ format for archiving.
Photographs of the scanning process.
Orthographic elevations in .TIF format derived from Faro Scene 6.2
Metadata for the scanning process



SITE
Brief description:
The House of the Cryptoporticus, Parco Archeologico di Pompei

Approximate size (m) H x W x D:
See figure above

Nature of surface:
Stone and stucco with frescos

Level of detail: (size of smallest feature to be recorded)
0.5cm

ENVIRONMENT

Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with no public access to the site during scanning.

Lighting (natural, fluorescent etc.):
Natural daylight only

SCANNING PROCESS

Carried out by:	Alex Turner
Date:	05/07/2017
Time taken:	4 hrs scanning
Scanner:	Faro Focus X330

Tripod: Gitzo standard and 5m elevating tripod

Power source:	Battery
Scanning distance (m):	10m approx.

Scanning parameters: Resolution ¼ = 43.7 million points 6mm resolution at 10m.

Quality threshold = 3

Number of stations: 20

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):
Faro Scene 6.2

Registration:
Maximum mean target distance error range was 0.6mm to 2.77mm

Software orthographic images and walkthrough:
Faro Scene 6.2 and ArcGIS 10.5
Point Cloud manipulation for walk-through: Autodesk Recap Pro

Data "cleaning":
Topological abnormalities were removed using Faro Scene 6.2. The project point cloud was created after cleaning.

OUTPUT
Point Cloud
Faro Scene Project in .lsproj format with scans in .FLS format
Project point cloud in .XYZ format (.ZIP for archiving)

Orthographic Images
Orthographic images of all elevations were created in .TIF format with a .TXT information file for each image.

JOB
Job title:
House of the Beautiful Courtyard, Herculaneum

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of the House of the Beautiful Courtyard for visualization and display. To derive orthographic elevations from the point cloud to enable planning of the Expanded Interiors installation.

Deliverables:
Raw Data in .FLS for processing and .XYZ format for archiving.
Photographs of the scanning process.
Orthographic elevations in .TIF format derived from Faro Scene 6.2
Metadata for the scanning process

SITE
Brief description:
The House of the Beautiful Courtyard, Parco Archeologico di Ercolano

Approximate size (m) H x W x D:
7.34 x 10.3 x 5.76

Nature of surface:
Stone and stucco with frescos

Level of detail: (size of smallest feature to be recorded)
0.5cm

ENVIRONMENT
Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with no public access to the site during scanning.

Lighting (natural, fluorescent etc.):
Natural daylight only – artificial lights were turned off.

SCANNING PROCESS
Carried out by: Alex Turner
Date: 06/07/2017
Time taken: 0.75 hours setup; 2.5 hours scanning
Scanner: Faro Focus X330
Tripod: Gitzo standard and 5m elevating tripod
Power source: Battery
Scanning distance (m): 10m approx.
Scanning parameters: Resolution ¼ = 43.7 million points 6mm resolution at 10m.
Quality threshold = 3
Number of stations: 13

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):
Faro Scene 6.2

Registration:
Maximum mean target distance error range was 1.4mm to 3mm

Software orthographic images and walkthrough:
Faro Scene 6.2 and ArcGIS 10.5
Point Cloud manipulation for walk-through: Autodesk Recap Pro

Data "cleaning":
Topological abnormalities were removed using Faro Scene 6.2. The project point cloud was created after cleaning.

OUTPUT
Point Cloud
Faro Scene Project in .lsproj format with scans in .FLS format
Project point cloud in .XYZ format (.ZIP for archiving)

Orthographic Images
Orthographic images of all elevations were created in .TIF format with a .TXT information file for each image.

JOB
Job title:
Roman Objects from Pompeii

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of a number of objects from the museum store in Pompeii for visualization and display. To create 3D prints of the models for inclusion in the Expanded Interiors installation at The House of the Cryptoporticus, Pompeii .

Deliverables:
Raw Data in .OBJ for printing and archiving.
Photographs of the scanning process.
Metadata for the scanning process

SITE
Brief description:
Roman Objects from Pompeii, Parco Archeologico Pompei

Nature of surface:
Metal (copper alloy and silver), stone and ceramic.

Level of detail: (size of smallest feature to be recorded)
0.1mm

ENVIRONMENT
Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with the assistance of museum staff.

Lighting (natural, fluorescent etc.):
Lighting provided by the scanner for Artec Spider objects

SCANNING PROCESS
Carried out by: Alex Turner (Artec Spider)
Date: 05/07/2017
Time taken: 5 hours scanning
Scanner: Artec Space Spider
Tripod: Manfrotto standard tripod
Power source: Battery
Scanning distance (m): 0.17m-0.3m approx.
Scanning parameters: Resolution 0.1mm

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):
Artec Studio 12.0

Registration:
Maximum mean distance error 0.1mm-0.2mm

Software Model Manipulation for 3D priniting
Autodesk Meshmixer

Meshlab 2016
Ultimaker Cura 3.1.0
Autodesk NetFabb Premium

Data "cleaning":
Topological abnormalities were removed using Artec Studio and the objects exported as .OBJ files with .PNG texture. Decimation and mesh 'fixing' for printing was done in a combination Meshlab 2016 and Autodesk Meshmixer

OUTPUT
Point Cloud
Printable textured 3D models in .OBJ format and non-textured models in .STL format

JOB
Job title:
Roman Objects from Herculaneum

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of a number of objects from the museum store in Herculaneum for visualization and display. To create 3D prints of the models for inclusion in the Expanded Interiors installation at The House of the Beautiful Courtyard, Herculaneum.

Deliverables:
Raw Data in .OBJ for printing and archiving.
Photographs taken for Structure from Motion (SfM)
Photographs of the scanning process.
Metadata for the scanning process

SITE
Brief description:
Roman Objects from Herculaneum, Parco Archeologico di Ercolano

Nature of surface:
Metal (copper alloy and silver), stone and ceramic.

Level of detail: (size of smallest feature to be recorded)
0.1mm

ENVIRONMENT
Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with the assistance of museum staff.

Lighting (natural, fluorescent etc.):
Lighting provided by the scanner for Artec Spider objects.
Lighting for SfM objects was from LED lighting box

SCANNING PROCESS
Carried out by: Alex Turner (Artec Spider); Rosie Morris (SfM)
Date: 06/07/2017-07/07/2017
Time taken: 8 hours scanning and SfM photography
Scanner: Artec Space Spider
Tripod: Manfrotto standard tripod
Power source: Battery
Scanning distance (m): 0.17m-0.3m approx.
Scanning parameters: Resolution 0.1mm

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):
Artec Studio 12.0

Registration:
Maximum mean distance error 0.1mm-0.2mm

Software Model Manipulation for 3D printing
Autodesk Recap Photo
Agisoft Photoscan Pro
Autodesk Meshmixer
Meshlab 2016
Ultimaker Cura 3.1.0
Autodesk NetFabb Premium

Data "cleaning":
Topological abnormalities were removed using Artec Studio and the objects exported as .OBJ files with .PNG texture. Decimation and mesh 'fixing' for printing was done in a combination Meshlab 2016 and Autodesk Meshmixer

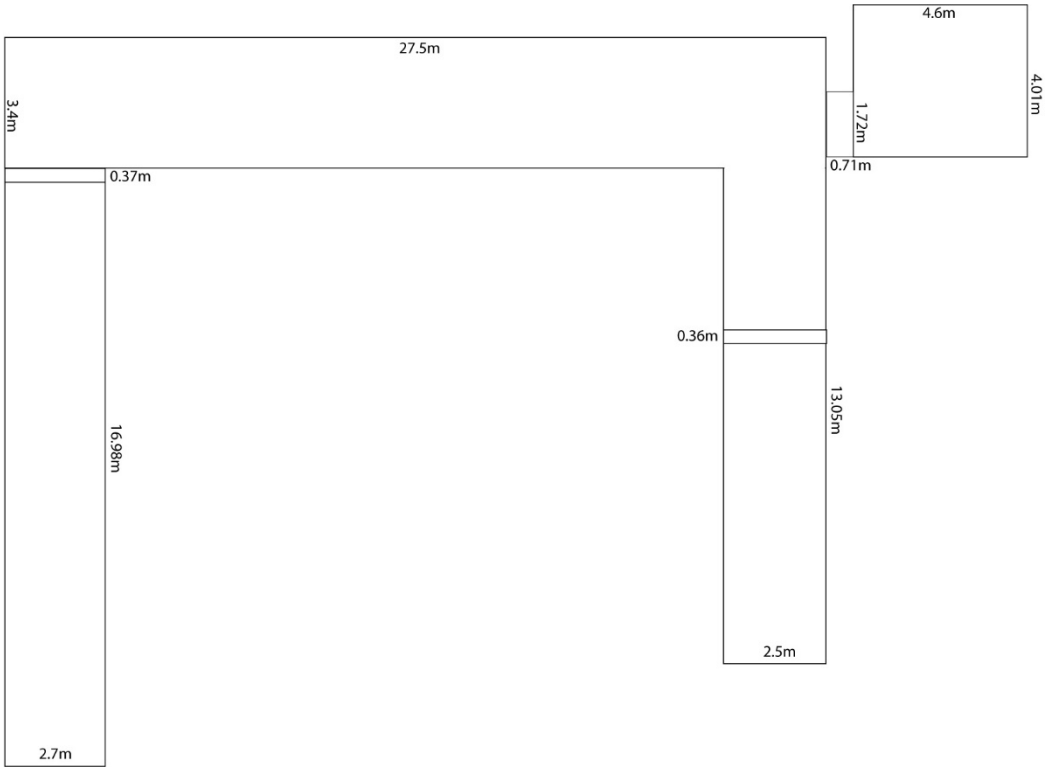
OUTPUT
Point Cloud
Printable textured 3D models in .OBJ format and non-textured models in .STL format

JOB
Job title:
House of the Cryptoporticus, Pompeii

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of the Expanded Interiors installation in the House of the Cryptoporticus for visualization and display

Deliverables:
Raw Data in .FLS for processing and .XYZ format for archiving.
Photographs of the scanning process.
Metadata for the scanning process



SITE
Brief description:
The House of the Cryptoporticus, Parco Archeologico di Pompei

Approximate size (m) H x W x D:
See figure above

Nature of surface:
Stone and stucco with frescos. Catrin Huber's installation with numerous shiny surfaces.

Level of detail: (size of smallest feature to be recorded)
0.5cm

ENVIRONMENT

Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with no public access to the site during scanning.

Lighting (natural, fluorescent etc.):
Natural daylight only

SCANNING PROCESS

Carried out by:	Alex Turner
Date:	12/07/2018
Time taken:	7 hrs scanning
Scanner:	Faro Focus X330

Tripod: Gitzo standard and 5m elevating tripod

Power source:	Battery
Scanning distance (m):	10m approx.

Scanning parameters: Resolution ¼ = 43.7 million points 6mm resolution at 10m.

Quality threshold = 3

Number of stations: 27

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):
Faro Scene 6.2

Registration:
Maximum mean target distance error range was 0.6mm to 2.77mm

Data "cleaning":
Topological abnormalities were removed using Faro Scene 6.2. The project point cloud was created after cleaning.

OUTPUT
Point Cloud
Faro Scene Project in .lsproj format with scans in .FLS format
Project point cloud in .XYZ format (.ZIP for archiving)

Orthographic Images
Orthographic images of all elevations were created in .TIF format with a .TXT information file for each image.

JOB
Job title:
House of the Beautiful Courtyard, Herculaneum

Client:
Expanded Interiors

Reason for scanning:
To make an accurate record of the House of the Beautiful Courtyard for visualization and display. To derive orthographic elevations from the point cloud to enable planning of the Expanded Interiors installation.

Deliverables:
Raw Data in .FLS for processing and .XYZ format for archiving.
Photographs of the scanning process.
Orthographic elevations in .TIF format derived from Faro Scene 6.2
Metadata for the scanning process

SITE
Brief description:
The House of the Beautiful Courtyard, Parco Archeologico di Ercolano

Approximate size (m) H x W x D:
7.34 x 10.3 x 5.76

Nature of surface:
Stone and stucco with frescos

Level of detail: (size of smallest feature to be recorded)
0.5cm

ENVIRONMENT
Location of scanning:(inside/outside, public access, tent etc.)
All scans were recorded inside with no public access to the site during scanning.

Lighting (natural, fluorescent etc.):
Natural daylight only – artificial lights were turned off.

SCANNING PROCESS
Carried out by: Alex Turner
Date: 10/07/2017-11/07/2017
Time taken: 0.75 hours setup; 7 hours scanning
Scanner: Faro Focus X330
Tripod: Gitzo standard and 5m elevating tripod
Power source: Battery
Scanning distance (m): 10m approx.
Scanning parameters: Resolution ¼ = 43.7 million points 6mm resolution at 10m.
Quality threshold = 3
Number of stations: 25

POST-PROCESSING
Carried out by:
Alex Turner

Software (point cloud):

Faro Scene 6.2

Registration:
Maximum mean target distance error range was 1.4mm to 3mm

Data "cleaning":
Topological abnormalities were removed using Faro Scene 6.2. The project point cloud was created after cleaning.

OUTPUT
Point Cloud
Faro Scene Project in .lsproj format with scans in .FLS format
Project point cloud in .XYZ format (.ZIP for archiving)

Orthographic Images
Orthographic images of all elevations were created in .TIF format with a .TXT information file for each image.

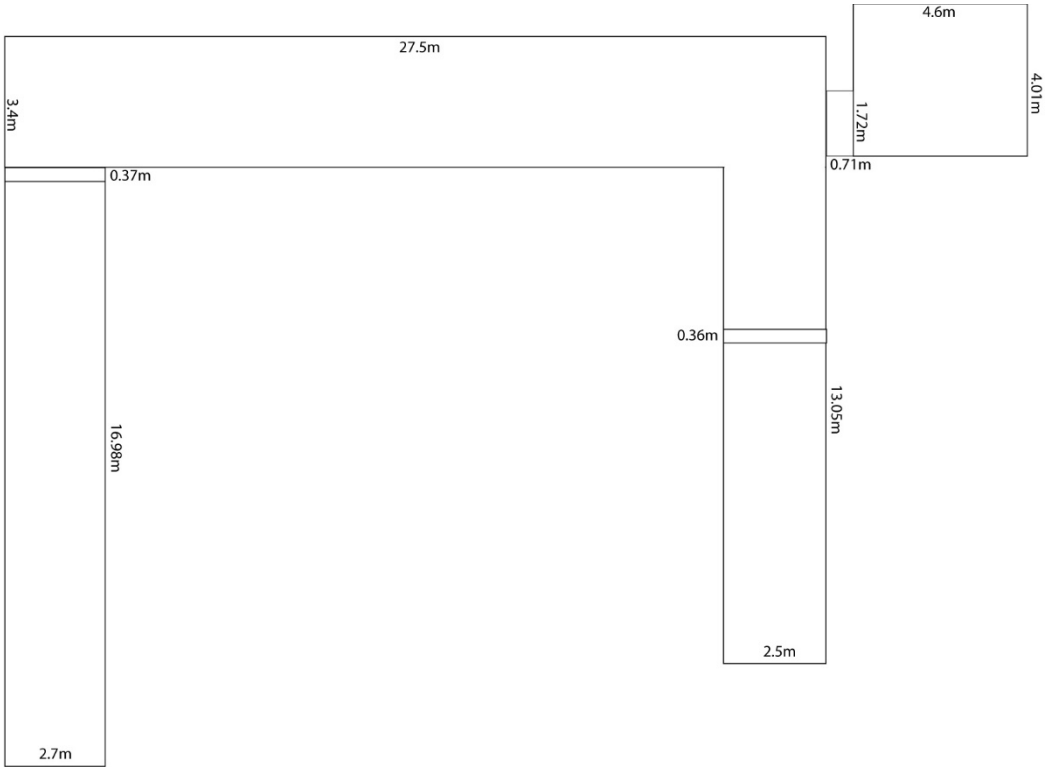
Newcastle University, Fine Art Department, Documentation of wall paintings and rooms of two houses at Parco Archeologico di Pompei and Parco Archeologico di Ercolano 2017-2018

JOB
Job title:
Photographic documentation of the cryptoporticus complex at the House of the Cryptoporticus, Pompeii

Project:
Expanded Interiors

Reason for photographic documentation:
To record and document the cryptoporticus complex at the House of the Cryptoporticus for research, visualization and installation development.

Deliverables:
Photographs in .TIF format derived from Canon EO5 digital camera.



SITE
Brief description:
The House of the Cryptoporticus, Parco Archeologico di Pompei

Approximate size (m) H x W x D:
See figure above

ENVIRONMENT

Lighting (natural, fluorescent etc.):
Natural daylight only

PHOTOGRAPHY

Carried out by:	Catrin Huber
Dates:	July 2017
Camera:	Canon EOS 5D digital camera

POST-PROCESSING

Carried out by:
Catrin Huber

Software:
Photoshop 2014.2.1

OUTPUT

Photographs in .TIF format

JOB
Job title:
Photographic documentation of the House of the Beautiful Courtyard in Herculaneum

Project:
Expanded Interiors

Reason for photographic documentation:
To record and document the House of the Beautiful Courtyard (especially its reception room) for research, visualization and installation development.

Deliverables:
Photographs in .TIF format derived from Canon EO5 digital camera.

SITE
Brief description:
The House of the Beautiful Courtyard, Herculaneum

ENVIRONMENT

Lighting (natural, fluorescent etc.):
Natural daylight only

PHOTOGRAPHY

Carried out by:	Catrin Huber
Dates:	July 2017 / January 2018
Camera:	Canon EOS 5D digital camera

POST-PROCESSING
Carried out by:
Catrin Huber

Software:
Photoshop 2014.2.1

OUTPUT
Photographs in .TIF format

JOB
Job title:
Photographic documentation of the Expanded Interiors installations at the House of the Cryptoporticus, Herculaneum

Project:
Expanded Interiors

Reason for photographic documentation:
To document the installations at the House of the Cryptoporticus.

Deliverables:
Photographs in .TIF format derived from Canon EO5 digital camera.

SITE
Brief description:
The House of the Cryptoporticus, Parco Archeologico di Pompei

ENVIRONMENT

Lighting (natural, fluorescent etc.):
Natural daylight only

PHOTOGRAPHY

Carried out by:	Amedeo Benestante
Dates:	July 2018
Camera:	Canon EOS 5D digital camera

OUTPUT
Photographs in .TIF format

JOB
Job title:
Photographic documentation of the Expanded Interiors installations at the House of the Beautiful Courtyard, Herculaneum

Project:
Expanded Interiors

Reason for photographic documentation:
To document the installations at the House of the Beautiful Courtyard.

Deliverables:
Photographs in .TIF format derived from Canon EO5 digital camera.

SITE
Brief description:
The House of the Beautiful Courtyard, Parco Archeologico di Ercolano

ENVIRONMENT

Lighting (natural, fluorescent etc.):
Natural daylight only

PHOTOGRAPHY

Carried out by:	Amedeo Benestante
Dates:	May 2018
Camera:	Canon EOS 5D digital camera

OUTPUT
Photographs in .TIF format