Digitizing and Preserving the Tuol Sleng Genocide Museum Archives: Stories of Compromises in a Challenging Environment

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Abstract

Stories of mass digitization projects and the preservation of those physical materials to be digitized often bring to mind well-equipped set ups in clean dust-free, air controlled rooms with highly skilled staff. One particularly thinks of this for museums and archives located in temperate-climate developed countries. But what about stories of digitization projects with limited resources in less than optimum environments, how does one envision those?

The Archives of Tuol Sleng Genocide Museum (TSGM) [1] is the largest and most complete record of Khmer Rouge actions during the Democratic Kampuchea (DK) regime. [2] The Archives contain forced "confessions", many extracted under torture; biographies of prisoners, guards and officials; photographs; original negatives; and other paper-based bound materials. Many items are very fragile and were not created with long-term preservation in mind so when handled for research they are at risk. The first Archive team did not record the provenance of the documents so research and recreating history is a challenge. In addition these records are not easily accessible for most Cambodians. For these reasons, and because the climate in Phnom Penh is hot and humid preservation is much harder than in more temperate climates, UNESCO and the Korea International Cooperation Agency (KOICA) have provided funds to digitize the Museum's archives. With these funds and under direction from UNESCO experts, along with the support of the Ministry of Culture and Fine Arts (MoCFA), Digital Divide Data and Brechin Imaging are collaborating to preserve and digitize the Archives and to train the Tuol Sleng staff in digitization and preservation.

Once ingested into the Project's database and crowd-sourcing website, which is currently being developed, these records will help illuminate the stories of people caught in this dark period of Cambodian history for the next generations.

Introduction

Held within the TSGM Archives is the unique and largest collection of over 400,000 pages of confessions; biographies; mugshot photographs and negatives; and other documents that include lists, logs, oversize charts and bound Khmer Rouge Revolutionary Flag magazines, handbooks and notebooks. These materials are from the notorious S-21 prison during the dark days of Pol Pot's Khmer Rouge reign against the Cambodian people [3]. Originally a high school, the Pol Pot clique turned it and the surrounding area into a brutal prison system where an estimated 18,000 people were held at S-21, tortured and eventually killed. It was turned into a museum in August 1979 and this year the Tuol Sleng Genocide Museum will commemorate its 40th Anniversary.

In 2009, these over 400,000 pages and 6000 photos from the Archives were recognized as World Documentary Heritage of international significance and inscribed on the UNESCO Memory of the World International Register. [4]

The TSGM Archives Preservation and Digitization Project (TSGM-APD) was officially launched on January 29, 2018.

This paper is a story that shares the challenges of working onsite in a developing-world museum environment where climate control and power fluctuations are not optimal. It describes the technical solutions used as well as best processes to maximize production while successfully meeting and exceeding international archival imaging quality standards including preservation metadata and indexing.

Overview of Project requirements

UNESCO requirements for this Project were laid out in the contract before work was started so it was possible to partially plan and prepare in advance of going onsite. There are two parts to this Project: Lot 1) digitization and preservation with partial preservation metadata and Lot 2) database indexing with crowd-sourcing website development. This paper will focus on digitization and preservation, which is expected to finish in July along with the indexing, but only in summary for the database website as it is still being developed.

Digitization and preservation requirements

1. Digitize all TSGM Archives materials that are included on the UNESCO Memory of the World register of 2009.
2. Complete all document preparation, unbinding, digitizing and rebinding onsite within TSGM Archives.
3. Perform Quality Control checks on all digitized images to ensure they are accurately produced, clean and correctly file named and formatted.
4. Provide onsite training and capacity building to 11 staff of TSGM and Ministry of Culture and Fine Arts for archival digitization of historical documents and first metadata creation (technical, structural and partial preservation).

Training requirements for capacity building include:

- Assessing physical condition of the material and their readiness for digitizing and recording in database
- Protocols in safe handling and storing fragile documents
- Learning preservation skills to repair documents such as using archival tape and heat set tissue with tacking iron
- Learning what materials need repairing by a conservator
- Assessing materials for dirt and mold and cleaning them
- Document preparation and labeling filename for digitizing
- Safe handling of materials while digitizing them
- Learning to use camera, lights and scanning equipment, RAW and post processing software and Quality Control.
- Performing image calibration. Learning to create settings for each station using greyscale and colour balance targets
- Learning post-processing skills to create master TIFF files
- Applying technical Metadata for different materials
- Demonstration of data management and storing process

Project brief

Budget, Schedule and Team
- $519 K
- January, 2018 to January 2020
- 10 staff from DDD (students in work-study program)
- 11 staff from TSGM

Objectives
- Create the TSGM Archives database
- Preserve and digitize the Memory of the World materials
- Build capacity of TSGM staff
- Create a crowd-sourcing website for the public to consult archives and edit / comment the content

Main Activities
- Cataloguing the materials into Excel database
- Preservation and preparation of materials for digitization
- Capturing and scanning
- Image editing and post-processing
- Indexing
- Importing the 400,000 page images into the final database
- Creating and designing the website

Imaging Specifications

Although archival imaging specifications were laid out in the UNESCO contract document, it was critical to create a specifications validation reference document prior to starting production. Table 1 identifies the specifications followed for manuscripts documents, photos and negatives. These technical specifications were agreed upon with the UNESCO Experts and Advisory Committee.

Table 1. Technical specifications for TSGM Project

Document Materials	
Input resolution	400 ppi
Output resolution	> 4000 pixels on long side
Bit-depth	24-bit
Color space	Adobe RGB (1998)
Compression	LZW lossless compression
Master File format	TIFF
FADGI performance level	4 star
Photos	
Input resolution	600 ppi
Output resolution	> 6000 pixels on long side
Bit-depth	24-bit
Color space	Adobe RGB (1998)
Compression	LZW lossless compression
Master File format	TIFF
FADGI performance level	4 star
Negatives	
Input resolution	3000 ppi
Output resolution	> 6000 pixels on long side
Bit-depth	8-bit
Color space	Gray Gamma 2.2
Compression	LZW lossless compression
Master File format	TIFF
FADGI performance level	3 star

Breakdown of the Collection

The TSGM Archives materials which are inscribed on the Memory of the World Register are shown below in Figure 1 as a visual breakdown. Only microfilms will not be digitized except for a few documents that cannot be found in their physical copy. It was agreed not to digitize the microfilms as the image quality and colour information gained from the original documents over the greyscale and badly deteriorated microfilm is far superior.

Figure 1. Visual overview of TSGM documents, photos and negatives

Project Challenges

There were certain known challenges in advance of the project starting which helped in preparation. Knowing about the heat, humidity and power fluctuations aided in determining digitization equipment options to best suit these challenges. Being aware of the skill level of the team helped in planning the solutions approach for training. Below are the main challenges; with the solutions and approach being described in next section.

Environmental Challenges

The Cambodian environment is hot and humid. TSGM is an old previous high school, turned into prison, turned into a museum. The Archives is equipped with air conditioners and is monitored for humidity and temperature but it has challenges.

Archives and digitization rooms

TSGM Archives is located in rooms where previously prisoners were held and there is evidence throughout the digitization room of its former prison state. There are markings on walls and floors; previously forced doorway gaps in walls have since been filled in with cement; and most obvious are cell numbers still remaining painted on the walls.

Historical status of room

One consistent challenge is the historical status of the digitization room itself and the constraint of ensuring floor and walls remain untouched. This was particularly challenging for computer equipment set-ups with network wiring encasements needing to be kept away from walls. In an already small room where space is a premium it has impacted on usable floor space.

Due to wire casings not being allowed to attach to walls, light stands and tables were limited in places where they could be put and so limiting camera station set ups. The issue is that TSGM rooms are in a sense artifacts themselves.

External environment is hot and humid

The digitization room has two external walls with one having the door opening directly to the exterior outside. Each time the door opens hot humid air enters in. Even with air conditioners it gets hot but if the power cuts out it is too hot.

Exterior temperature and humidity increases during parts of the year due to the hot and rainy seasons thus raising the risk of humidity increasing in the Archives and digitization room.

Power fluctuations

It was known in advance that power outages and low power availability would be an issue so plans were made to help manage this. Whilst that was resolved to a degree, recently it became an issue again due to the need for Phnom Penh to limit power to different areas of the city at varying times of day to help manage the huge demand for power with an infrastructure not fully equipped to handle the growing demand.

Skill set of team and language

As well as preserving and digitizing the Museum's archival materials, the key goal of this project is the training and capacity building of the Museum staff and DDD team.

One challenge for this project was to create a digitization capture and post-processing solution that resulted in high quality work yet was straight-forward for the inexperienced team to learn in a very short time.

In addition, in a project like this there is the challenge of language both in terms of human language: Khmer and English, but also in terms of the technical digitization language.

Limited existing Archives inventory

Within TSGM Archives there was some documentation including a log of some prisoners and a little other information but there was no complete existing database. In fact, the first archive team has all left but unfortunately no one recorded any provenance of Archives materials. They left no documentation about how they organized, retrieved, or researched data so recreating and researching TSGM's history and the archival materials is a challenge.

In addition, an inventory of the Confessions documents was limited and it was unknown how much of the 400,000 pages were original documents and how many were duplicates. This caused confusion for digitization in terms of what to capture and how to manage them. It resulted in digitizing more pages than was required which extended the capture and post processing by two months. After fully cataloging the room, the volume of the Archives reaches 750,000 pages with duplicates.

Limited local equipment and supplies

Most of the equipment: camera, lighting, scanning, copy stands, background, as well as preservation supplies, is not available locally in Cambodia. As a result these are imported from Canada, USA, Korea or elsewhere. This increases costs and makes replacing items slower and difficult.

In addition, as local repair expertise is limited, when equipment breaks it is often cheaper to buy new items than return overseas for repair. This is often an issue in developed countries but it is even more so in Cambodia. To help mitigate

down time, extra back up equipment was purchased to replace equipment if needed. For now this is the only easy solution but in time perhaps more materials will become available locally.

Some supplies such as archival paper for folders and art supplies are sourced locally whenever possible. Light stands, for example, were bought at a local camera shop. Lenses and camera sensors can be cleaned locally at very reasonable costs.

Tight timeline challenge to complete project

Over 400,000 pages needed to be preserved, captured, scanned and processed in one year so an efficient process and appropriate equipment needed to be planned and the team resources managed effectively from the start.

Project Approach

Given the challenges already identified and the need to produce excellent quality work in a tight timeline, the approaches taken for this project are outlined in this section.

An efficient process and appropriate equipment needed to be planned and the team resources managed effectively from the beginning. This has been successful and they consistently complete high quality work on time, often ahead of schedule.

First steps – starting from scratch to create the preservation database

As previously noted, at the start of this project there was no existing complete database identifying each of the materials. To cope with this challenge a database needed to be created from scratch. Due to the limited IT skill of the TSGM Archives staff, it was decided to use MS Excel.

In January, 2018, prior to digitization starting, a process was created to develop a preservation database to identify and track the various documents. Within this MS Excel database, as much information as possible is gathered for these documents that includes: estimated and/or actual page counts, fragility condition, paper type, size ranges, the document type such as photos, negatives, bound books, and biographies.

The existing provenance location for the Archive materials was also recorded and in addition that information is partly captured within image filenames. The names may be changed later but at least they can be tracked in the database. Recording their provenance is especially critical as part of the mandate is also to move the documents from the older box containers into new acid-free, lignin-free boxes.

Whilst there are indeed many fragile documents, one thing that has surprised the team is how good overall is the condition of many documents. Some documents present challenges due to being extremely fragile from physical paper damage. Also there is evidence of previous mold as well as foxing and others which are just plain dirty; but overall many pages are in much better state than one might think. Many of the documents and folders are quite acidic as was verified by using a pH pen.

First steps – determining best capture solutions

The Museum onsite environment, the capacity building mandate, local access to equipment, and portability were taken in to consideration when deciding best solutions to implement.

Digital camera capture stations for documents

It was decided to use three capture stations for most documents and bound materials. Each was equipped with a Nikon D810 digital camera on a Kaiser Copy-stand, tethered to a PC workstation with Phase One CaptureOne Pro 11 software.

The cameras run on their battery power for a long while and the PC stations which are attached to UPS battery supply support continued use for up to one hour.

In addition to portability and usefulness in an unstable environment where power can cut out at any time, by using digital cameras instead of flatbed document scanners this also enabled more capacity building for the TSGM staff as they could know how to use cameras for other purpose as well.

Rimelite battery powered lighting source

After investigation, the light source chosen was Rimelite portable strobe lights with battery power supply and softboxes. This enabled each station to continue functioning if the mains power was cut to the digitization room as they are not attached to the UPS power supply. Extra batteries were purchased for each station. Back-up AC power supply units for the Rimelites were also purchased that could be used while recharging the batteries if needed.

Epson scanner stations for photos and negatives

Two scanners were purchased. Epson v850 with SilverFast Ai8 software is used for scanning the small mugshot photos. Epson 12000 XL with SilverFast Ai8 is used for scanning black and white negatives and oversize documents and charts. PCs and scanners are attached to UPS power supply they can run for up to one hour before they shut down during power outages. Scanners are calibrated with SilverFast Ai8 targets and tools.

Light Meter and digitization targets for FADGI

A Light meter for ensuring even lighting on the copy board is shared among the three stations.

It was decided to follow parts of FADGI [5] digitization guidelines for archival imaging. The aim points are straight-forward to teach an inexperienced team. An X-Rite Mini Color Checker Classic target is used for colour balance and a Kodak Q-13 greyscale target ensures the A, M, B and 19 values can be measured daily and settings put in the digitizing software.

Other useful tools and materials

Plexiglas rods, micro-spatulas, brushes and other tools are used if and as needed for preservation, capturing and handling.

Grey studio background paper is used on the copy board and scanners so all documents are digitized against a neutral grey background except for the negatives.

A small custom book support was made and used for some of the bound books; others such as handbooks were shot flat.

First steps – document handling and prep

One of the risks that archives and museums are concerned about when outsourcing digitization is the security and physical impact that handling, movement and environment can have on archival material especially fragile, moldy or otherwise at-risk documents. In terms of safe handling and movement, Brechin provided hands-on training at the beginning to ensure that all DDD and Tuol Sleng staff working on the project developed a respect for the materials and gained skills for safe handling and movement throughout the digitization process.

They were shown how to do simple cleaning of documents prior to capture to remove loose dust and dirt with special brushes. In addition, training was given for small repairs using archival tape and heat set tissue with a tacking iron, Filmoplast P90 and Filmoplast R respectively. The team was also shown how to do basic cleaning of inactive mold on papers.

First steps – starting from scratch with Training

Protocols and procedures were written in English then translated into Khmer for each part of the digitization process: document handling, photo and negative scanning, document capture, RAW and TIFF post-processing, and quality control.

Languages – human and technical

It was required to ensure all training was given in Khmer and that it included a clear explanation and understanding of technical terms. The Project Coordinator spoke English well so was assigned the task of translating throughout the training. However, although he had some digitization skills one of the challenges with language was actually that some terms were their own technical language. So in order to translate to Khmer the Coordinator first needed to learn the terms and digitization along with the training while simultaneously translating to the team. It did work though and was successful as the team caught on amazingly quickly with this technology.

However, often there were limited Khmer words in which to translate some of the digitization terms. As many on the team had never used cameras tethered to PCs before and nor had they used lighting and film or photo scanning equipment, it was difficult to translate to Khmer so often English words were used in context within their Khmer conversations. In such cases the team themselves just used the English word such as the verb "capture" or "copy stand" within Khmer sentences. Some people knew only a little English while others understood more which helped in translating concepts and skills overall.

Training on whole digitization process

There are many parts to this digitization project so Brechin and DDD decided to train the Project team not only on specific parts of the digitization process but on the whole process end to end. Even though a digitization project may seem like a highly-skilled production process with protocols, quality control, tracking and standardization, it makes most sense only if each part of the process is understood and mastered by all who do it.

There are numerous activities and technologies for digitizing materials and often people come to this field with some photographic or imaging experience. In this case, the plan has been to train the team on the most critical skills in order to achieve maximum quality and production results in a very short time. This has worked and the team has been very successful.

Daily production processes

Document preparation

Before documents are digitized they go through the preservation station where they are cleaned, condition assessed, page type recorded and any other relevant notes updated into the preservation database. Each document is identified for document number, version and filename which is recorded on a ribbon of acid-free paper and wrapped around the document.

Document file-naming

By developing a consistent filename protocol for all digitized material types it is possible at a later date to be able to track from where the images originated. Even if file names are later changed there will be a means to track them. The naming process was determined prior to start up and was approved in the Image specifications document. Two examples are:

- CFS_A001_d001_v03_p001.tif (2nd duplicate version)
- PHT_1334_d002_v01_p001.nef (original version)

Capture calibration and targets

The team has been taught to digitize to FADGI [5] archival standards using colour targets and process RAW files to TIFF. Every day each station captures the targets, saves them according to the file naming protocol for targets then measures the aim points and adjusts the lights and settings as needed.

The X-Rite Mini Color Checker Classic is used for colour balance and the Kodak Q-13 is used for tone values. The aim points used are A, M, B and 19. Table 2 indicates the values.

Table 2. Technical values for Aim points on Kodak Q-13

Aim points	Standard	Value accepted
A	242	233-247
M	104	100-118
B	24	20-28
19	12	8-16

Document capture process

Each day the documents are digitally photographed at one of the three capture stations. They are captured into CaptureOne Pro 11 as RAW .NEF files and later transferred to the NAS server within the digitization room.

First each imaging technician prepares the lights, camera, software and folders to start the capture work.

Live view is used to accurately position each page and using the auto focus setting, the documents are captured page by page into the capture folder until the document is completed.

Special macros in Excel were created to automatically create document folders directly from the database. The imaging technician runs the macro to create a batch of document folders into which documents files are then captured. This saves the imaging technician time while capturing. Using CaptureOne setting options the file name is taken from the folder name thereby eliminating typing errors during capture.

Document post-processing and image editing

Each day some RAW .NEF files are copied in batch from NAS to the local drive on one of the post-processing assigned PCs. Using CaptureOne Pro 11, the imaging technician processes NEF files into TIFFs as per imaging specifications: Uncompressed TIFF, 400 ppi, Adobe RGB (1998), 8-bit.

TIFF files are then straightened and cropped using Adobe Photoshop along with actions to semi-automate the process. The cropped file increases in size as the crop setting adds a layer for later QC purposes and is saved. Technical metadata is then batch embedded into the files using Adobe Bridge.

Finished files are copied in batches back to the NAS server ready for QC process later. At which time they are checked for accuracy, batch flattened and saved as LZW compressed TIFFs.

Oversize

Oversize documents are scanned in parts on Epson 12000 scanner then stitched using Photoshop Photomerge. Custom-made supports are used around scanner to support paper. QC checked for correctly merged layers, crop, colour and dust. Technical metadata is embedded in files then copied to NAS.

Photos

Photos are scanned in batches at 600 ppi, 6000 pixels on long side in colour using Epson v850 scanner with SilverFast Ai8. Grey paper is used as a neutral background. Images are cropped and QC checked. Technical metadata is batch embedded. Files are copied to NAS.

Negatives

Negatives are scanned on the Epson 12000 XL scanner in batches using SilverFast Ai8. They are scanned at 3000 PPI and 6000 pixels on the long side in 8-bit greyscale as positive negative images to capture all the film details. In Photoshop they are inverted as actual positive images, straightened, cropped, levels adjusted and saved as uncompressed TIFFs. They are processed in such a way that if the Archives would later like to return to the original negative view it is possible.

Quality Control (QC)

Images are checked in batches for QC and every page image is viewed and checked for image quality to check for no dust, lines, and folds. Checked too are correct orientation, crop, correctly straightened, colour, bit-depth, and colour profile. Project Manager created an efficient auto Macro in Excel to auto check for correct filename, page sequence, folder, size.

The Team's documented challenges

In asking recently some team members about challenges they find difficult they identified a few. Some people had suggestions but for others these are just challenges they face or have now overcome. Some challenges are the same as previously identified by those leading the TSGM-APD Project.

Digitizing

- Targets add time to each day so as it is a production environment could this be done once per week not daily
- Learning new concepts such as tone, targets challenging on both capture stations and scanner stations
- Targets were difficult to grasp and accurately adjusting lights challenging due to space constraints by walls
- Setting lights difficult due to limited space as power wires in the way due to not being able to attach wires to walls
- Often people forget to reset Capture page counter so files need to be renumbered later which is time consuming
- Auto focus was a challenge and frustrating until a printed grid was created by the Project Manager to aid in focusing
- Capturing was difficult to learn at beginning but after 2 months they became proficient at the whole process
- Capturing and preservation stations were challenging at first due to lack of previous experience handling fragile documents but after practicing they became proficient
- Oversize scanning is challenging when extra-large charts do not lay flat which makes stitching difficult

Preservation and document handling

- Counting smaller volume documents page by page is time consuming for documents 30 pages or less. (Documents 1 cm high, page count was estimated at 100)
- Archives are often not in order within folders so duplicates and original documents are difficult to determine
- Notebooks were challenging due to shadow created at gutter and also when some pages have text upside down it is difficult to determine if content is considered as a new document within the book or not

Other issues

- Not knowing Khmer words for translation so used English words: Plexiglas, lights, capture, camera, duplicates, crop
- Many small tools cannot easily be bought in Cambodia or they do not know where to find them to buy easily
- Recent frequent power outages are frustrating for the team.

Project Results

Although there have been other scanning projects in Cambodia such as those of the Yale Genocide Program and Cornell, there has not been an archival preservation and digitization project of this extent and technical level before. Therefore even with the challenges of spreading expertise to local staff in a sustainable way it is hoped that this project will set a new standard of digitization in Cambodia.

Training, equipment and processes were optimized with local context and with limited resources the team has been able to reach a high level of quality in a developing country.

It's a story of compromises in order to meet the project production and capacity-building objectives in a challenging environment.

Behind the technical process of photography and scanning, lie the stories of the objects, people, places captured. Through this project, the aim is to enlighten these stories and that period of darkness for Cambodia.

Conclusions

The archives of Tuol Sleng are a treasure, in a sense that it has not been totally discovered, which makes the project team feel like explorers in a vast history of this former prison. Some of these stories will be illuminated and accessible via a website and online database currently in the process of being developed. By the end of this project anyone with access to the Internet anywhere in the world will be able to view, edit and use the TSGM Archives content.

The authors hope this paper will provide readers with an appreciation for how digitization capacity-building can empower a new generation of Cambodian youth to enlighten their future. Solutions presented here can be replicated in small community museums and archives anywhere. It is hoped that by sharing here what was learnt on this project that other projects for at-risk archives in the developing world with limited resources can benefit from this TSGM experience and will encourage them to digitize their own collections.

Throughout the digitization project and this paper there are stories being told: a story of a prison and a dark period in Cambodian history; a story of a digitization project and its team in a developing country; and within in the digitized materials, stories of thousands of souls.

Cultural heritage digitization is a link that brings past, present and future together; and this TSGM-APD Project is about exactly that. Over the coming months a website for hosting the TSGM digital archives will be created with some form of crowd-sourcing capability. In Cambodia, where about 70% of the current population is below 30 years old, the culture is more future-oriented. This will help involve Khmer people, especially the younger generation, to be actors of their history as "citizen archivists". In that sense they will become new story-tellers for future generations; and so the Story continues.

References

[1] Tuol Sleng Genocide Museum Archives. http://tuolsleng.gov.kh/en/.

[2]. Korea International Cooperation Agency (KOICA). Project: The Tuol Sleng Genocide Museum Archives Preservation and Digitization in Cambodia. http://www.koicacambodia.org/wp-content/uploads/2018/01/8-Tuol-Sleng-Genocide-Museum-archives-ditizationa-and-preservation-Project-revised-1.pdf. Published 8 January 2018. Accessed June 2018.

[3] It is estimated that between 1.5 and 2.5 million people were either killed or died from starvation during the time that the Democratic Kampuchea regime reigned over Cambodia from April 17, 1975 until January 7, 1979.

[4] UNESCO Memory of the World Register. http://www.unesco.org/new/en/communication-and-information/memory-of-the-world/register

[5] Still Image Working Group. Technical Guidelines for digitizing cultural heritage materials. http://www.digitizationguidelines.gov/guidelines/digitize-technical.html. Accessed June 2018.

Author Biography

Alexis Lecoq has managed the Tuol Sleng digitization since its start in January 2018. Alexis's parents are Cambodian but Alexis himself was born, raised, and educated in France. He graduated with a Master's degree from the SKEMA Business School. Alexis manages this project and has led various projects from application development to product launch in different sectors such as NGO, insurance, banking.

Jacqueline Vincent is responsible for the TSGM onsite digitization set-up planning and procedures, providing support working with DDD Senior Project Manager, Alexis Lecoq, reviewing QC and providing digitization and preservation capacity training to the DDD and Tuol Sleng Project team. She started her digitization career as a museum photographer and has over 20 years' experience in cultural heritage digitization and handling archival materials and artifacts.

Frederick Zarndt had digitized newspapers, journals, magazines, books, and records since technology first made it practical. He has experience in requirements development, project management, conversion operations, acceptance testing, software development, and digital preservation. Frederick has been a member of IFLA's Governing Board, Chair of its Division II, a member of IFLA's Committee on Standards, and secretary / chair of the News Media Section.

Pheaktra SONG was graduated in 2016 in History (Royal University of Phnom Penh). His thesis was entitled: "Role of Khmer Rouge songs and performances in gaining support from people during the civil war (1970-1975)". Then he worked in a local NGO where he interviewed many former Khmer Rouge and survivors to contribute to the writing of several books on the history of ethnic groups in Cambodia during Khmer Rouge time. Since August 2018, he is head of Tuol Sleng Genocide Museum Archives and an MA candidate of RUPP.