



Ph.D. Theme Proposal

Decode Giza – Digital Footprint of the Past

*Scientific Field: Archaeology/Digital
Archaeology*

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Sources, Keywords, Notices

My Home Library (History/Archaeology of Ancient Egypt)

Gertrud Thausing, Traudl Kerszt – Kratschmann, Das Grosse Ägyptische Totenbuch, Papyrus Reinisch, Kairo, 1969 and E.A. Wallis Budge, The Egyptian Book of the Dead, Papyrus Ani, London 1895

Cavendish, Ling: Mythology, An Illustrated Encyclopedia (Egypt), Orbis Publishing Limited, London, 1980

Sir Leonard Woolley, History of Mankind, Cultural and Scientific Development, The Beginnings of Civilization, George Allen and Unwin Limited, Unesco, London 1963

Zenon Kosidowski: When Sun was a God, Belgrade, 1997

Dragan Vicanovic: The Secrets of the Pyramids, Metaphysics, Belgrade, 2005

Roberto Giacobbo: Pyramids, Mystery and Reality (Le piramidi: mistero e realtà), Giunti Editore, S.p.A, Firenze – Milano, 2006

Mark Lehner, Ancient Egypt Research Associates, Giza Plateau Mapping Project.

Giulio Magli, The Giza Written Landscape and the Double Project of King Khufu, Faculty of Civil Architecture, Politecnico di Milano

Carlo Eduardo Rodriguez Varona, Damaso Rene Rodriguez Vives, Theory of Construction of Giza Plateau Pyramids, 2020

Jennifer Rigby, Building the Great Pyramid

Jonathan Shaw, Who Built the Pyramids?

Proposal Writing

<https://www.google.com/search?tbm=bks&q=Charles+Rigano>

Ann Darrin, Beth L. O 'Leary, Handbook of Space Engineering, Archaeology and Heritage, 2009

<https://www.google.ba/search?tbm=bks&hl=sr&q=James+Bonwick%2C+The+Great>

<https://www.youtube.com/watch?v=XnssJcG4aCU>

<https://www.3ds.com/stories/giza-3d/>

<https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199935413.001.0001/oxfordhb-9780199935413-e-29>

<http://giza.fas.harvard.edu/archaeology/>

<https://www.blender.org/>

<https://www.ancient.eu/giza/>

<http://www.emeraldgrouppublishing.com/research/guides/methods/interviews.htm>

<http://sru.soc.surrey.ac.uk/SRU13.html>

<https://museoegizio.it/en/discover/story/>

<http://www.egyptian-museum-berlin.com/index.php>

<https://www.orea.oeaw.ac.at/en/home/>

Keywords

Modelling, Digital, Egypt, Egyptology, Applications, Unity, Blender, 3D, Projects, DH

Notice

Some parts of this text are created according to European Commission rules – MSCA (Marie Skłodowska Curie Actions) program.

Important Notice

Integral part of this PhD theme proposal is the following digital support:

Digital Support for My PhD Theme Proposal

<https://joxus81.github.io/gizaArea/>

Giza Plateau, Reconstruction (Unity Game Engine - 3D Digital Environment)

<https://www.behance.net/gallery/160202263/Decode-Giza-Digital-Footprint-of-the-Past-%282022%29>

Video Support

<https://www.youtube.com/watch?v=Lj-kl5hI78E>

Quality, Innovative Aspects and Credibility of the Research Programme

Introduction – Abstract – Chapters – Quality – Innovative Aspect

Introduction

For several decades, computer science shapes our reality and world. From social connections to the practical use in many areas of life, we use computers to make better our daily activities. On the other hand, thanks to the computer technology, scientific community has an excellent support for research and further development, where archaeology isn't an exception. There are digital tools in archaeology, which are all about support for exploration missions and educational purposes. That's a reason why enthusiasts and professionals have an opportunity to be involved in research about archaeological missions around the world.

When we talk about Egyptian archaeology, digital tools have a potential to help in many different ways (people have a possibility to expand their knowledge about ancient Egypt, to meet the Pyramids, Sphinx and beyond). Additional, these tools give to young people possibility to develop interest for history and archaeology, and to open up new horizons in their view on scientific world.

To achieve these goals, we need new applications, new fresh ideas in archaeological science which have a capability to provide the next

generation of educational and exploration tools, with focus on young generations.

I am aware that there are some digital tools about Roman archaeology, but I believe that we need to move further, to expand our digital infrastructure in archaeological science. That's one between many reasons, why I have an intention to work on PhD research, with purpose to contribute to the further development of digital infrastructure of the Egyptian archaeology and history. Focus of my PhD theme is to create modern educational/exploration tool, which relates to Giza Necropolis area, where I am going to use digital tools and apps, modelling tools (Blender and 3DS Max), but also and game engines (Unity, Unreal).

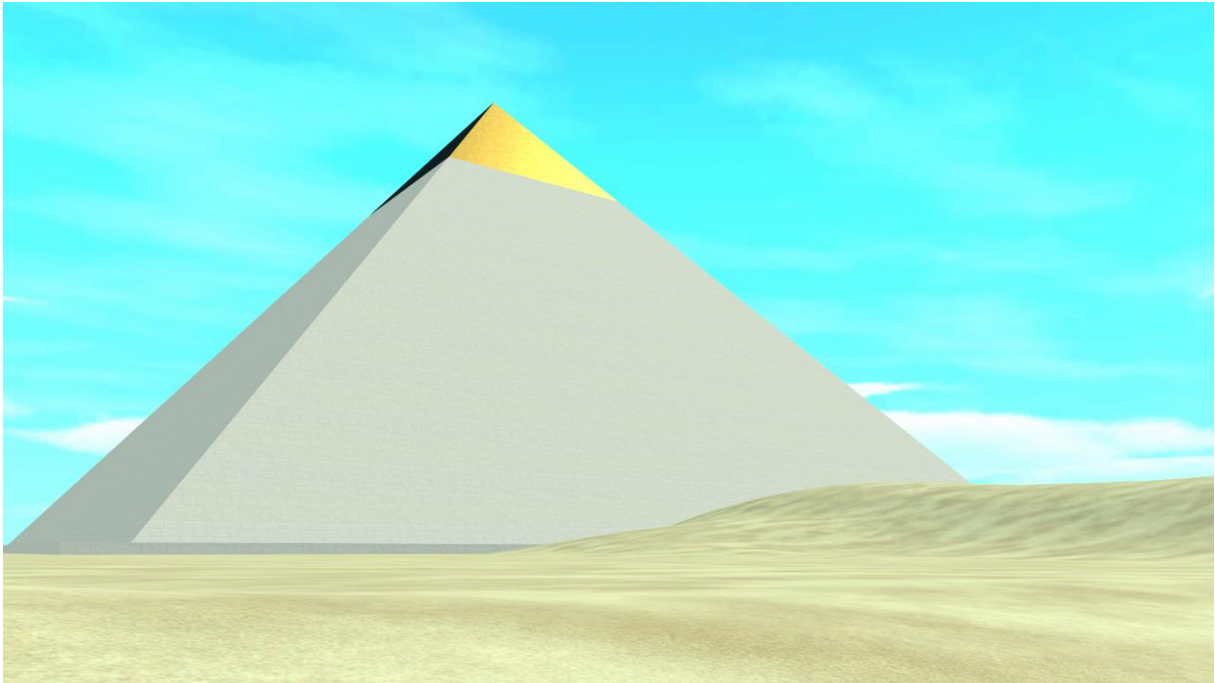
On the other hand, theoretical approach to the history and archaeology of the Giza Necropolis will be very important part of my work and I will use that as background for digital approach. Quality preparation is a key for the success of the doctoral research, and preparation is all about appropriate literature. In my home library, I have a lot of papers and books, which relates to Egyptian archaeology and history, from research about process of the building of The Great Pyramid (Jennifer Rigby – Building the Great Pyramid) to the research about workers of the pyramids (Jonathan Shaw – Who Built the Pyramids?).

Digital approach to exploration on Giza Necropolis is still in the cradle, and there are just few quality applications, which could be a support for research and education. It is worth to be mentioned Giza3D Project, which is created in partnership of Boston's Museum of Fine Arts and Harvard University^{1 2}. However, this application is only the beginning – there are many gaps, which need to be filled (there is no timeline, there is no

¹ <https://www.youtube.com/watch?V=xnssjcg4acu>

² <https://www.3ds.com/stories/giza-3d/>

explanation about age of pyramids, there are very basic characters and interaction with these (talk with the people, for example).



Khufu Pyramid, as it is seen in current version of my educational/exploration tool.

Objectives

Objectives for this work need to be structured to provide a possibility to be created quality dissertation. Also, because of better understanding of my work, and to present about work structure I will give short introduction about objectives for this scientific work.

Objective 1:

Important History Moments in Development of Giza Necropolis

History is always important in any research paper. Through historical approach it is possible to reveal about construction, early days and later development of Giza Necropolis.

According to Laurel Flentye, there are four important periods for research related to historical approach on Giza Plateau: antiquity, classical period, medieval Egypt, eighteenth and nineteenth centuries and finally twentieth and twenty first century.³ All of these periods could provide valuable information about archaeological and historical development of Decode Giza App.

Work on this objective need to give answers on several important issues:

- Age of Pyramids in Ancient Egypt
- Development of Giza Necropolis through time (from fourth dynasty to Roman period),

³<https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199935413.001.0001/oxfordhb-9780199935413-e-29>

- Problems, challenges, obstacles related to construction works on Giza Necropolis and how workers and engineers handled it,
- Giza Necropolis after Romans.

Objective 2

Archaeological Research on Giza Necropolis

In the first half of the XIX century, was taken the earliest modern scientific investigation on Giza Necropolis. Mr. Karl Richard Lepsius made first serious exploration there:

„Aside from some early clearance work in the first half of the 1800s by the Frenchman Auguste Mariette, director of the first national service to monitor and safeguard Egyptian antiquities, the earliest “modern” scientific investigation at Giza took place in 1842–43. At this time a Prussian expedition led by Karl Richard Lepsius (1810–1884) cleared and numbered several private tombs, entered the Great Pyramid, and drew maps and plans of the site.”⁴

Related to archaeological research, there are risen following questions:

- Napoleon in Egypt, first interest for Egyptology?
- Early archaeology research on Giza Necropolis, methods and instruments?
- Archaeological research in XIX century?

⁴ <http://giza.fas.harvard.edu/archaeology/>

- Modern tools in archaeology and exploration on Giza Necropolis?

Objective 3

UI/UX Development

To enjoy in work with any digital application, very important element is a quality UI/UX approach. The fact is that we like to see quality designed and functional user interface. In Decode Giza, I care about UI/UX, in first place because of comfortable use of my application. Excellent text about importance of the quality UI/UX design for modern educational tools, can be found on „Backpack Interactive“ website:

„When it comes to designing UX in education, a generalist approach to product design and user experience simply doesn't cut it.

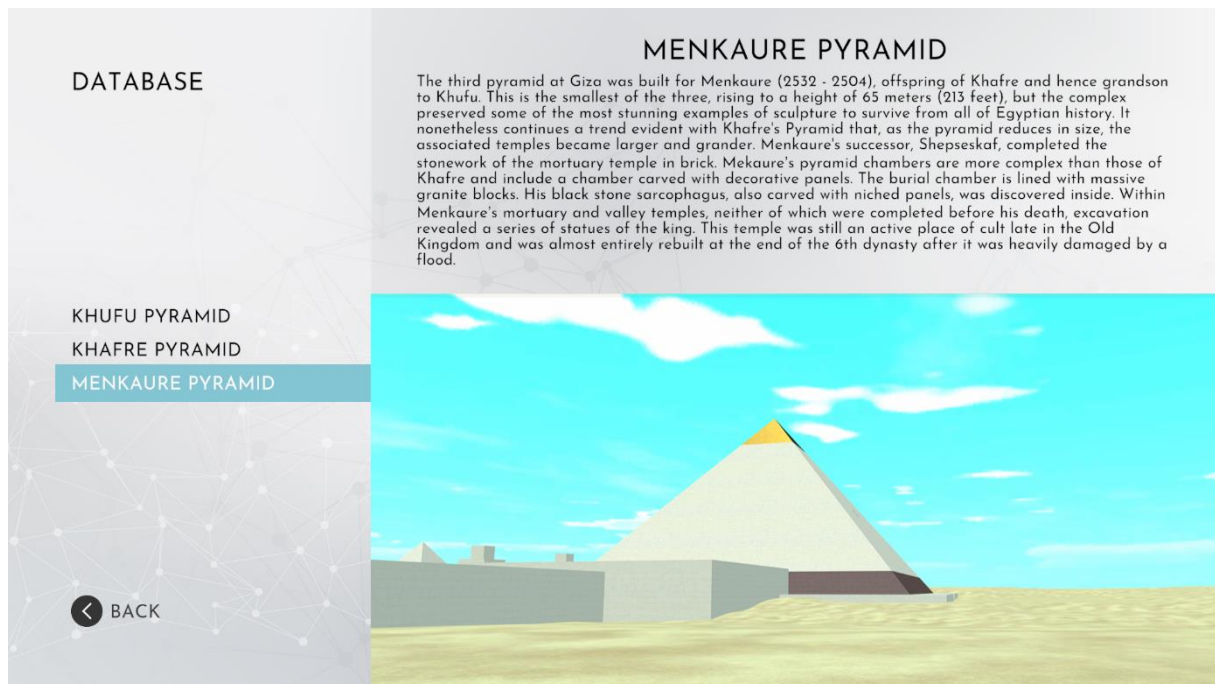
Learning products have very different requirements than consumer tech. They're used by teachers and students in school environments to achieve high-stakes outcomes.

That's why it's even more important to base the UX of learning tools on research that reflects how students learn most effectively. By specializing in learning science, product design, and user research, UX designers in education are poised to become the learning engineers of the future.”⁵

There are many subobjectives, which need to be answered, but the most important are:

⁵ <https://backpackinteractive.com/insights/ux-education-learning-engineers/>

- Customize application (graphics, sound, etc.),
- Educational/Exploration UI (texts, information).



UI in upcoming version of my Decode Giza app

Objective 4

Work on the Structures – From Khufu Pyramid to the Lost City of the Pyramids

The most complex element in my work is development of different structures on Giza Necropolis. It all starts with terrain creation, and continue with Khufu Pyramid, Khafre Pyramid, Menkaure Pyramid and beyond. To achieve these results, I am using two main tools – Unity Game Engine and 3DS Max. However, to improve my work, I additional use – Unreal Game Engine and Blender. To complete this objective I have to fulfill three main subobjectives:

- Historical/archaeological background about development of Giza Necropolis,
- Apply proper 3D models, textures and other digital assets,
- Programming elements in C# language.

Objective 5:

Comparative Approach

Because I am working on my own projects, which relates to digital archaeology of Ancient Rome and Egypt, in this paper I will use comparative approach in Roman digital archaeology. Ancient Rome has several important projects related to digital archaeology. It is worth to be mentioned ColosseumVR, Rome Reborn, Virtual Augustan Rome and many other. These are very quality projects, with modern approach to long history of Ancient Rome.

Research Methods

I have decided to use following research methods with purpose to achieve good results and to reveal some very useful findings in this exploration mission:

Research from Historical Point of View

History of Giza Necropolis is extremely long and from this method could be revealed many important findings for this research, from the three pyramids, workers quarters, tombs to the Great Sphinx.⁶ These are just a small part of the objects on Giza Necropolis Area.

Research from Archaeological Point of View

Archaeological research of the Giza Necropolis has a starting point in XIX century. Important people, who were involved in this research (Lepsius, Mariette⁷ and many other) were beacons for modern archaeological research on Giza Plateau. Crucial will be to tell more about first excavations, but also about important technologies in archaeology from XIX century to modern age.

Testing of digital apps and tools,

This method is important because, testing of digital apps and tools could provide crucial information about features, possibilities, limits, pros and

⁶ <https://www.ancient.eu/giza/>

⁷ <http://giza.fas.harvard.edu/archaeology/>

cons of these programs. I will need to test and present results about features, functions, options and development of Unity Game Engine, Unreal Game Engine, 3DS Max and Blender.

Interviews with high profiled experts in this field,

Today, but in the past too, interview is one of the most important tool for researcher. There are several important principles related to interview (I will insert here just some of them):

„Neutrality“,

„Generation of new knowledge“,

„Ethics“.⁸

- „*Neutrality*“ is probably one of the most important principle for good scientific research, because researcher need to take a neutral stand in interview.
- „Generation of New Knowledge“ – „...Thinking about an issue in a new way.“⁹
- „*Ethics*“ – Interviewer need to follow ethics standards.

Comparative approach (Digital Environments – Ancient Egypt and Rome)

⁸<http://www.emeraldgrouppublishing.com/research/guides/methods/interviews.htm>

⁹<http://www.emeraldgrouppublishing.com/research/guides/methods/interviews.htm>

Comparative approach is old good method for scientific research. There are two excellent sentences to reveal more about this approach:

„Comparative research methods have long been used in cross – cultural studies to identify, analyse and explain similarities and differences across societies.

The benefits to be gained from cross – national work include a deeper understanding of other cultures and of their research processes.”¹⁰

On the other hand, comparative approach, which relates to digital environments of Ancient Egypt and Rome, could provide excellent insight about development of digital reality worlds, which relates to these ancient countries.

Internet Research

In modern time, any scientific research need internet sources for creating a good research paper. There are many places on internet where could be found literature. As first Google Books is an excellent place for researching on different scientific themes. Also, there is a Google's Public Domain library.

On the other hand, there are quality scientific driven webpages (for example academia.edu, ResearchGate), where scholar could collect important material for his/her research.

Literature (books)

¹⁰ <http://sru.soc.surrey.ac.uk/SRU13.html>

There are many books written about Giza Plateau. I already have some important literature in my home referring to Ancient Egypt and Giza Necropolis. Also, Google has a collection of public domain books.

Research Visits

For successful research I need to visit several places with purpose to create better doctoral paper. My research visits need to provide useful facts in following areas:

HISTORY/ARCHAEOLOGY

Italy, Turin, Museo Egizio

Museo Egizio is one of the largest museums devoted to Egyptian history and archaeology. On the museum's website, we can read:

„The Museo Egizio is world's the oldest museum devoted entirely to ancient Egyptian culture.”¹¹

Also, museum has a very long history, which started in 1824:

“It was used to exhibit the first antiquities in the Drovetti collection, purchased by King Carlo Felice.”¹²

Large number of artefacts and excellent organisation give recommendation to visit this museum, talk with the experts about my PhD work and acquire new finds.

P.S.

I already contacted this museum. Contact person – Mr. Tommaso Montonati.

¹¹ <https://museoegizio.it/en/discover/story/>

¹² <https://museoegizio.it/en/discover/story/>

Austria, Vienna, Kunsthistorisches Museum

Kunsthistorisches Museum in Vienna is one of the most magnificent museum in the world. Excellent exponats, large monuments, are just some of the numerous artefacts in this excellent place. This museum is a real good place for lovers of Egyptian history and archaeology. Here are several paragraphs about this magnificent place:

„The Egyptian and Near Eastern Collection of the Kunsthistorisches Museum is among the world’s most important collections of Egyptian antiquities. The more than 17 000 objects date from a period of almost four thousand years, from the Egyptian Predynastic and Early Dynastic periods (ca. 3500 BC) to the early Christian era. Geographically their origins range from Egypt, Nubia, the eastern Mediterranean and Mesopotamia to the Arabian Peninsula.“¹³

DIGITAL APPROACH

Austria, Graz, Austrian Centre for Digital Humanities

To learn more about concept of digital humanities (visit to Graz, Austrian Centre for Digital Humanities). This visit is very valuable because of possibility to I learn more, talk with experts about digital humanities system and to apply some concepts to my work. I want to mention here, that I had some contacts appropriate scientist/professor in this institution.

¹³ <https://www.smb.museum/en/museums-institutions/neues-museum/about-us/profile/>

*Austria, Vienna, Institute for Oriental and European Archaeology,
Digital Documentation Lab*

Digital Lab (visit to OREA – Institute for Oriental and European Archaeology (Vienna), Digital Documentation Lab). Visit to this Lab could provide connections with crucial people and experts in digital archaeology field. Institute orientation to Europe, Egypt, Levant, Aegean and Anatolia¹⁴ regions give strong recommendation for visit to this Institute,

Ubisoft Offices, Belgrade, Serbia

Because Ubisoft software company is one of the largest gaming industry, but also their game Assasins Creed serial has excellent ancient locations, it will be very important to find out more about creation of different digital worlds, but also their experience in process of the creation itself. For example, in Assasins Creed Origins, along with gameplay, there is also and Discovery Mode.¹⁵

¹⁴ <https://www.orea.oeaw.ac.at/en/home/>

¹⁵ https://www.youtube.com/watch?v=L_KOpq_BH1g

Quality and Efficiency of the Implementation

Milestones list

- Introduction
- Long History of the Giza Necropolis
- Digital Approach

Work Chart



ETHICS

Intellectual Property Rights

All intellectual rights in this work will be protected. As first, any citation will be provided in footnote with appropriate data about author, book, publisher, etc. I will make a commitment to copyright protection related to digital products too. Any photo under licence will be treated according to licence. My work will be accessible for checking („Intellectual Property Rights“).

Legal and Ethical Elements

My work will be in line with legal documents related to ethical elements. Also, I will follow moral rules in this work.

Date: 22/02/2023