

# “The History of Islam”

## Of graphs, maps, and 30,000 Muslims

### *a digital project proposal*

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#### Abstract

For decades, scholars of Islam have recognized the value of Islamic biographical collections. Numbered in the hundreds, these multivolume texts cover practically every aspect of Islamic history and culture, being exceptionally valuable for the social history of Islam. Unfortunately, the sheer size of these texts posed the most formidable challenge and their riches still remain largely untapped. The recent digital turn, however, opens new research opportunities: thousands of classical Arabic texts are now available in online open-source libraries, and we have methods that support the automatic extraction of meaningful information from large textual corpora. Building on these developments, the project offers a computational analysis of perhaps the most ambitious history of the entire Islamic world that has been written in the 14th century by a Damascene religious scholar and historian al-Dahabī (d. 748/1347 CE). This book, the *Taʾrīḥ al-islām* (“The History of Islam”), preserves over 30,000 biographies of notable Muslims from the first seven centuries of Islamic history (c. 600–1300 CE). Drawing on insights from studies in literary history, social sciences, computational and corpus linguistics, geographical information systems, and computer science, the project seeks to offer a data-driven perspective on Arabic historiographical tradition and on the premodern Islamic world itself as can be constructed from the riches of this vast tradition. The project relies on a text-mining approach that was developed by the author for the analysis of Arabic historical texts. Finally, the project aims to pave the way to the analysis of the entire digital corpus of biographical collections and chronicles, which, with approximately 300 titles, includes over 400,000 biographical records (mostly pre-1600 CE).

## Outline of the project's arguments, themes, and significance to the field

With at least 25,000 unique titles identifiable for the period before 1500 CE,<sup>1</sup> the Arabic written tradition is one of the greatest treasures of knowledge in human history. Covering practically every aspect of Islamic culture, this tradition is particularly rich in extensive historical sources such as chronicles and biographical collections. The overall volume of individual titles is astonishing, varying from hundreds to tens of thousands of biographies each, with the overall number of biographies in digitally available sources running into hundreds of thousands. This circumstance makes biographical collections perhaps the best source on the social history of the Islamic world, particularly for the period prior to the 15<sup>th</sup> century, for which very few primary documents and archives are available.

The potential of the quantitative approach to these sources has been conceptualized and demonstrated by several historians who worked independently in different countries in the 1970s and 1980s.<sup>2</sup> However, the excessive volume of even individual titles posed a formidable challenge. Previous attempts to study Arabic historical sources relied on the use of mechanically sortable index cards, punch cards, early computers that stored data on magnetic tapes, and, most recently, relational databases. None of these approaches, however, allowed one to surpass the bottleneck of data extraction and processing, and the methods remained limited in many ways and extremely time consuming. The number of data-driven studies is still small, and the potential of the approach has not been realized. The unfathomable Arabic biographical and historical texts became “both a blessing and a curse,” to quote a prominent Islamicist.<sup>3</sup>

The recent digital turn offers unprecedented opportunities. In the course of the past decade thousands of premodern Islamic texts have become available in full-text digital format through a number of online open-access libraries,<sup>4</sup> while at the same time

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<sup>1</sup>This number is based on my analysis of the *Hadiyat al-ʿarifin*, a two-volume Ottoman bibliographical collection from the early 1900s, whose compiler, Ismāʿīl Bāṣā al-Baġdādī (d. 1920), listed over 8,800 authors and 40,000 titles: Ismāʿīl Bāṣā al-Baġdādī, *Hadiyat al-ʿarifin asmāʾ al-muʿallifin wa-atār al-muṣannifin*, 2 vols. (Istānbul: Wikālat al-Maʿārif, 1951).

<sup>2</sup>The approach was first explicitly conceptualized in Richard W. Bulliet, “A Quantitative Approach to Medieval Muslim Biographical Dictionaries,” *Journal of the Economic and Social History of the Orient* 13, no. 2 (April 1, 1970): 195–211, doi:10.2307/3596086; for a somewhat belated description of the approach used in Soviet Academia (*in Russian*): Stanislav M. Prozorov and Maxim G. Romanov, “Principles and Procedures of Extracting and Processing the Data from Arabic Sources (Based on Materials of Historical-cum-biographical Literature) / Original Title: Metodika Izvlecheniya i Obrabotki Informatsii Iz Arabskikh Istochnikov (Na Materiale Istoriko-biograficheskoi Literaturi),” *Oriens/Vostok* 4 (2003): 117–27.

<sup>3</sup>Wadād al-Qāḍī, “Biographical Dictionaries: Inner Structure and Cultural Significance,” in *The book in the Islamic world: the written word and communication in the Middle East*, ed. George N. Atieh (Albany : [Washington, D.C.]: State University of New York Press; Library of Congress, 1995), 93.

<sup>4</sup>Altogether, the libraries that I was able to survey include over 30,000 texts (the number of unique titles, however, is difficult to establish at the moment). The largest online libraries are: *al-Maktabat al-šāmilat* ([www.shamela.ws](http://www.shamela.ws); 6,300 texts); *al-Miškāt* ([www.almeshkat.net](http://www.almeshkat.net); 7,300 texts); *Ṣayd al-fawā'id* ([www.saaaid.net](http://www.saaaid.net); 10,000 texts); *al-Warrāk* ([www.alwaraq.com](http://www.alwaraq.com); 860 texts); *al-Maktabat al-šūʿīyyat* ([www.shiaonlineibrary.com](http://www.shiaonlineibrary.com); 1,970 texts); other libraries come on CDs, DVDs (for example, *al-Muʿjam al-fikhi*, Qom/Iran, 1,130 texts), and even external HDD (*al-Ġāmiʾ al-kabīr*, ʿAmmān/Jordan, 2,400 texts). NB: While some conservative scholars tend to dismiss these collections as unreliable, it must be stressed—time and again—that these texts are predominantly high-quality reproductions of printed editions that are widely used in the field of Arabic and Islamic studies; most of these reproductions were produced with a

rapid development of computational methods of text analysis has provided a number of novel approaches for studying large textual corpora. These two developments help to overcome the main limitations of conventional quantitative historical studies and take full advantage of the information trapped in these voluminous texts. First, modern computers make data extraction fast, scalable, and flexible; second, computational methods of text analysis allow one to maintain solid connections between collected quantifiable data and full-text passages that deal with specific instances, and thus bringing together distant and close reading. Exploring these advances, my doctoral dissertation<sup>5</sup> offered a novel method for studying Arabic historical sources and a showcase of its application. Building on this work, the proposed digital project offers an exploratory study of the largest surviving biographical collection, “The History of Islam” (*Taʾrīḥ al-islām*) of the Damascene religious scholar and historian al-Dahabī (d. 748/1347 CE): a 50-volume collection (~3,4 million words), this book covers seven centuries of Islamic history (c. 600–1300 CE) through about 30,000 biographies and 10,000 descriptions of historical events. Methodologically, the project draws on insights from studies in literary history, social sciences, computational and corpus linguistics, geographical information systems (GIS), and computer science, which now often merge in the growing field of the digital humanities.

The project deals with two closely intertwined broad themes of (1) Islamic biographical and historiographical tradition in Arabic; and (2) Islamic history. More specifically, **Theme I** focuses on the issue of how al-Dahabī’s *Taʾrīḥ al-islām* fits into the biographical and historiographical tradition of the premodern Islamic world. Methodologically, this issue is approached through the computational analysis of text reuse<sup>6</sup>—i.e., who quotes whom and to what extent—and thus focuses on the intertextuality of this collection of historical and biographical data, offering readers/users an analysis of the interconnectedness of the main text with its direct and indirect sources through multifaceted visualizations, extensive annotations, and interpretative narrative. While scholars familiar with this text never doubted that this text is a compilation, the project offers the first large-scale and data-driven insight into compilation practices in medieval Islamic culture through the comparison of this text with a corpus of about 4,000 Arabic texts from the first millennium of the Islamic history (roughly up until 1600 CE). The corpus that used for the analysis is compiled from texts that have been collected from a range of online open-access libraries (see a note on OpenArabic [Open ITI Corpus] below). Although not devoid of thematic biases, together these libraries offer a solid coverage of Arabic historiographical tradition—broadly defined (ca. 600 titles,

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double-keying method that provides 99.9% accuracy, see Susanne Haaf, Frank Wiegand, and Alexander Geyken, “Measuring the Correctness of Double-Keying: Error Classification and Quality Control in a Large Corpus of TEI-Annotated Historical Text,” *Journal of the Text Encoding Initiative*, no. Issue 4 (March 8, 2013), doi:10.4000/jtei.739.

<sup>5</sup>Maxim G. Romanov, “Computational Reading of Arabic Biographical Collections with Special Reference to Preaching in the Sunni World (661-1300 CE)” (PhD thesis, University of Michigan, 2013).

<sup>6</sup>Developed by David Smith, this approach is the methodological backbone of the Viral Texts Project ([viraltexts.org](http://viraltexts.org)). The approach is described in: Smith D., Ryan Cordell, Elizabeth Maddock Dillon, Nick Stramp, and John Wilkerson (2014). “Detecting and modeling local text reuse.” In *Proceedings of the 14<sup>th</sup> ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL ’14)*. IEEE Press, Piscataway, NJ, USA, 183-192. the same approach is also used in the KITAB-Project, of which I am also an integral part; the project is led by Dr. Sarah B. Savant (Aga Khan University—London); for more on KITAB-Project, see below.

170 million words)—as well as that of major forms and genres of Arabic written tradition more generally (ca. 4,000 texts, 500 million words).<sup>7</sup> Theme I also addresses the issue of al-Dahabī's historical method through the analysis of the relationship between the *Ta'riḥ al-Islām*, its sources, and al-Dahabī's other books.<sup>8</sup> Through the engagement with al-Dahabī's method, Theme I also deals with the issue of the “representativeness” of the *Ta'riḥ al-Islām* and the Arabic biographical tradition more generally, seeking to answer the question of what we can and cannot learn from these sources. Theme I is intended primarily for the attention of specialists in the field of Arabic and Islamic studies as it addresses historiographical issues and anticipates most common criticism of conservative colleagues who take a dim view of data-driven studies of Islamic historical texts.

**Theme II** focuses on a possible past—a view of Islamic history that can be constructed from al-Dahabī's extensive coverage of the first seven hundred years of Islamic civilization. Through the exploratory analysis of 30,000 biographies, this theme seeks to address such large-scale questions as: What was the extent of the Islamic world and how its shape changed over time? What were its cultural centers? How were they contributing to the cultural development of the Islamic world and how their role changed over time? What were the major transformations that the Islamic society—or, more precisely, its élites—underwent in the course of this long period? What social, religious and professional groups played an active role—also where and when—in molding what became the Islamic world?

[*Internal organization of the project*] From the bottom-up perspective (or the developer's/researcher's perspective), the project will feature a number of short analytical essays that focus on specific aspects of multifaceted biographical and historical data. Each of these essays will explore spatial, chronological, and social patterns—featuring graphs, maps and other relevant visualizations—of various groups of individuals that can be identified in the text of the main source through various techniques of computational text analysis. Each of these essays will stand on their own as analytical references accessible from different entry points into the digital project, but, more importantly, they will be woven—through their unique IDs (URIs)—into more complex narratives of cultural geography and social history of the premodern Islamic world (with each essay—or its specific sections—featuring in multiple narratives). Overall, there will be 200–250 of such analytical essays.

For example, an essay on al-Kūfat will focus on individuals whose extended names include *nisbat* al-Kūfi (or whose association with this garrison city of al-ʿIrāq can be identified through other means). Showing how the numbers of Kufans were changing over time, it will reflect on al-Kūfat's contribution to Islamic culture; the essay will

<sup>7</sup>The conversion of this huge collection of texts into a proper digital corpus—divided into logical information units and supplied with rich metadata—is an ongoing collaborative process of the Islamicate Texts Initiative ([iti-corpus.github.io](http://iti-corpus.github.io)); a detailed report can be found at [github.com/OpenArabic/Annotation/](https://github.com/OpenArabic/Annotation/).

<sup>8</sup>My latest article—“Observations of a Medieval Quantitative Historian?” (accepted for publication in *Der Islam*, summer 2016)—theorizes about a possibility of al-Dahabī using quantitative techniques while working with his sources; the submitted version of the article is accessible at [maximromanov.github.io/files/Romanov-OMQH.pdf](https://maximromanov.github.io/files/Romanov-OMQH.pdf).

also feature a geographical network of Kufans—i.e., where they traveled and how their travel patterns changed over time—as well as will look into other places in the Islamic world from which people traveled to al-Kūfat. Another part of this essay will focus on social, economic, religious, tribal and other backgrounds Kufans, as well as other issues that can be identified through the computational analysis of linguistic patterns in biographies. As an analytical reference in its own right, this essay will be accessible, for example, from the map of the premodern Islamic world—through clicking on the icon of al-Kūfat on the map. This essay—together with essays on other ‘Irāqī cities and towns—will be woven into a broader narrative on al-‘Irāq, as well as into the even broader narrative on the cultural geography of the premodern Islamic world in general. Sections of this essay that deal with specific social, religious, economic, tribal and other groups will be integrates into narratives on those groups, thus offering the social, chronological and geographical interpretations of those groups.

From the top-down perspective—the user’s/reader’s perspective,—the project will have multiple entry points. Namely, a user will be able to peruse each and every individual analytical essay—essays on provinces, cities and towns will be accessible through a searchable and interactive maps of the premodern Islamic world; essays on specific social, religious, economic, tribal and other groups will be accessible through the social network maps, which will also show and explain how these categories overlap. Another major entry point will be specific thematic narratives of cultural geography and social history. Narratives of social geography will include narratives of regions—to name just a few, how individual places make up a province and how the prominence of the entire province oscillates over time; how different regions contribute to the development of various forms of knowledge production (primarily, the development of Islamic religious sciences—the Qur’ān, Ḥadīth/Tradition, Fiqh/Law, Ṭaṣawwuf/Mysticism, etc.); how different regions are connected with the rest of the Islamic world and how travel patterns shift over time. Narratives of social history will include narratives of social groups—for example, an essay on the scholars of Ḥadīth/Tradition will highlight economic, religious and other backgrounds of these individuals, explore their geographical concentrations and travel patterns, and how these individuals are also involved in the development of other forms of knowledge production. Narratives of cultural geography and social history will be further interwoven into broader narratives that focus on tribal history, urban growth, development of religious sciences and other forms of knowledge production, the composition of Islamic élites, etc.

Such composition of the project will allow for guided (through narratives) and free (through individual analytical essays) explorations of patterns in Islamic historiographical tradition and premodern Islamic historical data. Relevant sections will also include descriptions of methodology for those interested in understanding how the project was developed as well as for those who are interested in engaging in a methodologically similar research.

One of the major long-term goals of the project is to provide the methodological and infrastructural foundation for the analysis of the entire digital corpus of biographical collections and chronicles that are currently available in the digital format (again, see

a note on OpenArabic [Open ITI Corpus]). Findings will be presented with time-series graphs, network graphs, cartograms and other custom visualizations designed for specific purposes. Examples of types of visualizations can be found on my website and in my dissertation.

### **Assessment of the work's fit with existing literature, comparison with other digital projects and/or published books on the topic, and discussion of the intended audiences and market for the project**

As mentioned before, a series of data-driven studies of social and intellectual history of the Islamic world have been published in the 1970s and 1980s,<sup>9</sup> but the cultural turn in the early 1990s made quantitative approaches unpopular among historians in general<sup>10</sup> and only a handful of studies that work with the data of Islamic biographical collections have appeared since then. Yet, the most recent digital turn brings data-driven approaches and the *longue durée* thinking back into the field of historical studies,<sup>11</sup> and “The History of Islam” fully embraces this turn. I have been consulting a number of colleagues on digital approaches to Islamic textual sources over the past three years in the US, UK and continental Europe, and to my knowledge, there are no comparable projects that deal with the premodern Islamic world.

Since the project is primarily academic, the two major categories of consumers of this project are scholars and students. My visualizations of biographical data from al-Dahabī’s “History” are frequently used by my colleagues for teaching purposes, so I have no doubts that “The History of Islam”, a dynamic and robust exploratorium of Islamic biographical data, will attract a lot of interest among professors, teachers and students. Since a lot of biographical data will be available in Arabic (a complete translation of a 50-volume book is hardly a possibility), those with command of Classical Arabic will benefit the most from the project. At the same time, the project will still be of significant value to anyone interested in Islamic history and is likely to attract a lot of interest from outside of academia as well.

<sup>9</sup>For example: Richard W. Bulliet, *The Patricians of Nishapur: A Study in Medieval Islamic Social History* (Cambridge, Mass.: Harvard University Press, 1972), Carl F. Petry, *The Civilian Elite of Cairo in the Later Middle Ages* (Princeton, N.J.: Princeton University Press, 1981), Hartmut E. Fāhndrich, “The Wafayāt al-A’yān of Ibn Khallikān: A New Approach,” *Journal of the American Oriental Society* 93 (1973): 432–45, Hayyim J. Cohen, “The Economic Background and the Secular Occupations of Muslim Jurisprudents and Traditionists in the Classical Period of Islam (Until the Middle of the Eleventh Century),” *Journal of the Economic and Social History of the Orient* 13 (1970): 16–61, Konstantin A. Boyko, *Arabskaia Istoricheskaia Literatura V Ispanii: VIII-pervaia Tret’ XI V.*, ed. Piotr A. Griaznevich (Moskva: Nauka, Glavnaia red. vostochnoi literatury, 1977), Stanislav M. Prozorov, *Arabskaia Istoricheskaia Literatura V Irake, Irane I Srednei Azii V VII-seredine X V.: Shiitskaia Istoriografiia*, ed. Piotr A. Griaznevich (Moskva: Nauka, Glavnaia red. vostochnoi literatury, 1980), Konstantin A. Boyko, *Arabskaia Istoricheskaia Literatura V Egipte, IX-X Vv.*, ed. Piotr A. Griaznevich (Moskva: Nauka, Glav. red. vostochnoi lit-ry, 1991); for a detailed discussion, see Romanov, “Computational Reading,” 51–58.

<sup>10</sup>John F. Reynolds, “Do Historians Count Anymore? The Status of Quantitative Methods in History, 1975–1995,” *Historical Methods* 31 (1998): 141–48.

<sup>11</sup>See, Jo Guldi and David Armitage, *The History Manifesto* (Cambridge, United Kingdom: Cambridge University Press, 2014).

### Statement of the anticipated timeline for completion of the project

The overall period of the development of the project is 24 months (12 months for each theme). Currently I am working on producing data from the main text as well as from other relevant textual sources and developing online visualizations (some in collaboration).

### Outline of technical structure of the project (platform, tools, etc.) and of past, current and future collaborators in terms of technical and, if applicable, scholarly development

The project will be an automatically-generated static website with dynamic data visualizations (R and Shiny, D3), linked into full text primary sources, which will be available through stable URIs from OpenArabic [Open ITI Corpus]; all other data of the project will be also available on github. An early version of the visualization prototype for biographical data can be found at [maximromanov.shinyapps.io/tabaqat/](http://maximromanov.shinyapps.io/tabaqat/).

In addition to analytical machine-readable data, from which visualizations will be generated, the project will include the full Arabic text of “The History of Islam” and a selection of other relevant biographical collections. In addition to being a scholarly contribution in its own right, the conceptual design of the project will allow “The History of Islam” to persist as a research environment that will facilitate seamless integration of distant and close reading of Islamic medieval biographical collections.

The technical development of the project will be accomplished in collaboration with the *KITAB-Project* (led by Dr. Sarah Savant, *see below*) and with occasional help from my colleagues at the Alexander von Humboldt Chair for Digital Humanities at the University of Leipzig.

### Sample of the digital project (link to prototype with basic functionality)

At the moment I do not have a prototype of for this project, but the following projects can be considered examples of my digital work. Each of these projects, completely or partially, will be integrated in “The History of Islam” project. (NB: the projects are listed alphabetically.)

1. **KITAB-Project.**<sup>12</sup> Led by Dr. Sarah Savant of Aga Khan University—London, our collaborative project uses David Smith’s text reuse algorithms that are behind the *Viral Texts Project* ([viraltxts.org](http://viraltxts.org)) at Northeastern University (Boston, MA, USA) to conduct a large-scale study of the intertextuality of classical Arabic written tradition, or, in other words, how authors copied each other. “The History of Islam” project will incorporate a series of visualizations and data browsers that we—as a team—are developing for the KITAB-project. A working prototype of the text reuse browser can be found

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<sup>12</sup>For the general overview of the project: [kitab-project.org/](http://kitab-project.org/); for the example of text reuse browser, see (in Arabic): <http://kitab-project.org/kitab/KTBLoadBookDD>.

at [kitab-project.org/kitab/KTBLoadBookDD](http://kitab-project.org/kitab/KTBLoadBookDD) (*username:* kitab-user; *password:* Kitab321), where one can already explore how al-Ḍahabī copied information from the works of his predecessors. “The History of Islam” project will be limited to the data relevant to the main text.

2. **OpenArabic** [Open ITI Corpus] (for a detailed information, see: [github.com/OpenArabic/Annotation](https://github.com/OpenArabic/Annotation)). The goal of OpenArabic is to build an open-source machine-actionable corpus of premodern texts in Arabic in order encourage computational analysis of the Arabic written tradition. Currently, most of the texts are historical in nature (chronicles, biographical collections, geographical treatises and gazetteers, adab, and thematic dictionaries). Most of the texts derive from open-access online collections of premodern and modern Arabic texts such as [shamela.ws](http://shamela.ws), [shiaonlineibrary.com](http://shiaonlineibrary.com), and *al-Jāmi‘ al-kabīr*, which has been published on an external HDD and is not available online. OpenArabic Project is an initiative at Alexander von Humboldt Chair for Digital Humanities (the chair is held by Prof. Gregory Crane) at the University of Leipzig; the project is led by Maxim Romanov. OpenArabic is soon to be morphed into Open ITI Corpus and merged with a broader interinstitutional venture—*Islamicate Texts Initiative*. Led by researchers at the Aga Khan University (AKU), University of Leipzig (UL), and the Roshan Institute for Persian Studies at the University of Maryland (College Park) and an interdisciplinary advisory board of leading digital humanists and Islamic, Persian, and Arabic studies scholars, ITI aims to provide the essential textual infrastructure in Persian and Arabic for new forms of macro textual analysis and digital scholarship. In the process, ITI will enable new synergies between Digital Humanities and the inter-related Islamicate fields of Islamic, Persian, and Arabic Studies. For detailed information, see <http://iti-corpus.github.io/>.
3. **Ṣūrat al-arḍ, Ver. 0.1**, *An Interactive Geographical Model of the Classical Islamic World*.<sup>13</sup> Using the data from *al-Turayyā Gazetteer*, the model is largely inspired by and follows in the footsteps of ORBIS, the Stanford Geospatial Network Model of the Roman World ([orbis.stanford.edu](http://orbis.stanford.edu)). The *Ṣūrat al-arḍ* is designed to explore different aspects of geography of the premodern Islamic world.
4. **al-Ṭabaqāt, Ver.01** ([maximromanov.shinyapps.io/tabakat/](http://maximromanov.shinyapps.io/tabakat/)) is a prototype of a visual explorer of data extracted from biographical collections. It is built with Shiny in R.
5. **al-Turayyā Gazetteer, Ver.03** ([althurayya.github.io](http://althurayya.github.io)).<sup>14</sup> Based on a printed atlas and a gazetteer,<sup>15</sup> *al-Turayyā Gazetteer* will serve as a reference for understanding the geography of the premodern Islamic world. The gazetteer is searchable and readers/users can get access to additional reference resources, to which

<sup>13</sup>[maximromanov.github.io/projects/surat\\_al\\_ard\\_01/](http://maximromanov.github.io/projects/surat_al_ard_01/), developed in collaboration with Cameron Jackson, a BA student at Tufts University (Class of 2014).

<sup>14</sup>The initial version of *al-Turayyā* that was developed in collaboration with Cameron Jackson, a BA student at Tufts University (Class of 2014) is available at [maximromanov.github.io/projects/althurayya\\_02/](http://maximromanov.github.io/projects/althurayya_02/).

<sup>15</sup>Georgette Cornu, *Atlas du monde arabo-islamique à l'époque classique: IXe-Xe siècles* (Leiden: E.J. Brill, 1983).



it is linked. The first type of linked resources includes to a series of modern on-line references (Brill's *Encyclopaedia of Islam*, *Encyclopaedia Iranica*, *Pleiades Gazetteer*, and *Wikipedia*); the second is full-text versions of two major classical Arabic gazetteers (Yāqūt al-Ḥamawī's *Muḥjam al-buldān* and al-Sam'ānī's *Kitāb al-ansāb*).

#### Examples of analytical essays:

1. *Chronological Coverage of an Arabic Corpus*: [maximromanov.github.io/2016/03-29.html](http://maximromanov.github.io/2016/03-29.html)
2. *Islamic Urban Centers (661–1300 CE)*: [maximromanov.github.io/2014/08-23.html](http://maximromanov.github.io/2014/08-23.html)
3. *Toward Abstract Models for Islamic History*: [maximromanov.github.io/2013/11-02.html](http://maximromanov.github.io/2013/11-02.html)<sup>16</sup>
4. *Prospects of Computational Reading*: [maximromanov.github.io/2013/10-02.html](http://maximromanov.github.io/2013/10-02.html)

#### Curriculum vitae

*Enclosed in a separate file*

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<sup>16</sup>Maxim Romanov, "Toward Abstract Models for Islamic History," in *The Digital Humanities and Islamic & Middle East Studies* (Berlin, Boston: De Gruyter, 2016), 117–49, <http://www.degruyter.com/view/books/9783110376517/9783110376517-007/9783110376517-007.xml>.

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