DH as “Disruptive Innovation” for Restorative Social Justice: Virtual Heritage and 3D Reconstructions of South Africa’s Township Histories

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Much of this essay constitutes an initial effort to frame an open access digital-first publication tentatively entitled, Apartheid Heritage(s): A Spatial History of South Africa’s Black Townships with Stanford University Press as its designated publisher. The project involves the development of a multi-modal 3D qualitative geospatial archive and platform for research into the apartheid-era “South Western Townships,” better known as Soweto, outside Johannesburg, South Africa.

Some background is needed to better situate this research. In 2011, the United Nations issued a report that declared internet access a human right.¹ (Interestingly, on that same day two-

¹ United Nations General Assembly, Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, Frank La Rue, A.HRC.17.27 (Geneva, 2011).
thousands of Syria’s internet access had gone dark—something that was likely the work of the Assad regime in response to unrest in that country.) In 2013, a group of scholars from across the United States approached the Alliance of Digital Humanities Organizations (ADHO) with a proposal for a new special interest group (or SIG) with a focus on social justice and human rights. As one step forward, the group developed an “advisory document for building collaborative projects, conducting events, gathering sensitive data, and composing scholarly communications with social justice issues and human rights in mind.”2 As part of the initial group of scholars who worked to develop this special interest group, I was much more invested in the potential praxis-based strategies we might develop—perhaps a list of ethical guidelines or even a kind of social justice toolkit—for engaging in community-centered digital humanities projects. Some of what I will be discussing in this essay is in itself filled with some controversy and is worthy of further debate with regard to issues of ethics, “reality,” and truth as applied to historical reconstructions—specifically computer-generated visualizations of historic landscapes and buildings within contested areas in certain fields—as issues of power and representation cannot be overlooked.

In a series of email exchanges in 2014 between Willard McCarty, Professor of Digital Humanities at King’s College London and Andrew Taylor, Associate Curator in the Department of Art History at Rice University, the debates over historical simulations/recreations and questions concerning the scholars’ research goals in creating accurate representations were made all too apparent to subscribers of the Humanist Discussion Group’s listserv (and also help to highlight what presently engages me across several disciplines). McCarty writes:

2 “Digital Humanities as Restorative Social Justice: Virtual Heritage, 3D Reconstructions and South Africa’s Township Histories,” Digital Humanities Initiative. See also “Update on Proposed ADHO SIGs,” Alliance of Digital Humanities Organizations.
I hear colleagues who work in visualization [sic] talk about the problem of how photo-realism, say in a VR representation of an ancient building which survives only in fragments, can be dangerously misleading. What then is an accurate representation? The most obvious response, I suppose, is one that informs the viewer somehow of the difference between that which survives and that which is inferred, ideally representing degrees of certainty. [...] I’d suppose that you do not want an “inaccurate” representation, but in the circumstance I am imagining, accuracy is just a stepping-stone. [...] I wonder further if this isn’t quite close to the historian’s tricky question of getting to “what actually happened” (von Ranke’s famous phrase). Even if counterfactual history is your thing, I’d think you’d be doing it in order better to illumine what did (in some sense actually) happen. Historians are quite sensitive about counterfactual studies and about the degree to which history-writing is creative. At the same time an accurate, let us say complete, chronological account is not a history, only the beginning of one.³

McCarty is essentially questioning the kinds of principles and methodologies of practice that help guide scholars through the many complex issues involved with creating historical reconstruction. As some archaeologists have argued, “One of the most significant consequences of the introduction of digital 3D modeling in the Cultural Heritage field is the possibility to use 3D models as highly effective and intuitive means of communication as well as interface to share and visualize information collected in databases.”⁴ I would also argue that 3D reconstructions

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have the potential for the building-up of more robust—and potentially on-line—textual and visual historic archives. The use of new media offers an enormous creative potential for marginalized communities to disrupt official history and reclaim aspects of their lost or difficult heritage if digital technologies (through digital humanities) are harnessed for their use. Verne Harris, longtime archivist of the Nelson Mandela Foundation makes clear, archives are “far from being a simple reflection of reality [...] [they] are constructed windows into personal and collective processes. They at once express and are instruments of prevailing relations of power.”5 Shifting that power into the hands of township residents requires a social justice framework whereby archival practices become an inherent part of a human rights agenda across the African Diaspora.

I was reminded when preparing this essay, of Hayden White’s work for a 2005 issue of Rethinking History, “Historical Fiction, Fictional History, and Historical Reality,” in which he quotes Ralph Ellison from a 1958 essay, “Some Questions and Some Answers.”6 There Ellison writes, “Men cannot unmake history, thus it is not a question of reincarnating those cultural traditions which were destroyed, but a matter of using industrialization, modern medicine, modern science in general to work in the interest of these peoples rather than against them.”7 In some small ways I see so much of our work, perhaps in an Afro-futurist sense, as taking full advantage of “modern science” and technology to question our narrative practices in the digital realm. My work, I would argue, also raises questions about the persistence of a digital divide that now exists between the Global North and South. Radical change is therefore necessary

7 Ibid., 157.
along the many social, economic, political, regulatory, and infrastructural barriers that continue to disadvantage many of the world’s “informational peripheries” — to aid those people who remain invisible or unheard in the African Diaspora. In the field of Africana or Black Studies, Abdul Alkalimat of the University of Illinois at Urbana-Champaign has made clear that “the impact of the information revolution can lead to a renaissance of community development, cultural creativity, and liberation politics.”

Much of my work-to-date explores the building of a multi-modal information environment to discuss Soweto’s past, present, and future redevelopment — one part of a new series of cultural practices of remembrance, reconciliation, and empowerment with a view towards an integrative approach to social justice and the practice of digital humanities scholarship. My digital scholarship comprises several works in process, already several years in the making and touching upon several discrete, but ultimately inter-related, areas of inquiry in apartheid-era South Africa. As it stands today, “virtual heritage” projects require multi-disciplinary teams of historians, writers, designers, software developers, cultural heritage managers, and local community informants who would collaborate in the design, development, and management of an immersive 3D virtual heritage landscape. This emerging digital research paradigm is quite unlike that of the archetypal solitary scholar toiling alone in a dusty archive. In particular, my projects would not be possible without a team of scholars and practitioners from Hamilton College’s Digital Humanities Initiative (DHi), where I was Co-Director with Janet T. Simons. Digital humanities, as a field, as a discipline, and a new knowledge community, is by its very nature a collaborative and iterative process that cannot be undertaken without a cohort of “experts” from all sides of the “learning through making and doing” spectrum that includes librarians, undergraduate student interns, designers, and soft-

ware engineers. In other words, as a professor and researcher I am, in many ways, a project manager of a team of “expert practitioner scholars” upon whom I rely to help me tell this particular spatial narrative. I would be remiss if I did not acknowledge, or at least situate myself, in an intellectual place (or space). Thus, DHi is a collaboratory—a humanities lab—where new media and computing technologies are used to promote humanities-based teaching, research, and scholarship across the liberal arts. There at Hamilton, a small Northeast US college, the liberal arts environment places a strong emphasis on the teaching curriculum and the integration of humanities-based research questions into undergraduate scholarship.

In South Africa the legacy of apartheid has meant a constant engagement with cultural trauma and its impact on all aspects of social life, particularly for township residents beginning in the early twentieth century. I have been working on various preservation efforts in Soweto outside of Johannesburg with local residents and former student activists for over a decade beginning in 2004. Located some 30km from downtown Johannesburg, the township of Soweto has been a site of both historical contestation and numerous state-sponsored heritage projects. Soweto was also where my first area of digital inquiry and recovery began at the Hector Pieterson Memorial and Museum in Johannesburg, South Africa, a heritage site that preserves the history and memory of all those who were involved in the Soweto Uprising of 16 June 1976. The museum is named in honor of 13 year-old Hector Pieterson, among the first student victims to die in the Uprisings. On that fateful day, Soweto students gathered to protest against the use of Afrikaans language as a medium of teaching and learning in black schools. Shortly thereafter, police began shooting at the assembled marchers, violently disrupting what was to be a peaceful protest. Hector Pieterson’s death, and the subsequent killing of 575 other protestors in the Uprisings
that would help bring about the first democratic elections of 1994, are memorialized at this National Heritage Site.\(^\text{10}\)

That first South African research project, eventually entitled *Soweto '76* had a scope that provided for the digitization and preservation of the archival collections of the Hector Pieterson Museum with the intention of providing on-line access to its holdings for broad public use.\(^\text{11}\) The holdings were considered endangered due to a lack of available resources for their care and preservation. The project was initially proposed to convert to digital format some twenty audio-cassette tapes of interviews conducted with students involved in the Uprisings of 1976. Even after years of working on community-based projects, I somewhat foolishly thought I could digitize the audio-cassette tapes, at the Hector Pieterson Museum over the course of six months while also developing a front-end interface for accessing the interviews on-line. As my first digital humanities project, I was very naïve about the many challenges facing the archive-making process for community-based township museums. Nonetheless, between 2006–2007, while at the Maryland Institute for Technology in the Humanities (or MITH), the project team began the process of digitizing a broader selection of the Hector Pieterson Museum's multi-media collections and holdings.

As cultural studies scholar Chela Sandoval argued in her book *Methodology of the Oppressed* the world inhabited by wired, technologized, privileged subjects requires a shift in educational preparation and cultural expertise so that “the technologies developed by [and with] subjugated populations to negotiate this realm of shifting meanings can prove indispensable.”\(^\text{12}\)

Placing various technologies in the hands of “subjugated populations” allows for new kinds of engagements to occur. The rise of network technologies (Web 2.0) has now allowed a diverse group of users to actively express and interrogate their racial,

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\(^{11}\) *Soweto '76*, http://www.soweto76archive.org.

gendered, national, and class identities. We have seen the power of the internet to transform the political, social, and economic future of a nation (for better or for worse)—for example, here in the US with Barack Obama’s and Donald Trump’s presidential elections, with the many “Arab Springs” that have occurred across the Middle East over the past handful of years, and within countries across the African continent including Liberia, Rwanda, and South Africa. However, in my own work with township residents in Soweto, Johannesburg, I have witnessed the emancipatory potential of the internet and new digital technologies for disclosing as yet untold stories about the anti-apartheid movement which not only impacts South Africans, but which is a worldwide movement itself. In South Africa those post-apartheid identities have largely been mediated through what Deborah Posel, professor of sociology at the University of Cape Town, sees as the “avowedly normative, officializing project of the truth commission [or Truth & Reconciliation Commission].”

The various projects I have been involved with in South Africa were developed, in part, to address the failures of the Truth & Reconciliation Commission of the mid-1990s, thus disrupting the “officializing” narrative.

A common thread throughout all of my research has been a focus on the experiences of women across the African Diaspora, who have not only struggled against the forces of the state and nation, but who have also sought innovative ways to tell their stories and provide the testimony needed to begin the processes of historical recovery, rebuilding, and reconciliation. I want to relate the story of one woman, Pauline Mohale—a woman whose story was referred to me by the then director of the Hector Pieterson Museum—and who was detained because of The General Law Amendment Act of 1963 which “authorized [sic] any commissioned officer [of the South African government] to detain, without a warrant any person suspected of political

activities and to hold them without access to a lawyer for 90 days."

On April 30, 1996, before the Truth and Reconciliation Commission (TRC), a representative of the commission read the following, “June 16 1976 saw the outbreak of violence on a larger scale than has ever been experienced in South Africa. During this time police were engaged in countrywide arrests, both adults and children were arrested. Quite a number of children went missing and most of them were not being held by police but had gone into hiding following the house-to-house raids. It was during this time that Pauline [Mohale] got arrested and suffered all kinds of human rights violations.” Mohale was held for almost two-years and tortured by SA-Police to reveal information about student protestors/activists in the mid-1970s. In her own words, Pauline recounts the events that led to her arrest:

In 1976 I wasn’t working. […] I was a member of SCM, Student Christian Movement. I was working with the students, that’s during the time we were fighting the Afrikaans issue and the equal rights as far as education was concerned. We marched in 1976. We used to march to John Vorster [Square — Police Headquarters in downtown Johannesburg]. When we arrived at New Canada [nearby Police Headquarters] they started throwing teargas at us. Some of our friends died there and others were arrested. But that day I managed to escape. I wasn’t arrested. Some of them were being looked after by friends but I was travelling to Swaziland. I was helping the other children to escape the country. They used to sleep under the table and throughout and then we used to take a combi [truck] so that they could go to Swaziland, get further training in Swaziland. They wanted to cross the border of Swaziland. But on that it happened that when we left, it was on the 16th [day of the “Uprising”], but I was also booked to

15 Ibid.
go, because I realized it was beginning to hot-up. When we arrived at the border gate — before we arrived at the border gate there was a road-block. We just saw a huge light and they stopped the driver. They told us we know that you are going to cross the border. You are going to get military training so that you can come back and start killing White people. We said no, we were lost. They arrested us and they put us in a cell in a prison near the border gate. [...] I was the only girl among them, the rest were the boys, so they closed me separately from that group. [...] The following day the police came in a truck. They came from Krugersdorp to fetch us. They were from the Special Branch.  

Black feminist scholarship during the past thirty years or so, I would argue, has made so many of us more conscious of the importance of letting women speak about their experiences as a legitimate way of questioning dominant paradigms of knowing and even unknowing. The popularity of oral histories, on the web, in recent years, reflects an attempt to capture the voices of immediate experiences, but as has been pointed out, many of these “so-called voices [...] are mediated (edited, translated, corrected) by ‘intellectuals’ working in the academy” or even in libraries and repositories already strapped for resources. As seen across South Africa, the resources needed to preserve intangible heritage and even extant cultural heritage (artifacts, buildings, material objects, etc.), remain out of reach for a whole host of reasons.

Few studies have considered the historical significance of these townships — townships that the disenfranchised such as Paulina Mohale called home — as extant physical artifacts of a difficult past; however, they now face complex heritage issues and the concurrent pressures of the international tourist market.

16 Ibid.
Do the meaning and significance (as sites of trauma, resistance, and empowerment for residents) of these planned communities defer to the competing interests of urban redevelopment, large-scale heritage planning, and globalization? A blog post sent to me by a Hamilton colleague, reminded me that much of the work I have been engaged in is what the Lesbian Herstory Archives calls “radical archiving.”18 I am sure we can all deconstruct and take issue with the term “radical,” but in many ways those of us working at the intersections of archive-making, virtual environment development, and historical reconstructions have grappled with a series of complex social justice issues while working within communities that have been adversely impacted by the work of architects and planners in service of the apartheid state. Apartheid planning and architecture were the direct results of serious human rights violations perpetuated by a state that was based entirely on racial violence against anyone other than those labeled “white” and European.

Unfortunately, accounts by women such as the aforementioned Pauline Mohale remain at the margins. Even Hector Pieterson’s narrative of martyrdom, although featured prominently at the Museum named in his honor, does not, however, tell a full account of the events of that day. What is often overlooked is that the site marked by the City of Johannesburg, as the location of where Hector was actually shot by police, is not where that violation of basic human rights occurred. In fact, there is still much debate as to where Hector actually fell as a result of being shot by police, because the “official” accounts suggest that he was one of many students hurling rocks at the police as they stood by and attempted to contain the “Uprising.” I would argue, that a 3D reconstruction, of the events of that day — something that could conceivably emerge from our ongoing efforts at Hamilton’s DHi — could provide unique insights into what occurred and perhaps even act as a form of restorative social justice if all of these conflicting accounts were told through a spatial history

process that allowed for digital testimony and “digital witnessing” to occur.

In South Africa, growing concern over the preservation of documents related to the liberation struggle of the 1970’s against apartheid has spurred new theoretical, methodological, and pedagogical questions over the making of web-based archives for local community-based township museums. I see the potential of an African digital history to interrogate the conditions of life histories of human rights violations, by examining those conditions for their “emancipatory potential and their capacity for instituting dialogical forms of historical consciousness between the testimony donors and possible communities of witness” on the internet.¹⁹ In other words, can those stories about life under apartheid actually effect change among their viewership on the internet? Can “radical archive” making act as a form of advocacy, alongside efforts to promote a form of restorative social justice? Can historical reconstructions — immersive virtual environments — provide opportunities for reconciliation, new forms of “truth-telling” and archive-making in countries ravaged by colonial empire building? I would argue that this is possible, although filled with its share of much-needed interrogation.

I would also argue that the link between “human rights” and the preservation of cultural heritage resources — particularly those in the built environment — is often misunderstood. If we are truly seeking social justice, we must remember these historical injustices and recognize how they continue to shape identities even today. It is therefore essential to understand cultural heritage resources as a part of peoples’ efforts to maintain and construct their own identity within a reconciliation process. Historic sites are critical elements in the struggle for equality and democracy, and new technologies can be used to increase access to the information kept in these important spaces. For example, recent work of Edward Gonzalez-Tennant, assistant professor at Monmouth University in New Jersey, provides an

example of efforts to “utilize new media to open (digital) spaces thus encouraging candid reflection on the connections between historical, face-to-face violence and present social inequality.”

In recreating the historical development and destruction of Rosewood, Florida, culminating in the 1923 massacre and leveling of the town, Gonzalez-Tennant has used geographic information systems (GIS) to provide a deeper contextualization of its history. In much the same way, my team and I employed geospatial tools and technologies to assist in succeeding phases of my South African research.

I would argue that new digital technologies can help to challenge and disrupt how one has interpreted and used various forms of historical evidence and testimony concerning the legacy of apartheid. In particular, digital technologies can work to fill in those many absences in the historical record, particularly as they relate to everyday citizens and their roles in social movements across the Global South. The development cycle of Soweto ’76 (and particularly its follow up, Soweto ’76 3D: the 3D recreation and simulation component of the overall project) was an ambitious technological goal when we first took it up in 2007. Although we had sufficient tools to create a sample 3D model of Soweto, the goal at the time was ultimately to let our users explore it in real time — without feeling limited by their operating system or web browser, and without having to download and install a desktop program simply to access what was ultimately a web-based archive. Technological obstacles in 2007 (a bit too complex to detail here), led to an intermediate solution: to create a proof-of-concept demo. Using Google SketchUp’s own animation support to create “flythroughs,” we rendered both models and transition videos to create an “on-the-rails” 3D interactive environment that we could deliver through (the widely available and, at the time, well-supported) Flash, a type of animation software.

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We were immediately satisfied with the result, but more so with the ability it gave us to demonstrate and describe our intended feature set to our audience and potential project partners. Of course, this approach was ultimately limited in its extensibility, and required a great deal of hands-on work to add new content. Given the extensive work the project required in other areas of its technical infrastructure — particularly the monumental task of assembling and implementing the database of locations, assets, and relationships between and amongst them — the decision was made to focus on these technology developments while waiting for the development efforts of various WebGL projects (for showing interactive 3D graphics, or whatever else might come along as alternatives) to catch up to the standard web browser such as Firefox, or Chrome.

A decade later we find ourselves in a much more viable technological position, with numerous solutions in place for realistic development in a browser-based 3D space. Forward-thinking browsers such as Google Chrome and Mozilla Firefox today include support for WebGL environments as part of their standard public releases. WebGL is an API, or interface, that specifies how software of this kind — rendering interactive 3D graphics and 2D graphics — operates within any compatible web browser without the use of plug-ins. And now, alternative 3D game engines are emerging as commercial alternatives for use in higher education research. With so much of the academic aspect of the project now better developed and more fully realized, the possibilities for utilizing these technologies seem all the more exciting, and have opened the doors to other valuable technical inquiries, such as the affordances of GIS data in Soweto ’76’s sibling project, the Soweto Historical GIS Project.²¹

The Soweto Historical GIS Project (SHGIS) began as a collaborative research project with three students in the Department of Geography at Middlebury College (along with Professor Anne Knowles, then on the faculty at Middlebury, as Project Consult-

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ant) to build a historical GIS database drawn from a collection of thirty-eight largely unseen maps, architectural plans, and drawings that were recovered by our research team from the National Archives Repository in Pretoria, South Africa. These thirty-eight maps, architectural plans and drawings were drawn from the holdings of the apartheid-era Public Works Department. The documents, developed by architects, engineers, and city planners, and dating from the period of the 1890s to the 1950s and ’60s, provide unique insights into the design and construction of model township communities for the City of Johannesburg during the apartheid era. That these existing idealized township designs were never realized in total for a variety of political, social, and economic factors is a topic that no researcher has yet to fully investigate in the fields of historical GIS and historical geography.

The research question developed by the team considers the following: How were apartheid policies constructed in the Soweto landscape? Our early findings demonstrate and chronicle how a research question can inspire a methodology for historical GIS through collaboration across disciplines and knowledge communities by working with undergraduate research assistants as collaborators. However, this study is different from most previous scholarship on the history of South Africa’s all-Black townships because few, if any, of these sources have been available to a wider public until now. To demonstrate this point, I am now suggesting that a more familiar American landscape, that of Virtual Williamsburg, running on the game engine Unity 3D and providing a model of the town as it appeared in 1776, can be usefully examined by way of contrast.22

SHGIS seeks to build a multi-layered historical geographic information system database that explores the social, economic and political dimensions of urban development under South African apartheid. SHGIS is a unique project because it combines both an intense methodological engagement with a wide variety

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of analog and digital archival materials and, at the same time, is a pedagogical effort to write the *spatial history* of a *traumascap*e shaped by the legacy of apartheid, racial terror, and political violence in Southern Africa. More simply, our research has allowed us to see how population density or overpopulation—just one social factor of the many we are exploring—over time became a determining factor in the kinds of resistance employed by township residents over subsequent decades against government sanctions.

Building a virtual heritage suite of tools and accompanying research methodologies for the purpose of designing, developing, and displaying authentic virtual heritage knowledge in a geospatially accurate environment is not by any means a simple task, especially when working so closely with community stakeholders who want to see this work used and implemented further locally. Questions about the efficacy of developing platforms and digital archives in communities-of-color in the Global South cannot be ignored and need to be further explored through a collaborative process with community stakeholders. Staff from the Hector Pieterson Museum, members of the Soweto ’76 Foundation (former students who took part in the liberation struggle) and local community-based scholars have all participated in various ways over the past decade. This is, admittedly, a somewhat haphazard process given the many intra- and inter-community struggles that often mirror the changes in local and national government leadership.

The use of virtual heritage applications in museums and cultural institutions is becoming more and more commonplace and is used as a vehicle for attracting younger visitors or “digital natives.” Sites of “difficult heritage” across the US and Europe have been able to take advantage of the recent proliferation and affordability of digital scanning devices to provide virtual and physical replication of objects or entire landscapes. The State Museum of Auschwitz-Birkenau offers a virtual tour in part of Auschwitz/Birkenau through Quick-Time Virtual Reality clips or Flash panoramas because so much of the site now fails to look
anything as it did during the Allied bombing campaigns. Since 2012, German architects and Israeli historians have been working to “produce 3-D computer visualizations based on detailed blueprints and architectural plans of each of the hundreds of structures located in the three central parts of the camp.” However, with re-creations such as these has also come controversy. Historical geographer Tim Cole has labeled much of the visitor experience at Auschwitz/Birkenau as “Auschwitz-land […] a ‘Holocaust theme-park’ rather than a ‘Holocaust concentration camp.’” Cole writes, “Walking through ‘Auschwitz-land’ we do not see an authentic past preserved carefully for the present. We don’t experience the past as it really was, but experience a mediated past which has been carefully created for our viewing.” For some, acts of reconstructing sites of tragedy and establishing memorial landscapes only contribute to “historical inauthenticity, trivialization and a commercial exploitation of death and violence.” Much of these same criticisms could be lobbed at the memorial practices of a white-majority heritage industry across South Africa that has carefully scripted the fight to end apartheid as a narrative of good vs. evil. Many of those narratives depict the African National Congress (ANC) as a multi-racial social movement that did not perpetuate systems of oppression, as did the white minority-led Nationalist Party. Indeed, oppression was carried out on the part of the ANC, particularly along gender-lines. Instead, the ANC continues to foster a national narrative, largely resulting from the proceedings of the televised Truth and Reconciliation Commission of a miraculous morality tale.

Institutions such as the Apartheid Museum, the District Six Museum, the Robben Island Museum, the Red Location Museum, and Freedom Park, all outgrowths of the ANC’s 1996 Legacy Project, were built to challenge and disrupt colonial museum narratives and provide new forums for formerly marginalized voices to emerge. These newer institutions—and others built across South Africa’s many townships, including those in Soweto—played a major role in advancing forms of reconciliation and helped to formulate a shared national identity for collectively dismantling apartheid. However, for some township residents these museum and national memorial sites only further compounded the inaccuracies, and distorted the everyday realities of how apartheid was lived day-to-day.

Despite the abundance of 3D virtual environments for historic sites that have emerged over the past decade, the impact of historical character modeling in the digital humanities has received little scholarly attention. Instead, when characters (or avatars) are used in virtual environments, the emphasis often tends to be on the constructed space with less attention paid to the modeling of the characters themselves and how these virtual embodiments impact the viewer/player. While this lapse may be due, in part, to a lag in technology, avatars now have the potential to become increasingly realistic. This presents us with many conceptually significant choices vis-à-vis avatar creation, each with important cultural and historical implications.

Maurizio Forte, the William and Sue Gross Professor of Classical Studies at Duke University, has called attention to “the use of 3D representations [that] has been completely random and thus has not had a great impact on the development of research methodologies and protocols.”\(^\text{27}\) However, the Unity 3D game engine has literally been a game changer in this regard, bringing in its wake increasing benefits and pitfalls. While on the one

hand these realistic 3D environments seem to engage directly with what Mark Gillings of the University of Leicester has called “dynamic interactive visualization,” little research has been done on the impact of character representations within these environments or how those choices might shape the narrative for the viewer.\(^{28}\) The development of Web 2.0 and the ability to deliver interactive content, and the creation of virtual world environments most assuredly now permits visitors to interactively explore past landscapes.

In the autumn of 2013, persons drawn from five different institutions were awarded a National Endowment for the Humanities Office of Digital Humanities Start-Up Grant. The Hamilton team — which it was my honor to help represent — was one of the awardees. This project, “Dangerous Embodiments: Theories, Methods, and Best Practices for Historical Character Modeling in Humanities 3D Environments” (with Co-Principal Investigator, Alyson Gill) has worked towards the development of a comprehensive typology for avatar creation — an essential, new, and potentially valuable contribution to the field — and the deployment of different possible representative avatars in two virtual “difficult heritage” environments (Soweto, Johannesburg and the Lakeport Plantation, Arkansas). We are now studying viewer responses to different representative avatars within these environments using tools drawn from experimental philosophy, and are working to publish the results with interpretation by scholars across a diverse array of fields.

As new technologies emerge, scholars are testing all available possibilities and alternatives for user interaction, remaining cognizant of the continuing chasm of the digital divide. Recently, Hamilton’s DH\(^{i}\) began working as developers for Oculus Rift, a mobile virtual reality wearable device/headset that allows users to step inside immersive environments. Our lead developer, Greg Lord, has integrated Oculus support into our Unity development pipeline via the Oculus SDK (Software Develop-

ment Kit). The Oculus SDK allows us to render our Unity virtual environment project through a special image rendering technique that automatically creates a stereoscopic view, splitting the scene’s rendered output into two left- and right-eye camera positions. These images are processed through a barrel distortion optical effect, warping the image into a kind of fisheye lens effect that will be corrected to appear spherical by the Oculus lenses. This creates a 90-degree field of view, with accurate depth effects, that allows the scene to appear fully three-dimensional within the headset. The result is a striking realism, lending a true-to-life immediacy to the virtual environment, as if the viewer were really standing inside the scene. The Oculus, and our Unity application, also makes use of a head-tracking camera that allows the viewer to freely tilt and rotate their head within the scene, updating their view in perfect sync with their motions. Although this “true 3D” effect requires the special head-mounted display to work, the Oculus is expected to become the leading virtual reality technology in the years ahead, with a significant industry buy-in and an active, growing community of users and developers. Our current application will also have the capability to fall back on traditional 3D rendering, for use with standard computer monitors for all other users.

The dangers of iconic representations and the powerful influence that images exert over us have long been recognized by scholars working in the humanities, with Brian Molyneaux of the University of South Dakota eloquently noting that, “The reinforcement of ideas in some images is very powerful. […] Pictures and other visual representations — have a tremendous inertia, or staying power, that may persist long after the ideas behind the images have gone out of fashion.” The preamble to the London Charter for the Computer-based Visualization of Cultural Heritage notes that “a set of principles is needed that will ensure that digital heritage visualization is, and is seen to be, at least as intellectually and technically rigorous as longer established cul-

tural heritage research and communication methods.” This an important issue for the humanist as the delivery of interactive, high quality 3D content via the web is becoming feasible in a way that was virtually impossible just a handful of years ago.

In conclusion, I would like to quote John Fleckner, then senior archivist at the Smithsonian’s National Museum of American History, from a 1990 address before the Society of American Archivists. Fleckner noted, “without the documentary record there could have been no calling to account, no investigation, no prosecution. And that record, the tapes, the documents, and all the rest-stands as witness in the future to those who would forget or rewrite that past.”

Today, South Africa’s former all-Black townships could easily be erased/destroyed as a result of ill-conceived tourism initiatives, irresponsible local politicians or neglect. As I have argued elsewhere, I ultimately believe that these sites of tragedy and dissonant heritage, such as those related to the Soweto Uprisings of 1976, can be used—in part through the use of 3D immersive virtual environments coupled with documentary evidence of institutional racial violence as experienced in the built environment through historical recreations—as models for community-based education and renewed political and social inclusion.

Today, scholars of difficult heritage are often confronted with the challenge of producing meaningful engagements with diverse audiences through the use of new digital technologies. With this engagement we often face risks as we represent serious, often painful and controversial, historical content through a medium once closely aligned with popular entertainment. In closing and despite these caveats, it is


inevitable that the transformative and disruptive promise of historical 3D models and virtual environments will be more fully realized.
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