



Building ACM-wide partnerships for developing virtual- /augmented-reality tools for pedagogy



*A workshop supported by the Associated Colleges of the
Midwest program for Faculty Career Enhancement*

July 15-16, 2019

Grinnell College, Grinnell, IA



Hosted by the Grinnell College Immersive Experience Laboratory

at the Grinnell College Golf Course



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Please note: If you need any accommodations in order to fully participate in this event, please contact Damian Kelty-Stephen (keltysda@grinnell.edu) and Erika Jack (jackerika@grinnell.edu) at the Science Division Office.

Acknowledgments

This event is funded by the gracious support of the Associated Colleges of the Midwest and the Andrew W. Mellon Foundation through their Faculty Career Enhancement (FaCE) Program. The FaCE theme for 2018-2019 is *Collaboration to Address 21st Century Challenges in Liberal Education through Communities of Practice*. We are honored to have the opportunity to bring such a diverse group of people together in the hopes of building a stronger, wider community around bringing liberal education into the 21st century through nimble, ethical, and educational deployment of digital technologies including virtual reality, augmented reality, 3D- and 360-imaging, as well as all neighboring/related/relatable technologies. We thank all attendees for taking the time and effort to come to Grinnell College in the midst of summer. We regret that more people originally invited and originally interested were not able to come due to their many other commitments to liberal-arts education. But hopefully, we are just beginning a longer term communication, and those who could not join us will soon be in the loop when they are next available to join in on subsequent meetings and exchanges, in-person and electronic.

This event would have been impossible were it not for the support of **Erika Jack** and **Allison Vosburg** at Grinnell College's Noyce Science Center; **Jenelle Veit** at Grinnell College's Conference Operations; **Lisa Hollopeter** at Grinnell College's Catering Office; **Karla Hall** at Grinnell College's Center for Teaching Learning, and Assessment; **Susan Ferrari**, **Laura Nelson Lof**, and **Hollie Nunnikhoven** at Grinnell College's Office of Corporate, Foundation, and Government Relations; **Ed Finn**, **Brian Williams**, and **Sonya Malunda** at Associated College of the Midwest; and **Victoria Szabo** at Duke University's Department of Art, Art History & Visual Studies.

This event also goes forward thanks to the immense patience and genuine support of **Prof. Emma Kelty-Stephen** as she and Damian Kelty-Stephen welcomed their newest family member **Simon**, born June 4, 2019. Simon and his 3-year-old sister **Violet** remain uncommitted to the potentials of incorporating digital literacy into liberal-arts pedagogy, but they and Emma have kindly allowed Damian to pursue this venture while navigating their family's life-changing events.

What Attendees Hope to Learn

Attendees all had the opportunity to share some thought as to what they hope to get out of this meeting, particularly in response to their presentations. Some attendees included this information in their abstract, but here are answers from attendees who answered this question explicitly.

*“How can the design of immersive computing experiences be aligned with the goals of a liberal arts education? What **curricular and institutional changes** are necessary to equip students with the necessary skills to design these environments?”*

*“I am interested in **potential collaborations to develop faculty capacity** in the technology, as well as potential uses for distance learning.”*

*“We hope attendees will be inspired to engage with this technology early, even as **budgets may be tight**, and to **consider collaborations that they may be able to create on their own campuses** in order to bring together ideas and resources to help get projects off the ground. We also hope to hear from other universities with similar budget constraints who may offer their own **stories as models or examples of how to create opportunities** for the campus to interact with this technology.”*

*“I’d like to prompt feedback/input/response that considers VR/AR/3D as tools to explore ‘the other’ places in a **sensitive** way. That is, what we present with VR/AR/3D is not just one single **representation** of the place, but a way to **start respectful and meaningful interactions** with the place.”*

*“The feedback and discussion I would like to prompt is about the ethics of technology, specifically VR. How can we best **engage our students to learn about ethics** as they learn history and technology? How do we decide the **best focus of VR projects**? Are there other topics we **should not** take on?”*

*“I would like to learn what other schools, particularly **library spaces**, are currently developing to take advantage of the **interplay between VR and Makerspaces**. I’d also like individuals to share any **assessment tools** that they have developed for VR/AR.”*

*“I’d be interested in discussing different ideas for implementing 360/VR/AR production assignments in **humanities courses**.”*

Schedule of Events

Sunday, July 14, 2019 at the Grinnell College Golf Club (933 13th Ave., Grinnell, IA)

7:30 pm-10:00 pm Welcome Reception

Come for company and light refreshments if you are in town early enough!

Monday, July 15, 2019 at the Grinnell College Golf Club

8:30 am Welcome *David Neville & Damian Kelty-Stephen (Grinnell College)*

9:00 am-11:30 am Organizing and centralizing resources in digital laboratories and makerspaces

9:00 am Building an ACM-wide network for pooling resources: A brief sketch of goals for the meeting

Damian Kelty-Stephen (Grinnell College)

9:15 am Designing and developing VR experiences: A liberal arts approach

David Neville (Grinnell College)

9:45 am Harnessing the experience: VR and Makerspace partnerships in libraries

Laura Riskedahl (Coe College)

10:15 am Doing more with less: VR and 3D printing on a budget

Angela Vanden Elzen & Andrew McSorley (Lawrence University)

10:45 am Break time for free discussion

and

David Neville will be providing demo of Grinnell College Immersive Experience Laboratory (GCIEL) technology and resources

11:30 am-1:00 pm Lunch

1:00pm-3:05pm Transporting history classrooms to other spaces and times

1:00pm Introduction *Damian Kelty-Stephen (Grinnell College)*

1:05pm Teaching art history by situating fragmented pieces of art back into their three-dimensional architectural context

Joy Beckman (Beloit College)

1:35pm Mapping Asia: Integrating VR/AR/3D into undergraduate teaching and research

Hsiang-Lin Shih (St. Olaf College)

2:05pm VirtualSpaces, IRL

Davis Schneiderman (Lake Forest College)

2:35pm The limits of VR: Slavery and the ethics of empathy

Sarah Purcell (Grinnell College)

3:05pm-3:35pm Discussion: Ethics and representation in virtual spaces

3:35pm-3:45pm Break

3:45pm-6:00pm Teaching scientific approaches to modeling

3:45pm Introduction *Damian Kelty-Stephen (Grinnell College)*

4:00pm Turning virtual environments from a neuroscience research tool to a pedagogical tool in the classroom

Benjamin Chihak (Coe College)

4:30pm Virtual reality as the next step in a rich history of mathematical model building

- 5:00pm Christopher French (*Grinnell College*)
Tales from the <virtual> trenches: Implementing VR & AR in the science classroom
- 5:30pm Jayme Nelson (*Luther College*)
Models are the failures that prompt the next successful step: A crash course in using VR in a course on sensation and perception
Damian Kelty-Stephen, Michi Soderberg, Nicole Carver, Mariam Nadiradze, and Caelin Bryant (*Grinnell College*)

6:00pm Dinner at Grinnell College Golf Club

Tuesday, July 16, 2019 at the Grinnell College Golf Club

8:30 am Welcome back Damian Kelty-Stephen (*Grinnell College*)

9:00am-9:50am Keynote Address

[Title to be added shortly]
Victoria Szabo (*Duke University*)

9:50am-10:00am Break

10:00am-11:30pm Assessment Discussion & Workshop

Aligning learning goals, approach, and assessment in VR/AR/3D pedagogies:
Remarks and interactive activity/discussion
Vanessa Preast (*Grinnell College*)

11:30 am-1:00 pm Lunch

1:00pm-2:00pm Engaging immersively with literature

- 1:00pm Introduction Damian Kelty-Stephen (*Grinnell College*)
1:15pm Inviting students to trace the dreamscape inside the thirteenth century romance
Le Roman de la rose
Joseph Derosier (*Beloit College*)
1:45pm Giving students a sense of space and time in the *Beowulf* meadhall
Timothy Arner & Justin Thomas (*Grinnell College*)

2:15pm-2:30pm Break

2:30pm-4:45pm Extending media studies into virtual frontiers

- 2:30pm Introduction Damian Kelty-Stephen (*Grinnell College*)
2:35pm Teaching virtual reality and story telling in the literature classroom
Nahir Otaño Gracia (*Beloit College*)
3:05pm 360/VR/AR assignments in humanistic contexts
John Kim (*Macalester College*)

3:35pm-3:45pm Break

- 3:45pm Enhancing humanities curricula through VR technology in a liberal arts context
Joseph Bookman (*Beloit College*)
4:15pm Getting beyond the novelty effect: Appropriate use of immersive technology in the classroom
Bret Jackson (*Macalester College*)

**4:45pm-5:15pm Discussion: Aligning technology needs with learning outcomes
Moderator: Eric Handler (*Macalester College*)**

5:15 pm Closing remarks David Neville & Damian Kelty-Stephen (*Grinnell College*)

6:00pm Dinner at Prairie Canary (924 Main Street, Grinnell, IA)

Abstracts

Designing and developing VR experiences: A liberal arts approach

David Neville (Grinnell College)

The humanities have interesting stories to tell, and immersive three-dimensional (3D), virtual reality (VR), and augmented reality (AR) experiences can be persuasive ways of sharing these stories. The question is, how best to design and develop these experiences so that effective learning and teaching can occur in a liberal arts context. This presentation will detail two projects originating in the Grinnell College Immersive Experiences Lab (GCIEL), specifically the Uncle Sam Plantation Project and the Viking Mead Hall Project, and describe the design and development practices the lab is exploring to align these projects with the curricular learning objectives of liberal arts courses. These practices include site-based research, Agile software development practices, bodystorming sessions, skill acquisition through online courses, and object-oriented modeling with the Unified Modeling Language (UML). The presentation will also highlight some of the communication and design challenges faced by the project development teams, and make suggestions for ways that liberal arts institutions can support the unique needs of these teams.

Harnessing the experience: VR and Makerspace partnerships in libraries

Laura Riskedahl (Coe College)

In the summer of 2018, the Media Technologies Department at Coe College's Stewart Memorial Library developed a VR Lab and MakerStudio. The near simultaneous creation of both entities lent itself naturally to the publicity and usage of both as a sort of partnership from the very beginning. A sizable percentage of First Year Seminar courses at Coe came through the space in Fall 2018, as an introduction to virtual reality and making. The Media Technologies Department immediately observed the interplay between the two spaces, envisioning ways to connect the VR experience with 3D printing, and vice versa. Programs such as ShapeLab allowed VR users to edit or create a STL file within a virtual setting, then export the file to a 3D printer to create a physical object. Next steps include adding 3D scanning capabilities, the development of an assessment rubric for learning outcomes, and the further exploration of the interplay between the virtual experience and the physical object.

Doing more with less: VR and 3D printing on a budget

Angela Vanden Elzen & Andrew McSorley (Lawrence University)

How can a small Midwestern university sustain efforts to support new technology in teaching, learning, and research, as entry costs into the world of 3D printing and virtual reality remain alarmingly high? The Seeley G. Mudd Library has been tackling exactly this problem. Our presentation will focus on the success of Lawrence University's virtual reality programs and makerspace in light of budget and space constraints in a small academic library. With a focus on collaboration, creative low-budget solutions, and through leveraging existing networks across the campus, the Seeley G. Mudd library has found ways to support hands-on learning across the curriculum, creating virtual reality opportunities for students and 3D printing training for faculty and students alike. This presentation will also provide details on the library's upcoming collaboration with the University's film studies department to create a more robust and comprehensive virtual reality learning experience for Lawrence University students.

Teaching art history by situating fragmented pieces of art back into their three-dimensional architectural context

Joy Beckman (Beloit College)

When taught in the classroom or in the museum, Art History has been limited by the 2-dimensional nature of the slide presentation. This is despite the fact that most artwork was created for and experienced within three-dimensional space. VR will dramatically transform the field when we are able to rebuild the architectural context of the artwork, rather than present it as fragmented pieces. Recently, the Dunhuang caves in Western China, a series of Buddhist grottos, have been digitized, and several of the caves are now available through VR. In Spring 2020, I will be introducing students to the caves through this website. I am interested in both technical strategies as well as conceptual strategies on ways of incorporating the VR into the class. In 2021, I will be teaching a course entitled Sacred Sites of Asia, which focuses on 12 religious and ritual sites and the art associated with the sites. This is a course that could potentially be taught completely through VR if and when it becomes available for the different sites.

Mapping Asia: Integrating VR/AR/3D into undergraduate teaching and research

Hsiang-Lin Shih (St. Olaf College)

St. Olaf College has a one-year program, Asian Conversations, in which students map journeys - historical and their own - in the fall, then go to Asian countries during a January interim, and finally interpret their travels in the spring. I have been exploring technologies that help students read the historical maps and make their own. This presentation will introduce the ideas about integrating VR (e.g. Google Earth, ThingLink) and AR (e.g. Pokémon GO, city tour apps) into the curriculum. I will illustrate how these tools can connect to undergraduate teaching and research. In particular, I will discuss how researchers and students can find a conversational relationship between maps and GIS when there are historical, non-English maps/images that provide invaluable information about a place.

VirtualSpaces, IRL

Davis Schneiderman (Lake Forest College)

This presentation will focus on the development of Lake Forest College's VirtualSpace, as an outgrowth of the College's Mellon-funded Digital Chicago project and its partnership with the Chicago History Museum. The presentation will detail the development of the space, and two distinct use categories: 1) the experience of third-party content as part of a creative writing course on science fiction and virtual reality, and 2) the use of homemade vr emerging through the Digital Chicago project.

The limits of VR: Slavery and the ethics of empathy

Sarah Purcell (Grinnell College)

This talk will explore the utility of teaching digital ethics by exploring the limits of VR and digital history. I will pose the idea that immersive VR technology is not appropriate as a means to teach about the history of American slavery. But having students grapple with the limits and ethics of historical empathy, by considering why VR is not appropriate, is a very powerful teaching theme.

The talk will reflect on the experience and insight gained in the Uncle Sam Plantation Project, part of the Grinnell College Immersive Experiences Lab (GCIEL). The GCIEL is an interdisciplinary community of inquiry exploring new ways to approach the liberal arts and make them more widely accessible through immersive 3D, VR, and MR experiences. A GCIEL project development team consisting of Dr. Sarah Purcell (History), Dr. David Neville (Center for Teaching, Learning, and Assessment), and three students (3D artist, software developer, and subject-matter expert) worked for two years on a 3D model of the Uncle Sam Plantation, a 19th-century sugar plantation that was located near the town of Convent in St. James Parish, Louisiana. Constructed between 1829 and 1843, the Uncle Sam plantation was once one of the most intact and architecturally-unified plantation complexes in the Southeastern United States and a prime example of Greek Revival-style architecture. Before the plantation complex was razed in 1940 to make room for a river levee, floor plans and elevations of the buildings were produced by the Historic American Buildings Survey. The team engaged in site-specific research and explored modeling the process of sugar production and living quarters of enslaved workers on the plantation.

The team grappled with ethical and technological issues simultaneously as we sought to represent the physical plantation that was part of a system of racialized hegemony in the United States. After studying philosophies of public history, special reports on how to teach the "hard history" of slavery, and the ethics of empathy in VR experiences, the team concluded that we could not continue the project. The Uncle Sam Plantation Project demonstrates the limits of how empathy should be used in education. Sometimes successful liberal arts thinking needs to challenge us to *not* do something, and that is a valuable lesson.

Questions to be explored in the talk include: What are the ethics of creating an immersive digital experience that relates to enslaved labor and white supremacy? What are the ethical considerations involved in creating open educational resources that might inadvertently reintroduce racial trauma to students? How can team work in digital projects help students explore such deep ethical considerations?

Turning virtual environments from a neuroscience research tool to a pedagogical tool in the classroom

Benjamin Chihak (Coe College)

In establishing my virtual environments (VE) lab at Coe it was clear to me how I was going to use virtual environments to investigate my research questions. What was less obvious was how to get students using this resource in a way that could contribute meaningfully to their learning. For my research students this was a question that I've addressed on a case by case basis. In the past two years I've worked with students with varying degrees of computer science and psychology acumen and I intend to share my experiences with the conference. In addition, I'm hoping to glean some insight from the other presenters regarding ways to leverage VE technology in a classroom context to enhance student learning of neuroscience topics in particular. This poses some logistical questions regarding moving a large number of students through the virtual experience with only one HMD available, or choosing which resources show the most enhancement of learning beyond the "oh wow" factor.

Virtual reality as the next step in a rich history of mathematical model building

Christopher French (Grinnell College)

Ever since Descartes coordinatized space, mathematicians have been studying geometric objects through the equations that define them. A circle may be described by the equation $x^2 + y^2 = 1$, a sphere by $x^2 + y^2 + z^2 = 1$. The latter part of the 19th century saw an explosion of interest in the kinds of surfaces that could be investigated in this way; in particular, surfaces defined by polynomials of degree 3 or 4, called cubics and quartics respectively, captured the attention of many of the leading mathematicians of the day. The pursuit of these geometric explorations in this time period has been compared to the pursuit of new specimens in botanical studies.

Such research was accompanied by the creation of mathematical models, many of which can still be seen in departments of mathematics, though often dusty, in disrepair, displayed in poorly lit cases and little understood. The greatest model-makers of the period hailed from Germany in the 1870s, Felix Klein and Alexander Brill designed plaster models at the Munich Technische Hochschule; these were marketed by Brill's brother Ludwig. The demand for such models expanded, and models like theirs were sold throughout the world from around 1870 to 1930. Models were used both to convey ideas in mathematical research to other experts and to illustrate mathematical concepts for students.

With new technologies, new tools are becoming available to study mathematical objects, both for research and for teaching. In particular, virtual and augmented reality have become household terms, even if the technologies are still somewhat underdeveloped. The use of such technologies could benefit from a historical study of how models were used in the period from 1870 to 1930.

This summer, three students will be investigating mathematical models with me, from both a historic and futuristic perspective. They will be considering what influences led to the interest in studying geometric objects in this period, in what ways were these models used in teaching and research, and what limitations these models had for conveying mathematical ideas.

In virtual reality, models can be created that can be changed in a moment, animated, potentially manipulated. Rooted in a historical understanding of the uses of physical mathematical models, my students will be exploring the creation of virtual models. Can games or puzzles be devised around mathematical models that would entice the user to engage in mathematical and geometric ideas? Can the ideas behind mathematical proofs be conveyed more effectively using models in virtual reality? In this talk, I will discuss the history of mathematical models, and give a progress report on their future.

Tales from the <virtual> trenches: Implementing VR & AR in the science classroom

Jayme Nelson (Luther College)

Scientific innovation is the “name of the game” for instruction within the health care sciences. Human patient simulators have become ubiquitous technologic tools in nursing laboratories where realistic “Westworld-esque” mannequins are able to reproduce credible physiologic responses. Faculty work to contextualize the equipment by providing authentic sociocultural narratives that challenge students to consider storylines engaging concepts of gender, race, socioeconomic and sexual identity. Developing realistic narratives to engage learners in a more humanistic approach, complements narrative pedagogical techniques and standardized forms of teaching and learning and emphasizes the learner’s perceptions and values in the learning environment. This presentation will highlight the author’s experiences creating such context using VR/AR modalities in the college classroom including: Second Life, Oculus Rift “Sharecare VR”, and Metaverse.

Virtual Reality experiences in platforms such as “Second Life” allow for student engagement with participants outside the academic classroom. Second Life offers some opportunities that are unique and relevant to disability studies as estimates of Second Life participants with disability range from 20-50% (French, 2017). Unique educational opportunities exist in both the biologic sciences and well as social sciences and humanities. Various non-profits (including the American Cancer Society and the Mayo Clinic) as well as Colleges and Universities have a presence in Second Life. A collaborative faculty-student experience of creating a conference in Second Life targeted towards those with disabilities will be described.

VR technology can be used in novel ways for traditionally taught science material. Forty-eight students in a science classroom studying Pathophysiology “experienced” disease using the Oculus Rift and the VR program “Sharecare VR”. This highly engaging project allowed all students to explore both normal and pathophysiologic disease processes in an immersive manner. Originally planned as a thirty minute experience, many students engaged with the material for several hours. The technical and pragmatic challenges of adding this experience to a traditional classroom will be described.

Augmented or Assisted Reality provides additional opportunities for faculty to captivate today’s learners. Utilization of AR platforms such as “Metaverse” offers potential opportunities to provide the engaging “back story” so central to narrative pedagogy. Whether used in the simulation lab to provide cognitive congruence with a scenario or used in more traditional classroom settings to enliven material, AR offers great potential to increase engagement with the Gen Z learner.

This presentation will seek to cover strengths and weaknesses of each of these immersive techniques and will guide participants to available tools while sparking creative interest in the engagement that VR/AR modalities might offer today’s learner.

French, Kristine. (2017 February 13). *Wired*. First they Got Sick, Then they Moved into Virtual Utopia. Retrieved from <https://www.wired.com/2017/02/first-they-got-sick-then-they-moved-into-a-virtual-utopia/?gi=be428e857f9a>

Models are the failures that prompt the next successful step: A crash course in using VR in a course on sensation and perception

Damian Kelty-Stephen, Michi Soderberg, Nicole Carver, Mariam Nadiradze, and Caelin Bryant (Grinnell College)

We report on the first year of our own crash course in embedding virtual reality in a course on Sensation & Perception in the Psychology Department curriculum. Virtual reality makes a ready test case for considering computational theories of mind, that is, the theories in psychological science that imagine the mind to be a computational organ operating on pixel-like bits of stimulation to produce a coherent, immersive model of the world. Whatever computational theories of subjective experience suggest the brain must do to support this mental calculation, virtual reality effectively poses for the programming the same challenge. In short, the goal was to give students an up-close and personal view of how challenging this computational feat could be and how likely computational models are to fail before supporting subjective experience. In our reckless optimism, we aimed for the enrolled students to generate psychological experiments using immersive aspects of virtual reality displays. The idea was that they could manipulate the bodily relationship to vast contextual parameters (e.g., stability of the horizon) and then could examine how these changed human-participant perceptual judgments of distance in this virtual ambient array. This crash course worked better than we anticipated or wanted, and the reasons were all perfectly expectable: the hardware and software alike (and not just for VR!) had bugs; different computers with different hardware would not be equally compatible with software; some student staff quit or did not yet have the requisite programming skills; finding new student staff was complicated by schedule constraints; the software libraries ideally making everything easy were not equally transparent to everyone; gradual version changes bewildered everyone who was not an old hand at Unity. Despite our ability to pay them for their time on the project, student staff did not have the professor's ~~tolerance~~ appetite for learning from failure. This crash course was a success that students (staff and enrolled) and faculty learned a lot from. We made no successful experiments, but we grasped two main successes: 1) we planned simpler tasks for Fall 2019 using off-the shelf products as experimental manipulations without requiring programming, and 2) we started building a student-generated tutorial document that could encode each semester's students new discoveries about *how* to program into an institutional memory of "code that students could want for a later project."

There is an often-told story about 10-year old children who pick up Unity and become super virtual-reality programmers in their free time. But 10 years more and entry into higher education leaves many of our students risk- and failure-averse. This talk is a story about learning from failure and persisting by reframing how we invite students enrolled in the class to, generally, learn from failure and more specifically to psychology, take firmer hold of computational theories of experience. We suspect that working with VR resources offer a new, current way for students to experience age-old and timeless lessons about learning from and progressing past failure.

[Title to be added shortly or later in online version]

Victoria Szabo (Duke University)

[Abstract to be added shortly or later in online version]

**Aligning learning goals, approach, and assessment in VR/AR/3D pedagogies:
Remarks and interactive activity/discussion**

Vanessa Preast (Grinnell College)

I will be giving a brief introduction to assessment. I will identify different types of assessment and explain the reasons why we assess classroom experiences. I will then discuss the importance of alignment, a central requirement for good assessment. Alignment involves making sure the learning outcomes, teaching approach, and assessment are all connected. I have some remarks to share on this topic but then would like to engage attendees in an interactive activity to illustrate the issue and raise new questions. I will then facilitate a discussion/workshop among participants to identify their learning outcomes related to VR/AR/3D and then identify the evidence they gather to demonstrate that students achieved the outcomes. We can also talk about how they teach the learning outcomes if there is time. I aim for this presentation to be an accessible introduction to those who have less experience with assessment and for those who know more about assessment, I aim to open the floor for sharing ideas and for reflecting on new challenges with assessing their learning outcomes in pedagogies with VR/AR/3D formats.

**Inviting students to trace the dreamscape inside the thirteenth century romance
Le Roman de la rose.**

Joseph Derosier (Beloit College)

My interest in virtual reality technologies stems from student-centered pedagogies in language and literature classrooms. As part of a larger strategy to encourage students to produce content, I would like to use VR as a tool for them to create and explore literary worlds in order to understand the spatial, visual, and representative aspect of literature. The main object of study for these purposes will be the thirteenth-century romance *Le Roman de la rose*, which take place within a walled orchard. The exterior walls are covered in portraits of romance's enemies: Avarice, Envy, Sadness, Old Age, and Avarice. Within the walls are the animated personifications of Idleness, Love, Beauty, Wealth, Generosity, and Courtliness. The narrative quickly shifts as reflected and refracted objects of desire are projected in and through a fountain, parodying Narcissus's folly and death. As a difficult text to visualize, I would like students to track the space of the text using VR technology. Thus when students feel lost in the text, we can return to the student-created VR content to trace the spatial journey of this dreamscape, exploring and re-creating the surreal dreamscape of the text. Medieval manuscripts attest to the desire and impulse to visualize the topography and geography of the text.¹ This project aims to transfer the agency to illustrate this text to the students, and allow them to engage with the text more deeply with this technology.

This type of project would not be limited to this text or this class. VR technology at Beloit will allow us to explore real and imagined cities while maintaining the immersive classroom environments to which we are committed.

Giving students a sense of space and time in the *Beowulf* meadhall

Timothy Arner & Justin Thomas (Grinnell College)

The VR Heorot project is virtually reconstructing the meadhall from *Beowulf* as a 3D model and immersive environment. The team has based its model on archeological excavations of Viking meadhalls in Denmark, England, and Iceland, as well as accounts from historical and poetic records from the early Middle Ages. The meadhall will be populated with objects important to understanding the world of the poem. The VR experience give participants a sense of space, allowing them to see how the layout of the hall contributes to its function as a political and social arena. In addition, people would be able to “hold” and examine virtual objects such as weapons, armor, jewelry, etc.

360/VR/AR assignments in humanistic contexts

John Kim (Macalester College)

My talk will be about my preliminary uses of 360 video and VR technologies in a humanities course I teach, *New Media Theories and Practices*. The course takes a critical and conceptual approach to new media technologies (including 360/VR/AR) that situates them in the history of media technologies and in the context of contemporary commercial and artistic practices. My talk will consider how to incorporate 360/VR/AR productions assignments that retain a critical perspective that avoids their uncritical celebration. It will also reflect on the role of digital production in the liberal arts with attention to how to implement production elements with new, emerging technologies in courses with a humanistic focus. I will draw on examples from my own teaching and research.

Enhancing humanities curricula through VR technology in a liberal arts context

Joseph Bookman (Beloit College)

A little over a year ago, Beloit College began investing in a range of new digital media equipment resources to support its newly established Media Studies program. This equipment—which includes a variety of cameras, microphones, field recorders, light kits, and miscellaneous production gear—has been integrated into our library circulation system and is now available for checkout 7 days a week. In recent months, we have begun looking into the possibility of expanding our digital media equipment offerings to include a selection of VR equipment. Departments across campus have been expressing interest in incorporating VR technology into their curricula. Certain professors of Art, English, Media Studies, Modern Languages and Literature, Classics, History, and Museum Studies are especially enthusiastic about making use of these new resources, if and when they should be made available. Faculty have suggested that having access to tools such as *VR Paint*, *Unity*, and *Google Tours* would be useful as they imagine developing future courses. A few professors are also interested in using VR technology to hold virtual office hours and/or deliver virtual lectures.

As the coordinator of our media lab and as a purchaser of media equipment on campus, I am hoping to acquire VR technology that meets the various needs of our campus community, but as I begin the process of introducing these new resources to our college, I have many questions about how to proceed. In this presentation, I will elaborate on our media lab’s ambitions to bring VR technology to campus, and will discuss some of the challenges we face moving forward. I will be seeking guidance on how to build a set of VR resources that will best meet the needs of humanities departments, and will be particularly interested in hearing from those workshop attendees who have experience developing VR labs at liberal arts colleges.

Getting beyond the novelty effect: Appropriate use of immersive technology in the classroom

Bret Jackson (Macalester College)

With the explosion of available low-cost hardware, immersive technologies are finally making it into the classroom. While it is easy to create an immersive experience, it is much harder to create a good immersive experience in the classroom that adequately meets the intended learning goals. In this workshop, we will discuss the affordances of immersive technology and several case studies from the AR/VR research community of successful immersive experiences in the classroom. Given time, participants will workshop their own curricular goals with other attendees with an eye towards good affordance design.

Ideally, I'd like participants to come about from this with a greater sense of what AR/VR is actually good for so that they aren't just using it in the classroom because it is popular right now, but instead to support specific learning goals. Hopefully the examples I will show will spur inspiration for new assignments or in class activities.

Discussion: Aligning technology needs with learning outcomes

Moderator: Eric Handler (Macalester College)

I would like to moderate a conversation about balancing the glitz and glamour of virtual reality with pedagogy. In my role as an academic technologist I find it is always helpful to ask a question along the lines of "What do you hope your students will learn?" when consulting on projects. The next questions are "What learning objective does including a Virtual Reality demonstration during a class session accomplish?" "What technical tools are needed to accomplish that goal?" "Is Google's Cardboard appropriate for your class, allowing students to bring their own phones and explore virtual worlds independently from their classmates? Would a small collection of headsets that cost less than \$500 per unit provide the best experience for you and your students or do you need a premium gaming computer and \$1200 headset to meet your goals? How do you account for accessibility concerns or provide an engaging experience for any students who are not in the virtual experience? The scalability of VR—e.g., many Google Cardboards in the classroom vs single HTC Vive Pro—has been a pressing question for me recently as our Center for Scholarship and Teaching recently purchased a "cart VR system" that I have been working on testing and documenting for classroom use. I plan to show you what I am working on with this cart system and hope to get feedback from multiple faculty at once.

Confirmed Attendees with Contact Information

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