Proposal for the Creation of the

DEPARTMENT of INTERACTIVE GAMES & MEDIA

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B. Thomas Golisano College of Computing and Information Sciences

Rochester Institute of Technology

Executive Summary

The faculty of the Game Design and Development program and New Media Interactive Design program propose the formation of a new departmental unit named "Interactive Games and Media."

Over the last several years, a new audience for computing education has emerged. These students see computing as a medium of expression and think about their college experiences in terms of what they wish to create. Since the inception of the Game Design and Development and New Media Interactive Development degree programs, it has been apparent that the message portrayed by these programs has resonated with students, parents, and industry alike. As our programs continue to grow, it is important to establish an identity that clearly conveys to stakeholders inside and outside the university (students, parents, other departmental units on campus, funding agencies, industry, etc.) who we are. Several major academic institutions—including USC, Georgia Tech, and NYU—have already taken measures to ensure their competitiveness in this area by defining distinct administrative units to guide their progress. Their experiences and examples provide us with a starting point for moving forward, while continuing to pursue our own unique vision.

GCCIS currently comprises four departments, none of which make clear the focus on media and content that are key to the Interactive Media and GD&D programs, faculty, and scholarship activities. Several GCCIS programs are accredited using standards appropriate for their departmental home, but those standards are inappropriate for our programs and new standards for accreditation are currently emerging around our own view of computing. We have identified four specific ways in which a new department will help focus and refine our energies as they relate to our contributions to the Institute:

1. The Department will provide a base for identity and branding, making it clear to prospective and current students who we are and what we do. This will help to illustrate to the campus as a whole the growing breadth of Computing & Information Sciences as defined by the College, and will assist us in communicating to students inside and outside of GCCIS the options we offer to them in their academic pursuits.

2. The Department will provide a recognizable central point of contact and focus for partners and agencies interested in funded collaboration with the Game Design & Development and New Media Interactive Development programs. It will also more clearly communicate our focus to internal and external partners, providing a wider range of opportunities for interaction and collaboration

3. The Department will allow the faculty to define appropriate standards for their curriculum, scholarship, and research as it relates specifically to their vision of computing as a medium of expression.

4. The Department will serve as an example of the type of innovation and creativity that President Destler has identified as the hallmark of RIT.

1. Motivation

The core computing disciplines no longer address the interests and goals of all our students – a new type of student has emerged, one who is interested in mastering not only technology, but also the use of technology as a means of creative expression. New degree programs have evolved to address this new audience, with great success in student demand and career placement, as well as strong academic and industry acclaim for the programs and the faculty supporting them.

Students entering these programs typically arrive at orientation with questions such as "How can I create video games?", "How can I build experiences/entertainment I can share with others online?", "Can I impact the ways people communicate with each other online?", and "How can I express myself with a computer?" Much as in the early days of photography and film, the emphasis in these programs is shifting away from the technology itself to the use of technology as a tool for creativity and expressiveness. We are often quoted as saying that games and other artifacts are 'applications of computing.' While this is partially true at some level, it belies the underlying message and use of computing as a medium. One would not claim that 'film making is an application of photography and behavioral perception,' as such a statement would deny the expressive component of the act itself, and this is a similar situation to the one in which we now find ourselves relative to computing.

Since the inception of the Game Design and Development (GD&D) and New Media Interactive Development (NMID) degree programs, it has become clear that these programs have resonated with students, parents, industry, and academic colleagues. We have seen unprecedented growth in GD&D as well as a controlled expansion of NMID. However, continued growth cannot be accommodated without looking at both the internal and external impact of our current situation. As our programs continue to grow, it is important that we establish an identity that provides outside scholarly and industrial entities with a clear vision of who we are. Internally, we are concerned that continued growth will create problems that cannot be accommodated by the Information Technology department without damaging its core identity. We are not unique in these concerns, which is why many of our competitive class institutions have already taken measures to address similar situations. We have carefully studied their experiences, and have attempted to learn from their examples while pursuing our own unique path forward.

This document will present the case for a new departmental unit. The first section will describe the uniqueness, goals, and vision of the proposed Interactive Games and Media Department. The second section will examine changes in the industry since the submission of the original degree proposals for Game Design and Development and New Media Interactive Design. The third section will describe current opportunities and the fourth section will outline some recent challenges. Finally, the fifth section examines the potential impact of the new structure as it applies to the existing Information Technology (IT) department, the B. Thomas Golisano College of Computing and Information Sciences (GCCIS), and the Rochester Institute of Technology (RIT) campus as a whole.

2. Defining Characteristics of the IGM Department

In order to understand the importance of an Interactive Games and Media Department, it is important to first understand what makes this proposed departmental unit unique. This section describes the qualities of the Interactive Games and Media Department in terms of its programs, vision, faculty, students, and synergy with the rest of GCCIS.

2.A What makes Interactive Games and Media unique?

The current GCCIS structure consists of four departmental units: Computer Science, Information Technology, Software Engineering, and Networking. Each of these departments has a different underlying philosophy pertaining to computing and its application in the real world.

Computer Science approaches computing from the standpoint of the design and implementation of software systems. Computer Science places particular emphasis upon theoretical, analytical, and algorithmic approaches to finding new ways to use computers and solve problem[45]. Information Technology approaches computing from the user's perspective. In particular, Information Technology places computing emphasis upon the technology and usability needs of individuals, groups, and organizations. Practitioners of Information Technology are capable of integrating existing technologies as well as building new ones [1, 45].Software Engineering approaches computing from a process pipeline viewpoint. In particular, Software Engineering follows the entire development cycle from design and implementation, through maintenance[45].Networking approaches computing from a connectivity perspective, looking at infrastructure issues at a variety of scales, system administration tasks, and security issues [45].

Unfortunately, none of these areas accurately describe Interactive Games and Media. **In this particular discipline we approach computing from the perspectives of content, experiences, and creativity**.

By content, we mean that we perform computing in the service of a constructive process. At one level, we can describe such content as multimedia: image, audio, text, and video. However, we perceive content at a higher level. We go beyond image and think of 3D models, lighting, textures, and compositions. We go beyond text and think of discourse and community. We go beyond audio and think about soundscapes for simulations and interactive environments. The concept of content also goes beyond software. We define content as being also of the physical – anything from simple input systems to augmented environments to manifestations that push the boundary of digital art. At the same time, when we explore these concepts we do so through the creation and construction of tools, systems, and technologies.

By experiences, we mean we use computing to create environments with a high degree of interactivity but we also create environments that are capable of conveying a message. Experiences can be light and fun or can be serious and thought provoking – they can tell stories, they can elicit emotional response, and inspire belief in alternate realities and virtual worlds. For example, when creating video games, we strive to create experiences that provide a sense of fun with the user. However, those same games can be used to illustrate a particular social problem and be used to jumpstart serious dialogue around a particular issue or theme.

When we refer to creativity, we refer to exploring new ways of developing technologies of expression. We push the borders of what can be built and experienced. We look for new ways of using games, multimedia, social connections, for a wide range of applications and uses. To be clear – we are not simply focused on 'building things from or for the user's perspective' – nor are we focused entirely on the systems we employ and their construction: **Our goal is to create highly technical applications and installations to create meaningful, memorable, and entertaining experience.** This represents a focus not just on technology, but on systems that drive message and deliver content, and which in some instances may be utilizing commercially available systems and in other instances relies on the creation of entire technologies from scratch.

Our academic focus is also clearly different from that of the Fine Arts. The modern day industry tends to bifurcate work in our discipline into 'designers' and 'developers' – and we clearly straddle the fence between the two, with a majority of our graduates hired into developer roles. The entire nature of creative work in this space is changing: over the past year we've seen creative tools become more technical (Flash, Flex, AS3, Silverlight, XNA, etc.), and during a recent campus visit Adobe® made known the fact that they are now seeking partners that have the technical focus that characterizes our programs since design programs in the arts have been unable to meet their

needs. At another level, this difference can be seen in the reflection of our coursework where we are focused not just on the production of the creative work itself, but on the meta-creation of the tools to produce such work. Students and faculty regularly fabricate entire systems either from scratch or by incorporating various existing technology for the purpose of creating new workflow, processes, and delivery systems for our creations, and regard this activity as both synergistic and embedded into the creative process.

2.B Who are our students?

The students entering our programs are unique in their backgrounds. Most of them have experienced computing differently from a generation ago. Their experiences around computing are defined by video console games, web interactions, and digital devices such as cell phones, iPods, and much more. Our students are consumers of the technology revolution and invent new ways to use technology, going well beyond those initially intended by the developers. Our students define themselves by moving beyond the role of consumer. They want to be at the forefront of creating new experiences and technologies for people just like themselves. When we discuss our programs with potential students, we hear about their desires to change the world through computing. For faculty, the new generation of students coming into our programs presents a significant challenge: how do we provide strong computing fundamentals while using their creative motivation to promote academic achievement?

Our students are also focused directly on content, creation and expression. They come to RIT with designs, challenges, and dreams of what they hope to build and realize through technology. They seek to not only become masters the underlying technology, but also to create works held in high regard by their peers and a specifically defined target audience. The driving force behind their academic pursuits is the exploration of the **craft** of interactive experiences – of blending invention, computing, and interaction in the service of message and content delivery. They approach technology as a tool, and content creation as the goal.

2.C Who are our faculty?

In the games and interactive media industries, interdisciplinary diversity is considered an asset in providing quality user experiences. Similarly, the faculty of the proposed Department of Interactive Games and Media come from a variety of backgrounds, with degrees in Computer Science, Fine Arts, Psychology, Engineering, Library Science, Media Theory, Mathematics, and other disciplines. Dedicated teachers, we also have an unusually wide range of professional experiences outside academia, working for or founding game studios, software and internet companies, as well as doing private consulting, writing for practitioners and researchers, taking industrial sabbaticals, and a participating in a range of other industry-linked activities. Our diversity stimulates innovative curricula within our discipline and provides unique opportunities for scholarship and industry partnership. Our unique range of backgrounds combined with a unity of purpose is a key resource and competitive advantage. We support this academic diversity, and regard it as one of our most unique and valuable assets.

2.D What Programs and Degrees do we Offer?

The Interactive Media and Games program will offer three degrees spanning two programs. First, the department will offer the B.S. and M.S. degrees in Game Design and Development. As described by our degree proposal document:

> "The Bachelors of Science in Game Design and Development defines a program of study that allows students to explore the entertainment technology landscape as well as other related areas, while still pursuing a broad-based university education. The program focuses its technical roots in the Computing and Information Sciences disciplines.
>
> Simultaneously, the program exposes students to the breadth of development processes through involvement in topics such as game design, design process, and animation."[36]

There is also the issue as to who the degree is intended for:

> "The degree is intended specifically for students that aspire to hold careers within the professional games industry or a related field such as simulation, edutainment or visualization, and focuses on producing graduates that understand the technical roots of their medium, the possibilities that creative application of software development affords, and the way in which their industry operates. This degree also provides students with a core computing education that would prepare them for graduate study in a number of computing fields, and employment in more general computing professions." [36]

The Masters of Science in Game Design and Development provides a graduate experience for student with pre-existing technical skills and a desire to focus their computing background in games or a similar field[37].

The New Media Interactive Development program provides a B.S. in New Media, as well as courses to students in the related B.F.A. programs. For the B.S. in New Media,

> "Students demonstrate special interest and capabilities in areas requiring communication and problem solving skills. Drawing from RIT's strengths in information technology, graphic communications, design, and imaging, our new media program offers a cutting-edge, interdisciplinary education preparing individuals to lead the collaborative development of dynamic, interactive, media-rich content." [43]

This degree program has long emphasized creative processes and skills, and has had strong links to the College of Imaging Arts & Sciences since the inception of the IT department.

2.E What is our Curricular Direction?

Both programs are characterized by strong computing fundamentals. Undergraduate students are required to take extensive programming coursework in a variety of languages. For Game Design and Development, B.S. students are required to learn programming languages such as Java, C#, C++, and ActionScript. New Media students are also required to learn a rigorous set of programming languages such as ActionScript, JavaScript, PHP, and C#. In both cases, the programming concepts are taught using tools and examples appropriate to creative domains. Students in both programs have mandatory coursework in areas such as introductory multimedia, time-based media programming, web design and development, human factors/interface design, introductory networking, as well as an array of math, science, and liberal art requirements. These students are also required to work as part of team project experiences. Both sets of students may take optional coursework in areas such as web programming, advanced multimedia programming, advanced graphics API programming, and much more. The experiences differ for Game Design and Development, as undergraduate students are required to take courses in game design and development, data structures and algorithms for games, as well as coursework designed to inform students of related topics such as traditional and 3D animation. New media students are required to take coursework outside the college for design, drawing, video, and animation.

Graduate Game Design and Development students are required to take a seminar track of courses related to game industry processes. They are also expected to select between major tracks in graphics and engine design or artificial intelligence for games. Minor tracks include content development, narrative and story, database, and usability. Graduate students are required to work together on a 20 week capstone experience as the culmination of their degree program.

The two programs have also continued to expand their curricular direction as their programs grow. Major areas of investigation include: casual game development, simulation and learning, persuasive (serious) games, games and society, social media and social computing, physical and logical control for games and media, data-driven systems

development, game system debugging and optimization, multi-core development techniques, gameplay architectures and development principles, audio for games and media experiences, and much more.

We have begun to explore ways in which to collaborate more effectively with other departments and units on campus, both internal and external to GCCIS. We recently proposed and will begin offering a Minor in Game Design & Development as an important step in working with students in other related majors. Likewise, we continue to offer a 'Concentration in Game Programming' to students in other GCCIS majors, and continue to provide interesting experiences to students in fine art, animation, computer graphics design, computer engineering, and engineering. It is our intent to continue development along this trend – our next proposal is a Minor in Game Design that should be applicable and enjoyable to students across the campus (i.e. non-computing majors), and beyond that we have interest in specific collaboration with a variety of institutions with regard to a focus on educational games in a variety of contexts.

2.F What is our Scholarship & Research?

Our faculty and students publish in a variety of venues related to games and media. We produce traditional scholarship published in journals and conference proceedings, and we also create content that is disseminated both nationally as well as internationally through the web, through gallery showings, and through live performances. We are engaged and involved in the regional and national efforts that surround our curriculum, as well as in producing models of creative practice for industry, peer institutions, and others. This differentiates our group: we value, and are respected for, scholarly outputs that range from the traditional to the experimental, from science to art.

Our definition of scholarship therefore differs from other departments in CGGIS, but it is no less rigorous. Our definition matches the industries we represent, and with emerging trends in the NSF and similar agencies (NSF, for example, recently had program officers attend a research meeting *inside* World of Warcraft[2], and is now holding workshops on issues such as 'productive play' [32]). As computer mediated content permeates modern life, the forms and venues for scholarly work, and for funded research will continue to diversify. We are well-positioned for publication and recognition in this new landscape.

Funded research to date from the faculty in this domain has included curricular development funded by the National Science Foundation and Microsoft Research, exploration of social software and collaborative systems funded by Microsoft, NSF, and the MacArthur Foundation, simulation and gameplay experimentation funded by the Department of Defense, preservation and content reproduction work sponsored by the Library of Congress, and work in games and simulations for education sponsored through the Department of Education, as well as several projects sponsored internally through PLIG and FEAD grants. These projects span the gamut of Boyer's classifications of scholarship [3], from the basic to the extremely applied.

Moving forward, we expect increased opportunity for research & development as our new department communicates its drive, purpose, and capabilities to funding agencies. Our faculty's scholarly output is already increasing steadily; this trend should accelerate as our academic programs grow and stabilize, and as newly recruited faculty establish their roots within the RIT research sphere. The IGM administrative unit should also be better able to recruit students for a variety of projects, from the Bachelor's level, all the way through to sponsoring doctoral students within the GCCIS Ph.D. program.

An incomplete listing of some of our current projects and publications can be found at http://games.rit.edu/ under the 'Research' tab.

2.G What is our Outreach and Community Involvement?

Our students and faculty feel strongly about outreach experiences. Over the last two years, our faculty participated in numerous activities involving city and suburban school districts, local scouting groups, volunteer

groups, local and regional museums and arts groups, and several other community and industry events. Outreach is not just the domain of faculty. Many of our students are eager and willing to participate. Several of our graduate and undergraduate students have acted as role models through programs such as Kids on Campus and through informal discussions at local events.

A small listing of GCCIS/RIT events in which we have represented either the college and/or the games programs include:

ACM SIGGRAPH
ACM Sandbox Symposium
Game Developer's Conference
Microsoft Research Faculty Summit
Microsoft Research Social Computing Symposium
RIT Middle College / NOVA Academy
RIT Brick City
RIT Career Day
RIT Orientation
Imagine RIT Innovation & Creativity Festival
Open House & Accepted Student Open House
Pittsford/Mendon Math Teachers Association
Area Career Days at BOCES and other local schools
Greater Rochester Area Guidance Councilor's Association
WITR Radio (several times, with a number of different faculty interviews)
Girl Scouts of America tech days and game badge programs
Publication in "They Teach That in College?!" – a Baron's guide to specialty degrees and programs in higher education, forthcoming publication in NextStep Magazine, a national publication to high-school administrators, staff, and students.

Because our discipline is uniquely accessible and attractive to the general public, events like these allow us to highlight the Golisano College and the work of the entire Institute.. They also allow us to inspire young children, and recruit some of the most promising candidates for our undergraduate and graduate programs.

2.H What is our Community?

The Interactive Games and Media group has a well-established sense of community with respect to our professional and personal goals and desires. Over the last few years, we have strived as a team to build high quality programs that benefit GCCIS and RIT. By elevating the group to a departmental level, we feel that this sense of community can help enhance the relations within and outside of our college.

Another aspect of our growing community is the relationship that we have with our growing set of program alumni. These former students are still in regular contact with the faculty, and often return to campus for final shows, events, and recruiting opportunities, as well as attend national events in which GD&D or New Media exhibit (Game Developer's Conference, etc.) In seeking to become more connected to our alumni, forming the Interactive Games and Media Department will aid in providing students an entity to which they feel more connected since it better represents the programs in which they were once enrolled.

3. A Shifting Landscape

Since the approval of the original degree proposals for Game Design and Development as well as New Media Interactive Development, the landscape in terms of academia, industry, and scholarship has begun to shift,

providing even greater, more varied career opportunities for students, and a stronger base for scholarly endeavors. This section outlines some of these changes.

3.A Change in Industry Landscape

The computer game and entertainment industries continue to grow at an unprecedented rate. In 2007, companies sold approximately 268 million computer and video game software units in the United States alone for approximately $9.5 billion in gross revenue [10]. This figure represents an increase of 28% from the prior year [10]. For the period covering April 2007 through 2008, 5.6 million Xbox 360 consoles, 3.2 million PS3 consoles, and 7.8 million Wii consoles were sold [67]. Projections when including associated hardware and accessories bring the total estimate gross revenue of the gaming industry closer to $18.5 billion dollars for 2007 [10]. To put earnings of the game industry into perspective, the first day of Halo 3 sales surpassed the top weekend box office sales for the highest U.S. grossing movie in history [10]. Even more revealing, the recent release of Grand Theft Auto IV sold 3.6 million units and generated an approximate $180 million in the first day, surpassing Halo 3's previous record [13]. By the end of the first week, GTA IV surpassed 6 million copies and $500 million in sales [13].

In addition, for the period defined by January 1, 2007 through December 1, 2007, the game industry's software sales totaled more than triple the sales of the rest of the software industry between 1996 and 2007[9]. The games industry contributed $3.8 billion to the U.S. Gross Domestic Product in 2006[9].

However, despite anticipated growth in this sector, new opportunities continue to reveal themselves. The Massively Multiplayer Online (MMO) game market is a strong force in the entertainment landscape. Current projections place active worldwide MMO subscriptions somewhere around 16 million [30]. Approximately 10 million of those active subscriptions are with the ever-popular *World of Warcraft* title, but other titles are starting to grab market share [30].

Another growth sector is the handheld game system. To illustrate, over the previous April 2007 to April 2008 period reported above, U.S. sales of the Nintendo DS game system surpassed 10 million units, surpassing Wii sales [67]. Worldwide, approximately 30 million Nintendo DS units were sold compared to 17.8 million Wii consoles, 9.3 million PS3 consoles, and 8.8 million Xbox 360 consoles [67].

Casual games are also starting to gain share in the industry. Research shows that approximately 200 million people worldwide play casual games on the Internet and that approximately $1.5 billion in world sales are projected for 2008 [6]. Although employment statistics are still hard to anticipate due the U.S. Department of Labor's classification of game design and development as well as interactive media jobs, resources still show around 80,000 current jobs with over $2.2 billion in employee compensation [9].

Games are also of interest in contexts not traditionally associated with the gaming industry. As mentioned previously, NSF is sponsoring a workshop in the spring of 2008 on the topic of "productive play"—games that engage participants in creative acts, often to solve real-world problems[32]. A growing number of companies have been founded recently to apply gaming concepts in non-gaming contexts, from corporate email to family chores. This application of gaming concepts and technologies in a broader range of contexts will offer even more opportunities for our students and our faculty.

3.B Breadth and Scope of the Interactive Games & Media Industry

The breadth and scope of the game industry has also changed since the initial Game Design and Development Proposal was published. The latest ESA 2007 report on the state of the games shows that 67% of American heads of households play computer and video games [8]. Although that number is down from previous reporting, there are other interesting changes in the statistics. The report shows that the average age of a game buyer is currently 28 years old and the average age of a game player is 33 years old [8]. In addition, 38% of those surveyed were female and 24% of those surveyed were over the age of 50 [8]. Even more interesting, when questioned, adult

gamers on average had played video games for approximately 13 years and 53% of gamers anticipate they will be investing the same time or more into video games 10 years out [11]. The average gameplay time for men surveyed remains around 7.6 hours per week and 7.4 hours for women [8]. Even more interesting is that as gamers become parents, they continue their interest in video games. For example, 35% of American parents still say that they play video games [12]. For moms that play video games, 37% say they play video games with their children at least once a week [12].

Demographics are slightly different with online games, where 53% of surveyed individuals are male and 47% are female [8].

The year 2007 also saw growth in family entertainment genres of video games, E-rated games, and wireless games [8, 9].

3.C Changes in the Academic Landscape

With the continued success of the games and multimedia industries, academia has focused its attention towards this emerging field. As of March 2008, the Game Career Guide lists over 500 schools that offer courses, concentrations, minors, and majors in game design and/or development [15]. The New Media Consortium website lists over 100 member organization programs with related degrees [47]. In this section, we examine competitive institutions that list games and/or new media as a core focus. A more thorough listing of these institutions and their programs can be found in Appendix A.

A great many institutions have initiated "game programs" in recent years. However, few of these programs are comparable to our Game Design and Development BS and MS. Most game programs currently come from one of two historical contexts – existing programs in Computer Science, or existing programs in the fine arts. For programs originating in the former, there are countless examples of a traditional CS program with a "course or two tacked on to make it seem games-like"– usually in the 3rd or 4th year of study. Programs originating from the fine arts generally do not exhibit the focus on core technology and systems development that characterize technical programs such as ours. What has not occurred in most of these programs is a complete rework of the curriculum to support the collaborative and content-driven nature of games as identified in this document and exemplified in our programs.

Our successes, and those of a few close peer institutions, have not gone unnoticed. There are now several examples of core programs that are of sufficient quality as to be seen as reasonable competition for our own entering class. Nationally, programs at USC, WPI, RPI, Carnegie Mellon and others have emerged as competitive class institutions. Locally, several schools in the SUNY system are working on their presence in this academic arena, as is a consortium consisting of NYU, Parsons, Tisch School of the Arts, Columbia, and SUNY.

Most programs related to new media are of one of two types: BFAs or MFAs that emphasize the visual design and media creation, or degrees in media studies. Very few combine a strong technology focus with a solid design background. Even fewer have the cross-disciplinary focus of the New Media Interactive Development degree. There are, however, competing programs by other names that do offer comparable curricula, and in recent years there has been a shift towards more attention on the intersection of visual computing and media design.

In several of these cases, and particularly in cases where the program approaches one of our size and reputation, administrative units have been defined to make clear the focus on these efforts by the university at large. Georgia Tech recently reorganized a subset of their faculty in the College of Computing into a 'School of Interactive Computing' (that contains no underlying departments and is one of 3 academic units within the college) [16]. The University of Southern California supports its games programs through the establishment of the Interactive Media Division, along with a collection of 4 distinct research centers[58, 59, 63, 64]. NYU, focusing more on the research end of the spectrum than a curricular program, supports its efforts through the NYU Media Research

Laboratory[35].The University of Central Florida established the Florida Interactive Entertainment Academy (FIEA), to serve the needs of its programs in this way[50].

In considering the benefits of this proposed new department such, it is helpful to examine Prof. Vick's experiences in architecting the FIEA program. When it became clear that the idea would not advance at UCF without monetary support from the game industry, Dr. Vick and his colleagues approached Electronic Arts. EA was interested in the opportunity to guide the development of such a program, and was willing to proceed because the UCF initiative grew out of a structure that served design, art and technology **from a single faculty and administrative unit**. In fact, during negotiations several EA employees made statements that the proposal would not have been considered if it came from any single discipline department, nor would it have been considered without having an appropriate administrative entity. In that case, having an established administrative structure centered on goals and ideals similar to ours resulted in a multi-year, $12 million gift. This is not to say that there will be an instantaneous gift should we form the proposed department, but it does illustrate that our current administrative structure may put us at a disadvantage for such efforts relative to our peer institutions.

A more comprehensive look at individual schools and their competing programs in this arena are provided in Appendix A.

3.D Accreditation

The accreditation of Information Technology programs by ABET was being finalized during the earliest phases of the New Media and GD&D degree programs. We (the IT Department at RIT, which at the time included faculty from NSSA) were heavily involved in that accreditation effort, and believe that the resulting ABET Information Technology guidelines are appropriate for the IT program and fit well with the national definition of IT. However, through that process, it became clear that the core goals and outcomes of the GD&D and New Media degree programs would not be appropriate to incorporate in the ABET IT guidelines. Similarly, the vision of IT articulated through the ABET Information Technology guidelines does not have significant overlap with the current direction of the GD&D and New Media degree programs.

While the ABET IT accreditation curriculum does not reflect our degree programs' focus, there are now talks beginning surrounding the accreditation of Games and Interactive Media. This past year, faculty in this group served on an ABET Task Force to explore the issue of accreditation of game development programs. A group within the International Game Developer's Association has also been considering this issue, again with heavy involvement from our faculty. While these efforts are just beginning and will take years to solidify, they already appear to be much more closely aligned with our efforts and the efforts of our peer institutions.

3.E Changes in the Scholarship, Research and Development Landscapes

Many grant funding organizations, both public and private, have begun to recognizethe value of these gaming and interactive media technologies. Grant opportunities that address gaming and new media have begun to emerge from agencies such as National Science Foundation, Department of Education Programs, SBIR and STTR, as well as many others. Foundations such as Pew, Ford, and MacArthur are just a few that are now recognizingthe importance of this discipline. There are also a number of corporations such as Microsoft, Intel, IBM, Adobe Systems, and Sun Microsystems that see the value of funding research and development in the areas of gaming and new media.

4. Rationale: Current Opportunities

4.A Leader in the Field

The introduction of the GD&D programs and the continued growth of the NMID program have resulted in many of our faculty receiving accolades from colleagues at other institutions, our industry partners, and our students. Our

programs have a strong technical focus, which is of great value to our industry partners. Our programs also have balance, providing students with strong fundamentals while providing an advanced overview of their intended fields. To ensure curricular relevance, the faculty are involved in a number of academic review boards as well as curriculum efforts led by such groups as the International Games Developer Association [23]. Members of our Industrial and Academic Advisory Board (IAAB) have provided valuable input with regards to shaping the curricular direction and goals of the program. When bringing in people from industry, the faculty hear about the relevance of our programs and how aligned our goals are with industry. Such alignment has led to unique opportunities with Adobe and Microsoft. Finally, our strongest gauge of leadership in the field is the feedback we receive from incoming students and alumni from the games concentration and new media programs that see the value of the educational experience with us.

4.B Size of our Programs

The new media and game design and development programs create are among the most popular at RIT. As an example, 2008's entering class is projected to be at least 45 B.S. New Media Interactive Development students, 120 B.S. Game Design and Development students, and 8 M.S. Game Design and Development students. To put these figures in perspective, when the Game Design and Development undergraduate program becomes steady-state and New Media Interactive Development meets its growth targets, there will be approximately 148 New Media Interactive Development and 396 Game Design and Development undergraduates, as well as 14 GD&D Masters students. This does not include any students involved in the minor, internal transfers, or any new projected programs, and accounts only grossly for estimated attrition over the life of an entire entering class. Tuition generated by these two programs alone is projected to gross $15.07 million using 2008 tuition rates, when all three programs reach steady state in 2010.

4.C Connections to Industry / Academic Partners

Members of our faculty have numerous connections to industry and academic research opportunities within and outside RIT. Currently, game students have partnered with research and entrepreneurial groups in almost every college at RIT. For example, our two degree programs have students working within COLA, CIAS, COS, Imaging Science, NTID, and more. Many of these projects require the perspective that only games and new media can bring to a problem. External interactions are numerous and include institutions such as SUNY at Buffalo, NYU, Hunter College, UIUC, Stanford, USC, FIEA, and more. Our faculty members enjoy industry contacts such as Microsoft Research, Microsoft Game Studios, Yahoo! Research, HP Labs, PARC, Electronic Arts, Vicarious Visions, Adobe Systems, Midway, THQ, and many more.

4.D Scholarly Activities

The Interactive Games & Media group is a perfect example of the spirit of RIT's new direction. The group is made up of faculty from diverse backgrounds, including those with terminal and non-terminal degrees in a variety of science and art disciplines, as well as those with experience with industry and entrepreneurship. Over the last 5 years, our faculty have accumulated an extensive track record of published work in the area, including conference publications, journal publications, extended abstracts, conference presentations, book chapters, and complete volumes. Equally as important, the faculty have also been involved with gallery presentations, performances, published or Internet disseminated software systems, patents, startup companies, and consultant opportunities. Faculty do not perform their research in a vacuum, but rather involve their students in opportunities not often found at the undergraduate or even graduate level, including publication and exposure opportunities that have led to jobs and additional academic progress.

Federal, foundation, and industry granting agencies have begun to recognize the value of funding research opportunities related to gaming. To illustrate the recent upswing, one has only to look at the grants and scholarship opportunities pursued by the faculty of these programs. For example, over the last five years, Microsoft Research and Microsoft Game Studios have funded our research through approximately $250,000 in

unrestricted gifts. Those monies have stimulated faculty and student research and have seeded new curricula and research directions. Faculty have received over $100,000 from NSF to explore social media and social media in the STEM classroom. Faculty have also received a $690,000 Library of Congress grant to explore the preservation of Virtual Worlds with several partners at the University of Illinois at Urbana-Champaign, Maryland University, Stanford University and Linden Lab, Inc., creators of Second Life.

Along with these significant funding opportunities, the faculty have availed themselves of smaller opportunities. We have taken on an NSF subcontract with Hunter College and New York University to build casual games for change, which funds three undergraduate students and will lead to further research opportunities. We have positioned our programs to receive resource and training support for faculty and students from Adobe Systems. We have completed a phase one STTR examining the integration of intelligent tutoring in games and simulations for the U.S. Army, and have been notified of funding on a National Endowment of the Humanities grant examining asset management and sharing. Some members of our group are consulting with the United States Air Force on games as tactical simulations and AI training grounds.

In addition, the faculty continues to explore new horizons in research. In 2007-2008, we have thus far submitted approximately $1.5 million dollars of grant proposals with NSF and FIPSE, as well as a $750,000 invited phase two proposal for an STTR at the intersection of commercial games, military simulation and training, and intelligent tutoring. We have also been invited to submit an additional phase one proposal for an STTR aimed at increasing health awareness for military personal through casual games. Through the Lab for Technological Literacy, we have brought in significant funding from General Motors. We are also exploring opportunities for funding with the Strong National Museum of Play.

4.E Nexus for National Activities

The games and new media successes are beginning to draw additional attention to the Rochester area as a place to go for education in these fields. As our reputation continues to grow, it is only a matter of time before we start bringing the nation to RIT to see what our programs are about. We intend to attract national conferences to RIT, so that we can showcase not only our programs, but our institution and our region. We have already been invited to give presentations—not only as individual faculty, but as RIT's GD&D program—at events such as the Austin Games Summit, FuturePlay, and others. We foresee substantial opportunity to begin hosting our own events in the near future.

5. Rationale: Current Challenges

5.A Identity and Branding

One of our greatest challenges is based upon where we are situated organizationally: a program that exists within a Department of Information Technology. While Information Technology has done an excellent job of establishing itself as a new computing discipline, our programs fall at the very periphery of that definition, and students interested in the type of creative technology in our programs are unlikely to look for them in an IT program.In addition, the broader usage of the term Information Technology in industry results in many potential partners being confused by our organizational location. Because RIT's marketing of degrees focuses on departments and not programs, it has become extremely difficult for the outside world to find us and learn what we have to offer. There have been significant efforts by the IT department to promote "programs first" – but the internal structure of RIT from course catalogues to phone trees makes it exceedingly difficult for this to succeed at the Institute level and beyond.

There is also the issue of the requirements that our Information Technology affiliation places upon us. Game design and development and new media do not easily conform to the accreditation and standards associated with IT. For example, both the ABET standards for Information Technology [1]and the ACM/IEEE Joint Task Force for Computing Curriculum 2008 Information Technology draft [46] pay little to no attention to the areas of multimedia and game technology within their mandate. Likewise, our work does not conform to the accreditation standards for the fine arts.

5.B Central Point of Contact

An important part of improving our visibility is the creation of a central point of access and information for scholarly activities within our purview. A number of units on campus contend that they have functions that promote game design and development. In many ways we are similar to the schools mentioned in the competitive analysis that have different programs and departments all claiming to handle game design and development issues. However, unlike our competition, we do not have a structure which acts as the focus, and the net result is confusion with groups such as admissions, development, research, and career placement. A department can provide focus for such activities and allow us to leverage the departmental status to increase public awareness of our innovative practices and programs.

5.C Departmental Direction

The size and direction of the games and new media groups have not scaled well with our current governance structure. These two programs constitute an enormous amount of the departmental direction. The growth and disparate directions of Information Technology programs has led to issues pertaining to facilities growth, hiring parameters, research and scholarship differences, industry contacts, outreach, resources, and other value-related items. It is anticipated that the issues will become exacerbated as the Game Design and Development program grows and as we near the time for a departmental chair search. In short, although faculty have been incredibly respectful and understanding of the needs of each program, the differences between the faculty supporting various degrees within the existing department is growing ever wider.

6. Benefits to the RIT Community

Of course, the formation of any new departmental entity on campus is always a subject of concern and discussion. The faculty proposing this new departmental unit has given serious thought to the impact upon the existing Information Technology department, as well as GCCIS and the RIT community. Our end analysis is that the formation of the new department is a unique and beneficial opportunity for all parties involved.

6.A IT Department Benefit

The benefit to the IT department is a refocusing and recommitment to the core values that comprise IT. The department needs to focus on what the industry and accreditors define as IT to help promote the program and extend its impact. We believe that removing the non-core areas of GD&D and New Media will facilitate a focus on core IT that will help in the promotion and impact of the program.

There is a clear path for growth in an IT program that includes programming, database, usability, software development and management, learning and knowledge management, as well as new areas of service oriented architectures, enterprise system design and maintenance, data scalability, medical informatics, and many other areas. We don't feel it is our place to define the direction of this group in any way, but rather simply to point out the notion that because of our growth and demands, other efforts in the department have been hampered in years past, and that in an amicable arrangement of cooperating departments it should be possible to refocus efforts in both groups on individual concerns while still cooperating in areas where the curriculum comes together.

6.B GCCIS Benefit

The primary benefit to GCCIS is that the new Department of Interactive Games and Media will demonstrate to the rest of the world that RIT continues to embrace the breadth and depth of computing not just as a computing discipline for its own sake but as a medium that allows for a full range of creativity and expressiveness. We believe strongly in collaboration with other departments both within and outside of GCCIS and we also believe that this new department will provide a solid base for solidifying our collaboration with these units.

The new department will put us on par with other institutions such as Georgia Tech, USC, and CMU that have already created similar administrative units. Likewise, it will make clear to the RIT campus at large our focus on creative uses of technology, and will help the college convey to the outside world, that we are more than simply implementers of technology. The new department will provide better opportunities for operation with the other units within GCCIS and throughout RIT: As students understand the clearly defined roles of each department (as opposed to the current grouping), they can more easily understand choices available to them, and through Minors and other collaborative efforts more effectively experience all that GCCIS has to offer.

6.C RIT Benefit

For the RIT community, the creation of the new department is in alignment with the President's new vision of an institute known for innovation and creativity. The department will create a showcase for such activities (and is, in fact, defined by these activities) and help provide a central point of contact for new associations and activities related to our purpose.

Conclusion

In conclusion, the faculty associated with both the Game Design and Development Program the New Media Interactive Development Program unanimously agree that the formation of an Interactive Games and Media Department is vital to the future direction of the B. Thomas Golisano College of Computing and Information Sciences The formation of this new department affirms that GCCIS recognizes and supports the evolution of the computing fields, and will ensure that RIT maintains its position of leadership in this emergent field.

Respectfully submitted,

The faculty of Interactive Games & Media
(Faculty signatures are provided in Appendix C at the close of this document.)

Appendix A: Competing Programs and Peer Institutions

With the continued success of the games and multimedia industries, academia has focused its attention towards this emerging field. As of March 2008, the Game Career Guide lists over 500 schools that offer courses, concentrations, minors, and majors in game design and/or development [15]. The New Media Consortium website lists over 100 member organization programs that focus in that discipline [47]. In this section, we will examine competitive institutions that list games and/or new media as a core focus.

The University at Buffalo (SUNY) offers an 11 credit hour undergraduate games certificate from its Department of Media Study. The certificate focuses upon the theory and history of gameplay, the impact of play and games on contemporary production and design practice, and the creation of video game experiences [49]. The Media Study department changed its core direction in the digital arts to embrace curricula previously in the domain of the computing sciences, including OpenGL programming, server-side web development, virtual environment development, and robotics [48].

RensselaerPolytechnic Institute in New York supports a Bachelor of Science in Games & Simulation Arts and Science. Established in 2007, the major has strong connections between computing, cognitive science, arts, as well as Literature, Language and Communication [41]. The program also supports a minor in Game Design Studies [42]. The RPI program provides a strong technical foundation while focusing on the design and analysis of game systems for the purpose of developing better game experiences. RPI also has a B.S. in Electronic Arts [39], which combines studio and theory with fine arts and digital arts. Concentration areas include video, animation, visualization, computer music, sound design, game design, multimedia, performance art, and net-based art. RPI also has a new emerging program in Electronic Media, Arts and Communication that intends to bridge art and technology approaches [40].

Syracuse University has begun to offer 2D Computer Gaming classes from their Art department. Despite being housed in the arts, the class is highly technical and addresses the programming of game systems in ActionScript 3.0. Coursework involves the complete design cycle, including content design and programming [44].

Cornell University continues to offer a minor in Game Design. The minor consists of two courses in gaming. Despite the limited course availability, the minor at Cornell attracts a great deal of attention due to its excellent branding and strategic alliances with industry [7].

Ithaca College offers serious games and educational games course experiences through their Communication Management and Design Program [24]. As part of their Bachelors of Science program, students can study the design and application of video games to convey a message or to inform instructional design [31]. Ithaca also offers virtual reality coursework through their mathematics and computer science program [25]. Finally, although Ithaca College does not currently have a strong game program, it enjoys NSF REU support for activities in Augmented and Virtual Reality as well as Serious Games [26].

University of Central Florida has several programs related to games and new media. Their flagship program is the Florida Interactive Entertainment Academy [50]. The FIEA program offers a Masters Degree in Interactive Entertainment. Students can elect to study in one of three tracks: art, programming, or production. FIEA is known for its strong alignment with Electronic Arts and has used that associated to create a powerhouse program that prepares students for large-scale studio experiences. UCF also offers a B.A. in Digital Interactive Systems that focuses upon technical art, modeling, rigging, as well as a broad assortment of digital arts curricular areas [51].

New York University has a number of programs, departments, and centers that all claim to do games and new media. For example Tisch School of Arts is the home of the Interactive Telecommunications Program[34]. ITP is a unique program that offers coursework in a variety of game and multimedia offerings. Coursework includes video

arts, digital sound, 3D environments, web development, programming, networked expression, game design, game production, time-based media, art through code, sensors, procedural animation, algorithmic composition, wearable computing, virtual environments, digital storytelling, and much more. The ITP program is a two-year graduate study program that leads to a Masters of Professional Studies (M.P.S.) degree. In addition, NYU is known for Ken Perlin's Media Research Lab[35]. As a part of the Computer Science program, the MRL lab concentrates upon areas related to game development including computer graphics, computer modeling, simulations, and other areas. The computer science department with relation to MRL offers courses in computer game programming, computer graphics, and physical computing. Some of Perlin's research efforts have attracted NSF funding for the study of computing education and games [38]. Perlin is currently involved in efforts to persuade Microsoft to build a national center for game design and development at the NYU campus. Gaming and media is also studied at NYU through the Department of Media, Culture and Communication [33]. As part of the Bachelor of Science in Media, Culture and Communication, students can study the technological and societal impact of games and new media. Current work by Helen Nissenbaum in the area of Values at Play is indicative of MCC's efforts to study this space [66].

Hunter College hosts an M.F.A. program in Integrated Digital Arts [22]. The program focuses issues regarding politically and socially engaged work. The program also places emphasis upon the social role of both media and technology. Dr. Mary Flanagan offers several courses at the intersection of media authorship, values and gameplay, and game design [14]. Currently, part of Hunter's research revolves around the concept of values at play in which morals and ethics are infused in game design decisions [66].

University of Southern California (USC) hosts a number of programs related to game design and development as well as new media. The Interactive Media Division offers a BS and MFA program in Fine Arts as well as a number of courses related to computer-based entertainment [60-62]. The program offers a number of courses related to applied media programs, including coursework in animation, cinema, television, and the digital arts. Course offerings also include virtual reality, interactive animation, design of online interactive games, computer graphics, 3D rendering, game anatomy, game studies, as well as multiple courses in game design, game storytelling, and game development. Both degree offerings combine strong technical foundational skills with advanced topics in media and games. The Interactive Media Division also promotes a research direction that is strongly linked to the division structure. Structures such as the Electronic Arts Interactive Entertainment Program and the Game Innovation Lab (a 35,000 square ft. dedicated space) provide focus for cutting-edge game related research and corporate development. USC also supports an Information Technology Program that offers a Game Design and Management minor [65]. The minor is co-offered with IMD and provides students additional coursework to help those with aspirations of game designer, game producer, or quality assurance specialist. USC also has a B.S. in Computer Science (Games) and a M.S. in Computer Science (Game Development) programs [56, 57]. Coursework is comprised of a mix from the Computer Science Department and IMD. At the undergraduate level, this major has the feel of a dual major, providing computer science fundamentals and game design and media arts as two distinct disciplines. At the graduate level, the course is mainly focused as a Computer Science program with focused coursework in game engine design and artificial intelligence for games. Another part of the USC landscape is GamePipe labs [58]. GamePipe is closely associated with the Computer Science program in much the same way as the Game Innovation Lab is associated with IMD. GamePipe, despite being heavily technologically focused, tries to link both undergraduate and graduate students in the sciences and the fine arts.

Georgia Tech has several programs that address critical technology and media areas. The Bachelors of Science in Computer Science uses a "threads" and "roles" system to customize a general computer science experience [17, 20]. Coursework includes media programming, media device architecture, computer graphics, video game design, visualization, digital video effects, computer animation, computer audio, and a multitude of special topics electives and seminars [21]. Georgia Tech also has courses in games and media through the School of Literature, Communication and Culture [19]. The school offers degrees ranging from a B.S. in Science, Technology, and Culture through a B.S. in Computational Media. The LCC also offers an M.S. and a Ph.D. in Digital Media. Georgia

Tech also hosts the Experimental Game Lab[18], an umbrella group housed in the School of Literature, Communication, and Culture's Digital Media program. The EGL includes a number of teams including the Emergent Game Group, the Designers Augmented Reality Toolkit group, the Digital World and Image Group, the ETV Lab, and the Synaesthetic Media Lab.

Michigan State University provides a M.A. in Telecommunications, Information Studies, and Media (TISM) that will allow for a serious game design track starting Fall 2008 [29]. The program acknowledges the intersection of the academic foci: theory, content, and design. The TISM program also provides an interdisciplinary approach with coursework in learning, cognition, emotion, and play as well as content need and pedagogy. Faculty involved with TISM come from traditional sciences (Ph.D.) as well as the arts (M.F.A.) along with specializations from industry. The TISM track is also available at an undergraduate level and services Computer Science, Fine Arts Studio Arts, as well as Media Arts and Technology [27]. MSU also supports the Games for Entertainment and Learning Lab [28], which hosts the Meaningful Play conference. The lab is TISM's research arm and is responsible for their public face when promoting the program.

Carnegie Mellon continues to expand their programs epitomized by the Entertainment Technology Center[4]. The center offers a Masters of Entertainment Technology (M.E.T.) terminal degree, which focuses upon the art and technology of the field [5]. In short, the program does not endeavor mix perspectives of artists and technologists, rather it seeks to improve each segment with a moderate amount of understanding and perspective for each group.

University of Denver offers a B.A. and B.S. in Game Development through their Computer Science Department [54]. The program has a strong technical focus with expectation that students will take courses from the arts and from digital media study. The program also has a focus on what they deem as "Humane Games" [55]. The area of humane games includes games for education, games for health services, and games for society.

University of Colorado, Colorado Springs [52] offers a new degree called the Bachelors of Innovation (B.I.). The University hosts a number of programs that offer this variation including a B.I. in Game Design and Development [53]. The Game Design and Development option has an innovation core, a creative communication core, and a selection between Business or Globalization core. Along with the core courses, students are supported by the Computer Science department and are required to take 30 credit hours of coursework from this area.

Worcester Polytechnic Institute (WPI) provides an Interactive Media and Game Development major [68]. The program is a combination of new media and game design, in which the two separate tracks lead to a single degree [69]. Essential areas include a game and media core, math, science, computer science, studio art, computer music, advanced coursework, and a qualifying project [70].

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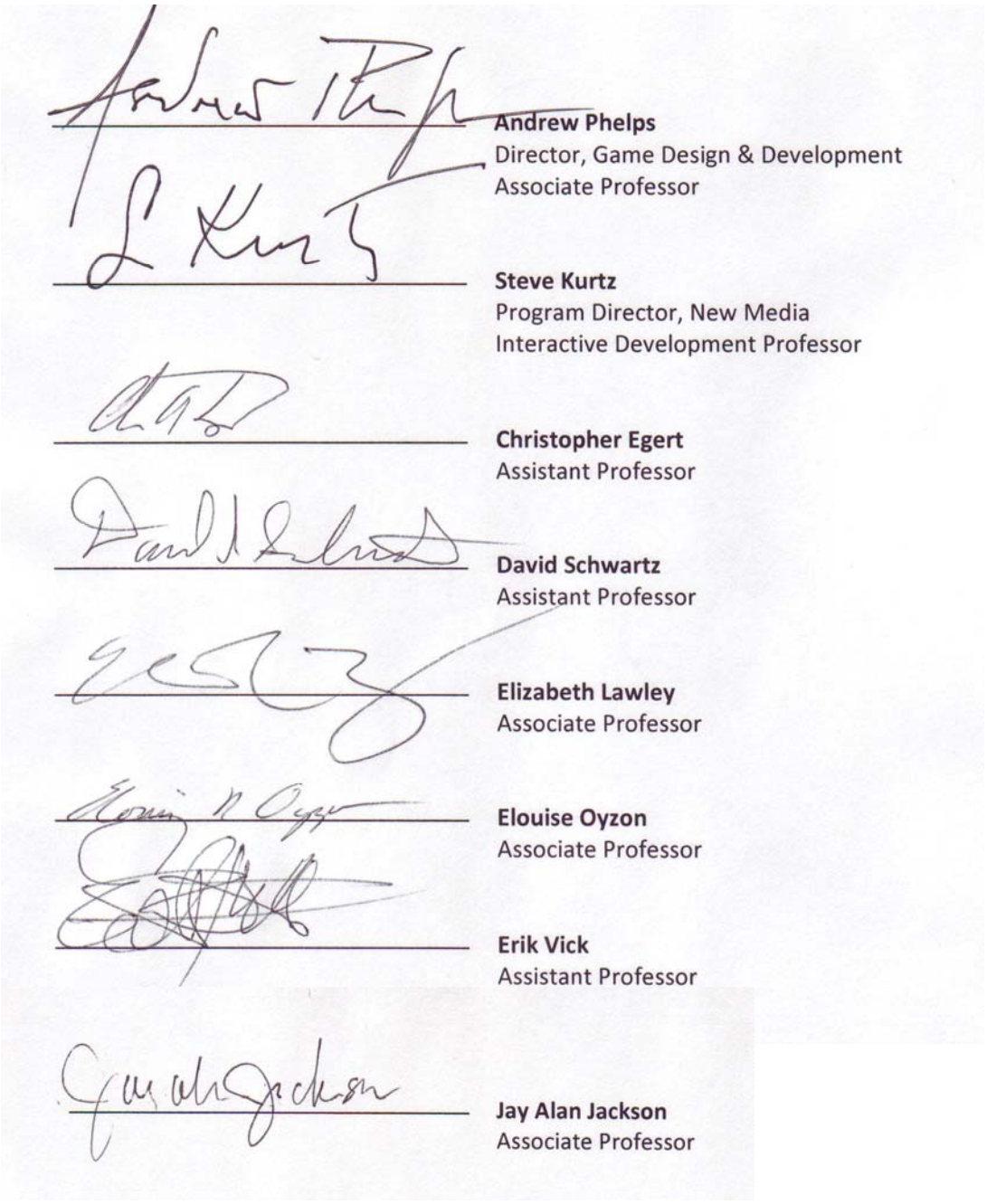
Appendix C: Supporting Faculty of the Proposed Department of Interactive Games & Media



Andrew Phelps
Director, Game Design & Development
Associate Professor

Steve Kurtz
Program Director, New Media
Interactive Development Professor

Christopher Egert
Assistant Professor

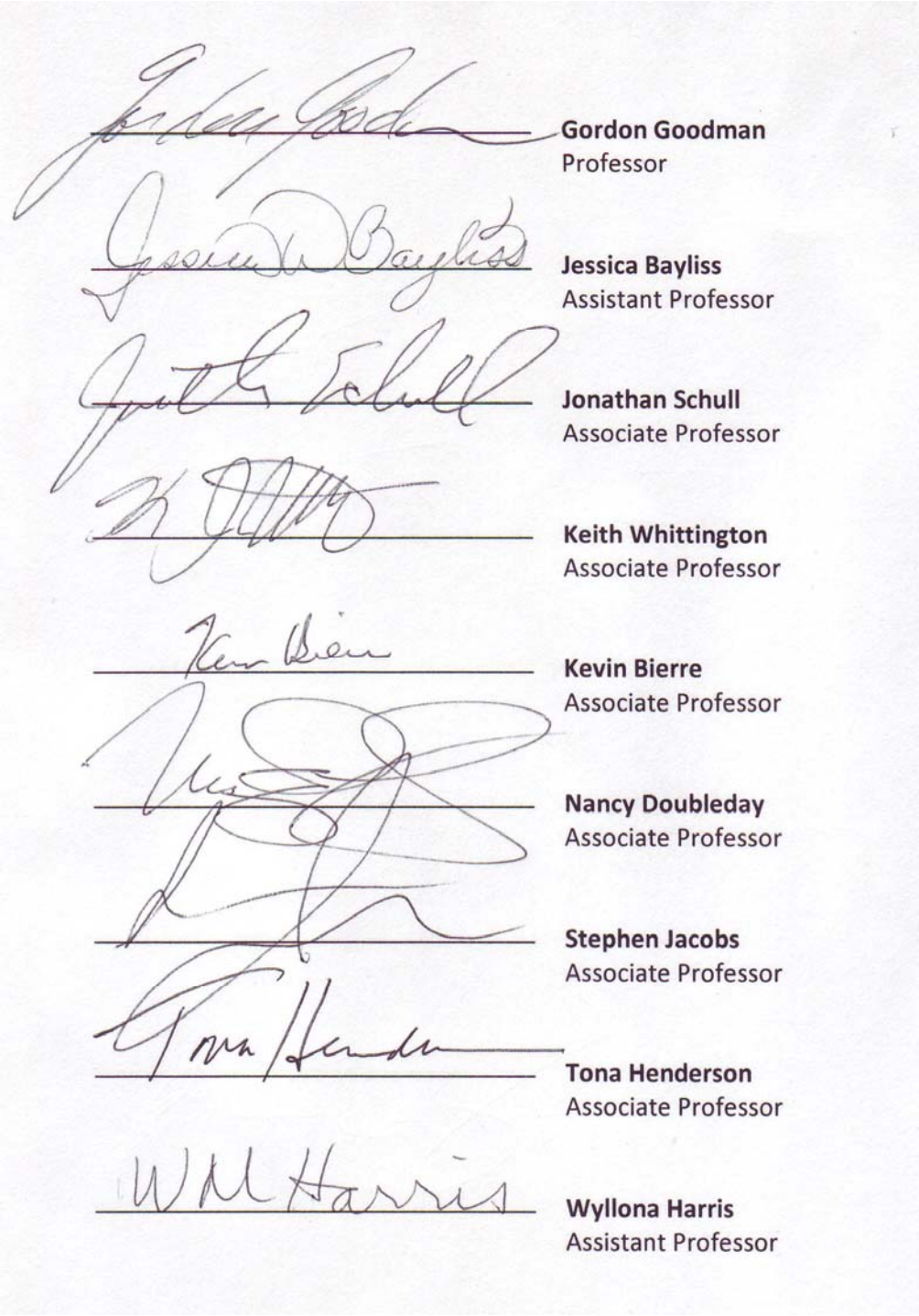
David Schwartz
Assistant Professor

Elizabeth Lawley
Associate Professor

Elouise Oyzon
Associate Professor

Erik Vick
Assistant Professor

Jay Alan Jackson
Associate Professor



Gordon Goodman
Professor

Jessica Bayliss
Assistant Professor

Jonathan Schull
Associate Professor

Keith Whittington
Associate Professor

Kevin Bierre
Associate Professor

Nancy Doubleday
Associate Professor

Stephen Jacobs
Associate Professor

Tona Henderson
Associate Professor

Wyllona Harris
Assistant Professor