



# Masters of Science in Game Design & Development

Executive Summary | Academic Council

**B. Thomas Golisano College of Computing and Information Sciences**

**Rochester Institute of Technology**

**Spring 2006**

**Version 1.0.7 [References full proposal 2.14.9.6]**

Prepared By:

**Andrew Phelps**

Department of Information Technology

**Joe Geigel**

Department of Computer Science

**Christopher Egert**

Department of Information Technology

**Jessica Bayliss**

Department of Computer Science

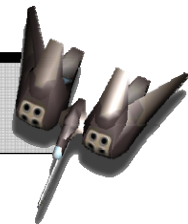
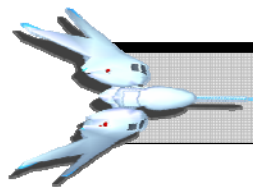
**Stephen Jacobs**

Department of Information Technology

**Nan Schaller**

Department of Computer Science





# Table of Contents

- I. Purpose of this document .....3**
- II. Summary of the Proposed Program .....3**
- III. Document Reference and Reader’s Guide .....5**
- IV. Overview of the Gaming Industry .....6**
  - A. *Description of the Modern Games Industry*..... 6
    - 1. Industry Statistics..... 6
    - 2. Breadth & Scope of the Games Industry ..... 6
    - 3. Projected Growth and Demand for Talented Professionals..... 7
  - B. *Computing Careers in the Games Industry*..... 7
    - 1. Sample List of Game Design & Development Career Opportunities..... 7
    - 2. Sample List of Careers Related to Game Design & Development..... 8
- V. Overview of the MS in Game Design & Development Curriculum .....9**
  - A. *How the MS in GD&D is Unique within the Academic Landscape*..... 9
  - B. *Curriculum Listing & Discussion* ..... 9
    - 1. Courses and Credits ..... 9
  - C. *Team-Based Capstone Description*..... 13
  - D. *Assessment*..... 13
    - 1. Program Goals and Educational Outcomes ..... 13
    - 2. Assessment Methods..... 14
    - 3. Accreditation..... 17
- VI. Program Faculty .....17**
  - A. *Designation of Program Faculty*..... 17
  - B. *Description of key personnel*..... 17
    - 1. Andrew Phelps ..... 17
    - 2. Jessica Bayliss..... 18
    - 3. Christopher Egert..... 19
    - 4. Joseph Giegel..... 20
    - 5. Stephen Jacobs ..... 20
    - 6. Marla Schweppe..... 21
- VII. Enrollment & Financial Projections.....22**
  - A. *Enrollment Projections* ..... 22
    - 1. Admissions Requirements ..... 22
    - 2. Enrollment Information ..... 23
      - a. Competition..... 23
      - b. Geographic Population..... 24
      - c. Status..... 24
      - d. Enrollment Projections..... 24
      - e. Attractor and Retainer..... 26
    - 3. Anticipated Graduation Rate..... 26
    - 4. Graduation Marketability..... 26
  - B. *Fiscal Viability* ..... 26



1. Rationale and Incremental Cost Estimate .....	26
a. Faculty.....	26
b. Support Personnel .....	27
c. Facilities and Equipment.....	27
d. Space Requirements.....	27
e. Library Resources .....	27
f. Institute Computer Facilities.....	27
g. Support Services .....	28
2. Grants and Contracts Received or Anticipated.....	28
3. Donations, Gifts, Scholarships, or Endowed Chair .....	28
4. Projected Revenue and Operating Costs (RIT Costing Model).....	28
<b>VIII. Conclusion .....</b>	<b>29</b>
<b>IX. References.....</b>	<b>29</b>

## I. Purpose of this document

This document offers an executive summary of the materials found in the full proposal for the Masters of Science in Game Design and Development. The full proposal is constructed around the proposal format prescribed by the RIT Provost’s Office, and has strong overlap with the proposal format for the New York State Office of Education. This document is specifically prepared for members of the RIT Academic Senate as a succinct version of the full proposal, created specifically to expedite the process of discussion and review. The entire proposal document, as well as any and all supplementary documentation, is available for review either by request or at the Academic Senate Office.

It is our sincere hope that you will find the proposed program to be an outstanding addition to the already incredible collection of programs available at the Institute. Reviewers seeking responses to specific questions are encouraged to contact either Andrew Phelps or Dr. Christopher Egert directly, at any time, using the following contact information:

<p><b>Andrew Phelps</b>  Director, Game Design &amp; Development  College of Computing &amp; Information Sciences  Building 70, Room 2559, Information Technology  102 Lomb Memorial Drive, Rochester, NY 14623  amp@it.rit.edu  585-475-6758</p>	<p><b>Christopher Egert, Ph.D.</b>  Assistant Professor of Information Technology  College of Computing &amp; Information Sciences  Building 70, Room 2515, Information Technology  102 Lomb Memorial Drive, Rochester, NY, 14623  cae@it.rit.edu  585-475-4873</p>
---	---

## II. Summary of the Proposed Program

The Masters 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. The program focuses its technical roots in the Computing and Information Sciences disciplines, while simultaneously covering the breadth of the development landscape through involvement in topics such as computer graphics design, human-computer interaction, interactive narrative, and

game world design. The program is characterized by a clear focus on development, but meets the industry need to graduate developers that will be involved in the design process from the beginning, just as they are in the professional field. 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.

The program is a 2-year, cohort-based program in which students are admitted through a portfolio review process and subsequently pursue a “*major*” sequence of six courses to guarantee depth within a specialization area relative to game development, and a “*minor*” of three courses specifically outside their major area of study. In addition, all students will complete a seminar track of five courses within the program that ties students specializing in various majors together, and explores the overlap and interconnection of their work as well as providing a framework of understanding for the professional industry as a whole.

Upon completion of their coursework, students are organized into development teams that construct a working game engine and software title as a capstone experience, with both individual and group requirements. The capstone experience culminates in a private defense before program faculty as well as a public exhibition. The capstone project, the focus on team-based collaborative development, the seminar track on industry issues, and the applied nature of the coursework all work together to provide a comprehensive treatment of the subject.

The proposed program directly addresses the needs of the professional game design and development industry. This conclusion follows numerous interactions between the authors of this document and high-level industry and academic professionals and leaders in the field. Typical employees hired from traditional computing majors need a minimum of 6 months re-training to work with artists and game production teams. The proposed degree seeks to reduce this retrain time, and offer graduates prepared to hit the ground running! In addition to introducing skilled graduates into the workforce, this program also offers opportunity for several avenues of applied research within the B. Thomas Golisano College of Computing: core program faculty have already begun publishing in this space, and have secured funding from Microsoft Research for their efforts in games research and education.

### III. Document Reference and Reader's Guide

The entire proposal is comprised of five (5) total documents, four of which were used to construct this summary (the fifth document) for members of the Academic Council. A small description of each of the other documents is presented here:



#### **Masters of Science in Game Design & Development: Degree Proposal**

[ Blue Cover ]

This is the formal degree proposal, which closely mirrors the NY State Department of Education degree proposal form, but with additional information for the Rochester Institute of Technology. All letters of support, financial and enrollment models, and full justifications for the proposal are found here.



#### **Masters of Science in Game Design & Development: Implementation Details & Frequently Asked Questions**

[ Red Cover ]

This is a FAQ document that attempts to respond to some of the questions that the authors of the degree proposal encountered at various levels of the curriculum review process, including information on portfolio review and how the proposed program will currently integrate with undergraduates already at RIT.



#### **Masters of Science in Game Design & Development: Team Based Capstone Frequently Asked Questions**

[ Purple Cover ]

This is a FAQ document that attempts to more thoroughly explain our concept for a team-based capstone than the formal proposal document, because the formal proposal is limited to the form prescribed by the RIT Provost's Office (which mimics the format prescribed by the NY State Department of Education). Notes on the implementation of the capstone for the proposed degree are found here.



#### **Masters of Science in Game Design & Development: Degree Proposal Overview**

[ Green Cover ]

This document is the PowerPoint presentation used for the presentations to Graduate Council and the Academic Senate at RIT. A copy of these slides, with a notes page, is included in the full proposal document listed above.





## IV. Overview of the Gaming Industry

### A. Description of the Modern Games Industry

#### 1. Industry Statistics

The computer games industry produces software for home computers, game machines, on-line games, and arcade games as well as console hardware, portable game platforms, and mobile multi-function devices. In 2004, the industry realized sales of between \$7.3 billion and \$8.2 billion for software in the United States alone (Entertainment Software Association, 2005; PricewaterhouseCoopers, 2005a). The sale of associated hardware brings this figure closer to \$18.1 billion, not including the segment of the PC market hardware that is directly tied to games (Plunkett Research, 2005). On a global scale, the sale of video game software reached record levels of \$25.4 billion (PricewaterhouseCoopers, 2005a). In addition, the number of game unit sales made to consumers also reflects the strength of the gaming industry. Estimates for 2004 indicate that the industry sold 248 million software units within the United States for both personal computer and console systems (Entertainment Software Association, 2005). Estimates place the number of jobs in the areas of computer game design and development at 100 million employees in North America (Bass, 2005). This figure does not include the number of jobs associated with the distribution, marketing, and sales of computer game technology nor does it include ancillary professions that could be classified in the broader area of entertainment technology production.

#### 2. Breadth & Scope of the Games Industry

Perhaps, even more important than the size of the industry is its breadth and scope. Computer games in all forms are, in fact, quite complex and serve as a rich and colorful form of entertainment to a variety of audiences. Games come in a variety of genres, including sports titles, educational games, strategic simulations, historical and military reenactment, cooperative games, science fiction and fantasy titles, construction-based games, and social interaction titles, as well as games that allow users to enact traditional war games. For the year 2004, market research indicated that 75% of all American head of households were computer game players, and 43% of those surveyed were women (Entertainment Software Association, 2005). Those surveyed ranged in age from 5 to 65, with an average age of 30 across all game genres. In addition, over 203 million game console units were sold within the United States in 2004 (Entertainment Software Association, 2005). The demand for game console software has also kept pace with hardware sales, with 52 console software titles selling in excess of 500,000 units (Entertainment Software Association, 2005). In all, the average game player will spend between 7.4 hours on average for women and 7.6 hours for men per week playing video games (Entertainment Software Association, 2005). Over 47% of Americans surveyed plan to buy at least one video game in 2005 (Entertainment Software Association, 2005). The prolific nature of games has even caused Hollywood to take notice since games have become a contender for consumer box office dollars (Holsen, 2004; Wong, 2004).



### 3. Projected Growth and Demand for Talented Professionals

Sales of games and game-related hardware have continued to grow each year, despite economic downturns in nearly every other market segment. Current projections forecast a global growth rate in software sales of 16.5% compounded annually through 2009 (PricewaterhouseCoopers, 2005a). Facets of the game industry with the potential for explosive growth rates include wireless (cell phone, wireless PDA's, etc.) game software sales, projected at 49.3% compounded annually through 2009 (PricewaterhouseCoopers, 2005a) as well as consumer demand for online multi-player gaming experiences, with a projected consumer subscription spending increase of approximately 35% compounded annually through 2009 (PricewaterhouseCoopers, 2005b).

Given this projected growth across all sectors, it will come as no surprise that there is a huge need for talented developers within this arena. In countless conferences, meetings, and talks the authors have received a plethora of feedback from the industry stating over and over again the need for talented technologists that have an appreciation for and understanding of the commercial industry. It is without question that there are also opportunities for other majors, fields, and universities to produce graduates to help meet this demand; but we believe we are one of only a handful of schools actively producing graduates to help meet demand in the technical end of the field, while still infusing our students with a sense of game design culture and an understanding of the professional industry.

## ***B. Computing Careers in the Games Industry***

### **1. Sample List of Game Design & Development Career Opportunities**

There are a wide variety of careers available in the games industry as shown by this partial list, taken from *Get in the Game: Careers in the Games Industry* and other sources (Hoekstra, 2000; Mencher, 2002; Olsen, 2004). Several students who have completed our existing undergraduate curriculum and/or graduate minor in game programming have gone on to pursue careers such as these, and have been hired by several companies including Microsoft, Sony, Electronic Arts, Linden Labs, and Vicarious Visions.

#### **Sample List of Game Design and Development Career Opportunities**

Game Designer	Producer
Level Designer	Network Engineer
Junior Programmer	System Administrator
Lead Programmer	Playability Tester
2D/3D/Graphics Programmer	Quality Assurance Technician
Artificial Intelligence Programmer	Narrative Design / Writer
Audio Programmer	Artist

NOTE: This list does not reflect the business and legal side of the industry, as this is not expected to be part of the proposed degree. We also don't expect our graduates to be hired directly to all of these roles, mostly those on the left hand column (but there are always exceptions and as such the table is listed here in a more complete form).

## 2. Sample List of Careers Related to Game Design & Development

It is interesting to note the relationship that games have to the larger context of multi-user and/or real-time application development. The technology for games currently drives a significant portion of the technology used in scientific and data visualization, from graphics hardware to engine algorithms to technologies for multiple simultaneous users. Games and game technologies are currently used in many environments to support education on topics ranging from high-school science and biology to the study of computer programming. Games in fact overlap with a variety of fields, as shown in part in Figure 2. The technology is related to that used for simulation, visualization, collaborative engineering, and interactive systems. Games are created with building blocks from fields such as artificial intelligence, graphics, mathematics, art and design, and literature. They are similar in some respects to film as an artistic medium, have overlap with traditional painting, drawing, and music, and have direct ramifications on the study of psychology, sociology and popular culture.

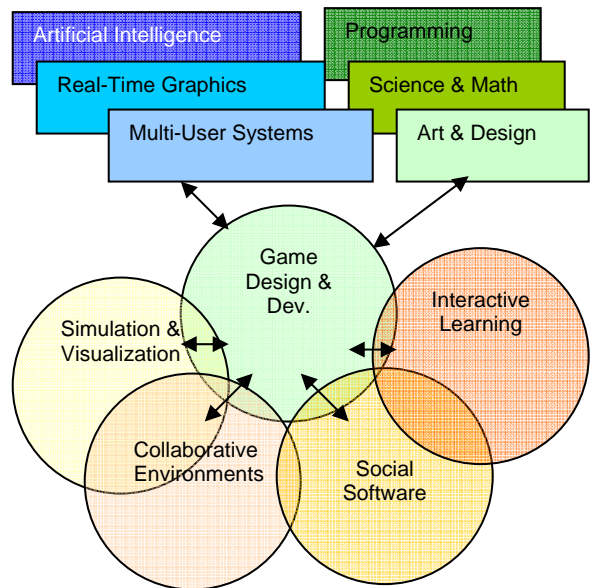


Figure 1: An extremely non-comprehensive list of overlap between Game Design & Development and existing fields of research.

Thus, there are career opportunities that are related to game design and development, and previous students who completed our existing undergraduate game curriculum have gone on to pursue careers in several of these related industries. These related career areas include:

- Scientific Interactive Visualization System Design
- Military Simulation and Training Systems Development
- Educational Systems Development
- Collaborative Software Experience Designer for Social Interactions
- Network Application Developer for Massively Multi-User Interactive Experiences
- Augmented Reality System Developer
- Related Entertainment Technology Disciplines
  - Developer of Applications and Plug-ins for Image, Video, and Audio Experiences
  - Development of Media Kiosks and Game-like Experiences for Physical Entertainment and Commercial Facilities



## V. Overview of the MS in Game Design & Development Curriculum

### A. How the MS in GD&D is Unique within the Academic Landscape

It is our belief that the gaming degree presented in this proposal is unique in New York State as well as nationally. Unlike other game related departments that have grown out of art and design, communications, or traditional sciences, this program is built upon a tradition of career-based education with strong foundations in the science of computing while still stressing the importance and relevance of art and the breadth of the game creation process. The strength of the programs upon which the degree will be built will ensure the creation of a competitive, viable graduate level program.

Additionally, our program relies on the deep technical focus that characterizes the RIT community. Approximately three-quarters of the programs known to exist that refer to themselves as “Game Design” programs do not contain any underlying coursework in software development. It is our belief that the medium *is not ready* to see this bifurcation of study: meaning that the technology that drives games and interactive experiences cannot be readily separated from their content. In order to become deeply versed in the totality of the phenomenon of games as medium, students must study not only the underlying theories of communication, cooperative development, and artistic expression. Furthermore, students must master the technical principles upon which games are designed and developed in order to appreciate the capabilities and limitations of the medium.

The focus on technical development, while leveraging a broader experience through teamwork and collaboration, sets this proposal apart from every other program we have studied thus far, while incorporating many elements from many diverse programs across the nation. RIT was, according to the NY Times, the first program in the country to offer graduate work specifically focused on the development aspects of game engines. This proposal seeks to build directly upon RIT’s previous success in this area, and our very successful concentration in game programming, which has placed a number of graduates into the field, and which incorporates these same differences of approach from the rest of the academic landscape.

### B. Curriculum Listing & Discussion

#### 1. Courses and Credits

Students entering the program are required to complete a major sequence (game engine development or artificial intelligence and simulation), a minor sequence (asset creation and animation, content authoring for games, human-computer interaction, database architecture and design, or a special topics minor) and a five-course seminar sequence that focuses on industry issues. As these courses are completed, students will form groups and work together to complete a capstone with both individual and group requirements, culminating in a defense before program faculty as well as a public showcase. The total number of credits for completion of all requirements is 62 credits. **Note that in the final quarter of study, students are registered for**



**only 2 credits while working on their capstone implementation: this is not because the expectation is only for two credits of effort, but is instead intended as a cost-savings to students who have nearly reached the end of the program.** The cost models and enrollment figures take this reduced load into account.

Figure 3 (on the following page) indicates the flow of course tracks and sequences in this proposed degree program. The colors shown in Figure 3 (blue, green, aqua, and red) will be used consistently in all tables that follow to help identify whether courses are common to all students in the curriculum versus whether they belong to a particular track or sequence.

Three academic units host the courses associated with the degree. These units include the Computer Science Department (CS) and Information Technology Department (IT), which belong to the B. Thomas Golisano College of Computing and Information Science (GCCIS). Also included is the Computer Graphics Design Program (CGD) of the College of Imaging Arts and Science (CIAS).

Within each sequence or track, prerequisites will ensure the proper course progression, however major and minor tracks and the seminar sequence are taken in parallel as the student progresses through his or her coursework.

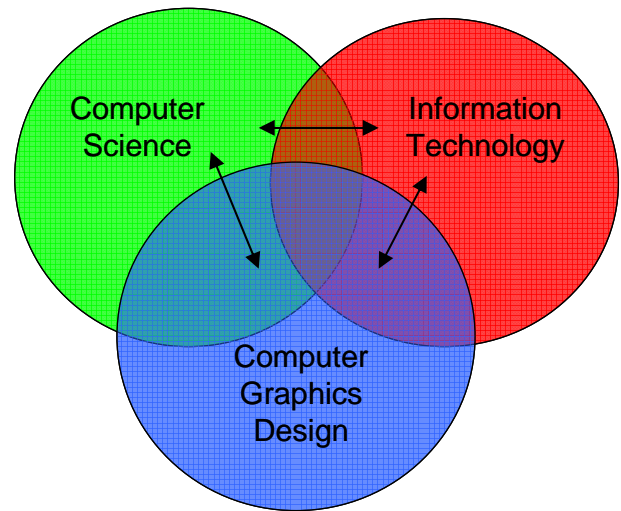


Figure 2: Cross-Disciplinary Support for the Game Design & Development Proposal

Students must successfully complete a total of 62 credit hours for this degree program. Although the credit hour requirements exceed the number prescribed for typical RIT Master's programs, the requirement is not considered excessive when compared to other graduate gaming degrees. Rationale for an increase in the required credit hours is based upon the necessity of having adequate breadth and depth in major and minor track areas as well as a capstone experience that reflects academic and industry needs.

Memos of support from all departments involved, including a cost estimate for any additional sections or new courses required by the program, are provided in the full proposal.

# Game Design and Development Curriculum

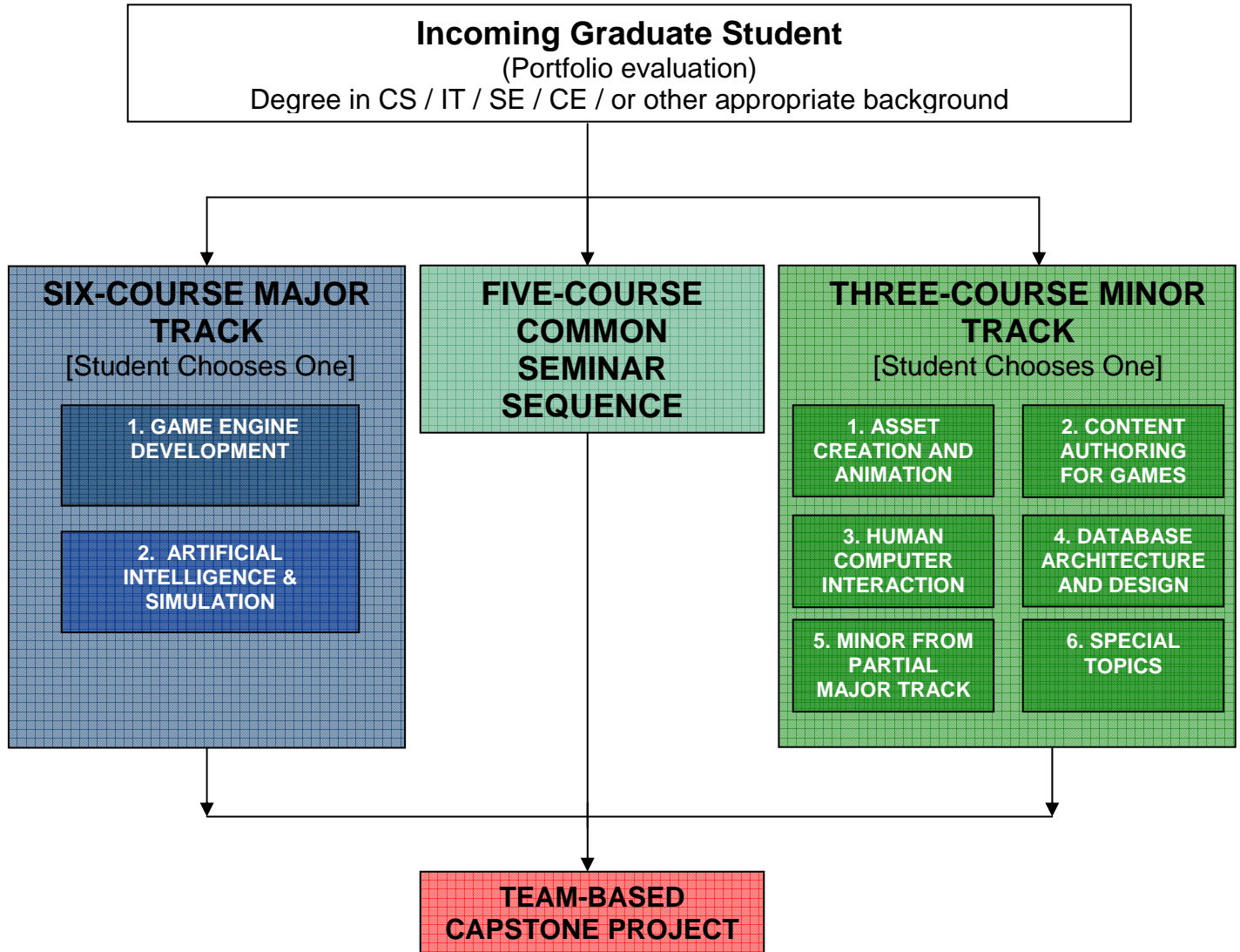
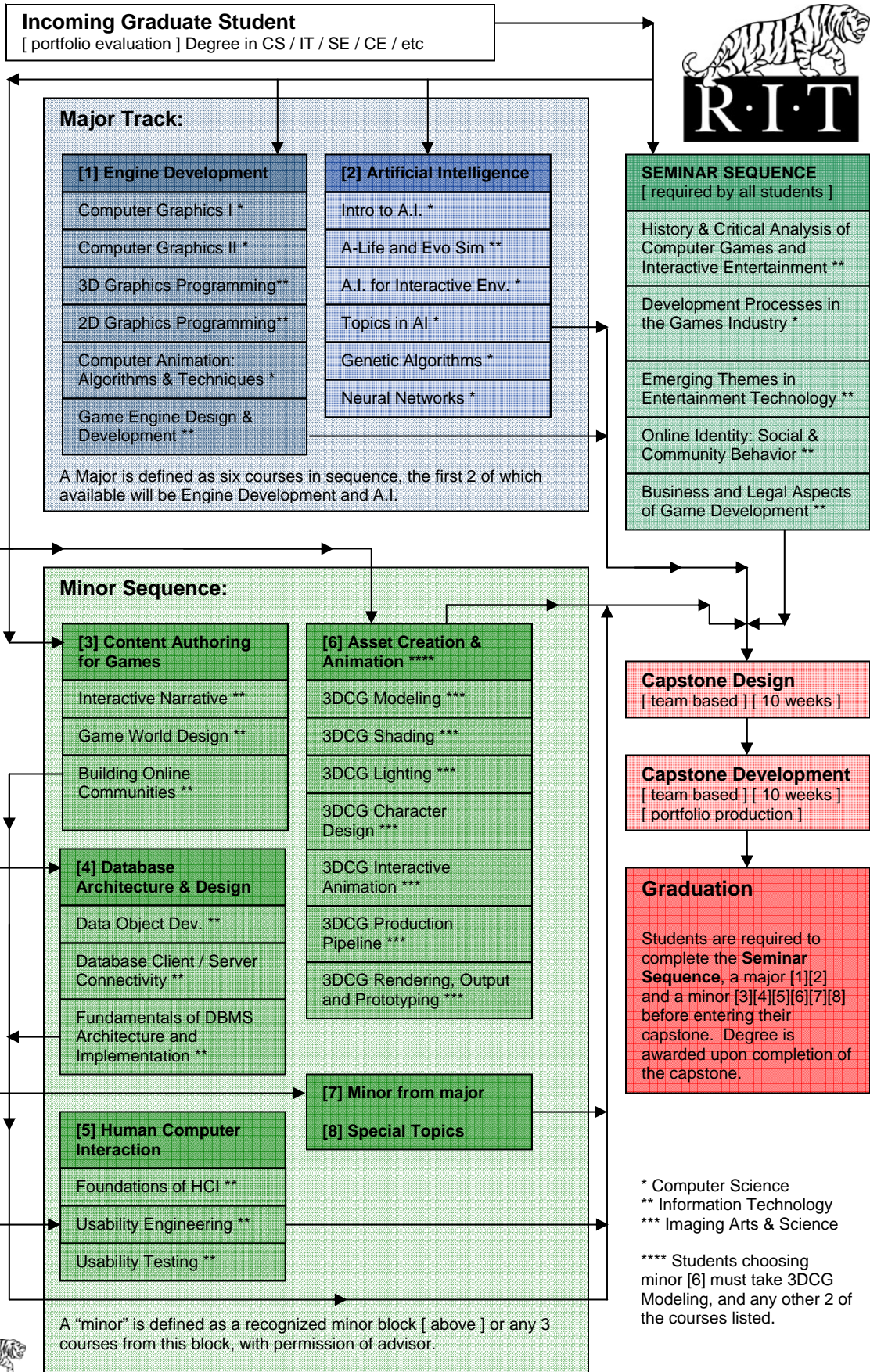


Figure 3: Flow of required course areas in the proposed degree program.

The following tables indicate the actual courses that comprise each track or sequence selection. Each entry within a table will include the course number, the course name, the home department or group (CS = Computer Science, IT = Information Technology, CGD = Computer Graphics Design Program), number of credits, and the approval and deployment status of the course.



# MASTERS OF SCIENCE IN GAME DESIGN & DEVELOPMENT



## **C. Team-Based Capstone Description**

At the outset, it is important to note that our definition of a “team based capstone” does not release a student from requirements for individual review. Rather, it enforces the notion that these requirements are both individual and group in nature, and both of these must be fulfilled in order to complete the degree. It must be stressed that students *will still be evaluated on an individual basis by the faculty*. They will work in teams to create completed works within the field of Game Design & Development, but they will do so in clearly delineated roles of specialty, with individual responsibilities and deliverables. Students in the program will have completed a major and minor track in a given area of study, preparing them for roles in the capstone development teams, as well as a seminar series that studies the breadth of game development and the overlap between the tracks and specialties.

At the start of the winter quarter of a student’s second year of the program, an informational meeting will be held for all members of the student’s cohort. At this meeting an initial call for the formation of project teams will be announced. Students will then have the next week or two to formulate rough plans, and to recruit from the cohort the various team members necessary for completion of the project. Development teams will likely be approximately 4-5 students each. At the end of this period, the student teams will submit to the faculty a rough sketch of the proposed project, along with a clearly defined set of roles and responsibilities for each member of the team. Students are expected to specialize based upon interests discovered within the major and minor tracks, in mimicry of the roles on a professional game development team. This model of group formation and role-definition has been used with great success for the past three years in the Game Programming Concentration, and we expect it will be well received.

The program faculty will then review each proposal, and each development team will be assigned a faculty “chair,” similar to the chair of a thesis committee. Each member of the team will then report both individually and as a group to their faculty chair as needed throughout the development cycle. During the next phase of winter quarter, students will flesh out the design of their proposed project, write their respective individual portions of a game design treatment, co-develop the overlapping portions of the same treatment, and work with their faculty chair to effectively plan and develop assets for implementation during the spring quarter. Also during this period, students will be finishing their remaining coursework (1 major sequence course and 1 seminar).

Following the private and public presentations, and the submission of the group and individual deliverables, the faculty chair of the development team, as well as the other faculty in attendance at the private presentation, will meet and assign a grade to each student in the cohort for the capstone development course, thus fulfilling the remaining requirement for graduation.

## **D. Assessment**

### **1. Program Goals and Educational Outcomes**

The primary program goal of the Masters of Science in Game Design and Development is to produce successful professionals within the game design and development industry as well as in careers related to entertainment technology. Furthermore, it is a goal of this program to produce professionals who understand the multidisciplinary nature of the gaming field.

The program goals will be addressed through a number of anticipated program outcomes.

- Students will be able to relate current game development practices and processes to historical roots within the industry. Students will be able to incorporate lessons of success and failure from previous works into their own game constructs. To be assessed through course projects, culminating in the capstone experience.
- Students will be able to incorporate currently accepted development processes in the game industry towards their own game development. Assessed in projects in several courses, culminating in the capstone project.
- Students will be able to work effectively in multidisciplinary teams to create entertainment technology titles with awareness and respect for various authoring, development and maintenance roles. Assessed by successful completion of the capstone project, as well as several group projects in various courses.
- Students will be able to incorporate social and community theory into the construction of gaming and entertainment systems. Assessed through seminar completion, culminating in the capstone project.
- Students will recognize intellectual property and publishing issues as related to the entertainment technology industry. Assessed through coursework within the degree.
- Students will be able to participate in the construction of a working game or entertainment technology software title. Assessed through the completion of the capstone design and development project.

## 2. Assessment Methods

As the game design and development program spans multiple departments and colleges, assessment methods must be designed in a manner that promotes multidisciplinary understanding and allows for transparency in the intended goals and outcomes of courses as well as program procedures and policies. By performing regular and diligent assessment of the courses and the program, it is the intent that the evaluation process will help the faculty to maintain closer ties with students as well as each other and the industry as a whole.

The assessment process begins with and is controlled by the Administrative Committee. The Administrative Committee, or an officially appointed assessment subcommittee, will be charged with the responsibility of creating and maintaining assessment criteria and standards. The committee will consist of representatives from all three sponsoring departments or programs.



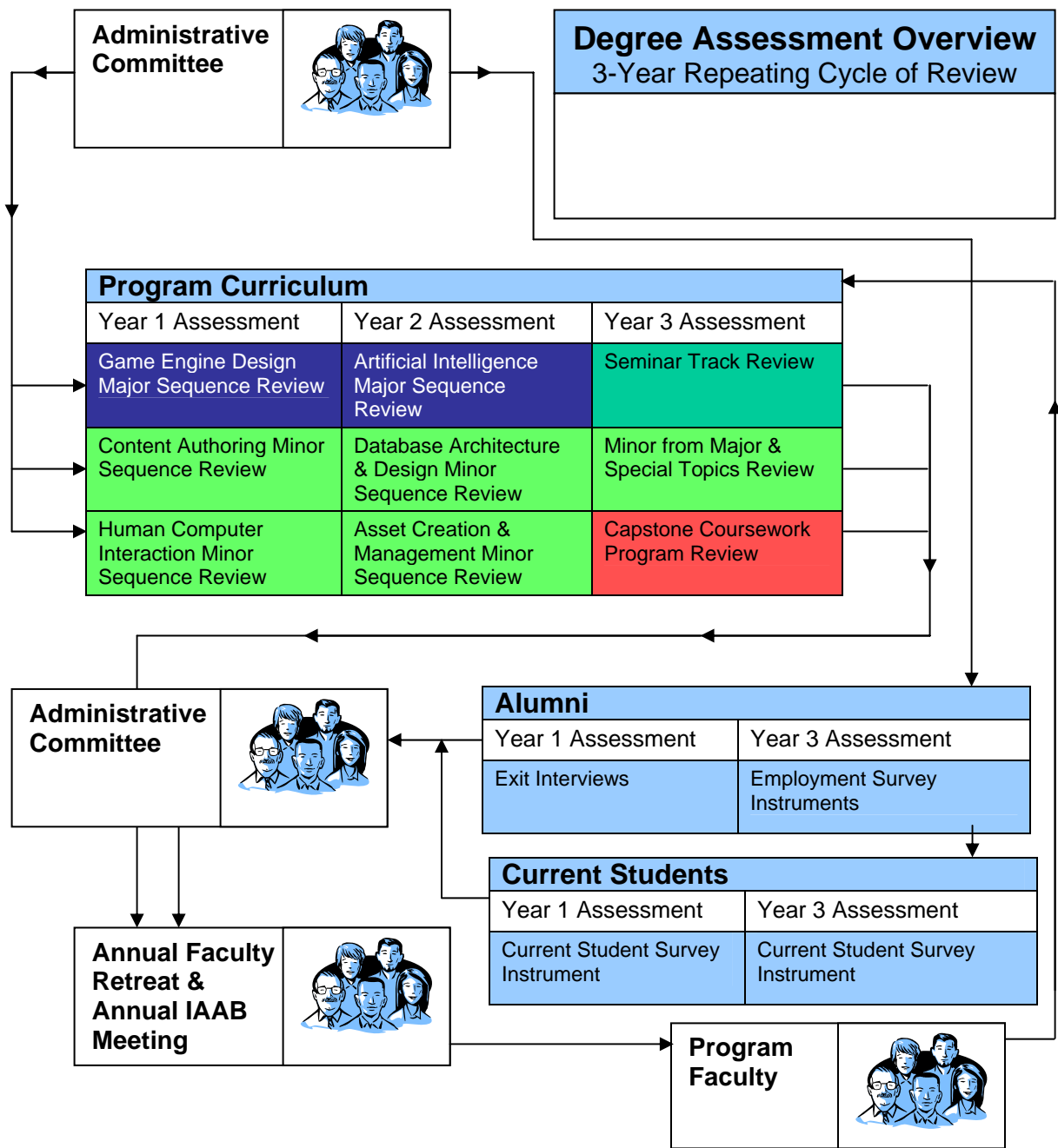


Figure 4: Assessment Cycle for the Game Design and Development Degree Program

Program evaluation will occur over a three-year cycle, as depicted in Figure 4. The evaluation process is divided into two categories, program curriculum as well as student and alumni satisfaction. Each academic year, the Administrative Committee will select a specific set of courses for evaluation, selecting equally from the major tracks, the minor tracks, the seminars, and the capstone experience.

From the selected courses, faculty will ascertain as to whether the course meets intended educational objectives as well as whether the course fits appropriately within the assigned track and the program as a whole. Part of the course assessment will come from analysis of student survey instruments, administered during the last week of the course.

As the faculty revise and develop course related materials, a review panel of faculty from the program will review the materials internally. The process will be formative in nature and will help to insure the applicability and quality of materials related to the coursework.

To address assessment of the current student body and alumni of this program, survey instruments will measure their overall satisfaction with the degree and applicability of the program to their overall career goals. While students are matriculated in the program, focus groups will be conducted with the faculty to determine if the program is meeting the student's educational expectations. After graduation, alumni will be surveyed at 1 year and at 3 years to determine if the program has successfully prepared them for their intended career path.

Furthermore, the Administrative Committee will compare selected accepted portfolio work relative to capstone projects in order to determine the growth of student competency as they progress through the program.

Another facet of assessment is the involvement of the Industrial and Academic Advisory Board (IAAB). Currently, each department's existing Industrial Advisory Board is comprised of select people who possess relevant backgrounds within the game industry and are directly involved with the game design and development process. These people have expressed an interest in advising this proposed degree program. Furthermore, Advisory Board members may also be selected directly from the game design and development industry. Members may also consist of academics from other universities or institutions with gaming or game related programs, degrees, or certificates. Finally, Advisory Board members may also consist of past graduates of the program who are working in industry or academia and who have a vested interest in the promotion and success of the degree program. In particular, the Advisory Board will provide insight and comment regarding particular content areas of the degree program, the overall direction of the degree, and how the degree matches the needs and future trends of the industry as a whole.

The results of curricular review, student focus groups, alumni survey instruments, and recommendations from individual IAAB members will be summarized and presented by the Administrative Committee to program faculty at an annual faculty retreat. The summary will also be presented to the Industrial and Academic Advisory Board at IAAB meeting, which will be conducted on a two-year cycle. After the results are presented, faculty will incorporate the feedback into curricular and program revisions.

Finally, the faculty will be responsible for disseminating classroom practice and results to juried and peer-reviewed conferences and journals dealing with the academic aspects of game design and development as well as industrial practices. Potential avenues for publication include the ACM SIGGRAPH Educational Program, ACM SIGCSE, ACM SIGITE, ACM SIGCHI, and the Game Developer's Conference.

Appropriate and authorized personnel within each home department and the Institute may examine course materials and representative student work at any time upon request.

### **3. Accreditation**

General accreditation of courses within the Game Design and Development program will occur as part of RIT's involvement with the Middle States accreditation process. At present, there is no professional organization or agency with the capability or authority to accredit a graduate game design and development program. Since the majority of courses in this proposal are contained within other degrees and certificate programs, they would be reviewed as part of required accreditation processes within each department or college. In the future, if a suitable professional accreditation organization or agency should come into existence, the faculty members of the Game Design and Development program will endeavor to be associated with the creation, implementation, and deployment of accreditation standards.

## **VI. Program Faculty**

### ***A. Designation of Program Faculty***

Within the full proposal, there are nineteen faculty that teach various courses within the degree (far more than are listed here). However, there are a select number of faculty that are designated as “program faculty” – i.e. those faculty that teach more than half-time within the proposed program, and whose academic interests are more directly focused upon the goals of the program.

There are six faculty designated as program faculty within the degree:

Andrew Phelps: Director of Game Design & Development, GCCIS (program director)

Chris Egert: Department of Information Technology, GCCIS

Steven Jacobs: Department of Information Technology, GCCIS

Jessica Bayliss: Department of Computer Science, GCCIS

Joe Giegel: Department of Computer Science, GCCIS

Marla Scheppe: Department of Computer Graphics Design: CIAS

### ***B. Description of key personnel***

#### **1. Andrew Phelps**

M.S. in Information Technology, Rochester Institute of Technology, 1999.

Professor Phelps is nationally recognized for his contributions in the areas of academic game and entertainment technology scholarship. He currently serves on the advisory board on the International Association for Game Education and Research. He has also served as a contributing editor for the International Game Developer's Association Special Interest Group on

Online and Downloadable Games from 2002-2004. He has been elected and has served as a co-chair on the VRML consortium's External Authoring Interface committee, which created the standards document for VRML and External Programming Language interoperability (1999-2001). Professor Phelps has also been elected and as served on the V-Learn board of directors, a not-for-profit organization sponsored by Cornell University, University of Washington, Harvard, and other academic institutions (2000-2003). Professor Phelps has also been invited to participate in invited evaluation panels, workshops, and panels hosted by Macromedia, Inc. Professor Phelps has published numerous peer-reviewed and popular press articles on entertainment technology and has talked at numerous national and international conferences by invitation. Professor Phelps has also secured a principal investigators grant from Microsoft for his work on M.U.P.P.E.T.S. (Multi-User Programming Pedagogy for Enhancing Traditional Study). He has also served on a number of department, college, and institute-level committees for graduate curricula. He has also been an invited member of program review and assessment committees for other games programs at both the baccalaureate and masters level.

**Areas of Interest:** Entertainment Technology, Game Engine Design and Implementation, Graphics Techniques and Algorithms, and Virtual World Design and Implementation.

**Selected Publications:**

Phelps, A., Principal Investigators Grant from Microsoft Corporation for M.U.P.P.E.T.S. (Multi-User Programming Pedagogy for Enhancing Traditional Study), 2005.

Bierre, K., Ventura, P., Phelps, A., and Egert, C., "Motivating OOP by Blowing Things Up: An Exercise in Cooperation and Competition in an Introductory Java Programming Course", The Technical Symposium on Computer Science Education, Houston, TX, 2006.

Phelps, A., Egert, C. and Bierre, K., "MUPPETS: Multi-User Programming Pedagogy for Enhancing Traditional Study: An Environment for both Upper and Lower Division Students", Frontiers in Education, Indianapolis, IN, 2005.

Phelps, A., Egert, C., Bierre, K., and Parks, D., "Half Day Workshop/Course: An Open-Source CVE for Programming Education: A Case Study", The 32nd International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH), Los Angeles, CA, 2005.

Bierre, K. and Phelps, A., "The Use of MUPPETS in an Introductory Java Programming Course", Proceedings of the Special Interest Group in Information Technology Education, Salt Lake City, UT, 2004.

Phelps, A., Bierre, K., and Parks, D., "MUPPETS: Multi-User Programming Pedagogy for Enhancing Traditional Study", Proceedings of the 4th Conference on Information Technology Education, Lafayette, IN, 100-105.

## 2. Jessica Bayliss

Ph.D. in Computer Science, University of Rochester, 2001.



**Areas of Interest:** Artificial Intelligence, Alternative Computer Interfaces, and Agents in Computer Games.

**Selected Publications:**

Bayliss, J., Microsoft Corporation Computer Game Production Curriculum Award for \$80,000 for a project entitled Reality and Programming Together (RAPT), 2004-2005.

Bayliss, J. and Inverso, S., “Automatic Error Correction Using P3 Response Verification for a Brain-Computer Interface”, HCI International, In Press, 2005.

Bayliss, J., Inverso, S., and Tentler, A., “Changing the P300 Brain Computer Interface”, Cyberpsychology, 7(6), 2004.

Bayliss, J., “The Use of the P3 Component of the Evoked Potential for Control in a Virtual Apartment”, Brain-Computer Interfaces for Communication and Control 2nd International Meeting, 2002.

### 3. Christopher Egert

Ph.D. in Computer Science and Engineering, University at Buffalo (SUNY), 2003.  
Minor in Media Study.

**Areas of Interest:** "Edutainment" Games and Online Play, Computer Mediated Communication, Computing Education through Multimedia Experiences, Distributed Systems, Desktop Virtual Reality, Agent Design, Application of Media Theory, and Computer-Human Interaction.

**Selected Publications:**

Bierre, K., Ventura, P., Phelps, A., and Egert, C., “Motivating OOP by Blowing Things Up: An Exercise in Cooperation and Competition in an Introductory Java Programming Course”, The Technical Symposium on Computer Science Education, Houston, TX, 2006.

Phelps, A., Egert, C. and Bierre, K., “MUPPETS: Multi-User Programming Pedagogy for Enhancing Traditional Study: An Environment for both Upper and Lower Division Students”, Frontiers in Education, Indianapolis, IN, 2005.

Decker, A., Haydanek, S., and Egert, C., “When Objects Collide: Abstractions over Common Physics Problems for Capstone Projects in CS1”, Eastern Conference of the Consortium for Computing Sciences in Colleges, 2005.

Phelps, A. and Egert, C., “Educational Practices for Technology Students in Entertainment Domains”, American Society for Engineering Education St. Lawrence Section Conference, Binghamton, NY, 2005.



Phelps, A., Egert, C., Bierre, K., and Parks, D., “Half Day Workshop/Course: An Open-Source CVE for Programming Education: A Case Study”, The 32nd International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH), Los Angeles, CA, 2005.

#### **4. Joseph Giegel**

D.Sc. in Computer Science, George Washington University, 2000.

**Areas of Interest:** Computer Graphics, Multimedia, and Virtual Theatre.

##### **Selected Publications:**

Geigel, J. and Schweppe, M., “ Virtual Theatre: A Collaborative Curriculum for Artists and Technologists”, The 32nd Annual Conference on Computer Graphics and Interactive Techniques (Educators Program), Los Angeles, CA, 2005.

Geigel, J. and Schaller, N., “Using Photography as a Metaphor for Teaching Image Synthesis”, *Computers and Graphics*, 29(1), pp. 257-265, 2005.

Geigel, J. and Schweppe, M., “Theatrical Storytelling in a Virtual Space”, Proceedings of the 1st ACM workshop on Story representation, Mechanism and Context, New York, NY, ACM Press, 39-46, 2004.

Geigel, J. and Loui, A., “Automatic Album Page Layout Using Genetic Algorithms for Electronic Albuming”, Proceedings of Electronic Imaging, 2001.

#### **5. Stephen Jacobs**

M.A. in Media Studies, New School for Social Research, 1988.  
Graduate Coursework in Animation at RIT.

Professor Jacobs has been editor, contributing editor, or publisher for a number of popular press publications related to the games industry, including Gadget Boy Gazette, CNET Consumer Electronics’ Future Tech Television 2.0, and Television Business International. Professor Jacobs has also engaged in freelance writing for popular publications such as Wired, and Fast Forward. He has served as a multimedia content designer and an “edutainment” game consultant for companies such as Anabasis Software, Discerning Nature, Binney and Smith, as well as Harbortown games from 1995-2003. Along with popular press publications, Professor Jacobs has also been the creator, producer, and director of a popular regional radio show, “What the Tech”, which aired on public radio in Rochester from 2002-2005. Professor Jacobs success in the popular press has translated into numerous media placements (quotes and commentary in nationally recognized media outlets) and invited talks. Professor Jacobs has been a chapter contributor and chapter editor for two Charles River Media books. Professor Jacobs is also involved in the International Game Developer’s Association Games Writers SIG, and has published nationally in this venue.





**Areas of Interest:** Social and Cultural Theories of Game Play and Interactivity, Media Theory Design Document Development, Narrative Structure Development for Games, History of Games and Entertainment Technology, and Human Factors.

**Selected Publications:**

Jacobs, S., “The Basics of Narrative for Games”, Game Writing: Narrative Skills for Video Games, Chapter Contributor, Charles River Media, Pending Publication.

Jacobs, S., “Writesizing”, Game Developer, 2004.

Jacobs, S. “What The Tech!”, Radio Show for Public Radio, 2002-2005.

Prof. Jacobs makes many appearances, provides press comments, and writes popular press articles for issues pertaining to the games industry as well as narrative and story for entertainment technologies.

## 6. Marla Schweppe

M.A. in Art Education, The Ohio State University, 1984.

Professor Schweppe is the Director of Visualization within the College of Imaging Arts and Sciences at the Rochester Institute of Technology. She has been the Art Gallery Chair for the ACM SIGGRAPH 1999 conference, and a committee member for the ACM SIGGRAPH in 1992 and 1994. She has served as a reviewer or juror for SIGGRAPH from 1996-1998, 2000-2003. She has also reviewed USDOE FIPSE grants and has served as a NY Foundation for the Arts Computer Art panelist in 2003. She has had dozens of publications and exhibits in peer-reviewed venues.

**Areas of Interest:** Computer Graphics Design, Modeling, Lighting, Shading, Character Animation, and Content Creation Practices.

**Selected Publications:**

Schweppe, M, CEIS University Technology Showcase, Entertainment Technology: Digital Visualization, 2004

Geigel, J. and Schweppe, M., “Theatrical Storytelling in a Virtual Space”, Proceedings of the 1st ACM workshop on Story representation, Mechanism and Context, New York, NY, ACM Press, 39-46, 2004.

Schweppe, M., “An Animator’s Perspective on Animating Cloth”, In Cloth Modeling and Animation, Breen, D. and House, D. (Eds.), AK Peters, Ltd., 2000

Art Gallery Chair, SIGGRAPH 1999 International Conference, ACM.



- Association for Computing Machinery. (2005a). Sigchi home page. Retrieved August 18, 2005, from <http://www.sigchi.org>
- Association for Computing Machinery. (2005b). Siggraph home page. Retrieved August 18, 2005, from <http://www.siggraph.org>
- Bass, D. (2005). Microsoft aims for video game heights, *Seattle Pi / Bloomberg News: Bloomberg News*. Retrieved October 1, 2005 from [http://seattlepi.nwsourc.com/business/214593\\_msftgames05.html](http://seattlepi.nwsourc.com/business/214593_msftgames05.html).
- Capps, M., McDowell, P., & Zyda, M. (2001). A future for entertainment-defense research collaboration. *IEEE Computer Graphics and Applications*, 21(1), 27-33.
- Charles River Media. (2005). Journal of game development home page. Retrieved August 18, 2005, from <http://www.jogd.com/>
- CMP. (2005). Game developers conference home page. Retrieved August 18, 2005, from <http://www.gdconf.com>
- CMU. (2005). Carnegie mellon entertainment technology center home page. Retrieved August 18, 2005, from <http://www.etc.cmu.edu/>
- Cornell. (2005). Game design initiative at cornell home page. Retrieved August 18, 2005, from <http://www.cs.cornell.edu/projects/game/>
- CRIC. (2002). Playing with the future: Development and directions in computer gaming. Retrieved August 18, 2005, from <http://les1.man.ac.uk/cric/gamerz/Default.htm>
- D'Errico, R. A. (2005, September 2). Early in the game: Rpi creates video game major. *The Business Review*.
- DiRGA. (2005). Digital games research association home page. Retrieved August 18, 2005, from <http://www.dirga.org>
- Entertainment Software Association. (2005). 2005 essential facts about the computer and video game industry. Retrieved August 15, 2005, from <http://www.theesa.com/files/2005EssentialFacts.pdf>
- FIEA. (2005). Florida interactive entertainment academy home page. Retrieved August 29, 2005, from [http://fiea.ucf.edu/shield/showpage.php?page\\_id=1](http://fiea.ucf.edu/shield/showpage.php?page_id=1)
- Flanagan, M. (2002). Hyperbodies, hperknowledge: Women in games, women in cyberpunk and strategies of resistance. In M. Flanagan & A. Booth (Eds.), *Reload: Rethinking women + cyberculture* (pp. 425-454). Cambridge, MA: The MIT Press.
- Flanagan, M. (2003). "next level": Women's digital activism through gaming. In G. Liestol, A. Morrison & T. Rasmussen (Eds.), *Digital media revisited* (pp. 359-388). Cambridge, MA: The MIT Press.



- Flanagan, M. (2005). Mary flanagan home page. Retrieved August 10, 2005, from <http://www.maryflanagan.com>
- Gamasutra. (2005). School finder web page. Retrieved August 15, 2005, from <http://www.gamasutra.com/php-bin/companies.php3?cat=153138>
- Game Studies. (2005). Game studies home page. Retrieved August 18, 2005, from <http://www.gamestudies.org>
- George Mason University. (2005). George mason university department of art and visual technology home page. Retrieved August 18, 2005, from <http://www.avt.gmu.edu/departments/digitalarts.htm>
- Georgia Tech. (2005a). Experimental game lab home page. Retrieved August 18, 2005, from <http://egl.gatech.edu/>
- Georgia Tech. (2005b). Information design and technology home page. Retrieved August 18, 2005, from <http://idt.lcc.gatech.edu/>
- Hoekstra, K. (2000). Getting a job in the game development industry. Retrieved August 18, 2005, from <http://www2.ravensoft.com/getajob.htm>
- Holsen, L. M. (2004, April 10). Out of hollywood, rising fascination with video games. *New York Times*.
- Horswill, I. (2005). Ian horswill's home page. Retrieved August 18, 2005, from <http://www.cs.northwestern.edu/~ian>
- Hunter College. (2005). Hunter college department of film and media studies home page. Retrieved August 10, 2005, from <http://filmmedia.hunter.cuny.edu>
- IAGER. (2005). Iager home page. Retrieved August 18, 2005, from <http://www.iager.org/>
- ICT. (2005). Institute for creative technologies home page. Retrieved August 18, 2005, from <http://www.ict.usc.edu/disp.php>
- IEEE Press. (2005). Ieee computer graphics and applications home page. Retrieved August 18, 2005, from <http://www.computer.org/portal/site/cga/index.jsp>
- IGDA. (2003). Igda academic events - gdc academic summit 2003. Retrieved August 18, 2005, from <http://www.igda.org/academia/events.php>
- IGDA. (2005). International game developers association home page. Retrieved August 18, 2005, from <http://www.igda.org>
- IGDA Education Committee. (2003). Igda curriculum framework: The study of games and game development. Retrieved August 15, 2005, from [http://www.igda.org/academia/IGDA\\_Curriculum\\_Framework\\_Feb03.pdf](http://www.igda.org/academia/IGDA_Curriculum_Framework_Feb03.pdf)



- ITU. (2005). Center for computer games research home page. Retrieved August 18, 2005, from <http://game.itu.dk/>
- IUP. (2005). Applied media and games simulation center. Retrieved August 18, 2005, from <http://www.coe.iup.edu/amsgc/index.html>
- Laird, J. E. (2005). John e. Laird's home page. Retrieved August 18, 2005, from <http://ai.eecs.umich.edu/people/laird/>
- Mencher, M. (2002). *Get in the game! Careers in the games industry*. New York: New Riders Publishing.
- Microsoft Corporation. (2004). Computer game production curriculum 2004 awards. Retrieved August 10, 2005, from [http://research.microsoft.com/ur/us/fundingopps/Gaming\\_curriculumRFP\\_awards.aspx](http://research.microsoft.com/ur/us/fundingopps/Gaming_curriculumRFP_awards.aspx)
- Northwestern University. (2005). Interactive entertainment group home page. Retrieved August 18, 2005, from <http://www.cs.northwestern.edu/research/groups/ieg/>
- Olsen, J. (2004). 2003 game development salary survey. Retrieved August 18, 2005, from [http://www.gamasutra.com/features/20040211/olsen\\_01.shtml](http://www.gamasutra.com/features/20040211/olsen_01.shtml)
- Plunkett Research. (2005). Entertainment and media industry statistics: Entertainment and media industry overview. Retrieved August 15, 2005, from [http://www.plunkettresearch.com/entertainment/entertainment\\_statistics\\_1.htm](http://www.plunkettresearch.com/entertainment/entertainment_statistics_1.htm)
- PricewaterhouseCoopers. (2005a). Global entertainment and media outlook: 2005-2009 (excerpt). Retrieved August 15, 2005, from <http://www.pwc.com/extweb/industry.nsf/docid/6bb1d7b2f2463e1885256ce8006c6ed6?opendocument&vendor=none>
- PricewaterhouseCoopers. (2005b). Online game market. Retrieved August 15, 2005, from <http://www.google.com/url?sa=t&ct=res&cd=18&url=http%3A//www.pwc.com/images/outlook2005/OnlineGameMarketUS.pdf&ei=tDj-QqXGL9C4apyd9Es>
- Purdue University. (2005). Purdue university computer graphics technology home page. Retrieved August 18, 2005, from <http://www.tech.purdue.edu/Cgt/>
- Rabin, S. (2005). *Introduction to game development*. Hingham, MA: Charles River Media.
- RPI. (2005). Rensselaer polytechnic institute game study minor home page. Retrieved August 18, 2005, from <http://www.rpi.edu/dept/hss/igsm/IGame/gamestudies.htm>
- SCAD. (2005). Savannah college of art and design interactive design and game development home page. Retrieved August 18, 2005
- Serious Games Initiative. (2005). Serious games initiative home page. Retrieved August 15, 2005, from <http://www.seriousgames.org/>



- SIAT. (2005). Simon fraser university school of interactive arts and technology. Retrieved August 18, 2005, from [http://www.sfu.ca/~siat/grad/archives/cat\\_grad\\_courses.html](http://www.sfu.ca/~siat/grad/archives/cat_grad_courses.html)
- tiltfactor. (2005). Tiltfactor home page. Retrieved August 10, 2005, from <http://www.tiltfactor.org>
- UCF. (2005). Creat home page. Retrieved August 18, 2005, from <http://www.dm.ucf.edu/main/index.html>
- UCI. (2005). Game culture and technology lab home page. Retrieved August 18, 2005, from <http://proxy.arts.uci.edu/gamelab/joystick.html>
- University of Tampere. (2002). Computer games and digital cultures conference announcement. Retrieved August 18, 2005, from <http://www.game-culture.com/cfp/CGDC.html>
- University of Washington. (2005). Digital gaming research group home page. Retrieved August 18, 2005, from [http://depts.washington.edu/diggames/index\\_1.htm](http://depts.washington.edu/diggames/index_1.htm)
- UNT. (2005). University of north texas laboratory for recreational computing home page. Retrieved August 18, 2005, from <http://larc.csci.unt.edu/>
- USC. (2005). University of southern california computer sciene department graduate programs. Retrieved August 18, 2005, from <http://www.cs.usc.edu/current/graduate/default.htm>
- Wong, M. (2004). Video games, hollywood converge. Retrieved August 18, 2005, from <http://www.cbsnews.com/stories/2004/05/17/entertainment/main617895.shtml>

