Integrative Game Design

Primary Departments
Computer Science (CCI), Art and Art History (CoA+A)

Represented Departments
Africana Studies (CLAS), Atkins Library, Communication Studies (CLAS), Dance (CoA+A), English (CLAS), Film Studies (CLAS), History (CLAS), Languages and Cultural Studies (CLAS), Marketing (CoB), Theater (CoA+A), Writing, Rhetoric, and Digital Studies (CLAS)

Area Leads:
Dr. Julio C. Bahamón (Computer Science, CCI)
Heather D. Freeman (Art & Art History, CoA+A)

Target Categories;
Area of Emerging Excellence; Future Opportunities and Investment

Keywords: Game Design, Collaboration, Ethics, Technology, Arts

Executive Summary

Integrative Game Design is the creation of digital interactive works in the context of cross-disciplinary, collaborative teams that approach games as both entertainment, art, and educational tools, ethically designed to assure responsible technology development for diverse audiences. Our team creates and studies games as both creative and transformative works of art and visual culture, as well as games that provide education, training, and information (i.e. 'serious games'). Integrative Game Design requires collaborative, team-based production and problem-solving. By working in multidisciplinary technical and scholarly teams, representing diverse cultural identities and perspectives, ethical game design and research can be achieved, equitably serving diverse audiences. The faculty in this cohort each research or teach in game design and development, AR (augmented reality), VR (virtual reality), MR (mixed reality), immersive video, interactive media, and media studies. All members engage with the role of ethics, representation, visual culture, and new technologies relevant to Integrative Game Design.

Digital games have received negative attention in recent years, and for good reason. Game industries have struggled to address issues of sexism, racism, and ableism, both in the workplace, in game play, and among players. Parts of the industry are also notorious for unsustainable labor practices. At the same time, some developers have used game design to create powerful tools for healthcare, education, first responder and military training, and more. These considerations have made the pursuit of ethical and sustainable game design a core concern for our cohort, in which accessibility, equity, and representation are integral to all phases of game development.

There is a high demand for game design and development in multiple industries ranging from art and entertainment to healthcare and education. However, most university game design programs do not mirror how industry production operates – they are discipline-specific, rather than team-based, multidisciplinary, and collaborative. As an educational approach, Integrative Game Design provides students with the intellectual skills, professional techniques, and ethical framework to enter both public and private industries invested in game design. Global revenue for digital games (including serious games) was $179.9 billion in 2020, eclipsing film and other media. Public and private entities both fund games research for diverse purposes and applications, and skills developed through game design translate to myriad industries. Faculty and students create interactive works for wide-ranging applications and audiences, from the public sector to private industry and commercial game consumers. Through this area, graduate and undergraduate students will collaborate across disciplines to create integrative and ethical games, work on faculty research in Integrative Game Design, and engage with regional and national game development companies.

The faculty working in Integrative Game Design share a common passion for games as visual culture and as a transformative technology. From accessible educational games for the visually impaired, to cinematic games grounded in historical research, to the growing field of interactive training games for healthcare professionals, we're invested in making broad impacts through digital games.

Evidence of Strength and Excellence (2 pages)

Julio Bahamón (Computer Science) and Heather Freeman (Art & Art History) began collaboratively teaching their respective game design courses in 2018. Similar to professional game production, students worked in teams consisting of a Producer, Level Designer, Programmer, and Artist. Bahamón and Freeman were impressed by the strength of the games resulting from this cross-disciplinary and collaborative approach, with measurable improvements in 'soft skills' as well. They soon began designing an interdisciplinary curriculum in Integrative Game Design, which will expand this collaboration to other disciplines key to game production and ethical design practices. This team-based curriculum will span multiple programs, including humanities-based coursework in ethics, equity, representation, and media studies, along with technical disciplinary skills. Cohort research highlights include:

- Bahamón, Kaustavi Sarkar (Dance), Phillip Kaffen (Japanese and Film Studies), and Ritika Prasad (History) are developing *Plávana*, a VR dance game designed to teach the classical Indian dance Odissi. This project went through UNC Charlotte's Ventureprise program and can be expanded to teach and preserve indigenous dance forms at risk of cultural loss.
- Bahamón is currently co-PI on "Digital Learning in the COVID Era: a Games-based Approach to Online Education for K-12" which was funded through a Gambrell Faculty Fellowship ($15,000). He was also technical lead on IC-CRIME, an NSF-funded project ($1.4M) to create 3D representations of crime scenes.
- Heather Freeman and Jeff Murphy (Art & Art History) created the mobile app *Flederhund,* an interactive children's book which was successfully crowd-funded ($7,305) and won a Platinum Remy Award in the Children's Educational Category for the *47th Annual WorldFest - Houston International Film Festival* (Houston, TX).
- Murphy's immersive video on water and environmental stewardship, *Befoul*, was selected by Nat Trotman, Curator of Performance and Media at the Guggenheim Museum, for exhibition at the Contemporary Art Museum (Raleigh, NC).
- Freeman's mobile app *Denisovan* appeared in five national and two international exhibitions, including *Interaction* at the Universidad de la Habana, part of the *12th Havana Biennial* in Havana, Cuba.
- Aidong-Lu (Computer Science) has been PI on six NSF grants since 2016 (over $4.5 million) for her work in VR, AR, MR, and personalized learning, training, and cognition. Her latest grants focus on how MR technologies can improve users' performance in diverse environments, such as effective operations for first responders. She is also head of CCI's Games and Mixed Reality Lab.
- Ming-Chun Lee (Architecture) has received six external grants for his AR and GIS mapping projects, including one from the Knight Foundation - Data for Civic Engagement. Lee has also presented his AR and GIS interactive works to Charlotte audiences through public institutions like the Levine Museum of the New South and *Open Streets 704*.
- JB Burke (Art & Art History) collaborated with Guggenheim fellow William Caballero on the video game "Just Being Here in This Moment/MELVIN: The Video Game". This project was a finalist for the 2019 Sundance New Frontier Lab grant, and a semi-finalist for the $40,000 Screencraft Film Fund Grant, both highly competitive awards.

- Beth Caruso (Co-PI), Tiffany Davis, Christine Lampkowski (all Atkins Library), Freeman, and Bahamón (Co-PI) are currently developing the *Diversity in Gaming Collection* for Atkins Library, funded by the Chancellor's Diversity Challenge Fund. The new collection will launch with a panel discussion by industry innovators and an IRB-approved study of audience reactions.
- Bobby Campbell (Art & Art History) and Freeman organized the 2016 Women and Video Games Festival, also funded by the Chancellor's Diversity Challenge Fund. This week-long festival included partnerships with CPCC's Simulation and Game Development Program, IGDA Charlotte, Project Scientist, among others. It featured panels and talks by faculty, renowned feminist game critic Anita Sarkeesian, and Ubisoft-Montreal Narrative Director Melissa MacCoubrey.
- Campbell, who specializes in UI/UX design, as well as diversity and equity in graphic design fields, has worked for over 100 clients including Fortune 5, Fortune 50, and Fortune 500 companies.
- Danny Jugan (Computer Science) is the founder and manager of Axis Games, an independent studio that has produced over 30 games for Steam, iOS, Android, Xbox One, and PS4.
- Animation Career Review ranked UNC Charlotte's Game Design offerings (courses taught by Bahamón and Jugan) #43 in the Nation and #8 in the South. Graphic Design (in which Bobby Campbell teaches, and Jeff Murphy and Heather Freeman also serve) ranks #3 in North Carolina among all public and private institutions.

Game design requires a diverse range of skills and disciplines. This cohort also includes dance and movement specialist Gretchen Alterowitz (Dance), concept artist Jamie Franki (Art & Art History), director, production designer, film production specialist, and actor Jay Morong (Theater), and screenwriter Rodney Stringfellow (Film Studies). Integrative Game Design also centers on ethical design practices and their impact upon diverse audiences, which requires media studies, visual culture, and the study of interactive technologies for immersive education. These areas are addressed through the teaching and research of Balaka Basu (English), Heather Marcelle Crickenberger (Writing, Rhetoric, and Digital Studies), Heather Perry (History), Debra C. Smith (Africana Studies / Communication Studies), Jennifer Ames Stuart (Marketing / College of Business), and Aaron Toscano (English).

With additional resources, faculty involved in this cohort will be more competitive for federal and private funds to create serious and transformative games at UNC Charlotte. This will provide further research opportunities for undergraduates in Game Design as well as graduate students from diverse disciplines, including Ph.D. students in Computer Science. Additional resources would also assure that faculty working in Integrative Game Design are working with current technology. Faculty would also be able to attend and present research at international conferences on Game Design and Interactivity and network with both industry and academic professionals. Finally, by providing faculty with competitive technology, course loads, and seed support, this cohort can solidify their emerging collaborative research and teaching in Integrative Game Design, and best prepare them to compete for federal, state, and private research funding in this high growth and dynamic field.

Alignment with Regional and National Priorities (1 page):

Integrative Game Design fulfills all aspects of UNC Charlotte's Mission Statement and bridges the Mission Statements of the College of Arts + Architecture, the College of Computing and Informatics, and the College of Liberal Arts & Sciences. This area will foster ethical game design and technology development through vibrant multi-disciplinary, team-based collaborative research projects between faculty, graduate, and undergraduate students from across the University. The values expressed in these mission statements are core to Integrative Game Design which centers on the well-being and ethical concern for audiences from diverse communities.

There is growing interest in digital games for educational and training applications, and organizations such as the Bill and Melinda Gates Foundation and the Robert Wood Johnson Foundation have funded research in serious games. Federal programs such as the NIH, NSF, NEH, EPA, and Departments of Education, Health and Human Services, Defense, and Home Security have each funded projects employing game design and development for diverse applications. The NSF cites strengthening the STEM workforce through "new approaches to education and training" and K-12 education among their Strategic Plan Objectives, which cohort members are already addressing in their research and teaching. Similarly, the NEH cites improving access to the humanities to traditionally underserved communities and expanding teacher education in the humanities among their own Strategic Plan Objectives. Again, this objective is reflected by current Integrative Game Design cohort research. By formalizing Integrative Game Design at UNC Charlotte, these faculty can apply competitively for NSF, NEH, and other federal funding to provide games and interactive experiences which will serve regional and national communities. State and federal workforce reports indicate increased need for partnerships between industry and higher education. By partnering with game design companies in North Carolina, as well as on-line partnerships with firms out of the region, students involved in Integrative Game Design can engage in internships and research projects within the industry, bridging their UNC Charlotte education with the most current technical skills and technologies.

National and International Organizations and Professional Societies
AAAI (Association for the Advancement of Artificial Intelligence)
AIGA (American Institute of Graphic Arts)
AIIDE (Artificial Intelligence for Interactive Digital Entertainment Conference)
ACM/SIGCHI (Human-Computer Interaction)
ACM SIGCSE (Computer Science Education)
ACM SIGGRAPH (Computer Graphics and Interactive Techniques)
Entertainment Software Association
Games for Change
GDC (Game Developers Conference)
IGDA (International Game Design Association)
Serious Games Association
Women in Games

Supporting Documents:

Name	*Title*	*Contribution/Expertise*
Dr. Julio Bahamón (Lead)	Associate Chair, Academics and Teaching Assistant Professor of Computer Science (CCI)	Game design, game programming, serious games, AI, collaborative practices, ethics and inclusivity in game design
Heather D. Freeman (Lead)	Professor of Art, Digital Media; Director of D+ARTS (CoA+A)	Game design, 2D and 3D animation and graphics for interactive media, sound design, ethical and audience-centered design, representation and equity in game design
Gretchen Alterowitz	Associate Professor of Dance (CoA+A)	Dance and movement, collaborative practices, the body in performance and media, women's and gender studies
Dr. Balaka Basu	Associate Professor of English (CLAS)	Game mechanics, digital humanities, media studies, ethics of gaming, social justice and gaming, narrative theory
JB Burke	Associate Professor of Art, Drawing (CoA+A)	Concept art and illustration
Robert Campbell	Associate Professor of Art, Graphic Design (CoA+A)	Graphic design, sequential visual narrative, concept art, 3D modeling, UI/UX design, community-engaged art practices, race and gender representations in design
Beth Caruso	Digital Pedagogy & Emerging Technologies Librarian (Atkins Library)	Gaming lab; visualization lab; VR; diversity, equity, and accessible game design
Dr. Heather Marcelle Crickenberger	Senior Lecturer, Writing, Rhetoric, and Digital Studies (CLAS)	Emerging media, immersive technologies, digital environments, spatial rhetorics, problem-based learning
Tiffany Davis	Digital Scholarship Librarian/Diversity Resident Librarian (Atkins Library)	Digital scholarship, Area 49, open access digital publishing, emerging technologies in academic libraries and higher education; outreach and marketing awareness for scholars

Jamie Franki	Associate Professor of Art, Illustration (CoA+A)	Illustration; concept art; character, prop, costume and scenic design
Dr. Danny Jugan	Lecturer in Computer Science (CCI)	Game design, game programming, serious games, AI, simulations, independent game production
Dr. Phillip Kaffen	Assistant Professor of Japanese / Film Studies (CLAS)	Art and technology in optical media, media ethics and philosophy, politics of surveillance and security
Christine Lampkowski	Technology and Digital Strategies Assistant (Atkins Library)	Technology and digital strategies, photogrammetry technologies
Dr. Min-Chun Lee	Associate Professor, School of Architecture (CoA+A)	AR/VR/MR/XR, architectural visualization, immersive rendering
Dr. Aidong Lu	Professor of Computer Science (CCI)	Visualization, mixed reality, AR/VR, intelligent systems, applied machine learning, gaming analytics
Jay Morong	Senior Lecturer, Theater, LBST and Film Studies (CoA+A)	Theatrical production, direction, acting, theatrical video design, film studies
Jeff Murphy	Associate Professor of Art, Digital Media (CoA+A)	Digital photography, video production, 360 video, VR, web design and browser-based interactivity
Dr. Heather Perry	Associate Professor of History (CLAS)	Digital humanities, digital learning tools
Bob Price	Associate Dean of Planning, Innovation, and Engagement (Atkins Library)	Technology and library infrastructure, digital collections and asset management, game collections
Dr. Kaustavi Sarkar	Assistant Professor of Dance (CoA+A)	Dance games for pedagogic and choreographic immersion in VR/XR, serious games, educational games
Dr. Debra C. Smith	Africana Studies / Communication Studies (CLAS)	Interactive cultural digital museums; media and representation

Dr. Jennifer Ames Stuart	Associate Dean, Graduate and Executive Programs and Clinical Professor of Marketing (CoB)	Consumer analytics, consumer products marketing, representation in advertising, youth development, women's leadership
Rodney Stringfellow	Part-Time Faculty in Film Studies (CLAS)	Screen-writing, writing for animation, narrative media for young audiences
Dr. Aaron Toscano	Associate Professor of English (CLAS)	Video games as American culture products; video games as rhetorical technology, visual rhetoric, technical writing