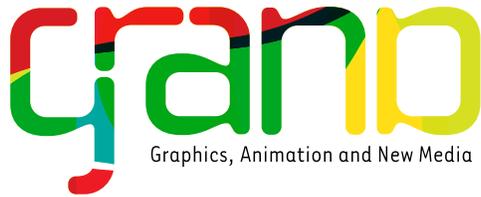




Graphisme, animation et nouveaux médias



2009/10 Annual Report



THE BIRTH OF A NEW NCE

The Networks of Centres of Excellence Secretariat announced a competition for new networks on December 1, 2008.

Over the next three months, a framework was developed for GRAND that included five research themes and theme leaders, a management plan including a chair of the Board of Directors and a network manager, and an ambitious roadmap for bringing together all of the Canadian stakeholders in the domain of digital media.

A letter of intent was put forward on March 2, 2009. A full application, with 32 projects lead by 50* Network Investigators at 19 universities across Canada and more than 30* partner organizations providing letters of support, was submitted on August 11, 2009. A meeting with the Expert Panel that reviewed the application was held later that month.

On December 1, 2009, the results of the competition were announced and GRAND became one of three new NCEs to be awarded funding. GRAND will receive \$23.25M for its first five years.



** by March 31, 2010 the GRAND NCE expanded to include 56 Network Investigators with more than 60 partners.*



TABLE OF CONTENTS

Executive Messages	1
Corporate Profile	2
Organizational Chart	3
Year in Review	4
Profiles	5
Excellence of the Research Program	6
Development of Highly Qualified Personnel	7
Networking and Partnerships	8 – 9
Knowledge and Technology Exchange and Exploitation	10
Management of the Network	11
Research Themes and Projects Matrix	12
Research Themes	13 – 15
Research Projects	16 – 26
Network Community	27 – 30
Financial Statements	31 – 36

To view the online version of the GRAND NCE 2009/10 Annual Report,
please visit www.grand-nce.ca/annualreport/2009

Message from the Chair of the Board



There is something special about being involved in a new venture from its very early days, especially when that venture begins to take shape and to develop a certain momentum. It has been my pleasure and my privilege to have been involved with GRAND from its conception and to have witnessed

the earliest vision for the network beginning to take shape. We knew even in its infancy that GRAND would be an ambitious undertaking with an impressive scope and diversity in its research program. I am confident it will have a significant impact on digital media in Canada and beyond.

As impressive as the conception and creation of GRAND has been, the events leading up to March 31, 2010 have all been prelude. They have merely set the stage. Fortunately we have been able to recruit a Board that is of very high quality, and I am very much looking forward to working with them as we move ahead to realize GRAND's vision and potential.

The timeliness of GRAND is especially poignant. Canada is home to more than 2,300 digital media companies and a digital media sector worth \$3.5 billion. This thriving and pervasive industry continues to grow and make new advances in the areas of arts and culture, research, and business. Organizations like GRAND ensure that huge strides can be made in advancing Canada's Digital Economy Strategy and that the necessary transformative actions are in place in order for Canada to surge ahead as a leader in this field.

I am excited about what I see coming to fruition in GRAND's current year, and in that enthusiasm I must extend my thanks and my appreciation to Kellogg Booth for his tireless leadership and to all those whose hard work and commitment in the first months of GRAND have laid such a solid foundation for all that is to come. I have no doubt whatsoever that those efforts will be rewarded through the continuing growth and success of GRAND in the coming years.

– C. Ian Kyer
Chair, Board of Directors
GRAND NCE

Message from the Scientific Director



Looking back on the past 20 months, there is a lot to celebrate in this first annual report, which focuses on activity during the four-month fiscal period from December 1, 2009 to March 31, 2010, during which the GRAND NCE initiated its formal operations. As impressive as these activities have been, they

are no more impressive than the incredible effort that went before in order to establish GRAND as one of Canada's newest Networks of Centres of Excellence.

December 2009 was a busy month for GRAND, devoted to the selection of a start-up Board of Directors, federal incorporation as a non-profit, and finalizing the funding agreement between the federal funding agencies, our host institution and GRAND Inc. In parallel with all this, Network Investigators and Collaborating Researchers began refining their research proposals and submitted 15-month budgets for approval by the Research Management Committee. By the end of March, the network agreement was being signed by the member universities, interim award letters had been sent out to the researchers, initial research funds had been distributed to some of the universities and research teams were well underway across the country.

So, a lot has been accomplished in a very short time, but there is more to do. We are still working out some of our operating procedures and, as we will throughout our mandate, we are looking for new ways to fine tune our research program to better respond to the fast-changing needs of new media, animation and games. Our unique combination of researchers in social science and humanities working together with scientists, engineers, artists and designers promises to make GRAND a truly Canadian response to challenges and opportunities in the new era of digital media.

– Kellogg Booth
Scientific Director
GRAND NCE

GRAND is a research network and commercialization engine whose goal is to address complex issues in digital media and transform multidisciplinary research into user-centred solutions. **GRAND** will explore the use and application of digital media in a variety of settings including entertainment, healthcare, education, environmental sustainability, and public policy.

GRAND is a federally-funded **Network of Centres of Excellence** supporting **32** research projects divided into 5 cross-pollinating themes involving **56** researchers at **19** universities across Canada with more than **60** industry, government, and nonprofit partners.

Our Vision

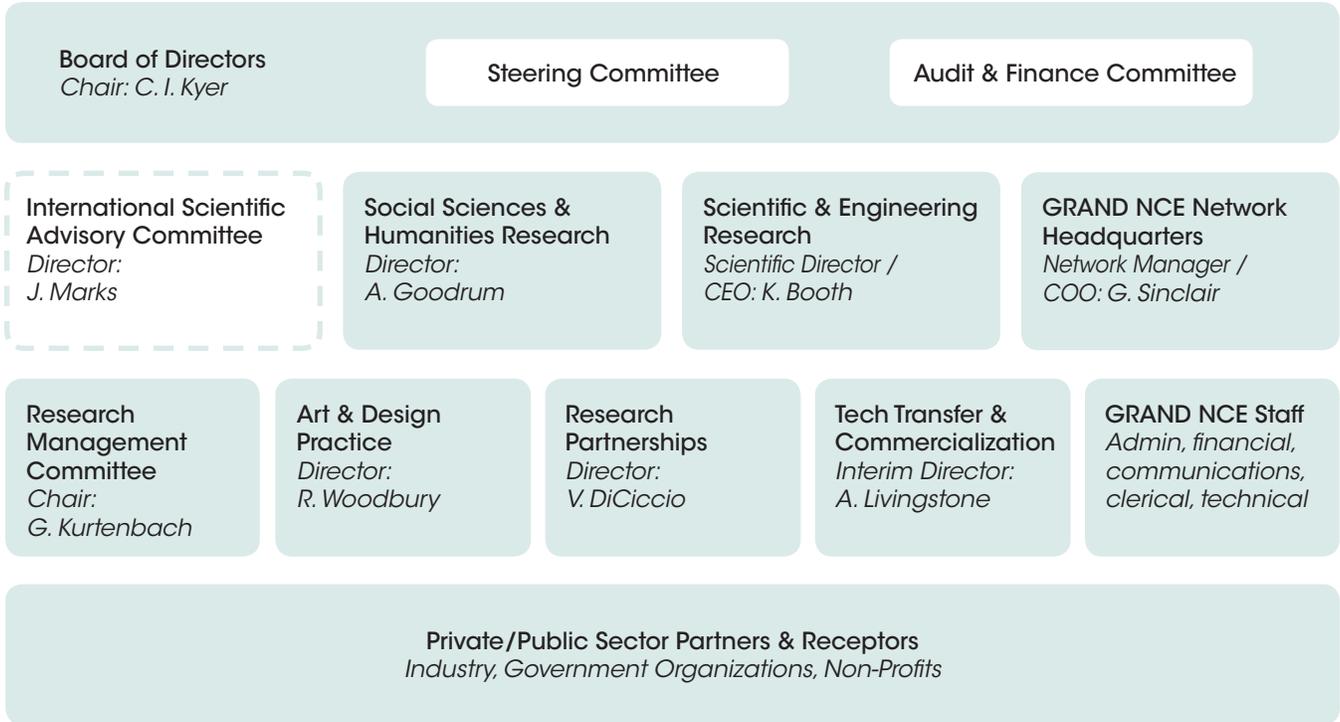
Through technology solutions, training the next generation of talent and encouraging a robust policy environment, GRAND will play a pivotal role in supporting Canada's National Digital Economy Strategy.

Our Mission

- Integrate and enhance Canada's thriving digital media sector through policy and practice
- Focus research and commercialization efforts towards solution-driven products and services
- Facilitate research across the broad spectrum of digital media by linking computer scientists and engineers with artists, designers and social scientists
- Develop opportunities for researchers and partner organizations to work together
- Teach and mentor the next generation of digital media innovators

Our Themes

GRAND addresses 5 themes: New Media Challenges and Opportunities (**nMedia**); Games and Interactive Simulation (**GamSim**); Animation, Graphics and Imaging (**AnImage**); Social, Legal, Economic and Cultural Perspectives (**SocLeg**); and Enabling Technologies and Methodologies (**TechMeth**).



Theme: nMedia
C. Middleton & D. Gromala
New media challenges & opportunities

Theme: GamSim
J. Schaeffer & R. Mandryk
Games & interactive simulation

Theme: AnImage
W. Heidrich & P. Poulin
Animations, graphics & imaging

Theme: SocLeg
S. Trosow & E. Toms
Social, legal, economic & cultural perspectives

Theme: TechMeth
J. Cooperstock & C. Gutwin
Enabling technologies & methodologies







"One of the things that I think is lacking in our society are bridges between the academic world and the business world. <What> excited me <about GRAND> was the opportunity to try to bridge some of those gaps."

- C. Ian Kyer,
Counsel, Fasken Martineau & Chair of the Board, GRAND

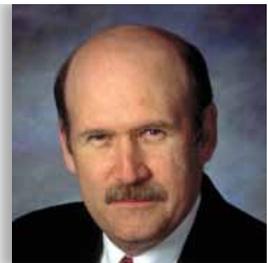
"The most I'd like to get out of GRAND <is> the contacts, the networks, ... improving my research and getting feedback from people across Canada."

- Neesha Desai,
PhD Student, University of Alberta & GRAND student researcher



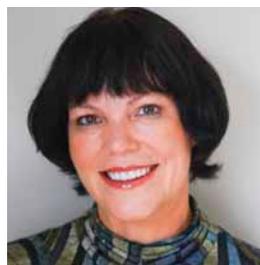
"GRAND is an organization that gives us really good insight into where the world is going in a digital economy...it gives us a view into what might exist as we go forward."

- David Martin,
Executive Chairman and Co-Founder Smart Technologies Inc. & Board Member, GRAND



"...the people involved with GRAND reads like an all-star list of researchers."

- Gord Kurtenbach,
Director, Research, Autodesk & Chair, Research Management Committee, GRAND



"It's not interdisciplinary, it's transdisciplinary...<GRAND is> creating new disciplinary structures that didn't exist before ...not only for researchers... for our industrial partners... and most importantly, our students."

- Abby Goodrum,
Associate Dean, Communication & Design, Ryerson University & Director, Social Sciences and Humanities Research, GRAND

"Networks are the hub of what we are creating in the 21st century. It's almost a natural that GRAND would be ... one of the foundations on which a new network of intellectual, research and pragmatic economic benefit can be created for the country."

- Ron Burnett,
President and Vice Chancellor, Emily Carr University of Art + Design



To view the complete video series, please go to www.grand-nce.ca/annualreport/2009/en/video.html

Program Matrix Structure

GRAND's research program has been designed as a twin matrix structure. It is composed of 5 overlapping themes with 32 research projects touching upon multiple subjects. This research program is designed not only to cover the full scope of the broad range of digital media subject areas, but also to have each project benefit from a multi-disciplinary approach to the greatest extent possible.

Talent From Across Canada

GRAND's researchers have been selected from universities across the country based on their specific research records and areas of expertise, as well as their commitment to play a role within the larger GRAND research program. This commitment involves not only working with other researchers and partners across the country, but also working with researchers across disciplines to maximize the impact of the research outcomes for receptor communities.

The significant mix of universities in the network represents the full gamut of talent and diversity found in Canada's post-secondary landscape. GRAND bridges between the top art and design schools and universities offering a full complement of studies. Under the GRAND umbrella, these disciplines unite to address the critical issues facing digital knowledge generation in this country.

Projects Covering a Broad Range of Subject Areas

GRAND's research projects have been selected and developed to focus on the significant issues, strengths and challenges in digital media and to cover the broad range of subject areas within the sector. The network matrix benefits from a strong balance of social science and humanities researchers who will work alongside computer scientists and engineers as well as artists and designers to achieve significant research outcomes more likely to yield innovations and social and economic benefits for Canadians.

GRAND projects, with a brief description, are listed here.

An Agent of Change

GRAND is an agent of change for finding effective and practical solutions to the challenges facing Canadians in relation to digital media, the digital economy, and the constantly evolving digital world.

A Leading Network

GRAND's contribution through its research program is to develop linkages between researchers, across disciplines and with partner organizations and receptor communities. Through these linkages GRAND is becoming a central point of contact and expertise within Canada and internationally, and developing a reputation as a leading network for digital media research, ideas, applications, and perspectives.



Video: Gord Kurtenbach, Chair,
Research Management Committee,
GRAND NCE



Video: Abby Goodrum, Director,
Social Sciences & Humanities
Research, GRAND NCE

Delivering HQP

GRAND's Training Program will attract, develop, and retain outstanding Highly Qualified Personnel (HQP). GRAND provides students access to a unique research environment in exciting new research areas within new media, animation, and games. Mentored by some of the best researchers in the world and through ongoing interaction with industry partners, students will develop highly marketable skills in IT, Engineering, Digital Media, and Communication fields.

Cross-Domain Research

GRAND is committed to cross-domain research, learning, and sharing. Each student will be engaged in one or more projects, many spanning multiple disciplines and universities. Networking with other projects, labs, students and with industry is strongly encouraged and supported. Students from art, design and computer science mix with students in the humanities and social sciences, creating a much broader awareness of different research methodologies and goals than the typical graduate student experience.



Video: Neesha Desai, PhD Student,
University of Alberta

Student-Centred Activities

GRAND's student-centred activities delivered over the past year include:

- Students, including post doctoral fellows, doctoral students, master's students, undergraduates, and research technicians, from the 19 member universities were engaged in 32 research projects.
- The Lab Visit Fund was established to facilitate student visits to other labs across the country and encourage networking between project teams.
- Students have access to state of the art research facilities at the 19 universities including 18 CFI funded labs.
- GRAND became a member of the MITACS Accelerate consortium, which will fund at least ten internship placements per year for the next five years.
- More than 70 students participate in GRAND's Peer Reviewed Poster Program. Each student peer reviews at least three posters from different disciplines across the GRAND network. Following the reviews, students present their posters at the Annual Conference's Opening Reception co-hosted with the AI/GI/CRV Conference in June 2010. The posters remain on display for the duration of the conference.
- The GRAND Graduate Student Advisory Committee is a venue for representing students in the various disciplines and universities involved in GRAND research. Elected members provide a conduit for direct communication between students and the Executive and Research Management Committee.

Building a Network

GRAND is aiming to create a well-connected, multi-disciplinary, partnership-rich, research network that addresses the needs of Canada's digital media industry. The networking and partnership foundation GRAND is building will be an efficient and effective platform for knowledge transfer and exchange and exploitation.

GRAND is based on an agile matrix organization of researchers, students and "project champions" working across themes, projects and universities to combine into dynamic, multidisciplinary teams. Every team addresses one of 32 specific industry-facing projects, each organized around a core challenge. Built into this matrix are project champions, at least one per team, who are drawn from either the private, public or non-profit sector.

Addressing the Needs of Industry

GRAND's project teams bring the expertise required to address the needs of our partners in the private, public and non-profit sectors who require multidisciplinary knowledge and experimentation to innovate and grow.

As our partner organizations create new services and improve their products, they are impacted by issues of speed, convergence, and multi-platform delivery. These often require expertise outside their competencies or they require more long-term experimentation and investigation than they can easily accommodate. GRAND has been designed to help organizations address these problems.

GRAND is actively engaging with NCE Centres of Excellence for Commercialization and Research (CECR) to develop valuable industry relationships. Joint brainstorming sessions and knowledge exchange workshops with CECR's such as the Canadian Digital Media Network ensure that GRAND remains apprised of the top issues facing industry. Equipped with this information, and given its strength as an ever-efficient network, GRAND is in a strong position to make connections and advances that address these challenges.

Partner Organizations

In addition to the 19 Canadian universities that comprise the network, GRAND is collaborating with more than 60 other partners in Canada. They represent a diverse cross section of some of the most successful organizations in the private, public and non-profit sectors. From their letters of support to their participation on every project, GRAND partners play an integral role in, and add incredible value to, the network through their contributions of cash and in-kind, but also through their involvement with the projects, bringing expertise and perspective that will help shape and enhance research outcomes.

Maximizing Networking Opportunities

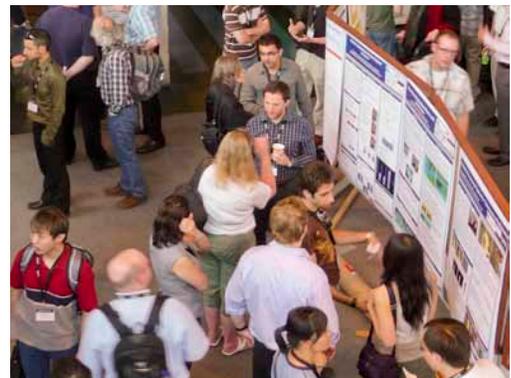
Throughout the year, GRAND is committed to hosting and sponsoring a calendar of events, workshops, and conferences in order to optimize networking opportunities and knowledge exchange. Linkages with existing and new complementary programs will be pursued to ensure maximum exposure at every opportunity.

In-house Tracking Leading to Network Improvements

NAVEL (Network Assessment and Validation for Effective Leadership) is a self-reflective project within GRAND established to study and improve the network's research and management culture. Findings from NAVEL, one of GRAND's 32 projects, will be useful not only to the GRAND community but to others engaged in similar collaborative research initiatives.

Expanding Beyond Canadian Borders

While laying the foundation for a strong network in Canada, GRAND is simultaneously pursuing an international strategy to bring together researchers, labs, and organizations from around the globe. One of GRAND's first orders of business was to establish an International Scientific Advisory Committee (ISAC). Chaired by Joe Marks, Vice President, Disney Research, ISAC promotes deep connections with the international community.



Video: Ron Burnett,
 President & Vice Chancellor,
 Emily Carr University of Art + Design

Workshops and Events

On January 6, GRAND took part in a meeting with NeuroDevNet, a sister Network of Centres of Excellence, to build upon introductory conversations on overlapping research interests. These discussions culminated in planning a workshop held in June where several potential joint research projects were discussed.

On February 27, GRAND participated in a roundtable discussion about Canadian digital strategies for research, commercialization, investment, and export. The event was co-hosted by Gerri Sinclair, Executive Director of the Masters of Digital Media Program and GRAND's Network Manager, and P. Thomas Jenkins, Executive Chairman of Open Text Corporation, Chair of the Canadian Digital Media Network (CDMN) Advisory Board, and a Board Member of GRAND.

Participants in the roundtable event included Minister Tony Clement, Industry Canada, Minister Iain Black, BC Small Business, Technology and Economic Development, Wade Oosterman, President of Bell Mobility, Jim Balsillie, Co-CEO of RIM, Art Mesher, CEO of Descartes Systems Group, Paul Lee, Co-founder and General Partner, VanEdge Capital, and others. The discussions illuminated the challenges faced by the interaction between university researchers and industry, as well as the importance of intellectual property law and education.

On March 12, GRAND co-sponsored an event with the Pacific Institute for Climate Solutions at the University of British Columbia's Peter Wall Centre. The event was a demonstration session showcasing leading local developers who are creating digital tools to communicate and mobilize meaningful action on issues of environmental sustainability and climate change.

Annual Conference

A significant amount of time in the early months of GRAND was spent planning for the initial GRAND Annual Conference held at the University of Ottawa in June. A poster session was planned to coincide with the opening reception so graduate students could showcase their roles in GRAND research.

The GRAND Conference was scheduled to commence when the AI/GI/CRV conference, also at the University of Ottawa, was closing. Capitalizing on the wider audience, an invitation was extended to all AI/GI/CRV delegates to attend the opening reception and participate in the poster session.

Project Champions

One of the elements that is integral to the GRAND research program is that each project have at least one "project champion" - a representative of a receptor community that has a stake in the success of the research project. This ongoing and iterative interaction with receptors is expected to become a key element in the research program. It is predicated on the benefits of mutual knowledge exchange.

MITACS Accelerate

GRAND initiated discussions with the MITACS Accelerate Program in February, and began planning for the first internship placements immediately thereafter. This program assists with knowledge exchange between industrial partners and university researchers. It will yield benefits for the HQP, the industrial partner and the specific research projects within GRAND.



Video: David Martin,
Executive Chairman & Co-Founder,
Smart Technologies Inc.

Structure

GRAND's Board of Directors has the overall responsibility for the management, direction and financial accountability of GRAND. The Board has a Steering Committee to authorize agreements and monitor the budget process and an Audit and Finance Committee to oversee the auditing and financial controls.

The Research Management Committee oversees the research activity of the network and makes recommendations to the Board regarding research projects and researcher funding. A key objective of the Research Management Committee is effective planning of the evolving research program to maintain a balance across disciplines in natural sciences and engineering, in social sciences and humanities, and in art and design, while maintaining a relevant and dynamic set of research projects that spans the broad spectrum of digital media issues and problems.

Day to day operations of the network are managed by the Scientific Director and the Network Manager, with the support of network staff.

Members of the Board and the various committees are listed here.

Tools

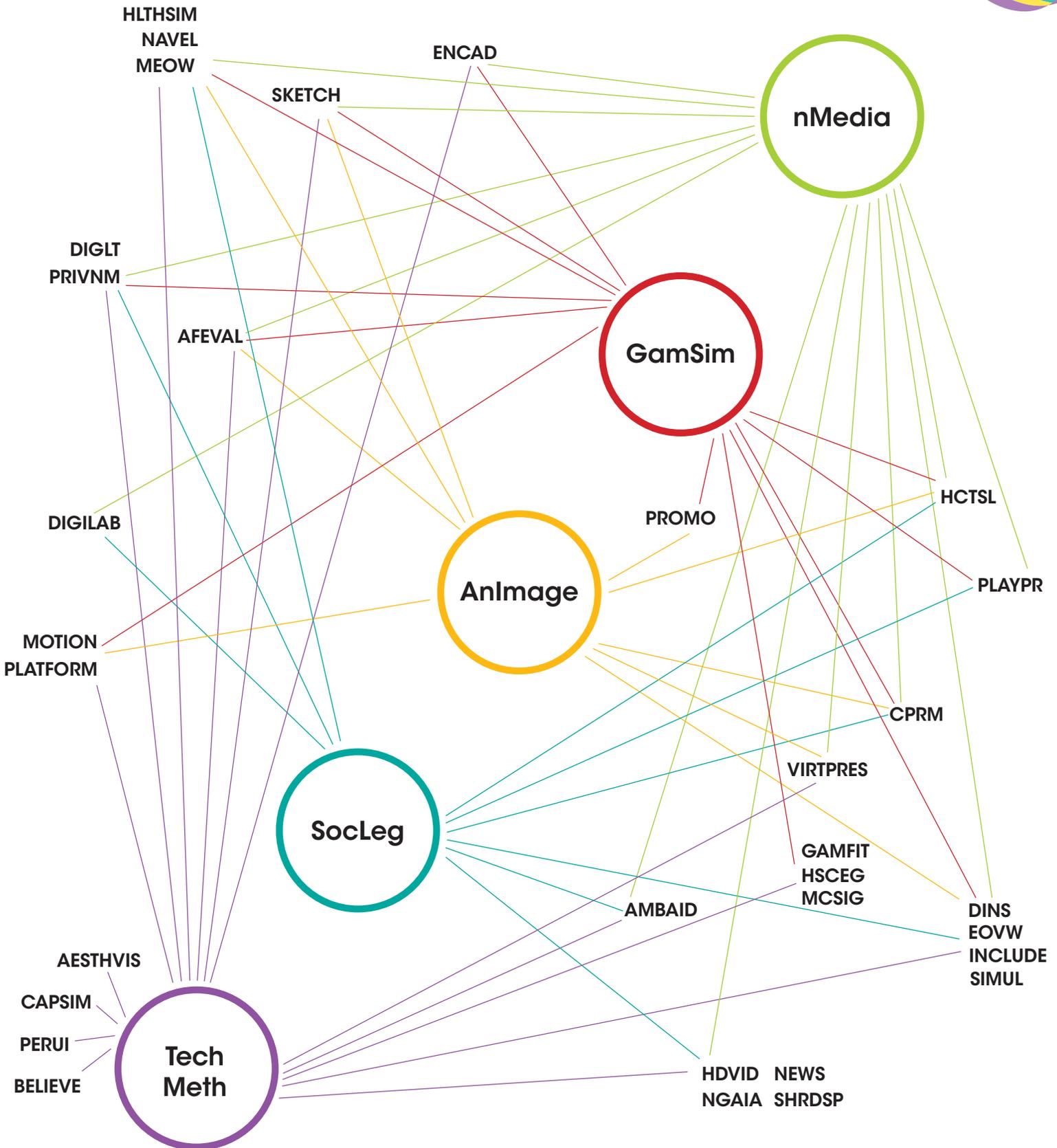
Given that the subject matter of GRAND's research program is "digital media", GRAND has made it a priority to continually develop ways of using digital media tools to manage the network more effectively. GRAND made extensive use of a wiki throughout its early development, and wiki technology continues to be used for internal communication and networking.

On February 15, 2010, GRAND launched its public website (www.grand-nce.ca). In addition, GRAND set up both a Twitter and a Flickr account.

Among the research projects, Media Enabled Organizational Workflow (MEOW) forms the centrepiece of this effort to incorporate digital tools for network management. MEOW will provide a full suite of integrated communication, reporting, and financial tracking functions to improve and enhance network management processes.



Video: C. Ian Kyer, Chair,
Board of Directors, GRAND



nMedia

New Media Challenges and Opportunities (nMedia)

Leader: Catherine Middleton

Co-Leader: Diane Gromala

nMedia researchers will identify, develop, and evaluate the tools, skills, and methodologies needed to advance the next generation of new media applications and distribution channels. nMedia will also address the ever-evolving challenges and impacts these changes will have on lifestyle, culture, law and business.

Taking a multidisciplinary approach, nMedia will explore human interaction with media (surprisingly not often considered) and track the changing interactions as content is created, distributed, experienced, shared, archived and then repurposed. Research activities are two-fold: New Media Creation and New Media Analysis.

This research will have direct application to Canadians in the design and accessibility of innovative digital media environments, interfaces and systems, as well as to the processes for the management of media assets and of media production, benefiting the growing Canadian media economy.

GamSim

Games and Interactive Simulation (GamSim)

Leader: Jonathan Schaeffer

Co-Leader: Regan Mandryk

Canada is an important global leader in the computer game production industry. Beyond entertainment, "serious applications" using interactive gaming technologies have made huge strides in education, training, healthcare, and social discourse.

The GamSim theme will cover a broad range of research in the construction, use, and understanding of games in three areas: Game Development Technologies, Education, and Applications.

Advances in gaming and simulation including "serious applications" requires the skills of computer scientists, interface designers, creative writers, artists, musicians, and domain experts. In cooperation with industry partners, we will bring these groups together to serve as catalysts for creating new technologies to advance the state of the art in gaming and simulation.

The GamSim theme will have a transformative impact across a broad range of fields. For experimentation and assessment, we will build proof-of-concept games and test-bed environments that may themselves have commercial value. These prototypes will ensure our Canadian partners lead the revolution in gaming and simulation technologies.

AnImage

Animation, Graphics, and Imaging (AnImage)

Leader: Wolfgang Heidrich

Co-Leader: Pierre Poulin

One of the biggest challenges in animation and games is content creation. Because it is time and labour intensive, there is a barrier to scalability for companies and also to the possibility of “prosumers” and amateurs engaging in creation.

In response, the field of computer graphics research has begun to shift from investigating raw capabilities to finding more scalable methods to create content and build interactive worlds.

The AnImage theme will not only tackle the question of how to create content, it will also question what to create, including ways to intuitively guide creators toward the details that matter. Areas of focus will include: Animation, Scalable Content Generation, Effective and Intelligent User Interfaces, and Human Perceptions.

Integrating interactions with other GRAND themes, AnImage research will result in new knowledge and technology addressing the vast challenge of content generation and scalability. It will further impact the deployment of digital technologies in a large range of social contexts and contribute to the quality of life for all Canadians.

SocLeg

Social, Legal, Economic and Cultural Perspectives (SocLeg)

Leader: Samuel Trosow

Co-Leader: Elaine Toms

Research conducted in the SocLeg theme focuses on the need to recognize that the technologies and practices of new media, games, graphics and animation do not exist in a vacuum. Technological innovations in these areas create opportunities, tensions and challenges in all aspects of our lives and are interrelated with their social, cultural, economic, political and legal contexts.

Digitalization can have a profound and often unsettling effect on all of the research areas SocLeg will focus on: Education and Learning, Intellectual Property, Privacy and Security, Business and Commerce, Sustainability and the Environment, Arts and Culture, Health and Fitness, and Labour and the Workplace.

SocLeg will ask hard questions about how research generated throughout the GRAND network will be relevant and beneficial to Canadians in all walks of life, as well as how policymakers can best adopt legal and regulatory processes to the challenges of digital media.



Enabling Technologies and Methodologies (TechMeth)

Leader: Jeremy Cooperstock

Co-Leader: Carl Gutwin

In the last few decades, our society has leapt from being passive consumers of pre-packaged information and entertainment to active participants in the production, selection, and consumption of such content. The heart of this shift has been triggered by numerous technological advances in online games, electronic mail, VOIP, Internet search, wikis, media-sharing sites, mobile devices and social networking systems.

Although existing infrastructure has supported an impressive number of novel developments, applications are reaching hard limits. New technologies are clearly needed.

Broadly speaking, the TechMeth theme will concentrate on four categories of reusable knowledge: Architectures, Specific Techniques, Methods and Methodologies, and Tools.

The TechMeth theme will identify and develop the building blocks that will be used to invent, design, produce and evaluate the next generation of games, animation and new media technologies for use by consumers, research and industry.

AESTHVIS ○

Aesthetics and Visualization

PROJECT LEADER
Sheelagh Carpendale,
University of Calgary

PROJECT CO-LEADER
Lyn Bartram,
Simon Fraser University

Prior research shows that qualities such as balance, flow, symmetry, colour and form (and many others) enhance the appeal and usefulness of human interfaces to technology. These qualities comprise what is commonly known as aesthetics. Using aesthetics to improve interfaces, in particular those used for data visualization, is largely a tacit professional skill, not explicit, reproducible or transferable knowledge.

The new research will focus on discovery, explanation, and computational modeling of aesthetic principles across a variety of key areas, including affective and ambient interfaces, textures and emotions, complex architectural form, graph layouts using traditional motifs and music browsing.

AESTHVIS will develop empirical guidelines for aesthetics in visualization so designers can produce more imaginative and innovative visualizations less constrained by technology.

AFEVAL ○○○○

Evaluating Affective User Experience

PROJECT LEADER
Regan Mandryk,
University of Saskatchewan

PROJECT CO-LEADER
Jeremy Cooperstock,
McGill University

User experience from emotional or affective perspectives is not well understood when the primary goal is to entertain or invoke emotional response. Traditional productivity measures are often not applicable to games, animations, or new media. A robust suite of methods to evaluate affective user experience will address these unique challenges.

Models of affect based on users' physiological signals (cardiac rate, galvanic skin response,

brain activity, eye gaze, blink patterns, pupil diameter, and muscular activity) and less invasive approaches (facial expression, thermographic imaging, interactive behavioural measures, and subjective responses) will be validated in laboratory and real-world settings to reduce time-to-market and risk for new digital media products.

AFEVAL will provide better tools for testing the emotional impact of games and other digital media products to reduce development costs.

AMBAID ○○○○

Appropriate-Modality Bases For Ambient Information Display

PROJECT LEADER
Karon MacLean,
University of British Columbia

PROJECT CO-LEADER
Ravin Balakrishnan,
University of Toronto

Graphical displays can overwhelm users' visual channels and they ignore other sensory channels used every day to make sense of the world. Haptic (touch) and auditory senses are especially well suited to process background, ambient information. Today's digital media environments do not handle these nuanced, ambient aspects of human communication.

Interfaces should employ additional display modalities such as haptics and audio for guidance, haptics for low-attention background information, audio for non-verbal social cues, and haptics and audio to serve as agents of persuasion. Human response to non-graphical displays coupled with practical application to novel digital media products will be studied to expand users' capabilities to interact with complex systems.

AMBAID will provide multi-sensory input and output capability for next-generation digital media applications.

BELIEVE ○
 Believable Characters, Behaviours
 and Stories in Story-based Games

PROJECT LEADER
Duane Szafron,
*University of
 Alberta*

PROJECT CO-LEADER
Magy Seif El-Nasr,
*Simon Fraser
 University*

A major bottleneck in computer games is scripting. Scripts dictate agent behaviour. They are essential to controlling the plot in story-based games. The goal is to ensure that game designers have a creative environment to generate scripts that ensure player actions influence the plot and that plot points occur in rational order as the story unfolds.

Research to discover new mechanisms to allow game designers to create helpful allies and challenging opponents by generating scripts automatically can support authors in providing creative high-level direction to these agents. A multi-queue behaviour architecture with prioritized interruptible and resumable independent and collaborative behaviours will be employed.

BELIEVE will provide authors a library of high-level behaviour, plot patterns, and game story idiom scripts for adaption to the story at hand.

CAPSIM ○
 From Capture to Simulation

PROJECT LEADER
Wolfgang Heidrich,
*University of
 British Columbia*

PROJECT CO-LEADER
Eugene Fiume,
*University of
 Toronto*

Realistic computer-generated images and animations have become a normal and expected part of flight simulators, videos, movies and games. Such realism depends on the ability to simulate the behaviour of complex real-world phenomena such as flames, water flow, fabric movement, and facial expressions. However, some of the things we next want to simulate exceed current knowledge and computational capacity.

The ultimate goal is to tie together the capture (imaging) of natural phenomena with physics-based simulation and control of these effects. By combining data captured from the real world with simulation systems, this research will bring a new level of realism to computer graphics.

CAPSIM will produce general methods to capturing time-varying geometry of complex physical phenomena including fluids, fire, smoke, fabric, and facial expressions to bring a new level of realism to computer graphics.

CPRM ○○○○
 Confronting Pain: Redefining Mobility

PROJECT LEADER
Diane Gromala,
*Simon Fraser
 University*

PROJECT CO-LEADER
Chris Shaw,
*Simon Fraser
 University*

Digital media can help address long-term issues faced by people suffering from persistent, chronic pain. Three major initiatives work synergistically: virtual reality (VR) therapy/training, accessible tools developed for diagnosing and managing pain over time, and use of mobile technologies. Each of these requires a deep integration of digital media modalities into therapeutic tools.

This work is unique in its integration of technologies, its longitudinal focus, and the depth of involvement with a Canadian physician who is an acknowledged expert in complex pain. It has potential impact to other areas of graphics, animation and new media research by increasing our understanding of how digital media triggers emotional and physiological responses.

CPRM will lead to improved pain management tools and techniques for people who suffer from chronic pain.

DIGILAB ○○

Digital Labour: Authors, Institutions and New Media

PROJECT LEADER
Samuel Trosow,
*University of
 Western Ontario*

PROJECT CO-LEADER
Bart Simon,
*Concordia
 University*

There are accelerating and interrelated changes in the organization of computerized and networked labour and the institutional settings in which it takes place. Research examines how these changes affect the creation, production, distribution, and re-use of intellectual goods within a variety of domains and how the individuals, groups, organizations and institutions involved in these processes fare.

There are five study domains: (1) game production – design and programming in game development, (2) music production – creating, performing, recording and distributing musical works, (3) post-secondary education – teaching practice and course development, (4) librarianship – which is undergoing changes associated with the increased digitization of collections and services, and (5) journalism.

DIGILAB will inform public policy on copyright, access to information, employment standards, and historical archiving.

DIGLT ○○○○

Digital Games for Learning and Training

PROJECT LEADER
Cristina Conati,
*University of
 British Columbia*

PROJECT CO-LEADER
Jennifer Jensen,
York University

Digital games for learning and training integrate game design concepts with instructional design techniques in order to better address the learning needs of the new generation that highly regards “doing” rather than just “knowing”. This makes interactive experiential learning a necessity for educational success.

An interdisciplinary team is developing formal knowledge and methods for the design and evaluation of games and learning technologies. Outcomes of the design and evaluation processes are used to refine both game prototypes and theoretical instruments, resulting in a pool of educational games of proven effectiveness, as well as a body of solid theoretical foundations for new game design and evaluation.

DIGLT will identify the components of successful instructional game design and develop guidelines for developers.

DINS ○○○○○

Digital Infrastructures

PROJECT LEADER
Catherine Middleton,
Ryerson University

PROJECT CO-LEADER
Barry Wellman,
*University of
 Toronto*

Quality of life can be greatly enhanced when digital media build and sustain a “networked society”. Three challenges exist: Canadians must understand what infrastructure is needed and they must have access to it; they must have capacity for, and interest in, using digital media to engage each other and support economic activities; and they must understand the social implications (positive and negative) of living and working in a networked society.

Four distinct studies conducted by this project consider various ways in which digital infrastructures are developed, created and taken up by individuals and within organizations and communities for mobile and fixed access to content and services.

DINS will provide a better understanding of the continued evolution of Canada as a networked society and its relationship to the global network.

ENCAD ○○○○
 Enabling Technologies for CAD Systems

PROJECT LEADER
Temy Tidafi,
*Université de
 Montréal*

PROJECT CO-LEADER
**Wolfgang
 Stuerzlinger,**
York University

Computer-aided design (CAD) systems are comprehensive environments. Specific features support long-term productivity for CAD users. Constraints and simulation through modeling enables designers to adapt to context and to the physical forces acting on a design. Histories and alternatives enable deeper problem space exploration. Simpler user interfaces for modeling are the third enabling feature.

Constraints and simulation establish a new design space, in which histories and alternatives enhance the ability to explore new alternatives for new designs. Simplified user interfaces for modeling support rapid, interactive exploration of the design space, which is essential to achieve all of the desired outcomes of a design exercise.

ENCAD will combine constraints, simulation, histories and alternatives with established representations so CAD system developers can readily transfer to commercial practice.

EOVW ○○○○○○
 Developing Methods for Evaluation of Virtual Worlds & Understanding User Experiences

PROJECT LEADER
Magy Seif El-Nasr,
*Simon Fraser
 University*

PROJECT CO-LEADER
Regan Mandryk,
*University of
 Saskatchewan*

Virtual worlds and massively multiplayer games continue to exist after the user logs off. Game instrumentation that augments observations, surveys and logs creates automatic statistical metrics of user behaviour in a virtual world that will provide novel evaluation methods for measuring these persistent interactive experiences.

Understanding and modeling users' activities, motivation, attentional patterns, perceptions

and attitudes with a visualization system helps virtual world designers make critical and fast analyses and decisions. The role of in-world social interactions and social networks in keeping users engaged will also be studied. A prototype visualization system for Toki World, by partner Bardel Entertainment, is being implemented for the research.

EOVW will use Toki World to test telemetry of user behaviour and data mining techniques for understanding user play styles and learning methods.

GAMFIT ○○
 Gaming for Physical Fitness

PROJECT LEADER
Nicholas Graham,
*Queen's
 University*

PROJECT CO-LEADER
Regan Mandryk
*University of
 Saskatchewan*

Video gaming can be used to motivate people to begin and maintain a program of physical activity. We examine what design elements in games increase peoples' motivation to become and remain physically active, and whether this actually provides sufficient exercise to produce health benefits.

Tools to support common input styles in exercise video games help programmers focus on the game itself rather than low-level input capture. Measuring exercise through direct and indirect sensor data and more accurate and reliable representations of player fitness are key goals. Investigating whether cognitively-stimulating games can increase mental fitness or create "cognitive reserve" to delay or ameliorate expression of Alzheimer's disease offers exciting possibilities.

GAMFIT will harness the popularity of computer and video gaming to maintaining and improving physical and cognitive well being.

HCTSL ○○○○
 Human Centred Technologies
 for Sustainable Living

PROJECT LEADER
Robert Woodbury,
*Simon Fraser
 University*

PROJECT CO-LEADER
Lyn Bartram,
*Simon Fraser
 University*

A "Green Building" has high overall environmental performance that impacts climate change, resource consumption, and wellness. Pervasive and interactive digital media technologies can be a powerful vehicle for reducing energy demand, encouraging a conservation ethic, and improving quality of life.

Networked systems for monitoring and control enable non-intrusive ambient awareness of building performance, but they often do not provide appropriate information and control choices to building occupants. New energy and water monitoring systems from industrial partners are being combined with prototype interfaces to promote awareness, understanding, prediction and control. Trial deployments will measure how well information about building performance improves conservation and sustainability outcomes.

HCTSL will develop interactive control and visualization systems that help building occupants make appropriate energy and resource use decisions without imposing undue technological complexity.

HDVID ○○○○
 New Interactions Around HD Video

PROJECT LEADER
Edward Lank,
*University of
 Waterloo*

PROJECT CO-LEADER
Lynn Hughes,
*Concordia
 University*

Modern HD video systems present opportunities for the design of new interactions around media. They have significant surplus storage capacity; they support BD-J, a specification of the Java ME Xlets standard that allows disks to include software that creates dynamic behaviours; and they have network connectivity so devices can interact with each other remotely.

Several gaps in previous video research require ethnographic studies to understand the unique nature of digital video and its impact on the viewing experience. The methodology will focus on artifacts gathered from participatory design exercises and cultural probes obtained using new applications that overlay the video viewing experience or enhance the value of content ownership.

HDVID will conduct case studies and develop prototypes designed to understand and enhance consumers' use of digital video appliances.

HLTHSIM ○○○○
 Multi-Modal Augmented Reality
 for Training Healthcare Professionals

PROJECT LEADER
Roy Eagleson,
*University of
 Western Ontario*

PROJECT CO-LEADER
Eleni Stroulia,
*University of
 Alberta*

Multi-modal, augmented reality-based and game-like simulations improve surgical and clinical training and build collaborative skills critical to professional health team problem-solving. Physical realism combined with virtual reality develops visual-spatial skills and helps rehearse specific healthcare procedures.

Prototype virtual world training simulations in development include: the handoff scenario when paramedics bring an accident victim to the ER, a virtual world with real world mobile sensors for students from various health disciplines to learn basic factual knowledge and procedures related to physiological processes, and control of a laparoscopic tool under different perspectives, varied lighting conditions and typical obstructed views to assess the effectiveness of surgical skills training.

HLTHSIM will use virtual world scenarios to train future health professionals to better collaborate in teams and enhance clinical-diagnostic skills.

HSCEG ○○
 High-Speed Coordination in Electronic Games

PROJECT LEADER
Carl Gutwin,
*University of
 Saskatchewan*

PROJECT CO-LEADER
Nicholas Graham,
*Queen's
 University*

Team sports involve closely-coupled, high-speed coordination. Expert players interact with split-second timing, maintaining awareness of where other players are and predicting what they will do next. The immense popularity of team games in the real world has analogues in the digital world, but high-speed interaction and coordination is often missing.

Critical factors in networked systems will be analyzed to develop interaction techniques and design guidelines that rely on system-level support (toolkits, architectures, design patterns, reusable code and reference implementations). Novel latency-reduction techniques, temporally sensitive consistency maintenance algorithms, and visualization techniques to maximize players' abilities to adapt to online environments for digital games will be based on studies of human limits on team coordination.

HSCEG will develop tools for high-speed networked games that allow true coordination amongst players.

INCLUDE ○○○○○○
 Accessibility of New Media for Disabled, Elderly and Vulnerable Individuals

PROJECT LEADER
Deborah Fels,
*Ryerson
 University*

PROJECT CO-LEADER
Ronald Baecker,
*University of
 Toronto*

Designing for exceedingly variable motor, sensory and cognitive abilities requires innovative digital media solutions. These can be used to satisfy compliance requirements for accessibility in organizations and inform government legislative process regarding accessibility. A taxonomy and evaluation framework will guide the research.

Novel sensory substitution in a vibrotactile element can represent speech prosody for non-verbal communication by children with cochlear implants, mobile tools can support artists and designers with disabilities to achieve self-expression, learnability of devices for older adults can be increased, a multimodal system to combat social isolation among individuals in hospice or user-created memory aids for patients with dementia can be built.

INCLUDE will explore, develop and evaluate technologies to improve access to interactive media systems for people with disabilities, people isolated from others, and seniors.

MCSIG ○○
 Monte Carlo Search in Games

PROJECT LEADER
Jonathan Schaeffer,
*University of
 Alberta*

PROJECT CO-LEADER
Holger Hoos,
*University of
 British Columbia*

Fundamental improvements in Monte Carlo Tree Search algorithms may generalize from games like Go to new application domains where achieving intelligent behaviour for artificial characters and opponents is key. Virtual worlds have clear rules and boundaries, with controllable complexity, and offer a stepping stone to less well-defined real-world applications.

Automatic divide-and-conquer methods to avoid global search for large problems, computer-aided algorithm design, better incorporation of domain knowledge, and improved design principles are being investigated. "Imperfect information" games such as Hearts are expected to provide particular insights. Using multiple cores to increase decision quality and evaluate game positions plays a key role.

MCSIG will improve decision making for imperfect information games and in the presence of uncertainty, infer hidden state from move sequences, and model opponents' weaknesses.

MEOW ○○○○○
 Media Enabled Organizational Workflow

PROJECT LEADER
Eleni Stroulia,
*University of
 Alberta*

PROJECT CO-LEADER
Kellogg Booth,
*University of
 British Columbia*

MEOW uses digital media technologies such as web-based collaboration, web syndication and social networking to enhance the cohesiveness of the GRAND network. A full suite of integrated communication, reporting and financial tracking functions will be deployed to simplify and improve network management processes, collecting information as a natural by-product of the primary research and collaboration activities of the researchers.

Collaboration tools will support 'best practices' for knowledge translation across research disciplines, and dissemination and adoption of results of the research by partners in the receptor community. Particular attention will be paid to developing a novel, peer-review process that allows graduate students in GRAND to support each other in multidisciplinary research.

MEOW will ensure that GRAND uses 'best of breed' digital media tools to manage itself.

MOTION ○○○○
 Modeling Human Motion

PROJECT LEADER
**Michiel van
 de Panne,**
*University of
 British Columbia*

PROJECT CO-LEADER
Paul Kry,
*McGill
 University*

Realistic and flexible models of human motion have a diverse range of applications. Games, animation, and scenario simulations need rich and interactive depictions of human behaviour. Current models limit both the kinds of motion expressible and the believability of motions expressed. In addition to the underlying models, effective motion depiction requires both interactive editing and use of data on actual human motion from the physical world.

New biomechanically-faithful motion models can provide an expanded repertoire of motions, new authoring and editing tools, and improved capture of and reference to actual human motion. Extensive industry connections will ensure relevance to the rapidly developing digital media industry.

MOTION will develop results for animation, games, e-commerce, new media interfaces, health care applications, and entertainment robotics.

NAVEL ○○○○○
 Network Assessment and Validity
 for Effective Leadership

PROJECT LEADER
Barry Wellman,
*University of
 Toronto*

PROJECT CO-LEADER
Abby Goodrum,
*Ryerson
 University*

GRAND's performance depends on how well collaborative research is managed. A fundamental shift in innovation and knowledge transfer builds on informal professional ties between loosely connected academics, government, and industry. Networked organizations are particularly suitable for scientific research, but collaboration is not easy. Researchers in different disciplines have different training, publication channels, and scientific forums.

Surveys and field studies to identifying disconnects and untapped opportunities will target communication and knowledge transfer interventions using a social network analysis perspective. The effect on social bonds of working across institutions, influence of bureaucratic institutional culture that discourages information sharing, and differences in procedures that impede shared understanding and common practice will be addressed.

NAVEL will be the yin for project MEOW's yang, ensuring GRAND researchers network effectively with each other.

NEWS ○○○

Access to News Media: Production, Search, Retrieval and Distribution

PROJECT LEADER

Abby Goodrum,
Ryerson University

PROJECT CO-LEADER

Charles Clarke,
University of Waterloo

How does an always-connected, media literate, prosumer society inform itself? The Internet and other information and communication technologies transform the way news is gathered, presented, distributed and archived. Search and retrieval over news sources is characterized by unique challenges. The inclusion of blogs, tweets and other social media only compounds this problem by their sometimes unreliable or highly subjective content.

Specific initiatives include: understanding human news behaviour, data mining for fact checking and credibility assessment, news search and retrieval by genre and source at different points in the timeline of an event, virality and social networking of the news, and mobile journalism.

NEWS will explore the future of news seeking behaviour, news retrieval, news mining and the interplay of social media and institutional media outlets in global news flows.

NGAIA ○○○

Next Generation Information Appliances

PROJECT LEADER

Elaine Toms,
Dalhousie University

PROJECT CO-LEADER

Charles Clarke,
University of Waterloo

Information retrieval for different tasks requires different types of tools and novel task-specific information appliances. Search for information has evolved from highly structured but limited access points to full-text search systems over unstructured data. The challenge lies in developing new media applications to support access and use of information for context specific purposes.

Initial prototypes will be in a scholarly national information network for the humanities and social sciences. Later studies will target environmental decision-making to aid government agencies engaged in coastal marine management, design of tools to support health information for chronic care patients, and community-based local information systems.

NGAIA will examine the advantages of a task-based rather than document-based approach to the retrieval of information for workplace decision-making.

PERUI ○

Personalized User Interfaces in Real World Contexts

PROJECT LEADER

Michael Terry,
University of Waterloo

PROJECT CO-LEADER

Joanna McGrenere,
University of British Columbia

Modern content creation tools offer a wide range of sophisticated capabilities, but at the cost of overwhelming options and commands. Sophistication is a natural byproduct of supporting a wide range of tasks and users, but it easily overwhelms novices and experienced users, especially when learning new tasks. New interface paradigms are needed to enable users to effectively and efficiently manage complexity.

Personalization techniques draw upon recent advances in machine learning and statistical inferencing to better understand users' tasks, intentions and goals, allowing a system to adapt and teach the user how to best use the application. Mature open source applications will be used to conduct large-scale, longitudinal research on usability and feature sets.

PERUI will investigate interface personalization techniques to address problems of complexity and learnability in modern interfaces.

PLATFORM ○○○

Platform Performance

PROJECT LEADER
Alexandra Fedorova,
Simon Fraser University

PROJECT CO-LEADER
Bruce Gooch,
University of Victoria

Harnessing the parallelism of new processors (such as heterogeneous multicore processors) to perform complex, real-time computations for games requires new parallel algorithms for surface representation and generation in geometric modeling and real-time graphics.

New methods for triangulating surfaces to produce better tessellations and fast polygonization of mathematical surfaces are being developed. The new CASCADE parallel programming framework automatically detects implicit dependencies among tasks using compile-time analyses and runtime information. A method for avoiding race conditions in parallel games by comparing compile-time analyses of memory locations used by each task has the potential to achieve greater parallelism than a human programmer would using traditional tools.

PLATFORM will relieve game developers from thread and shared state management and will provide faster parallel algorithms for geometry processing.

PLAYPR ○○○

Play and Performance Interfaces for Culture and Games

PROJECT LEADER
Lynn Hughes,
Concordia University

PROJECT CO-LEADER
Ron Wakkary,
Simon Fraser University

The relationship between performance and content in digital media will be examined through case studies in game design, interactive museums, and cultural installations.

Research/creation will occur along three axes: spatial play, which considers the body's movement in physical space in relation to digital

media, gestural play, which considers discrete movements of bodies in relation to screen-based media and interactive installations that raises questions of how the body and its gestural motion can affect the player's relationship to digital representations, and vocal/audio play, which considers voice as an important input channel in interfaces and explores vocality as a corporeal practice that enhances engagement and interactivity.

PLAYPR will integrate the analysis, evaluation and design of cultural and entertainment applications with the development of interfaces for play, performance, and storytelling.

PRIVNM ○○○○

Usable Privacy and Security for New Media Environments

PROJECT LEADER
Robert Biddle,
Carleton University

PROJECT CO-LEADER
Konstantin Beznosov,
University of British Columbia

Principles of "usable" privacy and security refine human-computer interaction (HCI) principles, especially for security needs, and can improve design for privacy and security. These are augmented by social science research on "networked individualism" that charts how online behaviour resembles understood social patterns.

Research that takes advantage and account of the reach and distribution of online worlds, can identify, articulate, and inform the legal perspectives on privacy and new media environments, especially the movement advocating "privacy by design" that embeds privacy and related security considerations directly into the design process.

PRIVNM will support privacy and security in new media environments by leveraging social science research and exploring new designs and legal perspectives.

PROMO ○○○
 Procedural Modeling

PROJECT LEADER
Pierre Poulin,
Université de Montréal

PROJECT CO-LEADER
Przemyslaw Prusinkiewicz,
University of Calgary

Procedural models offer unsurpassed capability to synthesize complex scenes (L-systems for plants and ecosystems, fractals for terrains, grammar-based methods for buildings and cities). These have been used successfully in a relatively small number of well-crafted special cases. Key challenges to general usage include design of multi-scale, view-sensitive models; lazy evaluation (computing only when needed); user control in modeling; and extended ranges for current models.

Bridging the gap between interactive and procedural methods is needed for creation and management of virtual worlds of unlimited size. Understanding fundamental problems in procedural modeling can produce practical solutions for the next generation of video games and animation and CAD systems.

PROMO will extend the range of procedural modeling capabilities and extend it to a number of applications areas and industry uses.

SHRDSP ○○○○
 Understanding Roles and Rules for Shared Display Environments

PROJECT LEADER
Sidney Fels,
University of British Columbia

PROJECT CO-LEADER
Ravin Balakrishnan,
University of Toronto

Large-screen displays help people to work together in a common space in novel ways. Small, mobile displays offer different challenges and opportunities. New metaphors, interaction paradigms, and mechanisms for effective sharing of displays are being developed that depend on the form factors and affordances of displays, the tasks being pursued, and the roles of people engaged in the tasks.

The term 'display' is not restricted to visual displays. It covers visual, audible, haptic, and olfactory modalities. Participants with sensory deficits can benefit from redundant, multimodal display as well as alternate display techniques that equally support all participants. Both collocated and distributed environments are being considered.

SHRDSP will investigate a range of computer display modalities and techniques to enhance human-human communication.

SIMUL ○○○○○○
 Enhanced Communication in Simulation and Training

PROJECT LEADER
Gerald Penn,
University of Toronto

PROJECT CO-LEADER
Carl Gutwin,
University of Saskatchewan

Online simulation and training environments lack many of the natural perceptual cues available in the real world. These cues often play an important role in the way that people understand the environment and work with others. Improved realism and richness in communication in turn enables more natural behaviour on the part of participants, which is then better predictable by user models developed through observation of human-human interactions.

Techniques from computational linguistics, speech processing, HCI, and CSCW are being used to enhance the richness of communication, both verbal and non-verbal, in order to improve the verisimilitude of immersive simulation or training environments.

SIMUL will provide direct benefit to Canada's defence and aerospace technology sectors, and has civilian applications such as video gaming and voice-controlled operation.

SKETCH ○○○○

Sketch Interfaces

PROJECT LEADER
Karan Singh,
*University of
 Toronto*

PROJECT CO-LEADER
Faramarz Samavati,
*University of
 Calgary*

Sketch-based interfaces are increasingly important as displays and devices support tactile input to achieve natural and powerful communication using traditional metaphors of drawing, painting and gesturing. The increasing emphasis on user-created content challenges the assumption that graphics and design tools are used only by experts.

The semantics of sketch strokes, in combination with speed, pressure and pen tilt, are key to recognition and understanding of handwriting, scientific symbols and gestures. Improved inference of 3D models from sketching is being explored based on human perception, human conceptual frameworks and the interaction of human visual processing with the spatio-temporal aspects of sketching (foreshortening and perspective).

SKETCH will design new interaction interfaces that leverage affordances of sketching to infer user intent, recognize complex gestural communication, and create 3D models and animation.

VIRTPRES ○○○○

Enhanced Virtual Presence and Performance

PROJECT LEADER
**Jeremy
 Cooperstock,**
McGill University

PROJECT CO-LEADER
Stephen Brooks,
*Dalhousie
 University*

Digital media is transforming live theatre, dance, and other performance arts. Time and distance are no longer barriers with high-speed networking. Research will improve the functionality, usability and richness of teleconferencing through support for multiple people, possibly at multiple locations, engaged in work, artistic performance, or social activities without inducing greater fatigue than with non-mediated experiences.

To realize these objectives, further development and integration of several enabling technologies, including video acquisition and display architectures, spatially reactive yet controllable lights and cameras, tetherless tracking systems, video segmentation, multimodal synthesis, latency-reduction techniques for networking, and novel GIS-like production-ready interfaces are being explored.

VIRTPRES will enhance the next generation of virtual presence and live performance technologies in a manner that supports the task-specific demands of communication, interaction and production.

Board of Directors

Current Board of Directors (as of September 2010)

Kellogg Booth	Scientific Director, GRAND	Professor, University of British Columbia
Jim Brookes*	Director, GRAND	Consultant, NeuroDevNet
Sara Diamond	Director, GRAND	President, Ontario College of Art & Design University
Vic DiCiccio	Director, GRAND	Director, Institute for Computer Research, University of Waterloo
Angus Frame*	Director, GRAND	Group Director, Digital Media, The Globe & Mail
Abby Goodrum	Director, GRAND	Associate Dean, Communication & Design, Ryerson University
John Hepburn	Director, GRAND	Vice President, Research, University of British Columbia
P.Thomas Jenkins	Director, GRAND	Executive Chairman, Open Text
Jason Kee*	Director, GRAND	Director, Policy & Legal Affairs, Entertainment Software Association of Canada
C. Ian Kyer	Chair, GRAND	Counsel, Fasken Martineau
David Martin	Director, GRAND	Executive Chairman, Smart Technologies
Ron Price*, CMA	Director, GRAND	Consultant
Paul Salvini	Director, GRAND	Chief Technology Officer, Side Effects Software
Gerri Sinclair	Director, GRAND	Corporate Director/ Strategic Consultant
		<i>*Pending formal approval</i>
Sara Esam	NCE Observer, GRAND	Senior Program Manager, Networks of Centres of Excellence

We thank the following retiring director for his service:

Angus Livingstone	Director, GRAND	Managing Director, UILO, University of British Columbia
-------------------	-----------------	---

International Scientific Advisory Committee

Joe Marks	Chair, GRAND	Vice President, Disney Research
-----------	--------------	---------------------------------

Research Management Committee

Kellogg Booth	Scientific Director, GRAND & Director, Scientific & Engineering Research	Professor, University of British Columbia
Jeremy Cooperstock	Theme Leader (TechMeth), GRAND	Professor, McGill University
Vic DiCiccio*	Director, Networking & Partnerships, GRAND	Director, Institute for Computer Research, University of Waterloo
Abby Goodrum*	Director, Social Sciences & Humanities Research, GRAND	Associate Dean, Communication & Design, Ryerson University
Wolfgang Heidrich	Theme Leader (AnImage), GRAND	Professor, University of British Columbia
Gord Kurtenbach	Chair, GRAND	Director, Research, Autodesk
Catherine Middleton	Theme Leader (nMedia), GRAND	Professor, Ryerson University
Jonathan Schaeffer	Theme Leader (GamSim), GRAND	Vice Provost, Information Technology, University of Alberta
Samuel Trosow	Theme Leader (SocLeg), GRAND	Professor, University of Western Ontario
Rob Woodbury*	Director, Art & Design Practice, GRAND	Professor, Simon Fraser University

**Non-voting members*

Member Universities

Carleton University
 Concordia University
 Dalhousie University
 McGill University
 Nova Scotia College of Art & Design University
 Ontario College of Art & Design University
 Queen's University
 Ryerson University
 Simon Fraser University
 Université de Montréal
 University of Alberta
 University of British Columbia
 University of Calgary
 University of Saskatchewan
 University of Toronto
 University of Victoria
 University of Waterloo
 University of Western Ontario
 York University

Principal Partners

Autodesk
 Deluxe
 Electronic Arts
 Rogers Communications Inc.
 Side Effects Software

Partners

3D3 Solutions
 Bardel Entertainment Inc.
 Bay of Fundy EcoSystem Partnership
 BC Hydro Power Smart
 BC Innovation Council
 BioWare
 Bravo!FACT
 CAE
 Canadian Association of University Teachers
 Canadian Digital Media Network
 Canadian Film Centre
 Canadian Pain Society
 Canoe.ca
 CBC Newsworld Archive at Carleton
 University Library
 City of Vancouver
 CMLabs Simulations, Inc.

Communications Research Centre Canada
 Coole Immersive
 Credo Interactive
 CSTAR
 Custom Prototypes
 Defence Research Development Canada
 Disney Research
 Entertainment Software Association of Canada
 Fasken Martineau
 The Globe & Mail
 Great Northern Way Campus
 gsmprjct
 HITLab
 Immersion
 in Motion
 Intel
 International Oceans Institute
 Masters of Digital Media Program
 Metranome
 Mingleverse
 MITACS
 MT Innovations Ltd.
 Museum of Anthropology
 National Film Board
 Nokia Vancouver
 Ontario Information and Privacy Commissioner
 Open Text
 Pain BC Society
 Pew Internet and American Life Project
 Pixar
 Precision Conference Solutions
 Ramius
 Rogers New Ventures
 SAP
 Science World
 Smart Technologies
 SpongeLab
 Thought Technology
 Toronto Rehab
 TubettiWorld Games
 Vancouver ACM SIGGRAPH

Network Investigators

Carleton University	Robert Biddle	School of Computer Science
Carleton University	David Mould	School of Computer Science
Concordia University	Lynn Hughes	Faculty of Fine Arts
Concordia University	Bart Simon	Department of Sociology & Anthropology
Dalhousie University	Stephen Brooks	Faculty of Computer Science
Dalhousie University	Elaine Toms	School of Business Administration
McGill University	Jeremy Cooperstock	Department of Electrical & Computer Engineering
McGill University	Paul Kry	School of Computer Science
Ontario College of Art & Design University	Paula Gardner	Faculty of Liberal Studies
Queen's University	Nicholas Graham	School of Computing
Queen's University	Roel Verlegaal	School of Computing
Ryerson University	Deborah Fels	Ted Rogers School of Information Technology Management
Ryerson University	Abby Goodrum	School of Journalism
Ryerson University	Catherine Middleton	Ted Rogers School of Information Technology Management
Simon Fraser University	Lyn Bartram	School of Interactive Arts & Technology
Simon Fraser University	Alexandra Fedorova	School of Computing Science
Simon Fraser University	Diane Gromala	School of Interactive Arts & Technology
Simon Fraser University	Magy Seif El-Nasr	School of Interactive Arts & Technology
Simon Fraser University	Chris Shaw	School of Interactive Arts & Technology
Simon Fraser University	Ron Wakkary	School of Interactive Arts & Technology
Simon Fraser University	Rob Woodbury	School of Interactive Arts & Technology
Université de Montréal	Pierre Poulin	Department of Computer Science
Université de Montréal	Temy Tidafi	School of Architecture
University of Alberta	Geoffrey Rockwell	Department of Philosophy
University of Alberta	Jonathan Schaeffer	Department of Computing Science
University of Alberta	Eleni Stroulia	Department of Computing Science
University of Alberta	Duane Szafron	Department of Computing Science
University of British Columbia	Konstantin Beznosov	Department of Electrical & Computer Engineering
University of British Columbia	Kellogg Booth	Department of Computer Science
University of British Columbia	Cristina Conati	Department of Computer Science
University of British Columbia	Sidney Fels	Department of Electrical & Computer Engineering

University of British Columbia	Wolfgang Heidrich	Department of Computer Science
University of British Columbia	Holger Hoos	Department of Computer Science
University of British Columbia	Karon MacLean	Department of Computer Science
University of British Columbia	Joanna McGrenere	Department of Computer Science
University of British Columbia	Michiel van de Panne	Department of Computer Science
University of Calgary	Sheelagh Cependale	Department of Computer Science
University of Calgary	Przemyslaw Prusinkiewicz	Department of Computer Science
University of Calgary	Faramarz Samavati	Department of Computer Science
University of Saskatchewan	Carl Gutwin	Department of Computer Science
University of Saskatchewan	Regan Mandryk	Department of Computer Science
University of Toronto	Ronald Baecker	Department of Mathematical and Computational Sciences
University of Toronto	Ravin Balakrishnan	Department of Mathematical and Computational Sciences
University of Toronto	Eugene Fiume	Department of Mathematical and Computational Sciences
University of Toronto	Gerald Penn	Department of Mathematical and Computational Sciences
University of Toronto	Karan Singh	Department of Mathematical and Computational Sciences
University of Toronto	Barry Wellman	Department of Sociology
University of Victoria	Bruce Gooch	Department of Computer Science
University of Victoria	Brian Wyvill	Department of Computer Science
University of Waterloo	Charles Clarke	David R. Cheriton School of Computer Science
University of Waterloo	Edward Lank	David R. Cheriton School of Computer Science
University of Waterloo	Michael Terry	David R. Cheriton School of Computer Science
University of Western Ontario	Roy Eagleson	Faculty of Engineering
University of Western Ontario	Samuel Trosow	Faculty of Information & Media Studies / Faculty of Law
York University	Jennifer Jenson	Faculty of Education
York University	Wolfgang Stuerzlinger	Faculty of Science & Engineering

Staff

Grace Battiston	Director, Communications
Kellogg Booth	Scientific Director
Kristina Fiedrich	Administrative Support
Josh Miller	IT Support

Spencer Rose	Web Services
Adrian Sheppard*	Director, Operations
Gerri Sinclair**	Network Manager

*As of Sept 2010, Network Manager

**As of Sept 2010, Board Member

AUDITORS' REPORT

To the Directors of Graphics, Animation and New Media NCE Inc.

We have audited the statements of net assets of the GRAND Fund — Network of Centres of Excellence (the "Fund") as at March 31, 2010 and the statements of operations and of cash flows for the period from commencement of the Fund, January 8, 2010 to March 31, 2010. These financial statements are the responsibility of the Fund's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Fund as at March 31, 2010 and the results of its operations and its cash flows for the period from commencement, January 8, 2010 to March 31, 2010 in accordance with Canadian generally accepted accounting principles.



Chartered Accountants

Vancouver, British Columbia

July 23, 2010

Statement of Financial Position

March 31, 2010

ASSETS

Current

Cash - restricted		
Uncommitted	\$	822,133
Committed to research projects		873,400
		<hr/> 1,695,533

LIABILITIES

Current

Accounts payable and accrued liabilities (Note 5)		32,627
Research project commitments		873,400
Deferred research project contributions (Note 3)		790,353
		<hr/> 1,696,380

NET ASSETS	\$	(847)
-------------------	-----------	--------------

Remarks from GRAND

There are a few points to note about GRAND's initial set of financial statements. First, interim award letters were sent out on March 11, 2010, for a total amount of \$1.43M. However, only \$556,600 of these awards had been sent out before March 31, with the remaining \$873,400 indicated as unpaid commitments as of the end of the fiscal year. Second, the apparent negative balance of \$847 under the "net assets" indicates an amount that was expended that was not an eligible expense under NCE guidelines. As of March 31, GRAND had not yet received any non-NCE funds that could cover this expenditure. Finally, the "deferred research project contributions" amount of \$790,353 is the amount of unspent NCE funding that was carried over into the current fiscal year. In all other respects, these financial statements are relatively straightforward.

Statement of Operations

Period from commencement, January 8, 2010 to March 31, 2010

RECEIPTS

Contributions from Network of Centres of Excellence	\$	1,534,647
---	----	-----------

EXPENDITURES

Networking	1,892
New project research	3,532
Professional fees	19,044
Project administration	4,577
Research project grants	1,430,000
Salaries and benefits	75,861
Travel	588
	1,535,494

EXCESS OF EXPENDITURES OVER RECEIPTS and NET ASSETS, END OF PERIOD	(847)
---	--------------

Statement of Cashflows

Period from commencement, January 8, 2010 to March 31, 2010

Cash provided by (used in)

Operating activities

Cash received from Network of Centres of Excellence	\$	2,325,000
Cash disbursed for research project grants		(556,600)
Cash disbursed for project administration and networking		(72,867)

INCREASE IN CASH and CASH, END OF PERIOD	\$	1,695,533
---	-----------	------------------

March 31, 2010

1. OPERATIONS

The Network of Centres of Excellence Program (the "NCE") was created by the Government of Canada to mobilize Canadian research talent in the academic, private and public sectors and apply it to the task of developing the Canadian economy and improving the quality of life of Canadians. The GRAND Fund (the "Fund") was established jointly on January 8, 2010 by the Natural Sciences and Engineering Research Council ("NSERC") and the Social Sciences and Humanities Research Council ("SSHRC") specifically for the purpose of promoting research in new media, animation and games, initially for the period ending on January 7, 2015, and Graphics, Animation and New Media NCE Inc. (the "Network") was selected to operate the Fund and the University of British Columbia ("UBC") was selected to serve as the host institution for the Network and the Fund, providing facilities and services for the Network's administrative centre and acting as the legal entity on behalf of the Fund.

The Network is a not for profit company which was incorporated under Part II of the Canada Corporations Act on December 9, 2009 to achieve the following objectives:

- Build an intergrated, multi-disciplinary understanding of the technical aspects of new media, animation, and games as well as the social, legal, economic and cultural aspects.
- Foster an appreciation for the role of design in the research and development of technology.
- Develop strong end-to-end networking and partnerships among the academic, private and public sectors to enhance Canada's competitive advantage.
- Conduct world class research in new media, animation and games.
- Train highly qualified personnel and facilitate knowledge and technology exchanges that lead to commercialization and innovation.

On January 8, 2010, the Network entered into a supplemental Memorandum of Agreement with UBC, to clarify UBC's responsibilities as the host institution.

These financial statements include only the GRAND Fund contributions received from NCE by the Network and disbursed on behalf of NCE. During the period the Network received all of its revenue from NCE and may not be able to maintain the operations described in these financial statements should this funding be significantly reduced or ended.

2. SIGNIFICANT ACCOUNTING POLICIES

These financial statements have been prepared on the basis of Canadian accounting principles generally accepted ("GAAP") for non-profit organizations, which include the following significant policies:

Contributions from the Network of Centres of Excellence (NCE)

Contributions to Fund and other programs are recorded as "receipts" at the time all criteria established in the funding agreement are satisfied. The agreement for each grant or fund determines the appropriate disbursement of NCE contributions, and contributions received but not disbursed at the end of a fiscal period are recorded as "deferred" and are transferred to "receipts" when disbursed during a subsequent fiscal period.

Any contributions received and not spent when the Fund is ended are to be refunded to NCE, no later than three months of the end of the Fund.

Financial Assets and Financial Liabilities

The Fund has adopted the accounting recommendations of the Canadian Institute of Chartered Accountants (the "CICA") for the recognition, measurement and disclosure of financial instruments, hedges and comprehensive income, as described in CICA Handbook Sections 1535 Capital Disclosures, 3855 Financial Instruments – Recognition and Measurement, 3862 Financial Instruments – Disclosures, 3863 Financial Instruments – Presentation and 3865 Hedges.

The Fund's financial assets, other than cash, and financial liabilities are classified as follows:

- Accounts and contributions receivable are classified as "loans and receivables" and are measured at amortized cost.
- Accounts payable and accrued liabilities and deferred contributions are classified as "other financial liabilities" and are measured at amortized cost. At March 31, 2010 the recorded amounts approximate fair value.

The organization's fair value measurements are based on a three-level hierarchy:

- Level 1 – inputs are unadjusted quoted prices in active markets for identical assets or liabilities;
- Level 2 – inputs other than quoted prices in Level 1 that are observable for the asset or liability, either directly or indirectly; and
- Level 3 – inputs for the asset or liability that are not based on observable market data.

Transaction costs directly attributable to the acquisition or issue of a financial asset or financial liability are added to the carrying amount of the financial asset or financial liability, and are amortized to income using the effective interest rate method.

Income Taxes

The Fund is not subject to Federal or Provincial income taxes.

Use of Estimates

The preparation of financial statements in conformity with Canadian generally accepted accounting principles requires management of the Fund to make estimates and assumptions about future events that affect the reported amount of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. Actual results could differ from these estimates.

Significant estimates used in these financial statements include, among others, research project commitments and deferred research project contributions.

Future Accounting Changes

In 2006, the Accounting Standards Board ("ASB") of the CICA ratified a strategic plan that will result in Canadian GAAP, as used by publicly accountable enterprises, evolving and being converged with International Financial Reporting Standards ("IFRS"). In March 2010, the ASB issued an Exposure Draft proposing that not-for-profit organizations in the private sector be provided with options for financial reporting. The adoption date for new financial reporting standards for not-for-profit organizations is expected to be January 1, 2012. The organization will continue to use the requirements of CICA Handbook 4400 for not-for-profit organizations until finalization of the new standard.

3. CONTRIBUTIONS

In January 2010 NSERC and SSHRC agreed to contribute funding of \$23,250,000 for the Fund for five years to January 7, 2015. The funding is to be received according to the following schedule:

Fiscal Year	NSERC	SSHRC	Total
2009 – 2010	\$ 1,860,000	\$465,000	\$ 2,325,000
2010 – 2011	3,595,000	1,055,000	4,650,000
2011 – 2012	2,800,000	1,850,000	4,650,000
2012 – 2013	2,800,000	1,850,000	4,650,000
2013 – 2014	2,800,000	1,850,000	4,650,000
2014 – 2015	1,860,000	465,000	2,325,000
Total Funding	\$ 15,255,000	\$ 7,995,000	\$ 23,250,000

The annual contributions of will be released subject to:

- Parliamentary appropriation of the funds in each fiscal period
- satisfactory progress, as determined by the NCE Secretariat, towards predetermined milestones for the NCE Network
- continuing eligibility of the NCE Network Host and the NCE Network, and
- compliance with the terms of the funding agreement

When all the conditions for the release of contributions to the Fund committed by, but not yet received from, NCE under this agreement have been met, the contributions to be received will be recorded as "Research contributions receivable" and "Deferred research project contributions" on the statement of net assets of the Fund.

4. CAPITAL MANAGEMENT

The Fund's capital management objectives are to meet the requirements of the funders providing grants for research and to safeguard its ability to continue as a going concern in order to pursue the advancement of graphics, animation and new media. The Fund considers its capital for these purposes to be its available received and committed grants, as disclosed on the statement of net assets. The organization manages its capital by preparing annual expenditure budgets, which are revised periodically based on current commitments and available funds, and potential additional funding which it may be actively pursuing. Annual and materially updated budgets are approved by the Board of Directors.

5. FINANCIAL RISK

The Fund's activities expose it to a variety of financial risks, which include credit risk and liquidity risk. The Fund's risk management program focuses on the unpredictability of financial markets and seeks to minimize the risk to its assets and its ability to meet its mandate.

(a) Credit risk

Credit risk is the risk of financial loss to the organization if a counterparty to a financial instrument fails to meet its contractual obligations, and arises mainly from its cash. The organization limits its exposure to credit risk arising from these instruments by only depositing cash in major Canadian financial institutions and holding only financial instruments of institutions with the highest credit rating.

(b) Liquidity risk

Liquidity risk is the risk that the organization will not be able to meet obligations associated with financial liabilities and commitments as they come due. The organization manages this risk by holding its cash only with universities and at major Canadian financial institutions.

GRAND

Centre for Digital Media
577 Great Northern Way
Vancouver, BC V5T 1E1

t: 778 370 1001

e: grand@gnwc.ca | grand-nce.ca



([flickr.com/photos/grand_nce](https://www.flickr.com/photos/grand_nce))



(twitter.com/GRAND_NCE)

Writers & Contributors:

Grace Battiston, Kellogg Booth, C. Ian Kyer, Adrian Sheppard

Design:

FMS Creative Inc.