

LOI Response For Phase 2 Projects

Completed LOI Responses should be sent as email attachments to applications@grand-nce.ca with "GRAND LOI Responses for Phase 2 Projects" as the subject line.

A successful LOI Response will address problems of significant relevance to the GRAND research program and must meet all of the guidelines for projects within GRAND, including the following mandatory requirements:

- The project must address significant research issues relevant to one or more of the GRAND Challenges identified for Phase 2 of the GRAND NCE
- The Project Leader and Co-leader must work at different universities; often they will represent multiple disciplinary approaches, appropriate to the project.
- There must be at least three researchers (including the Project Leader and Co-leader) who are or are eligible to be Principal Network Investigators within the GRAND NCE.
- There must be at least one Project Champion personally involved in planning and carrying out the project who is affiliated with a current or potential GRAND Partner drawn from the receptor community.
- One or more Partners from the receptor community must commit to making significant cash or in-kind contributions to the project.
- A current NSERC Form 100, SSHRC CV, or CIHR Common CV for both the Project Leader and Co-leader must be submitted as attachments to the LOI Response, if they were NOT submitted with an LOI in the previous round in June 2013.

Detailed instructions for completing this LOI template are on Page 2. More information on Phase 2 of the GRAND NCE is available on the GRAND website at the following URL, which will be updated with links to additional information as it becomes available:

<http://grand-nce.ca/renewal>

Project Title and Description

Title of proposed project

KNOW: Knowledge Networking for Organizational Work

Brief description for public use

Knowledge-based work is often the activity of many experts, from different disciplines, using a variety of tools for discipline-specific and collaborative tasks. Supporting this complex ecosystem requires new software tools to enable and coordinate the exchange of digital artifacts and information within a team in order to maintain awareness and cohesion and to effectively communicate and disseminate a team's work to potential receptors in order to amplify its impact. This project will systematically study knowledge-work ecosystems using ethnographic and data-analytics methods to better understand the needs for improved tools and policies.

Proposed Project Leader

Name

Eleni Stroulia

Email

stroulia@ualberta.ca

University

University of Alberta

Title/Position

Professor

Proposed Project Co-leader

Name

Anatoliy Gruz

Email

gruzd@dal.ca

University (must be different from Project Leader)

Dalhousie University

Title/Position

Associate Professor

Proposed Project Champion

☒ Confirmed

☐ Contacted

☐ Not Yet Contacted

Name

David Baker / Charles Humphrey

Email

dbaker@casrai.org / chuck.humphrey@ualberta.ca

Organization

CASRAI / UAlberta, CASRAI, IASSIST, CODATA

Title/Position

Executive Director / Academic Director, Research Data Centre, UofA

Instructions for LOI Responses for Phase 2 of the GRAND NCE

Front Page: All fields are mandatory. (a) Provide a project title, the name, email address, university, and title for the proposed project leader and the proposed project co-leader. (b) Provide the name, email address, organization name, and title for the proposed project champion and indicate whether the project champion has been confirmed, has only been contacted, or has yet to be contacted.

This Page: (Read all of the instructions for completing the LOI Response template before filling out any of the information on later pages.)

In **Part A**, Provide the names of up to six partner organizations, indicate whether each has been confirmed, has only been contacted, or has yet to be contacted, and provide a brief explanation for how each organization will be involved in the project either as an active participant or as a potential receptor that will benefit from the research.

In **Part B**, list all GRAND projects that are related to the new LOI and also any other LOIs you are aware of that may be relevant to the new LOI.

In **Part C**, List up to nine additional co-applicants (not including the individuals listed on Page 1) who are expected to be involved as active participants in the research project. Indicate for each whether the individual is a project champion from the receptor community or an academic researcher.

In **Part D**, succinctly summarize (up to one half page) the problem being solved by the research project.

In **Part E**, provide an overview (up to one and one half pages) of the proposed solution and the approach that will be taken in the research. Include relevant details about the theoretical framework, significant previous work, methodological approaches, and how the research will be managed and structured to achieve the desired goals. (Subprojects not described in Part F can be briefly described here.)

In **Part F**, describe up to six subprojects (up to one half page for each subproject) that will be pursued during the first two years of the project. Indicate for each subproject the research question(s) that will be addressed, the relationship of the subproject to the rest of the project, the deliverables and assessment criteria appropriate for evaluating the success of the subproject, and the time frame (start and finish dates) estimated for the subproject.

In **Part G**, explain the likely technology transfer, knowledge mobilization, knowledge translation, or other activities that are planned for the project and how they may provide benefits to the receptor community.

In **Part H**, explain how the project will interact with other projects and the ways in which it may support or otherwise enhance the overall impact of the network.

In **Part I**, explain specific ways in which current or future partners will participate in the project and the mechanisms that will be used to ensure that this takes place.

In **Part J**, for each of the seven GRAND Challenges check whether the project will make a major contribution, a minor contribution, or a negligible contribution to the challenge. For each box that is checked as a major or minor contribution, provide a brief description of the expected contribution.

Part A: Receptors and Partners list up to six organizations		
Organization MediaSpotMe (StavrosRougas, stavros@mediaspotme.com)	<input checked="" type="radio"/> Confirmed	<input type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement Stroulia is developing a NSERC Engage grant with MediaSpotMe on integrating different sources of information about experts (University expert profiles, Forum results, their own curated DB).		
Organization SAP and CA	<input checked="" type="radio"/> Confirmed	<input type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement Lyons (CoDyn) is currently working with SAP Jam team; they are interested in providing access to people, technology but have not committed funding. Lyons is currently working with CA Technologies User Community Team; they have developed a social platform to support community interaction and information sharing and may be interested in results of our study.		
Organization Intel	<input type="radio"/> Confirmed	<input checked="" type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement Intel will provide data and in-kind support to Wellman's activity on Networked & Distributed Work (ENOW).		
Organization Hacking Health (J. Chowdhury, jeeshan.chowdhury@gmail.com)	<input checked="" type="radio"/> Confirmed	<input type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement Stroulia (HH) has developed a plan for analyzing the data collected by their social-network system for match-making technologists and clients from the health-care sector, and for monitoring a number of term-long projects established through this process with the student software teams.		
Organization Elsevier	<input checked="" type="radio"/> Confirmed	<input type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement Gruzd has been working with Elsevier, who recently bought Mendeley, on a number of web apps for their SciVerse app platform - see http://socialmedialab.ca/?p=6541 .		
Organization OpenText	<input type="radio"/> Confirmed	<input checked="" type="radio"/> Contacted <input type="radio"/> Not yet contacted
Brief description of involvement (Husam Zein, Senior Program Manager, hzein@opentext.com) Booth has started a discussion with OpenText about possible future collaboration between the GlobalChild, the Forum team and OpenText as part of their OpenText Developer Network and their AppWorks system.		
Part B: Relations to existing and proposed projects in the GRAND NCE		
Related Current Projects MEOW, NAVEL		
Related Response LOIs (refer to the list provided) G4HLTH, HLTHSIM.EDU, NMSL, IIDES, Sensemaking++, KIDZ(Globalchild)		

Part C: Additional Co-Applicants List up to nine additional co-applicants

Name Kellogg Booth	Email ksbooth@cs.ubc.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization University of British Columbia	Title/Position Professor	
Name Luanne Freund	Email luanne.freund@ubc.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization University of British Columbia	Title/Position Assistant Professor	
Name David Harris Smith	Email dharrissmith@gmail.com	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization Mcmaster University	Title/Position Assistant Professor	
Name Kelly Lyons	Email kelly.lyons@utoronto.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization University of Toronto	Title/Position Associate Professor	
Name Alexandra Marin	Email alexandra.marin@gmail.com	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization University of Toronto	Title/Position Assistant Professor	
Name Catherine Middleton	Email catherine.middleton@ryerson.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization Ryerson University	Title/Position Professor	
Name Mike Smit	Email msmit@dal.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization Dalhousie University	Title/Position Assistant Professor	
Name Barry Wellman	Email wellman@chass.utoronto.ca	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization University of Toronto	Title/Position Professor	
Name Frauke Zeller	Email fraukezeller@gmail.com	<input type="checkbox"/> Project Champion <input checked="" type="checkbox"/> Researcher
Organization Ryerson University	Title/Position Assistant Professor	

Part D: Summarize the problem being solved (1/2 page)

Today's grand challenges, such as climate change, energy shortage, and the monitoring and containment of disease outbreaks, can only be addressed by large-scale projects with distributed teams of experts across disciplines and organizations, from academia and industry. These teams of knowledge workers increasingly rely on software systems to conduct their work, share information and work artifacts, collaborate and coordinate their activities, and share their findings and products with the broader community. To effectively support and manage such large-scale projects, important innovations are called for, including (a) integrated digital infrastructures, on which to conduct the work, collaborate with each other, manage the project activities, and disseminate the work products; (b) new models of communication, interaction, collaboration and dissemination, through traditional scholarly channels but also special-interest social networks; and (c) new methods for systematically studying knowledge work and its impact in order to inform research policies.

In the first phase of GRAND, the MEOW and NAVEL projects investigated some of these issues, reflecting on the GRAND community itself. An important outcome of this work has been the development of the Forum, a software platform that primarily supports the administrative functions desired of a research infrastructure. The Forum supports the collection of information about the community and its productivity, conducting surveys to collect data on the community's collaborative ties and perceptions, and the statistical analysis of the collected data to understand the community structure, work processes, and their evolution. Going forward, the KNOW project will (a) integrate the Forum with third-party tools and services through which to observe more aspects of the team work and collaboration and to more broadly disseminate its products, and (b) expand its data-analytics toolkit in order to examine the interplay between types of tool support, types of work objectives, community structure and dynamics, and productivity and (broadly conceived) impact. In parallel, following a mixed-methods methodology, KNOW will conduct ethnographic studies to gain insights on how the individuals in these teams and communities perceive their work.

By partnering with a number of different communities (macGRID, CWRC, CWN and Hacking Health) we will apply our tools and analyses to these different types of knowledge work, and we will comparatively analyze how discipline-specific factors impact collaborative activity and productivity. At the same time, working with a number of receptor communities (standards' organizations, publishers, media SMEs, large organizations of knowledge-based work, and software industry), we have established the prerequisites for effective dissemination of our work.

Part E: Summarize the proposed solution and approach (1 ½ pages)

The proposed project, KNOW (Knowledge Networking for Organizational Work) fuses the agendas of MEOW (on system integration, information exchange, and research management) and NAVEL (on studying social research networks) into a comprehensive plan for supporting, studying, managing, and disseminating knowledge work. The project activities follow three general themes.

The first theme (extending the original MEOW agenda) involves SYSTEM INTEGRATION. In the Forum, we have a core system for recording essential information about research and scholarly work. KNOW will extend and integrate the Forum with three types of external systems and/or services. The first such class of systems includes systems that implement standards and protocols for exchanging information about research and knowledge work, such as ORCID (a system for persistent digital identifiers for researchers), the Canadian Access federation (CAF) that manages access-control credentials to a number of Canadian organizations, and the Canadian Common CV (CCV). These tools are designed to enable the federation of the research ecosystem and simplify access for researchers. As we take advantage of these tools by integrating them with our platform, through the ACRI subproject, we will work to disseminate tools and expertise developed within GRAND to Canada's broader research community. Second, we plan to integrate the Forum with software systems supporting discipline-specific work, such as for example software and data repositories and computing platforms. The usage logs of these types of tools capture rich information about the intensity and the patterns of discipline-specific activities. The MVW subproject is an example of this activity, focusing on a shared VW and a repository of shareable assets. In a similar vein, the CoDyn and HH subprojects focus on the integration of social platforms used to mediate the team-member interactions before team formation, during collaborative work, and work-product dissemination. Finally, we will integrate the Forum with dissemination platforms, such as search engines (e.g., Google Scholar), publishers' web sites, collaborative-reading applications (e.g., Elsevier's Mendeley), scholarly social networks (e.g., Academia.edu, ResearchGate), and media web sites (e.g., Media SpotMe). This last category of tools enables the broad sharing of research results (which is at the core of the DaD sub-project).

This comprehensive software infrastructure will effectively mediate the complete workflow of knowledge-based work, from inception, to execution, to reporting and managing, to dissemination to receptor communities, thus enabling the second theme of our agenda: the systematic STUDY OF THE KNOWLEDGE-WORK PROCESS. Extending the original NAVEL agenda, we propose to systematically analyze the rich multi-dimensional data (research-tool usage, relations among researchers, publications and activities, metrics of

Part E: Summarize the proposed solution and approach (continued)

research impact on various dissemination platforms, and information self-reported through surveys and interviews) to gain insights about collaborative interdisciplinary work, learning, and knowledge transfer. Through social-network analyses we plan to estimate the centrality of individual researchers in the context of different networks, based on affiliation, works-with, co-publication, co-citation, co-readership, and co-funding relations. Using statistical methods, we plan to analyze the correlations between inter-disciplinarity, seniority, geographical proximity, social-network centrality (of the relation types mentioned above), research productivity, and impact; and investigate the dependencies between seniority, interdisciplinarity, formal organizational ties, productivity, funding, and impact. Through machine-learning methods, such as clustering and sequence mining, we plan to discover typical patterns of researcher profiles, projects, and research activity over time. Recognizing that these analyses are not sufficient to explain the patterns of collaborative work and knowledge transfer, nor do they provide insights regarding the mechanisms (including policies, practices, and information technology support) that lead to the formation of the relationships and resulting outcomes, we plan to augment them with ethnographic studies and semi-structured interviews with researchers, partners, corporate employees, and students. In the CoDyn subproject, we plan to ask the GRAND community members to tell us their "stories" of participating in the network, based on their profile data. The ENOW subproject will focus on mapping the structure of the GRAND community (including researchers and partners) and how it supports collaboration and knowledge/technology transfer; ENOW will also study employees at the Intel Corporation to better understand (through comparative analysis of the GRAND/Intel data) how institutional setting affects collaborative ties. The SNETS subproject will focus specifically on the issue of "seniority" and how GRAND and, more generally, NCEs benefit young professionals during their studies and beyond, in their early professional lives. Following such a mixed-methods methodology, we will make best use of the technical and social-science skills of our team towards integrating observed knowledge and reported subjective information and gaining deeper insights regarding effective collaborative research and knowledge and technology transfer.

We have partnered with a number of research communities, in addition to GRAND. macGRID is a community of researchers and practitioners, working on virtual worlds on a shared virtual OpenSim platform, supported by SharcNet. CWRC is a community of digital humanists working on born-digital and digitized texts on a CFI platform, currently under development. Hacking Health is an organization that brings together health-care providers, software teams and designers for developing health-related software applications. The organization manages its client-developer matchmaking process through a social-network tool. CWN is the Canadian Water Network NCE, interested in participating in our young-professionals study. All these organizations are interested in extending their infrastructure with our Forum-centered tools and our comparative analyses of these communities will enable a more in-depth study of research partnerships.

Finally, the third theme of KNOW's activities will focus on providing a number of specific SERVICES to the researchers in our community.

- 1) We will support data-interchange between the Forum and the external systems mentioned above. The Forum-CCV data-exchange service is already underway. Similarly, we have started work on developing APIs for exposing the Forum data through CERIF-compatible APIs for systems that consume CERIF data.
- 2) We will develop an aggregator service for collecting a comprehensive researcher profile, based on the data currently collected on the Forum, references to the researcher in Tri-council repositories, references to the researcher in publishers' web sites and scholarly research networks, authoritative expertise catalogs such as the ones developed by Universities, and potentially traces of the researchers' activity in open-ended social networks. This service will provide the base of our FiRE and DaD subprojects. Possible receptors of this activity include MediaSpotMe (a media company) and the communications officer of GRAND.
- 3) We will develop a log-analysis service toolkit to support the managers' awareness of their platforms' usage (a service relevant to GRAND, macGRID, CWRC and Hacking Health). We will aim to design this service as a composition of general and domain-specific components so that we can collect precise and meaningful data, while at the same time being able to comparatively analyze this data across platforms. macGRID is a particularly interesting case study; as an example of a platform on a virtual shared infrastructure, it can substantially benefit from this service as a means of effectively managing this platform to maximize its usage and minimize its downtime. This will be the subject of our MVW and HH subprojects.

Part F: Subprojects list up to six subprojects that will be undertaken in the first two years.

Subproject Name (1)

FiRE - Finding Research Experts (lead: Luanne Freund; w. Eleni Stroulia, Mike Smit)

Summary

In this subproject we focus on the problem of expertise location in a research context. Identifying and communicating with local and external experts is a core activity of knowledge work, whether in the workplace or in academia. It is often the first step towards collaboration and network building. However we still do not have a good understanding of what constitutes expertise and what serves as evidence of it in the digital age. Social media and other digital exhaust left in the wake of activities can serve as some indication of knowledge and productivity, but how do we piece this together to identify experts?

FiRE builds on previous research that resulted in the design of Virtu, an expert search system built as a front end to the Mendeley academic social network, and later implemented in the GRAND Forum. Our approach to expertise location is to identify, extract and represent diverse facets of expertise, such as for example, experience, depth of knowledge and productivity, and to support the searcher to explore the dataset through manipulation of these facets.

Currently, there are many web-based systems available to search for scholarly output: e.g. Google Scholar, Microsoft Academic Search, Mendeley, but none of these focus on finding the people behind the research. FiRE will examine two use cases: (a) researchers seeking collaborators and media, and (b) industry representatives seeking consultants or subject experts. The project will entail an environmental scan of existing expert search technologies and relevant standards and tools to support interoperability; a user study to determine how expertise is conceptualized within different groups and how experts are recognized; and the development and testing of prototypes within the GRAND research network infrastructure. The project will connect to other sub projects within KNOW and other GRAND projects that focus on information retrieval, social media and text mining.

FiRE will seek out partnerships with Microsoft Academic Search, Elsevier-Mendeley, and ScienceScape.org.

Subproject Name (2)

CoDyn - Collaboration Dynamics (lead: Kelly Lyons; w. Eleni Stroulia)

Summary

In this subproject, we will study the integration of collaboration tools in the Forum to support meetings, social and work interactions, and decision making involving specific, structured research workflow processes and more ad-hoc collaborative activities. We will integrate existing and newly developed social awareness, collaboration and structured meeting tools (that enable research teams to accomplish collaborative research workflows and decision-making, brainstorming tasks) into the Forum and study their use in collaborative research networks, receptor organizations, and healthcare system development (through the HH subproject). To do this we will: a) identify and characterize the set of tools that researchers currently use to carry out their collaborative work and characterize the tools based on when during the research process they are used, how they are used, the frequency of use, satisfaction with use, and other characteristics; b) articulate research work processes and workflows and design tools to support them; c) identify less-structured team activities (such as brainstorming, idea selection, and meetings) and develop and integrate tools that support those activities; d) identify a set of social and cooperative work tools (those that provide profiles, show awareness, and enable chat) to integrate within the Forum; e) develop a set of workflow-support tools that can be used to carry out structured and unstructured team meetings, making use of game elements in cooperative work platforms to motivate and incent participants to contribute to collaborative tasks; and, f) analyze how teams use the collaboration tools in the Forum including an analysis of their satisfaction with and outcomes resulting from using the tools. We will carry out user studies and analyze data collected through tool use to aid in the evaluation of the tools. Even though our focus is on collaborative tools for research work, we will compare our investigations with the use of collaborative tools in receptor organizations and in unique and important settings such as a healthcare through the HH subproject.

Part F: Subprojects (continued)

Subproject Name (3)

DaD - Dissemination and Discovery (lead: Mike Smit; w. Anatoliy Gruz, Luanne Freund, Eleni Stroulia)

Summary

This subproject examines methodologies, analyses, and tools to support and study research dissemination and discovery, and the cloud-scale data required to inform these. For the partner communities engaged in knowledge work, there are two key questions: 1) which are the most effective dissemination pathways, and what mechanisms would help improve and understand the process? and 2) how do researchers new to a field / community discover reputable and relevant research artifacts, venues, colleagues? By instrumenting dissemination mechanisms (e.g. standard server logs, URL shortening services with statistics, Facebook Like counts, retweets, citations, links, Twitter mentions) to assess an enhanced version of “impact”, we can gather phrases, sentences, and keywords consumers used to describe a given research artifact. These relevant terms form an emergent, human-curated topic map that can be used to improve dissemination efforts, to inform expert identification efforts (e.g. FiRE), to suggest potential collaborations, to create or inform a topic-driven researcher social network, and much more.

Informing discovery by new researchers begins by understanding what researchers unfamiliar with a field are capable of asking, and what answers they are seeking: how do new researchers evaluate relevance and reputation? From this understanding, we can develop approaches and tools to augment existing sources of information (e.g. mentoring) with information from the Forum++, academic social networks, topic maps, and other sources. Examples of tools include augmenting Google Scholar with community-relevant information, highlighting search results in venues frequented by colleagues, or leveraging the capabilities of FiRE to suggest experts in a field whose publication records might form the basis of a literature search.

Subproject Name (4)

ACRI - Advancing Canada's Research Infrastructure (lead: Catherine Middleton; w. Barry Wellman, Geoffrey Rockwell, Eleni Stroulia)

Summary

The objective of this subproject is to work with the Digital Infrastructure Leadership Council to provide research expertise on the further development of research infrastructure in Canada.

GRAND researchers are already actively engaged on this issue: Catherine Middleton is on the board of CANARIE, Canada's advanced research and innovation network; Geoffrey Rockwell is a member of the Digital Infrastructure Leadership Council; and Barry Wellman is a Member of the Expert Panel on Memory Institutions, of the Council of Canadian Academies. These memberships provide us a unique opportunity to inform and influence the decisions of these important organizations with knowledge gained through the activities of KNOW and, more generally, GRAND.

The DIL council is tasked with leading the further development of research infrastructure in Canada, coordinating efforts among various infrastructure providers (including CANARIE, Compute Canada, CUCCIO, and CARL among others), user communities and additional stakeholders including the granting councils, CFI and Industry Canada. The expert panel is tasked with the assessing and recommending digital means for preserving Canada's Heritage. This subproject will work to disseminate tools and expertise developed within GRAND to Canada's broader research community as appropriate, seek additional support for work done within GRAND to develop research infrastructure (e.g. through CANARIE's Research Middleware program) and work with the Digital Infrastructure Leadership Council to identify and research the specific challenges of further advancing Canada's research infrastructures.

Part F: Subprojects (continued)

Subproject Name (5)

MVW - Multidisciplinary Collaboration in Virtual Worlds (leads: David Harris Smith, Frauke Zeller; w. Eleni Stroulia, Mike Smit)

Summary

The purpose of this study is to learn about multidisciplinary collaboration in the context of a research and creation network of artists, technologists, and scientists working together in virtual worlds (VWs) on the macGRID OpenSim cloud.

The macGRID project will adopt the Forum for managing the various activities on the macGRID cloud. Furthermore, we plan to instrument the cloud infrastructure, the OpenSim platform, and the various repositories associated with macGRID, in order to collect data about the actual activities of these interdisciplinary teams. In parallel with collecting observations through the Forum-on-macGRID, we will conduct focus groups to learn about the salient social and technological features of multidisciplinary collaboration in VWs and to establish the design of subsequent qualitative and quantitative measures of individuals, groups, and technologies engaged in the network. The focus group will convene twice, for an open discussion of collaboration, and a Q Sort method to rank statements on salient issues in VW collaboration derived from the first meeting.

We will apply qualitative/quantitative methods to analyze the above data in order to describe and evaluate collaboration in the VW research network and associated physical world sites. We will conduct a longitudinal survey and ethnographic study of the experiences, practices, and processes of collaborators, the contents and quality of communications, the use of various communication technologies (in and out of the VW) the usage logs of the VW platform and the in-world tools and objects, the use of tools and technologies external to VWs, and the sites and context of their collaborative work. Next, we will analyze and synthesize the qualitative and quantitative accounts of VW research collaboration, drawing upon prior contributions to the field and relevant theory.

Subproject Name (6)

HH - Clients and Software Teams in Hacking Health partnerships (lead: Eleni Stroulia; w. Kelly Lyons)

Summary

Healthcare is a critically important field that deserves attention from the best minds in technology. Many of the people who best understand the problems in healthcare lack the knowledge and network necessary to design and build technological solutions.

Likewise, very few designers and developers have the unique medical knowledge and credibility necessary to successfully innovate in the healthcare space. This knowledge-network gap is costly: problems remain unsolved, and current solutions remain inefficient. We must empower technology innovators with the knowledge and network required to improve healthcare.

In this subproject, we will modify the weekend hack-a-thon model of Hacking Health (HH) to integrate it with a term-long UoA software-engineering course (CMPUT401) and we will study the collaboration between the healthcare clients and the software teams through the logs recorded by the HH Sparkboard and the CMPU401 GitHub. This activity will drive the integration of the Forum with these two systems, further enhancing the richness of the Forum data collection. In addition, we will conduct interviews and focus groups to collect information about the participants' expectations and views on the process. Note that the HH Sparkboard is an example of the types of tools we envision to develop in CoDyn; therefore it will provide a state-of-the-art reference point, against which to assess the CoDyn tool usability and effectiveness. This project will essentially apply the KNOW methodology to a small scale activity, focusing on the client-developer relationship and the technical and social factors that influence its success.

Part F: Subprojects (continued)***Subprojects 7 and 8***

Subproject Name (5)

ENOW - Effective Networked Organizations and Work (lead: Barry Wellman; w. Anatoliy Gruzd)

Summary

The ENOW project builds upon and extends the NAVEL study to examine how researchers and corporate employees collaborate and exchange information. ENOW is in a unique position to address important knowledge gaps and related to them industry and government's concerns about collaboration and knowledge and technology transfer across sectors. In Phase 1, NAVEL studied the collaborative ties among GRAND researchers, the practices they employ to work across disciplines and distance, and the challenges and benefits GRAND researchers identify. Building on this work, ENOW will extend the study of networked research to the broader topic of networked work and networked organizations. We will study networked work in at least two settings: GRAND and the Intel Corporation. In GRAND, we will continue monitoring the network but will identify projects that differ in terms of how they engage non-academics. We shall also analyze how the reorganization of GRAND affects work relations and productivity. We will solicit champions and partners' views on the benefits and the challenges of participating in GRAND as well as on effective collaborative strategies. In the Intel Corporation, we will look at how corporate employees work in multiple teams and how they reach out to experts outside Intel to network, get information, and collaborate. (In addition to Intel, we are firming up our relationships with other possible partners such as Mozilla; the Pew Internet and American Life Project, which is interested in doing a 2,000-respondent national survey with us, an in-kind contribution of US\$120,000; and Canopy Labs, a Toronto-based start-up). Comparing patterns across these settings will assist our understanding of how networked research is similar to - and different from - corporate networked work. This will enable us to generalize results to broader context. In addition, the work accomplished in Phase 1 of GRAND will assist in refining the analytical methods suitable for studying networked work: we will use multi-level modeling techniques to understand how individual, project-level, and network-level factors jointly shape collaborative processes and outcomes. In short, the proposed project will build upon and extend past work to contribute to our understanding what structures and practices foster successful collaboration and knowledge and technology transfer across sectors and how such structures and strategies vary in different settings.

Subproject Name (6)

SNETS - Student Networks and Labour Market Outcomes (lead: Alexandra Marin; w. Barry Wellman, Eleni Stroulia)

Summary

We will examine how GRAND affiliation shapes the professional networks of graduate students and how these networks, supported by digital technology, influence their productivity, skills, and job search strategies and outcomes. By comparing GRAND HQPs with graduate students not affiliated with similar research networks (at the Universities of Toronto and Alberta), we will identify benefits of GRAND affiliation. We expect that GRAND will provide benefits via two mechanisms: (a) affiliation with GRAND will provide numerous and diverse opportunities to meet and collaborate with new scholars; and (b) because GRAND researchers share an interest in digital media, including communication and collaboration technologies, we expect that GRAND-affiliated students will be more conscious and skilled in using these technologies to build and manage their networks, and to collaborate across distance and disciplines. Further, we will employ a design that will allow us to examine regional variations as well as variations across natural science, social science, and interdisciplinary fields. SNETS will collect data in three waves - during graduate studies, 3-6 months and 2 years after graduation, to answer three important questions.

(1) How does GRAND affiliation shape the professional networks created by graduate students during their studies and digital media use to maintain and build these networks? In the first wave of data collection, we will survey GRAND-affiliated students at four universities in three fields as well as a control group of non-affiliated students in those same departments. Students will identify members of their professional networks and the media by which their ties are formed and maintained.

(2) How do these networks affect their learning, job search and the performance on their first job? Our second and third waves of data collection, occurring 3-6 months and 2 years after graduation, will determine if ties are retained and how the use of these ties has changed since graduation. As well, we will collect data on their productivity and career progress.

(3) How do the effects of GRAND-affiliation vary across regions and disciplines? We will collect data from four universities (two in Central Canada, one in Western Canada, and one in Eastern Canada) and from three fields (computer science, sociology, and art and technology study) to see regional differences and differences across fields based on institutional context, cultures, interdisciplinarity, and geographic proximity and concentration of fellow researchers.

Part G: Summarize how the proposed project will pursue technology and knowledge exchange and exploitation activities within the context of GRAND.

KNOW will pursue Knowledge and Technology Exchange and Exploitation through activities in four different scopes.

First, through our collaboration with a number of different communities of knowledge workers (GRAND, CWN, CWRC, macGRID, HH, SAP and Intel), we will have the opportunity to study the general question of "how modern digital tools support and inform collaborative work" in a variety of contexts and variants. The various parallel activities across these communities will inform each other and will enable knowledge transfer (of tools and analysis results) across them.

Second, through our collaboration with our industrial partners (CA, SAP, MediaPotMe, Elsevier and OpenText), we will have the opportunity to integrate our methods and tools in our partners' software infrastructures. A potential opportunity for the Forum itself may be its adoption by MITACS; we are currently planning a demonstration of the platform to MITACS decision makers.

Third, we will work to disseminate our tools and expertise to Canada's broader research community through our work with CASRAI and our participation to Digital Infrastructure Management organizations, in the context of ACRI. CASRAI (Consortia for Advancing Standards in Research Administration Information) is an international organization for research-information standards interoperability, and they have already invited a demonstration of the Forum in their 2013 conference.

Finally, we will disseminate our work through relevant academic and trade conferences in computer science, information-and-library science, and the social sciences.

Part H: Summarize how the project will network with other projects within GRAND.

KNOW is fundamentally an "infrastructure" project, in that it aims to develop platforms for collaborative knowledge work, across disciplines, organizational boundaries and locations; as such, it is relevant to all other GRAND projects. To some extent, this was true of MEOW and NAVEL, but, having established a mature infrastructure for administrative purposes with the Forum and a team of GRAND researchers across disciplines who already collaborate in a substantive manner, KNOW will proceed to expand the Forum with a broader suite of tools and services to support more broadly conceived communities of knowledge workers. This has already started with the adhoc wikis that some teams have used to collaborate on the LOI phase and will continue with the integration of software repositories, collaboration-support tools, shared virtual worlds, and third-party tools as well as the new services planned in KNOW. We envision that individual GRAND projects will choose to adopt some (or all) of these tools and may even drive the integration of new tools relevant to their activities.

More specifically, there are at least three specific points of interaction between KNOW and other GRAND projects: the macGRID infrastructure that KNOW will study and support will be used by HLTHSIM2.0 and G4HLTH researchers; the KNOW analyses of collaborative work will feed into a Sensemaking++ subproject of contribution and influence in collaborative design activities; finally, some of the Forum software components (particularly analyses and visualizations) will be repurposed for IIDEMS and NMSL.

Part I: Summarize how one or more current or potential GRAND partners will be engaged in and benefit from the proposed research.

The partner that can benefit potentially the most, in the short term, from KNOW activities and products is the CCV development and delivery team. In our development of an exchange mechanism between CCV and the Forum, we aim to construct an extendible framework that could potentially be used by other organizations that may want to exchange data with the CCV system. Given the number of CCV users (all researchers funded by the tri-council across Canada) such a tool could improve the efficiency of all Canadian researchers and effectively support their migration to CCV.

In the medium term, the various receptors of our research such as MediaSpotMe, CA, SAP, Elsevier, Intel and OpenText will benefit (a) from integrating specific tools (for data analysis and visualization) in their workflows and software platforms, (b) from adopting our empirical methodologies to study their own software ecosystems and the ways in which they influence their work processes, and (c) from the findings of our analyses on effective structures and practices for collaborative work in various organizational settings.

In the long term, we hope to establish a mechanism through which to share the Forum (as the platform supporting all these activities) with the research community at large through our partnership with CASRAI and MITACS. Our objective is to establish a sustainable future for system (and its ecosystem of services) beyond GRAND.

Part J: GRAND Challenges Check all that apply and briefly describe anticipated impact	
Entertainment <input type="checkbox"/> Major impact <input type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	
Learning <input type="checkbox"/> Major impact <input checked="" type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	By studying how researchers and corporate employees exchange information with colleagues in multiple teams or outside their organization, KNOW will understand how knowledge exchanges take place, especially knowledge transfer across sectors and disciplines, and what the most effective structures and practices are.
Healthcare <input type="checkbox"/> Major impact <input checked="" type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	HH and ENOW will contribute to the understanding how multi-disciplinary health care teams function and can facilitate the development of guidelines for their recruitment and management.
Sustainability <input type="checkbox"/> Major impact <input type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	
Big Data <input type="checkbox"/> Major impact <input checked="" type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	Through the analysis of usage logs of software platforms (especially the macGRID VW) and social network data, KNOW will develop algorithms and tools for studying (analyzing, fusing and visualizing) big multi-modal datasets.
Work <input checked="" type="checkbox"/> Major impact <input type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	The core subject matter of KNOW is to support and understand the collaboration of scholarly and research communities, and more generally knowledge workers. Since many (most) types of work today involve teamwork and are supported by digital tools, the potential impact of our findings in this area is substantial.
Citizenship <input type="checkbox"/> Major impact <input type="checkbox"/> Minor impact <input type="checkbox"/> Negligible impact	