

HOT RESEARCH

Supporting Trust through Continuous Coordination

Coordination and cooperation are considered crucial to collaborations and trust is at the heart of these activities. Trust often becomes an issue in distributed software engineering teams. These teams may not have previous experience with one another and are typically self-directed. They also typically need to adapt to diversity in culture and geographic backgrounds, in addition to the “lack of touch” (as it is commonly referred to) that is typically inherent in such teams. These factors and others can challenge the potential establishment of trust. However, where trust exists, it can enable distributed teams to manage the uncertainty and complexity of collaborating remotely. Consequently, trust can reduce transaction costs and increase confidence. It can also promote open, substantive, and influential information exchange.

RESEARCH BRIEFS

Prof. **Susan Sim** has received an NSF CAREER award in the amount of \$498,367 for her research on Program Comprehension in Internet-Scale Code Search for Open Source Reuse in Opportunistic Software Development..

Prof. **Walt Scacchi** has received a grant for \$86,500 from the Computing Community Consortium to hold an international symposium on the future of research and multidisciplinary empirical science of free/open source software in late 2009.

Prof. **Gloria Mark**, was quoted in “Juggling multiple tasks at work just compounds stress,” in the March 22 issue of the *Boston Globe*. The article addressed her research on Multi-tasking in the Workplace (see *ISR Connector*, Spring/Summer 2008).

ISR Director **Richard N. Taylor** and Prof. **Walt Scacchi** were quoted in multiple articles addressing ISR’s research on “Decentralized Virtual Activities and Technologies: A Socio-Technical Approach.” The articles appeared in February in *Virtual World News* - “UC Irvine Gets \$3M to Study Virtual Worlds and Games for Work,” *PC World* - “Study: Can Games Improve Workplace Collaboration?” and others.

More Research Briefs on page 5.

ISR Prof. **David Redmiles** and ICS Project Scientist **Ban Al-Ani** have begun to research the interplay of several factors that are typically encountered during distributed development and the forces that influence the development of trust. They conducted a field study in a Fortune 5000 organization that focused on exploring task allocation, leadership, and social interactions. Sixteen employees accepted the invitation to take part in the study and participated in a one-hour interview accordingly.

Respondents’ experience and status within the organization was diverse. An analysis of the background information provided by the respondents revealed that their experience in the development domain ranged from 3 to 45 years. Respondents had a mean of 19.3 years experience with both collocated and distributed projects. Altogether, respondents mentioned a total of 26 different work sites.

On average, the distributed teams were located on 4 different sites.

Some of the study results were surprising to Redmiles and Al-Ani, and some not. It may not be surprising to experienced researchers and practitioners that trust is crucial to both successful collaboration and effective leadership within a distributed group, nor that trust was not typically a concern by study respondents reporting their experience in smaller teams. However, it was somewhat surprising that trust was not a factor that software tool developers thought about explicitly in their work. Another surprising observation was that, within the organization studied, individuals typically seemed to trust their leader by default and seemed more concerned about gaining the leaders trust than vice versa. Finally, the team’s diversity appears to influence the level of trust attained and bestowed to remote team members in particular. These factors appear to act as forces to influence trust, and time emerges as a valuable factor that is needed to allow for trust to develop. In sum, they found that four primary forces influenced trust: team size, type of project, team diversity, and leader characteristics. Time was a common thread that ran through all these forces.

A collective review of factors that emerged from the study led to an analogy that these factors act as forces in a manner similar to opposing teams in a “tug-of-war” with



Al-Ani and Redmiles

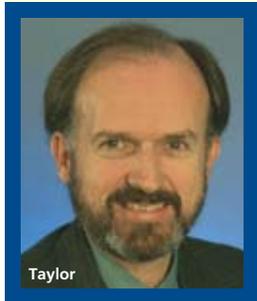
Researchers have found that trust is essential to the loose coupling that allows distributed teams to work effectively. However, research into radically collocated collaborations has found that tight coupling (dense relations and the ability to observe each other) is often assumed to be the necessary ingredient for successful collaborations. This leads to an interesting paradox; if members of distributed teams are going to engage in cooperative activities, they must either trust each other or be able to monitor each other. In distributed teams there is a chance of behavioral invisibility and the added risk of neglect of others’ interests and mis-anticipation of others’ actions which can undermine the development of trust.

IN THIS ISSUE:

- 2-Message from Director
- 3-Taylor Wins SIGSOFT Award
- 4-Meet Prof. van der Hoek
- 4-Student News
- 5-ISR Participates in GSAW 2009
- 5-Research Briefs
- 6-7-Student News
- 6-Norwegian Visitor Studies Games
- 6-Tech Reports
- 7-ISR Sponsorship
- 8-iSchools Workshop

MESSAGE FROM THE DIRECTOR

Ten years ago the University of California, Irvine established the Institute for Software Research with the stated mission of:



- fostering innovative basic and applied research in software technologies;
- working with companies, government agencies, and standards bodies to develop and transition the technologies to wide-spread and practical application;
- training the next generation of software researchers and practitioners in advanced software technologies; and
- supporting the public service mission of the University of California in developing the economic basis of the State of California.

Ten years is an awfully long time in the software world, and especially so at the research edge of it. While we can also look back at many accomplishments in each of the areas mentioned, the mission statement above still rings true. The specific means and primary focus areas have shifted over time, but the goals remain the same.

One example serves to illustrate both how times have changed ... and how they haven't. In 1999 **Roy Fielding** was still a graduate student at UCI. He had just finished pushing RFC 2616 --- the HTTP/1.1 Protocol Specification --- through the IETF standardization process. He was a year away from graduation and no one had heard of the REST architectural style. **Jim Whitehead** was similarly a graduate student --- sharing an office with Roy. WebDAV was still a concept, not a specification. The world was abuzz with venture-backed startups, and some people touted that revenue wasn't a necessary indicator of a successful company --- something called "mind-share" was sufficient. Or just "eyeballs". Now, looking back, we can see that ISR's work with the web was just at the beginning of its huge impact. Roy and Jim graduated, competent Web and Internet designers think about RESTful interfaces, Roy and the Apache team won the ACM Software System Award, most desktop applications implement the WebDAV protocol --- and a lot of startup companies have come and (mostly!) gone. ISR's involvement in this world is certainly not past though! **Justin Erenkrantz**, a current ISR graduate student, is President of the Apache Software Foundation and leading an effort to establish the next major architectural advance over REST. How this story will play out over the next ten years is, obviously, unknown, but one thing is certain: ISR researchers and alumni will continue to play very significant roles.

While the story of ISR's role in the development of the Web is interesting in its own right, it is exemplary of a key point about ISR's role in the software community. If one looks at the companies that indeed prospered through the era of the Web explosion, they were the companies that were engaged with the research community in developing the technologies. Waiting for the Web to "settle down" and "reach consensus" is a fine recipe for falling behind the power curve. Complacency about what the research community is doing simply means inevitable technical obsolescence.

A constant, therefore, of ISR has been engagement with a broad community to shape the future of software technology. ISR engages with its industrial partners in many ways, including sending students to internships, working together on joint research projects, sending graduates off to successful careers within sponsoring companies, participating in distinguished speaker seminars, the annual ISR Forum, and the annual GSAW meeting. ISR students, staff, and faculty participate in professional conferences throughout the year, and frequently are key organizers of those conferences. ISR has hosted visitors from around the world, including several industrial researchers from Japan, academics from Brazil, Norway, Italy, and more. Our students are sharp and the level of activity is intense.

My privilege as Director of the Institute is to invite you to continue to partner with us as we continue to make the future of software.

ISR Director **Richard N. Taylor** can be reached at taylor@uci.edu.

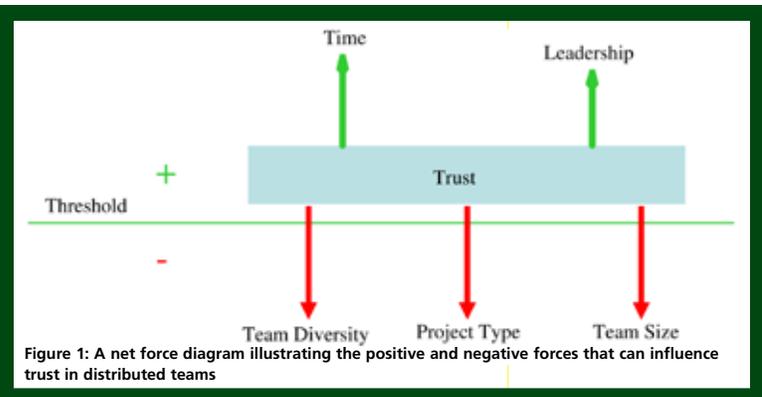
trust placed on the "centre line." Study data indicated that a leader who demonstrates anticipated leadership qualities and adequate time allocation can act as two forces that positively influence trust in a distributed team. Conversely, a large team size, high team diversity, and challenging project deliverable can have a negative influence on trust within a distributed team. This tug-of-war analogy leads to the conclusion that negative forces can be overcome if the opposing forces (leadership and time) are of sufficient strength and quantity. Study data implies that the key to maintaining equilibrium, at least, is to reach a state such that the trust

marking on the rope is closest to positive forces. Trust crossing the centre implies that the trust within the team has negatively crossed over the trust threshold which can imply that the team is not performing to the best of its ability.

Figure 1 is a net force diagram that models the impact of the forces indicated by study findings. The diagram demonstrates that trust is the end result of the net forces acting on it. The trust threshold (a theoretical concept) represents the minimum level of trust necessary for distributed developers to collaborate effectively as a team. However, these

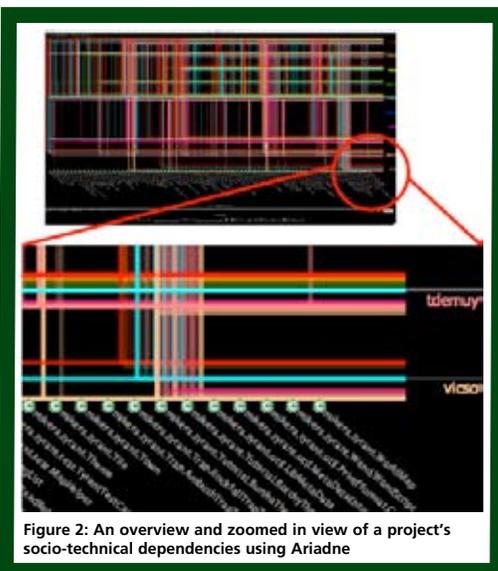
forces are dictated and thus limited by the scope of the pilot study which was exploratory in nature and in which trust was not the primary focus. A review of literature in other fields of study led Redmiles and Al-Ani to surmise that there are probably many other forces that can influence trust and motivated them to investigate these forces within distributed software engineering teams further.

Recognizing the influence of these forces and reacting accordingly can be one means of promoting positive trust within a distributed team. Redmiles and Al-Ani are intrigued by the notion that incorporating the results of



their study into the design of new software tools and add-on's to existing tools could explicitly improve trust in distributed teams. For a number of years, together with ISR Prof. **André van der Hoek** and a number of graduate students, Redmiles and Al-Ani have been developing software tools to support collaborative software engineering. These tools make an excellent starting point to test out the theme of supporting trust.

One tool developed on this project, Ariadne, is a visual tool that infers dependencies between virtual teams based on the modules they author [Figure 2]. Ariadne is being developed by ISR Ph.D. student **Erik Trainer** (D. Redmiles, advisor). Ariadne lays out called code units on the horizontal axis and developers on the vertical axis. It draws connections from a dependent author to the code unit they are dependent upon and back to the author responsible for that code unit and repeats this for each code unit in the project. It allows its users (managers and developers) to view different filters of who is responsible for what modules and a calculation of who is dependent on whom in a collaborative development.



Redmiles and Al-Ani plan to extend this tool to include features that will allow them to monitor and manage trust in virtual software engineering teams by monitoring the level of collaboration detected through identified interdependencies.

Previous work suggests that low levels of collaboration can be a sign of low trust. They will also examine how they can generate swift trust by importing a virtual developer's experience into other projects. Ariadne can be used to illustrate the role a virtual team member played in previous projects and could engender positive trust when the team member joins a new team. These expectations regarding Ariadne's role were explored in a pilot laboratory study.

Redmiles and Al-Ani conducted a preliminary pilot laboratory study to investigate the impact of Ariadne's visualization in managing trust. In the pilot study of the tool's support of trust, they invited six graduate UCI Informatics students to participate and interact with the researcher on a one-to-one basis. Each participant was presented with two scenarios. The purpose of the first scenario was to explore the impact of Ariadne when a developer has no prior knowledge of others they need to collaborate with. The second scenario allowed Redmiles and Al-Ani to explore whether Ariadne can manage a developer's expectations of others within their own team. They found that Ariadne played a positive role in managing the expectations of participants based on the role developers represented in these visualization played. They also found that both cognitive and affective trust was influenced by the visualizations.

In conclusion, Redmiles and Al-Ani believe that improving trust in distributed teams will have great benefits to their productivity and innovation.

For more on Prof. Redmiles' and Al-Ani's research, see:

<http://www.isr.uci.edu/~redmiles/>
<http://www.isr.uci.edu/~balani/>

Redmiles can be reached at redmiles@ics.uci.edu. Al-Ani can be reached at balani@ics.uci.edu.



Director Richard N. Taylor Honored with ACM SIGSOFT Outstanding Research Award

The ACM Special Interest Group on Software Engineering has given its 2009 Outstanding Research Award to ISR Director **Richard Taylor**. The prestigious award is bestowed annually to an individual who has made significant and lasting research contributions to the theory or practice of software engineering.

In conferring the award, Taylor's Web and software architecture research was cited. Over the past decade, Taylor guided a group of graduate students who have been instrumental in shaping the Web. **Roy Fielding** is a co-authors of the Hypertext Transfer Protocol Specification (HTTP/1.1), which governs how Web clients and servers interact. **Jim Whitehead** spearheaded WebDAV, an extension to HTTP that governs collaborative authoring and versioning over the Web, a protocol upon which such widely used products as Mac/OS, Microsoft Office, and Adobe Acrobat rely. **Justin Erenkrantz** is the president of the Apache Foundation, famous for free, superbly engineered implementations of the infrastructure components upon which the modern Web rests, including the Apache HTTP server. (See Message From Director, pg. 2.)

In the area of software architecture, Taylor and his group developed a host of principled architectural styles that, through cleverly separating different concerns in multiple layers of the architecture, not only guarantee different qualities, but also dramatically reduce development effort as developers only need

ISR STUDENT NEWSBRIEFS

Hazel Asuncion (R. Taylor, advisor) presented two papers at workshops held at ICSE 2009. The first, “Capturing Custom Link Semantics Among Heterogeneous Artifacts and Tools,”



co-authored with Richard Taylor, was presented at the Traceability in Emerging Forms of Software Engineering Wkshp. The second, “Analyzing Software Licenses in Open Architecture

Software Systems,” co-authored with Thomas A. Alspaugh and ISR Prof. **Walt Scacchi**, was presented at the Analyzing Software Licenses in Open Architecture Software Systems workshop.

Nicolas Mangano (A. van der Hoek, advisor) spent 5 months in Brazil



working with Claudia Werner’s research group at the Federal University of Rio de Janeiro. He has also been accepted to the “Theories of Creative Design” International Summer School, to be held in

September in Milan, Italy.

Jahmeilah Roberson (B. Nardi, advisor) has been awarded the Faculty



Mentor Program and President’s Dissertation Year Fellowship. This award is intended to assist graduate students with the completion of their dissertation and to enhance their qualifications as candidates for

university faculty teaching and research appointments.

For more information on students:

<http://www.isr.uci.edu/people.html>

to plug in application-specific code. This work has been very visible, governing Web applications, robotics, user interface development, and software development environments themselves. His recent work addresses dynamically evolving software architectures.

The award was presented to Taylor at the 31st International Conference on Software Engineering (ICSE) in May in Vancouver.

For more information on Taylor, see: <http://www.isr.uci.edu/~taylor>

FOCUS ON FACULTY

Meet Revisionist Historian André van der Hoek

Ever since his early days in graduate school, ISR faculty member **André van der Hoek**



has had an interest in software configuration management. Now, 15 years later, he has developed a unique perspective on the role of configuration management in

development projects, the tools in use, and the opportunities that exist for advancing the state of the art. States van der Hoek: “The present generation of SCM tools only

begins to scratch the surface of possibilities. Support for coordination is key, yet underexplored to date. SCM functionality must go well beyond its traditional focus on artifacts and changes.”

van der Hoek’s research agenda reflects this observation. World View is an experimental prototype focusing on highlighting coordination patterns in distributed software development. Partly funded by a gift from IBM, World View builds upon Google Maps to show different kinds of dependencies across teams in geographically distributed software projects [Figure 3]. World View particularly mines the information available in SCM repositories to provide a historical perspective through which it becomes possible to detect and diagnose potential coordination problems. For instance, one may wonder why many more work items are re-assigned to different teams in the first quarter of 2007, or why in that same quarter an increasing number of work items are reopened across teams. van der Hoek notes: “SCM systems are wonderful sources of data, much of which can be leveraged for providing visibility into these and other kinds of crucial project phenomena.”

Lighthouse is another example of how van der Hoek’s research agenda repurposes SCM systems to address a broader range of coordination issues. Lighthouse bridges the gap between coordination and design by reverse engineering the emerging design out of the code that is being written, not just by one developer, but by all developers in parallel. By precisely annotating the resulting UML-like diagram with information on who is making which changes where, and laying out the diagram to understand impact of those changes on each other [Figure 4], develop-



Figure 3: Evolution of work item dependencies among IBM Jazz teams from 2006 quarter 4 to 2007 quarter 1; red: initial assignment of work item to an owner, blue: change of owner, green: work item resolution, purple: reopening of resolved work item. Note how the flow across teams intensifies greatly.

RESEARCH BRIEFS

ISR Researcher **Margaret S. Elliott** and ISR Prof. **Walt Scacchi's** paper "Mobilization of Software Developers: The Free Software Movement" has been chosen as a Highly Commended Award Winner for the Literati Network Awards for Excellence 2009.

Prof. **Bonnie Nardi** has been awarded \$500 in support of her project "VoiceList: Socio-economic Opportunity through User-generated Audio Content" and \$1100 in support of her project "Cultural Diversity Issue: Homelessness" from the UCI Academic Senate Council on Research, Computing and Libraries (CORCL). This research is being carried out with her students Nithya Sambasivan (former award) and Jahmeilah Roberson (latter award).

Prof. **Alfred Kobsa** was interviewed in the January 21 issue of Der Standard, an Austrian national daily newspaper. The interview, "We Aim for Conciliation," focused on his work on reconciling privacy and personalization on the Web.

ers can be much more aware of concurrent efforts and proactively avoid conflicts and gauge whether certain changes lead to design

numerous hurdles arise that prevent an efficient and smooth process to emerge. We are exploring an awareness-based solution that would remove those hurdles while respecting the need for mutual autonomy."

van der Hoek actively engages in the academic community. He is program chair of the upcoming ACM SIGSOFT International Symposium on the Foundations of Software Engineering in 2010, serves on the ACM Transactions of Software Engineering and Methodology editorial board, and was co-author of the 2005 Configuration Management Impact report. The latter, authored by key industrial and academic

leaders, provides a retrospective on the intricate history of innovation through which the state-of-the-art in configuration management has advanced over the decades. The report precisely documents the crucial role of close interaction among the academic and industrial communities, without which many advances simply wouldn't have happened.

For more on the Impact project, see:
<http://www.sigsoft.org/impact/>

For more on van der Hoek's research, see:
<http://www.ics.uci.edu/~andre>

Contact van der Hoek at: andre@ics.uci.edu.



ISR Participates in Ground Systems Architecture Workshop (GSAW) 2009

Each year ISR is pleased to be involved in the Ground System Architecture Workshop (GSAW), sponsored by long-time ISR supporter The Aerospace Corporation.

ISR continued its tradition of participating in GSAW's Architecture-Centric Evolution (ACE) Working Group. The theme for 2009 was "Service-Oriented Architecture-Based Approaches for Architecting Satellite Ground Systems in a Net-Centric Environment – Where We Are Today." ISR Director **Richard N. Taylor**, ISR faculty associate Prof. **Nenad Medvidovic** of the University of Southern California, and ISR alumnus, Dr. **Eric Dashofy** of The Aerospace Corporation, gave panel presentations leading to lively discussions. Prof. Taylor reflected on the day: "GSAW 2009 provided another excellent opportunity for researchers from ISR to calibrate their interests and activities with the challenges faced by our partners in industry. The talented and engaged participants of GSAW look at issues fairly and deeply --- the result is numerous engaging conversations, sometimes leading to new collaborations."

Prof. **Walt Scacchi** contributed to GSAW by delivering a tutorial titled "Beyond Open Architecture: Issues, Challenges, and Opportunities in Open Source Software Development (OSSD)." The goals of the tutorials were to ensure that participants (1) learned about the state of the art in OSSD processes, work practices, and project community dynamics, based on review of empirical studies of OSSD, and (2) understood the roles and relationship of "open architecture" (OA) and OSSD.

Contact Taylor at taylor@uci.edu and Scacchi at wscacchi@ics.uci.edu.

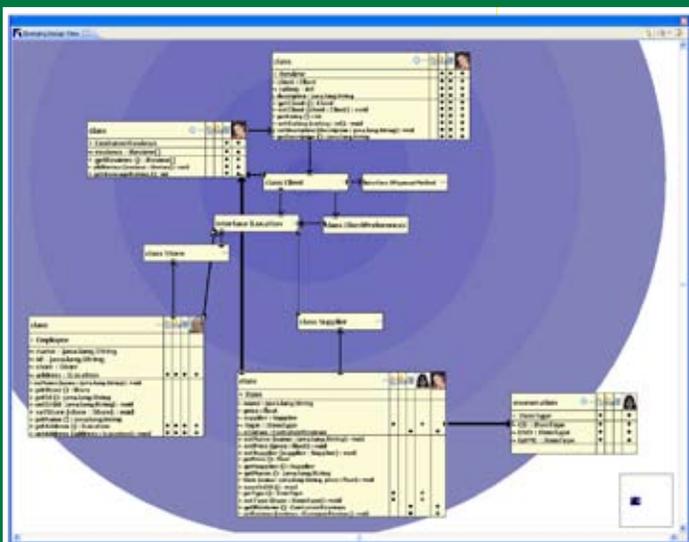


Figure 4: Lighthouse view, with two developers concurrently editing the code base. Degree of impact of changes is shown through concentric circles; the further away changes are of the currently edited artifact in the center, the less impact those changes have.

erosion. van der Hoek performs much of his research in a collaborative manner. He says: "My work has greatly benefitted from collaborations with, among others, IBM, Accenture, Hitachi, and HP. Having access to real-world challenges has significantly shaped my research agenda, and having been able to verify and refine our solutions with developers who are in the trenches every day is invaluable. As one example, together with ISR faculty member James Jones, we are embarking on a new effort with Accenture that aims to reduce costly inefficiencies involved in test outsourcing. When independent test centers are brought in to autonomously test a software system,

ISR STUDENT NEWSBRIEFS

Sameer Patil (A. Kobsa, advisor) will present his paper, "Interpersonal Privacy Management in Distributed Collaboration: Situational Characteristics and Interpretive Influences," at Interact 2009, the 12th IFIP TC13 Conference in Human-Computer



Patil

Interaction, in Uppsala, Sweden in August. The paper is co-authored by ISR Prof. **A. Kobsa**, as well as A. John, L. S. Brotman, and D. Seligmann

Kristina Winbladh (D. Richardson, advisor) was awarded the Pedagogical Fellowship for the Informatics dept. This fellowship is awarded by the Teaching, Learning, and Technology Center and the Division of Graduate Studies to students who serve as teaching mentors for



Winbladh

incoming teaching assistants.

Jose Romero-Mariona (D. Richardson, advisor) presented two papers in April. The first, "Later Stages Support for Security Requirements," was presented at the Richard Tapia Celebration of Diversity in Computing Conference. The second, "Towards Usable Cyber Security Requirements," was presented at the Cyber Security and



Romero-Mariona

Information Intelligence Research Workshop. Both papers were co-authored by ISR Profs. **Hadar Ziv** and **Debra J. Richardson**.

For more information on students:

<http://www.isr.uci.edu/people.html>



Wang and Scacchi

Visitor from Norway On the Search for Game Software Architectures

From August 2008 through June 2009, ISR hosted visiting guest researcher, **Alf Inge Wang**, who holds a position as an associate professor at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway. He is the head of the research program on computer games at NTNU and also head of Norway's largest professional network for game developers and game researchers. His research background is in software engineering with emphasis on software architecture, software engineering and education, and mobile application development. An important part of Wang's Ph.D thesis was based on research of his faculty host, Professor **Richard N.**

Taylor, which was one of the reasons Wang chose ISR for his sabbatical year. Since 2007, Wang has focused his research on development and usage of computer games from a software engineering perspective.

Wang chose ISR/UC Irvine for his sabbatical year, as ISR is one of the few research institutions in the world that does research on software engineering and game development. Further, ISR carries out research that focuses on software architecture in games, which was the main research topic Wang wanted to pursue during his sabbatical year.

During his stay at ISR, Wang has worked on various aspects of games related to software engineering. He analyzed how a game development project introduced in a software architecture course affected the students' motivation, effort, knowledge, grades, and how they perceive the course. He also identified the advantages and disadvantages of introducing games in software engineering courses. He designed the architecture for a game that can be used by teachers and students to promote student participation and motivation. He studied pervasive game projects at ISR to suggest architectures and designs to make development of such games easier. Currently, there is very little research establishing the characteristics of game software architectures. To address this, Wang carried out a survey and conducted a case study of game software architectures to establish a framework that can describe and identify the main structure and main components in a game software architecture (on-

ISR Technical Reports Available Online

ISR technical reports present information resulting from student and faculty research carried out under the auspices of the Institute. They showcase early results not available in print elsewhere. ISR technical reports are available in PDF on the ISR website. Recent reports include:

"Software Transactional Distributed Shared Memory"

Alokika Dash, Brian Demsky
UCI-ISR-09-2, February 2009

"Disjointness Analysis for Java-Like Languages"

James C. Jenista, Brian Demsky
UCI-ISR-09-1, February 2009

"Decentralized Virtual Activities and Technologies: A Socio-Technical Approach"

Walt Scacchi, Cristina V. Lopes, Gloria Mark, Bonnie A. Nardi, Richard N. Taylor, David Redmiles, Alfred Kobsa
UCI-ISR-08-4, December 2008

All ISR technical reports are available at:

<http://www.isr.uci.edu/tech-reports.html>

Students Organize iSchools Workshop Fostering Community, Collaboration, and Intellectual Exploration

Fifty doctoral students from University of California Irvine, Berkeley, and Los Angeles came together January 23-24 at UC Irvine to discuss pressing issues in information studies and sciences, find productive collaborations, and learn from one another.

"I absolutely loved the event. It is not every day that Ph.D. student can put down her everyday work (meetings, class, teaching, and --particularly-- email) to engage with other students who share a commitment to interdisciplinary research," Daniela Rosner, a Ph.D. student at UC Berkeley's School of Information said. Emphasizing the importance of having an event away from the distractions of daily life, Rosner continued, "this was a very supportive group. I found most people eager to discuss each others topics and listen closely without the pressures of time or other investments."

For two days, students gave short presentations on their research, solicited feedback, and came together in small groups to discuss themes in information studies research such as information in disaster management, the politics of information, and everyday creativity and learning.

"I've been sharing papers and recommendations of related research," **Lilly Irani** (advisor: Paul Dourish), a Bren School doctoral student said. "The workshop also helped me initially get to know some students with whom I've had great research conversations in the last few weeks. I think I'll be collaborating with some of these folks for many years to come."

From UCI, The workshop was co-organized by Ph.D. students **Lilly Irani**, **Silvia Lindtner** (advisor: Paul Dourish), and **Sameer Patil** (advisor: Alfred Kobsa) -- all in the Institute for Software Research and the Department of Informatics. Co-organizing were Ph.D. students Lilly Nguyen and Becca Dean from UCLA's Department of Information Studies and Megan Finn, Christo Sims, and Dan Perkel of UC Berkeley's School of Information.

The workshop was funded with generous grants from Intel through the PAPR@UCI initiative, the UC Berkeley School of Information, Yahoo Research, UCI's Associated Graduate Students, the Donald

ISR EVENT SCHEDULE

Mark your calendars now!



June 5, 2009

2009 ISR Research Forum

1:00-7:30 p.m., Donald Bren Hall, room 6011

Keynote: Dan Lejerskar, Chairman and Co-Founder, EON Reality
"Trends in Immersive and Holographic Interactive Displays (IHI)"

Featuring an evening reception with posters and demos.
<http://www.isr.uci.edu/events/Research-Forum-2009/>

June 8, 2009

Software Architecture Challenges in the 21st Century Workshop

Hosted by USC CSSE; Co-sponsored by USC CSSE, IEEE Software, and ISR.
<http://csse.usc.edu/csse/event/2009/Arch-Workshop/>

ISR's 2009-10 Distinguished Speaker Series will be announced in late summer. Thank you for making the 2008-09 Distinguished Speaker Series a success!

For more information: <http://www.isr.uci.edu/events.html>

Bren School of Information and Computer Sciences, and UCLA's Graduate School of Education and Information Studies, as well as ISR. A planning grant from the Bears Breaking Boundaries contest at UC Berkeley provided initial support.

Nguyen, Irani, Patil, Lindtner, and Sims shared the results of the workshop and the organizing experience at February's iConference 2009 in Chapel Hill, North Carolina in hopes of spurring regional doctoral workshops more broadly. Plans are currently underway to organize the workshop for 2010.

Program and additional information is available from:

<http://uc-ischools.differenceengines.com/>

SPECIAL THANKS

The UCI Institute for Software Research is generously supported by:

Fuji Xerox
IBM
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Northrop Grumman
The Aerospace Corporation



UCI Ph.D. student Su speaking at UC iSchools Workshop

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