ISR Connector

INSTITUTE FOR SOFTWARE RESEARCH / UNIVERSITY OF CALIFORNIA, IRVINE

HOT RESEARCH

Agile Software Development, Agile Research, Agile Collaboration

ISR Prof. **Susan Elliott Sim** and her Galen Lab have initiated a new research focus on agile software development. This work has included the creation of a new software tool to support program comprehension, empirical studies of agile practitioners, basic research into User Stories, and a new resource center for agilists. New models for collaborative relationships were needed for this research, because agile teams typically work on short release cycles with minimal overhead.

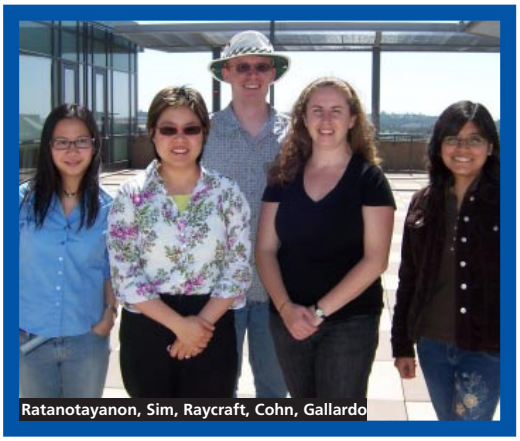
Agile software development is an iterative and incremental software development process. The most well-known agile process is Extreme Programming (XP). However, unlike Barry Boehm's Spiral Model, it uses a set of interlocking continuous practices, such as Planning Game, Test-Driven Development, Pair Programming, and Refactoring. Agile and XP have been growing in popularity in recent years, especially among software developers.

Agile software development, especially XP, has been both unfairly maligned and over-hyped. "There's a lot of misconceptions about agile," said Sim. She continued, "We're not out to show that agile is better or worse. We're using it as a laboratory to study software engineering. It has a different starting point and works with a different set of assumptions, so it give us the opportunity to ask a lot of interesting 'what if?' and 'why?' questions."

The Galen Lab, named after the groundbreaking ancient Greek physician, is dedicated to studying software engineering empirically and philosophically. Led by Sim, it consists of a research programmer, six graduate students, and multiple undergraduate students. The lab has been working on several XP projects.

- Ph.D. student, **Sukanya Ratanotayanon** (S. Sim, advisor), and research programmer, **Derek Raycraft**, have been working on a software tool specifically designed to support program comprehension in agile environments. The tool, STITCH, is an Eclipse plug-in that takes advantage of the artifacts and sequence in which they are created to provide the information needed to understand a program while developing incrementally. Previous research has shown that software developers need a good understanding of software at the domain, program, and situation level, as well as mappings between them, in order to successfully make changes to a program. In XP, domain knowledge can be obtained from User Stories, program knowledge can be obtained from test cases, and situation knowledge can be found in individual lines of code. STITCH links together these artifacts and manages these links as the code evolves.

- Sim's group is also conducting empirical studies of agile practitioners. This project is led by Ph.D. student, **Rosalva Gallardo** (S. Sim, advisor). They have established relationships with the XP Users' Group in both Los Angeles/Orange County and San Diego. Interviews have been conducted with various practitioners and field studies are in progress. To date, this research has focused on User Stories and how they deviate in practice from the methods described in the literature. User Stories are a brief description of a unit of work or feature that is 1-3 sentences long and are typically written on an index card. When used with the Planning Game key practice, they become micro milestones. When combined with an On-Site Customer and Test-Driven Development, they function as feature requests or requirements. For their simplicity, they are surprisingly effective. Initial research suggests that this effective-



Ratanotayanon, Sim, Raycraft, Cohn, Gallardo

RESEARCH BRIEFS

ISR alumnus **Jie Ren** and Director **Richard N. Taylor**, have published their article "Automatic and Versatile Publications Ranking for Research Institutions and Scholars" in the June 2007 issue of *Communications of the ACM*. Ren and Taylor present the results of a project that created an extensible framework which allowed for automated quantitative ranking of institutions based on research publications. One significant finding is the Software Engineering group at UC Irvine is ranked #6 in the world.

The paper is available at: *http://doi.acm.org/10.1145/1247001.1247010*
The application and more info are available at: *http://www.isr.uci.edu/projects/ranking/*

ISR Profs. **Walt Scacchi** and **Robert Nideffer** have been awarded $1.35 million for a 3-year partnership between the UCI Game Culture & Technology Lab and Korean researchers supported by the Digital Industry Promotion (DIP) agency's Daegu Global R&D Collaboration Center in the ICT Park in Daegu City, Korea. The collaboration will focus on long-distance communications and collaboration infrastructure, heterogeneous game networks, new game devices, and tools and techniques for developing beyond next-generation games and game software.

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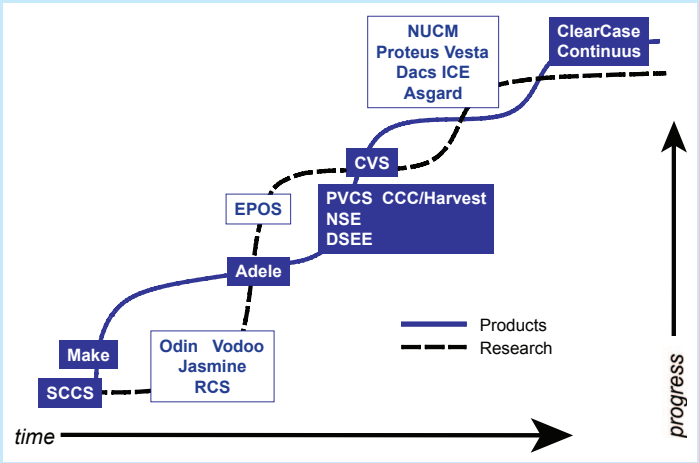
MESSAGE FROM THE DIRECTOR

Some technologies, like the Web and configuration management tools, are so much the part of everyday industrial practice that it is easy to forget the times when those technologies were not available. It is also easy to forget how they came to be.

ACM's Special Interest Group on Software Engineering (SIGSOFT), with the sponsorship of the National Science Foundation and the U.K. Institute of Electrical Engineers, has engaged in a long term effort to trace the origins of several of the most important software engineering technologies. As the IMPACT project's website puts it, "The project has two organizational thrusts: to seek, on a technology-by-technology basis, the sources of the ideas, designs, and working prototypes of widely used software technologies and to examine the ways in which software engineering research directions and areas have been synergized into commonly used technologies."


Taylor

Several reports have already emerged from this project, the first of which focused on software configuration management (SCM). ISR's Professor **André van der Hoek** was a key co-author of this study. One of the most interesting results of this study revealed how SCM has evolved over the past 30-40 years in a complex interplay between academia and industry. The impact of one community upon the other took place though publications, products, and the movement of people. A little summary of this interplay is shown in the figure (right).



A similar history could be drawn for the Web, showing the early importance of the work at CERN, then the W3C/MIT, NCSA/University of Illinois at Urbana-Champaign, Compaq, and of course the University of California, Irvine, as well as others. See Focus on ISR Technologies, page 6, for an historical perspective on ISR's involvement in the Web.

Participating in the creation of industry-transforming technologies requires a degree of awareness and openness that is not typical – in either industry or academia. Academics can pursue topics that have little relevance to practical problems; industry can just as easily proceed to waste time and money simply because of unawareness of known solutions to problems. The critical ingredients for both communities to have the greatest impact and success are for mutual awareness and respect, leading to productive partnerships. The annual ISR Research Forum has highlighted some of the partnerships we have engaged in over the preceding years, from the Web to system architecture modeling to requirements engineering to collaboration practices. Many other efforts are underway. Whether you are a member of the research or practitioner community (or both!) we encourage you to regularly take the time to acquaint yourself with what's going on "over there". The Next Big Thing awaits those engaged in productive partnerships.

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

For more information on the IMPACT project, visit: *http://www.sigsoft.org/impact/*

ness is derived from our familiarity with everyday stories and story structure. Ph.D. student **Marisa Cohn** (S. Sim, advisor) has been doing basic research into stories and storytelling. Together they have found that stories are very good at answering 'why' questions and conveying rationale. This research is expected to lead to richer techniques for requirements elicitation.

Much of this research, in particular the empirical studies, has been conducted in collaboration with XP practitioners. However, this is a group of software developers, managers, and customers who are working on short release cycles, using a minimum of documentation, and relying on rapid communication. As a result, traditional models of building research relationships have not transferred well. Instead, collaborations and consultations have happened on an ad hoc, impromptu basis. The Galen Lab recently hosted the XP Users' Group of Southern California at the UCI campus. As well, small group meetings have been held with practitioners who have visited the Galen Lab and with developers in their work places.

Through these interactions, the Galen Lab has realized there is a need for a resource center for agile practitioners in the area, and that this would be a good opportunity for reciprocity with practitioners. To this end, the group has created a center named "Resources for Agile Development" or RAD. It is a place where agile developers, managers, and customers can come to try out different software tools on lab computers; use their reference library of books, articles, and academic papers; and access services such as case studies and reviews. The official opening of RAD will be on June 20, 2007, scheduled to coincide with the grand opening of the new Donald Bren Hall.

For more information visit the web site for the Galen Lab and RAD:

http://calla.ics.uci.edu
http://rad.ics.uci.edu

More information on Susan Elliott Sim can be found on her web site:

http://www.isr.uci.edu/~ses

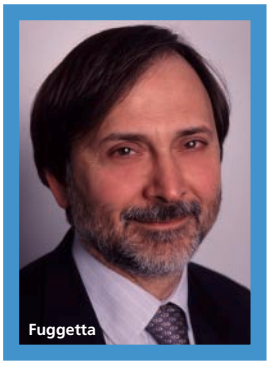
She can be reached at ses@ics.uci.edu.

Sim was also featured in the Fall/Winter 2004 issue of the **ISR *Connector***.

FOCUS ON FACULTY

Meet Information and Communication Technology Aficionado Alfonso Fuggetta

Alfonso Fuggetta is the CEO and Scientific Director of CEFRIEL, a research and technology transfer institution established in 1988 in Milan, Italy to support cooperation between industry and academia. He is also a Full Professor at Politecnico di Milano, where his research interests include open source, impact of Information and Communication Technology (ICT) on society, and the role of software in modern telecommunication systems. Fuggetta joined the ISR faculty in 2002, and has been a regular summer visitor since 1998.


Fuggetta

Fuggetta's passion lies in CEFRIEL, which has the mission of providing an effective environment to support industries in innovating their products, processes, and services. CEFRIEL is an independent, non-profit organization. In 2006, its revenues amounted to approximately 10 Million Euros.

Says Fuggetta: "I am trying to direct CEFRIEL operations towards supporting our customers in innovating their products using Information and Communication Technology. Many companies do not yet understand the role that ICT can play. ICT is often perceived as just a communication means (mobile phone, internet access, etc.) or the software we use to manage business operations and office workflow (accounting systems, office tools and environments, etc.). Certainly, the Internet has created a whole new range of opportunities to establish new businesses and new business models. Nevertheless, many companies do not understand that ICT can be instrumental to radically innovate their own products and, as a consequence, their services and overall offer to the market."

Memories, microprocessors, and communication devices can now be inserted in almost any object produced. A dishwashing machine or a tractor can radically improve and innovate features and performance using ICT.

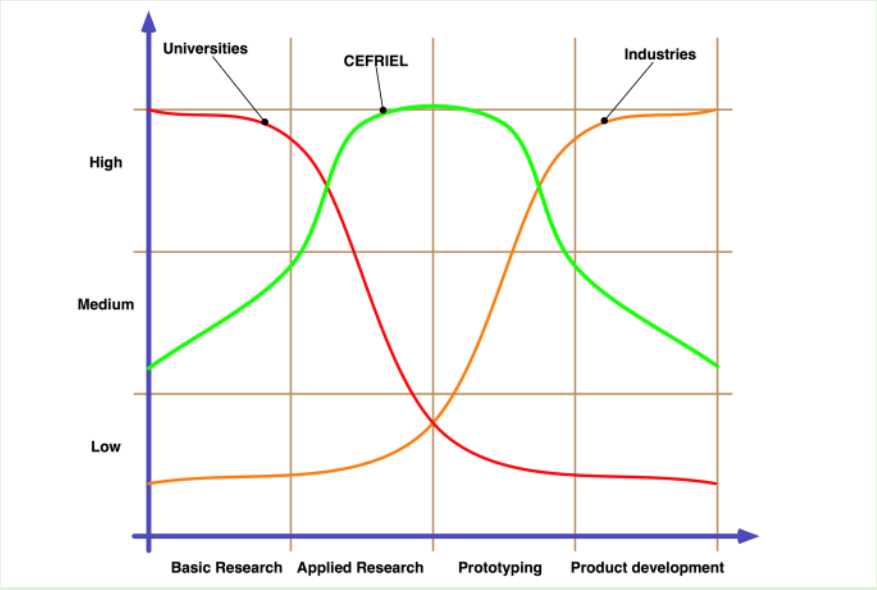
RESEARCH BRIEFS

"A Classification and Comparision Framework for Software Architecture Description Languages" by ISR Prof. **Nenad Medvidovic** and ISR Director **Richard N. Taylor** has been identified as the most cited software engineering article for the year 2000 by Information and Software Technology. It ranks as the 4th most cited of all software engineering publications from 1986-2005. The paper was originally published in IEEE Transactions on Software Engineering, in January 2000.
http://dx.doi.org/10.1109/32.825767

Ten years after its publication, "Aspect-Oriented Programming," co-authored by ISR Prof. **Crista Lopes**, is the 23rd most-cited paper in all computer science publications indexed by CiteSeer. The paper was the first of its kind when published in 1997 and is considered a seminal paper in software design research.
ftp://ftp.ccs.neu.edu/pub/people/crista/publications/ecoop97/index.html

Bonnie Nardi's article "Why We Blog" was recently ranked the most popular paper downloaded from the ACM's magazine and computing surveys articles. The paper was originally published in the December 2004 issue of Communications of the ACM, and was co-authored by Diane J. Schiano, Michelle Gumbrecht, and Luke Swartz.
http://doi.acm.org/10.1145/1035134.1035163

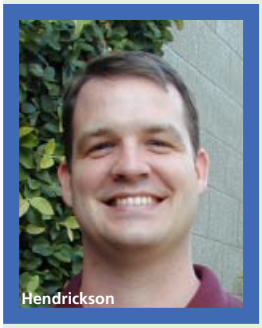
Alfonso Fuggetta's paper "Open Source Software—An Evaluation" published in the Journal of Systems and Software in April 2003, and written while visiting ISR, is the 15th most downloaded paper from the JSS web site.
http://top25.sciencedirect.com/?journal_id=01641212



The starting point of CEFRIEL's work is a company business need. CEFRIEL then exploits technology scouting and R&D activities to conceive and design new product/service concepts that are evaluated by the customer. If perceived useful and convincing, customers are supported in moving from concepts to products and services. To enable this kind of operations, the center employees over 130 permanent professionals (designers, project managers, software developers, specialists, etc.) and about 30 faculty members acting as scientific mentors and advisors. CEFRIEL is thus basically an advanced engineering & design center with its roots in the university, but with a vision and attitude that aims at actively and directly support the demanding innovation needs and requirements of modern companies and organizations.

ISR STUDENT NEWSBRIEFS

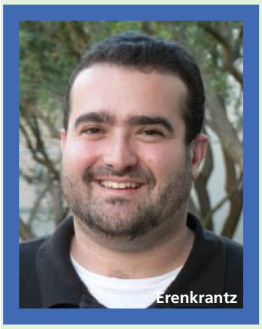
Scott Hendrickson (R. Taylor, advisor) presented his paper "Modeling Product Line Architectures through Change Sets and Relationships" at the 29th International Conference on Software Engineering (ICSE) in May 2007. The paper was co-authored by ISR Prof. André van der Hoek.


Hendrickson

Norman Makoto Su (G. Mark, advisor) is presenting his paper "Workplace Connectors as Facilitators for Work" at the 3rd International Conference on Communities and Technologies (C&T 2007) in June. The paper, co-authored by ISR Prof. Gloria Mark and Stewart A. Sutton of The Aerospace Corporation–an ISR Sponsor, examines the high-paced nature of workplace interactions with multiple, varied groups in and out of an organization's traditional boundaries.


Su

Justin Erenkrantz and **Michael Gorlick** (R. Taylor, advisor) were invited, as part of the NSF Science of Design program, to present their paper "Rethinking Web Services from First Principles" at the 2nd International Conference on Design Science Research in Information Systems and Technology (DESRIST 2007) in May. For more about the Web and ISR, see Focus on ISR Technologies, page 6.


Erenkrantz

For more information on students: *http://www.isr.uci.edu/people.html*

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:

"Meeting the Requirements and Living Up to Expectations"
Kristina Winbladh, Thomas A. Alspaugh, Debra J. Richardson, Rand Waltzman
UCI-ISR-07-1, January 2007

"Harmonizing Architectural Dissonance in REST-based Architectures"
Justin R. Erenkrantz, Michael Gorlick, Girish Suryanarayana, Richard N. Taylor
UCI-ISR-06-18, December 2006

"Cross-Workspace Impact Awareness for Early Detection of API-induced Indirect Conflicts in Configuration Management"
Anita Sarma, Gerald Bortis, André van der Hoek
UCI-ISR-06-17, December 2006

All ISR technical reports are available at:

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

A container can be monitored and tracked during it journey to provide comprehensive information on its state and on the state of its contents. Sensors can be used to monitor the territory for environmental control or to ensure citizen protection and security. Even corks used in wine bottles can be made "intelligent" using micro sensors: this makes it possible to control the quality of the wine during storage.

In general, ICT is not just instrumental in making products more "intelligent." An intelligent product is able to interact with its environment, thus enabling "intelligent" services. This is a unique opportunity for companies seeking new business models based on service revenues. For instance, an "intelligent" dishwashing machine can tell if it is going to break and timely inform the customer support center. Even more importantly, it can report to the engineering and marketing departments a whole range of useful information on customer behavior and critical operating conditions. This information is essential to drive new products development and address market needs more effectively and timely.

CEFRIEL strategy can be summarized as "bringing ICT into the non-ICT world", or also, "making objects intelligent to enable intelligent services." According to Fuggetta, "This mission is extremely demanding because it requires the ability to work side-by-side with our customers in designing and developing new products and services. It is not just the typical work of university researchers and faculty. For this reason, we have created an industrial organization that is able to operate with the constraints and requirements of companies operating on the market."

Wearing his academic hat, Fuggetta's research focuses on open source, where he studies the relationship between open source and digital rights management, and between open source and open standards. (See Research Brief, page 3.) He also studies the business models induced by the open source paradigm and the impact on economy and companies' innovation processes. Fuggetta's open source work has led to his appointments on several committees at the national and Europeans levels, including the Information Society Technologies Advisory Group (ISTAG) Core Expert Group on Software Technologies, Information Technology for European Advancement (ITEA) expert groups, and open source software and e-government committees for the Italian government.

Another of his research foci is net neutrality. Fuggetta believes net neutrality is extremely important as it directly impacts the development of the Internet. On one side, software is the enabler of the Internet: devices, routers, applications and services are all based on software. At the same time, net neutrality guarantees that anybody can develop new

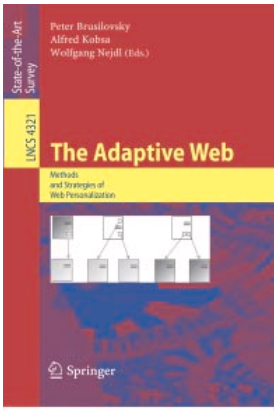
services and applications. Net neutrality is therefore a key feature to enable open and continuous innovation. Unfortunately, it is not simple to define net neutrality in a way that can be simply and effectively ensured and enforced. Also, the implementation of net neutrality has a direct implication on the structure and organization of the telecommunication market. Fuggetta believes these new problems require a multidisciplinary approach to understand, frame, and address them.

For more information on Fuggetta and CEFRIEL, see:
http://www.cefriel.it/~alfonso
http://www.alfonsofuggetta.org/

Fuggetta can be reached at alfonso.fuggetta@polimi.it or fuggetta@ics.uci.edu

Book Publishings: Web Personalization and Computerization Movements

ISR Professor **Alfred Kobsa** published the book "The Adaptive Web: Methods and Strategies of Web Personalization" together with two colleagues from the University of Pittsburgh and the University of Hanover, Germany. This 760 page state-of-the-art survey provides a systematic overview of the ideas and techniques of the adaptive Web and serves as a central source of information for researchers, practitioners, and students. It constitutes a comprehensive and carefully planned collection of 24 chapters that maps out the most important areas of the adaptive Web, each solicited from the experts and leaders in the field. Kobsa contributed two chapters, on Generic User Modeling Systems and on Privacy-Enhanced Web Personalization.



The largest part of the book focuses on personalization techniques, namely the modeling side of personalization and on adaptation. This technique-focused part is complemented by four domain-oriented chapters. The book also details recently emerging topics and provides a prospective view of new ideas and techniques that are likely to move soon into the focus of Web personalization.

The book is available from Springer Verlag, both in print and online:
http://dx.doi.org/10.1007/978-3-540-72079-9

For more information on Alfred Kobsa:
http://www.isr.uci.edu/~kobsa

Margaret Elliott, ISR Research Specialist,UC Irvine and Prof. Ken Kraemer, Director of the Center for Research on Information Technology and Organizations (CRITO), The Paul Merage School of Business, UC Irvine, have co-edited a book, "Computerization Movements and Technology Diffusion: From Mainframes to Ubiquitous Computing" to be published by Information Today, Inc. within the next year. This book is about "computerization movements" (CMs), a special kind of social and technological movement that promotes the adoption of computing within organizations and society. The book traces such movements from the mainframe and PC eras to the current Internet era and the emerging era of ubiquitous computing. It shows that these movements are driven by utopian visions of technology that influence decisions about computing adoption by individuals and organizations. It examines the influence of CMs on the diffusion of information and communication technologies across many platforms and contexts ranging from those promoting hardware technologies (mainframes, PCs, PDAs, digital cameras, or mobile phones) to infrastructures such as the Internet, extranets and intranets, to software applications such as expert systems (e.g., mortgage banking) and to software genres such as free/open source software (F/OSS) (e.g., GNU/Linux).

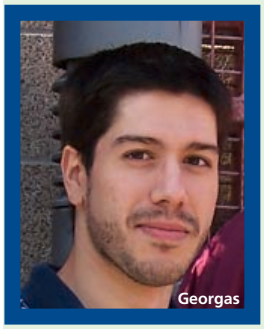
This is an edited book of commissioned papers by distinguished authors who were asked to write papers to advance the study of CMs. The initial versions of the papers were presented at a workshop to honor the late Professor Rob Kling (who coined the term "computerization movement"), March 11-12, 2005 at UCI (see Spring/Summer 2005 issue of the **ISR *Connector*** for more information). The list of authors includes distinguished academics from ISR including Profs. **Mark Ackerman**, **Les Gasser**, **Gloria Mark,** and **Walt Scacchi**.

For more information on Margaret Elliott:
http://www.ics.uci.edu/~melliott

ISR STUDENT NEWSBRIEFS

Chris Jensen (A. van der Hoek and W. Scacchi, advisors) presented his paper "Role Migration and Advancement Processes in OSSD Projects: A Comparative Case Study" at the 29th Int'l Conf. on Software Engineering (ICSE 2007) in May. He is also presenting a short paper, "Reference Model Based Open Source Software Process Discovery" at the Third Int'l Conference on Open Source Systems (OSS '07) in June. Both papers were co-authored by ISR Prof. **Walt Scacchi.**

As part of the Int'l Conf. on Robotics and Automation (ICRA) 2007 in Rome, **John Georgas** (R. Taylor, advisor) presented his paper "An Architectural Style Perspective on Dynamic Robotic Architectures" at the workshop on Software Development and Integration (SDIR) 2007. As an outcome of his presentation, Georgas became a member of the IEEE Robotics and Automation Society (RAS) Technical Committee on Programming Environments in Robotics and Automation (TC-PROG).



Kristina Winbladh (D. Richardson and T. Alspaugh, advisors) is interning this summer at Google where she will focus on requirements-based testing. She is also serving as Chair of the ISR Graduate Student Research Symposium (GSRS 2007) Organizing Committee.

For more information on students:
http://www.isr.uci.edu/people.html

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Rubbing elbows with ISR faculty, staff and students gives you a valuable window into the technology landscape of the future. But a relationship with ISR can be much more: Think of us an extension of your company—a think tank, an R&D department, a research library, a consulting firm, a training department, and an employment agency, all rolled into one. More importantly, when you sponsor ISR you become part of a friendly group of folks who speak the same language and are eager to work with you to solve your current technical problems in the most cost-effective way possible.

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Friend	$10,000	ISR's general research fund.
Affiliate—Research	$30,000	A designated ISR research area.
Affiliate—Visiting	$40,000	Host Faculty's research area.
Affiliate—Grad Student	$60,000	Graduate Student fellowship.
Partner	$100,000 or more	Large-scale research project.

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Debra A. Brodbeck
brodbeck@uci.edu
(949) 824-2260

FOCUS ON ISR TECHNOLOGIES

Spotlight on Contributions to the World Wide Web from ISR/UC Irvine

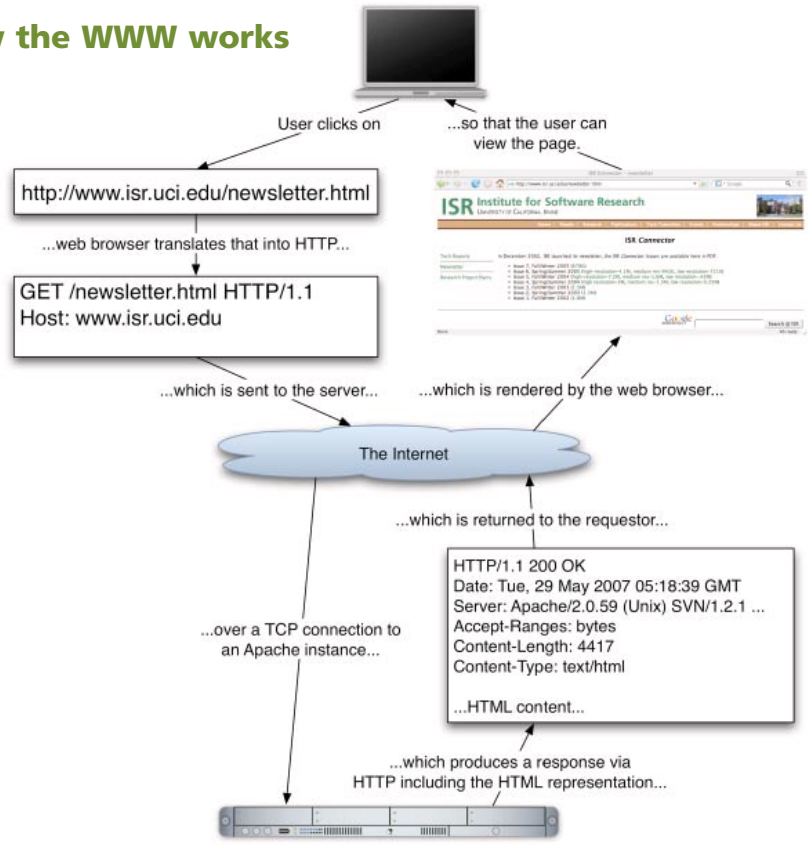
Did you know that ISR and UC Irvine have been home to many key contributions to the World Wide Web? In this article, we'll provide you with a brief retrospective of the contributions made by ISR and UC Irvine students from ISR Director **Richard Taylor's** research group to the World Wide Web (hereafter abbreviated just as the WWW).

Critical to the WWW's success has been the reliance on open standards and implementations. Most of the standardization work was conducted through the Internet Engineering Task Force (IETF) which has been responsible for producing various Requests for Comments (RFC). These RFCs are not actually requests for feedback, but rather descriptions of how something on the Internet works so that independent implementations can be made. Several ISR and UC Irvine alums have played key roles in the creation of these RFC documents for the World Wide Web.

The contributions from ISR and UC Irvine have not been restricted to just specifications. Many critical infrastructural components of the World Wide Web have been backed by contributions from ISR and UC Irvine students and alums – see Sidebar for more information.

Finally, some of these standards and implementations were guided by architectural

How the WWW works



styles that were produced at ISR and UC Irvine. We have previously covered some of these architectural styles in the "Designing a RESTful World" article in **ISR *Connector*** Issue 6, Spring/Summer 2005.

Uniform Resource Locators (URL)

While you may not have heard of URLs before, chances are that you see lots of them every day as you browse the Web. If you happen to look at your location bar at the top of your favorite web browser, you may see something like: "http://www.isr.uci.edu/" That string is called a Uniform Resource Locators (URLs) and is an easy way to identify what parts of a website you are visiting or want to visit.

URLs are composed of five elements: the scheme, authority, path, query, and fragment. The scheme identifies the protocol to talk to the server with – such as "http" or "https" for HTTP with Secure Socket Layer (SSL). The authority section declares which specific server you want to locate – such as "www.isr.uci.edu". (Trivia: the protocol for identifying the specific machine on the Internet which corresponds to "www.isr.uci.edu" is the Domain Name Server (DNS) protocol – which was led in its standardization by UC Irvine alum Paul Mockapetris.) Finally, there are the path/query/fragment sections which help identify the specific resource on the server that you are trying to retrieve – be it a page, graphic, or video file.

While there were earlier drafts, the generic syntax of a URL was standardized in RFC 2396 in 1998 by Dr. Tim Berners-Lee, ISR Alum **Dr. Roy Fielding** (R. Taylor, advisor) and Dr. Larry Masinter. In January 2005, a revision to this specification was released under RFC 3986 with mostly editorial changes and rewrites to clarify some past confusion.

Trivia: You may sometimes see references to URIs instead of URLs – URIs are Uniform Resource Identifiers. URLs are a specific instance of a URI that denote how to retrieve that URI over a network. Sadly, the distinction has been largely been blurred over time and most people just refer to URLs.

Software for the World Wide Web with ISR Contributions

Apache HTTP Server http://httpd.apache.org/
The most widely used HTTP server for over ten years.
ISR contributors: **Roy Fielding, Justin Erenkrantz**

mod_pubsub http://mod-pubsub.sourceforge.net/
An Apache plugin to provide publish/subscribe messaging.
ISR contributors: **Rohit Khare**

Chimera http://serl.cs.colorado.edu/chimera/
A hypermedia system predating the WWW, but key principles later used in WebDAV.
ISR contributors: **Ken Anderson, Jim Whitehead**

DAVExplorer http://www.davexplorer.org/
One of the first Java-based WebDAV clients.
ISR contributors: **Joe Feise, Yuzo Kanomata**

Subversion http://subversion.tigris.org/
A popular version control system that uses WebDAV and DeltaV.
ISR contributors: **Justin Erenkrantz**

MOMspider http://ftp.ics.uci.edu/pub/websoft/MOMspider/
An early WWW crawler written in Perl.
ISR contributors: **Roy Fielding**

libwww-perl http://ftp.ics.uci.edu/pub/websoft/libwww-perl/
A Perl-based HTTP client library – only supports Perl 4.
ISR contributors: **Roy Fielding**

libwww-ada95 http://ftp.ics.uci.edu/pub/websoft/libwww-ada95/
An incomplete and experimental Ada95-based HTTP client library.
ISR contributors: **Roy Fielding, Kari Nies, Yuzo Kanomata**

Serf http://code.google.com/p/serf/
A high-performance C-based HTTP client library.
ISR contributors: **Justin Erenkrantz**

Khare–PhD '03, Whitehead–PhD '00, Taylor–Director, Fielding–PhD '00, Feise–MS '98, Kanomata–programmer Photo by Oreizy '99

Hypertext Transport Protocol (HTTP)

Now that you understand what a URL is and why it's so prominent in your web browser, what is that "http" or "https" thing? HTTP stands for the HyperText Transport Protocol and is what is spoken between your web browser and the origin web server.

On the wire, HTTP is a rather simplistic protocol – largely targeted towards human understanding rather than computational efficiency. Tim Berners-Lee's first implementation was codified under HTTP 0.9. Later on, as more people were using the Web, the first real attempt at creating a coherent standard was introduced in HTTP 1.0 with RFC 1945 released in May 1996 under the editorial review of Tim Berners-Lee, Roy Fielding, and Henrik Frystyk Nielsen.

ISR EVENT SCHEDULE

April 13, 2007
Distinguished Speaker: Colin Ware
Data Visualization Research Lab, University of New Hampshire
Space, Time, Whales, and Simple Cognitive Models forData Visualization

April 27, 2007
Distinguished Speaker: Hiroshi Ishii
MIT Media Laboratory, Tangible Media Group
Tangible Bits: Beyond Pixels

May 18, 2007
Distinguished Speaker: Jeff Magee
Department of Computing, Imperial College, London
Distributed Software Engineering: an Architectural Approach


Razouk

June 1, 2006
2007 ISR Research Forum
1:30-7:30 p.m., Calit2 Auditorium
Keynote: Dr. Rami Razouk, Senior VP, Engineering and Technology Group, The Aerospace Corporation
Cyber threats - Is the sky falling?

Evening reception with posters and demos at the University Club.
http://www.isr.uci.edu/events/Research-Forum-2007/

Graduate Student Research Symposium: For Students By Students
9:00-1:00 p.m., Bren Hall 6011
This special event, organized by ISR graduate students, features refereed short paper presentations. It precedes the main ISR Research Forum.
http://www.isr.uci.edu/events/GSRS-2007/

For more information:

http://www.isr.uci.edu/events.html

However, as described in more detail in Roy Fielding's Ph.D. dissertation and related works, HTTP 1.0 faced several real-world problems. To address this, Dr. Fielding created a new architectural model – REST – to guide the next revision of the HTTP specification. These changes resulted in HTTP 1.1 as specified in RFC 2616 which was released in June 1999.

Trivia: To this day, the Apache HTTP Server still supports HTTP 0.9. However, internally, any HTTP 0.9 requests are marked as 'assbackwards' – referring, of course, to the extremely primitive nature of the HTTP 0.9 protocol.

Web Distributed Authoring and Versioning (WebDAV)

One of the aspects that was neglected in the early WWW was how to remotely collaborate with others over this new medium. How could John in Chicago work on a paper with Mary in Los Angeles? The answer to this emerged with WebDAV: a set of extensions to HTTP focused on supporting collaborative authoring of content on the WWW.

Building upon the HTTP specification, ISR Alum and now Associate Professor **Jim Whitehead** (R. Taylor, advisor) led the IETF working group for what become known as WebDAV. The first standard to emerge was RFC 2518 in February 1998 which described the core WebDAV extensions. In March 2002, RFC 3253 was introduced to discuss how the collaborative content could be versioned over time.

To date, all major operating systems, Microsoft Office, Adobe Creative Suite and many many other applications all now support WebDAV in various forms through the interoperability standards put forth through the WebDAV extensions.

Trivia: You'll sometimes see people refer to RFC 2518 as "WebDA" instead of "WebDAV" – this is because the IETF working group could not agree on the versioning semantics as part of the initial standardization effort. So, they agreed upon what they could in RFC 2518 – then came back to versioning with RFC 3253 – nicknamed "DeltaV"– because it added the "V" (Versioning) to the "WebDA" standard.

Conclusion

As you now know, the underpinnings of the WWW – be it the underlying interoperability specifications or the software that runs it all – has been conducted and created with the help of ISR researchers. In the next issue of **ISR *Connector***, we will report on how ISR researchers are still contributing and helping to shape the future of the World Wide Web.

For more information visit:
http://www.isr.uci.edu/projects/web/

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