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C&C'09

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Creativity and Cognition

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**Association for
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Advancing Computing as a Science & Profession

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Everyday Creativity

WELCOME

The 7th Creativity and Cognition Conference (CC09) embraced the broad theme of Everyday Creativity. This year's conference was held at the Berkeley Art Museum (CA, USA), and asked: How do we enable everyone to enjoy their creative potential? How do our creative activities differ? What do they have in common? How do shared languages support collective action? How can we incubate innovation? How do we enrich the creative experience? What encourages participation in everyday creativity?

Welcome to the 7th Creativity and Cognition conference. We are truly at a momentous turning point in understanding and supporting creative activity. Technologies and techniques once the exclusive domain of research scientists and artists now belong to the street. Deep rooted intellectual and philosophical barriers between artists and technologists are falling. The general public is awash with ways to create, collaborate, and engage with each other across the globe twenty four hours a day, seven days a week. This fresh, dynamic spirit inspired the theme for this year's conference - "Everyday Creativity" - a spirit that demands that we must engage on a grand, global, yet personal scale. Now is the time to take action, to push our theories into new and potentially uncomfortable domains.

It is clear that whilst our technologies and interactions have radically changed over the last 40 years, our understanding of the role and use of technology in creative endeavors is still limited. In 1973, Cornock and Edmonds [1] proposed models of the interaction between artist, technology, and those who encounter the art, which are still pertinent today. Indeed, we should ask ourselves what, exactly, have we learnt since then. Prominent members of our field have explored the structure and processes of creativity (e.g. [2]), we have seen computational models of creativity (e.g. [3]), models of cognitive structure (e.g. [4]), technologies to lower the entry level to interactive programming [5], explorations of performative creativity in the wild [6], and I myself have tried to explore the collective nature of our creative acts [7]. These are, of course, just the tip of the iceberg. Now that technologies which easily support creative endeavors are escaping from the confines of academia and the constraints of the corporate world, we stand at a point at which we can explore what it means to really with engage new forms of creativity and art. This is what I understand by Everyday Creativity - creativity beyond the confines of the lab, office, or gallery, creativity that embraces the everyday and helps us *all* realize our full creative potential. This is the tipping point at which we stand today which we must embrace to take Creativity and Cognition to the next stage, to truly engage with Everyday Creativity.

Needless to say, there was lively debate within the organizing committee over what exactly we meant by "Everyday Creativity." Through fervent debate we hammered out a set of questions which shed a critical light on the nature of Everyday Creativity, and the ways in which we can understand, and design for it. These questions are addressed by many of the submissions in our extremely competitive program:

- How do we enable everyone to enjoy their creative potential?
- How do our creative activities differ? What do they have in common?
- How do shared languages support collective action?
- How can we incubate innovation?
- How do we enrich the creative experience?
- What encourages participation in everyday creativity?

Our program of papers, posters, and interactive demonstrations was complimented by a startling evening event of art installations and live performances. These shone a neon-clad spotlight on the future of Everyday Creativity beyond the research lab and art gallery, where new forms of creative expression thrust themselves into our consciousness. In contrast, the Graduate Symposium brought a new generation of researchers into the field, providing a venue for 12 of the brightest new stars to find their feet.

This year our keynotes, Mihály Csikszentmihályi, JoAnn Kuchera-Morin, and Jane Prophet mixed models of creativity, visual arts, music, and interdisciplinary research to frame each day of the conference. We are proud and delighted to have had such an influential and visionary group of keynotes to inspire our exploration of art, technology, and cognition.

This conference would not be possible without Ernest Edmonds and Linda Candy's continuing work to progress the field, and their hard work in starting the conference series in 1993. Many thanks to Ernest and Linda. Thanks also go out to Ben Shneiderman for his help and support in passing the baton from CC07 to CC09, and for organizing the panel exploring social creativity.

This year's conference was held at the UC Berkeley Art Museum and various places around the UC Berkeley Campus. The UC Berkeley Art Museum and Pacific Film Archive is the visual arts centre of the University of California, Berkeley, and one of the largest university art museums in the United States. Special thanks go to Dennis Love and Richard Rinehart at the museum for their inspiration and support. Thanks also go to Daniela Rosner for her co-ordination in Berkeley. The museum is steeped

in a history of radical interdisciplinary creativity which we felt provided the ideal environment for researchers, practitioners and artists to come together to examine and reflect on the role of technology in Everyday Creativity. This spirit of pragmatic creativity stretches back to the earliest days of the museum as captured by Pacific Film Archive founder Sheldon Renan:

“This whole thing is put together with spit, chewing gum, good intentions, cooperation from the film community and overhead paid by the Museum. I'm not over-budget or under-budget because I haven't got a budget.”

Sheldon Renan, February 1971 interview.

This sense of community is reflected by the hard work put in by the whole of the organizing committee who worked tirelessly to pull the whole program together, especially Mark Gross and Jennifer Sheridan. Our thanks also go out to the program committee who reviewed and critiqued hundreds of submissions to select only the highest quality work for our program.

Finally, we are especially thankful to our sponsors who made this event possible: ACM SIGCHI, The NSF, The Centre for Digital Music, BigDog Interactive, Taylor and Francis Group, and the Creativity and Cognition Studios.

I am very proud to have been the general chair of the Creativity and Cognition conference at this momentous point in its development, and leave you with the following thought:

“You cannot acquire experience by making experiments. You cannot create experience. You must undergo it.”

Attributed to Albert Camus.

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Welcome to the Creativity & Cognition 2009 Proceedings

EVERYDAY CREATIVITY

We are pleased to share with you the Proceedings of the Seventh ACM Conference on Creativity and Cognition. The Proceedings contains research from an amazingly diverse array of disciplines, perspectives, and methodological approaches. The conference topic of ‘everyday creativity’ reminds us of the varied ways in which individuals and groups can be innovative, inventive, ingenious, and resourceful not only in the arts, science, engineering, and design, but also in addressing situations that arise in everyday life.

Out of 137 submitted full papers we could publish only 34, for a full-paper acceptance rate of 25%. The Proceedings also includes a set of eleven short papers from the Graduate Student Symposium, showcasing the emerging perspectives of new voices in this community. The 14 demos and 36 posters presented at the conference are represented here by short papers, as are the thirteen art pieces and seven live performances. The Proceedings also includes brief outlines of invited keynote talks, conference workshops, and tutorials.

This year’s papers fall into six broad themes of Young Creators; Inclusion and Identity; Culture and Context; Theories, Methods, Metrics, and Tools; Art and Craft; and Design.

A group of three papers on Young Creators looks at children in science, music, and storytelling. One paper studies two online communities that mediate children working with scientists; another reports on teenagers doing computer music; and the third on technology-augmented environments for children’s storytelling.

Two Inclusion and Identity papers look at social aspects. One discusses a project that engaged older men in participatory design, in an effort to tackle digital exclusion. The other paper in this category confronts questions of prejudice, stigma, and the creation of social identities in online environments.

The four Culture and Context papers go beyond individuals and view creativity as a phenomenon in the broader community. Two papers on childhood and education examine, respectively, the American and Australian contexts; a third describes six creativity support tools developed in a community-based robotics project. The fourth paper reports on the use of cultural probes for design in a village in Rwanda.

Seven papers on Theories, Metrics, Methods, and Tools view creativity as a process that can be explicitly modeled, measured, and supported. One establishes the ‘Creativity Support Index’, a survey metric to help researchers and designers evaluate the level of creativity support that various systems provide. Another reports on a study using ‘Computational Metaphor Identification,’ a textual analysis

technique, to foster metaphorical creativity in science education. A third paper investigates how practitioners make sense of their own creative work using the ‘Repertory Grid Technique’. A fourth discusses a computational framework that addresses the worth of ideas ascribed by agents embedded in a social world. A fifth, empirical, paper reports on three perspectives on creative interaction: productive, structural, and longitudinal. A sixth considers serendipity in people’s interactions with computers, revealing a space for computer-based systems to support serendipitous creativity, innovation and discovery. And a seventh paper studies the relationship of consuming alcohol with perceived and actual creativity.

Five papers look at creativity in art—film scoring, theatre, literature, and interactive art—and two more look at craft—one at digitally printed paper collage; the other at knitting. The paper on film scoring presents a design study, including prototypes, for supporting synchronous and asynchronous collaboration among stakeholders. The theatre paper asks: What are actors thinking as they engage in improvisational theatre? The literature paper describes the RiTa computational toolkit for writing, and its use in a computational literature class. A case study of the design of an interactive art piece and the audience’s experience reflects on the relationship of play and complexity. And a reflective paper looks at algorithmic art from its early days to postulate about relationships between art, artists, creativity, and society.

Finally, the largest group of papers is about design. Three focus on creative processes in design, for example papers on ‘microsketching,’ prototyping, and generative walk-throughs. The fourth investigates how designers can learn from stroke patients’ designs for assistive devices. A case study in biologically inspired (biomimetic) design is the topic of a fifth paper in this group. A sixth paper looks at social creation and cultural cognition through the lens of visual and verbal protocols of an architectural design process. Using ‘Business Process Excellence’, a seventh design paper reports on a case study of how an engineering firm balances risk and creativity. An empirical study employing social network analysis finds that teams scoring higher on perspective taking and team cohesion produce more innovative final designs. The ninth paper in this group reports a fine-grained study of a concurrent engineering design practice using participant observation, interviews, and video interaction analysis. And the tenth describes design-based case studies to derive guidelines for embodied metaphor-based interactional models.

This Proceedings volume is the result of hard work by a large group of people, beginning with those who submitted work to the conference. Submissions come from remarkably diverse intellectual communities, from the arts, to human-computer interaction, to cognitive science; unsurprisingly,

the academic cultures of each of these communities differ as widely as the fields themselves. A special thank-you goes to the program committee and reviewers for Creativity & Cognition 2009, who enabled us to provide each submission with at least three thoughtful peer reviews.

Creativity and Cognition is an ACM SIGCHI-sponsored conference, and we believe that although the works in this Proceedings run the gamut from computational models of

creativity to interactive art, from empirical investigations to case studies, all are in one way or another relevant to work in the interaction of people and computers. We hope that in perusing this volume you will agree that research in creativity and cognition has a special relevance to contemporary computing, and that computing has a key role to play in creativity and cognition research.

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C&C'09 Art Exhibition and Live Performances

WELCOME

The Art Exhibition and Live Performance event at C&C'09 asked artists-practitioners-makers-scientists to respond to the theme "Everyday Creativity". The mobile, wearable, stand-alone and nomadic works on display explored the invisible, unexpected and unanticipated in the everyday. Work from four continents included staged and walkabout performances, interactive installations, and outdoor projections. Invited and selected proposals were on display at the Berkeley Art Museum during the conference.

Creativity and Cognition has always viewed the Art as an essential component of the conference dialogue. C&C'09 is no exception. This year, the C&C'09 committee asked artists-practitioners-makers-scientists to respond to the theme of "Everyday Creativity". Inspired by this theme, artists submitted an overwhelming number of proposals with less than 15% of peer-reviewed proposals accepted for exhibition.

The Berkeley Art Museum (BAM), one of the largest university art museums in the United States, provided the backdrop for the events. The mission of BAM is to inspire the imagination and ignite critical dialogue through art and film. Through their programs, collections and research resources, they aspire to be locally connected and globally relevant, engaging audiences from the campus, community, and beyond.

ART INSTALLATIONS

Renowned British visual artist **Professor Jane Prophet** (Goldsmiths College/University of London) provided the keynote for the events. Her works on display included *Swab Drawing*, a collection of videos, in which the audience are privy to an intimate moment as cardiothoracic surgeon Francis Wells uses a swab of the patient's blood, during open-heart surgery, to recall diagrammatically the operating procedure.

Invited data visualization artist **Aaron Koblin** exhibited *The Sheep Market*, which was projected on the exterior walls of the museum during the conference. Aaron uses everyday social and infrastructural data to examine cultural trends and emergent patterns. Aaron received the National Science Foundation's first place award for science visualization and is currently Technology Lead at Google's Creative Lab in San Francisco.

The illusive **Amuse Bouche** from the UK provided a glimpse into the flow of the peripheral imperceptible and inescapable unknown with *Inescapable*.

Interactive projections were particularly well represented this year, including *Glowloodle* - a medium for expressive inquiry that supports both intuitive play and iterative experimentation. The free software allows users to paint

with light, or with anything, and share their creations online. Borrowing from the seductive formal qualities of today's slick consumer gadgets, *Uberobject* featured a reactive virtual object rendered as an oversized projection and exhibiting unexpected, responsive behaviors. *Telematic Timelapse* comprised of a suite of musical video compositions. Images were harvested from public surveillance cameras and a synchronized musical score accompanied the micro-narratives. Time-lapse videos were presented alongside live webcam feeds.

Additional and unusual outdoor installations included *Vehicle #3: Heliotropic Furniture* which explored furniture forms and their influence on people and their environment. In this installation, solar powered autonomous benches reacted to changes in their surroundings using their own logic. Augmented reality experience *(In)box with Malcom* took place inside a shipping container. The work explored the persona of Malcom McLean, inventor of the shipping container, and the effects of the container system itself.

Selected installations came from all corners of the globe. *Material Inspiration* from Finland exposed the expressivity of a physical material and demonstrated a material's potential for transforming the meaning of artifacts in functional forms into a metaphor for affordances of everyday objects.

Highlighting the impact and power of digital media tools on culture *Stratification* and *Where I Come From...* emphasized the collaborative art practice with non-native English speakers and at-risk youth.

LIVE PERFORMANCES

For one evening, artists-performers-makers-scientists descended on the Berkeley Art Museum for a heady mix of performative and interactive delights happening in/on/around the conference.

The evening event began in the BAM theatre - a space designed for 'happenings' in the 60s. Invited performers **Professor Ernest Edmonds** and **Mark Fell** collaboratively performed *Two Generative Pieces: Port Hacking* and *DC_Release* a generative piece in which sound and image are integrated by operating with structures that can mediate between sound and vision, so that a unified work can be produced that integrates both.

Di Mainstone's *Addressing the Unexpected* performance exhibited her interactive couture garments that playfully explore human behaviour. Investigating the landscape between ad-hoc performance, communal experience and wearable architectures, Di has collaborated with a range of international artistic institutions including include the Banff New Media Institute, XS Labs, Montreal, V2_, Institute for the Unstable Media, Rotterdam and most recently Eyebeam

in New York City. Di trained in fashion design at Central Saint Martins College of Art.



Figure 1. Chiptune Marching Band in action in Maker Faire, Newcastle, UK.

Walkabout performances included *Chiptune Marching Band* (Newcastle University) (Figure 1) a public workshop and performance where participants make a sensor-reactive sound instrument, powered by a localized power resource, and perform with their instrument as a band. *I Seek the Nerves Under Your Skin* (University of Nottingham) is a wearable audio performance which uses the intense physical activity of sprinting to alter the state of mind of a person listening to a poem. *Ghost Scraper* (moolab) is a custom designed interactive apparatus, using embedded computing, real-time audio processing, to engage the audience in sonic exploration of the city's invisible layers of imaginary memories, and presence of ghosts.



Figure 2. Mobispray used in Graffiti Dance.

Staged performance *Nature as Interface: MacGyvering Interactivity with Trees, Pencils, Grandpa, Even the Kitchen Sink* (MIT) asked “What do you get when you cross MacGyver with Martha Stewart? Inventions made of magic markers, chewed bubble gum, flowers, friends, and rainwater!” *Graffiti Dance* (Yahoo! Research, University of Art and Design, University of Illinois at Urbana-Champaign) (Figure 2) dynamic played between re-appropriated media and its creators. The audience-driven movement performance of syndicated images and text and free-form colors were constructed as digital graffiti via large-scale projection.

CALL FOR BAGS

In addition to the many creative artworks on display at the museum, C&C’09 asked the public to join in the making of a special group artwork for the Art Exhibition. C&C’09 asked the public to post old conference bags so that they could be recycled into one-of-a-kind reusable conference bags (Figure 3). Each bag sent was hand crafted and sculpted by up-and-coming British designer **Sarah Atkinson**. Sarah is a young, London-based fashion and textiles designer who specializes in knit. Her work walked down the runway at the London and Russian Fashion Weeks 2009 and has been sold in Japan as well as being featured in a promotional video for a well-known candy brand. CFB was sponsored by BigDog Interactive.



Figure 3. Call for Bags by Sarah Atkinson.

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