

annual bulletin

Garage Cinema Research is an interdisciplinary research group at UC Berkeley's School of Information Management and Systems working on the automation of digital media production and reuse. Started in September 2002, Garage Cinema Research has grown rapidly to include 30 student members (both graduate and undergraduate) from a wide variety of academic and professional backgrounds (SIMS, EECS, Film Studies, Art Practice, Architecture, and Cognitive Science). We are unified by our desire to transform the world of digital media technology and applications by enabling daily media consumers to become daily media producers. We welcome interested students to apply to join Garage Cinema Research. We also welcome interested sponsors to talk with us about how they can get involved in supporting and benefiting from our work.

DEVELOPMENTS

Sponsorship

GCR research has attracted the attention of some of the most innovative companies in the world, and has received generous support from British Telecom, Nokia, AT&T Wireless, Futurice, and others. GCR is currently developing considerably more relationships to other pioneering companies.

Conference Presentations

In the past year, GCR has contributed to many influential conferences in multimedia. Under the leadership of GCR Director Marc Davis, GCR faculty and students have presented and demonstrated GCR research at: 030303 Collective Play; the International Conference on Image and Video Retrieval (CIVR 2003); the IEEE International Conference on Multimedia and Expo (ICME 2003) Special Session on Moving from Features to Semantics using Computational Media Aesthetics; the ACM International Conference on Multimedia (MM 2003); the ACM SIGMM 2003 Workshop on Experiential Telepresence; and Plasmatica 040404.

Invited Talks

GCR Director Marc Davis has been busy delivering many invited talks about GCR at academic and industrial venues around the world including: the MIT Media Lab Europe Open House; the UCLA Department of Design | Media Arts Seminar Series; the Stanford University Seminar on People, Computers, and Design; and the Adobe Corporation Advanced Technology Group Seminar Series.

Upcoming Conference Presentations

In the coming months, GCR will be presenting at various international conferences including: CHI 2004, where we are presenting a paper on our Active Capture research, a short paper on our Mobile Media Metadata (MMM) project user studies, and a paper at the Time Design Workshop; MobiSys 2004, where we are presenting a conference paper on MMM, and a paper context-to-content inferencing at the Context-Awareness Workshop; and ICME 2004, where we are presenting a paper on MMM at the Special Session on Mobile Imaging, and a paper on Active Capture for Folk Computing.

NSF Fellowship

Ana Ramirez, a GCR Ph.D. student in Computer Science, has been awarded a prestigious three-year National Science Foundation Fellowship for her innovative research in GCR on Active Capture and the Active Capture Automation Language (ACAL).



NSF FELLOWSHIP RECIPIENT

UC Berkeley Center for New Media

Over the past year the UC Berkeley Strategic Planning Committee had a competition for awarding tenure-track faculty positions and matching funds to new academic directions for the campus. In a rigorous juried competition, the initial 150 proposals were reduced to 10, and the 10 to 4 winning proposals. GCR faculty from SIMS were instrumental in working with faculty from Film Studies, Art Practice, Art History Architecture, IEOR, EECS, Journalism, Architecture, and the University Library to create the successful proposal for the Center for New Media. Look this coming year for an interdisciplinary graduate Designated Emphasis in New Media and two new undergraduate courses in New Media. In the coming years, the Center for New Media will hire new faculty and also create a "New Media Commons" in the first floor of Moffitt Library.

ACM Multimedia Strategic Planning

Marc Davis was invited with 25 other participants from industry and academia to the ACM Multimedia Strategic Planning Retreat to help set research directions for the field of multimedia. GCR's recent research on context-to-content inferencing for media asset management received special mention when the report was delivered at a plenary session of the ACM Multimedia conference.

New ACM Multimedia Journal

In recognition of GCR's role in the multimedia research community, GCR Director Marc Davis was invited to be one of the founding members of the editorial board for the new ACM Transactions on Multimedia Computing, Communications, and Applications. He has also been invited to join the editorial board of IEEE MultiMedia.

GCR Press Coverage

GCR research has been cited in a number of newspaper, magazine, and online articles, including "Free Thinker Interview: Do-It-Yourself Television" from THIS Magazine, the Irish Times articles "Starring in a movie directed by you may become a reality thanks to the camera" and "Scientist puts Hollywood in a handheld," and other international publications.

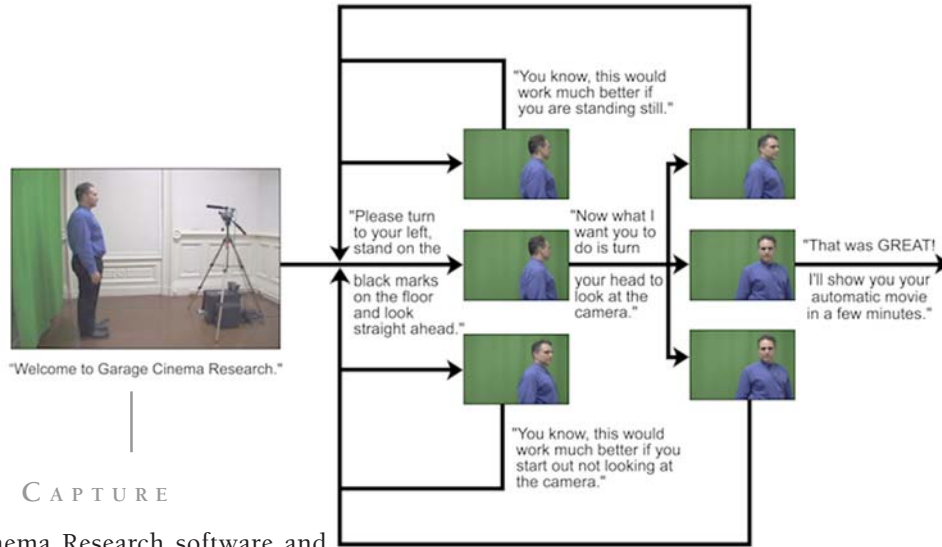
National Academies Beyond Productivity Report

The Committee on Information Technology and Creativity of the National Research Council cited "Narrative Intelligence" (a subfield of artificial intelligence and narratology co-founded by GCR Director Marc Davis) as one of the most promising areas for innovative, interdisciplinary technology and design research in its report entitled "Beyond Productivity: Information, Technology, Innovation, and Creativity."

GCR RESEARCH

Garage Cinema Research is developing a new generation of software solutions that proactively guide the user through the capture, processing, distribution, and reuse of media assets.

Unlike current manually driven software tools, Garage Cinema Research is developing automated solutions that enable the user to capture high quality media assets, personalize and organize these assets, and share and reuse them. The following provides an overview of how Garage Cinema Research technology will reinvent the media production and reuse process to enable the automated production of reusable media assets. Garage Cinema Research is researching and developing media automation technology and applications in the following key areas:

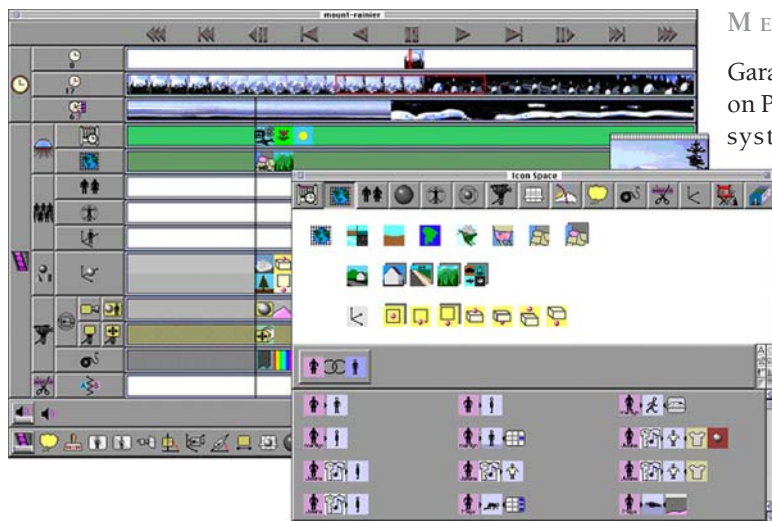


ACTIVE CAPTURE

Garage Cinema Research software and interaction design automate the capture of stills and video for, and of, users. By integrating capture, processing, and interaction, Garage Cinema Research's Active Capture approach automates the traditional processes of direction and cinematography. Using real-time and non-real-time media analysis in an interactive control loop, Garage Cinema Research's software structures the user's interaction with a capture device to record reusable, annotated media assets.

ADAPTIVE MEDIA

Garage Cinema Research is researching and developing software for the mass customization and personalization of media. Using annotated assets and automatic media editing functions, Garage Cinema Research's "Adaptive Media" technology produces high quality, "mass customized" media without any effort by the user, by structuring media assets into Adaptive Media Templates. AMTs encode media assets in such a way that they can co-adapt input media assets and compute a unique customized and/or personalized result.



MEDIA STREAMS

Garage Cinema Research is building on Professor Davis' Media Streams, a system for media annotation, retrieval, and resequencing according to semantic descriptions of media content using manual, semi-automatic, and automatic techniques. Media Streams is the only software solution that offers a uniform, scalable, and global language for semantic annotation, retrieval, and resequencing of video content.

By integrating metadata, and functionality that can use metadata, throughout the media production pipeline and lifecycle, a variety of tasks that currently are laborious, time consuming, and expensive can be automated, and as a result become simple, fast, and cheap. Garage Cinema Research's technologies will revolutionize the media production process by transforming it from a tedious, difficult, manual process to an easy to use, automated process for capturing, annotating, editing, sharing, and reusing media assets.



MOBILE MEDIA METADATA



Mobile phones with media creation capabilities are rapidly entering the marketplace in the USA and already have significant market penetration in Asia and Europe. In 2003, there were more camera phones sold worldwide than digital cameras. The devices and usage contexts of consumer digital media capture are undergoing rapid transformation from the traditional camera-to-desktop-to-network pipeline to an inte-grated mobile media experience. We now see a new class of networked media capture device (typified by camera phones) which combines:

- Media capture (images, video, audio)
- Programmable processing using open standard operating systems, programming languages, and APIs
- Wireless networking
- Time, location, and user metadata
- Personal information management functions

We are working to shape the future of mobile media computing and applications in our Mobile Media Metadata (MMM) research. Our central idea is to leverage the spatio-temporal *context*, social *community*, and user *interaction* of media capture to infer media content and thereby simplify and automate mobile media metadata creation, sharing, and (re)use. Our MMM research approach is to: gather all automatically available information at the point of capture (time, spatial location, phone user, etc.); use metadata similarity and media analysis algorithms to find similar media that has been annotated before; take advantage of this previously annotated media to make educated guesses about the content of the newly captured media; and interact in a simple and intuitive way with the phone user to confirm and augment system-supplied metadata for captured media. As a result of this new approach, we believe we will solve a fundamental problem in personal media management—the need to have content-based access to the media consumers capture on their mobile media devices.



Matti Rantanen joins GCR as the 2004 Visiting Scholar from the Helsinki Institute of Information Technology (HIIT) to lead the Mobile Media Metadata project (MMM-2).



SOCIOLOGICAL PROTOTYPING

Current camera phones are the forerunners of networked digital imaging devices. Image capture, annotation, and sharing will become increasingly easy. Our contention is that, if we understand the goals and activities for which people currently use technology, and their current practices, we can better project how people will use new technology, and design technology that better fits their needs and preferences. Our research aims at predicting how people will create and share images by understanding the current social uses of images. We can then use this information to aid in the design of more useful and usable digital imaging devices and software.

FOR PROSPECTIVE SIMS STUDENTS

Garage Cinema Research is a highly interdisciplinary research group composed of faculty, graduate students, undergraduate students, visiting scholars, and research assistants and affiliates that have diverse and often hybrid backgrounds and expertise. GCR has many opportunities for participation on our **functional teams** and **project teams**. GCR is educating talented students to become innovative designers and leaders who will shape the future of digital media. If you're interested in knowing more about a specific team, please contact the respective team leader below.

Functional Teams:

TeamLeads Team
Team Lead, Bruce Rinehart
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Project Teams:

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Active Capture Team
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Social Uses of Personal Media Team
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Media Streams Team
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OTHER STUDENT ACTIVITIES



Students at SIMS have a unique opportunity to participate in a diverse set of activities and organizations to explore and shape the future of digital media. Such activities and organizations include:

- Garage Cinema Research Independent Study Credit
- Garage Cinema Research GSR and TA Positions
- UC Berkeley Center for New Media (CNM)
- Group for User Interface Research (GUIR)
- Berkeley Institute for Design (BID)
- Art, Technology and Culture Colloquium (ATC)
- Management of Technology Certificate (MOT)

GCR-RELATED COURSES

Fall 2004

Art, Technology and Culture (Nagasawa)
CG Animation Studies (Niemeyer)
Digital Video: The Architecture of Time. (Walsh)
Foundations of Software Design (Hearst)
Information Art: Database and Interface (Rinehart)
Information Organization and Retrieval (Davis & Larson)
Information Users and Society (Van House)
Intro to Artificial Intelligence (Wilensky)
Knowledge Representation and Reasoning (Russell)
Multimedia Information (Davis)
Realizing Digital Convergence (Braunstein)
Research Topics in Human-Computer Interaction (Garcia)
Social Networks/Social Software (Lyman)
Strategic Computing and Communications Technology (Varian)
Technology and Policy (Glusko & Samuelson)
Temporal Structures: Video and Performance Art (Garcia)
Web Services: Concepts, Design and Services (Blum)

Spring 2005

Architecture and the Internet: Design of Virtual Places (Cryslar)
Advanced Computer Graphics Production (Niemeyer)
Advanced Digital Video. (Niemeyer)
Database Management (Larson)
Digital Media Design Studio. (Davis)
Digital Video: The Architecture of Time. (Walsh)
Distributed Computing Applications. (Chuang & Tygar)
Document Engineering (Glusko)
Embodiment and Media. (Williams)
Information in Society. (Van House)
Information Visualization and Presentation. (Hearst)
Needs and Usability Assessment. (Van House)
Temporal Structures: Video and Performance Art (Nagasawa)
User Interface Design and Development (Hearst)
Wireless Technologies (Moazzami)
XML and Related Technologies (Miloski)

GCR DIRECTOR



MARC DAVIS¹ DIGITAL MEDIA PRODUCTION AND REUSE, HUMAN-COMPUTER INTERACTION, KNOWLEDGE REPRESENTATION FOR MEDIA

Marc Davis is an Assistant Professor at the School of Information Management and Systems (SIMS) at the University of California at Berkeley where he directs the Garage Cinema Research group. His work is focused on creating the technology and applications that will enable daily media consumers to become daily media producers. Prof. Davis' research and teaching encompass the theory, design, and development of digital media systems for creating and using media metadata to automate media production and reuse. As a pioneer in the repurposing of digital video, he has done groundbreaking work in video annotation, retrieval, and automatic movie assembly.

As part of his doctoral dissertation at the MIT Media Laboratory, he developed Media Streams, an iconic visual language for annotating, retrieving, and repurposing digital video. From 1993 to 1998 at Interval Research Corporation, he led research and development teams in automatic media production technology for which a patent was awarded in 2001. From 1999 to 2002, Prof. Davis was Chairman and Chief Technology Officer of Amova, Inc., a developer of media automation and personalization technology.

At the MIT Media Laboratory, Marc Davis co-founded the Narrative Intelligence Reading Group, which innovated interdisciplinary discourse at the intersection of literary and media theory, artificial intelligence, and media technology and design. At UC Berkeley, Prof. Davis is a Co-Founder and Executive Committee Member of the interdisciplinary Center for New Media (CNM) which competed for and received funding and FTE support from the UC Berkeley Strategic Planning Committee. He is also an Advisory Board Member of the Art, Technology, and Culture Colloquium (ATC) and an Affiliated Faculty Member of the Berkeley Institute of Design (BiD).

In addition to research in digital media, Prof. Davis is also an innovator in interdisciplinary curricula for multimedia. His IS246 Multimedia Information¹ and IS290 Digital Media Design Studio² courses combine media theory, media production, analysis, and design of current and future multimedia systems and applications. In IS202 Information Organization and Retrieval, Prof. Davis has been working with students on large scale projects in media metadata and applications for digital cameras³ and mobile camera phones⁴.

Prof. Davis has numerous publications, presentations, and workshops, to his credit. He was one of the invited contributors to the 50th Anniversary Edition of the Communications of the ACM, for which he wrote a vision piece about the next 50 years of media technology. He authored an invited chapter on video representation for *Readings in Human-Computer Interaction: Toward the Year 2000*, which has become a standard textbook in the field. He was invited to address the MPEG committee that has developed the MPEG-7 standard for multimedia content description based in part on his dissertation work on Media Streams. In spring 2003, Prof. Davis outlined a new paradigm for computational media production in "Editing Out Video Editing" in a special issue of IEEE MultiMedia on Computational Media Aesthetics. In fall 2003, Prof. Davis was invited to participate in the ACM SIGMM Strategic Planning Retreat whose aim was to initiate a discussion on and help set new directions for research in the field of multimedia. Prof. Davis is on the editorial boards of leading journals in the field of multimedia: IEEE MultiMedia and ACM Transactions on Multimedia Computing, Communications, and Applications. Prof. Davis earned his B.A. in the College of Letters at Wesleyan University, his M.A. in Literary Theory and Philosophy at the University of Konstanz in Germany, and his Ph.D. in Media Arts and Sciences at the Massachusetts Institute of Technology Media Laboratory.

¹ <http://www.sims.berkeley.edu/academics/courses/is246/>

² <http://www.sims.berkeley.edu/academics/courses/is290-1/s04/>

³ <http://www.sims.berkeley.edu/academics/courses/is202/f02>

⁴ <http://www.sims.berkeley.edu/academics/courses/is202/f03/>

GCR MEMBERS

If you'd like to join the GCR team, feel free to contact Professor Marc Davis at marc@sims.berkeley.edu.

Affiliated Faculty:

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Nancy Van House

Visiting Scholars:

Joost Geurts
Antonia Giannoccaro
Mohan Kankanhalli
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Risto Sarvas
Amy Shuen

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Melanie Feinberg
Nathan Good
Erick Herrarte
Jeremy Kashnow
Simon King
Vam Makam
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Ana Ramirez
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Yuri Takhteyev
Jeff Towle
Anita Wilhelm

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Research Affiliates:

Jim Lanahan
Rachel Strickland

Undergraduate Students:

JoJo Chang
Leo Choi
Madhu Prabaker
Arian Saleh
William Tran

SPONSORING FIRMS

GCR would like to thank the following companies for their generous support.



F U T U R I C E

NOKIA

RECENT GCR PUBLICATIONS

Mobile Media Metadata:

Marc Davis and Risto Sarvas. "Mobile Media Metadata for Mobile Imaging." In: Proceedings of IEEE International Conference on Multimedia and Expo (ICME 2004) Special Session on Mobile Imaging in Taipei, Taiwan, IEEE Computer Society Press, Forthcoming 2004.

Risto Sarvas, Erick Herrarte, Anita Wilhelm, and Marc Davis. "Metadata Creation System for Mobile Images." In: Proceedings of the Second International Conference on Mobile Systems, Applications, and Services (MobiSys2004) in Boston, Massachusetts. ACM Press, Forthcoming 2004.

Marc Davis. "Mobile Media Metadata (Video)." Submitted to: Video Proceedings of the Second International Conference on Mobile Systems, Applications, and Services (MobiSys2004) in Boston, Massachusetts. ACM Press, Forthcoming 2004

Anita Wilhelm, Yuri Takhteyev, Risto Sarvas, Nancy Van House, and Marc Davis. "Photo Annotation on a Camera Phone." In: Proceedings of the Conference on Human Factors in Computing Systems (CHI 2004) in Vienna, Austria. ACM Press, Forthcoming 2004.

Active Capture:

Ana Ramirez and Marc Davis. "Active Capture and Folk Computing." In: Proceedings of IEEE International Conference on Multimedia and Expo (ICME 2004) Special Session on Folk Information Access Through Media in Taipei, Taiwan, IEEE Computer Society Press, Forthcoming 2004.

Jeffrey Heer, Nathaniel S. Good, Ana Ramirez, Marc Davis, and Jennifer Mankoff. "Presiding Over Accidents: System Direction of Human Action." In: Proceedings of the Conference on Human Factors in Computing Systems (CHI 2004) in Vienna, Austria. ACM Press, Forthcoming 2004.

Marc Davis. "Theoretical Foundations for Experiential Systems Design." In: Proceedings of the ACM SIGMM 2003 Workshop on Experiential Telepresence (ETP 2003) at the 11th Annual ACM International Conference on Multimedia in Berkeley, California, ACM Press, 2003.

Marc Davis. "Active Capture: Automatic Direction for Automatic Movies (Video)." In: Video Proceedings of 11th Annual ACM International Conference on Multimedia in Berkeley, California, ACM Press, 2003.

Marc Davis. "Active Capture: Automatic Direction for Automatic Movies (Video Description)." In: Proceedings of 11th Annual ACM International Conference on Multimedia in Berkeley, California, ACM Press, 602-603, 2003.

Marc Davis, Jeffrey Heer, and Ana Ramirez. "Active Capture: Automatic Direction for Automatic Movies (Demonstration Description)." In: Proceedings of 11th Annual ACM International Conference on Multimedia in Berkeley, California, ACM Press, 88-89, 2003.

Marc Davis. "Active Capture: Integrating Human-Computer Interaction and Computer Vision/Audition to Automate Media Capture." In: Proceedings of IEEE International Conference on Multimedia and Expo (ICME 2003) Special Session on Moving from Features to Semantics using Computational Media Aesthetics in Baltimore, Maryland, IEEE Computer Society Press, Vol. II, 185-188, 2003.

Media Streams:

Joost Geurts, Jacco van Ossenbruggen, Lynda Hardman, and Marc Davis. "Video on the Semantic Web: Experiences with Media Streams." Submitted to: International Semantic Web Conference.

Adaptive Media:

Marc Davis. "Editing Out Video Editing." IEEE MultiMedia, 10 (2). April-June 2003. 54-64.

On Interdisciplinary Methodology:

Marc Davis and Michael Travers. "A Brief Overview of the Narrative Intelligence Reading Group." In: *Narrative Intelligence*, eds. Michael Mateas and Phoebe Sengers. 27-38. Amsterdam: John Benjamins Company, 2003.

Read these and other publications at

garage.sims.berkeley.edu

GARAGE CINEMA RESEARCH

To enable the billions of daily media consumers to become daily media producers.

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