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photo by Bruce Hemingway

Charles Simonyi discusses his second trip to the International Space Station

UW CSE Distinguished Lecturer Series, Fall 2009

CSE's 2009 Distinguished Lecturer Series drew packed audiences and covered an eclectic array of topics that stretched from high-earth orbiting and high-tech cooking to wireless technologies and futuristic interfaces.

Charles Simonyi in Space

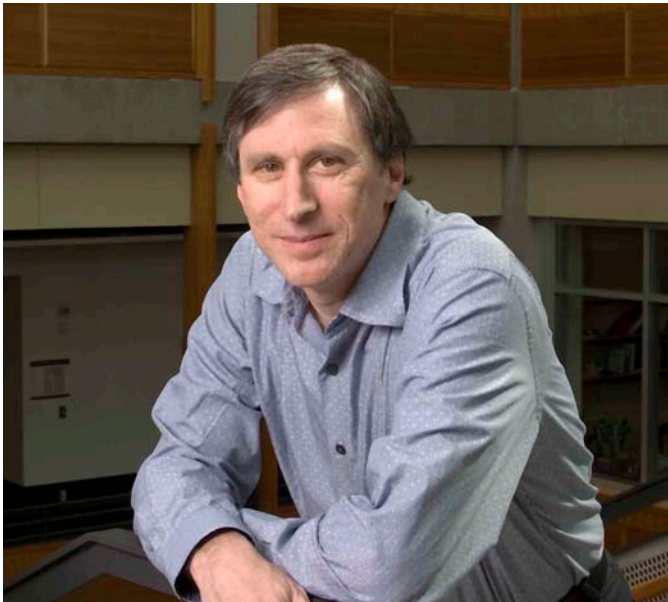
The series blasted off on October 1 with Charles Simonyi recounting his March 2009 trip to the International Space Station, two years after his first space adventure.

His photos and videos offered a rare look inside the Russian Soyuz spacecraft, which has surprisingly rudimentary systems, including a 386 computer running the instrument panel. The Russians have developed ingenious, low-tech solutions for many functions. Simonyi amused the audience with a video demonstration (filmed in space) of the clever toilet mechanism, in which a suction device directs liquid waste into a funnel and down into a container, with nary a drop left to float around the Soyuz capsule.

During his stay on the International Space Station, the software icon assisted with research projects and talked to classrooms of schoolchildren all over the globe, answering their questions via ham radio. His favorite aspects of space life include the wonderful sleep possible in a weightless environment, spectacular views of sunrises, clouds, and lightning, and spotting earth landmarks, including SeaTac airport. With terrific photos and an engaging presentation style, Simonyi welcomed the audience into his experiences.

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From where I sit...



Happy New Year! It's hard to believe that it's 2010. How did that happen? It seems like not long ago we were ushering in the new century and worrying about whether computers worldwide would crash.

It's impressive how far our field has come over the last decade, and how closely computing is integrated, in an increasingly seamless way, into people's lives. Our kids take all of this for granted: that they can connect with their friends on Facebook, that they can answer every question with Web search, that they can stream TV shows over the Internet, that they can shoot a video with their cell phone and publish it on YouTube, and that they can text their parents that they left their lunch at home. We forget that this world did not exist a decade ago, and that it's all been made possible (for better or worse!) by the capabilities our field has enabled. We're all lucky to be part of this, and for those of us "of a certain age," we're lucky to have witnessed the remarkable advance of computing technology, almost from its infancy. For me, it's been amazing to experience the move from punched cards to teletypes to CRTs to today's huge LCD monitors and touch-screen web-connected mobile phones.

It's been a crazy ride, and it's worth sitting back and thinking about what we've achieved and what we hope to achieve in the future. One exciting change that's reflected by a number of research efforts in our department is the focus on using computers and technology to improve people's lives in very direct ways. For example, many of our students have spent time in Africa, India, or South America looking at how technology can empower people in developing countries. There are efforts to create computing tools to help those with hearing or visual impairments. There is work to advance robotic prosthetics and

to provide brain-computer interfaces for people with physical disabilities. There is research that will help reduce energy consumption and make our cities and transportation systems more effective. And there are many other similar efforts in CSE. In the future, I expect (and hope) to see more projects like this -- because this type of research is helping to excite and draw the next generation of students to our field.

Again, I wish you a Happy New Year and hope to see or hear from many of you in 2010.

Henry M. Levy
Chairman and Wissner-Slivka Chair

Datagrams

Ratul Mahajan wins SIGCOMM Rising Star Award

Ratul Mahajan, a 2005 UW CSE Ph.D. alumnus now working at Microsoft Research, received the 2009 SIGCOMM Rising Star Award. Each year, ACM SIGCOMM presents the Rising Star Award, recognizing a young researcher — an individual no older than 35 — who has made outstanding research contributions to the field of communication networks during this early career stage. Depth, impact, and novelty of the researcher's contributions are key criteria upon which the Rising Star Award Committee evaluates the nominees, as well as strong research contributions made independently from the nominee's Ph.D. advisor.



Gaetano Borriello, Chandu Thekkath named ACM Fellows



Professor Gaetano Borriello is the latest UW CSE faculty member to be named a Fellow of the ACM. (He is the 14th UW CSE faculty member to receive this

honor.) UW CSE Ph.D. alumnus Chandu Thekkath, a principal researcher at Microsoft Research, also was named an ACM Fellow this year. ACM is the major professional society in computer science. Roughly 1% of ACM's members are elevated to the rank of Fellow.

New faculty additions



Su-In Lee joined the faculty in Computer Science & Engineering and Genome Sciences in January 2010. She received her Ph.D. from Stanford University in January 2009 and most recently was a visiting assistant professor at Carnegie Mellon University.

Lee's research focuses on computational methods and machine-learning techniques for understanding the genetic basis for complex traits. Humans differ in many phenotypes such as weight, hair color, and, more importantly, disease susceptibility. These phenotypes are largely determined by each individual's specific genotype, stored in the 3.2 billion pairs of his or her DNA sequence. Lee's long-term research goal is to develop interdisciplinary approaches combining computer science and biology to decipher the genetic code from various types of genomic data. For more information on Su-In and her research, please see:

<http://www.cs.washington.edu/homes/suinlee/>.



Anup Rao joined the faculty in January 2010. He received his Ph.D. from the University of Texas at Austin and recently finished two and a half years as a post doc, first at the Institute for Advanced Study in Princeton, NJ, and then at Princeton University.

Rao's research aims to understand some of the foundational questions of computer science. His past work has focused on the study of pseudo randomness, lower bounds and approximation algorithms, efficient ways to reduce the dependence of computer science solutions on pure randomness, and on improving understanding of optimization problems for which it is hard to approximate answers. Rao's theoretical research has achieved success in answering the questions "To what extent is the use of randomness necessary to computer science?" and "How can we amplify the hardness of computational problems?" These kinds of questions can sometimes lead to strange and unexpected revelations — for example, a recent sequence of work that he was involved with led to the discovery of the most economical shape for soap bubbles. For more information on Anup and his research, please see:

<http://www.cs.washington.edu/homes/anuprao/>.

Luke Zettlemoyer joins the faculty in July 2010, after he completes a post doc at the University of Edinburgh. He received his Ph.D. from MIT.



Zettlemoyer's research focus is artificial intelligence. He has worked on problems in natural language processing, machine learning, and decision making under uncertainty. One goal of this work is to build automated systems that can have natural conversations with human users. He has worked on a number of aspects of this problem, including (1) grammar induction techniques for learning to automatically convert sentences to logical representations of their underlying meaning; (2) methods for efficiently reasoning about nested beliefs; and (3) algorithms for model learning and decision making in large, structured environments. Zettlemoyer is generally interested in building systems that recover and make use of representations of the meaning of natural language text. For more information on Luke and his research, please see:

<http://www.cs.washington.edu/homes/lasz/>.

Seattle Girl Geek Dinner



Seattle Girl Geek Dinner attendees enjoy the technical presentations in the Atrium

CSE hosted the fifth Seattle Girl Geek Dinner in the Microsoft Atrium on December 3. More than 100 women from the local technology community attended and enjoyed some time to network and grab a quick bite of food. CSE's Magda Balazinska and Yoky Matsuoka provided the technical content.

To see information about some of the fabulous women of UW CSE, please see:

<http://wicse.cs.washington.edu/>

Information about Seattle Girl Geek Dinners may be viewed at: <http://www.seattlegirlgeekdinners.com/>.

(Continued from first page)

CSE Distinguished Lecturer Series, Fall 2009

In response to a question about balancing risk with adventure, Simony said he felt safe during the entire trip and that “a lot of things must go very wrong before your heart needs to go pitter-patter.” His first-ever videos taken during the Soyuz’s parachute dependent, 25-mph jolting return to earth might turn others’ knuckles white, though.

Simonyi questions the wisdom and risks of sending humans to the Moon and beyond, advocating instead for robotic explorations to expand knowledge in the astronomical and planetary sciences. He says advances in artificial intelligence will be extremely important in pushing far into the universe, but acknowledges that people “want to go into space because Star Trek went there” and that space tourism in earth orbit has a bright future.

And yes, space flight is more wonderful the second time around! With the basics mastered, an experienced voyager can accomplish more and enjoy it to the full, he noted.

Nathan Myhrvold in the Kitchen

Who knew that computer science, mathematics, and physics could take gourmet cooking to a new plane of perfection? Renaissance man Nathan Myhrvold, founder of Microsoft Research and now CEO of Intellectual Ventures, astrophysicist and paleontology buff, gastronome and a world barbeque champ, is doing exactly that. He is an explorer on the frontiers of molecular gastronomy, a term originating in Europe about two decades ago to describe the scientific examination of the physical and chemical processes involved in cooking and its artistic and technical components.

Myhrvold has dived so passionately into the subject that he and a staff of 15 have written a 1500-page illustrated cookbook to be published next year. Their test kitchen boasts equipment you could find

in many UW labs — centrifuges (great for making a clear but intensely flavored tomato juice), microscopes, infrared cameras, and a \$250,000 freeze drier bought for a song at a bankruptcy auction.

With amazing photos and video, Myhrvold and colleague Chris Young (a UW chemistry alum and professional chef) enthralled

and educated the audience with more energy, enthusiasm, and charisma than most Food Network stars. They have cut heavy pots in half (in their own machine shop) to photograph the cooking process with an infrared camera, and they take HD video at 6200 frames per second. (A video of a kernel of corn exploding to the popped stage was a stunner.)

They rue that most chefs don’t know anything about the general heat equation, and have developed a technique to cook duck so the skin stays crispy and the meat moist. It requires a dog brush and dry ice. They offered high-tech techniques for steaming vegetables and caramelizing food, and punched holes in “food safety myths” — asserting there’s no need to overcook any meat except bear.

Young demonstrated how to use liquid nitrogen (“every kitchen should have a supply”) to make almond ice cream, with tastings for the audience. Yum!

Their key take-home message called attention to a “cooking revolution” — at least at rarified levels of gastronomy. Myhrvold and Young, however, hope to inspire all adventurous cooks to try unusual new techniques and to understand the science behind the exceptional results. Keep a lookout for their book, and don’t be surprised to see them on TV someday. (And in the New York Times on November 17, 2009: <http://www.nytimes.com/2009/11/17/science/17prof.html>.)

Back on More Familiar Terrain

The next three lectures featured computer science luminaries in industry and academia. Wireless “wizard” **Irwin Jacobs**, co-founder and former CEO of Qualcomm, directed commercialization of CDMA (code division multiple access), the most advanced and fastest-growing technology for voice and data wireless communications. His various ventures and their offshoots spawned more than 35 telecommunications companies in the San Diego area.

Jacob’s talk “From Cell Phones to Smart Phones to Smart Books” touched on how he launched Qualcomm with no business plan and no product, just a mission focused on innovation to significantly



Nathan Myhrvold and Chris Young discuss the science behind cooking



Irwin Jacobs provides an overview of the progression and innovation of wireless technology

improve wireless technology. He covered the progression of technologies to include voice, then cable and GPS, and soon 3D graphics. The future includes adding laptop capability to phones, with advanced chips that pull everything into a single package.

Microsoft chief research and strategy officer **Craig Mundie** drew a crowd of students, faculty, and alumni to Kane Hall



Craig Mundie gives a glimpse of future computer systems

for his talk on “Rethinking Computing” — a look at how emerging technologies can help solve critical societal problems in areas such as energy, the environment, and climate change. Mundie demonstrated a global climate-modeling system that unites massive databases with new analytical methods to show how CO2 emissions and deforestation can affect climate patterns in widely dispersed locations. He spoke about how more powerful computers

united with more sophisticated software tools will allow scientists to work across disciplines on huge, complex problems.

Mundie emphasized that computing is still in its infancy, and gave the audience a glimpse of future interfaces with touch-screen and motion-sensor technologies that will become more proactive, also noting that new search engines and interfaces “should be able to predict intent.” Also in the future he sees an expanding relationship between Microsoft and the UW community.

The final lecture on December 3 featured Stanford University professor and computer graphics architecture expert **Pat Hanrahan**, addressing the question: “Why are Graphics Systems so Fast?”

Hanrahan believes that most programmers have only a limited understanding of GPUs, which are parallel computers that combine many cores, threads, and wide vector processing units. He described their



Pat Hanrahan talks about advances in computer graphics

architecture and covered the programming models used to achieve high performance, asserting that GPU speed derives from the innovative combination of processor design and programming model. Earlier in his career, Hanrahan was the chief architect for Pixar’s Renderman Interface, for which he shared an Academy Award for Science and Technology.

On a Screen Near You!

All UW CSE colloquia, including our Distinguished Lecturer Series, are webcast live, web-archived, and broadcast on UWTV and ResearchChannel. Complete information is available here: <http://www.cs.washington.edu/news/colloq.info.html>.

MSB moving online

We are working toward a greener 2010! And part of the process is to move MSB online! By limiting what we print, we’re reducing costs and lowering our impact on the environment by using less paper and ink.



One of this first steps to effectively achieve this goal is to expand our email database. We need your email address and updated contact information! (We will not share your address outside the UW community.) If you would like to receive the online version of the newsletter, please sign up by sending an email to msb@cs.washington.edu. Additionally, please be sure to add msb@cs.washington.edu to your email list of contacts.

Here are some additional ways to stay in touch with what’s happening in CSE:

Web site: Stay informed about colloquia, upcoming events, and research news by visiting our Web site: <http://www.cs.washington.edu>.

RSS feeds: Subscribe to our RSS feeds for current news items: <http://news.cs.washington.edu>

Facebook: Become a fan, find friends, and stay on top of what’s going on across the department on our Facebook page: <http://www.facebook.com/uwcse>.

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We want to hear from you!

Do you have news you’d like to share with the CSE community? Comments or suggestions for future issues of MSB?

Let us know! Email the editors at: msb@cs.washington.edu
and be sure to visit us online at: www.cs.washington.edu

Celebrating UW CSE innovators: TR35 winners

Since 1999, the editors of *Technology Review* have honored the young innovators whose inventions and research they find most exciting. Today, that collection is the TR35, a list of technologists and scientists, all under the age of 35. Selected from more than 300 nominees by a panel of expert judges and the editorial staff of *Technology Review*, the TR35 is an elite group of accomplished young innovators. Spanning medicine, computing, communications, electronics, nanotechnology, and more, their work is changing our world.

UW CSE friends and family have again scored big in the TR35.



Professor **Shwetak Patel** was recognized for using simple sensors to detect how residents move through their homes and how they use electricity, water, and gas. Patel has shown that each electrical appliance in a house produces a signature in the building's wiring; plugged into any outlet, a single sensor that picks up electrical variations in the power lines can detect the signal made by every device as it's turned on or off. This monitoring ability could be particularly useful for elder care or for residential or business power conservation, but there was previously no practical way to achieve it, because it would have required numerous expensive sensors. (TR35 article may be viewed at: <http://www.technologyreview.com/tr35/Profile.aspx?Cand=T&TRID=814>.)

Recent Ph.D. alumnus **Jeff Bigham**, who joined the faculty at the University of Rochester in August 2009, was recognized for his work on WebAnywhere, a free screen reader for the sight-impaired that can be used with almost any web browser on any operating system, including locked-down public computers — no special software required. The system serves as a convenient, low-cost solution for blind users on-the-go, for blind users unable to afford a full screen reader, and for web developers targeting accessible design. Users start at <http://webanywhere.cs.washington.edu/>. From there, they can use keyboard commands to navigate to any web page. (TR35 article may be viewed at: <http://www.technologyreview.com/tr35/Profile.aspx?Cand=T&TRID=766>.)



Recent Ph.D. alumnus **Adrien Treuille**, who joined the Carnegie Mellon faculty in fall 2008, is recognized for his work on complex physics simulations for computer animation and games that can run on everyday PCs. While a grad student, he and fellow CSE grad student Seth Cooper worked with CSE professor Zoran Popovic and UW biochemist David Baker to design a web game called Foldit (<http://fold.it/>) that allows players to compete in finding minimum-energy folds in proteins, aiding Baker's world-renowned research. More than 90,000 users have registered and played since the game's launch in May 2008. Treuille wonders if someone — most likely even an amateur, since teenage gamers are beating the pants off Ph.D. biochemists at the game — might someday use Foldit to help discover a protein that cures cancer. (TR35 article at: <http://www.technologyreview.com/tr35/Profile.aspx?Cand=T&TRID=818>.)



University of Massachusetts professor Kevin Fu was also recognized for work on the security and privacy of implantable medical devices, a collaboration with UW CSE professor Yoshi Kohno.

It's been a great few years for UW CSE in the TR35. In 2008, the TR35 recognized CSE affiliate faculty members Tanzeem Choudhury (Dartmouth) and Merrie Morris (Microsoft Research) and close collaborator Blaise Aguerre y Arcas (Microsoft LiveLabs). In 2007, the TR35 recognized CSE professor Yoshi Kohno, CSE graduate student Tapan Parikh (now a faculty member at UC Berkeley), CSE Ph.D. alumna Karen Liu (now a faculty member at Georgia Tech), and CSE affiliate faculty member Desney Tan (Microsoft Research).

CSE alum Kira Lehtomaki in *New York Times*

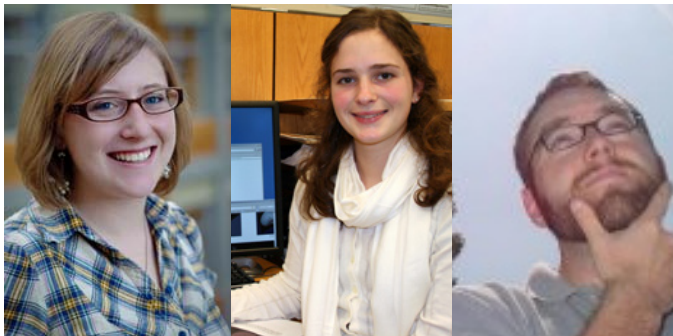
Kira Lehtomaki, a UW CSE alum who works at Walt Disney Animation Studios, was featured in a *New York Times* article on non-traditional careers for computer scientists.

You can learn about all sorts of interesting things such as this by subscribing to the RSS feed of UW CSE News. See:

<http://www.cs.washington.edu/news/>



Three UW CSE students recognized in CRA awards competition



UW CSE seniors (l-r): Justine Sherry, Rita Sodt, Eric Kimbrel

Each year the Computing Research Association recognizes a small number of the nation's undergraduates with the CRA Outstanding Undergraduate Research Awards.

In 2010, **Justine Sherry** was selected as the national female winner. Justine's research involves Internet measurement. She has worked on several applications of the IP timestamp option: improving its usage within the Reverse Traceroute project, developing a technique for discovering IP aliases, and measuring one-way link latency. Next year, she hopes to start graduate school in computer science.

Rita Sodt was selected as a finalist. Rita's research involves enhancing a mathematical model that quantifies and predicts the growth of gliomas (a highly invasive type of brain tumor). She has been writing a program to simulate the anisotropic growth of gliomas in a 3D visual brain, which takes into account the observation that tumor cells migrate preferentially in the direction of white matter pathways. The simulations can be a critical tool for doctors trying to target treatment to cancerous regions of the brain. Rita is in the fifth year computer science masters program.

And **Eric Kimbrel** received an honorable mention. Eric has been working with the Seattle Network Testbed research group since winter 2009. He has focused on adding various types of network support to the testbed, such as designing a service to perform NAT forwarding and expand the reach of the testbed to more home users. His honors thesis research was to design an extensible networking API that offers a high level of abstraction and is capable of masking network heterogeneity from the application programmer. He plans to graduate from the department later this year and looks forward to working as a software developer in the Seattle area.

Justine, Rita, and Eric join 32 previous CSE undergraduates who have been recognized by CRA since the award's inception in 1995. As of 2009, UW CSE ranked #1 in the nation in the number of undergraduates recognized with CRA Outstanding Undergraduate Research Awards in the preceding decade; that record should continue.

Continued from page 2

Datagrams

Dan Halperin, Kathleen Tuite Awarded Intel Fellowships

UW CSE graduate students Dan Halperin and Kathleen Tuite are among 26 exemplary Ph.D. students from across the nation who have been named recipients of Intel Ph.D. Fellowships. The Intel Ph.D. Fellowship program focuses on research in Intel's principal technical areas: Hardware Systems Technology and Design, Software Technology and Design, and Semiconductor Technology and Manufacturing. Dan, who is advised by Tom Anderson and David Wetherall, was awarded his fellowship for research "enabling the realistic design of next generation wireless systems." Kathleen, who is advised by Zoran Popovic, was awarded her fellowship for "active world reconstruction through a real-world multiplayer game."

Noah Snavelly wins University of Washington Graduate School "6th Chapter" Dissertation Award

2008 UW CSE Ph.D. alumnus Noah Snavelly, now on the computer science faculty at Cornell University, has received the UW Graduate School "6th Chapter" Dissertation Award. Named by former dean of the Graduate School Suzanne Ortega, the 6th Chapter Award refers to the five-chapter length of most dissertations. In a hypothetical sixth chapter, Ortega reasoned, candidates would propose practical applications resulting from their research, translating their insights into real-world policies or programs. Noah's Ph.D. work, co-supervised by Steve Seitz and Rick Szeliski (affiliate CSE professor at Microsoft Research), concerned recovering 3D structure from large community photo collections. Microsoft's widely-praised Photosynth application represents technology transfer from Noah's work.

Jonathan Carlson wins 2009 University of Washington Distinguished Dissertation Award

Recent UW CSE Ph.D. alumnus Jonathan Carlson received the 2009 UW Graduate School Distinguished Dissertation Award. Carlson's thesis work on "Phylogenetic Dependency Networks: Inferring Patterns of Adaptation in HIV," co-supervised by Larry Ruzzo (CSE) and David Heckerman (Microsoft Research), seeks to enable improved HIV vaccines by identifying HIV adaptations that the virus employs against the immune system. Carlson now works with Heckerman in the Microsoft Research eScience Group in Los Angeles.

Kindle DX Pilot Program

At the start of fall quarter 2009, each incoming CSE graduate student received a Kindle DX, Amazon.com's latest wireless reading device, to use in place of traditional printed textbooks and research papers in their first-year graduate courses. The University of Washington is one of seven colleges and universities conducting a Kindle DX pilot program with Amazon. At the UW, Computer Science & Engineering and the Foster School of Business are participating in the pilot. The other institutions taking part in the pilot are Princeton University, Case Western Reserve University, Reed College, Arizona State University, Pace University, and the Darden School of Business at the University of Virginia.

The pilot program's goals are to explore the use of electronic readers in university classes and to discover their strengths and weaknesses relative to traditional content delivery. As part of the pilot, UW CSE will participate in assessments in cooperation with all participating institutions and will also conduct usability assessments to focus specifically on the Kindle DX's annotation facilities.

Under the direction of Professor Ed Lazowska, approximately 40 students are participating at UW CSE, and course materials from 12 classes have been made available. In addition to reducing textbook cost and backpack weight, use of the Kindle



CSE grad students Brian Van Essen (background) and Colin Gordon participate in CSE590, one of the five UW CSE graduate courses that used the Kindles during fall quarter.

DX should dramatically reduce printing and its environmental impact and cost. We estimate that the typical first-year UW CSE graduate student prints 1,000 pages of research papers as reading material for courses.

As anticipated, students are using their Kindles to read research papers and other items that would normally be read on a computer or in paper form, which is reducing the number of pages printed. As one grad student noted: "Reading on the Kindle is much more pleasant than on the computer." Early feedback also suggests that the Kindle user interface, which is outstanding for personal pleasure reading, could benefit from some changes for the educational environment. Overall, however, the students responses have been fairly positive.

msb p8

most significant bits

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