



Searching for the Lost Leonardo

While the search is not over yet, there is growing evidence that a team from CISA3 may have pinpointed the location of the Leonardo da Vinci masterpiece, "The Battle of Anghiari," which has remained hidden for nearly 500 years. A *National Geographic* documentary on the project began airing worldwide on March 18.

In a press conference held March 12 in the Palazzo Vecchio's Hall of the 500 in Florence, CISA3's founding director, Maurizio Seracini, divulged the results of scientific tests in November, December and early 2012. With support from Mayor Matteo Renzi, the team of researchers from UC San Diego, National Geographic and Italy's chief art restoration agency, the Opificio delle Pietre Dure, used an endoscopic camera system to peer behind the existing mural. The goal: to see if there are traces of Leonardo's lost masterpiece on a stone wall hidden behind the current brick wall put up by Giorgio Vasari when he renovated and expanded the Hall in the mid-16th century.

What's Next?

CISA3 hopes to work with the Opificio as it begins a planned restoration of the Vasari mural. If so, it would make it possible to insert the endoscopic camera into areas where the Vasari is being restored, without doing any damage to the mural. Dr. Seracini has already pinpointed at least seven other points that are in areas behind which he believes the da Vinci mural is located. With recent support from CISA3 donors, including Paul and Stacy Jacobs, as well as Doug Carlson, the center aims to continue work on the project, while also opening a new research facility in Florence in 2012.

"These data are very encouraging," said Seracini. "Although we are still in the preliminary stages of the research and there is still a lot of work to be done to solve this mystery, the evidence does suggest that we are searching in the right place."

Seracini noted that the data gathered was very limited, because the small-bore holes drilled for the endoscope could only occur at locations where the Vasari mural had lost its pigment. Even with the small data set, however, he said four lines of evidence support the hypothesis that the lost Leonardo *is* located behind the Vasari mural:

1. A sample containing a black material was analyzed with scanning electron microscopy and it showed a chemical composition similar to black pigment found in brown glazes on Leonardo's "Mona Lisa."
2. Analysis of red material flakes found inside the wall showed them to be organic material, which is unlikely to be found in an ordinary plaster wall.
3. Visual evidence obtained through high-definition endoscopic images suggests that a beige material seen on the previously hidden wall could only have been applied by a paint brush.
4. The team visually confirmed the existence of an air gap between the brick wall on which Vasari painted his mural, and a wall behind it.

The latter finding suggests that Vasari may have preserved da Vinci's masterpiece by building a wall in front of it. There is no evidence of an air gap behind any other parts of the Vasari murals on the Hall of the 500's east and west walls.



NSF IGERT Updates

Seismic Fragility of Cultural Heritage Statues



In Florence, IGERT Trainee Christine Wittich (above), a graduate student in structural engineering at UCSD, carried out research on 'Seismic Fragility of Cultural Heritage Statues.' Wittich and colleagues surveyed 25 Florentine statues with laser scans and microscopic imaging to assess their current structural health and to predict how they would react to severe earthquake tremors. The long-term goal: figure out how to prevent or mitigate seismic damage to important statues. Preliminary results indicate that the majority of Florentine statues will rock when subject to probable earthquakes, and could possibly overturn. Wittich is now working on numerical time history analyses and doing finite element analyses. Seismic fragility observations are expected this spring in partnership with the Getty Center: Wittich will put two statues on the single-axis shake table at UCSD's Englekirk Structural Engineering Center. The researcher will assess how different statue geometries – tall vs. squat – react to shaking at different speeds ('loads').



ARtifact

IGERT Trainee David Vanoni (below right) is working on **ARtifact**, an augmented reality prototype for the interactive exploration of paintings. A graduate student in computer science and engineering, Vanoni has developed an Android tablet application that uses augmented reality to overlay multispectral imagery onto Giorgio Vasari's fresco (see page 1). This app was used as a positioning tool to help CISA3 identify the areas of the fresco overlapping with radar scans to help pinpoint possible areas where Leonardo da Vinci likely painted 'The Battle of Anghiari.'



Using available multispectral images, the app will also be useful for visualizing the data in real time on the actual fresco: you can point the mobile device (tablet) at the fresco, and select, for example, a thermal image, which will overlay the areas of cracks or voids and show where they are in relation to the painting. The app also has a wipe-off technology so that lets the viewer look at the various spectral images (UV fluorescence, thermal, infrared, etc) by pointing the tablet at the painting and wiping off the areas of interest with your fingers.

IGERT UPDATES

3D Scanning

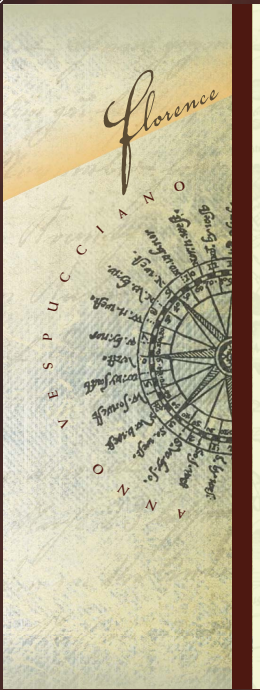
After completing LIDAR scans of the Palazzo Vecchio's Hall of the 500, CISA3 compiled a 3D model of the space. This allowed IGERT Trainee Vid Petrovic to compile videos showing fly-throughs of the



Hall where 'The Battle of Anghiari' was painted. One video shows real-time user control (using a game controller to fly through the data); the other is a frame-buffer-captured version. The 3D model permits custom fly-throughs with different aspects of the scene to be explored. To watch the 360-degree fly-through on the National Geographic website, go to <http://video.nationalgeographic.com/video/specials/in-the-field-specials/salone-dei-cinquecento/>.

Events

EVENTS

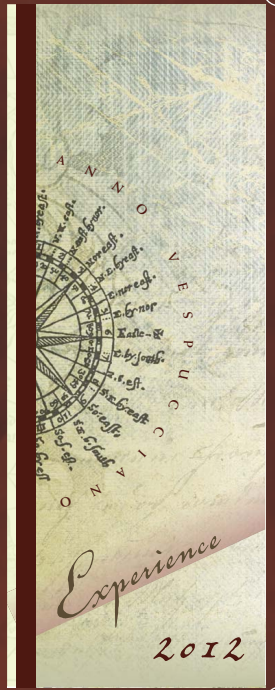


Supporters of CISA3 and UC San Diego have until Thursday, April 12 to RSVP to participate in **Florence Experience 2012: Voyage of Discovery – Bridging the Atlantic**, in Florence, Italy from April 19-22, 2012. The experience is organized by the Jacobs School of Engineering, UC San Diego Alumni and Calit2-based CISA3, and coincides with other events to mark the *Anno Vespucciano* – Florence's Year of Amerigo Vespucci, commemorating the 500th anniversary of the explorer's death.

The *Florence Experience 2012* will feature distinguished guests, a dialogue about UC San Diego developments and outreach in Europe, behind-the-scenes visits to Florentine museums and more, as well as tours around Tuscany.

Participants will also attend an exclusive gala in the Palazzo Vecchio, including a presentation by UC San Diego alumnus Maurizio Seracini (Class of '73) regarding his current scientific research to find Leonardo da Vinci's long-lost masterpiece, 'The Battle of Anghiari'.

To RSVP or get more information, contact Anna Gabriele, Director of International Outreach, (858)534-7034, angabriele@ucsd.edu.



Mark Your Calendar!

Thursday, June 21, 2012

&

CISA3 5th Anniversary

Join us for a special celebration in Calit2 UC San Diego's Atkinson Hall, including a symposium, donor recognition event, film showings, lab tours and more.



CISA3's graduate students and IGERT-TEECH Trainees

AROUND CISA3... In March, Prof. Falko Kuester (bottom left) welcomed the UCSD research community and CISA3 supporters to the first **CISA3 Open Lab Night**, when graduate students staged demos of their research. Last November, members of the World Cultural Heritage Society attended **From Florence to You - Sunday Morning with Maurizio Seracini**. Seracini joined them via videoconference from atop a scaffold in front of Giorgio Vasari's 'Battle of Marignano' fresco, behind which Seracini believes Leonardo da Vinci's mural 'The Battle of Anghiari' is hidden. CISA3 also provided **exclusive email updates** to donors and supporters in late November and early December as work continued in the Palazzo Vecchio.



<http://culturalheritage.calit2.net/cisa3/>

Friend of CISA3:

Doreen Schonbrun



SUPPORTING CISA3

Doreen Schonbrun has worked passionately on behalf of CISA3, not least because of her long-time interest in the arts and dedication to education and charitable giving.

She inherited her affinity for the arts from her late mother, a painter and collector of art and antiques. Living in Los Angeles, they took full advantage of the city's museums, including the Getty Villa, with its collection of Roman, Greek and Etruscan antiquities.

While still in L.A., Doreen was planning to study art restoration at the Getty Center for Conservation, but the plan was cut short when she fell in love with husband, Myron Schonbrun, and with San Diego, where he lived. Doreen enrolled in UC San Diego and received a bachelor's degree in Art History and Criticism (with a minor in Fine Arts). "Ideally I would like to return to UCSD for a Ph.D. in Art History," she says, "but my time is limited because of numerous commitments within the community."

For many years, Doreen served on the board of UCSD's University Art Gallery and on the funding panel for the San Diego Art Commission. For the last 12 years, she has been a Circle Donor at The San Diego Museum of Art, where she is actively involved in the annual fundraising event, *Art Alive*. At the San Diego Center for Children, San Diego's oldest children's center for high-risk abused and neglected children, Doreen teaches studio art and art history for the center's Wellness Program, and is co-chair of this year's Annual Gala.

"One-third receiving and two-thirds giving back" is how Doreen explains her formula for a happy life -- and her lifelong dedication to charitable work. She has worked

with at-risk and low-income children, and views art as a way to educate kids and encourage creativity and self-esteem.

Doreen became involved with CISA3 while serving as Program Director for the Sanford-Burnham Fishman Fund lecture series. She invited CISA3 Director Maurizio Seracini to give a lecture on art preservation, and the audience -- including Doreen -- was mesmerized. "He talked about a new approach to art history and conservation, using science to explore and discover the truth in art," she recalls. "I decided there and then that I would help Maurizio fulfill his vision for CISA3."

In supporting CISA3, Doreen hopes to leave a legacy for future generations, including her own children and grandchildren. "I have a passion for Italian Renaissance art as well as architecture and science," she says. "CISA3 also possesses relevancy, because it allows us to explore the past in order to learn from it."

Doreen and Myron are looking forward to the CISA3 excursion to Florence in late April, together with other supporters of the center. "We will get a chance to see historic Florence through the eyes of Maurizio Seracini," explains Doreen. "It's a rare opportunity to go behind the scenes on several projects that are redefining the way the world sees Renaissance art." Doreen expects to return to San Diego with a renewed sense of urgency in support of CISA3's vision of using science and technology to preserve and understand art.

Invest in CISA3!

To preserve cultural heritage for future generations, your support is critical. Members of the World Cultural Heritage Society enjoy special benefits and exclusive access to world renowned explorers (*Tom Levy pictured, addressing WCHS audience*), emerging innovators, and bright young minds. A gift at any level is meaningful.



Give Online:

To contribute via the Web, click on this link:

<http://culturalheritage.calit2.net/cisa3/patrons.php>

Please consider the following opportunities to invest in CISA3:

- **Support students** through graduate and exploration fellowships.
- Create opportunities for **field work** and hands-on experience with travel grants.
- Provide flexible funding to meet the **greatest needs** for innovation and discovery.

and click on "Give Now" to be directed to the UC San Diego Giving site.

For more information about ways to support the World Cultural Heritage Society and CISA3, please contact Sarah Beckman, Director of Development, at sbeckman@ucsd.edu or call (858) 534-7320.

World Cultural Heritage Society

To provide the vital support necessary for innovative research, international expeditions, and unique global partnerships, the World Cultural Heritage Society (WCHS) for CISA3 was formed. With ever increasing competition for public funding, private support from individuals, foundations, and corporations is critical to the growth and sustainability of CISA3. We are grateful for the passionate donors and volunteers who have invested their time and resources to support exploration and discovery, and helped position CISA3 as a global leader in the field of cyber-archaeology and cultural heritage preservation.

Supporting CISA3

With the stepped-up work in Florence in search of Leonardo da Vinci's long-lost mural, 'The Battle of Anghiari', CISA3 and the World Cultural Heritage Society benefited greatly from the addition of new industry supporters as well as critical (and timely) philanthropic donations from private donors, including Qualcomm CEO Paul Jacobs and his wife Stacy, as well as Fiji Water co-founder Doug Carlson.



See page 3 for more on ways that corporations, non-profits and private donors can support CISA3's research and educational mission through the WCHS.

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