

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/3338993>

Revisiting Computer Image Analysis and Art

Article in IEEE Multimedia · August 2007

DOI: 10.1109/MMUL.2007.62 · Source: IEEE Xplore

CITATIONS

3

READS

22

2 authors:



David G. Stork

Rambus

216 PUBLICATIONS 17,035 CITATIONS

[SEE PROFILE](#)



Marco Duarte

University of Massachusetts Amherst

113 PUBLICATIONS 7,020 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Wavelet-based hyperspectral imagery processing [View project](#)

All content following this page was uploaded by [Marco Duarte](#) on 16 July 2014.

The user has requested enhancement of the downloaded file. All in-text references [underlined in blue](#) are added to the original document and are linked to publications on ResearchGate, letting you access and read them immediately.

Revisiting Computer Image Analysis and Art

To the editor:

Recently, thin-film physicist Charles Falco tried to defend his and artist David Hockney's revisionist theory that some early Renaissance masters traced optical projections.¹ Although he claims to find fault in our work and others' work, he does so with misleading and erroneously selective arguments. Following his outline, here's a brief summary of the peer-reviewed scholarly consensus; readers should read the literature and further details at <http://www.diatrope.com/stork/FAQs.html>.

Some background

Falco tries to denigrate the art historical community by implying this community's broad rejection of the revisionist theory is to preserve the honor of Old Masters. In fact, though, historians of art and optics have given thoughtful, detailed, peer-reviewed rebuttals based on solid evidence and historical knowledge generally unknown to physicists or artists, all unrelated to the matter of "honor." For instance, in a four-day symposium devoted to testing Hockney's theory, such scholars unanimously and vigorously rejected the tracing theory.²

Tracing

Falco writes (on p. 9) that he and Hockney "do not subscribe to the misconception that any of these paintings is a composite of slavish tracings." However, their argument for several key paintings (for example, *Arnolfini portrait*, *Husband and wife*, and *Albergati portrait*) and their stated precisions depend on just such "slavish" accuracy in purported tracing. Falco wishes to invoke accuracy in some cases and inaccuracy in others—whichever supports his predetermined conclusion. This approach is, of course, methodologically incoherent and self-contradictory.

Talent

Falco writes (on p. 9) "[t]hat a given artist *could*

paint realistically without a tool does not prove that he did not use that tool." Of course. But the converse carries more force since it lands on the revisionists who bear the burden of proof: the fact that an artist could achieve some visual effect using optics does not mean that he used optics.

Complicated optics

Falco objects to the claim that the optical projector would have been "the most complicated optical system of its day" (see p. 9) by stating that its components were simple and existed before that time. But the *system* requires that these components be *understood* and *configured for projection onto a screen*. Although such projection is simple in the 21st century, we have no independent evidence that anyone of the time of van Eyck—even the greatest optical scientists—had figured it out. If Falco wishes to rebut the claim (voiced by historians of optics) he need merely identify a contemporary optical system more complicated than the projector. In seven years, he has failed to do this.

Perfect symmetry

In December 2002, Hockney told 8 million viewers on CBS' *60 Minutes* that the Arnolfini chandelier "is in perfect perspective." Later, Antonio Criminisi and David Stork proved him wrong.³ Falco writes (on p. 10) that "[i]naccurately, Stork assumes that a handmade 15th-century chandelier ... would have been perfectly symmetrical." False. Criminisi and Stork used rigorous photogrammetry and direct physical measurement of appropriate chandeliers in situ to demonstrate merely that such chandeliers are significantly more symmetric than is consistent with Hockney's broad claim.⁴

Use of erroneous evidence

Falco is concerned that he can't find the kink in the shadow of Christ's knee in de la Tour's

painting and somehow thinks this undercuts the evidence for the location of the illuminant(s) in the painting. But the direction of illumination direction for the knee's shadow was estimated using constraints and is perfectly acceptable, as shown elsewhere.⁵ Curiously, Falco brings up the matter of ambiguity in depth (z) of any illuminant(s), but Hockney's claim for this painting can be tested using just the horizontal and vertical positions (x, y). Johnson and Stork showed that the overwhelming visual evidence demonstrates that Hockney is wrong about such a position and thus his tracing theory is wrong for this work.⁶

Selective omission of relevant evidence

Falco claims Duarte and Stork "ignored" the shifts in the *Albergati portrait*. They pointed out in their original research paper,⁷ however, that an artist can achieve the observed fidelity "by eye"—a point Falco now concedes. Thus an artist can place (or scale) portions, such as the ear, at will—including the scaling and shifting found in van Eyck's work.

Conclusion

Now that every independent expert who has published peer-reviewed scholarship on the tracing theory has rejected it, it is time to move to more productive areas.⁸

David G. Stork
Chief Scientist, Ricoh Innovations
Lecturer, Stanford University

Marco Duarte
Graduate student
Department of Electrical Engineering,
Rice University

References

1. C.M. Falco, "Computer Vision and Art," *IEEE MultiMedia*, vol. 14, no. 2, 2007, pp. 8-11.
2. S. Dupré, ed., "Optics, Instruments and Painting 1420-1720: Reflections on the Hockney-Falco Thesis," *Early Science and Medicine*, vol. 10, no. 2, 2005.
3. A. Criminisi and D.G. Stork, "Did the Great Masters Use Optical Projections While Painting? Perspective Comparison of Paintings and Photographs of Renaissance Chandeliers," *Proc. Int'l Conf. Pattern Recognition*, IEEE CS Press, 2004, pp. 645-648.
4. D.G. Stork, "Computer Vision, Image Analysis, and Master Art, Part 1," *IEEE MultiMedia*, vol. 13, no. 3, 2006, pp. 16-20.
5. D.G. Stork, "Mathematical Foundations for Quantifying Shape, Shading and Cast Shadows in Realist Master Drawings and Painting," *Proc. Int'l Soc. for Optical Eng. (SPIE)*, vol. 6314, 2006, pp. 63150K1-63150K6.
6. D.G. Stork and M.K. Johnson, "Estimating the Location of Illuminants in Realist Master Paintings: Computer Image Analysis Addresses a Debate in Art History of the Baroque," *Proc. Int'l Conf. Pattern Recognition*, IEEE CS Press, 2006, pp. 255-258.
7. D.G. Stork and M. Duarte, "Fidelity Analysis of Mechanically Aided Copying/Enlarging of Jan van Eyck's *Portrait of Niccolò Albergati*," *SPIE Electronic Imaging*, 2007, pp. 649903-1-649903-6.
8. D.G. Stork and J. Coddington, eds., *Computer Image Analysis in the Study of Art*, SPIE Press, to be published in 2008.

IEEE

MultiMedia

Visit us on the Web

- Subscribe or renew online
- Access our digital archives
- View calls for papers
- Submit an article
- Sign up for our RSS feed

www.computer.org/multimedia