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SNAPSHOT

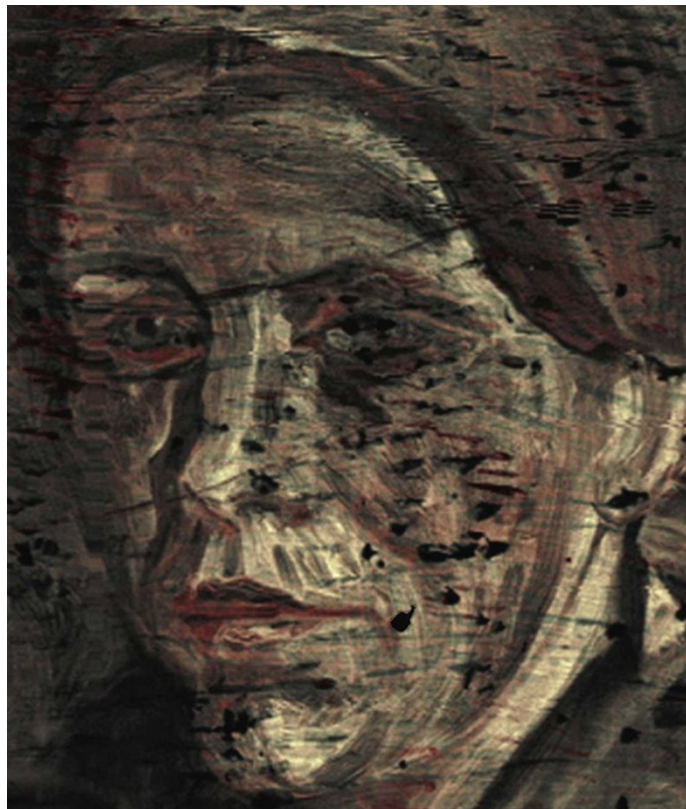
The hidden van Gogh

An unknown Vincent van Gogh painting of a woman's head has been revealed with X-ray technology. The painting is thought to have been made in 1884–85, during a period in which he painted several portraits of peasants in the Dutch village of Nuenen. The image was hidden beneath *Patch of Grass*, an unrelated landscape that van Gogh painted a year or two later when living in Paris.

Earlier X-ray studies revealed a faint, blurry shadow of a figure. But Joris Dik of the Delft University of Technology in the Netherlands and his colleagues have extracted a much sharper image using the Deutsches Elektronen-Synchrotron (DESY) in Hamburg, Germany (J. Dik *et al. Anal. Chem.*

doi:10.1021/ac800965g; 2008). The synchrotron's X-ray beam excites secondary X-rays from elements in the sample at characteristic wavelengths. The researchers mapped the distributions of cobalt, arsenic, lead and other metals in the hidden paint layers — all well-known components of pigments that were available at the time. Although the study did not identify all the pigments in the picture, it enabled the researchers to create the partial colour reconstruction shown here.

Van Gogh often re-used old canvases, partly in an effort to save money. Dik's team speculates that he took the portrait with him to Paris, where it would have seemed sombre and unfashionable in comparison to the Impressionists' works, and so he decided to paint a brighter, more commercial floral scene over it. Philip Ball



DELFT UNIV. OF TECHNOLOGY

Q&A: Pier Oddone

The director of Fermi National Accelerator Laboratory in Batavia, Illinois, talks to **Eric Hand** about the uncertain future of particle colliders in the United States.



FERMILAB

Did Fermilab welcome the \$337.5 million for science in last month's congressional spending bill after a dismal 2008 budget?

Fermilab received an allocation of essentially \$29.5 million, including \$9.5 million to get Nova [a neutrino project] restarted — it had been zero-ed out in the 2008 omnibus bill. Nova is a project that needs to be done within a reasonable timescale and can't lose much more time. The other \$20 million was used to avoid layoffs and to shore up staff. It eliminated the involuntary stage of our layoffs.

Delays at the Large Hadron Collider (LHC) at CERN, near Geneva, led to a push to continue running Fermilab's Tevatron. Was that a boon for your scientists?

Our scientists are involved in both colliders, so it's not an issue of it being a boon for us. It has always seemed to me that the prudent thing would be to run the Tevatron until it is clearly overtaken by the LHC, and that

means having colliding beams at energy, with reasonable luminosities.

The Tevatron is the last US particle collider and will eventually be turned off. What then for Fermilab?

We still have the highest-intensity neutrino beam in the world. We have a project to greatly upgrade that, and it would give us a world-class machine at what we call the 'intensity frontier'. Ultimately, we'd go to Project X and that new beam line would go up to 2.5 megawatts. That's a very rich programme. In addition to doing neutrinos, you can tackle what we call rare decays or rare transitions.

But many come to Fermilab to work at the energy frontier. What will it mean not to have a collider in the United States?

It would be really depressing if we totally gave up on the energy frontier here. The

energy frontier has moved: for quite a while, it has been in the United States and now it's going to Europe. We have aimed to have a critical mass [of expertise] such that once the detectors are running at the LHC, the experience of coming to Fermilab to do physics will be as rich as it would be to go to CERN.

US budgets mean that the proposed International Linear Collider (ILC) will probably be hosted outside America.

The method of funding in the United States — year-to-year budgets, with surprises in the middle of a fiscal year — is clearly not a system that would allow you to have a partnership to build an international facility in the United States. It's symptomatic of a problem that I think needs to be fixed; perhaps by treaty, or by putting the money up front, the way we build big aircraft carriers. ■