LEON BELLAN, a Polytechnic School student, holds copies of color samples he used in his study of a human's ability to detect soiling on artwork. He will present his findings this weekend at the American Association for the Advancement of Science meeting.
Staff photos by WALT MANCINI

Study uncovers art's dirty truth

Student's work reviews ability to see buildup

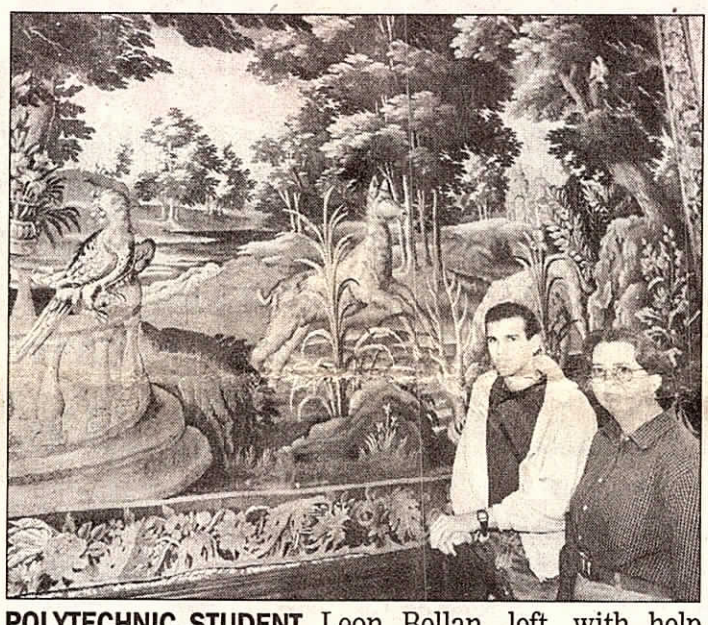
By Andrew Bridges
STAFF WRITER

PASADENA — Few can define what a dirty painting is, but they know one when they see it.

Leon Bellan can tell you why.

The 17-year-old Polytechnic School senior has wrapped up a two-year study on the human ability to detect the buildup of soot on works of art, including paintings and tapestries.

For years, art experts have been able to determine soot deposition rates for works of art housed in many museums, generally by measuring ambient amounts of airborne pollutants associated with the burning of fossil fuels.



POLYTECHNIC STUDENT Leon Bellan, left, with help from Lynn Garry Salmon, a Caltech research scientist, studied the ability to see soot buildup on art.

What has been largely unknown is at what point the microscopic particles of carbon and other substances accumulate to the point they become visible to the naked eye.

Take the Sistine Chapel ceiling as a case in point. A thorough cleaning job completed a decade ago provoked an international outcry among those art lovers who had grown accustomed to the previously muted, dingy tones of Michelangelo's fresco cycle, and not the vibrantly rich palette of colors revealed after the restoration work was completed.

Previous studies undertaken in the 1950s claimed that as little as 0.2 percent coverage of black particles on a pure white background would be visible to a human observer.

"But the figures they came up with didn't reflect any kind of actual situation," Bellan said.

Bellan's study, the results of which he is presenting this weekend at the American Association for the Advancement of Science meeting in Anaheim, shows that a much greater accumulation of black carbon is necessary before a colored surface is visibly soiled.

"For years, we have being going into galleries and museums and measuring the rate

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$1.8 million to boost freeway study

Dedicated truck lanes could improve safety and ease traffic congestion

By Dan Lee
Staff Writer

LOS ANGELES — A regional planning agency has received an additional $1.8 million in state funding to study adding dedicated truck lanes to Southland freeways, officials said this week.

The money will allow the Southern California Association of Governments to add the Long Beach (710), Santa Ana (5) and Ontario (15) freeways to its feasibility studies, said SCAG planning official Hasan Ikhrata.

The designated planning agency for a six-county region, SCAG has already received $500,000 in state funding for a similar study on the Pomona (60) Freeway, he said.

"The benefit is in not just improving congestion, but saving lives," Ikhrata said of the truck lanes. "There will definitely be much less accidents."

'The benefit is in not just improving congestion, but saving lives. There will definitely be much less accidents.'

Hasan Ikhrata, SCAG planning official

The studies — which would take a year starting in March — will focus on the engineering challenges posed by truck lanes, he added.

Officials have to determine whether there is enough room to add truck lanes or if lanes can be added above or below the freeways, he said. The studies will also explore what the environmental and community impacts might be.

Ikhrata said the proposed truck lanes would run:

- on the Pomona Freeway from the Long Beach Freeway east to the San Bernardino (10) Freeway;
- on the Long Beach Freeway from the Port of Long Beach north to the Pomona Freeway;
- on the Santa Ana Freeway from the San Gabriel River (605) Freeway north to the Antelope Valley (14) Freeway; and,
- on the Ontario Freeway from the Pomona Freeway to Barstow.

The truck-lane concept was included last year in SCAG's regional master transportation plan, because the planning agency is expecting truck traffic to increase by as much as 40 percent by 2020.

Glendora Mayor Sue Bauer, who heads a SCAG task force on the subject, said truck lane are one possible means of hel ing officials continue to mee federal air quality standards fo the region.

"We have to see if the actua (financial) investment is wort the outcome (in air quality), Bauer said. "Whether it's poss ble or not yet, we do no know."

If truck lanes aren't practica SCAG would have to revam its regional transportation pla to meet federal air quality star dards, she said.

Bauer and other officials me Thursday at SCAG headquar ters in downtown Los Angele to discuss how to study truc traffic patterns and to creat other components of the feas bility study.

Construction of the truc lanes could be partially funde by special taxes or tolls o trucking companies.

ART

Study casts light on dirt

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of deposition of particles from the air," said Lynn Salmon, a Caltech research scientist who assisted Bellan with his research. "His study was a nice way of saying when does the public care."

Soot is a major problem for museums, especially in cities like Los Angeles, which has the nation's worst air pollution.

"Particles deposited on a painting can change more than just its tone and color," said Joe Fronek, the Los Angeles County Museum of Art's head of paintings conservation. "It also changes how the painting appears, it can take away its depth."

In a laboratory setting, Bellan found a group of 30 test subjects could say with 100 percent accuracy whether a colored sample was soiled only when at least 12 percent of its surface was uniformly covered with microscopic printed dots, which simulate minute particles of soot.

Soiling begins to be apparent to some observers with coverage as low as 2.4 percent — still 12 times the 0.2 percent threshold reported in previous studies, Bellan found.

Salmon, who has done her own research into air pollution's effect on paintings, said Bellan's work could prove invaluable for museum curators.

"This will tell them whether they need to worry more," Salmon said.

Bellan is being joined thi weekend in Anaheim by fellov Poly student Dana Sadava, wh studied volcanic rocks from Swa ziland and South Africa to pin point the geographic location o South Africa 2.9 billion years ag — a time when the protoconti nents were being formed.