

An Interview With Project Chameleo's Richard Schowengerdt

by Robert Guffey

he title of this interview serves several purposes at once, both literal and metaphorical. Although it's a reference to a classic 1963 science fiction story by Robert Silverberg, the subject matter is hardly science fiction. Richard Schowengerdt, founder of Project Chameleo, has successfully developed a technique to make men invisible.

A team of U.S. and British researchers at Duke University in North Carolina and a Tokyo professor named Susumu Tachi have recently attracted a great deal of media attention by making very similar claims. However, whereas the invisibility techniques of both Tachi and the Duke University team remain rather limited in scope, Schowengerdt's has the potential to revolutionize covert warfare—if, in fact, such a contingency hasn't already occurred.

Over the past five decades Schowengerdt has been quietly responsible for a number of innovations in the field of electromagnetics while working under the auspices of the U.S. military at installations such as the Navy Metrology Engineering Center (MEC), the Naval Sea Systems Command Technical Representative Office (NAVSEA

TECHREP AEGIS), and with the Naval Reserve at the Miramar Naval Air Station and the Naval Air Station, Pt. Mugu, among several other installations.

At MEC he was instrumental in developing the first digital voltmeters in concert with industry, as well as directing nuclear magnetic and Josephson's Effect research with the National Bureau of Standards, now designated as the National Institute of Standards and Technology (NIST).

Furthermore, when he worked for NAVSEA he pioneered a concept for closed-loop testing of guided missiles that reduced the need for excessive missile firings on a test range. Currently, he is working at the El Segundo division of Northrop Grumman Corporation (NGC) where he is responsible for engineering surveillance of the NGC workshare on the EA-18G Growler, a new fighter aircraft designed to replace the EA-6 Prowler, the primary electronic warfare aircraft used by both the Navy and the Marines.

Schowengerdt's private experiments with electro-optical camouflage began in 1987, but it wasn't until 1993 that he launched Project Chameleo. He finally secured Project Chameleo
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Patent No. 5,307,162 entitled "Cloaking Using Optoelectronically Controlled Camouflage" on April 26, 1994. Later he teamed up with an associate in Hemet, California, Dr. Lev Berger, and performed some tests and simulations involving Project Chameleo technology, culminating in the presentation of a paper, "Physical Aspects of Electro-Optical Camouflage," at the American Physical Society Centennial in Atlanta on March 23, 1999. In

February 2005 he presented another paper titled "Innovations in Electro-Optical Camouflage—PROJECT CHA-MELEO" at a Military Sensing Symposium at SPAWAR, Charleston, South Carolina. His pioneering experiments

with optical camouflage continue to this day.

And yet, despite these and other accomplishments, few people have ever heard of Schowengerdt's work. To correct this oversight, I decided to shine a spotlight on the Invisible Man himself. I recently sat down with Mr. Schowengerdt on the campus of California State University Long Beach and talked with him for three hours about the possible effects his technology will have not only on the military, but on everyday life.

Guffey: Can you briefly give us a rundown of your pro-

fessional background?

Schowengerdt: I'm an engineer by profession. I also have a bachelor's degree in business administration. I've been in the aerospace industry for over forty years and in and out of the government, so I have a lot of diverse experience as an electronics engineer. I'm also a registered professional engineer (electrical) by examination.

Guffey: And what is Project Chameleo?

Schowengerdt: Project Chameleo was conceived with the idea that we could take a background and present it on a surface surrounding an object or in front of an object and portray the background on this image, giving you the same effect as if you were looking through the object, seeing the background behind it. And the chameleon does this; that's why I chose Chameleo, which is the Latin word for the genus chameleo, or chameleon.

Guffey: When did you first come up with the idea for all this?

Schowengerdt: Well, one day in 1987 I was walking with my buddy around the grounds over at Pico Rivera where the B2 facility was. We were walking around at noontime talking about how it would be neat if we could somehow build something that would screen an object so you'd be looking through it. That's how I got started on

it, discussing it with my buddy at lunchtime. And then, about a year later, I started actively working on it.

Guffey: And what was your immediate impression as

to what the applications would be in daily life?

Schowengerdt: Well, my first thought was that it would be used primarily by the military or law-enforcement personnel, but then of course there are a lot of commercial applications as well. Security, hiding industrial facilities from view, and conserving or protecting strategic assets. There are a lot of potential uses for the commercial sector as well as the government.

Guffey: How could the military use this?

Schowengerdt: Mainly they would build a shield around a vehicle, an aircraft. A simple case would be where you have a tank moving along and you have one side shielded, so the tank is moving along and people are observing it from the side and all they see is the wall it's moving against or the background it's moving against.

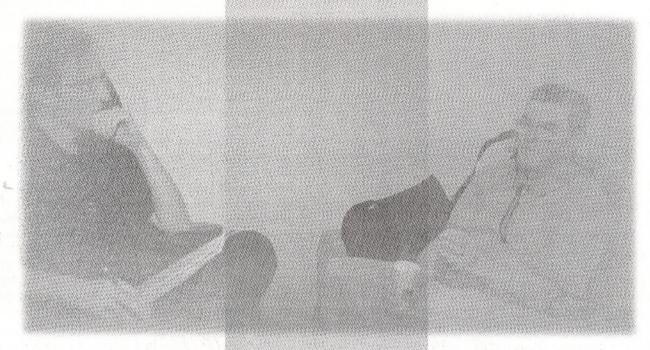
Guffey: Right. And so the shield is blending with the background, so it's not exactly invisibility but more like

super camouflage.

Schowengerdt: Well, it's a matter of degree and the scenario that it's used for. For moving targets, it's difficult. It takes highly sophisticated electronics, and you have to match the terrain. It becomes especially difficult to match vertical lines. Horizontals aren't as bad as verticals, but matching vertical lines in the background are difficult. It can be done, but it's very expensive.

With stationary targets it's much easier. And distance is a major factor. The further you are away from the ob-

TO SEE THE INVISIBLE MAN



ject, the easier it is to camouflage it. If you're a mile or so away, it's very easy compared to, let's say, three or four hundred feet, which becomes extremely more difficult. And there's some physical laws that enter into the equation where you can calculate exactly what degree of resolution you can get at certain distances.

Guffey: What physical laws?

Schowengerdt: These are optics laws, basically, resolution of optics, and we did some calculations and came out with a magic number of 700 feet. If you're further than 700 feet you can do a very decent job of camouflage, even on a moving target, but as it moves in closer it becomes extremely difficult. If you remember the 1987 movie *Predator*, the monster, the beast came out of the jungle and when he came close, the jungle started moving around him. So that's what happens basically, you get distortion, extreme distortion.

Guffey: In fact, when I was reading your patent, that's the first thing I thought of, the *Predator* movie.

Schowengerdt: Right. The movies do a very good job in portraying that. They have some good consultants no doubt working for them in optics. Predator is a very good example of one of the older movies where that law can be observed. As the creature got up in the top of the tree, he could be seen only if you looked extremely close; you could see a shimmering of light, a shimmering of the tree. Reflections on the leaves did not look quite normal. But you had to look really close to see it. So that's the kind of distortion you get with this system.

Guffey: So, if you're going to shield, say, an installation, a building, and somebody is flying overhead, they wouldn't be able to see it?

Schowengerdt: That would be pretty easy; with a stationary facility you can depict the ground underneath, or whatever, or the surrounding forest. You can super-

impose that on the cloth of the facility, and you can do a very good job of terrain-matching so it's almost virtually impossible to see.

Guffey: What about, for example, masking radar or heat emissions?

Schowengerdt: If the enemy is employing sophisticated sensors, then he may see that there's really an object that does not match the terrain. But there are ways to get around that. There are some ways you can fool these sensors, or you can lead them to believe it's not what they think it is. A lot of this begins to get into classified areas when you start talking about countermeasures, countercountermeasures and all this.

Guffey: So if I were to ask you what certain countermeasures were, would you be able to tell me?

Schowengerdt: If I get into specifics, it may get into classified areas if I start talking numbers with you.

Guffey: Could you tell me in general?

Schowengerdt: Oh yeah, certainly. What were you thinking of?

Guffey: In terms of countermeasures, for example, if you have an installation and somebody is flying overhead and they notice the terrain is not matching what they're detecting, how would you be able to fool them into thinking it's something else?

Schowengerdt: You would put a device on the surface of the object you're shielding, and you regenerate a signal or some kind of a deception, deceptive signal, to portray that it's something different than what it really is.

Guffey: Is this technology more speculative than operative?

Schowengerdt: There are programs that I know are in operation. As far as my project is concerned, to my knowledge there is no direct evidence that it is being used, but the Army has released some information about

their Future Soldier program, where they mention that it will have a skin that will blend into the background in a chameleonic fashion, but they don't describe how they're going to do this. I can only assume that it's related to some kind of a sensor that would sense the background and then display it on the skin, on the uniform. I know they're working on this, but I don't know to what extent they've developed it.

Guffey: Before you were talking about the building being stationary, but you just mentioned a scenario in

which you can actually do this on a person.

Schowengerdt: Oh yes, yes. I mentioned that in my patent. I mentioned that it can be used to conceal men, vehicles, whatever.

Guffey: I understand this device working when the object is stationary, but when you have a person who is moving around, perhaps in a covert situation, how would you get him so that his body is consistent in blending into the background?

Schowengerdt: You need to have a group of sensor

cells on the side facing the background, and as the person turns, you have an array of these sensors, and you can have them blended in with display pixels as well. Even now there's a type of cell, developed by NASA, that serves both as a sensor and a display.

So you could use these kinds of cells; you could have hundreds of these on a uniform, and as a person turns, the background would be displayed in front, and through

miniature computerized programs you could program it so it would blend in pretty good with the way it should be looking from the view of the observer. Obviously, for the Soldier of the Future to blend into the background would be an asset, a terrific asset. And for, of course, spies or people who are operating in covert assignments, it would be ideal not to be seen.

Guffey: You mentioned the Soldier of the Future, but what about the soldier of now? Do you think it's possible that something like this is already being done by the military?

Schowengerdt: The Army has told me they don't have funding for this program yet. The Future Soldier is a concept they have. They have people working on it, consultants, and they told me about a year ago that they

do not have a program established yet with funding and milestones and all. The typical DoD development program has not yet been established. Now they may be doing something on their own internal funds. That I don't know.

Guffey: Is there anybody other than the Army who'd be interested in developing it?

Schowengerdt: The Navy has shown some intense interest. I was interviewed by the Navy. The Navy came out to see me last March, and I made a presentation to them. This was a team of three people, including the chief of a Naval operations strategic studies group. They were studying technologies that could be applied in the year 2025 in the fight against global terrorism. So the Navy is very interested, and they told me they intended to give Project Chameleo a good recommendation for the type of technology that could be applied by that time period.

Guffey: And how did they find out about you and your

project?

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should be seeing.

Schowengerdt: It was mainly through my appearance

psychological warfare. person thinks he's not what he really

back in Charleston at a Military Sensing Symposium (MSS) in February, the month before. A gentleman contacted me from the Navy about Project Chameleo and said they would like to come out and talk to me about it. So I said, "Are you going to Charleston to the symposium?" And he said no, they could not make it there, but they would be coming

out here. So they came out the following month, to Anaheim.

Guffey: Tell me about the presentation.

Schowengerdt: It was a military sensing symposium, and it was composed of Army, Navy, Air Force, and contractor personnel. It was a multiservice-type group. The papers covered a lot of areas, but one of the subgroups was visual camouflage. I sent in an abstract and they accepted it. I spoke for about 45 minutes.

Guffey: And what were their reactions to what you had

to say?

Schowengerdt: I had one very unsettling reaction. About midway through my presentation the group moderator came up and whispered in my ear that I was revealing Top Secret information. This was following a

remark I made about the Future Soldier program—that they intended to develop a suit that would change in a chameleonic fashion.

It was that phrase that prompted someone in the audience to say to the moderator that I was revealing Top Secret information. I said I don't think so, and she said, "Well, see me right after the presentation." So I went ahead with the presentation and then I was hustled off into a room of about three or four security personnel, and they had me in there over half an hour questioning me.

Where did I get this information? And so forth. And I said that I got it out of a public-release document from the Future Soldier program at NATEC. And the lady said, "Do you have that document with you?" And I said, "I sure do, it's out in the car." She said, "Let's go get it."

So she walked with me to the car to get the document. We came back in and continued our conversation with the security people there, and then they called in the lady who claimed this was Top Secret information and questioned her on it. She finally had to admit that evidently it had been declassified.

Guffey: Did they ask you if you were working on a Top Secret project?

Schowengerdt: They asked me if I was cleared for Top Secret, and I said, well, yes, I am cleared for Top Secret, but not on a program like this.

Guffey: Is it possible that when these people came and talked to you, they might have been interested in seeing what you knew about something they were already working on?

Schowengerdt: I think so, possibly. Or to get my slant on it. I know the Army really went out to bat for me to get me in that conference. It was not easy because my regular employer would not sponsor me. And this was a classified meeting, so I had to get my clearance sent in.

Since my immediate organization would not sponsor me, I had to go over their head and get my clearance sent in by headquarters. But then I was up against another obstacle. I still could not get into the conference until I had established a need-to-know, and my organization would not give me that because I was going under my own auspices, you know, my own personal program.

So I contacted the Army and they went to bat for me. The head of the Army symposia group, I guess, wanted me there bad enough that he gave the go-ahead on it to the security people in the Army who gave me the need-to-know. So I was admitted to the conference.

Guffey: Since 9/11 there's been a rise in surveillance. Is it possible that this technology will be used to monitor private citizens in the United States? Is that a concern?

Schowengerdt: Yes, it could be a concern, and our intelligence people could possibly utilize this to spy on our own citizens. I don't think it's very likely they would do that because they have other ways of infringing on our privacy that are more direct, such as monitoring our communications and all that. So I don't think they have a strong need to conceal themselves from us visually in order to do something.

I think a more practical application would be with security people who could be sitting, for example, over here on a tower somewhere, observing things, and this observation tower could be made totally invisible, and they could monitor traffic down below; they could monitor all kinds of criminal things going on visually by just sitting there watching what's going on.

It's kind of an extension of video surveillance, except in this case there could be operators in that tower. They could be looking out and visually seeing what's going on down below them. And this could add, let's say, a third dimension or fourth dimension to simple video cameras, because it takes a lot of cameras in many locations to see everything that's going on, whereas up on a tower looking down, you can see all kinds of things, and if people don't know you're there, it makes it even better.

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tracks.

... do something real easy, something small and hand-held so that you can move around with. I said, sure I can do that.

Guffey: So this could be used to counter possible terrorist cells.

Schowengerdt: Oh yes, absolutely. Counterterrorism. And the Navy, I think, appreciated that when I made the presentation. They could see the advantage of the fact that you could be invisible to what's going on. In my presentation I showed how one of their new ships could be concealed and just sort of blend into the ocean, pretty close to the shoreline. And just for a little emphasis, I showed that, sure, I'm concealing the ship, but here's these two guys sticking their head up through the port hole, and they're sitting out there sort of above the water, and I had a little footnote saying, "Tell those guys to put their head back inside next time."

Guffey: I wondered about that. If I have one of these suits on and I'm holding a coffee cup in my hand, is the

coffee cup visible?

Schowengerdt: You could even eliminate the coffee cup if you wanted to. With a computerized system you could screen out things that you wanted to screen out, or you could make it appear to be something it's really not. You could make a human being appear to be an animal, let's say, or a tree or you could paint a portrait on the surface of the object of whatever you wanted it to be. It does not necessarily have to blend in with the background. If you had difficulty blending it, for example, well, make it a tree. That looks natural.

Guffey: That's very interesting. We've gone beyond just camouflage, but also to the use this could have in the psychological warfare arena as well.

Schowengerdt: Right. It gets more into deception. Vi-

sual deception.

Guffey: So if, for example, let's take Fidel Castro, somebody like that, and you wanted to imbalance him, couldn't you use this to sort of slowly drive him mad?

Schowengerdt: Yeah, it could be used for psychological warfare. You could create a situation where a person thinks he's not seeing what he really should be seeing. That he's had too many drinks or he's done something. He's on something. And, right, you could do things that would greatly disturb the psyche of a group of people.

Guffey: And would it affect everybody in the immedi-

ate area or could you target a particular person?

Schowengerdt: You can target a segment of people. To target one person is very difficult because of the optics of the situation. You would have to know exactly where the

person is you want to deceive. You'd have to know their coordinates exactly in order to do that, and that may be very difficult to achieve.

I think in the future we'll be able to do a lot of those things. We'll be able to pinpoint where people are by geographical coordinates, and then we can, in the simulation system, screen those people or select those people to be targeted. I think that's in the future, but right now about the best you can do is target an area, a group of people in a, let's say, a quadrant—like that quadrant over there, let's say, 45 degrees or so, one side or the other. To do much better than that right now is not feasible.

Guffey: So if you had people in an enclosed area, you could just target that area. You could really bombard

them with hallucinations.

Schowengerdt: You could actually create things that are so goofy they would begin to wonder what's going on.

Guffey: I believe you're doing a Freedom of Information Act (FOIA) investigation involving this technology?

Schowengerdt: I did launch a FOIA investigation, and the only thing I was able to determine was that the Army is doing some investigation. And it kind of stopped at that level. I was unable to get down below there and find out exactly what's being done by the Army.

Guffey: You said the Navy was interested too. Did you

initiate a FOIA request through the Navy?

Schowengerdt: Well, I went to an attorney and we went to all the services. Actually, we went to DoD, and then DoD eventually pointed us down toward the Army. And we were really unable to determine what documents should be requested because the way the FOIA works, you have to identify specific documents. You cannot identify merely a concept or an idea. You have to identify a set of documents. So if you don't have the names of documents or numbers of documents, you can't do anything. So you can't get past that wall of secrecy, you know.

Guffey: Ostensibly, it's open information, but you need to know the specific serial numbers, and since you can't

know that then—

Schowengerdt: That's right, you don't have access to it. If you have, for example, a letter with a date and who signed it and you requisition that letter, then they have to either give it to you or deny it to you. And they can deny it to you under security laws and say it's classified. So they can stop you no matter what. But if it's unclassified, then they have to give it to you, theoretically.

Guffey: So you need somebody on the inside to say, "Look for this specific document."

Schowengerdt: If you have somebody on the inside who can identify a document or drawing that's unclassified you can theoretically get it through FOIA. And many times you'll see black marks throughout almost everything, so you end up with a page that's half black.

Guffey: Since the Patriot Act, I believe it's even more difficult to get a Freedom of Information Act request

through.

Schowengerdt: It probably is. They throw every roadblock they can in your path, on technicalities, to discourage you and to get you to give up on this. They put the burden on you to make a positive identification of exactly what it is you want in terms of a name, a number and so forth. So it makes it very difficult unless you're on the inside.

Guffey: Can you explain what prompted you to initiate the FOIA request?

Schowengerdt: Mainly, I was motivated by patent protection. My patent is due to run out. I just renewed it again for eight years last year, so I've got another eight years to go, but if I don't do anything in eight years I've lost it, and it will go into the public domain. That frequently happens with patents. Many of them are high-technology or before their time, like Nikola Tesla, for example, who was way before his time. And for many of these things, the cost of implementing something is so great at this point in time that it's not realized till after the patent has run out. I have some hopes, but I don't have great hopes that I'll be able to achieve this before the patent runs out.

Guffey: If this technology is being used now, shouldn't

you have some rights to that?

Schowengerdt: Only if you can prove it. You have to prove that it infringes on your patent. The burden of proof is on you, the patent holder, to prove beyond a doubt that this patent is being infringed upon. It's very difficult.

A good example is the man who invented the intermittent windshield wiper. He nearly lost it, but he finally managed to collect on that from all of the major automobile manufacturers—General Motors, Ford, Chrysler. In the end, all of them had to pay off on that to the tune of millions of dollars. But the patent holder himself only got, I think, a quarter of a million dollars, and the attorneys got the rest.

You know, that's what happened. His attorneys got the lion's share of it. And this was a long legal battle. I think it took ten years to resolve. And that was a simple case where it's a simple mechanical object that is pretty easy to prosecute relative to something like mine, which is more complex and very difficult to show infringement.

Guffey: You can't see it. It sounds like you suspect there's somebody out there who's making use of your

ideas without your knowledge.

Schowengerdt: I do suspect that the military is already working on it. A few years ago I was contacted by a company in San Diego and I met with one of their representatives, and we had a long discussion on the subject. I later found that they had a big contract with the Army and were developing something similar to this, but there was a wall of secrecy there I could never get past. It was a dead end.

Guffey: What year was this?

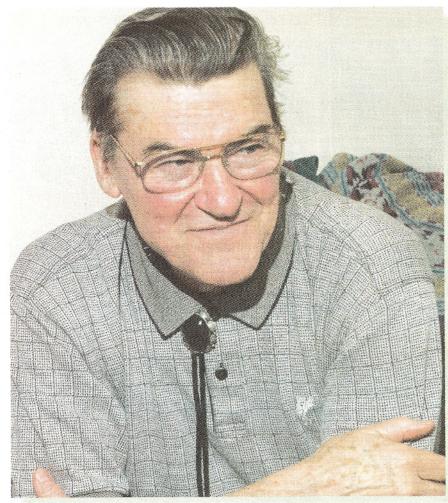
Schowengerdt: I think it was over five years ago that I had a conversation with those people and interchanged some correspondence, but it never led to anything positive. I think they were picking my brain rather than the other way around.

The name of the company is Science Applications International Corporation. They're a consulting firm in San Diego. I agreed to meet with this guy from SAIC. We met in a restaurant here in Los Angeles. I've got all the records on this meeting.

He was amazed that Dr. Schweizer and I—my associate, Dr. Felix Schweizer—had come up with the same things they had been working on in isolation. He said, "It's amazing you've come up with much of the same things we have."

And then I explained to him that I'd been in contact with Dr. Thomas Hafer back at Defense Advanced Research Projects Agency (DARPA), and he said, "Yeah, that's the right person you should be dealing with, Dr. Hafer." And so we had a lot in common.

He was telling me a lot about what they were doing, that they had a contract with the Army and that they were doing things with the Army. But then later I wrote a letter to the president of SAIC and suggested that we enter into some kind of a mutual collaboration group and that I could license them because I have the patent rights. I got a letter back saying something like they would consider this and get back with me and that was the end of it. Then



I sent a follow-up letter and I never got a response. So I came to the conclusion that these people were already doing it.

Guffey: These people sort of sound like vacuum cleaners. I mean, they come in, suck up information, then

leave and never get back to you.

Schowengerdt: Yeah. Now, we were doing it so much near the same time frame that, legitimately, they might claim they came up with it independently. And it's possible. I have the patent on it but now it was brought out to me by the patent office that there are patents that are classified.

They're not in the public domain. They've not yet been released. They're reserved for the military and it could very well be that SAIC has that kind of a patent pending. It's called *patent pending*, a release from the military because you cannot have a secret patent.

cause you cannot have a secret patent.

In other words, you can have a secret patent pending, but when you file and release it, it's put in a public book.

The patent office issues a book, and so it cannot be classified at that point in time. So if the military is using things, they can do it in a clandestine atmosphere that's

protected by U.S. patent laws.

In other words, the military is allowed to use anything they want. But that does not mean they can manufacture and sell products based on these ideas. They can't do that. So what they do is that usually they go out and get a company to develop and manufacture something. That's when you have to step in and sue them for patent infringement. So if a company starts producing cloaking systems, that's where I can step in and sue the company.

Guffey: What are your immediate plans

for Project Chameleo?

Schowengerdt: My partner out in Hemet, Dr. Lev Berger, wants me to develop something real simple. He said do something real easy, something small and hand-held so that you can move around with. I said, sure I can do that. I think I can do that. It won't cost me too much.

Guffey: Are you having trouble with fi-

nancing right now?

Schowengerdt: Well, to do the sophisticated stuff, yeah. We've done some lab experiments and things like that down in Hemet, and we've demonstrated the concept. It's not a question of the concept not working, it's more the degree of fidelity you can get. If you want the best displays you're going to have to put some extraordinary coatings on it, antireflective coatings on it. And that's the problem I run into. That starts to get expensive. I have a concept for a type of display that would prevent this, but to develop that display it would probably cost \$6,000 dollars or so.

Guffey: Can you tell me a little something about your

partner?

Schowengerdt: He's a fascinating guy. An eminent physicist, well-recognized all over the world. He's from Russia. He's got a good sense of humor and a real wit to him, and he used to work for the Russian navy. He was a civilian and he was also military.

He got interested and sympathetic toward my design because in World War II in Russia, many times they would camouflage railway trains by painting on the roof. They would paint the railroad tracks on the roof of the train so if you're looking down from above, all you see is the railroad tracks. You can't see the train moving. So he got real intrigued with it, and he's been my supporter, one of my sole supporters, for quite a long time.

And he's collaborated with me on a couple of papers; one we presented at the American Physical Society at their Centennial in 1999, I believe. And then he helped me on my most recent papers too. He sort of went over some of the calculations and things, confirmed what I said was true and reliable. He's got a laboratory where he does testing for various companies and the government. An excellent, isolated place to do work.

Guffey: Yeah, Hemet is pretty much no-man's land. Schowengerdt: So I took the Navy out there, these Navy people. I escorted them out there and gave them a tour of that lab. They were quite impressed with it. They liked our work. But we haven't got any contract yet. We're still waiting.

Robert Guffey is a graduate of the Master of Fine Arts Program at California State University at Long Beach and the Clarion writer's workshop in Seattle, WA. His first published short story, "The Infant Kiss," received an honorable mention in the 2001 edition of *The Year's Best Fantasy & Horror*, Vol. 14. (Eos., 2001)

His short stories, articles, and interviews have appeared in such magazines and anthologies as After Shocks, The Chiron Review, Like Water Burning, Modern Magic, Mysteries, New Dawn, The New York Review of Science Fiction, Paranoia, The Pedestal, Riprap, Steamshovel Press, and The Third Alternative. He is currently teaching English at CSU Long Beach. He can be contacted at rguffey@hotmail.com.

