

Statement of Carter Gooding

1 My name is Carter Gooding. I am 50 years old. For the last 12 years, I have worked as a forensic
2 entomologist in private practice, as well as serving as an adjunct professor at both Purdue and the
3 University of Georgia. I am also a partner in the American Forensic Entomological Consultancy LLP
4 (“AFEC”). AFEC is a group of forensic entomologists who have been given an exclusive contract to
5 serve as entomological experts by the National District Attorneys’ Association, assisting prosecutors’
6 offices across the U.S., Canada, and U.S. Virgin Islands. As such, we use our knowledge of insects and
7 arthropods to help determine what happened at crime scenes. We are paid \$1500/day for our services and
8 testimony, including travel time. That is a discount from my usual rate of \$300/hour as a private
9 consultant. Unless subpoenaed by the defense, we testify exclusively for the prosecution. We are not as
10 one-sided as that sounds, though. We give our honest scientific appraisal, and if our findings don’t
11 support their theory of the case, prosecutors often won’t bring charges.

12 I have attached the forensics-focused version of my curriculum vitae for your review. In
13 summary, I received my B.S. in Biological Engineering with minors in Architectural Engineering and
14 Crop Science from Purdue University. I went on to earn my Ph.D. in Entomology in 1992. I took a post-
15 doctoral position with the Federal Bureau of Investigation and worked, first in their national criminal
16 laboratory, and then as a member of the Evidence Response Team Unit. Ten years later, my kids were
17 getting to be college age, so I entered private practice because of the higher pay. A few years ago I joined
18 AFEC, and it now accounts for 15 – 20% of my income. The majority of my time I focus on agricultural
19 or biological engineering, developing crops that are resistant to insects or helping communities fight
20 against invasive insect species through effective pesticide use or plant selection strategies.

21 Despite the portrayal of CSI investigators on TV, we don’t work in labs full of shiny equipment
22 or super-computers. We mainly use our brains, experience, and some basic tools to make fairly
23 straightforward conclusions. That’s all I’m doing in this case. Late in the evening on September 15, 2014,
24 I received a call from the AFEC hotline, asking if I wanted to take this job. I’d never been to Utopia, so I
25 agreed to do it. The next morning, I loaded up my gear into my truck and headed out, arriving late that
26 night. I visited the crime scene at Utopia University (“UU”) for the first time just after dawn on
27 September 17. I met the officer on the scene and the local police chief, who introduced me to UU’s Vice
28 Dean for Facilities, Frankford Milam. We went together to visit the scene. According to Milam, the gate
29 that partially collapsed was a *Paifang* donated to the university in 1868 in celebration of the Burlingame
30 Treaty establishing cordial relations between the U.S. and China after the Opium Wars. Anson
31 Burlingame, a Utopia alumni, negotiated the treaty. Burlingame also established an Asian Studies
32 program at Utopia University and an exchange program between UU and Peony University in Peking
33 (now Beijing) in 1871. I soon came to understand the importance of that historical information.

34 We arrived at the *Paifang* to find it surrounded by police tape, flowers, and candles. I was upset to
35 see the memorial. While understandable, this display risked contaminating the crime scene by impacting
36 the insects present. Changes in fragrance or temperature can certainly affect insect behavior. Nonetheless,
37 after taking precautions to avoid further contamination, I crossed the tape and began my inspection.

38 The base of the *Paifang* was solid stone and was in excellent shape. The rest of the structure was
39 lacquered wood as was the custom in archways of that time period. Considering its age, the wood
40 generally was in decent shape. It appeared mostly solid to the eye, with a fairly recent coat of paint and
41 lacquer covering the original decorative carving. At the top were a series of stacked wooden slats. Dean
42 Milam advised me that there had been little or no work done on the *Paifang* since it was substantially
43 refurbished in the 1960s and had some cosmetic work done in the 1980s. Those restorations explained the
44 modern nails and 2x4 fragments I was seeing.

45 I had been told that the victim died after falling from the top of the archway. It was easy to see
46 where it had happened: a large piece of wood was ripped from the western end on the northern face. As I
47 focused on the damaged area, I could see movement. I grabbed a ladder and climbed up. Reaching the
48 top, I immediately discerned a colony of termites crawling all over the wood near where the piece had
49 broken. I grabbed several and was shocked to see, not the telltale markings of the wood termite
50 commonly found in Utopia – the Eastern subterranean termite (*Reticulitermes flavipes*) – but the lighter-
51 shelled Formosan subterranean termite (*Coptotermes formosanus*).

52 It is hard to overstate how shocking this discovery was. These termites had never before been
53 reported in Utopia! In the pest control field, they call the Formosan Subterranean Termite (“FST” or
54 “Formosan” for short) a “super-termite.” The FST is among the most destructive sub-species. A typical
55 Eastern subterranean termite (EST) colony might destroy 5 grams of wood/day, an amount equivalent to a
56 teaspoon of sugar. It would take a long time for an EST colony to damage a large structure like the
57 *Paifang*. Formosan colonies can have ten times as many members, and a mature FST colony can destroy
58 400 grams (13 ounces) of wood/day – 80 times as much. An FST infestation can structurally undermine a
59 full building in a couple of months and can render one unsalvageable in less than a year.

60 I’ve worked against FST invasions before, mostly in Hawaii and Florida, but there’s very little to be
61 done against them. They have never been successfully eradicated from an area after invading it. The one
62 saving grace for now (absent mutation) is that FST eggs will not hatch in temperatures below ~ 20 °C (68
63 °F). As a result, they’re essentially limited to areas south of 35° North latitude, or no farther north than
64 North Carolina. Utopia’s southernmost point is at 40 degrees, or about 350 miles north of that limit. Thus,
65 it’s virtually impossible for the Formosan termites to have migrated to the UU *Paifang* on their own.

66 I immediately began hypothesizing ways that the FSTs could have gotten there. Most Formosan
67 colonies that do not expand naturally from established colonies are introduced inadvertently. Formosan

68 termites are indigenous to southern China and Taiwan; they are not native to the U.S. As best we can tell,
69 the first colonies came to Hawaii via infested wood on a boat in the late 1800s. They reached the mainland
70 U.S. the same way shortly afterward and have been reported in 11 states: Alabama, California, Florida,
71 Georgia, Hawaii, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. Because of
72 UU's location, it was not possible that they could have been introduced to the *Paifang* in that fashion.

73 I next considered the possibility that a dormant colony had been present in the *Paifang* for years,
74 maybe decades. But that made no sense either. For one thing, the scientific evidence for dormancy lasting
75 more than 10 years or so is very thin, limited to a handful of papers, mostly without scientific basis.
76 Controlled experiments cannot rule it out, but prolonged dormancy has only worked in the most ideal
77 laboratory conditions. The variable climate in St. Thomas More County made it extremely unlikely that
78 dormancy could explain the Formosans' presence in the *Paifang*. Second, if there had been a dormant
79 colony, some sort of radical environmental change would be needed to trigger the termites to become
80 active. I was not aware of any such precipitating environmental changes in 2014, nor did Milam
81 remember any. When I subsequently reviewed National Weather Service data, I confirmed that it had not
82 been unusually hot or humid in the area during the summer of 2014.

83 That left intentional implantation as the most likely cause. I first surmised that someone had an
84 anti-China agenda, perhaps a group of students who sympathized with Tibetans or the demonstrators in
85 Hong Kong. Milam acknowledged that Utopia had some students with those ideals, but he didn't think it
86 likely they had implanted the termites. And he didn't believe it could be the actions of rival sports fans.
87 Apparently Utopia's biggest rival is Dartmouth, a college not known for extreme fan reactions. Besides, if
88 opposing fans wanted to insult the Utopia teams, they would more likely vandalize the Utopia Unicorn
89 statue outside the football stadium.

90 I was puzzled. But then I remembered seeing a group of Utopia students while I was in Florida.
91 They were obtaining samples for the UU entomology lab. Milam told me that was impossible, but I
92 ignored him and went straight to the CSI detective on the scene. We called Rebecca Gordon, the UU
93 President, and obtained her permission to search the entomology lab and collect records and samples as
94 needed. In the lab, we found Utopia's licensed laboratory FST colony. It was seemingly half-empty,
95 without any notation in the daily lab reports to indicate the missing termites' disappearance or destination.
96 Morgan McCabe, the post-doc in charge of the lab, stuttered something about a bacterial infection, but it
97 sounded implausible. It turns out McCabe was more of an administrator over the lab than an entomological
98 expert. McCabe's supervision of the lab appeared half-hearted at best.

99 The Utopia City Police Department and Elizabeth Samuels from the Utopia Department of
100 Agriculture conducted a full audit. They reported to me, and stated in their official report, that the lab was
101 one of the best-maintained, most compliant they had inspected in years. Only a handful of things were

missing: an explanation as to where half the Formosan colony went, some records regarding their bedbug laboratory, and several missing chemicals. The lab also had no records of the number of modular insect transport systems they should possess, so it is possible some of them were also missing.

When I reviewed the list of missing chemicals, I recognized one of them as a component used to make synthetic scents that trigger specific insect behaviors. For instance, one is used to make synthetic bedbug pheromones. Pheromones are chemical factors that trigger a social response in members of the same species. These chemicals can attract groups of insects to an area or make a particular location seem more attractive. We sometimes use synthetic bedbug pheromones in apartment buildings to keep infestations contained to one area until linens can be thoroughly washed or destroyed. The pheromone prompts the bedbugs to stay near the scent, reacting to the chemical like a moth to a flame or an undergrad to free donuts.

I did not recognize the other missing chemicals, so that evening I emailed Christiana Kasko, a colleague at the University of Hawaii who is an expert in the FST. Christiana had peer-reviewed an article written at Utopia a year or so earlier which theorized a path to a similar synthetic pheromone to use on Formosan colonies. As far as Christiana knew, it had never been successfully created, but she told me that UU has a reputation for “accidentally forgetting” to share new discoveries with their research partners until the new creations have been patented.

No actual synthetics were found at the UU entomology lab, but the police did find lab notes detailing Utopia’s FST terrarium signed by a Grayson Zayne. Dean Milam told me that Zayne was an undergraduate and student leader. The notes were thorough and well-organized; they looked like graduate level work to me. They were co-signed by the lab director, Morgan McCabe.

I urged the police to speak with both Zayne and McCabe since two of the chemicals mentioned in the FST lab notes were missing. Unfortunately, neither chemical was recovered at the scene or anywhere else. One chemical was water-soluble and the other evaporates rapidly, so their recovery would have been unlikely in any case. And rain the night after the tragic incident would have destroyed any trace on the wood of the *Paifang* even if there had been a valid test for them, which there isn’t.

I was able to conduct genetic tests on the Formosans found in the lab and those found on the *Paifang*. I also had my results verified by the independent lab run by Professor Max Nichols. The two FST colonies are virtually identical to a degree that is very unlikely to be mere chance. However, genetic drift in insects is very limited, and virtually all labs in the country primarily use FSTs from the same original set. Thus, I cannot say to a degree of scientific certainty that the termites on the *Paifang* were taken from the McCabe/Zayne lab (rather than a different lab). That’s certainly the most likely explanation, but I cannot swear to it as a matter of pure science. The genetic match does make it much less likely that the insects were part of a dormant colony. For that to be the case, the colony would have just happened to be

from a genetically near-identical line as our lab source. The odds against that are extremely high, perhaps on the order of 1,000,000 to 1.

The colony structure was also unusual. Typically, Formosans are expansionist, traveling along food sources in ever-expanding rings rather than decimating their colony center before moving to a different location. The *Paifang* colony, however, seemed to have stayed in one place, deeply weakening that location without expanding the colony in any meaningful sense. It was one of the densest groups I have ever seen! Either something in that particular wood was incredibly tasty – which occasionally happens for reasons we do not fully understand – or an artificial chemical trigger, or pheromone, was keeping them in place.

I must note that the degree of destruction in the *Paifang* is more consistent with an infestation of a month or more, rather than one that lasted a week. The damage was so extensive that large swaths of the area from which Harper fell turned almost to dust when touched. The pieces recovered from the ground were no better. The samples I used in my report were the best ones I found, but even those had more holes than a block of Swiss cheese. The damage to the *Paifang* was so serious that it was no surprise the wood where Harper was located broke off easily.

Of course, I am basing my damage assessment timeline on typical FST behavior. But pheromones can significantly change that. Pheromones commonly associated with famine have been documented as causing animals to overeat, sometimes nearly to death. If an FST expert knew which chemicals to use, s/he could promote extensive damage in much less time. I have no way to estimate how much the damage could be accelerated because FSTs do not typically act that way, and no one has published findings that explain how to keep them contained.

I am familiar with Shelby Grody's opinions regarding this case, and although Grody has earned his/her reputation for thinking outside the box, I do not agree with Grody's conclusions. To suggest that a colony of FSTs were dormant in the *Paifang* because of an ancient sealant is possible, I suppose, but extremely unlikely – akin to throwing a pile of sand in the air, expecting it to form a sand castle as it landed. Grody is an acknowledged genius, but his/her best days are apparently past.

Indeed, science is on my side. I can state within a reasonable degree of scientific certainty that the wood of the *Paifang* was weakened by an infestation of Formosan subterranean termites. Moreover, these FSTs were, within a reasonable degree of scientific certainty, introduced by an outside vector to the area of the *Paifang* that collapsed. In addition, the highly localized and compact nature of the colony, despite the colony's large size, suggests within a reasonable degree of scientific certainty that their behavior was affected by an outside force, such as a synthetic pheromone. Based on my experience with FSTs in other locations and my knowledge of architectural engineering design, I conclude that the infestation weakened the *Paifang* to a dangerous degree. When weight was placed on the weakened structure, specifically the

wooden cross-bar at the top, the material failed and collapsed. That fall is the cause of Harper Finch's death. Of course, it is not my role to surmise who placed the insects on the arch. That is a matter for the police.

In preparing for this case, I reviewed the statements of Avery Koltasch, Morgan McCabe, Grayson Zayne, and Logan Kaufmann and a final draft of Shelby Grody's statement. I also reviewed the following Exhibits: Exhibit 5 (Police report), 7 (photo of *Paifang* gate), and 10 (excerpt from Zayne's lab notes). I am familiar with the *curriculum vitae* of Shelby Grody as well as my own (Exhibits 8 and 9), and my opinion is based in part on the facts and experiences reflected in my CV.

I swear or affirm to the truthfulness of everything stated in this affidavit. Before giving this statement, I was told it should contain everything I knew that may be relevant to my testimony, and I followed those instructions. I also understand that I must update this affidavit if anything new occurs to me until the moment before opening statements begin in this case.

Carter Gooding
SIGNATURE

December 12, 2014
DATE

Subscribed and sworn before me this 12th day of December, 2014

Jill Miller
Jill Miller
Notary Public in and for the State of Utopia

