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# Exhibit 4

## Declaration of Dr. Aaron S. Benjamin, Ph. D.

I, Dr. Aaron S. Benjamin, Ph.D., based upon my good-faith knowledge and belief, declare as follows:

#### I. Summary of Expert Opinions

Evidence provided by witnesses to a crime is like other types of evidence: it is prone to degradation and contamination. When an investigation is not promptly begun, there is a significant risk that forgetting will reduce the quality of the evidence that witnesses can bring to the judicial system (Doggett v. United States (1992)). Information will be lost, intervening events will contaminate existing memories, and confidence in one's reports and identifications will be increasingly untethered from the accuracy of those reports. These risks all increase as more time passes between the event and the recovery of witness evidence. To mitigate these risks, defense counsel should be appointed promptly so that they may begin investigating the existence of and preserving exculpatory witness evidence. Failure to do so will result in the degradation and contamination of such evidence.

#### II. Expert Qualifications

My name is Dr. Aaron S. Benjamin, Ph.D. I am a Professor in the Department of Psychology, Program in Neuroscience, and the Beckman Institute for Advanced Science and Technology at the University of Illinois Urbana-Champaign. I am Assistant Head of Operations and Infrastructure in the Department of Psychology. I hold a Ph. D. in Psychology from the University of California, Los Angeles, and a B. A. from Carnegie-Mellon University.

I conduct research and teach courses on human learning, memory, and decision-making. Among other topics, I do research on forgetting and eyewitness memory, and I have testified in a number of criminal cases about factors that affect witness memory accuracy. My curriculum vitae is attached as **Exhibit A**.

### III. Expert Opinions

Forgetting is ubiquitous in human remembering. For every event we experience, and for any means of accessing or testing our memory, the quality and quantity of information that we can access from our memory decreases as time passes from the initial experience. The pervasiveness of forgetting in humans is revealing of an important difference between memory in living systems (e.g., humans) and memory in digital systems (e.g., computers). Digital systems

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are designed for exact retention and exhibit "forgetting" only in catastrophic circumstances, like the mechanical disruption of a magnetic record. In humans (and other species), forgetting is a byproduct of the fact that the brain is organized around the need to generalize knowledge, rather than remember exact details. In that sense, forgetting is not a failing of human cognition but rather a natural, adaptive feature.

A fundamental fact about forgetting is the fact that it follows a mathematical function in which losses are greater earlier than later. The consequences of this are shown in the following figure, in which the time period shortly after the experience reveal greater losses per day than more distant moments (Wixted, 2004).



This fact tells us that, when seeking accurate memory reports, we should aspire to investigate as soon as possible. Each additional day that passes is the most important remaining day.

In the next figure, we see an example of this phenomenon with actual data from an experiment on forgetting in humans (Slamecka & McElree, 1983; Wixted, 2004).



More rapid forgetting is evident early than late. In addition, it can be seen that this fact is true regardless of whether the initial learning is substantial (the "high" degree of learning indicated by the black dots) or less so (the "low" degree indicated by the white dots). These phenomena are also clearly evident in the forgetting of faces (Deffenbacher, Bornstein, McGorty, & Penrod, 2008). Memory for faces are often key to eyewitness identifications, so all of the concerns about forgetting we preview here are central to the probative value of eyewitness evidence.

The specific rate at which these functions decrease with time depends on the materials, the nature of the memory test, and other experimental factors, so it is challenging to place an exact time point at when forgetting will have reduced memory to a particular proportion of its original strength. Given the forensic value of such as estimate, I did estimate some relevant values from a set of experiments that estimated forgetting over several weeks or longer. The blue dots in the Figure below show recognition memory for faces that were studied once and then tested. A face recognition test consists of a set of faces, some of which were seen in the study list and some not; the task for the subject is to pick out the faces that were studied and not incorrectly endorse the faces that were not. Performance is measured by a score called *d'*, which is on the left y-axis of each graph.



These plots also include a forgetting function that connects these points using a version of the mathematical *power* function that is known to well represent human forgetting (Wickens, 1998). In all four plots, which correspond to four different empirical studies, it can be seen that memory for faces in reduced to 90% of its original estimated strength between ½ day and 2 days, and to 70% of its original strength between one and two weeks. In the bottom two plots, which are taken from studies that measured forgetting over even longer periods, it is evident that memory performance reaches 50% of its original strength at close to one month. Estimates beyond this range are difficult to compute because of the distant extrapolation and the small number of experiments in the literature that have used retention intervals past one month. These values dramatically indicate how important it is to collect eyewitness information about faces as close as possible to the event: memory strength is reduced 30% as investigation is delayed from one week to one month. And, in cases of extreme delay, like the 3+ month waiting period experienced by many of the plaintiffs in this class action, the drop in memory accuracy is even greater.

The implications of forgetting for eyewitness scenarios are clear: to gather the most informative and most accurate information from a human witness, evidence should be collected as soon as possible after the event.

The fact that brains are adapted to the process of learning and generalizing from statistics in the environment, rather than to recording information in an exact manner, has implications for the rate of forgetting for different types of information. The *gist* of events is remembered

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better, and forgotten more slowly, than the exact details of that event (Sacripante, Logie, Baddeley, & Della Sala, 2023). So, for example, people may remember what a conversation was about but forget the details (Brainerd & Reyna, 2002; Neisser, 1981) and also forget who exactly said what (McKinley, Brown-Schmidt, & Benjamin, 2017). **Memory for details and for attribution are especially at risk when the collection of evidence is delayed**. Specific information is often central to important advances in criminal investigations, as when, for example, the details of clothing or a license plate number are sought. Attributions are often central to cases of white-collar crime, where details about ultimate culpability often lie in who instructed whom to, for example, maintain false records. Issues about memory for attribution and source are also relevant in cases where public knowledge of a case is shaped by leaks and rumors spread on social media.

Remembering is highly driven by expectations, or *schemas*, about how things work in the world (Bartlett, 1995). For that reason, errors in remembering tend to shift our memories towards narratives that make more sense and that omit details that are inconsistent or improbable (Schacter, 1999). **Delays in recovering witness evidence may lead to reports that lack evidence that is inconsistent with a broader narrative about the crime**. This well-known memory bias could have effects that are particularly damaging to the defense. Investigators and prosecutors will have narrowed in on a suspect precisely because of the plausibility of a narrative involving that suspect. Information inconsistent with that particular interpretation of the crime may be lost as the simpler narrative grows in plausibility to the witness.

The effects of delay on the shaping of a narrative about a crime are worsened in many situations by *post-event information*. Witnessing a crime is a salient and emotionally heightened event for most witnesses. For this reason, witnesses are prone to ruminating about the events, to discussing them with fellow witnesses or confidants, and to seeking news stories relevant to the crime. Such post-event information can affect individuals' memories (Wright & Davies, 1999). For example, misinformation introduced by confederates during a discussion can be incorporated into one's own memory for an event (Wright, Self, & Justice, 2000). A poignant example of this phenomenon occurred when Richard Jewell was accused of masterminding the bombing at the 1996 Olympics in Atlanta. Television interviews conducted after Jewell discovered the backpack with the bomb, as well as information and impressions shared by past colleagues of Jewell, created a narrative in which Jewell became a suspect in the crime. This occurred despite the absence of substantial evidence implicating Jewell, and shows just how compelling the effects of post-event information can be (Schuster, 2019).

Longer delays between an event and an investigative interview provide more time for postevent information to influence witnesses' memories of an event. **Delays in investigation are** 

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**likely to lead to witness reports that are more homogeneous and lack idiosyncratic details. Such an effect may be particularly disruptive to justice when investigators then treat multiple reports as additional evidence.** This effects of post-event information are particularly concerning in cases with extensive media reporting (Blom, 2023), or in which groups of individuals known to each other witness a crime together. Inconsistencies across witnesses that could serve as exculpatory evidence may be lost as narratives converge onto a more homogeneous reckoning of events.

A key element of a witness's report or identification is the confidence they provide. Confidence is strongly related to accuracy under most circumstances (Gronlund & Benjamin, 2018). However, long delays between an event and recall have two effects on confidence in eyewitness identification. First, confidence in one's identification diminishes as accuracy decreases (Odinot & Wolters, 2006). This is appropriate, but does mean that a witness's confidence may not carry evidential weight in a trial. The second effect is more pernicious. If an individual has had occasion to recall the information in question in the intervening period, then the correspondence between confidence and accuracy drops over time and confidence will no longer be a strong indicator of accuracy at a long delay. Specifically, a phenomenon called confidence inflation occurs, whereby confidence in one's accuracy grows with each retrieval of the details of an event (Wells et al., 2006). Confidence is maximally diagnostic of accuracy in a witness report or identification when there has not been an extended opportunity for intervening events to inflate that confidence. Inflated confidence is damaging to the defense because a high-confidence lineup identification is often key evidence against a defendant (Garrett, 2011). If that high confidence is the result of excessive delay and not reflective of genuine accuracy, then innocent defendants are especially at risk.

It is sometimes thought by laypeople that memories of dramatic experiences, called *flashbulb memories*, are not prone to the usual processes of forgetting and distortion. This is an important point to consider, since witnessing a crime is an emotional experience for most people. However, this belief is not true (Hirst & Phelps, 2016). Memory of events as dramatic as the terrorist attacks on September 11, 2001, are forgotten and show many of the same characteristics as other memories (Hirst et al., 2015). One important way in which flashbulb memories actually differ is that they are often reported with a high--often inappropriately high-level of confidence in the accuracy of the content (Talarico & Rubin, 2003). **Even vivid**, **dramatic, emotionally laden experiences are prone to forgetting and disruption.** 

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